ASPECTS OF THE DIETETIC MANAGEMENT OF DIABETES MELLITUS

by

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A thesis submitted for the Degree of Doctor of Philosophy

1998

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Abstract

This thesis discusses the history of Diabetes Mellitus (DM) which has been recognised since antiquity. The role of the diet in the management of DM is discussed in the light of the development of scientific dietetics made possible by the chemical analysis of food.

Both the development of the profession of the State Registered Dietitian (SRD) and the workload of the dietetic department at Bedford Hospital is described over a period of 5 years. It was noted that 35% to 49% of all new referrals for dietetic advice had a diagnosis of DM.

A survey of diet sheets supplied for patients with a diagnosis of DM, apart from forbidding sugar, showed a total lack of consistency. Nor did the dietary advice meet the recommendations of the scientific literature with respect to appropriate dietary management or even guidelines on 'healthy eating'.

A study of the referral pattern of patients for dietetic advice over a period of 3 years showed that a number of them were never seen by a SRD.

Examination of the medical records of 100 patients with a diagnosis DM, showed that, apart from a benefit to weight reduction, the advice from a SRD did not significantly assist in the reduction of complications.

Difficulties in the diagnosis of DM were discussed. It was found that 18 patients with a recorded diagnosis of insulin dependant DM had insulin requiring DM. These patients were older (p< 0.001) and had spent more days in hospital (p< 0.001) than others with DM.

Case histories of 6 people with DM showed great variations in the impact of the advice from a SRD with some individuals requiring little or no advice.

Recommendations for ways in which SRDs could examine and improve their practice are made, including that for a greater unity in advice on diet for DM, such as is provided in diet sheets.
PROLOGUE

"NO ILLNESS WHICH CAN BE TREATED BY DIET SHOULD BE TREATED BY ANY OTHER MEANS"

Maimonides 12th Century Physician

"I THINK IT COULD BE PLAUSIBLY ARGUED THAT CHANGES OF DIET ARE MORE IMPORTANT THAN CHANGES OF DYNASTY OR EVEN OF RELIGION"

George Orwell, 1937 in The Road To Wigan Pier
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<th>Description</th>
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<tr>
<td>BDA</td>
<td>British Diabetic Association</td>
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<tr>
<td>BMA</td>
<td>British Medical Association</td>
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<tr>
<td>BMI</td>
<td>Body Mass Index (kg/m²)</td>
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<td>BNF</td>
<td>British National Formulary</td>
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<tr>
<td>CHC</td>
<td>Community Health Centre</td>
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<tr>
<td>CPSM</td>
<td>Council for the Professions Supplementary to Medicine</td>
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<tr>
<td>CVA</td>
<td>Cardiovascular Accident</td>
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<tr>
<td>DHA</td>
<td>District Health Authority</td>
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<tr>
<td>DHSS</td>
<td>Department of Health &amp; Social Security</td>
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<tr>
<td>DM</td>
<td>Diabetes Mellitus</td>
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<tr>
<td>DMEG</td>
<td>Diabetes Management &amp; Education Group</td>
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<td>DNA</td>
<td>Did Not Attend</td>
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<td>DoH</td>
<td>Department of Health</td>
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<tr>
<td>DHSS</td>
<td>Department of Health and Social Security</td>
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<td>FHSA</td>
<td>Family Health Service Authority</td>
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<td>Fig</td>
<td>Figure</td>
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<td>FIP</td>
<td>Financial Information Package</td>
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<td>ft</td>
<td>Feet (imperial measure)</td>
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<td>g</td>
<td>Gram</td>
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<tr>
<td>HbA₁₀</td>
<td>Glycosylated Haemoglobin</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<tr>
<td>GTT</td>
<td>Glucose Tolerance Test</td>
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<tr>
<td>HDL</td>
<td>High Density Lipoprotein</td>
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<td>HEA</td>
<td>Health Education Authority</td>
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<tr>
<td>Hg</td>
<td>Mercury</td>
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<tr>
<td>IBS</td>
<td>Irritable Bowel Syndrome</td>
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<td>IDDM</td>
<td>Insulin Dependent Diabetes Mellitus</td>
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<tr>
<td>ins</td>
<td>Inch (imperial measure)</td>
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<tr>
<td>kg</td>
<td>Kilogram</td>
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<td>l</td>
<td>Litre</td>
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<td>m</td>
<td>Metre</td>
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<td>MAFF</td>
<td>Ministry of Agriculture Fisheries and Food</td>
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<td>m mol</td>
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<td>mm</td>
<td>Millimetre</td>
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<td>NB</td>
<td>Note Bene</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>ng</td>
<td>Nanogram</td>
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<tr>
<td>NIDDM</td>
<td>Non-Insulin Dependent Diabetes Mellitus</td>
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<tr>
<td>NSP</td>
<td>Non-Starch Polysaccharide</td>
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<tr>
<td>NVQ</td>
<td>National Vocational Qualifications</td>
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<tr>
<td>RNI</td>
<td>Reference Nutrition Intake</td>
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<td>RHA</td>
<td>Regional Health Authority</td>
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<tr>
<td>SRD</td>
<td>State Registered Dietitian</td>
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<tr>
<td>st</td>
<td>Stone (imperial weight)</td>
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<tr>
<td>SW</td>
<td>South West</td>
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<tr>
<td>UKPDS</td>
<td>UK Prospective Diabetes Study</td>
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<tr>
<td>WI</td>
<td>Women's Institute</td>
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<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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<tr>
<td>WTE</td>
<td>Whole Time Equivalent</td>
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ACKNOWLEDGEMENTS

My thanks go to a number of people who have helped and supported me in this work.

Firstly I wish to gratefully acknowledge my academic supervisor Dr Jane Morgan, whose own experience of academic research and expertise was inspirational in the early stages of research.

Additionally my very great thanks must go to Professor Dickerson who has acted as a ‘voluntary advisor’ giving freely of his time and own vast expertise out of what can be only described as pure kindness. I first met Professor Dickerson as an undergraduate and the thirst for knowledge which he then stimulated has never gone away and spurred me on to seek information and expertise in various areas. Certainly I hope to continue this quest in the future and hope that this piece of research will be a beginning to further pieces of work in which I hope I can continue to seek his and Jane’s guidance and assistance.

Also I would like to particularly thank Ken Williams, Dr Nick Morrish, Dr John Hawkes, Dr Jeremy Saunders and the dietitians of Bedford Hospital for advice and encouragement.

My thanks also go to Dr Margaret Ashwell, Sylvia Hughes, Helen Brown, Dr Samantha Williams, Dr Verner Wheelock, Diane Sturgess, Jennette Higgs, and numerous others who have assisted with this study.

In particular I would like to thank Professor David Hughes, Dennis Schulster, Dr Caroline Seddon and Dr Mel Chevanne for reading and providing editorial expertise.

I would also like to thank Peter Wilkinson and Dawn Homer for assistance and practical advice with statistical analysis.

I would also like to thank the patients of Bedford Hospital who provided data and also encouraged me with the study.

Finally the greatest thanks must go to my husband who has encouraged me throughout.
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<td>1.2</td>
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CHAPTER 1

INTRODUCTION

A historical summary on the management of Diabetes Mellitus up to the present day. Particular reference is made to dietary advice and the aims of this thesis.

1.1; BACKGROUND

"Man has been preoccupied since the earliest times with the relationship between food and health", states the opening sentence of latest edition of The Manual of Dietetic Practice (Thomas, 1994), one of the major text books used by the dietetic profession in the UK. Nutrition as the science of the influence of food intake on health, was founded by Lavoisier towards the end of the 18th Century. Dietetics, which is the application of nutritional knowledge to the needs of the individual and specific groups, is a much older subject and Hippocrates, sitting under the great tree in Kos, frequently gave his patients advice about food to eat (cited from Davidson et al, 1979). Dietary advice is used in the treatment and management of disease conditions. It is only with the development of chemical analysis that our knowledge of food composition has occurred over the last 200 years and that recommendations on the type and amounts of food to be eaten for health have been made possible.

In early times there were few means other than diet to treat individuals with various types of disease. As the sciences of medicine, nutrition and dietetics developed it became evident that there were a number of diseases and conditions which are associated with metabolism which can be rectified by dietary means. Diabetes Mellitus (DM) is a chronic condition characterised by thirst, polyuria, glycosuria and weight loss. It is one such disorder in which dietary manipulation can be a vital part of its management and can produce
benefits to daily control, well being and the prevention of complications. There are 2 types of DM; insulin dependent diabetes mellitus (IDDM) and non-insulin dependent diabetes mellitus (NIDDM) and diet is a fundamental part of the treatment of both (for details see section 1,2). Indeed in some individuals, those with NIDDM, it is the only treatment required as will be seen later in this thesis with a "case history" of a patient.

Dietitians or State Registered Dietitians (SRDs) as they are correctly called, are trained to "interpret and communicate the science of nutrition to enhance the quality of life of individuals and groups in health and disease" (Thomas, 1994). Thus the dietitian is considered by the British Dietetic Association (NB the British Dietetic Association is always written in full in this thesis to prevent confusion with the British Diabetic Association which is abbreviated as BDA) to have a key role in advising individuals with various types of disease on an appropriate diet. Such advice can be given during a consultation with individual patients and their carers and also via any written material such as diet sheets that they provide.

If dietary modification is of benefit to those with DM in producing an improved outcome for the sufferer in both the short term and long term, it can be hypothesised that those with DM who are advised on appropriate dietary modifications by a SRD will accrue greater benefits than those who do not receive such advice. This study aims to explore the role of dietary management in DM, the role of the SRD and the benefits of such advice from a SRD. (While the correct definition of a "dietitian" is a State Registered Dietitian (SRD), these terms are often synonymous and "dietitian" is more commonly used in literature than SRD and in this thesis both terms are used).

1,2; DIABETES MELLITUS

In DM the beta cells of the islets of Langerhans in the pancreas produce insufficient insulin, to enable the body cells to take up glucose for use as a
substrate for energy production and growth. Factors contributing to the development of DM include heredity, stress, maternal diet, disordered immunology, infections and diet. As already stated, there are two main types of DM, currently referred to as insulin dependant diabetes mellitus (IDDM) and non-insulin dependant diabetes mellitus (NIDDM). In this study, which deals with dietary advice for both types of DM, the terms IDDM and NIDDM are used as they are in general usage.

1,2,1; Prevalence of DM
In the UK it is estimated that 3% of the population has DM (Bennett et al., 1993), this rises to 6% in those over 65 years. The prevalence is higher in people of Afro-Caribbean and Asian origins. The cost of caring for people with DM and its complications accounts for approximately 5% of the NHS budget of £36 billion (National Association for Health Authorities and Trusts, 1996).

The majority of people with DM have "primary diabetes" where the precise aetiology is unknown. Secondary DM is rare and accounts for only 1% of persons with the disorder. Such DM is caused by a disorder destroying the pancreas or impairing the secretion of insulin. It is thus secondary to another medical problem such as pancreatic cancer. In this thesis the condition of primary DM will be exclusively considered.

1,2,2; Classification of DM
1,2,2,1; IDDM
People with IDDM require insulin for their control. Previously this form of DM had been known as "juvenile onset diabetes" (WHO., 1965), and "Type 1 diabetes" (Diabetes Data Group of the National Institute of Health in the USA, 1979;  WHO Expert Committee on Diabetes, 1980). The condition usually occurs before 30 years of age in persons of normal weight. Symptoms are severe and develop in a matter of days, insulin treatment is mandatory. Most patients complain of all the "classical symptoms" of DM ie: polydipsia
(excessive thirst), polyuria (excessive production of urine), weight loss, tiredness and reduced visual acuity. Ketonuria (the presence of ketones in the urine) is always present. Some patients may be treated as a medical emergency with ketoacidosis, pain and vomiting with dehydration and with loose dry skin, dry furred tongue and cracked lips. Usually the pulse is rapid and breathing deep with the odour of acetone (due to ketoacidosis) detected on the breath. Apathy and confusion are common and stupor or coma may be present. Evidence of the complications of DM may be noted. Examination of the person with a diagnosis of IDDM may reveal abnormalities of the retina (retinopathy), impaired vibration sensitivity and/or depression of knee jerk reflexes (neuropathy) and proteinuria (nephropathy) (Diabetes Advisory Group, 1993). A case history of a woman with IDDM is included in this thesis to demonstrate the onset of the disease and its management (section 6.3.1).

Dietary modification is essential, and the insulin type and regimen should be fitted to the patient's dietary requirements. Additionally, a programme of education is necessary to enable the patient to manage their DM on a daily basis. The education programme is usually co-ordinated by a diabetes nurse specialist, who is usually based at a General Hospital or Diabetes Centre, which is also usually located at a General Hospital. It includes how to give insulin injections, testing blood sugar levels, urine testing, the identification and management of hypoglycaemia, the nature of complications associated with DM, effects of illnesses on the control of DM, foot care and the organisation of follow-up. The advice given also includes that on diet. Often in the General Practitioner (GP) surgery situation the practice nurse provides the education which a diabetes nurse specialist may give in a Diabetes Centre. Practice nurses are usually trained in this by diabetes specialist nurses (Cradock, 1994).

1,2,2,ii; NIDDM

NIDDM is the term commonly used to refer to those people with DM in whom the disorder is usually controlled by diet alone or diet plus oral hypoglycaemic
agents. Previously this condition has been referred to as "maturity onset diabetes" as suggested by the World Health Organisation (WHO., 1965) classification, and then as "Type 2 Diabetes" by the Diabetes Data Group of the National Institute of Health in the USA (1979) and the World Health Organisation Expert Committee on Diabetes in 1980. Those who suffer from NIDDM are normally over 30 years of age and frequently overweight if not obese. Those individuals with a Body Mass Index (BMI) of more than 30 kg/m² have a risk of developing DM which is five times that of the individual with a BMI of less than 25 kg/m². Also individuals who are physically active have a reduced risk of developing DM (Helmrich et al, 1991).

Onset of NIDDM is slow and may take several years. Some individuals with NIDDM may present with the classical symptoms of polydipsia, polyuria, tiredness, weight loss and reduced visual acuity. There is no ketonuria. Some individuals with NIDDM may present not with symptoms of the disorder but of one of the complications such as infection, impotence, failing vision or pain in the legs due to neuropathy. In these patients the disease has remained undetected and any complications may be well established. (Case histories of people with NIDDM are described to show diagnosis, complications and the difficulties individuals encounter in reducing their body weight (section 6,3)). While the causes of NIDDM are still unclear they include a progressive insulin resistance and also pancreatic impairment. The situation is exacerbated as individuals gain weight and their insulin resistance increases still further. The bodies demand for insulin to maintain blood glucose levels increases until eventually the pancreatic capacity for insulin secretion is exceeded and raised blood glucose levels develop. These levels exceed the kidney's capacity for glucose reabsorption and glucose spills over into the urine.

Initially people with NIDDM should be tried on diet alone for a period of 3 months, (Diabetes Advisory Group, 1993). Such a diet should provide the nutritional recommendations for people with DM described later in this Chapter.
in section 1.4. However, this does not always occur and patients are sometimes given oral hypoglycaemic agents, with little or no dietary advice (a case history illustrates this occurrence). If the patient's blood glucose level becomes well controlled (ie reaches levels of blood glucose of 4-10 mmol/l) with diet, and urine tests for glucose are negative then further treatment with oral hypoglycaemic agents is not considered to be needed but regular reviews are essential at a minimum of one per year. A programme of education similar to that for IDDM is also advocated (Diabetes Advisory Group, 1993).

As already described some people with NIDDM may have had the condition for many years without it being detected. Once diagnosed and treated by diet blood glucose levels may still not be controlled (this can be often due to poor dietary compliance) and oral hypoglycaemic agents prescribed to effect a control of blood glucose. Eventually these may become ineffective due to the worsening of the condition and insulin is required to control blood glucose levels. Such individuals are considered to be "insulin requiring", not insulin dependent. A case history of such an individual is included in chapter 6. It is thus difficult to exactly categorise the types of DM as the situation can arise whereby a person diagnosed with NIDDM can require insulin for good control.

While most health professionals swap between terms to describe DM, as required by the situation. The terms in use during the period of this study were IDDM and NIDDM, but throughout the following section on the history of DM the term used at the time to describe DM has been used. This term was often the more imprecise term "diabetes".

1,2,2,iii; Latent DM
This type of DM occurs when an individual exhibits glycosuria during times of stress and his or her glucose tolerance test (GTT) is also abnormal. Such stresses can occur in pregnancy (when the condition is known as gestational DM), obesity and illness such as severe infection. After the cessation of the
stress the GTT returns to normal and the glycosuria disappears. People with latent DM have an increased risk of developing DM. (As can be seen in chapter 6, a woman with a diagnosis of IDDM originally had gestational DM.)

1,2,2,iv; Potential DM

Individuals who have a normal GTT but an increased risk of DM and are said to have potential DM. Such a person could be the twin of someone with DM.

1,2,2,v; New recommendations for naming of IDDM and NIDDM

The presently commonly used terms of IDDM and NIDDM were recommended to be replaced by the previously used terms; Type 1 and Type 2 diabetes respectively by the American Diabetes Association at a recent meeting in June 1997. Such a recommendation would seem satisfactory as, firstly it would help to stop the practice of clinical staff in referring to people with IDDM and NIDDM as "IDDS and NIDDS" respectively. This can be found to be both confusing and offensive for people who are already dealing with a chronic disease. Secondly it could prevent confusion on the type of DM which has been diagnosed as some patients with NIDDM may require insulin for good control but are not dependant on it for control. As these recommendations have not yet been adopted in the UK the terms IDDM and NIDDM (which are the current ones in use) are used in this thesis.

1,3; HISTORY OF DIETARY ADVICE IN DIABETES MELLITUS

Throughout the history of DM the disorder has been controlled by various types of diet. The literature of the history of DM has been researched in some detail to indicate the importance of diet in the control of it and how the advice on diet currently advocated to control DM has evolved.

Today the term "people with diabetes" is the one favoured by sufferers and members of the BDA (Diabetes Advisory Group, 1993) rather than the previously much used term "diabetics". However it should be noted the latter
term is used in this literature review when it was the term used in the source material from which information was derived.

1,3,1; Early use of diet in DM
Probably the first reference to "diabetes" was found in the Ebers Papyrus circa 1552 BC, with reference to a disorder of "too great emptying of urine", for which a diet of wheat, berries, honey and grapes was advocated.

Aretoeus the Cappadocian, who wrote in Greek in the 2nd century AD, actually referred to the term "diabetes", which is the Greek word meaning to flow through a system. He wrote:-

"Diabetes is a wonderful affliction being a melting down of the flesh and limbs into wine. The patients never stop making water, the flow is incessant, as if from the opening of ague ducts. The patient is short lived if the constitution of the disease be completely established; for the melting is rapid, the death speedy. Moreover, life is disgusting and painful; thirst unquenchable; and one cannot stop them from drinking or making water. Their mouth becomes parched and their body dry; the viscera seem as if scorched up and at no distant term they expire".

These symptoms of polydipsia, polyuria, and weight loss are those recognised today and are known as the "classical symptoms" of DM. For the condition cereals, fruits and sweet wine were prescribed (cited by Brown, 1966; Bierman et al., 1971; Thomas, 1979). It is interesting to note that honey was no longer recommended by Aretoeus, as was originally advocated in the Ebers Papyrus.

1,3,2; Polyuria and glycosuria in DM
Since the time of early writings on medicine, an examination of the colour and volume of urine has been considered very important in the diagnosis of many illnesses. Today the volume and constituents in urine continue to be examined
as part of the diagnosis of various illnesses and testing strips such as Acetest (produced by Bayer pharmaceuticals) have been developed to detect ketones present in hypoglycaemia. The large volume of urine produced, and also the presence of glucose in it, are still considered to be the two major factors in diagnosing DM.

Early Greek physicians were aware that the urine produced by the person with DM was sweet and the Persian physician Avicenna, who lived from 980 - 1037 AD, noted this in his writings. Despite the fact that constituents in urine continued to play an important part in the diagnosis of illnesses, this knowledge of sweetness in the urine of people with DM seems to have been lost (or ignored) until 1684 when Thomas Willis, a physician, described the urine of diabetics as "wondrously sweet" (cited by Marwood, 1975).

1,3,3; Dietary advice in the 1600s and 1700s
People with DM continued to be prescribed diets based on fruit and vegetables and Willis, in his Practice of Physic (1684), advocated a diet of milk with boiled barley or white bread. Later, in 1729, Willis wrote a comprehensive account of DM in which he described the patient "as being washed away in the great quantity of urine produced" (Willis, 1729). Later he said "let the patient eat food of easy digestion such as veal, mutton and the like and abstain from all sorts of fruit and garden stuff" which was a complete reversal from previous ideas.

Sydenham, a contemporary of Willis, wrote a "Practice of Physic" (1706) and included a chapter on "Diabetes". This was probably the first time in England that the term "diabetes" was used to describe the disorder. It began to supersede the previous term for DM commonly used which was "continual pissing" disorder. In his book, Sydenham detailed the signs and symptoms of diabetes "the great quantity of water which is pissed forth" and the "urine grows sweet in taste". Certainly, these are the two most prominent symptoms of DM and this is probably the first clear reference to both the polyuria and glycosuria
in DM in Britain. He also described how urine when dried on clothes becomes stiff as "if it had been dipped in sugared or hard water". This sign is still noted in individuals with DM who are untreated.

Sydenham recognised that DM was very difficult to cure. He recommended that, "in the diet (or regimen), the air should be pure and dry, the food and drink thickening, astringent and nutritive". The diet consisted of cheese and meat, wine, whey, goat or sheep's milk which could be thickened with eggs or sago. Abstinence for "all sorts of fruit and garden stuff" was advocated. "Wine may be allowed - water and cold drinks are to be avoided". "Sleep is to be moderate and all the vehement passions of the mind avoided".

Probably one of the most important breakthroughs with regard to the treatment of DM occurred in 1776, when Dobson, who worked in Liverpool, recognised that the sweet material in the urine of diabetics was sugar. He did this by evaporating 4 pints of diabetic urine and obtained a material which weighed over 4 oz. "smelt sweet, like brown sugar". This was one of the first documents of a scientific approach to the examination of the constituents of human urine. Having established that people with DM were losing sugar in their urine Dobson, not surprisingly, gave large quantities of sugar and honey by mouth in an effort to replace it. The subjects worsened with this treatment and soon died. Therefore, within months, the detrimental effects of this treatment soon caused it to cease being prescribed (cited by Cammidge, 1920). Thus, Dobson was probably the last person to prescribe sugar or honey for DM. The need for people with DM to exclude sugar from their diet, which is very well known today, became firmly established over 200 years ago.

1,3,4; Nutritional classifications
Probably the first nutritional classifications were made in the late 16th century when foods were put into 7 groupings ie fruits, herbs, flesh, fish, white meats, spices and tobacco as described by O'Hara May (1971). It is interesting to note
that this classification grouped together foods containing similar nutrients. For example fruits which are low in protein and have a high content of water. Herbs, which would have referred to leafy vegetables eg. cabbage rather than herbs for flavouring (as we think of them today), tend to be low in energy and contain fibre. Flesh which referred to meat is high in protein, as is fish, white meats were dairy products and most are a good source of calcium. Spices included honey, sugar and salt. Tobacco was at this time included as it was sometimes drunk as an infusion. There was no group for cereals.

Cullen, in the 18th Century suggested a further food grouping in his "Materia Medica" of 1784 in which, for the first time, foods, ("aliments") were listed separately from medicines. The foods were grouped into:-

Vegetables
Animal foods
Drinks
Condiments

Cullen stated that "nutritive parts of aliments passed into the common mass of blood." This consideration of foods and their fate in the body was a step forward for nutrition and physiology (cited by O'Hara May, 1971).

John Rollo in 1797 advocated a diet for DM based on fat and rancid meats. He based this treatment on the belief that DM was a disease of the stomach and might be cured by "diminishing the increased activity" of the organ. The diet (Fig 1,1) was based on rancid meat "as fat as the stomach could bear" in the belief that feeding rotten meat lessened the stomach's workload (cited by Leeds, 1979).

1,3,5; Analysis of food

It was not until the 1840's that food analysis had developed sufficiently to give a greater understanding of the nutritional content of foods. The detrimental effects of sugar for diabetics had been already noted by Dobson. Diets based
on this knowledge, combined with the knowledge of which were nitrogenous (protein) and carbohydrate foods, began to demonstrate the beginning of an even greater carbohydrate restriction for diabetics.

In 1841 Bourchardat, a French doctor, utilised this information about the nutrient content of foods to try and improve the palatability of "diabetic diets".

As Rollo had already established diabetics could be given meat, a nitrogenous food, without harm, Bourchardat probably concluded that the inclusion of other nitrogenous (protein) foods would not have an ill effect.

He began to use "gluten bread" (which contained 49% protein or nitrogenous matter) for diabetics in order to increase the number of foods allowed and increase the palatability of their diet. The bread was produced by making dough of flour and water and washing the starch out of the dough before baking it.

This marked the beginning of 2 important concepts;

1. Bourchardat attempted to improve the diet for diabetics so that they would comply with it. This was probably the first time that the importance of producing palatable diets was considered.

2. The use of gluten bread as a low carbohydrate substitute for diabetics was the first usage of the concept of a "diabetic food" and paved the way for many diabetic foods which are available today.

Later, Bourchardat began to include well boiled vegetables in the diabetic diet
THE DIET RECOMMENDED BY JOHN ROLLO FOR DIABETES IN 1797

**BREAKFAST**

ONE AND A HALF PINTS MILK
PLUS
ONE AND A HALF PINTS LIME WATER
BREAD AND BUTTER

**NOON**

PLAIN BLOOD PUDDING (BLOOD AND SUET ONLY)

**DINNER**

GAME OR OLD MEATS
FAT AND RANCID OLD MEATS
"AS FAT AS THE STOMACH MAY BEAR"

**SUPPER**

ONE AND A HALF PINTS MILK
PLUS
ONE AND A HALF PINTS LIME WATER
BREAD AND BUTTER
in an attempt to improve the palatability of the diet still further. The vegetables allowed were those established to contain very small amounts of starch by analysis ie spinach, artichokes, cabbage, lettuce, asparagus and green beans. These vegetables are those still advocated freely for inclusion in a DM diet today. Men were allowed 1-1½ pints of claret or burgundy per day, which probably helped to alleviate the monotony of the diet (for men at least).

In 1843 Perira wrote a book entitled "A Treatise of Food and Diet" in which he stated "the only disease in which a diet exclusively of animal food is recommended is diabetes". He allowed butcher's meat, poultry, game, fish, shellfish, cheese, eggs, sausages (which would be similar to black pudding and based on blood) and brawn. Beef tea and mutton broth were sparingly allowed as such beverages contained starchy thickening. Milk was not permitted. It was found that many patients craved vegetables and Perira allowed cabbage, cress, cauliflower, broccoli, mustard and "aromatic condiments" ie herbs. Such vegetables are low in carbohydrate and still freely allowed for diabetics.

1,3,6; "Cures" for DM
Diets based on the analysis of food were slow to gain acceptance and trial and error methods of compiling diets still prevailed. Various "cures" for DM became fashionable for a short period at the end of the 19th century (cited by Cammidge, 1920). Rice, oatmeal, potato, semolina and legume "cures" were tried for a short time.

1,3,7; Aims of diet for Diabetics in the 1800's
In 1891, Saundby, in his "Lectures on Diabetes", thought DM was due to an excess of starch and sugar, excess consumption of beer and cider, and obesity. He referred to the mortality rate of diabetics in England as 5.8 deaths per 100,000 population. (Today the mortality figures from DM prove difficult to obtain as it is the complications of both IDDM and NIDDM that are the causes of death and not untreated IDDM which would have been the cause of death
in 1891. He treated DM with a strict diet and by this he aimed to:-
1. Relieve thirst.
2. Diminish quantity of urine.
3. Restore traces of sugar from urine.
4. Remove body weight to normal.
These aims are consistent with the short term ones advocated today as will be shown later in section 1,4.

The strict diet Saundby advocated in 1891 consisted of mainly meat (roast, boiled or stewed), green vegetables and gluten bread. Fats were encouraged as fat bacon, cream, eggs and cod liver oil. However, Saundby found it difficult to get patients to keep to this diet, which is hardly surprising, as high fat diets are somewhat nauseating. Aerated water and "Vichy water" were encouraged as drinks. Saccharine (benzoyl sulphamic amide) was suggested as a substitute for sugar. This was the first time saccharine was recommended and it is still used today as a sweetener for people with DM.

1,3,8; Use of Starvation Diets
At the turn of the century starvation diets were being used in the belief that there was about to be a breakthrough in the treatment of DM. Children were only given "400 calories per day" as food and the Sabbath was frequently a day of no food at all. Not surprisingly, the children found the diets extremely difficult to adhere to and were so hungry that they stole food and even ate things like bird seed. Sadly, in most cases, the children died (cited by Leeds, 1979).

In 1911 Hutchinson wrote a revised edition of "Food and Principles of Dietetics" in which he described protein, fats, carbohydrates and minerals. He gave DM patients a diet consisting of 4-6 oz of fat (an extremely high level which may have been difficult to eat, even if it was given as a pleasant source such as butter. To illustrate this quantity in today's terms it would have equated with the sufferer having to eat at least half a commonly available pack of butter each
day), meat, eggs, fish, green vegetables and 4 oz of bread per day. This diet would have been low in carbohydrate with "60 grammes per day" being provided by the bread. The urine was tested for sugar using a copper reduction test. If no sugar appeared in the urine the patient was given more carbohydrate and the urine tested again for sugar. This procedure was continued until sugar appeared in the urine, at which point the patient was considered to have reached the limit of their carbohydrate tolerance. Patients were then given less carbohydrate each day than they could tolerate. Protein was added to the diet to give 1.5 g of protein per kg body weight. (Assuming a male aged 15-18 years of 70 kg, this would have given a protein intake of 105 g per day which is almost twice the RNI for protein of 55 g per day (DoH, 1991). Also assuming an energy intake of 2,550 kcal/d (10.6 kJ/d) (DoH, 1991) protein would provide a contribution to energy of 16.5% which is in excess of the 12% contribution of energy from protein recommended by the Nutrition Sub-Committee of the BDA (1992), described in section 1,4,5). If the sugar in the urine disappeared only on a carbohydrate free diet, patients were given extra fat to make up the energy deficit produced by the lack of carbohydrate.

This crude type of carbohydrate tolerance test has now been superseded by today's glucose tolerance test, whereby fasting patients are given 75 g of glucose orally and blood glucose concentrations measured at 30 minute intervals. Patients on a diet adapted to their carbohydrate tolerance were given cod liver oil supplements as a way of increasing the fat (and energy) content of the diet. Green gooseberries, early oranges, cranberries and raspberries were permitted for diabetics as they had been found to be low in carbohydrate. This was the first time that fruits were introduced into the DM diet. Cream was used instead of milk, which was considered too high in carbohydrate, and gluten bread was still often used instead of ordinary bread.

1,3,9; Banting and Best and the Discovery of Insulin
There is no doubt that the major advance in the treatment of IDDM and the
understanding of the causes of IDDM was due to the isolation of the hormone insulin by Banting and Best working in Toronto, Canada. Their work was based on physiological experiments such as those by Von Mering in 1893 in which they showed that the removal of the pancreas in animals quickly resulted in the symptoms of IDDM and death. Implantation of pancreatic tissues reversed this effect. Attempts to isolate the active principle failed and Banting and Best thought this might be due to its destruction by the digestive enzymes such as trypsin also secreted by the gland. Accordingly their extraction process was designed to avoid this. They suspected that the active principle was a protein and this was later recognised to be insulin which reversed the effects of IDDM in dogs. On 11th January 1922 the insulin, derived from a dog, was successfully used to treat an 11 year old boy who suffered from what today would be regarded as IDDM.

Subsequently insulin was derived from bovine and then porcine pancreas and was crystallised as a zinc salt. Early insulins were of the short acting "soluble" type and as their action was for only 6-8 hours, two injections per day were required (Joslin, 1946). Insulins were used in the work of Fred Sanger in Cambridge in which he identified the complete amino acid sequence and the 3 dimensional structure of the molecular chain. Chemical manipulation based on this work resulted in the production of human insulin which today is produced by genetically modified bacteria in industrial scale fermenters (personal communication Hughes, 1997). Such insulin is today widely used in the management of IDDM. Parallel with these advances was the understanding of the metabolism of glucose and the biochemical processes by which it is taken up by the body from food and distributed into the cells by the action of insulin. Other hormones are involved in the use of glucose as an energy source or for growth. These include glucagon from the alpha cells of the pancreas, adrenalin from the adrenal glands and corticotrophin from the pituitary gland.

The reasons for failure of insulin production by the beta cells of the Islets of
Langerhans in the pancreas are less well understood. Loss of the Islets of Langerhans is thought to be due to an auto-immune process initiated by virus infection. Defects in the insulin receptors on cells are also thought to be involved in the onset of NIDDM. These advances in our knowledge of insulin and associated hormones in glucose metabolism emphasise the role of hormones and dietary control in the treatment of both IDDM and NIDDM. However in the 1920s there appeared to be no differentiation between the 2 types of DM of IDDM and NIDDM and even today there are often difficulties in defining the types of DM (Alberti, 1997).

Even after the discovery of insulin in 1922, starvation was still used to "get rid of the glycosuria" (cited by Joslin 1946). If the patients fainted during the fast they were allowed food. Diets of progressively increasing amounts of food were given to see how much food could be tolerated by the individual person with DM without glycosuria or marked ketosis (Maclean, 1927). Insulin was only introduced if the diet was such that ketosis and glycosuria appeared on a diet of insufficient energy to sustain body weight. When insulin was used carbohydrate was restricted even more severely. Initially, insulin (which was originally derived from cattle) was in fairly short supply, therefore, it was considered that less insulin would be required if less carbohydrate was given. In these diets carbohydrate provided only 4-9% of the energy, while fat provided between 72% and 78% of the energy (MacLean, 1927).

In 1926, Graham wrote about the pathology and treatment of DM. He advised that the carbohydrate intake of diabetics should be increased. This was probably the first suggestion that the carbohydrate intake of the diabetics' diet should be increased and marked the beginning of an upward trend of the carbohydrate content of such diets. Graham (1926) also suggested that diabetics should avoid becoming obese and that obese diabetics should reduce their weight. The realisation that obesity was detrimental to the health of people with DM was an important new development. It was also indicative of the
recognition of NIDDM.

1,3,10; Carbohydrate content of diets for DM
During the 1920's it was assumed that increasing the carbohydrate content of the DM diet would directly increase the insulin requirements. However, in 1929, Richardson challenged this concept by giving 9 diabetic patients, who would have had IDDM, more carbohydrate and finding that their insulin requirements did not increase. The diets used contained 100 g of carbohydrate (which was double the normal level at that time of 50 g of carbohydrate per day), and 50-70 g of fat instead of the usual 100-150 g of fat per day.

This work began a further upward trend over time (albeit slow), in the carbohydrate content of diabetic diets. In 1931 at The London Hospital, Rose Simmonds, (one of the first qualified dietitians), used diabetic diets which contained 15% of the energy from carbohydrate, 17% from protein and 68% from fat. In 1934 Himsworth demonstrated that the carbohydrate tolerance and glycosuria improved, after increasing the carbohydrate content of the diet to 30-45% of the energy contribution. He confirmed that increasing the amount of carbohydrate in the diet did not increase the patient's insulin requirements.

1,3,11; Arteriosclerosis in DM
Meanwhile, in America in 1928, Joslin was concerned about the prevalence of arteriosclerosis in DM and attributed it to the high quantity of fat in the diet. Indeed, diabetics were twice as likely as non-diabetics to die of arteriosclerosis (and the incidence still remains near this level). High levels of cholesterol (normal range maximum 6.5 mmol/l) had been noted in the blood of diabetics with arteriosclerosis. It was found that cholesterol levels were lower in those with DM when the diets contained less fat and more starchy carbohydrate foods. Joslin was concerned about the death of people with DM from arteriosclerosis when previous to the discovery of insulin concerns about the actual survival of people with DM were more the norm (Joslin, 1946).
In 1939 Lawrence who worked at Kings College Hospital in London produced his famous diabetic diet which consisted of "lines" (Fig. 1, 2) and became widely used for both those with IDDM and NIDDM. The "lines" consisted of a chart upon which black lines represented the quantities of foods containing 5g carbohydrate, and red lines represented the amount of a food eg "meat which contained 7.5g of protein and 15 or 9g of fat". Patients were given advice about the number of black and red lines they could take each day and in this way the total diet for DM and not just the carbohydrate content was controlled.

The dietary advice given by Lawrence was made possible by the analysis of foods which was carried out by McCance and his colleagues (including Elsie Widdowson) who worked at Kings College Hospital in London. Research on foods, to underpin the dietary advice of Lawrence for people with DM began in 1925 and was funded by a grant from the Medical Research Council. The "Analysis of Foods" was published in 1939 by McCance. Since then the work has been updated and expanded and still remains the main reference for the composition of foods. Today the latest version (the 5th edition) of McCance and Widdowson's "The Composition of Foods" produced by The Royal Society of Chemistry and The Ministry of Agriculture Fisheries and Food (1991) together with supplements on specific food groups is still the standard, and an invaluable reference book for SRDs and nutritionists. It is also the basis of information on the nutritional contents of foods used in the nutritional analysis computer programmes such as Diet Plan (Forestfield Software, 1996) which is commonly used for analysing dietary intakes, and recipes. Diet sheets written in Great Britain should be based on the information on food analysis as were those of Lawrence. Despite this bedrock of nutritional information on which the dietetic profession is based, originally provided by McCance, it is sad to note that in the history of the British Dietetic Association (Hutchinson, 1961) no reference was made to him or his work.
The "Line-Ration" Diet Scheme

Table 3

<table>
<thead>
<tr>
<th>Doctor's Prescription:</th>
<th>Diet:</th>
<th>Insulin:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial Diet:</td>
<td>10 Blacks.</td>
<td>15 Blacks.</td>
</tr>
<tr>
<td>Breakfast:</td>
<td>8 or 4</td>
<td>4</td>
</tr>
<tr>
<td>11 a.m.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midday meal:</td>
<td>6 or 8</td>
<td>6</td>
</tr>
<tr>
<td>Tea:</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Evening meal:</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Bed-time:</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional Instructions: insulin dosages not prescribed by

(Detailed examples of diets are given on p. 201.)

Instructions to Patients

Normal persons use and burn the sugar and starchy foods they eat to give them heat and energy, like a good fire or engine burning coal. Varieties cannot burn sugar or starchy foods, such as flour, bread, rice, potatoes, etc., which become sugar when digested. Such foods only lead to an accumulation of sugar in the body, which is harmful to the health. The body cannot use the excess in the same way that the body can use the sugar in the blood. The excess is stored in the blood or used up in the body.

Your doctor will prescribe a diet arranged to suit your case, as to what and how much. The number of meals per day depends on the individual case. The doctor will usually have a diet that he knows will suit your case, and he will prescribe the diet accordingly.

Fats are not allowed in the diet except in small quantities, as butter, lard, suet, dripping, etc.

Insulin is not mentioned on this card because they are mostly men. The doctor will prescribe the insulin dosage for each case, and the insulin will be given as directed by your doctor.

If you are taking insulin, the correct balance between your diet and insulin must always be maintained. Never take insulin without your doctor's advice, and never take insulin in excess of your diet. If your insulin is too low, your diet will not be sufficient to meet your needs. If your insulin is too high, your diet will be too low, and you will become weak.

The amount of insulin given must be accurately measured, and the correct dosage must be taken. Full details for patients about diet and insulin are published in the 'Line-Ration' diet.

Table 2

The "Line-Ration" Diet Scheme

<table>
<thead>
<tr>
<th>Red Portions (Protein and Fat)</th>
<th>71 gm. Protein and 8 gm. Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Egg</td>
<td></td>
</tr>
<tr>
<td>Bacon or Ham (both lean) 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Kedg 11 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Liver 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Tongue (floured or fresh) 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Tripe or Sweetbreads 1 1/2 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Lean Beef or Veal 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Lean Lamb or Mutton 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Lean Pork 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Chicken or Pigeon 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Beef 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Pleasants, Grapes or Partridge 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Rabbit or Ham 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Crab or Lobster 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Herring 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Salmon 1 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Baked Cod 1 oz.</td>
<td></td>
</tr>
<tr>
<td>White Fish (all kinds) 1 1/2 oz. and Fat 1 oz.</td>
<td></td>
</tr>
<tr>
<td>Cheese 1 oz.</td>
<td></td>
</tr>
<tr>
<td>All Fats (also contains 1 Black).</td>
<td></td>
</tr>
</tbody>
</table>

Fats are Meat, Fats, Lard, Suet, Dripping, Butter, Margarine, Olive Oil; Thick Cream in twice the amount stated for other fats.

Table 1

The "Line-Ration" Diet Scheme

<table>
<thead>
<tr>
<th>Carbohydrate Foods (containing Sugar or Starch)</th>
<th>Black Portions (10 gm. C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice, Sago, Tapioca (raw)</td>
<td>1</td>
</tr>
<tr>
<td>Butternut, Roasted or Broiled Carrots; Fruits, Oat meal, Macaroni (all dry); Jam or Marmalade</td>
<td>2</td>
</tr>
<tr>
<td>Broccoli; Brussels Sprouts; Onion</td>
<td>3</td>
</tr>
<tr>
<td>Bread (all kinds)</td>
<td>4</td>
</tr>
<tr>
<td>Potato, Peas or Beans (dried or tinned); Banana or Grapes; Dried Apricots (stewed)</td>
<td>5</td>
</tr>
<tr>
<td>Parmesan; Fine Greengages; Prunes (stewed)</td>
<td>6</td>
</tr>
<tr>
<td>Raw Apple, Pear, Cherries, Gooseberries, Plums, Damson, Grapes (skinned); Young Peas or Green Beans</td>
<td>7</td>
</tr>
<tr>
<td>Peach or Apricot or Blackcurrants (ripe); Green currants (stewed); Bread Beans</td>
<td>8</td>
</tr>
<tr>
<td>Strawberries; Steamed Peas, Damsons or Plums</td>
<td>9</td>
</tr>
<tr>
<td>Fruits (also contains 1 Red); Raspberries or Blackcurrants (stewed)</td>
<td>10</td>
</tr>
<tr>
<td>Apples or Cherries (stewed); Cavolo or Leeks</td>
<td>11</td>
</tr>
<tr>
<td>Formalin Artichokes; Leguminous; Black currants (stewed)</td>
<td>12</td>
</tr>
<tr>
<td>Grapenut (in milk); Tomatoes; Red Currants</td>
<td>13</td>
</tr>
<tr>
<td>Onions, Turnips or Radishes</td>
<td>14</td>
</tr>
</tbody>
</table>
Lawrence wrote two editions of a book entitled "The Diabetic Life", which were published in 1939 and 1945 respectively. He also wrote "The Diabetic ABC" (1945) which contained information about the diabetic condition and diet. These books were aimed at giving the person with DM information about his or her condition including the diet, so that he or she could personally control it. Although these books were primarily aimed at the lay reader they were extremely complex in parts, and may not have been well understood. However, the books demonstrated that Lawrence realised the great importance of people with DM themselves understanding and controlling their condition through diet and insulin if required. He felt that "uncontrolled diabetic diets" of 250-400g of carbohydrate gave no real future to diabetics whom he found were rarely free of glycosuria. Usually Lawrence recommended "10 black lines (100g of carbohydrate)" per day to diabetics. If the blood sugar level fell to within the normal limits he allowed up to "150 grammes of carbohydrate". Also, "150 grammes of carbohydrate were allowed in obese patients who had lost weight". Lawrence considered such diets were sufficiently high in carbohydrate to prevent ketosis yet low enough to give patients the best chance of avoiding insulin. Diets were varied using red and black lines. The diets advised by Lawrence were widely taken up and used throughout Britain and some patients with DM continued on the line diet into the 1970s. No mention of dietitians was made by Lawrence, presumably as the members of the profession were scarce with only 150 dietitians in Britain (Hutchinson, 1961).

At the same time that Lawrence advocated his "line diet", Saunders, (1939) wrote a book entitled "Pleasant Food for Diabetics". This book also aimed to inform the diabetic about diet and thus encourage compliance with it. The diets were different from Lawrence's in that only the carbohydrate was controlled rather than the total diet. Therefore, the diet advocated by Saunders was much simpler to understand and follow than the more complicated "Lawrence's Lines".
1,3,13; The 2nd World-War time diet
Lawrence also gave advice on the dietary needs of people with diabetes during the Second World War (ABC of Rationing in the UK - Ministry of Foods, 1951). Due to the large amount of fat in the diet for IDDM during this period ketosis was still a problem, but in NIDDM the mortality fell, probably due to the enforced weight reduction of those who were obese (Himsworth, 1949).

1,3,14; Carbohydrate content of diets for DM
During the 1950's and 1960's there was much debate about the amount of carbohydrate that should be included in the diabetic diet. Diets containing high levels of carbohydrate were not used in Britain. In America, Joslin (1946), who was an influential diabetologist there, advocated a minimum of "150 g of carbohydrate for diabetics". These "high" levels of carbohydrate were recommended as he was concerned about the high levels of arteriosclerosis among diabetics which he attributed to their high fat intake. In 1953 a survey of 80 diabetic clinics in the UK showed that 20 of these advocated diets providing only 20% of the energy from carbohydrate (which is only a minor increase from the levels used in the London Hospital in 1931) and 36 advocated 32-40%. The non-diabetic population took between 45 and 55% of its energy from carbohydrate. Therefore, the diabetic population was taking the majority of their energy from fat (Bierman et al, 1971).

Albrink and Man (1959) were concerned about the incidence of arteriosclerosis in people with DM. They noted that there was a high incidence of hyperlipidaemia among diabetics which they attributed to the high fat content of the diabetic diet. But Albrink and Mann (1959) argued against liberalising the carbohydrate intake of the diabetic diet as they felt this would result in an increase in circulating triglycerides. Opponents of high carbohydrate diets, such as Lawrence, argued that giving more carbohydrate would result in increased insulin requirements. However, Stone (1961) showed that, in adult diabetics given a high carbohydrate diet, the insulin requirements remained unchanged.
Also Stone and Connor (1963) confirmed that, in Type I (IDDM) adults, the insulin requirement remained unchanged or fell on "a high carbohydrate diet". Rudnick and Taylor (1965) showed that in Type II diabetics (NIDDM) the blood glucose levels could be lowered by giving them high carbohydrate diets.

1,3,15; The role of the dietitian in the 1970s
The importance of the person with DM in controlling their own condition continued to gain recognition and more emphasis was put upon them receiving good dietary advice (Clarke and Duncan, 1971). Dietitians became increasingly recognised as being important in both assessing the patient's needs and then teaching them a diet appropriate for their own personal requirements as it was considered that a "poor diabetic diet led to ineffective control" (Hill, 1973; Gale and Tattersall, 1979; Hadden et al, 1975 and Stone (1961).

1,3,16; The "fibre" content of the diet and interest in fibre in the 1970s
During the early 1970s there was increased interest in "dietary fibre", as it was then referred to, for the non-diabetic population. The value of fibre in preventing many bowel diseases was vigorously advocated by Burkitt (1973) and Trowell (1974 and 1975). The effect of fibre in ameliorating other disorders such as DM was also noted by Burkitt (1973) and Trowell (1974). Therefore, the type of fibre to be included in the diabetic diet came to be considered important and the effect of different types of fibre was examined.

Both guar and pectin, were found to produce reduced post prandial glycosuria and glycaemia when added to meals (Jenkins et al, 1976; 1977; 1979; Leeds, 1977). It was recognised that the fibre reduced the rate of digestion of the food containing it and slowed the absorption of the glucose from the polysaccharides. Guar is a derivative of the cluster bean. It is unpalatable and can cause flatulence, 25g of guar per day was found to have a therapeutic effect in reducing glycaemia. Guar was found to be easily incorporated into foods such as crispbreads, biscuits and bread (Hill and Leeds, 1976; Leeds, et

The physical structure of food also causes differences in the rapidity and extent of the rise in blood glucose levels after a meal which is termed the glycaemic effect. Whole apple, for example, has a lower glycaemic effect than puree which, in turn, is less than the apple juice (Haber et al, 1977). This was thought to be related to the slower digestion and absorption of the whole apple when compared to the puree. Cereals and fruits were found to produce a rise in blood sugar 80-100% of that of glucose, breakfast cereals 50-70% and legumes 30-50% (Haber et al, 1977) see Fig 1,3. Such studies on fibre indicated the advantages for DM in increasing the fibre content of the diet and the current position of fibre in the diet for people with DM is discussed later.

1,3,17; The increasing carbohydrate content of the DM diet in the 1970s
During the 1970s, much attention was focused on the amount of carbohydrate and then on the type of carbohydrate for DM. A study of DM diets showed that people with IDDM and NIDDM in other countries were being controlled on diets using more carbohydrate than in the UK. In Japan and Asia people with DM took 70% of their dietary energy from carbohydrate (Kay, 1974) whilst in Africa it was 80% (Hirata et al, 1971). In West Africa there were few deaths from coronary heart disease and Mann et al (1976) suggested that the diets in Africa which are high in polysaccharide carbohydrates, contributed to the low incidence of coronary heart disease in these countries. One may dispute these figures as the populations are different and the West Africans tend to die earlier of other disorders than the British population.

Despite the high levels of carbohydrate advocated for diabetics abroad, in a survey of diets used in diabetic clinics in Britain by Truswell et al (1975) found that, in 1975, only 40% of the energy in a diabetic diet came from carbohydrate. This level of carbohydrate was very similar to that advocated in 1953 (Bierman et al.,1971). Later, Keen and Thomas (1978) found that
**Figure 1.3 THE GLYCAEMIC INDEX OF FOODS**

GLYCAEMIC INDEX = \( \frac{3 \text{ HOUR GLUCOSE AREA (FOOD)}}{3 \text{ HOUR GLUCOSE AREA (GLUCOSE)}} \times 100 \)

(The Glucose Area is the area under the 3 hour post-prandial blood glucose area)

<table>
<thead>
<tr>
<th>FOOD</th>
<th>GLYCAEMIC INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALTOSE</td>
<td>100+</td>
</tr>
<tr>
<td>GLUCOSE</td>
<td>100</td>
</tr>
<tr>
<td>CARROTS</td>
<td>90-100</td>
</tr>
<tr>
<td>PARSNIPS, BAKED POTATO</td>
<td>80-90</td>
</tr>
<tr>
<td>CORNFLAKES</td>
<td>80-90</td>
</tr>
<tr>
<td>INSTANT POTATO</td>
<td></td>
</tr>
<tr>
<td>HONEY</td>
<td></td>
</tr>
<tr>
<td>WHOLEMEAL BREAD</td>
<td>70-80</td>
</tr>
<tr>
<td>WHITE RICE</td>
<td></td>
</tr>
<tr>
<td>WEETABIX</td>
<td></td>
</tr>
<tr>
<td>BROAD BEANS</td>
<td></td>
</tr>
<tr>
<td>APPLE PUREE</td>
<td></td>
</tr>
<tr>
<td>SWEDE</td>
<td></td>
</tr>
<tr>
<td>WHITE BREAD</td>
<td>70</td>
</tr>
<tr>
<td>BROWN RICE</td>
<td>60-70</td>
</tr>
<tr>
<td>MUESLI</td>
<td></td>
</tr>
<tr>
<td>SHREDDED WHEAT</td>
<td></td>
</tr>
<tr>
<td>RYE BISCUITS</td>
<td></td>
</tr>
<tr>
<td>BANANAS</td>
<td></td>
</tr>
<tr>
<td>RAISINS</td>
<td></td>
</tr>
<tr>
<td>NEW POTATO</td>
<td></td>
</tr>
<tr>
<td>DIGESTIVE BISCUIT</td>
<td></td>
</tr>
<tr>
<td>SWEETCORN</td>
<td></td>
</tr>
<tr>
<td>SUCROSE</td>
<td></td>
</tr>
<tr>
<td>PASTRY</td>
<td>50-60</td>
</tr>
<tr>
<td>WHITE SPAGHETTI</td>
<td></td>
</tr>
<tr>
<td>OATS</td>
<td></td>
</tr>
<tr>
<td>PEAS</td>
<td></td>
</tr>
<tr>
<td>BRAN CEREAL</td>
<td></td>
</tr>
<tr>
<td>WHOLEMEAL SPAGHETTI</td>
<td>40-50</td>
</tr>
<tr>
<td>SWEET POTATO</td>
<td></td>
</tr>
<tr>
<td>BAKED BEANS</td>
<td></td>
</tr>
<tr>
<td>ORANGES</td>
<td></td>
</tr>
<tr>
<td>ORANGE JUICE</td>
<td></td>
</tr>
<tr>
<td>GRAPESE</td>
<td></td>
</tr>
<tr>
<td>PORRIDGE</td>
<td></td>
</tr>
<tr>
<td>BUTTER BEANS</td>
<td>BELOW 40</td>
</tr>
<tr>
<td>HARICOT BEANS</td>
<td></td>
</tr>
<tr>
<td>SOYA BEANS</td>
<td></td>
</tr>
<tr>
<td>LENTILS</td>
<td></td>
</tr>
<tr>
<td>APPLE-WHOLE</td>
<td></td>
</tr>
<tr>
<td>ICE CREAM</td>
<td></td>
</tr>
<tr>
<td>MILK PRODUCTS</td>
<td></td>
</tr>
<tr>
<td>PEACH</td>
<td></td>
</tr>
</tbody>
</table>
"diabetic children" were still recommended a restrained and monitored carbohydrate intake. Diets providing more than 50g carbohydrate at a meal were felt to produce excessive blood glucose levels (Truswell et al., 1975).

In the U.S., in the 1970s, the American Diabetes Association recommended that carbohydrate should not be restricted unduly, and as the non-diabetic population took 45% of its energy from carbohydrate, this was considered to be acceptable for the person with DM (Bierman et al, 1971). Unfortunately, many interpreted this to mean people with DM could continue with the same sort of diet as they previously consumed. Later, in the U.S., experimental DM diets containing 75-80% of the dietary energy as unrefined carbohydrate were found to be effective in reducing the insulin requirements in men requiring 30 units of insulin or less per day (Kitchener, et al., 1976; Anderson and Ward, 1979). It should be noted that these diabetics had NIDDM and it was more usual in America for such patients to be given insulin than in Britain, where they would be controlled by diet alone or diet and oral hypoglycaemic agents. Therefore, it was not surprising that the insulin requirements were reduced.

Diets containing 70% of energy from carbohydrate could prove very bulky to eat. An experimental diet containing approximately 70% energy from starchy carbohydrates has been developed and analysed by the author. As shown in Figure 1,4 this is based mainly on fruit and vegetables and wholemeal bread and would be difficult to cope with in modern day society, especially when eating outside the home. The diet of the general population contains 45% of energy from carbohydrate thus such diets could have been difficult to eat and therefore may not be adhered to for long periods. Indeed a palatable menu was quite difficult to compile by an SRD and thus leads to the question on how well the experimental diets were actually adhered to by the subjects.

Meanwhile in the UK, diets containing 45% of the energy as polysaccharide were tried by Brunzell et al (1971) and showed an improved glucose tolerance
Figure 1,4

MENU DERIVED TO PROVIDE APPROXIMATELY 70% OF ENERGY FROM CARBOHYDRATE

For use throughout the day in teas and coffees - 1 pint (584g) skimmed milk

Breakfast;
   bowl of porridge made with water (150g)
   2 large slices of wholemeal bread (60g)
   low fat spread (18g)
   jam sugar reduced (8g)

Midmorning
   banana (80g)

Lunch
   large jacket potato (400g)
   baked beans (80g)
   yoghurt one pot - low calorie (125g)

Mid-afternoon
   orange (120g)

Evening meal
   grilled chicken breast (50g)
   savoury brown rice made with brown rice (100g), carrots (50g) and frozen peas (40g)
   salad made with iceberg lettuce (80g), tomato (65g), cucumber (60g), apple (67g), coleslaw - reduced calorie (50g) and low calorie salad cream (30g)
   desert of jelly (200g), peaches in natural juice (120g) and fromage frais (60g)

Supper
   2 digestive biscuits (26g)

Menu provides 1,995 kcal

69% of the energy is derived from carbohydrate, 18% from protein and 13% from fat.
in those with DM. In another study, Type II diabetics (NIDDM) given diets containing 50% of energy from unrefined carbohydrate produced an improvement in blood glucose levels (Simpson, 1979). Anderson (1977) also found an improvement in glucose tolerance and a reduction in insulin requirements in Type I diabetics (IDDM) given experimental high carbohydrate diets providing 75% of the energy from carbohydrate.

1,3,18; Dietary recommendations for people with diabetes for the 1980s

The 1980s were years of increasing public awareness of nutrition. "The F-Plan" diet by Eyton (1982) entered the "best-sellers" book list and "fibre" became a familiar term. The concept of increasing the amount of energy from carbohydrate for those with both types of DM gained acceptance in the UK and the Nutrition Sub-committee of the BDA (1982) produced recommendations on the diet for "diabetes". They stimulated the uptake of the recommendations into advice given to patients with DM, by presenting them in press releases. A dietetic representative from each NHS dietetic department was invited to a meeting to discuss the rationale for the recommendations and elicit a response from the dietitians to take them up. Thus the BDA became a catalyst for endorsing changes in the diet for people with DM and also encouraged a wide and rapid uptake of the recommendations. The recommendations advocated;

1. A minimum of 55% of the energy should be supplied from carbohydrate.
2. The carbohydrate should be derived from polysaccharides (e.g., bread, potatoes, cereals) and foods rich in fibre encouraged. While sweets, chocolates and disaccharide rich food should be excluded.
3. Fat intake should be curtailed to less than 35% of the energy.
4. Sorbitol and fructose diabetic foods are of little health benefit.
5. Diets should be nutritionally balanced.
6. Dietary advice should be tailored to the individual needs and professional dietetic assistance should be available.
7. The insulin regimen should be tailored to the diet and not vice versa.
By spreading the messages widely in the media and BDA publications (at a time when there was more public interest in nutrition) they encouraged people with DM to enquire about the diet and also to necessitate dietitians to update the advice they gave. Also many people with DM were convinced to make changes themselves without reference to doctors or dietitians.

1.4; DIETARY RECOMMENDATIONS FOR PEOPLE WITH DIABETES FOR THE 1990s

This section aims to examine the current dietary recommendations for people with DM and to summarise these at the end of each section. These summaries will then form the standard of nutritional advice against which the nutritional content of diet sheets obtained from dietetic departments in Great Britain is compared in a study of diet sheets for DM, described in chapter 3.

In "Dietary recommendations for people with diabetes - an update for the 1990s" (Nutrition Sub-committee of the BDA, 1992), the aims remained similar to those of the 1980s and are to;

1. abolish primary symptoms of diabetes. Thus for those with NIDDM diet alone was considered to be often the only form of treatment required.
2. minimise the risks of hypoglycaemia which occurs mainly in IDDM.
3. minimise the long term macrovascular and microvascular complications which result in the morbidity and shortened lifespan of people with DM.

Dietary control of blood glucose and lipids is the cornerstone of the management of DM, and can help to delay and prevent long term complications (Pirart, 1978; Seviour et al, 1988). "Nutritional goals for both IDDM and NIDDM are the same" and radically different types of diet for both groups are not recommended", and there should be "a clear and consistent policy for all patients with DM" (Nutrition Sub-committee of the BDA, 1992). For both NIDDM and IDDM cardiovascular disease is the major cause of mortality
therefore a reduction in saturated fat should be universal to both. Attempts to
modify microvascular disease by protein restriction were recommended to be
directed at those with IDDM. This information was not presented by the BDA
to dietitians throughout the country as previously occurred in 1981.

1,4,1; Carbohydrate content of DM diet
As was seen in earlier sections, a diet of steadily increasing amounts of
carbohydrates has been recommended over the last 50 years, with the most
recent recommendation by the BDA (1992) being for 50-55% of the energy
being derived from carbohydrates, most of which is recommended to be in the
form of fibre rich polysaccharides. The UK population takes 45% of its energy
from carbohydrate (Gregory et al., 1990). But 10-20% of this is derived from
mainly sucrose (DHSS, 1979) which has been recognised for over 2000 years
to be harmful in DM.

As discussed, experimental diets of 70% of the energy being derived from
carbohydrate have been shown to improve diabetic control. There is evidence
that high carbohydrate and low fat diets can increase serum triglycerides and
lower HDL-cholesterol (Reaven, 1988) thus because of this effect and difficulties
in adherence, such diets are not recommended for routine prescription.

Research on fibre and its effect on blood glucose control, in the 1980’s has
been taken further and it is now known that it is the soluble fibre (food sources
shown later) and leguminous fibres which have the beneficial effects on
improving blood glucose levels, glycosylated haemoglobin and serum lipids
(Fuessel et al., 1987; Vinik and Jenkins, 1988). Anderson et al (1991) showed
that experimental diets containing 70 g of fibre and 70% carbohydrate reduced
basal insulin requirements and lowered high LDL cholesterol. However as
already discussed such diets were unlikely to be adhered to for long periods
also their effect may have been due to the amount of soluble fibre they
contained rather than the large amounts of wholewheat products. To encourage
people with DM to increase the carbohydrate content of their diet to provide more than 50% of dietary energy, Armstrong (1993) has suggested different ways of including foods based on the different properties of foods recommended. Examples of types of fibre in foods are shown below;

<table>
<thead>
<tr>
<th>SOLUBLE FIBRE</th>
<th>INSOLUBLE FIBRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>beans</td>
<td>wholemeal bread</td>
</tr>
<tr>
<td>lentils</td>
<td>wholewheat breakfast cereals</td>
</tr>
<tr>
<td>peas</td>
<td>brown rice</td>
</tr>
<tr>
<td>oats</td>
<td>wholewheat biscuits</td>
</tr>
<tr>
<td>oranges, apples</td>
<td>wheat bran</td>
</tr>
</tbody>
</table>

Guar gum was shown by Landin et al (1992) to improve insulin sensitivity and improve blood lipid levels in healthy individuals. Hockaday (1976) showed that such fibres reduce post-prandial increases in plasma glucose concentrations and insulin requirements. People with DM showed improved glycaemic control and lower lipid levels with a diet containing at least 35g of fibre per day of which 50% is the viscous type. Such a use of guar is more likely to be prescription eg Guarem (Shire Pharmaceuticals) to assist the control of NIDDM.

Further studies based on the glycaemic index of foods, which is the response of an individual to a food in comparison to glucose, were based on the work of Jenkins et al (1983) and Haber et al (1977) which were discussed earlier, have led to a tabulation of glycaemic indexes of various foods being tabulated and shown as Figure 1,3 (Fuller 1990). A study by Hamden et al (1993) looked at the glycaemic indexes of mixed meals and found that high fat, high fibre and high carbohydrate meals reduced post prandial glycaemic indexes. Other studies have shown that glycaemic responses to a particular food correlated only weakly with the fibre content of the food but strongly correlates with its particle size (Tattersell & Marshall, 1990). Rasmussen et al (1991) studying the glycaemic index of bread showed that it correlated with the particle size of the flour from which it was made, with coarsely ground flour producing a lower
glycaemic index than finely ground flour. Despite the interest in the glycaemic index there are few studies on mixed meals (ie. there is no data available on simple meals such as toast with various spreads). Therefore they are of less use than was hoped.

The dietary recommendations for people with DM are summarised as; 50-55% of energy from dietary carbohydrate and the promotion of soluble fibre and carbohydrates with a low glycaemic index.

1,4,2; Fruit and vegetables
Low intakes of fruit and vegetables, and the antioxidants they contain, have been associated with increased incidence of heart disease (Kushi et al., 1985; James et al., 1988; Gramenzi et al., 1990). The World Health Organisation (WHO., 1990) recommended that 400g of fruit and vegetables (excluding potatoes) are eaten per day. This advice is equally valid for those with DM and the report on Dietary Recommendations For People With Diabetes for the 1990s (Nutrition Sub-committee of the BDA, 1992) stated "increased intakes of fruit and vegetables can be recommended strongly for people with diabetes". The dietary recommendations for people with DM are summarised as; 400 g of fruit and vegetables (excluding potatoes) should be taken each day.

1,4,3; Sugar (sucrose)
The avoidance of sugar (sucrose, fructose and glucose) rich foods is still advocated for people with DM. (Nutrition Sub-committee of the BDA, 1992) However with the glycaemic index of sucrose being noted as only 60% of that for glucose, due to the presence of fructose, a liberalisation of the advice to avoid sugar has been considered. The BDA (1990) produced a policy statement on sucrose and fructose in DM. In this it was suggested that it was no longer necessary to limit sucrose in the diet of people with well controlled DM, and that up to a maximum of 25g of sucrose per day can be taken in baked items as part of a diet low in fat and high in dietary fibre. Artificial sweeteners such as Aspartame, saccharin and acesulfame K are recommended to remain the
sweeteners of choice. This recommendation is much in line with that of 30g per day for the general population (DoH, 1991) and those with DM can easily be accommodated within family meals if a pattern of "Healthy Eating" is followed.

The dietary recommendations for people with DM are summarised as; sugar should be avoided but 25 g of sucrose per day can be taken in baked items.

1,4,4; Diabetic foods
In the past with strict carbohydrate limitations "diabetic foods" eg chocolate and sweets, provided a welcome treat for the person with DM and a sweet tooth. A recent discussion paper on diabetic foods concluded that "these products have no place in the current management of diabetes" (Thomas and the Nutrition Sub-Committee of the BDA, 1992). The present availability of sugar-free and low-sugar foods enables people with DM to enjoy such jams, drinks, jellies, tinned fruit, puddings etc without purchasing "diabetic foods". However a survey by Fairchild et al (1990) on the use of special foods by people with DM showed that 74% used some form of food, 45% sweeteners, 47% preserves, 34% squash, 31% sweets 31% chocolate and 20% used biscuits and tinned fruit. People with NIDDM were found to use more of the products than those with IDDM. This indicates that despite advice to the contrary people with DM purchased such foods probably because of advertising.

The dietary recommendations for people with DM are summarised as; "diabetic foods" are not recommended.

1,4,5; Protein
Renal disease is one of the complications of DM and a reduction in protein intake can reduce albuminuria in those with early nephropathy (Viberti, 1988). It was considered by the Nutrition Sub-Committee of the BDA (1992) that a limitation of protein intake could be important in IDDM where nephropathy is more common than in NIDDM and it was recommended that protein should not exceed more than 12% of dietary energy.

The dietary recommendations for people with DM are summarised as;
excessive quantities of protein should not be promoted and should be limited to no more than the quantity providing 12% of dietary energy.

1,4,6; Fat
Building on previous recommendations of diet for the general population in the NACNE report (Health Education Council, 1983) the Committee on Medical Aspects of Food Policy (COMA) recommended that total fat energy should average 30% of dietary energy (DoH, 1991). Of this only 10% should be from saturated fat, 12% from mono-unsaturates, 6% from poly-unsaturates and no more than 2% from trans-fatty acids. People with DM, particularly those with NIDDM have an increased risk of cardiovascular disease. The BDA (1992) advised that total fat should be restricted to 30-35% of dietary energy and that no more than 10% of this should be from saturated fat. The main aim at the beginning of the 1990s which is still valid today, was to reduce the saturated fat intake by controlling the amount of full fat dairy products, fatty meat and saturated spreading fats.

Overweight people with NIDDM often have increased levels of blood triglycerides and long chain fatty acids such as the omega-3 fatty acids from fish oils may be beneficial (Gramenzi et al, 1990; Axelrod, 1995; McGill, 1995). Therefore it was considered appropriate by the Nutrition Sub-Committee of the BDA (1992) to advise people with DM to take fish as an alternative to meat and cheese.

The dietary recommendations for people with DM are summarised as; total fat should be restricted to 35% of daily energy and that no more than 10% of daily energy should be from saturated fat. Oily fish should be encouraged to be included in the diet 2-3 times per week.

1,4,7; Salt
Hypertension is an additional complication in people with DM and it is recommended that they do not take excessive amounts of salt or manufactured
foods containing it e.g. potato-crisps. It has been recommended that total salt consumption should be limited to 6 g per day (Nutrition Sub Committee of the BDA, 1992). Dodson (1989) suggested that people with DM may be salt sensitive and that moderate sodium restriction results in significant reductions in systolic blood pressure of 1-2 mm Hg.

The dietary recommendations for people with DM are summarised as; the diet should provide no more than 6 g of salt per day.

1,4,8; Alcohol

The recommendations (Connor and Marks, 1985) regarding alcohol consumption are similar to those for the general population;

1. Never drink and drive
2. Men should limit their consumption to 3 units of alcohol per day and women to 2 units.
3. Alcohol inhibits gluconeogenesis and can increase the risk of hypoglycaemia in those taking insulin or sulphonylureas. Alcohol should therefore be taken after food or with food.
4. For people using carbohydrate allowances, any alcohol should not be counted as part of the allowance.
5. Alcohol free and low alcohol drinks should be taken in preference to those of normal alcohol content. Those drinks low in both alcohol and carbohydrate should be taken for preference.
6. Low calorie mixer drinks with spirits are advised as the combination of alcohol and sugar can trigger "reactive hypoglycaemia".
7. Overweight patients should not take more than a unit of alcohol on more than 5 days per week.
8. Patients should be warned that hypoglycaemia can mimic drunkenness.

A study by Gregory et al (1990) reported that 49% of people with DM attending an out-patient clinic did not know hypoglycaemia was likely to occur with alcohol consumption, which is a disturbing finding.
The dietary recommendations for people with DM are summarised as; men should limit their consumption of alcohol to a maximum of 3 units of alcohol per day and women to 2 units of alcohol per day. Overweight individuals should not take more than 5 units per week. Alcohol should be taken with food. “Low calorie mixer” drinks should be used.

1,4,9; Dietary prescription
It is recommended that individuals with DM are “advised by a dietitian when newly diagnosed” and also offered an annual update on their diet (BDA, 1992). Chapter 5 describes a 3 year study of patients attending the diabetic clinic at Bedford General Hospital. Until 1997 patients, including those with DM, could only be seen by a SRD after referral by a medical or dental practitioner (CPSM, 1996). They are seen at a hospital as an in-patient or out-patient, a health centre or GP surgery, private hospital, diabetes centre or in their home.

Part of the dietetic consultation will include the review of clinical information, taking of a dietary history to establish the patients normal eating habits and meal pattern. It is generally accepted that in order to be effective dietary advice for the person with DM needs to be tailored to the individual. The SRD will adapt the diet as much as possible to fit in with the normal dietary pattern, thus making it more acceptable to the patient and their family. A diet sheet is usually given as well as recipes and other information. A critical examination of diet sheets used in Britain for people with DM is reported in Chapter 3. Regular meals should be advocated, with all meals and snacks containing some carbohydrate. This is particularly important for those treated with insulin or oral hypoglycaemic agents. Snacks are useful in preventing hypoglycaemia in IDDM (Nutrition Sub-committee of the BDA, 1992).

Previously “10 gram carbohydrate exchanges” as provided by the BDA (1972) (Fig.1,5) were used to ensure carbohydrate was taken at each meal and that no excessive quantities of refined carbohydrates were taken. Today with
CARBOHYDRATE EXCHANGE LIST

In view of metrication, weights of foods are given in GRAMS OF WEIGHT calculated as follows:

- 30 grams weight = 1 ounce
- 15 grams weight = 1/2 ounce
- 10 grams weight = 1/3 ounce

Liquid measures are expressed in MILLILITRES:

- 600 millilitres = 1 pint
- 300 millilitres = 1/2 pint
- 200 millilitres = 1/3 pint
- 150 millilitres = 1/4 pint

Each of the following contains about 10 Grams Carbohydrate

### BREAD

<table>
<thead>
<tr>
<th>Metric grams (weight)</th>
<th>Brown or white plain or toasted</th>
<th>1/2 slice of thick cut sliced large loaf</th>
<th>2/3 slice of a thin cut sliced large loaf</th>
<th>1 slice of a small sliced loaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Brown or white plain or toasted</td>
<td>1/2 slice of thick cut sliced large loaf</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>15</td>
<td>Allbran</td>
<td>3 level tablespoons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Biscuits</td>
<td>2 biscuits</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
knowledge of the glycaemic index carbohydrate exchanges are not normally taught, however some people with long standing DM are unwilling to stop using them. Mitchell et al (1990) made a comparison of such exchanges with a simplified dietary exchange system for IDDM and found no difference in HbA1c with the use of the simplified system. They felt some kind of "food swap list" (so named to prevent confusion with the previous 10 grams of carbohydrate exchanges) can be useful in teaching individuals about the amount of carbohydrate in foods. The use of a "plate model" in education can give patients an understanding how the portions of food can be balanced. This model (Fig. 1.6) enables patients to maximise carbohydrate to over 50% of the energy of the meal (Armstrong 1993), and is the one advocated by the Community Nutrition Group of the British Dietetic Association (1987) and the Swedish Diabetic Association (1987). Also it is the model recommended by the Nutrition Sub-Committee of the BDA (1992). The model is based on a plate and is similar to the one advocated by the HEA (1996) as the National Food Guide and model to be recommended for nutritional education it enables individuals to see the use generally of a unified model. Fig. 1.7 shows the Balance of Good Health, the National Food Guide. Therefore the dietary recommendations for people with DM are summarised as; a plate model and "food swap" list should be included in dietary advice.

1.5; THE ROLE OF THE SRD IN PROVIDING DIETARY ADVICE
The importance of dietary advice in DM has been established over the last 3000 years. Only since the 1930s has the role of the SRD in providing such advice been developed, both with the provision of written advice such as diet sheets and with consultations on an appropriate diet to individuals. Dietary advice aims to promote a normalisation of blood glucose levels and to prevent complications in people with DM (Nutrition Sub-committee of the BDA, 1992).

1.5.1; Size of the dietetic profession
It is hardly surprising that SRDs have not had a major impact on dietetic issues
If you had your plate set out in front of you this is a good guide to the proportions of each type of food you should be eating.

**How much starchy food must I eat?**

The smallest part of your meal should be made up of meat or fish or an alternative. The remainder should be divided into equal portions of starchy foods (such as potatoes) and vegetables.
The Balance of Good Health

Fruit and vegetables

Bread, other cereals and potatoes

Meat, fish and alternatives

Foods containing fat

Foods containing sugar

Milk and dairy foods
as their number is small with only 3,920 SRDs registered at the CPSM on 30th September 1995 (BDA 1995). Not all of these were working and those that were did not all work in the NHS. Also with SRDs being predominantly a female profession, many also only worked part time. Thus it can be seen the support to the NHS of SRDs is seen to be very small indeed.

1,5,2; Training
In 1984 dietetics became an all graduate profession and training was by a 3 or 4 year degree course or by a post-graduate course at a University. Either mode of training included a block of 31 week practical training at a hospital approved by the Dietitians Board. Practical training is at present undergoing changes, with more self-directed learning and assessment by students and also a change in emphasis to more community settings rather than acute hospitals. Also the training of dietitians, like that of many health professionals may change with the further implementation of National Vocational Qualifications (NVQS) which are already being used in nursing, occupational therapy and physiotherapy.

1,5,3; Organisations supporting SRDs
SRDs are supported by the "British Dietetic Association" to which the majority of them belong. It also provides professional indemnity insurance for the SRD which is essential for him or her to practice in many clinical areas. The British Dietetic Association also acts as a trade union which is recognised in the NHS. Each month a publication called "Dietetics Today" is produced and circulated to all members of the association. It contains information on clinical dietetics, industrial relations, publications and advertisement for jobs. To give peer support and facilitate ease of attendance at meetings the British Dietetic Association has a branch network of meetings based on geographical boundaries. There are a number of specialist groups to which SRDs can belong for support and information. An example of such groups is the Diabetes Management and Education Group (DMEG) which is of interest to the SRD interested in DM.
1,5,4; Training by SRDs

SRDs are involved in training a number of groups on nutrition and dietetics. As there has been much debate about the role of practice nurses in providing therapeutic dietary advice in Dietetics Today (British Dietetic Association, 1995 and 1996) it seemed appropriate to briefly discuss this. There is some overlap of the role of the practice nurse with that of the diabetes nurse specialist and also that of the SRD. An expansion of the practice nurse profession, occurred from 1992 due to increases in funding for GP practices provided by Government to promote the Health of the Nation initiatives. Many practice nurses began to take over some of the role of SRDs by giving advice to patients referred to them by GPs. Patients were then seen in clinics such as "Diabetic Clinics" held at the surgery. Practice nurses were free to use either commercial diet sheets or ones prepared by local, (or distant) dietetic departments. Nor were they limited by the statement of conduct of the CPSM, and could thus offer a more rapid service to patients than the SRD. Some SRDs harnessed this demand on practice nurses by offering education and support on aspects of dietetics and developing protocols, so that patients requiring extra expertise could be referred to the SRD for more specialist advice (Kyle, 1993). Leeds et al (1990) wrote a book on nutrition for practice nurses to improve education in this area. Kirkham (1994) examined the role of practice nurses offering a monthly telephone service to patients with NIDDM and found that patients were more likely to be referred to the dietitian by the practice nurse taking part in the study.

1,5,5; Diet sheets and supplementary information on diet

Diet sheets are important for SRDs to provide information to patients on the diet on which they have been advised and are usually given to patients during a dietetic consultation. Also they can be provided for other health professionals eg practice nurses, to use in giving advice to patients. The writing, preparation and updating of diet sheets can be a major task for dietitians and diet sheets should reflect the current consensus of nutritional knowledge. Diet sheets are
also produced by food manufacturers, pharmaceutical companies and also in magazines and books sometimes with the help of SRDs. For people with DM the content of the diet sheet is of major importance and should reflect the nutritional advice given in the literature and thus reflect the dietary recommendations summarised earlier. With the introduction of the NHS reforms in the UK there has been a drive for hospitals to make themselves and the literature they provide more attractive to patients. Frost et al (1991) examined the information they provided to patients with NIDDM and found that better quality information improved knowledge levels. MacQueen and Frost (1995) also studied if the provision of higher quality information to obese patients improved their attendance rates and treatment success. They found that providing an information pack to the patients including information of appointments, maps of hospital, 3 day food diary and healthy eating booklet versus only an appointment card made no difference to patient compliance. Due to the importance of diet sheets in providing information to the patient with DM it was felt imperative to study diet sheets provided for people with DM. This study (chapter 3) critically examines the information provided in the diet sheets with the summary of dietary recommendations.

The Patients Charter (Fig. 1.8) was prepared by the DoH (1995) as an attractive A5 size booklet of details and delivered to all homes in the UK. It stated that patients can expect a written explanation of the hospital's food, nutrition and health policy and catering service standards. It also stated there should be a choice of dishes on hospital menus, including meals suitable for all dietary needs. It thus encouraged the SRD to provide clearly defined local standards and to assess and measure the benefits of dietary interventions that they made as well as providing information on food and nutrition for hospital patients.

1,5,6; Record keeping on work load by SRDs

With the NHS reorganisation (Secretary of State for Health, 1989) and the establishment of purchasers and providers there has been a greater
CATERING SERVICES

From April 1995, if you have to stay in hospital, you can expect to be given a written explanation of the hospital’s patient food, nutrition and health policy and the catering services and standards you can expect during your stay.

The standards will mean that:

- you have a choice of dishes, including meals suitable for all dietary needs;
- you have to order no more than your next two meals in advance;
- you have a choice of the size of portion you want;
- you are given the name of the catering manager;
- you have help, if you need it, to use the catering services, for example, menus printed in other languages and large print. This help should be readily available.
requirement for recording of work loads for costing purposes. The introduction of GP fundholders, with their own budget for services for patients also required attention to recording for charging purposes. Additionally, there is a much greater focus on quality with the Patient's Charter (1991) which also requires more recording of direct data. Annually dietetic departments are asked by the DHSS to provide information on the dietetic workload based on the requirements of the Korner report (DHSS, 1983). Statistics on dietetic services are reported annually by the Department of Health in "A summary of information from form KT25" which is the name of the "form" on which heads of dietetic departments are required to summarise information on "the number of patients seen as face to face contacts". It was noted that in the year April 1st 1990-March 31st 1991 throughout England 1,819,700 people were seen for dietetic advice. (DHSS, 1991).

With the introduction of purchasers and providers the concept of auditing of performance has been initiated. Clinical audit is a feature of quality in health care and is the systematic process for assessing, evaluating and improving care and should include every aspect of care including the contribution of the SRD. The term audit was first introduced into medicine in 1912 by surgeons in the USA (cited by Carne, 1991). However the concept originates from Hippocrates who reported on the outcomes of disease in the patients he saw. In the mid-17th century, Francis Clifton made a plea for hospital medical records to be published so that data could be analysed (cited by Carne, 1991) He included diet high on his list of factors for evaluation and puts to shame the still somewhat unsystematic recording of patient information today, with most emphasis being on post code for computerisation and charging purposes. Clinical audit projects are usually agreed within a Hospital Trust at the beginning of the financial year. Therefore for the SRD there is an opportunity to ensure that their contributions for dietary advice are included in any clinical audit.
**1,5,7; Organisation of dietetic services**

The majority of SRDs are employed in the NHS which has a career structure and remuneration for them. Most SRDs are based in District General Hospitals which are now known as Hospital Trusts. Previously the service head was called a District Dietitian and managed the dietetic service to both the hospital and geographical area that the hospital served i.e. the "District". This service included a clinical dietetic service to in-patients as well as to out-patients who were referred by hospital doctors and GPs. Often clinics were held in the community at Health Centres which was obviously more convenient for patients. Health promotion initiatives were also taken throughout the district with development of protocols and policies on nutrition as well as training. Advice on nutrition and dietetics was provided directly to the District Management Team to whom the District Dietitian was accountable. Staffing levels of dietetic departments were very small with some districts having only one dietitian.

With the NHS reforms the development of Hospital Trusts and Community Trusts has occurred which cut across district boundaries and made the post of a District Dietitian unviable. District Dietitians have been absorbed into Trusts and although they may have retained the management of a district wide service in many cases the requirements of this service have been dictated by the Trusts rather than the District Dietitian. In other districts the post of District Dietitian has been made redundant, and in still others the post made accountable in only one Trust leaving a community or Hospital Trust with little dietetic service. Thus dietetic services have become fragmented with little leadership or management.

**1,6; COMPLICATIONS IN DM, OFTEN CAUSED BY A FAILURE OF DIET**

DM is associated with various complications which are briefly discussed. Most of the increased morbidity and mortality associated with DM is due to vascular disease. This can be divided into microvascular disease such as retinopathy and nephropathy which are specific to DM, and macrovascular disease such
as myocardial infarction, cerebrovascular disease and peripheral vascular
disease.

1,6,1; Cardiovascular disease
Cardiovascular disease is the major cause of mortality in both IDDM and
NIDDM. Risk factors include obesity, hypertension and hyperlipidaemia, all of
which have nutritional aspects in their development, as well as smoking stress
and lack of exercise. Hyperlipidaemias (blood triglycerides and cholesterol
levels are abnormally raised beyond the normal maximum of 1.9 and 6.5 mmol/l
respectively) are prevalent in DM leading to an increased incidence of heart
disease and strokes. The incidence of death from coronary heart disease is 2-3
times higher among individuals with DM than among their age and sex matched
peers (Diabetes Data Group, 1979; Frier, 1998). Dietary modifications for
lowering blood lipid levels of people with DM have proved effective. Diets
containing 70 g of fibre and 70% of carbohydrate were shown to reduce levels
of triglycerides and also cholesterol (Anderson, 1991).

1,6,2; Renal Disease
Good control of DM is considered to be the key to the prevention of renal
complications. This includes monitoring and control of blood pressure. Diabetic
nephropathy is a complication of DM. Protein intake, both as regards quantity
and quality, may be important deterrents in the development of renal disease.
The use of low protein diets of 40 g protein per day in patients with DM and
progressive nephropathy have been reported to precipitate a significant fall in
albumin excretion with no deterioration of glycaemic control (Walker et al.,
1989). The benefits may be due to the reduction of protein, and possibly other
components such as reduced phosphate levels.

1,6,3; Retinopathy
People with DM have a greater prevalence of retinopathy and cataracts. Back
ground retinopathy is very common in 95% of patients with IDDM after 15 years
from initial diagnosis and about 65% of patients with NIDDM after the same period. Two years after diagnosis it has been found in about 2% of patients with IDDM and 25% of patients with NIDDM (Diabetes Advisory Group, 1993). Regular examination for retinopathy is important as early detection and treatment may save sight. Good glycaemic control, as measured by HbA1c strongly correlates with a reduced level of retinopathy (McCance, 1989) Vitamin C has been suggested to be a factor in preventing retinopathy (Bates & Evans, 1990).

1,6,4; Obesity
"About 75% of Type II diabetic patients are overweight" (Salen, 1987; Lean et al 1990,). Obesity contributes to the development of NIDDM initially. It is extremely difficult to treat and also contributes to increased incidence of hyperlipidaemia, heart disease and strokes. Fasting blood glucose concentrations below 6.0 mmol per litre were achieved by less than half the "diet treated patients" in the UK Prospective Diabetes Study (1990) and patients who achieved this level of control had to lose significant amounts of weight ie 18 kg. Energy restriction is well recognised to lead to the rapid cessation of the primary symptoms of DM ie thirst and glycosuria and polyuria (Baumann et al, 1988). For those with NIDDM, who are obese, weight loss is almost always the only form of treatment required.

Very low calorie diets, "400 calories (1680 joules), combined with behaviour modification were compared with 1000-1500 calorie diets (4200-6300 joules)" and have been shown to promote long term glycaemic control in obese NIDDM subjects (Armetrude, 1988). Fasting glucose improved more in the very low calorie group than on the 1000-1500 calorie diets. Weight losses in both groups remained similar at the end of a year (Wing, 1990). Marked reductions of serum triglyceride levels were noted in IDDM after adherence to such diets.

Frost (1989) achieved significantly greater weight loss in people with obesity
and DM using diets of 1,600 kcal in comparison with 1,200 kcal per day. It was felt that patients more readily complied with the larger energy allowance. Exercise confers metabolic advantages in NIDDM with improved insulin sensitivity and glucose usage (Devlin & Horton, 1987). Exercise also helps to maintain muscle mass with loss of adipose tissue (Stern et al, 1987). Therefore it is recommended that weight loss for the obese person with DM should be encouraged vigorously and people with DM who are of normal weight should be discouraged from gaining weight.

1,6,5; Hypertension

Hypertension (defined in Bedfordshire by the Diabetes Advisory Group in 1993 as a blood pressure of 140/90 mm Hg or above) is more prevalent in people with DM than in the general population. It is a complication of DM nephropathy and is a powerful risk factor for other complications such as cardiovascular disease. Life style changes of weight reduction, stopping smoking, avoidance of salt, decreasing excessive alcohol intake, increasing exercise and relaxation should be advocated (Diabetes Advisory Group 1993). If these measures do not help antihypertensive medication is usually prescribed.

1,7; MANAGEMENT OF DM

There is no single treatment for DM whether IDDM or NIDDM. Diet, insulin, oral hypoglycaemic agents and lifestyle modifications of exercise and cessation of smoking as well as the regular monitoring of the condition by both the sufferer and professionals are all important aspects of the management of the condition and in the prevention of complications.

1,7,1; Strategy for IDDM

Insulin treatment is mandatory in IDDM and may be used in NIDDM where other treatments have failed. Insulin is used in pregnancy for those women with IDDM. It is the only safe treatment in gestational DM if the diet has failed. The duration of action of any insulin preparation is related to its rate of absorption
from the site of injection. Soluble insulin is rapidly absorbed, protamine and zinc bind with insulin and delay the insulin absorption. Warmth and exercise speed up the absorption of insulin. Insulin should be given 15-20 minutes before food. Correct insulin injection techniques should be taught. In general two injections per day are required to achieve glycaemic control. A single dose of insulin may be used in the elderly where glycaemic control may not be of prime consideration. The exact dosages of insulin, regimens and combination need to be tailored to the individual and their normal eating pattern and not vice-versa. The usage of 4 injections per day of soluble insulin before main meals (with a longer acting insulin before bed-time) gives a more flexible lifestyle whilst maintaining control and giving a more physiological pattern of insulin delivery. The use of "insulin pens" eg Novopen (Novo Nordisc) makes multiple injections much more acceptable and practical, as injections are possible through thin clothing materials. Nowadays the predominant insulin in use is human insulin. There has been controversy about some individuals with DM suffering from "hypoglycaemia unawareness" on this (BMA and Royal Pharmaceutical Society, 1997). Porcine and bovine insulins are also still available. Insulins are highly purified and of U100 strength.

1,7,2; Strategy for NIDDM
Initially patients should be tried on diet alone even if the blood glucose is in excess of 20 mmol/l (Diabetes Advisory Group, 1993). A programme of education for the patient on their control is an important facet of management. However, this does not always occur and patients are simply given oral agents with little or no dietary advice or other education. If the patient's blood glucose becomes well controlled and urine tests are negative for glucose then the DM needs no further treatment but a regular review. If control is not achieved then an oral hypoglycaemic agent is used as well as a diet.

Oral hypoglycaemic agents are usually given in tablet form. Sulphonylureas act by stimulating the pancreas to release insulin. Some beta cell function must
therefore remain for them to be effective. They should be taken before meals for the full effect to occur as they have the potential to cause hypoglycaemia. This is most marked with the longer acting sulphonylureas eg chlorpropamide. and these should not be used in the elderly living alone because of this risk (BMA and Royal Pharmaceutical Society, 1997). Metformin, a biguanide, is the first choice for obese patients with NIDDM as it inhibits appetite. It can be used alone or in combination with sulphonylureas. Metformin acts by inhibiting glucose absorption from the gut and should be taken with or after food. It does not cause hypoglycaemia and is thus "antihyperglycaemic" (BMA and Royal Pharmaceutical Society, 1997). Acerbose is a fairly new product developed in the 1990s and delays the digestion of starch and sugar. Guar gum may be prescribed as granules and reduces post-prandial blood glucose concentrations.

1,7,3; Monitoring the control of DM
Monitoring of blood glucose levels and urine for glucose are important facets of management of DM. In well-controlled NIDDM, self monitoring by urine testing slips is usually adequate. Most people "leak" glucose into the urine when the blood glucose level is above 10 mmol/l. Urine testing is usually undertaken on 2 days per week, before breakfast and after a main meal once control is established. Urine testing strips are available eg Diabur-Test 5000 (BM Diagnostics). The urine is checked for ketones in times of illness with testing strips eg Ketostix (Bayer Diagnostics). (A list of the organisations producing products referred to in this thesis is given as Appendix 1).

Blood glucose testing is important in NIDDM in times of illness, pregnancy, poor control, changes in medication or at the preference of the patient. Glycosylated haemoglobin (HbA1c) is often used to monitor the blood glucose over a longer period ie the preceding 6-12 weeks. The blood requires to be taken from the patient and sent to a central pathology laboratory. The following table indicates the targets agreed by the Diabetes Advisory Group (1993);
HbA1c level Control
below 6% good
6-7% adequate
7-9% moderate
above 9% poor

Self blood testing is performed using a drop of blood placed on testing strips such as BM 1-44 (Boehringer Mannheim). Blood glucose level can be assessed by comparison with a chart or by use of a blood glucose estimation meter eg Hypocount G A (Hypoguard)

1,7,4; Education of people with DM
It has been considered important by the BDA since its inception in 1934 that people with DM are educated upon the management of DM so that they are able to assist themselves by controlling their condition. SRDs are the prime educators for people with DM on diet. They also can provide education to nurses and doctors on diet and DM. The whole emphasis for the care of DM nowadays is to use a team approach using nurses, doctors, dietitians, chiropodists and possibly psychologists to provide advice and support to people with DM (BDA, 1993). Diabetic nurse specialists have a key role in educating patients in medication, insulin injection, testing, monitoring of health and they also discuss diet in DM. Most diabetic nurse specialists are based in General Hospitals, or in Diabetes Centres. Many GPs have established Diabetes Clinics and the BDA, the association which supports people with DM and spearheads care and sponsors research, has made recommendations for these, which include education by the practice nurse (BDA, 1993; Royal College of Nursing, 1994).

1,8; AIMS OF PRESENT STUDY
It can be seen from the history of DM that diet has been recognised as essential for the management for over 3000 years. Therefore it is not surprising, with more scientific evidence on diet and DM that diet is still
regarded as the cornerstone of treatment. However this cornerstone is one that frequently crumbles due to problems with dietary compliance (Williams, 1994).

It is recommended by the BDA (1993) that the "dietitian is an essential member of the Diabetic Team" and that all patients should have a consultation with a SRD. Part of the role of the dietitian is to interpret nutritional science, such as the Guidelines for Diabetes for the 1990s (Nutrition Sub-Committee of the BDA, 1992) into information for patients. Such information is given to a patient by SRDs in the written form of diet sheets. It has seemed essential to review the contents of the diet sheets being given to patients.

Having been referred to a SRD what is the effectiveness of such consultations in promoting improved control of DM and also the prevention of complications? It seemed essential that the effectiveness of the services of SRDs is evaluated.

1.8.1; Summary of aims of the study

This study was undertaken to address these questions posed. Specifically the areas addressed in this thesis are, broadly the following;

1. An examination of the role of the SRD and the spectrum of work undertaken by him or her (chapter 2)
2. A critical study of diabetic diet sheets produced by dietitians working in Great Britain (chapters 3 and 4)
3. A 3 year study of the number of patients referred and not referred for dietary advice from the diabetic clinic at Bedford Hospital and the benefits of such advice to the control and prevention of complications (chapters 5 and 6)
CHAPTER 2

PATTERNS OF REFERRAL TO THE DIETETIC DEPARTMENT AT BEDFORD HOSPITAL

A descriptive account of the dietetic department of Bedford Hospital where the study was carried out

2.1; BACKGROUND

A brief mention is made in this chapter of the management of the provision of health care in North Bedfordshire, where the author undertook much of this research. Originally Bedfordshire was split into 2 District Health Authorities, one in North Bedfordshire based around Bedford Hospital serving a population of 260,000 and one in the South of the county based around Luton. The district was part of North West Thames RHA. North Bedfordshire is a large geographical area and apart from the county town of Bedford is a mainly rural county with much agricultural activity. In April 1992 Bedford Hospital became a Trust which provided emergency and acute clinical care and "Beds and Shires Community Trust" which provided community based services for example district nursing and specialist services for those with mental illnesses and mental handicaps.

During the period of this study from 1989 until 1995 the dietetic service was a district wide service and centred on Bedford Hospital Trust. This Trust had 386 general patient beds on the South Wing site and 36 maternity beds and 112 beds for the elderly on the North Wing site. The South Wing site also accommodated 57 psychiatric beds which were managed by the Beds and Shires Community Trust. Additionally, the district included Bromham Hospital with 203 places for people with learning disabilities, Steppingly Hospital (32 beds) and Biggleswade Hospital (34 beds) for elderly people, all of which were also managed by the Beds and Shires Community Trust. GPs in the district
may have had "on-site dietetic clinics" or referred patients to Health Centres in their proximity or to clinics at South Wing hospital site. Dietetic clinics were held regularly at the South Wing hospital.

The District Dietetic/Manager of Dietetic Services (Chief 2) post was established in 1975 and the post holder managed the department and increased it from a single handed post to a maximum of 14 staff in early 1993. Since April 1994 with external management issues there was an erosion of funding and staffing levels. Initially there were a number of other District management posts for example in speech therapy, physiotherapy, occupational therapy, pharmacy, catering, dentistry and health promotion which were all lost as a result of early retirements and redundancies with the NHS reforms, thus leaving dietetics as the only district wide service. After the District Dietitian resigned the post ceased and a chief dietitian was appointed for Bedford Hospital alone and no one dietitian managed the service to Beds and Shires Community Trust, thus the service became extremely fragmented.

2.1.1; Organisation of the NHS

To facilitate an understanding of the organisation of dietetic services in the NHS it is necessary to examine the overall organisation of the NHS. The Department of Health (DoH) sets the policies, allocates resources and monitors performance in the NHS. The DoH had an adviser on dietetic matters until October 1995, when this post was made redundant (Dietetic Adviser, DoH, 1995).

Prior to April 1994 there were 14 Regional Health Authorities (RHAs) which were based on geographical regions these were then merged and replaced by 8 RHAs. The RHAs have now become out-postings of the central DoH Management Executive. They were responsible for planning the development of services and allocate resources they are given to District Health Authorities (DHAs), Family Health Service Authorities (FHSAs), Trust Hospitals and GP fundholders, whose performance they then monitor. DHAs are expected to
assess the health care needs of the population they serve and to purchase these. They have become known as "purchasers" of health care. DHAs also have a responsibility for public health, including epidemiology. It is at the level of public health at DHA level that the proposed position of Public Health Nutritionists, (Nutrition Society, 1997) should be accountable and based. DHAs work closely with FHSAs in assessing the population's health care needs. Additionally the FHSAs manage the contracts with GPs, dental practitioners and pharmacists. As there is close working between the FHSA and DHA and overlap of some tasks in some areas the FHSA and DHA have merged to form one organisation which in Bedfordshire is called Bedfordshire Health. Community Health Councils are statutory bodies established by the RHAs, to represent public interest in the local provision of health services and to help consumers deal with any concerns.

In December 1997 the Government's White Paper on the NHS was published which aims to rebuild and renew the NHS over the next 10 years. It abolishes the internal market and directs HAs to work on commissioning for care with local authorities, Primary Care Groups and Hospital Trusts, aims to cut waiting lists for hospital treatment, provides a 24 hour telephone advice line staffed by nurses, provides speedier test results to GPs and provides Primary Care Groups to ensure the best and most reliable treatments are available. Two new organisations to ensure efficiency and cost effectiveness are planned; the National Institute for Clinical Effectiveness to promote national guidelines for treatments and the Commission for Health Improvement to ensure all parts of the NHS are brought up to the best standards (DoH, 1997).

2.2; AIMS OF STUDY

The NHS has also been required to examine the quality of the services it provides (Secretary of State for Health, 1989). The British Dietetic Association (1997) in the document entitled "National Professional Standards for Dietitians Practising in Healthcare" encourages an examination of the effectiveness of dietetic services and the outcomes they produce. Therefore explicit details of
dietetic services need to be developed which include both quantitative and qualitative data. These managerial documents and changes provide opportunity for the SRD to promote the value of their advice by examining their workload and its impact upon patient care. As a first step in determining quantitative measures of quality it seemed imperative to critically examine the pattern and type of referrals to the district dietetic department for North Bedfordshire at Bedford Hospital over a period of 5 years for a period of 6 months per year from April to October (in order to avoid the Christmas and New Year period when work is reduced and clinics cancelled), and to comment on them. Thus the study aimed to describe the role and work pattern of the dietetic department at Bedford Hospital and to quantify and examine the pattern and type of patient referred to the department for dietary advice.

2.3; METHODS

Permission to undertake the research on the dietetic department at Bedford Hospital Trust was obtained from the Chief Executive. He considered that as no details of individual patients were to be recorded or any interventions undertaken as part of this research that approval from the ethical committee would not be required. He emphasised that the data was to remain confidential to the Trust and not be published as he considered there may be a possibility of it being used by other dietetic departments in competing Trusts in competing for dietetic contracts with Bedford Hospital Trust.

All management data pertaining to the dietetic department was carefully examined for details of the aims of the service, staffing levels, location and clinical provision provided by service, data recorded and by what methods and general pattern of dietetic duties. Special reference was made to any annual reports produced by the dietetic department which summarised the dietetic service.

Additionally the number of patients referred and the pattern of referral of dietetic patients over a 5 year period was examined. A previous study on patterns of
referral and distribution of work load in a dietetic department of the District General Hospital of Darlington Memorial Hospital in 1991 was carried out for a 3 month period (Hankey et al, 1991) by interrogating computer records of the dietetic department. This study provided a basis for a comparison of results. Data collected on patients by the dietitians at Bedford Hospital Trust for management purposes and for presentation to the DHSS (as described in section 1,5,6) was investigated by analysing any computer records as well as examining any individual dietetic patient records.

2.4; RESULTS
2.4.1; Core Mission of the dietetic department
In order to provide a focus for the dietetic service a "core mission statement" was agreed by the dietitians and senior managers at Bedford Hospital Trust. This statement was reviewed annually to ensure that it continued to reflect the departments overall mission. This was worded as follows:

"The Nutrition & Dietetic Department aims to provide a quality clinical dietetic service for people referred for advice, as well as advice and education on matters relating to food and its effect on health and well-being. The dietitians aim to see patients within 30 minutes of their appointment time, and to provide specialist individual advice on a suitable diet. (The word diet is used in its wider context of food eaten rather than the popular context of a slimming diet). Written information, recipes, etc are also provided." (January 1994).

This core mission statement was displayed in patient waiting areas, in consulting rooms and in dietitians offices. Additionally it was included in all management reports for the dietetic department.

To promote this core mission statement the dietetic department aimed to promote health by means of enhanced nutrition by the following methods;
1. Informing doctors and other health care staff of the benefit of dietary advice.
2. Enhancing the awareness of the benefits of nutrition by communicating this to doctors.
3. Reiterating the benefits of dietary advice with individual patients.
4. Operating a service to GPs in the district at Bedford Hospital.
5. Outposting the dietetic service to GP premises in the district.
6. Empowering other health practitioners by educating them on nutrition.
7. Working in partnership with other agencies such as the catering departments, nursing, health promotion departments, education, local companies.
8. Keeping up-to-date regarding nutritional matters and communicating this.

2,4,2; Staffing of the dietetic department

Examination of personnel records showed that both recruitment and retention of staff were good. All of the staff employed in the department as dietitians were SRDs. The dietetic establishment was funded at 6.0 whole time equivalents (WTE) in 1989, 7 in 1990, 9 in 1991, 10 in 1992 (but with 3 staff taking maternity leave for which no replacement staff were employed because of funding difficulties as the hospital became a Trust), 14 in 1993 (one of which was funded to undertake an audit of dietary advice in individuals suffering from constipation by a North West Thames RHA grant, another for GP fundholding clinics and another for a project with the Child Development Centre on short term contracts), 9 in 1994 and 8 in 1995. Staff were deployed in 1995 as follows:-

District Dietitian/Manager of Dietetic Services provided management and business support and clinical work.

Senior I Dietitian full-time for people with learning disabilities

Senior I Dietitian 0.6 for co-ordination of service in the acute unit and clinical work.

Senior I Dietitian 0.6 for co-ordination of service in the community and clinical work in the community, HIV specialist work
Senior I Dietitian full-time for specialist dietetic service to people with diabetes.

Senior I Dietitian 0.4 for community clinical work.

Senior II Dietitian full-time for wards for elderly people and outpatient work, covers general wards including paediatrics, assists with HIV specialist work.

Senior II Dietitian 0.4 for elderly people based at North Wing site.

Senior II Dietitian full-time for acute unit

Basic Grade Dietitian acute unit

Secretaries part-time 6 mornings per week

The department also was approved for providing training for student dietitians and took up to 2 students at any one time for such training.

Dietitians and students all worked 36 hours per week Monday to Friday. Flexibility of hours to cover evening duties of clinics and meetings was enabled by staff being able to take time off in lieu of the additional hours worked. Staff were entitled to 25 days annual leave per year plus all bank holidays plus 2 statutory days.

An examination of the records kept in the department of the deployment of staff showed that all staff, were involved in giving patients therapeutic dietary advice. These records were in the form of daily time sheets kept for a period of 10 days per year. Advice to patients on therapeutic diets took up 54% of time in the case of the District Dietitian/Manager of dietetic services and 70% to 78% of time for other staff. Such consultations took place on hospital wards, in clinics and in patients homes. Other key duties included attending meetings, travel from Hospital site to clinics in the community, training groups, self development and updating on clinical matters, data recording on patient activity, writing diet sheets, corresponding with those who had referred patients, advising catering staff on menus and ordering products.

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2,4,3; Workload for the dietetic department

The dietetic department provided a district wide service which included serving the Beds and Shires Community Trust and GP fundholders, some GP non-fundholders and other agencies. Work with GP fundholders had quadrupled following discussions which had enabled them to value dietetic intervention and persuaded them to purchase additional services. Perhaps this indicated that GPs who are involved in face to face patient care are more willing to support and indeed fund additional dietetic services, as they have an understanding of the impact that dietetic advice can make upon the health of their patients, whilst requests through the consultants and hospital management channels to increase dietetic support to patients had been refused.

At each dietetic clinic approximately 10-15 patients were seen. Clinics were held from 9.30am until 12.30pm and from 2.00pm until 4.30pm. A mixture of newly referred patients and review patients were seen at each clinic. This mixture varied according to the clinic, patient requirements and referrals. Each newly referred out-patient was given a 20 minute appointment and review patients 5 to 10 minutes. Similar timings were allowed for patient consultations on the wards. A range of patients with different diagnoses were referred to the dietetic department including those with IDDM, NIDDM, obesity, IBS and other conditions considered to be assisted by dietary advice. The consultations between the dietitians and patients followed the format described in section 1,4,9. Details of dietetic clinics are shown below:-

**Outpatient clinics at South Wing Bedford Hospital** A general dietetic clinic was held every day of the week, morning and afternoon, with an additional clinic on Wednesday evenings. Additionally, there was a food exclusion clinic with an additional 2 clinics for people with DM each week.

**An outposting of the clinical dietetic service to GPs, both fundholders and non-fundholders occurred with clinics at:**
- **Health Authority clinics**
  Ampthill Health Centre - monthly
Flitwick Health Centre - monthly
Shefford Health Centre - monthly
Sandy Health Centre - monthly
Biggleswade Health Centre - fortnightly

- **GP fundholder clinics**
  Shefford Health Centre - weekly
  Sandy Health Centre - weekly
  273 Bedford Road, Kempston - fortnightly
  Ivel Medical Centre, Biggleswade - weekly
  Flitwick Health Centre - fortnightly
  Queens Park Health Centre - monthly
  Pemberley Surgery, Bedford - monthly

- **Other clinics at GP surgeries**
  2 Goldington Road, Bedford - fortnightly - funded by the Beds and Shires Community Trust
  Cater Street, Kempston - monthly
  Shakespeare Road, Bedford - monthly
  Sharnbrook Surgery - Diabetic clinic monthly
  Harrold Surgery - Diabetic clinic monthly

The waiting time of patients was assessed for all clinics at Bedford Hospital in accordance with the standards for the Patients Charter (Secretary of State for Health, 1991) which states that patients should be seen within 30 minutes of their appointment time. This assessment was undertaken centrally by the audit department at Bedford Hospital but dietitians were required to complete a record sheet of times of patient appointments and time when they were seen by the dietitian. The assessment was based on records of all clinics held by the dietitians for one week per month. An analysis of the assessments showed that all patients had been seen within 30 minutes of their appointment time.
Training of staff by dietetic department

Home economics, medical, nursing, catering and management students and work experience students have all received "on the job" training in the department for variable periods from 1 day to 50 weeks. The dietitians also provided regular training on all aspects of dietary modifications in various clinical disorders for example DM, for other staff such as practice nurses, ward staff and carers. The training of practice nurses was discussed in more detail earlier in section 1,5,4.

Data collected on dietetic patients

Statutory requirements for collection of data on dietetic activity and clinical contact data were introduced with the Korner report (DHSS, 1983) described in section 1,5,6. At Bedford Hospital data on "patient contacts" was collected by the dietetic department using a Financial Information Package (FIP) computer system produced by Peak Services Ltd of Kilwining, Scotland. This system was integrated with other paramedical staff that is, speech therapists, occupational therapists, physiotherapists and chiropodists and also community nursing staff of health visitors, district nurses and psychiatric nurses. For each patient the following information was collected by all professional groups:- name, address, postcode, title, date of birth, patient identification number for Bedford Hospital, name of GP. This information was common to all of the professionals using the system. Each patient had an individual computer number allocated to them. Dietetic patients also had the following additional information recorded:- referring agent, diagnosis (up to 3 diagnoses could be recorded), dietary treatment, location where seen for example hospital ward, health centre, the name of the dietitian who saw the patient, the date when referred and the date when seen. Since January 1989 this information has been collected on all patients seen by the dietitians at Bedford Hospital. In December 1995 the data for dietetic patients for the period 1 April - 31 October 1993 was collected for the period 1989 to 1993 and analyzed using the FIP computer package for numbers of dietetic patient consultations, location at which consultation took place and referring agent. It was not possible to
**Figure 2.1** RECORDING SHEETS OF THE DIETETIC DEPARTMENT OF BEDFORD HOSPITAL

<table>
<thead>
<tr>
<th>DATE</th>
<th>RELEVANT BIOCHEMISTRY</th>
<th>WEIGHT</th>
<th>BMI</th>
<th>COMMENTS</th>
<th>OBJECTIVES AND REVIEW DATE</th>
</tr>
</thead>
</table>

**DIETITIAN**

<table>
<thead>
<tr>
<th>MPI NO</th>
<th>TELEPHONE</th>
<th>HOME</th>
<th>WORK</th>
<th>DOB</th>
<th>GP</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>RELEVANT SOCIAL HISTORY</th>
<th>OCCUPATION</th>
<th>DIET</th>
</tr>
</thead>
</table>

**DIAGNOSIS:**

**REFERRED BY:**

**HOSPITAL NO:**

**SURNAME:**

**FORENAME(S):**

**ADDRESS:**

**MPI NO TELEPHONE HOME WORK DOB GP HEIGHT RELEVANT SOCIAL HISTORY OCCUPATION DIET**

**DIAGNOSIS:**

**REFERRED BY:**

**HOSPITAL NO:**

**SURNAME:**

**FORENAME(S):**

**ADDRESS:**

**MPI NO TELEPHONE HOME WORK DOB GP HEIGHT RELEVANT SOCIAL HISTORY OCCUPATION DIET**

**DIAGNOSIS:**

**REFERRED BY:**
examine data for years 1994 or 1995 as there had been 2 major computer system malfunctions which had resulted in a loss of data.

Additionally all dietitians wrote into the patient medical notes a brief summary of the details of the nutritional advice given such as in the case of an obese patient with NIDDM "Low fat, high fibre diet with 50% starchy carbohydrate. Approx 2000 kcals. Encouraged to stop sugar in drinks and frying food. Encouraged exercise". Any findings made as a result of the dietetic assessment were also recorded in the medical notes. For example in the case of a patient with IDDM "refuses to stop taking sugar in drinks". Special recording sheets which were easily identified by means of blue corners (Fig. 2,1) were available for dietitians to write information on.

2,4,6; Numbers of Dietetic Consultations
The results of the numbers of dietetic consultations were compiled as Table 2,1. As clearly shown during each of the 6 month periods April to October 1989 to 1993, 3,874, 4,892, 6,044, 5,463 and 8,934 patients respectively were referred to the dietetic department at Bedford Hospital for advice. Table 2,1 also shows that the number of SRDs in post at Bedford hospital during the period 1969-1993 from 6 to 14, and the average number of patients seen per SRD; 646, 699, 671, 546, and 638 for years 1989 to 1993 respectively.

The location where the dietetic consultations were carried out was shown in Table 2,2. Patients were seen at the following locations: on hospital sites which included hospital wards and out-patient clinics, NHS non-hospital premises which included health centres, GP surgeries and child development clinics, in patients own homes as domiciliary visits, in Local Authority premises which included schools and residential homes and at other locations which included self help group venues. It was shown that the majority of dietetic consultations were on hospital sites either as out-patients or in-patients; 3,578 (92%) in 1989, 3978 (81%) in 1990, 5,100 (84%) in 1991, 4,283 (78%) in 1992 and 6,785 (76%) in 1993. Dietetic consultations at NHS non-hospital sites were 227 (6%)
**Table 2.1**

DIETETIC CONSULTATIONS BY THE DIETETIC DEPARTMENT AT BEDFORD HOSPITAL DURING THE PERIOD APRIL TO OCTOBER 1989 TO 1993 AND NUMBER OF SRDs EMPLOYED

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>NUMBER OF PATIENTS</strong></td>
<td>3874</td>
<td>4892</td>
<td>6044</td>
<td>5463</td>
<td>8934</td>
</tr>
<tr>
<td><strong>NUMBER OF SRDs</strong></td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>10*</td>
<td>14</td>
</tr>
<tr>
<td><strong>AVERAGE NO. OF PATIENT CONSULTATIONS BY SRDs</strong></td>
<td>649</td>
<td>699</td>
<td>671</td>
<td>546</td>
<td>638</td>
</tr>
</tbody>
</table>

* SRDs on maternity leave
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HOSPITAL SITE</td>
<td>3578</td>
<td>3978</td>
<td>5100</td>
<td>4283</td>
<td>6785</td>
</tr>
<tr>
<td>NHS NON-HOSPITAL</td>
<td>227</td>
<td>376</td>
<td>548</td>
<td>911</td>
<td>1664</td>
</tr>
<tr>
<td>PATIENTS' HOME</td>
<td>46</td>
<td>63</td>
<td>104</td>
<td>39</td>
<td>126</td>
</tr>
<tr>
<td>LOCAL AUTH. PREMISES</td>
<td>26</td>
<td>306</td>
<td>101</td>
<td>55</td>
<td>96</td>
</tr>
<tr>
<td>OTHER LOCATIONS</td>
<td>0</td>
<td>160</td>
<td>191</td>
<td>175</td>
<td>263</td>
</tr>
<tr>
<td>TOTAL ALL PATIENTS</td>
<td>3874</td>
<td>4892</td>
<td>6044</td>
<td>5463</td>
<td>8934</td>
</tr>
</tbody>
</table>
in 1989, 376 (8%) in 1990, 548 (9%) in 1991, 911 (17%) in 1992 and 1,664 (19%) in 1993.


Table 2,3 was prepared to show the referring agents for new patients for dietetic consultations. This shows the groups of consultant specialities and GPs who all referred patients for dietetic advice. It demonstrates that all consultant specialties referred patients but in varying numbers. Table 2,3 also included the number of referral from dietitians outside of Bedfordshire of which there were only a maximum of 8. There were no self referrals during the period of the study.

The data in Table 2,3 data shows that most patients were referred by consultant medical staff that is 497 (83%) in 1989, 455 (81%) in 1990, 628 (77%) in 1991, 387 (70%) in 1992 and 610 (64.5%) in 1993. GPs were the second largest group of doctors who referred patients for dietary advice. An increasing trend in referrals of new patients, by GPs was noted that is 218 (15%) in 1989, 236 (17%) in 1990, 441 (21%) in 1991, 430 (26%) in 1992 and 818 (33%) in 1993 as shown in Table 2,3. Medicine for the elderly (Geriatrics) referred the third largest proportion of patients for dietetic advice.

A comparison of the number of new referrals to the dietetic department with the total number of patients referred was made (Table 2,4). This showed that in the period 1989 to 1993 38%, 28%, 35%, 30% and 28% of the patients seen in the dietetic department were new referrals. A ratio of follow up patients to newly referred patients was developed from 1989 to 1993 and this showed a ratio of 2.6, 3.6, 2.9, 3.3 and 3.6 respectively. This showed an increasing trend for
Table 2,3

REFERRING AGENTS FOR NEW PATIENTS SEEN IN THE DIETETIC DEPARTMENT AT BEDFORD GENERAL HOSPITAL DURING THE 6 MONTH PERIOD APRIL TO OCTOBER 1989 TO 1993

<table>
<thead>
<tr>
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<tr>
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<td>160</td>
<td>112</td>
<td>191</td>
<td>138</td>
<td>185</td>
</tr>
<tr>
<td>T &amp; O</td>
<td>30</td>
<td>27</td>
<td>31</td>
<td>19</td>
<td>45</td>
</tr>
<tr>
<td>MEDICINE</td>
<td>497</td>
<td>455</td>
<td>628</td>
<td>387</td>
<td>610</td>
</tr>
<tr>
<td>RHEUMATOLOGY</td>
<td>9</td>
<td>14</td>
<td>25</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>PAEDIATRICS</td>
<td>67</td>
<td>74</td>
<td>67</td>
<td>72</td>
<td>85</td>
</tr>
<tr>
<td>GERIATRICS</td>
<td>209</td>
<td>193</td>
<td>370</td>
<td>317</td>
<td>321</td>
</tr>
<tr>
<td>OBS &amp; GYNAE</td>
<td>0</td>
<td>99</td>
<td>24</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>MENTAL HANDICAP</td>
<td>95</td>
<td>114</td>
<td>102</td>
<td>52</td>
<td>97</td>
</tr>
<tr>
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<td>13</td>
<td>23</td>
<td>16</td>
<td>13</td>
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<tr>
<td>COMMUNITY</td>
<td>8</td>
<td>23</td>
<td>25</td>
<td>71</td>
<td>132</td>
</tr>
<tr>
<td>OBS &amp; GYNAE</td>
<td>30</td>
<td>39</td>
<td>49</td>
<td>32</td>
<td>18</td>
</tr>
<tr>
<td>DENTAL</td>
<td>10</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ENT</td>
<td>1</td>
<td>12</td>
<td>25</td>
<td>14</td>
<td>27</td>
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<tr>
<td>ONCOLOGY</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>GP</td>
<td>218</td>
<td>236</td>
<td>441</td>
<td>430</td>
<td>818</td>
</tr>
<tr>
<td>OTHER MEDICAL</td>
<td>30</td>
<td>23</td>
<td>33</td>
<td>59</td>
<td>57</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OTHER DIETITIANS</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1484</td>
<td>1376</td>
<td>2089</td>
<td>1652</td>
<td>2470</td>
</tr>
</tbody>
</table>

T.O. TRAUMA & ORTHOPAEDICS
OBS & GYNAE OBSTETRICS & GYNAECOLOGY
ENT EAR, NOSE & THROAT
Table 2.4

COMPARISON OF NUMBERS OF NEW PATIENTS SEEN WITH TOTAL NUMBER OF PATIENTS GIVEN DIETETIC CONSULTATIONS IN THE DIETETIC DEPARTMENT AT BEDFORD HOSPITAL DURING THE PERIOD APRIL TO OCTOBER 1989 TO 1993

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW</td>
<td>1484</td>
<td>1376</td>
<td>2089</td>
<td>1652</td>
<td>2470</td>
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<td>TOTAL</td>
<td>3874</td>
<td>4894</td>
<td>6044</td>
<td>5463</td>
<td>8934</td>
</tr>
<tr>
<td>% OF NEW REFERRALS</td>
<td>38</td>
<td>28</td>
<td>35</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>RATIO NEW TO FOLLOW UP PATIENTS</td>
<td>2.6</td>
<td>3.6</td>
<td>2.9</td>
<td>3.3</td>
<td>3.6</td>
</tr>
</tbody>
</table>
patients to be given more follow up appointments over the years as the dietetic department expanded.

2.4.7; Number of Dietetic Consultations to people with DM

The FIP computer system proved impossible to interrogate by the researcher or the computer managers in order to obtain a summary of referral of people with different types of diagnosis such as DM. Advice from the manufacturers of the FIP system was sought and they advised that the only way of investigating the number of people with a diagnosis of DM would be by a manual search of all the data on patients registered on the system. Initially a computer print-out of all patients who had been given a diagnosis of DM for the period April to October 1989 to 1993 was obtained from the computer manager. The printing of this report was extremely time-consuming and took from 4.00pm on a Friday evening until 10.00am on the following Monday morning. The researcher then had to examine manually all of the data and to extract information on the number of people with DM referred and also the referring agents. This piece of research was visually tedious due to the fine print on the computer paper and took 38 hours to perform.

It was found that all of the consultant specialities and GPs listed in Table 2,3 referred people with newly diagnosed of DM for dietetic advice. During the period of study 3,810 people with newly diagnosed DM were referred, of these 1,032 (27%) were referred by their GP and 1,452 (38%) were referred by the staff in general medicine. The remaining 1,326 (35%) were referred by the other consultant specialities. During 1989 to 1993, 85, 150, 201, 186 and 410 patients were referred by GPs per year and 275, 235, 420, 190 and 332 patients per year were by staff in general medicine and 510, 133 ,327, 246 and 470 by other consultant specialities over a similar period (Table 2,5). As shown in Table 2,5 this represented a range of 39% to 64% of the referrals of people with newly diagnosed DM from GPs and 49% to 67% of referrals from staff working in general medicine. Examination of the percentage of new referrals to the dietetic department showed that 35% to 49% of patients had a
Table 2.5

NEWLY DIAGNOSED PATIENTS WITH DM REFERRED FOR DIETARY ADVICE BY STAFF IN GENERAL AND BY GPs DURING APRIL TO OCTOBER 1989 TO 1993

<table>
<thead>
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<th></th>
<th></th>
<th></th>
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</thead>
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<tr>
<td>GPs - DM</td>
<td>85</td>
<td>150</td>
<td>201</td>
<td>186</td>
<td>410</td>
</tr>
<tr>
<td>TOTAL ALL</td>
<td>218</td>
<td>236</td>
<td>441</td>
<td>430</td>
<td>818</td>
</tr>
<tr>
<td>PATIENTS %</td>
<td>39</td>
<td>64</td>
<td>46</td>
<td>43</td>
<td>50</td>
</tr>
<tr>
<td>GENERAL MEDICINE</td>
<td>275</td>
<td>235</td>
<td>420</td>
<td>190</td>
<td>332</td>
</tr>
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<td>DM REFERRAL</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL ALL</td>
<td>497</td>
<td>455</td>
<td>628</td>
<td>387</td>
<td>610</td>
</tr>
<tr>
<td>PATIENTS %</td>
<td>55</td>
<td>52</td>
<td>67</td>
<td>49</td>
<td>54</td>
</tr>
<tr>
<td>OTHER SOURCES</td>
<td>150</td>
<td>133</td>
<td>327</td>
<td>246</td>
<td>470</td>
</tr>
<tr>
<td>OF DM REFERRAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL DM</td>
<td>510</td>
<td>518</td>
<td>948</td>
<td>622</td>
<td>1212</td>
</tr>
<tr>
<td>TOTAL ALL</td>
<td>1484</td>
<td>1376</td>
<td>2089</td>
<td>1652</td>
<td>2470</td>
</tr>
<tr>
<td>PATIENTS %</td>
<td>35</td>
<td>38</td>
<td>45</td>
<td>38</td>
<td>49</td>
</tr>
</tbody>
</table>
diagnosis of DM.

2.5; DISCUSSION
This study examined the workload, pattern and type of referrals to the dietetic department at Bedford General Hospital over the 5 year period from 1989 to 1993. A description of the staffing profile, spectrum of work and data recorded on patients referred to the department was made. All dietitians employed in the department were SRDs in accordance with the regulations for dietitians to be employed in the NHS (CPSM, 1996). It was shown that the number of dietitians in the department had doubled from 1989 to 1993 as more funds were obtained for staff. Often staff were given short term contracts for specific projects, eg for work with individuals suffering from constipation. However, since 1993 there was an obvious decrease in numbers of dietitians due to financial pressures upon the Trust preventing recruitment to existing vacancies.

It became evident early in this study that it was impossible to obtain information on the diagnosis of patients from the FIP computer system. This system was designed to fulfil the requirements for data collection for statutory purposes and presentation to the DHSS and not for any other purposes. The British Dietetic Association (1997) has developed standards which encourage dietitians to examine the outcome of their work both quantitatively and qualitatively. In order for dietitians to fully develop such evaluations it is essential that appropriate and effective computer systems are designed which take into account the full requirements of dietitians for examining data on patients. Until such systems are available then it is unlikely that many dietitians will devote the excessive amounts of time required to evaluate data on patients with diagnosis such as DM as was undertaken by the author.

It was noted that patients were referred to the department for dietary advice (Table 2,3) for a wide range of conditions where dietary advice had been shown to be helpful, also it was noted that all consultant groups and GPs in North Bedfordshire referred patients for dietary advice (Table 2,3). The data on
patient referrals to the dietetic department showed that from 1989 to 1993 there has been a steady increase in numbers of new referrals to the dietetic department. Such referral numbers were noted to be reflective of dietetic staff numbers. Growth of the department from a total of 5 whole time equivalents in 1989 to 14 in 1993 had considerably increased the number of patients seen. The decline in numbers of patients given dietetic consultations in 1992 coincided with a period of maternity leave of senior members of staff. Due to most dietitians being female this reduction in patients numbers during periods of maternity leave is a problem that is inevitable in many departments. Since the study dietetic posts have been funded to meet an increased need for dietetic advice in particular for people with DM (see chapter 5), elderly inpatients and referrals from GPs. The increasing or decreasing numbers of dietetic staff not only seemed to increase the number of total patients seen but also the attraction of new referrals for dietary advice. It was noted that as the department grew there was an increased tendency for patients to be seen more frequently as shown by Table 2,4. However from the data examined from the FIP system, it was impossible to obtain any information on the benefits of such an increase in follow up appointments for patients. Therefore it seemed imperative to ascertain the benefits of dietetic consultations for patients and whether more follow up provided an increased benefit.

On examining the referral pattern of patients it was evident that there was a decline in number of patients being seen on the hospital site (from 92% in 1989 to 76% in 1993) with a commensurate increase in numbers of patients being seen on non-hospital NHS premises (from 5.8% in 1989 to 18.6% in 1993). This increase in patients seen on non-hospital NHS premises was reflective of the increase in new referrals of patients from GPs from 15% to 33%. With the advent of GP fundholding practices there was a requirement for more dietetic clinics to be held on GP premises as demonstrated by the wide variety of out-posted dietetic clinics (Section 2,4,3). Such clinics can be helpful to patients in providing dietetic information to those with DM in GP practices with a resultant improved control as was shown by Sullivan et al (1988).
It was also noted that more patients were seen at other venues away from the hospital including in their own homes and also at other venues such as at self help groups which was reflective to a move away from central hospital services to more community based ones.

An examination of the origins of referrals showed a decline in numbers of referrals from Obstetrics and Gynaecology was noted and reflected a changing dietetic work pattern whereby dietetic input into obstetric clinics ceased as a savings measure. It was also interesting to note that, despite the publication of the Kings Fund Centre Report (1992) and local dissemination and education sessions on this, there was in fact no increase in referrals from trauma and orthopaedics, general surgery or medical oncology. This could reflect the low level of awareness of the value of dietetic intervention for such patients by medical staff as has been commented on by Brett et al (1986) and Hankey et al (1991). Probably the lack of nutrition in the undergraduate medical curriculum as noted by Jackson (1995) contributes to this low level of understanding.

It was also noted that no patients had self referred themselves for dietetic advice. This maintained the Professional Code of Conduct of the Dietitians board SRDs in force at the time of the study which states SRDs shall not;

"Advise An individual therapeutically except in an emergency unless that individual has been referred;

i. by a medical or dental practitioner.

or ii. after dietary treatment has been agreed in consultation with the patient's medical or dental practitioner.

or iii. via a procedure which has been previously agreed by dietitians and relevant medical staff and which is in accordance with a registrants professional duty." (CPSM,1995).

In order to compare the data with that of Hankey, et al (1991) who undertook the similar study at Darlington General Hospital for 3 months. It was apparent that in their study only computer data of dietetic referrals was examined and
that no manual examination of data was undertaken. In their study they totalled the number of referrals of patients from general medicine and GPs. At Bedford Hospital during the same period it was noted that 628 (30%) of the new referrals were from general medicine and 441 (21%) from GPs (Table 2,3). This gave a total of 51% which is less than the 60% found by Hankey, et al (1991). As at Darlington General Hospital it was apparent that at Bedford Hospital patients with a variety of conditions including DM who were referred by GPs and consultants of general medicine provided the greatest work load to dietetic departments.

Indeed as demonstrated in section 2,4,6 approximately half of all new patients referred from both staff in general medicine and GPs had a diagnosis of DM. Indeed 35% to 49% of all the new patients referred to the dietetic department had a diagnosis of DM (Table 2,5). Thus people with DM constituted a between a third and a half of the work load for the dietetic department at Bedford Hospital. This indicated that DM was well recognised by medical staff to require dietetic advice, (the establishment of the need for such advice in DM was discussed in the preceding chapter) and caused them to refer patients for dietary advice.

As mentioned, the data as collected by the use of the FIP system could only be used to provide fairly crude investigations into quantitative data, ie numbers of patients seen in the dietetic department and no real information on numbers of patients referred with specific diagnoses such as DM or the outcomes of dietary advice for people. Therefore much more detailed investigations on the outcomes of patients with DM referred for dietary advice were planned and are discussed in chapters 5 and 6.
CHAPTER 3

AN EXAMINATION OF DIET SHEETS PROVIDED FOR PEOPLE WITH DIABETES MELLITUS IN GREAT BRITAIN

A critical study of diet sheets produced by dietetic departments and commercial and charitable organisations in Great Britain for people with DM

3.1; INTRODUCTION

"Diet sheets are one of the main tools of the dietitian" (Lambert, 1990). Yet no definition of a diet sheet or examples occur in the Manual of Dietetic Practice (Thomas, 1994), one of the major text books on the science and practice of dietetics in Great Britain. In the USA a "diet manual" is defined by the American Dietetic Association as, "information that hospitals are required to have, which describes the foods allowed and restricted, the rationale and sample menus" (Cataldo et al, 1992).

All dietetic departments in Great Britain use a range of written information containing advice for patients on the therapeutic diet they have been advised to follow. These are commonly known as "diet sheets". Dietary information contained in these reflects the current knowledge of therapeutic dietetics for specific disorders including diabetes mellitus (DM). The writing, preparation and updating of diet sheets can be a major task for dietitians (chapter 1,5,5).

With the NHS reforms in the UK there has been a drive for hospitals to make the literature they provide more attractive to patients. Such literature includes diet sheets. Well designed, attractively presented, concise and printed diet sheets are important for comprehension, retention of information and patient motivation (Clarke and Duncan, 1971; Duchastel, 1978; Hartley, 1981; Frost
et al 1991). Diet sheets should be "clear and easy to read, simple to understand, easy to amend, durable and attractive" (Hearnshaw, 1981), "they are of no use if they cannot be read or understood" (Thomas et al, 1974). Nurses, GPs, and other health professionals may give patients diet sheets without reference to a dietitian. This was noted by Lambert (1990) in a study of patients with Irritable Bowel Syndrome (IBS). Presentation of the diet sheet is of great importance to patient comprehension. Diet sheets are also available in magazines and books, giving an expectation of presentation and content.

Diet is a major component in the management of DM (chapter 1). Information contained in diet sheets for DM is of considerable importance to the education of patients with respect to control, general well being and the prevention of complications. Poor understanding and compliance leads to poor metabolic control (Stone, 1961; West, 1973). Renal complications, visual impairment, peripheral vascular disease and coronary heart disease result in adults (Pell and D'Alonzo, 1970) and growth retardation in children (Jivani and Reyner, 1973). Yet Mitchell et al (1990) and Humphreys et al (1994) reported on difficulties people with DM had in complying with a diet. Despite the key role that a diet sheet can have in a patient's education no comprehensive surveys of diet sheets used for DM appear to have been published apart from the ones by Thomas et al (1974) and Truswell et al (1975).

The aim of the present study was to examine diet sheets for patients with DM produced by dietetic departments and commercial organisations in the UK with respect to their form and presentation, clarity, ease of interpretation as well as to determine the current consensus of dietary advice provided.

3.2; METHODS
Lambert (1990) undertook a comprehensive study of high fibre diet sheets, in which the nutritional content provided by diet sheets was calculated but also the presentation was examined. The structure of this study was used as the basis for the present examination of diet sheets in current use for DM.
3.2.1; Requests for diabetic diet sheets

On 4th May 1996 a request for "copies of diet sheets for people with diabetes" (Appendix 3,) was sent to 40 Dietetic Managers known to manage dietetic departments in the NHS in England, Scotland and Wales (Table 3,1). Addresses for the dietetic managers were obtained from the secretary of the Dietetic Managers Group of the British Dietetic Association. These departments included centres of excellence for the management of DM, such as Great Ormond Street Children's Hospital Trust, Kings College Hospital Trust and St Thomas's Hospital Trust, all located in London. Additionally 10 dietitians not employed in the NHS were asked to provide diet sheets. These included 7 dietitians employed in commercial organisations and 2 in private practice (including Harley Street) and also the senior dietitian of the BDA a charitable organisation advising people with DM and funding research into the condition.

The request was in the form of a letter (Appendix 3,1) which was personalised according to the recipient, and a large stamped addressed envelope was enclosed for the return of these to the researcher. Within 6 weeks 35 replies were received from representatives of the Dietetic Managers in the NHS, a response rate of 87.5%. Twenty five (62.5%) dietitians sent diet sheets, 2 managers in Scotland replied that a common diet sheet was used throughout Scotland and was identical to that provided by the dietetic manager at Paisley Hospital. Two dietitians declined to provide diet sheets as their departments consisted of only 2 dietitians and they had no time to update diet sheets and used photocopies of ones several years old. Three dietitians declined to provide diet sheets as they were updating them. Also 2 dietitians sent unsolicited diet sheets (Table 3,1). A total of 153 diet sheets were received from the 27 NHS dietetic departments and these provided the resource material for the study. Seven diet sheets were received from dietitians employed in private industry, 2 in private practice and 8 from the BDA, a 100% response rate.

3.2.2; Data coding

Upon receipt each diet sheet was allocated a code number for identification
<table>
<thead>
<tr>
<th>Location</th>
<th>Code</th>
<th>Comments</th>
<th>Received</th>
<th>Additional Information</th>
</tr>
</thead>
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<td></td>
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<td></td>
</tr>
<tr>
<td>North Hampshire Hospital</td>
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<tr>
<td>GoodHope Hospital Trust</td>
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<td></td>
</tr>
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<td>Sutton Coldfield</td>
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<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>East Birmingham Hospital</td>
<td>5</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Trust, Bury St Edmunds</td>
<td>6</td>
<td>Teaching Hospital</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Blackpool Victoria Hospital</td>
<td>7</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S.W. Region</td>
<td>8</td>
<td>Source - Dietetic Mgr at Bristol</td>
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<td>Diet Sheets used throughout S.W. Region</td>
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<tr>
<td>Kings College Hospital</td>
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<td>Centre of Excellence</td>
<td>Y</td>
<td>undertaken research on DM</td>
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<tr>
<td>Queen Elizabeth Hospital</td>
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<td></td>
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<td>Dudley Hospital</td>
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<td>Teaching Hospital</td>
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<td>Dietetic service to Newcastle</td>
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<td>Draft provided</td>
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</tr>
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<td></td>
</tr>
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<td>Solihull Hospital</td>
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<td></td>
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<td></td>
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<td>Y</td>
<td></td>
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<tr>
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<td>Y</td>
<td>being updated</td>
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<tr>
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<td></td>
<td>Y</td>
<td>being updated</td>
</tr>
<tr>
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<td></td>
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<td>N</td>
<td></td>
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<td></td>
<td>N</td>
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<td>University College</td>
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<tr>
<td>Brighton Hospital</td>
<td>43</td>
<td></td>
<td>N</td>
<td></td>
</tr>
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<tr>
<td>BUPA hospital Watford</td>
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<td>Y</td>
<td></td>
</tr>
<tr>
<td>Kellogs</td>
<td>1</td>
<td>Cereal Manufacturer</td>
<td>Y</td>
<td>'free phone'</td>
</tr>
<tr>
<td>Tesco Stores Ltd</td>
<td>2</td>
<td>Supermarket</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Bayer Pharmaceuticals Ltd</td>
<td>3</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Sainsbury's</td>
<td>4</td>
<td>Supermarket</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Hoechst</td>
<td>5</td>
<td>Pharmaceuticals</td>
<td>Y</td>
<td></td>
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<tr>
<td>Siemens</td>
<td>6</td>
<td>sweeteners</td>
<td>Y</td>
<td></td>
</tr>
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<td>7</td>
<td>Supermarket</td>
<td>Y</td>
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</tr>
<tr>
<td>BDA</td>
<td>1</td>
<td>Charitable Organisation</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>
purposes and to maintain confidentiality of the provider. The numbers of diet sheets provided per organisation, their titles, presentation and content were examined in detail.

3,2,3; Analysis of diet sheets
The diet sheets were critically examined under 6 main headings;
- Numbers of diet sheets produced; section 3,3,3
- Appearance and language; section 3,3,4
- Instructions regarding food and nutrition; section 3,3,5
- Instructions for shopping, cooking, meals and snacks; section 3,3,6
- Lifestyle factors; section 3,3,7
- Dietary advice for special groups with DM; section 3,3,8

The findings were then compared with current recommendations in the scientific literature as summarised in chapter 1 sections 1,4,1 to 1,4,9. Nutritional analysis of any "suggested menus" ie food suggested to be eaten throughout the day, contained in the diet sheets was undertaken in the following chapter.

3,2,4; Statistical analysis
Advice on the data analysis of the diet sheets was sought from a statistician at the University of Surrey, who recommended that the diet sheets from commercial sources, the BDA and from dietitians employed in private practice were analyzed separately from those produced by dietetic departments in the NHS. Furthermore it was recommended that the information in the diet sheets produced by NHS dietetic departments was summarised and presented according to dietetic department rather than individual diet sheet. Some departments produced a range of diet sheet which were similar in presentation and general content (examples in Figs 3,1 and 3,2 of the cover, introduction and contents page of 2 diet sheets from the South West Region). The only variation in the 2 diet sheets was in the inclusion of material on counting carbohydrate in one diet sheet but the exclusion in the second.
3, 3; RESULTS

As shown in Table 3,1; seven departments produced one diet sheet for DM, 4 departments 2, 3 departments 3, 2 departments 5, 2 departments 6, 3 departments 9, 1 department 10, 2 departments 13, 1 department 17 and 1 department (Paisley, Scotland) produced 22 (which the dietitians in Scotland had all agreed to use). The wide range of types of diet sheets received varied in appearance, size, format and content as discussed later in this chapter.

3,3;1 Collaboration in producing diet sheets
3,3;1,a; NHS dietetic departments

As shown in Table 3,1 diet sheets produced by dietitians in the NHS were used over a wide geographical area. Fourteen departments included their address in the diet sheets. Two departments relied on the person providing the diet sheet to write in a contact telephone number. No space for an address was provided as shown in the diet sheet from the South West Region (Figs 3,1 and 3,2). As mentioned, dietitians throughout Scotland had collaborated to produce a number (22) of uniform diet sheets for DM which they had agreed to use as part of "A Scottish Diet Sheet Initiative" which commenced in 1985. Each stage of the process of production had integral quality control mechanisms such as peer review, readability scoring, involvement of patient groups. The diet sheets can be ordered throughout Scotland at a charge of 20-40 pence per copy plus £1.32 for the plastic folder which is given to patients in which to store their copies. No address of the provider of the diet sheet was contained as part of the pack but the provider had stuck a small self adhesive "address label" onto the cover. The dietitians in the South West part of Britain (ie the area from Lands End to Bristol, the old South-West region of the NHS) had compiled diet sheets via a small working group. The diet sheets had been printed using commercial printers and the NHS Supplies organisation undertook to distribute them to dietitians and other health professionals at a charge of 17 pence per copy.

The dietetic departments in North Bedfordshire and East Anglia also provided
When you have diabetes the level of sugar in your blood is too high. The main way to control this and keep yourself well are to:

- Eat less sugar and sugary foods
- Eat more fibre.
- Cut down on fried and fatty foods.
- Do not miss meals; have breakfast, a mid-day meal, and an evening meal. In between meal snacks may be necessary.
- Watch your weight.

It is recommended that this diet sheet is only used after taking a detailed diet history.

Contents

- Introduction
- How to eat more fibre
- Snacks and drinks
- Fat and your diet
- Ways to eat less sugar
- Ideas for meals
- Example of meal plan
- Alcohol
When you have diabetes the level of sugar in your blood is too high. The main way to control this and keep yourself well are to:

- Eat less sugar and sugary foods
- Eat more fibre.
- Cut down on fried and fatty foods.
- Do not miss meals; have breakfast, a mid-day meal, and an evening meal. In between meal snacks may be necessary.
- Watch your weight.

IT IS RECOMMENDED THAT THIS DIET SHEET IS ONLY USED AFTER TAKING A DETAILED DIET HISTORY

CONTENTS
Introduction Page 4
How to eat more fibre Page 6
Snacks and drinks Page 7
Fat and your diet Page 8
Ways to eat less sugar Page 10
Ideas for meals Page 12
Counting carbohydrate Page 13
Example of meal plan Page 17
Alcohol Page 18
information as "Guidelines for Diabetes Care" produced for use in those areas. Both documents contained information on standards of care for people with DM including dietary advice and reference to diet sheets provided, as well as referral procedures for people with DM to obtain dietetic advice.

3,3,1,b; Commercial, private and charitable organisations
Replies were received from; Kelloggs (a cereal manufacturer), 2 Pharmaceutical Companies that produce medication for DM diabetes management, 1 Sweetener Manufacturer, 2 Dietitians working in Private Practice, 3 Major Supermarkets (Tesco, Asda and Sainsbury's) and the BDA. The diet sheets had been compiled by dietitians employed by the organisations. Additionally 2 dietitians employed in commercial organisations, one from Tillery Valley Foods, a supplier of cook-chill food to the NHS and one from St Ivel a manufacturer of dairy products, sent unsolicited information. St Ivel did not provide diet sheets but provided a teaching pack which contained information on diets for patients with DM for use by practice nurses. The dietitian from Tillery Valley foods wrote to say that no individual information was produced as she found that "dietitians never agreed".

Information provided on diet for people with DM by Kelloggs was available via a free-phone number which is widely advertised on their product packs. Two of the supermarkets, Tesco's and Sainsbury's have stores throughout Britain. Information sheets for people on various aspects of diet, including DM, are placed in leaflet holders in the store. The third supermarket, Asda, provided information via its customer services' desks or head office. The 2 Pharmaceutical Companies and the Sweetener Manufacturer provided information for health professionals for use with patients. All the commercial organisations had collaborated with the dietitians of the BDA in producing the diet sheets and acknowledged this as well as suggesting that they were a resource, giving both their address and telephone number.

The 2 dietitians who worked in private practice provided this from their home
and also used consulting rooms in private hospitals and Harley Street. Patients referred to them by consultant diabetologists, physicians and GPs originated from any part of Britain and in some cases the world. The dietitian who worked with a consultant diabetologist in Harley Street had been delegated an extended role and advised on medication changes in conjunction with the consultant, tested urine and blood for the level of glucose as well as weighing patients and advising extensively on lifestyle. They wrote diet sheets for patients which were totally personalised according to the individual's lifestyle, management and eating pattern. Additionally they used information purchased from the BDA and other dietetic departments where they considered it helpful to the patient. Each saw a limited number of patients with a maximum of 6 consultations per day, fees were charged in the range £35-65 per consultation depending on which consulting rooms were used.

3, 3, 2; Costs of diet sheets
All the diet sheets were free to patients with any costs borne by the provider. The dietitians in private practice included the cost of diet sheets as part of the consultation fee. As mentioned earlier diet sheets cost 17 pence each for those for South West England and 20-40 pence each for the ones used in Scotland. Diet sheets from Ealing in London were available at 50 pence each to health professionals elsewhere. A pack of 10 diet sheets entitled “Teaching packs for children with diabetes” was available for purchase from Great Ormand Street Children’s Hospital Trust at a cost of £45. Two dietetic departments had obtained sponsorship for producing diet sheets. One from Bayer PLC, a producer of DM medication and the other from Abbott Laboratories Ltd, a major producer of enteral and sip feeds.

All diet sheets produced by commercial organisations were free to anyone wishing to use them. Sainsburys had been involved in National Diabetes Week, held annually in June, during a collaborative venture with the BDA and local dietitians. During this week educational store tours for people with DM were carried out by SRDs. The BDA produced a range of 8 diet sheets, one of these
was free. Originally a more comprehensive diet sheet was free, but in 1996 SRDs working in the NHS had exhausted supplies, so a charge of 80p was levied (Personal Communication BDA, 1996). A range of books on "diet and diabetes" were produced costing £2.00 to £10.99.

3.3, 3; Numbers of diet sheets produced
3.3, 3, a; NHS Dietetic departments
As discussed in section 3.3 the number of diet sheets provided for people with DM varied between departments (Fig.3,3), 8 departments provided sheets specifically for NIDDM, 5 for IDDM (the South West Region provided 2 different diet sheets for IDDM) 5 departments special diet sheets for people with obesity, 1 (Great Ormond Street Childrens Hospital) for children, 1 for women with gestational DM, 1 for helping people with DM to choose from the hospital menu while an in-patient, 2 for those with a poor appetite, 1 for those of Afro Caribbean Culture and 2 for those of Asian culture. One department also purchased diet sheets from the BDA. Three dietetic departments produced information which was designed to be given to people with newly diagnosed DM by doctors or nurses. Other departments provided a range of information from which dietitians selected sheets according to the patient's needs.

3,3,3,b; Commercial, private and charitable organisations
Each of the commercial organisations produced one diet sheet for people with DM. The BDA produced 8 diet sheets (2 in English and the rest as translations into foreign languages) plus a range of books on DM. They were for use with both IDDM and NIDDM.

3, 3, 4; APPEARANCE AND LANGUAGE OF DIET SHEETS
3,3,4,i; Presentation
3,3,4,i,a; NHS Dietetic departments
Fig 3, 4 shows that of the 153 diet sheets, 71 were white, and 41 of them had been reproduced by photocopying. Thirty four were green, 25 blue, 4 red, 8 pink, 1 purple, 3 orange, 2 beige, 1 brown, 1 peach and 1 yellow. The coloured
Figure 3.3

NUMBER OF DIET SHEETS FOR PEOPLE WITH DM PRODUCED PER NHS DIETETIC DEPARTMENT
Figure 3.4

COLOURS USED IN PAPER & COVERS OF DIET SHEETS PRODUCED BY DIETETIC DEPARTMENTS

![Bar chart showing the number of times each colour was used in diet sheets produced by dietetic departments. The most common colours are white and green.]

Number of Times Colour Used

<table>
<thead>
<tr>
<th>Colour</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>80</td>
</tr>
<tr>
<td>Green</td>
<td>40</td>
</tr>
<tr>
<td>Light Blue</td>
<td>20</td>
</tr>
<tr>
<td>Dark Blue</td>
<td>10</td>
</tr>
<tr>
<td>Red</td>
<td>5</td>
</tr>
<tr>
<td>Pink</td>
<td>3</td>
</tr>
<tr>
<td>Purple</td>
<td>2</td>
</tr>
<tr>
<td>Orange</td>
<td>1</td>
</tr>
<tr>
<td>Beige</td>
<td>1</td>
</tr>
<tr>
<td>Brown</td>
<td>1</td>
</tr>
<tr>
<td>Peach</td>
<td>1</td>
</tr>
<tr>
<td>Yellow</td>
<td>1</td>
</tr>
</tbody>
</table>
diet sheets had been reproduced by professional printing. Of the dietetic
departments providing information, 17 (63%) provided information with errors,
crossed out words and hand written additions. In one case the photocopying
and stapling was so poor that the diet sheet could not be opened or read.
Another diet sheet contained the mystifying phrase "hydrate foods".

3.3.4, i,b; Commercial, private and charitable organisations
With the exception of the diet sheet produced by Asda, which was on white
paper, all were in full colour print on glossy paper. Fig 3,5 shows an example
of the diet sheet produced by Sainsbury's. No errors were found in the sheets
and all were easy to open and read. All were professionally printed.

3.3.4, ii; Readability
3.3.4, ii,a; NHS Dietetic departments
Print size was of 12 font in diet sheets from 23 departments. They were easily
legible for those with normal visual acuity at a distance of 25 cm., 4
departments used a print size of 18 font. Blocking of text (whereby pieces of
text were separated) was used in all diet sheets. Capitals were used for titles
and headings in 22 diet sheets. All sentences and phrases were short with a
maximum of 24 words in a sentence and the first person was used throughout.

3.3.4, ii,b; Commercial, private and charitable organisations
Print size of 12 font was used throughout. Capitals were used for titles in 2 diet
sheets. Different font style of lower case and larger size print were used
extensively for titles in the remainder of the diet sheets. Sentences were short,
with the maximum number of 28 words, being found in a diet sheet produced
by the BDA. All diet sheets were of a warm friendly tone, the layout and
pictures encouraged easy comprehension.

3.3.4, iii; Illustrations
3.3.4, iii,a; NHS Dietetic departments
Twenty two of the departments illustrated the diet sheets with drawings of
Diabetes

a healthy eating guide

Sainsbury's

FRESH FOOD, FRESH IDEAS.
foods, 8 used computer "clip art". Fig 3,6 shows the cover of the NHS diet sheet which had the most illustrations. No photographs or full colour pictures were used and diet sheets appeared dull.

3,3,4,iii,b; Commercial, private and charitable organisations
Apart from Asda, all used full colour photographs of foods, families at meal times and people shopping to illustrate them. One diet sheet from the BDA included a photograph of the senior dietitian and an introduction to her role.

3,3,4,iv; Size
3,3,4,iv,a; NHS Dietetic departments
The 153 diet sheets ranged in size from a single page in 4 instances to one of 23 pages of text. One department produced an A6 size diet sheet, five departments A4 size diet sheets and twenty one A5 diet sheets. 3 diet sheets (A5 size) had pockets in the front cover to hold additional information.

3,3,4,iv,b; Commercial, private and charitable organisations
All diet sheets were of A5 size, except for one of A6 (Bayer Pharmaceutical) and another A4 (Asda Supermarket). No single page diet sheets were produced and the length of the booklets ranged from 8 to 26 pages.

3,3,4,v; Titles of diet sheets
3,3,4,v,a; NHS Dietetic departments
As shown in Figure 3,7 of the titles of the diet sheets, 16 departments used the term "Healthy Eating", 4 "Diabetes and Food", 3 "Diabetic Diet", 1 "Eating Plan for Diabetes", 1 "Low Sugar Diet" and 1 "Diabetes the Healthy Way" in their titles. One department provided an untitled draft diet sheet.

3,3,4,v,b; Commercial, private and charitable organisations
The word "Diabetes" or "Diabetic" featured in titles of all of the diet sheets produced by the commercial organisations. The diet sheets available from the BDA were entitled "Food and Diabetes" and "Eating Well With Diabetes"
LOW SUGAR DIET
FOR
DIABETES

Name: ..............................

Date: ..............................
Figure 3.7

TITLES OF DIET SHEETS PRODUCED BY DIETETIC DEPARTMENTS

Guide to Healthy Eating for Diabetes
Diabetic Diet
Eating Plan for Diabetics
Low Sugar Diet
Diabetes the Healthy Way
Untitled Draft
3.3.4, vi; Introduction to diet sheets

All diet sheets examined contained an introduction to DM and the rationale for dietary modifications. In 10 instances this was of 1 paragraph in length, in 15 1 page long and in 2, 2 pages long. Introductions to the diet sheets were quick and easy to read except for the ones which were 2 pages long. The language used in all of the introductions to the diet sheets was simple to understand, was in the first person and of a "friendly tone". The phrase "Diabetes is due to too much sugar in the blood" or similar was used to describe the rationale for dietary advice in DM in all of the diet sheets. Five diet sheets detailed how "sugar in the blood comes from food". The remaining 22 made no mention of the process of digestion and absorption. Two diet sheets detailed "normal blood glucose levels of 4-7 mmol glucose per litre blood". One diet sheet stated in its introduction that "the diet for diabetes prevents long term complications", 2 others that "the diet for diabetes also prevents constipation and bowel problems" and 3 that the diet "prevents heart disease".

3.3.4, vi, b; Commercial, private and charitable organisations

Each diet sheet contained an introduction which was one page in length. It included definitions of the different types of DM, prevalence and treatments as well as the role of dietary advice. The language used was simple to understand, warm and friendly and all diet sheets took the reader easily through information on blood sugar levels.

3, 3, 5; INSTRUCTIONS IN DIET SHEETS ON FOOD AND NUTRITION

3.3.5, i; Aims of diet for DM

Each department’s diet sheets contained a number of specific aims for the diet. These immediately followed the introduction and the aims had been put into simple rather than scientific language. Fig. 3,8 summarised the main aims presented in the diet sheets. It is clear that the sheets lacked uniformity for, while all advised "reduce sugar", the sheets from 26 departments advocated
MAIN AIMS OF DIET FOR DM STATED IN THE DIET SHEETS PRODUCED BY THE DIETETIC DEPARTMENTS

- Regular meals
- High fibre
- Avoid 'Diabetic' foods
- Medium protein portions
- Plenty of fruit and veg
- Occasional treats
- Exercise

- Watch weight
- Include starchy foods
- Drink plenty
- Reduce fat
- Watch alcohol intake

Figure 3.8

Diagram showing the main aims of diet for DM stated in the diet sheets produced by the dietetic departments.
"regular meals", 24 "high fibre foods" and "a reduction of dietary fat ", 11 advised patients to "watch their weight", 9 advised an "avoidance of diabetic foods", 6 recommended that patients should "watch their alcohol intake", 8 recommended the "inclusion of starchy foods", 1 recommended "medium protein portions", 5 recommended "plenty of fruit and vegetables", 4 advised that patients should "drink plenty", 1 recommended an "occasional treat", 2 advocated exercise and 5 recommended "less salt".

3,3,5,i,b; Commercial, private and charitable organisations
The aims mentioned by each of these organisations were consistent with those of the BDA and all the diet sheets acknowledged the role of the BDA. Thus each diet sheet included the following aims; to watch weight, take regular meals, avoid excess alcohol, take starchy food at each meal, avoid fats, avoid sugar and high sugar foods, include high fibre foods including fruit, avoid adding salt to foods, diabetic foods are not necessary. Again these aims had been expressed in simple language understandable to the lay-person.

3,3,5,ii; Summary of information contained in diet sheets
3, 3,5,ii,a; NHS Dietetic departments
None of the diet sheets contained a summary of the information presented.

3,3,iib; Commercial, private and charitable organisations
All contained a summary of the information included, and that further advice could be obtained from the BDA, dietitian and doctor.

3,3,5,iii; Carbohydrate foods
3,3,5,iii,a; NHS Dietetic departments
The avoidance of sugar and sugary foods was advocated by all of the sheets. It was the only dietary aim about which the diet sheets were unanimous. Ten dietetic departments' diet sheets suggested low sugar choices for foods with a high sugar content. This took the form of vertical columns in 8 diet sheets which were headed by instructions "Foods to choose" and "Foods to avoid".
Another had columns of foods to be avoided but very little of what could be eaten. The remaining 17 departments sheets recommended an avoidance of foods with a high sugar content by giving a list of these. "Simple carbohydrates" was the term used to describe sugars by one diet sheet, another "short acting carbohydrates" and 2 "refined carbohydrates", one "hydrate" foods and the remainder used "sugars" and "sugary foods".

In 2 instances Greek yoghurt (made from ewes milk and with a high fat content) was described as a "sugary food". Horlicks and Bournvita were described as "high in sugar" by one diet sheet. Sweeteners such as Sucron, Sugarlite and Sorbitol were recommended to be avoided in the text of 2 diet sheets and coffee essence by a third. Ice cream and lollies were recommended to be avoided by 3 diet sheets. Ice cream was allowed occasionally by a third. Ten remaining diet sheets permitted ice cream and 13 did not mention it. The diet sheet from St Thomas's Hospital, London stated that "25 grammes of sugar" could be taken as part of a dish but in the aims recommended an "avoidance of sugary foods". Sugar-reduced cakes were permitted by the diet sheet from Scotland, a third diet sheet said that sugar was permitted in baking, a fourth gave "tips" on how to use sweeteners in cooking and a fifth advised how to adapt recipes to reduce the sugar content. Low sugar preserves were advocated by one diet sheet while others specified low sugar jams and marmalades. Information on sugars and how to read food labels for sucrose, glucose and maltose was provided by only one department.

Fig 3,9, shows the range of different biscuits suggested in the sheets. One sheet did not mention biscuits and another one suggested swapping sweet biscuits for savoury ones. One dietitian gave the diet sheets personally to the researcher and then asked for them back. She immediately crossed out digestive biscuits which were included in the departmental diet sheets and said she felt they were too high in fat to be eaten by people with DM.

There was great variety in the way information on "starchy and high fibre foods"
Figure 3.9

BISCUITS SUGGESTED BY DIET SHEETS FROM DIETETIC DEPARTMENTS
was presented in the diet sheets. The inclusion of starchy foods in the diet for people with DM was advocated in the main aims of sheets from 8 departments. Twenty four departments advocated high fibre foods as part of the introductory text. However, high fibre foods were advocated as part of the diet in the later part of the text of the diet sheet by the remaining 3 departments. "Complex carbohydrates" was the term used in 3 sheets to describe starchy foods. Five departments explained the function and sources of soluble and insoluble fibre. Twelve departments described the role of fibre in the diet and the effect on blood glucose levels. One department also referred to fibre as "roughage". None of the departments used the presently accepted term NSP (non-starch polysaccharides) and none of them mentioned the concept of glycaemic index. Consumption of "high fibre" carbohydrate foods was encouraged in all the sheets. Ten departments gave a list of high fibre choices in place of low fibre foods. These were presented in all cases as vertical columns of foods headed with titles of "low fibre carbohydrates and high fibre alternatives". Four departments had 3 sections from which carbohydrate food choices could be made, these were presented as vertical columns in a similar format with columns headed "sugary foods", "starchy foods" and "high fibre starchy foods". In one diet sheet the 3 columns of foods were presented on different colour paper, with sugary foods on red paper, starchy foods on amber and the high fibre starchy foods on green paper, in a representation of the "traffic light system" of "stop, caution and go". The remaining 14 diet sheets advocated high fibre starchy foods in the text. All the diet sheets advocated wholemeal rather than white bread, wholegrain breakfast cereals and the avoidance of sugar coated cereals. One department recommended avoidance of Crunchy Nut Cornflakes, Frosties and Sugar Puffs. Another department advocated trying high fibre cereals such as Weetabix, Shredded Wheat, porridge, Sultana bran, Raisin bran and Puffed Wheat but made no mention of other high fibre cereals. One department recommended checking the label of breakfast cereals to see that they did not contain "more than 20% added sugar".

Various ways of exchanging one carbohydrate food for another and thus
varying the diet were found in the diet sheets. Different terms were used for the system by which this occurred. Two diet sheets used "swaps", 4 diet sheets advocated, "10 gram carbohydrate exchanges" (the term used by the BDA), 1 diet sheet provided a carbohydrate list of "foods containing 10 grams of carbohydrate" and another used the term "portions". The 5 diet sheets produced specially for IDDM used the terms "10 gram carbohydrate exchanges" in 4 cases and "foods containing 10 grams of carbohydrate" in the fifth. Eleven diet sheets relied on a dietitian advising on varying the diet by providing an individualised list of carbohydrate alternatives in a menu plan. This was either completed on a proforma sheet provided as part of the diet sheet or on a separate sheet.

3,3,5,iii,b; Commercial, private and charitable organisations
Sugar was recommended to be avoided by all of the diet sheets and high sugar foods were recommended to be replaced by low sugar ones. The BDA included pictures of a range of suitable low sugar alternatives from a variety of manufacturers. Tescos and Sainsbury's also had lists of suitable foods.

Each diet sheet advocated the inclusion of more "starchy foods" which were defined as bread, potatoes, rice, pasta, breakfast cereals and chapattis. All diet sheets recommended that these foods should constitute the basis of meals. High fibre varieties of these foods were universally encouraged. Definitions of fibre and the role it has in the diet were given in simple terms by all diet sheets. The BDA provided comprehensive information on fibre including soluble fibre. The diet sheets from Tesco, Sainsbury's, Bayer and the BDA contained illustrations of "plates" to show that "starchy" foods should be the largest portion of a meal. All the diet sheets except the one from Asda had full colour illustrations of "starchy foods" which included a full range of breads, potatoes, rice, pasta, noodles and spaghetti. Ideas on how to prepare potatoes, pasta and rice were included in diet sheets from the BDA, Sainsbury's, Tesco, Bayer, Sionon, Kelloggs and Hoesch. Full recipes were given by the BDA and Sionon. The diet sheets from Bayer, Hoesch and Sionon explained the concept of 10
gram carbohydrate exchanges and that patients may still use these. Bayer Pharmaceutical had a "tick list" of targets to encourage the inclusion of more starchy foods, fibre and reduction of sugar. The Asda diet sheet gave full nutritional contents of products provided and indicated their suitability for inclusion in a DM diet by a "traffic light" system of coding.

3,3,5,iv; Fruit and vegetables
3,3,5,iv,a; NHS Dietetic departments
Fruit and vegetables were advocated by all the diet sheets and 5 did this as part of the initial dietary aims. One diet sheet stated that grapefruit, lemons, watermelons, rhubarb, gooseberries, blackcurrants, blackberries and loganberries could be taken freely. The amount of fruit and vegetables recommended for consumption each day varied. One sheet advocated that some fruit should be taken, a second 2 servings per day, a third 2-3 pieces of fruit, a fourth 3 pieces, a fifth 5 portions of fruit and vegetables, a sixth plenty of fruit and vegetables and a seventh advised including fruit and vegetables at each meal and an eighth advised that 1 pound in weight of fruit and vegetables should be taken per day. Fruit juice was limited to one glass per day by 2 diet sheets, another recommended it should be limited. Two others produced information sheets and the rest did not mention it. Dried fruit (227 kcal; 967 kJ per 100 g; MAFF, 1994) was included in the fruit group by 3 diet sheets with no mention of quantities.

3,3,5,iv,b; Commercial, private and charitable organisations
All the diet sheets encouraged the inclusion of "plenty of fruit and vegetables". The BDA advocated "at least a pound of fruit and vegetables per day, and to include 3-4 pieces of fruit". Sainsbury's and Tesco advocated 5 portions of fruit and vegetables per day with 3 pieces of fruit. Bayer encouraged 2 helpings of vegetables and 3 pieces of fruit per day as part of their "Tick list" of targets. Asda included fruit and vegetables in their "Green Light" section and encouraged people to eat these freely. Kelloggs included 2 pieces of fruit and 2-3 portions of vegetables per day as part of their menu plan. Full recipes were
given by the BDA and Sionon and information on how to prepare them by Sainsbury's and Tesco. Information on the limitation of fruit juice was given by the BDA, Bayer and Sainsbury's. Juices were put into the "Amber" section by Asda to encourage caution. Fruit canned in natural juice was encouraged by all diet sheets.

3.3.5,v; Fats

3.3.5,v, a; NHS Dietetic departments
All sheets encouraged a reduction of fat and 24 included this as part of the introductory aims to the diet sheet. Ten diet sheets advocated this by vertical columns of high fat foods and lower fat choices. The remaining sheets advised "reducing fat". One sheet stated "do not fry - frying adds fat to foods", 3 departments advocated an avoidance of cheese (no mention of types) and the use of lean meat to reduce fat, information on different types of fat was given by 2 departments. One stated that saturated fats were found in "bought baked goods" which could be interpreted as bread, biscuits and cakes.

3.3.5,v, b; Commercial, private and charitable organisations
All of the diet sheets encouraged a reduction of dietary fat. Great detail on this was given by the BDA who also gave explanation of the effect of saturated fat on cholesterol levels and defined polyunsaturated, monounsaturated and saturated fat. Sainsbury's discussed the role of omega 3 fatty acids (see section 3.3.5,vi,b). Ghee was mentioned by the BDA and Hoesch in detail. All diet sheets encouraged skimmed or semi-skimmed milk and low fat cheeses. Bayer encouraged these in a "tick list" of targets. Asda included low fat dairy products in the "Green Light" section. Low fat cooking methods were advocated by all diet sheets and full recipes were given by the BDA and Sionon. Sainsbury's and the BDA suggested the use of yoghurt or fromage frais instead of cream, and explained differences between diet and low fat yoghurts.
3.3.5, vi; Protein

3.3.5, vi, a; NHS Dietetic departments

Only one diet sheet mentioned protein foods in the introductory aims and advocated "moderate protein portions". One sheet advocated 2 portions of protein per day in the text. Protein was not defined. "Chicken, turkey, lamb, beef etc" were permitted by one diet sheet leaving the reader to interpret the meaning of "etc". Another diet sheet stated "it is better to choose cheese, turkey, lean meat and low fat cottage cheese". One recommended that less red meat should be eaten. Only one diet sheet mentioned shellfish. One sheet mentioned textured vegetable protein and other meat alternatives. Oily fish tinned in brine was recommended by 2 sheets. One sheet advocated pulses.

3.3.5, vi, b; Commercial, private and charitable organisations

All diet sheets recommended that lean meat, fish, eggs, low-fat cheese and dairy products and poultry were used in the diet. Fattier cuts of meat, poultry skin, pate and full-fat cheeses were recommended to be included infrequently. Sainsbury's explained the role of omega-3-fatty acids in their section of the diet sheet which discussed fish of different types. Fish was recommended to be consumed 3 times per week including one portion of oily fish. More pulse vegetables which were defined as peas, beans and lentils in the text and had an accompanying illustration, were recommended by Sainsbury's, Kelloggs, the BDA and Tesco and suggestions for their inclusion in dishes were made. Recipes were given by the BDA and Sionon. Sainsbury's and the BDA advised the choice of lower fat sausages. The BDA explained that luncheon meat, corned beef and salami were high in fat.

3.3.5, vii; Salt

3.3.5, vii, a; NHS Dietetic departments

A reduction of salt was advocated by 5 diet sheets in the "Aims" and by a further 4 as part of the text. One diet sheet suggested checking food packages for salt, one advocated no excessive amounts of salt and another to cut down on salt. None of the sheets contained any explanation for reduction of salt.
3.3.5,vii,b; Commercial, private and charitable organisations
All the organisations were unanimous in recommending a reduction of salt and salty foods. The BDA and Sainsbury's mentioned the link between salt and high blood pressure. Crisps, salty meats, tinned and packet soups, stock cubes, packaged and processed foods and soya sauce were recommended to be reduced. Herbs and spices were suggested for adding flavour.

3.3.5,viii; Fluid
3.3.5,viii,a; NHS Dietetic departments
Four diet sheets advised that the reader should "drink plenty" as part of the introductory aims to the diet, two advocated 6-8 cups of liquid to be taken per day, one quantified this as 2-3 pints liquid (6-9 cups). A further diet sheet advised on "increasing the fluid intake as the fibre intake is increased ". The remaining diet sheets did not mention fluid.

3.3.5,viii,b; Commercial, private and charitable organisations
Other than advocating low calorie drinks as sugar free alternatives, only the BDA discussed fluid intake in detail and suggested 6-8 cups of liquid per day.

3.3.5,ix; Alcohol
3.3.5,ix,a; NHS Dietetic departments
Each department (including Great Ormond Street Hospital for Children) included advice on alcohol. Six departments advised on "watching alcohol intake" as part of the "Aims". "No drinking and driving", "no alcohol was to be taken on an empty stomach", "avoidance of alcohol if overweight", and "sugar free mixer drinks" were recommended. 14 and 21 units of alcohol per week for women and men respectively was the maximum allowed by 24 departments. One diet sheet advocated the maximum consumption of alcohol to be 2-4 units 2 or 3 times per week. Information on the units of alcohol as; 1 unit per half pint beer or cider, glass of wine and a tot of spirits was provided by all of the diet sheets. One sheet recommended a "moderate consumption of alcohol", and another requested the reader to ask for further advice. The avoidance of
alcoholic beverages "over 4% alcohol" was recommended by a 3rd sheet and a 4th the avoidance of strong beers.

3,3,5,ix,b; Commercial, private and charitable organisations
All of the diet sheets except those from Sionon and Kelloggs gave information on alcohol. The BDA gave comprehensive information on alcohol with pictorial representation of the units of alcohol found in different drinks. Information about the hypoglycaemic effect of alcohol was given and also recommendations to choose ones with less than 5% alcohol. Low sugar and "diet" beers were discussed. Sainburys gave similar information to the BDA. They recommended the choice of dry wines and sherries.

3,3,5,x; Specialist dietary products
3,3,5,x,a; NHS Dietetic departments
As discussed earlier "Diabetic foods" were recommended to be avoided by 9 departments in the "Aims" to their diet sheets and the remainder all included this later in the text. Sweeteners were recommended instead of sugar in all the sheets. Low calorie, diet drinks, diet yoghurts, low sugar jellies, fruit in natural juice and low fat spreads were recommended. No mention was made by any diet sheet of "low calorie complete meals" or of "meal replacement drinks".

3,3,5,x,b; Commercial, private and charitable organisations
All diet sheets recommended an avoidance of "Diabetic foods". Apart from the BDA, which gave examples of the brand names of sweeteners, the rest simply advocated sweeteners. The supermarkets did not advocate their own brand items. "Diet drinks" were recommended by all but only the BDA sheet gave a list of brand names of products. Sainsburys advocated choosing food labelled with their "Healthy eating" symbol.
3,3,6; INSTRUCTIONS ON SHOPPING, COOKING, MEALS AND SNACKS

3,3,6,i; Shopping and food labelling

3,3,6,i,a; NHS Dietetic departments
Four diet sheets advised on "foods to look for while shopping". One was in a "fill out list" for a dietitian to complete during the consultation. Three departments provided information on how to read food labels, another gave information on how to search for sugars on them, a fifth gave information on breakfast cereal labels and a sixth diet sheet suggested that a leaflet on food labels should be requested from the dietitian. The remaining dietetic departments did not mention shopping or food labelling in the diet sheets.

3,3,6,i,b; Commercial, private and charitable organisations
The Asda diet sheet gave comprehensive information on the nutritional content of all their products using the Traffic Light System. The Sainsbury’s diet sheet had a "tear out" shopping list which included guidelines on how to read food labels and items to select when shopping. Reference was also made to the "Healthy Eating" symbol used. The BDA included a picture of a supermarket shopping basket full of foods produced by a variety of leading manufacturers, eg. Del Monte, suitable for inclusion in the DM diet. A "table" was also included to "show some of the low sugar or sugar free alternatives" for purchase.

3,3,6,ii; Convenience foods

3,3,6,ii,a; NHS Dietetic departments
Little mention was made of convenience foods. No diet sheet mentioned ready prepared meals, cook-in-sauces, bread-crumbed dishes, boil-in-the-bag meals, or re-hydrated type snacks. All emphasis was on traditional cooking and main meals of meat and two vegetables. No mention of ethnic dishes was made apart from in the eating out section. Three departments produced advice on reading food labels for suitability of inclusion in the diet for DM.

3,3,6, ii, b; Commercial, private and charitable organisations
No mention of convenience foods other than the use of canned fruit was made.
3.3.6.iii; Cooking
3.3.6.iii,a; NHS Dietetic departments
All of the diet sheets made some reference to cooking and suggested grilling rather than frying and avoiding sugar. More extensive cooking information was given by 5 diet sheets including; adapting recipes, how to use sweeteners, cutting down on sugar in baking as well as methods of cooking vegetables and adding extra pulses to casseroles. Two sheets mentioned microwaving, none mentioned the use of other modern appliances such as slow cookers.

3.3.6.iii,b; Commercial, private and charitable organisations
All of the diet sheets made reference to cooking and two provided recipes. All suggested grilling rather than frying, taking the skin off chicken before eating, using more pulses in casseroles and two suggested microwaving.

3.3.6.iv; Meal patterns
3.3.6.iv,a; NHS Dietetic departments
Twenty six diet sheets advocated regular meals as part of the "Aims" of the diet and the remaining one advocated this later in the sheet. In 8 sheets "suggested menus" were provided and all were reflective of traditional meal patterns with a breakfast, lunch and evening meal. Pro-forma menu plans, designed to be completed by the dietitian were presented in 6 diet sheets and were also of a traditional meal pattern. No mention was made of shift working, different meal patterns, fasting times (eg Ramadan) by any diet sheets.

3.3.6.iv,b; Commercial, private and charitable organisations
Regular meals were advocated by all sheets in the "Aims". One pharmaceutical company, Bayer, produced a sheet for fasting during Ramadan.

3.3.6.v; Education models for composition of meals
3.3.6.v,a; NHS Dietetic departments
Seven diet sheets used the "plate model" (as described in chapter 1 section 4,9 Fig 1,6) to recommend the amounts of foods to be taken at meals. This was
derived from the "Balance of Good Health" which is the National Food Guide produced by the Health Education Authority (1996) "to provide a unifying and consistent model for nutritional education throughout Great Britain". The model shows that meals should contain large portions of fruit and vegetables and starchy carbohydrate foods and smaller portions of meat and alternative foods (Fig 1,7). One diet sheet included 5 food groups, another 3 food groups based on; proteins, fats and carbohydrates, and another provided information on nutrition using the terms vitamins, minerals, protein, fat and carbohydrate.

3.3.6,v,b; Commercial, private and charitable organisations
Five diet sheets used the plate model of the "Balance of Good Health" (already described in Fig 1,7). In 4 cases this had been further simplified to show the size of portions on a plate to encourage the reader to eat large portions of "vegetables and starchy foods".

3.3.6,vi; Snacks
3.3.6,vi,a; NHS Dietetic departments
There was a total lack of uniformity in the diet sheets about suitable snacks for people with DM. One sheet stated "avoid nibbling between meals especially crisps, nuts and cheese", fruit or plain biscuits were suggested instead. Another recommended the avoidance of crisps, nuts and other snack foods, but Hula Hoops, Twiglets, Cheddaries and slices of pizza were advocated. A third sheet suggested popcorn and Twiglets. A fourth sheet recommended diet yoghurts, bread and low sugar jam, wholemeal shortbread, high fibre malt loaf and cereal bars, eg. Jordans, as snacks. A fifth sheet suggested slices of pizza as snacks. The remaining sheets did not mention snacks.

3.3.6,vi,b; Commercial, private and charitable organisations
No recommendation for snacks was made by any of the diet sheets other than the one from Kelloggs which recommended a mid-morning, mid-afternoon or supper-time snack as part of the 7 day menu. Sainsbury's in their "shopping list" section recommended crispbreads, cereal bars, crackers and fresh fruit.
3.3.6, vii; Eating out

3.3.6, vii, a; NHS Dietetic departments
One dietetic department produced a leaflet on packed lunches. Information on meals out was produced by 3 departments which discouraged beefburgers and takeaways because of their high fat content.

3.3.6, vii, b; Commercial, private and charitable organisations
No information was produced other than as part of the general text.

3.3.7; LIFESTYLE FACTORS

3.3.7, i; Exercise and smoking
3.3.7, i, a; NHS Dietetic departments
Exercise was advocated by 6 diet sheets and discussed in detail by 3 of these which suggested exercise such as walking 20-30 minutes on 3 occasions per week. Three others advocated dietary measures or high fibre biscuits and bread to prevent hypoglycaemia occurring with exercise. Eighteen diet sheets suggested supplementary foods such as glucose tablets, confectionary and Lucozade and other rapidly absorbed carbohydrates during exercise or hypoglycaemia. No mention of smoking was made by any of the diet sheets.

3.3.7, i, b; Commercial, private and charitable organisations
All encouraged exercise and 4 recommended avoidance of smoking.

3.3.8; DIETARY ADVICE FOR SPECIAL GROUPS WITH DM

3.3.8, i; People with DM and obesity
3.3.8, i, a; NHS Dietetic departments
As discussed earlier 11 diet sheets advised people with DM "to watch their weight" as part of the "Aims" and 5 departments produced special diet sheets for overweight people with NIDDM. The rationale for not becoming overweight, and the benefits this produced for the control of DM were included. One department advocated maintaining a healthy weight and another included a Body Mass Index (BMI) chart in the diet sheet (derived from Garrow, 1988),
and two others included charts which a dietitian could complete to record the patients weight. Such simple information may have been helpful to patients and less threatening than "ideal weight charts" which give more rigid information.

3,3,8,i,b; Commercial, private and charitable organisations
All the diet sheets advocated that people with DM should "watch their weight". The BDA gave comprehensive information on obesity and included a BMI chart. Patients were recommended to lose weight and to consult a dietitian for help. Kelloggs also included a BMI chart (Garrow, 1988) and how to use it. The diet sheet emphasised weight loss and provided a "1500 Calorie", 7 day menu plan designed to promote weight loss which was discussed in section 3,3,6. Information from Hoechst included a weight record.

3,3,8,ii; Women with gestational DM
3,3,8,ii,a; NHS Dietetic departments
Only one dietetic department produced information for those with gestational DM. This advocated a diet similar to that for NIDDM but included information on nausea and constipation, problems which frequently occur during pregnancy.

3,3,8,ii,b; Commercial, private and charitable organisations
No diet sheets were provided for the pregnant woman.

3,3,8,iii; People with DM from different cultural backgrounds
3,3,8,iii,a; NHS Dietetic departments
One department provided diet sheets for those of Afro-Caribbean cultures and 2 departments for those from the Asian culture. All diet sheets were written in English but reflected cultural foods eg "Jaggery" a sugary substance. No diet sheets, even those aimed at Asians mentioned such foods as "Karella" an Indian vegetable known to have hypo-glycaemic effects (Pitchinson, 1979).

3,3,8,iii,b; Commercial, private and charitable organisations
One pharmaceutical company (Bayer) provided information on fasting during
Ramadan and the BDA provided a range of diet sheets in Asian languages and Italian which could be purchased by individuals.

3,3,8,iv; In-patients with DM
3,3,8,iv,a; NHS Dietetic departments
One department provided information to help people with DM to choose suitable food from the hospital menu. The remaining departments did not send information, but may have provided some assistance to in-patients with DM by writing information on the hospital menu.

3,3,8,iv,b; Commercial, private and charitable organisations
No information was provided.

3,3,8,v; Children with DM
3,3,8,v,a; NHS Dietetic departments
Apart from Great Ormond Street Childrens Hospital no specific information was provided for children.

3,3,8,v,b; Commercial, private and charitable organisations
The BDA publishes a pack for carers of children with DM which includes extensive information on a range of subjects including diet.

3, 4; DISCUSSION
This discussion aims to both comment on the results and make practical suggestions for inclusion in diet sheets for people with DM. As in chapter 1 these recommendations have been shown in bold print. Additionally, based on the nutritional analysis of the menus, this discussion aims to provide a critique of the nutritional recommendations summarised in chapter 1. A response rate of 87.5% was obtained to the request for diet sheets from dietitians in the NHS and 100% from those in private industry. This was an excellent response rate in comparison with that of Thomas et al (1974) who received a response rate of 72% and Truswell et al (1975) a response rate of 59% to their requests for
diet sheets. It was of concern that 2 dietitians declined to give diet sheets as they photocopied old ones and 3 others declined to provide them as they were updating them and said they were using up stocks of old sheets. This raised the question of how up to date the information was that they were using and whether it reflected the present recommendations for diet for DM?

3.4.1; Diet sheets and collaboration in producing them

There was an enormous variety both with regard to content and presentation of the 153 diet sheets that were received. The diet sheets produced by dietitians in the NHS were used over a wide geographical area of Great Britain. Collaboration had occurred throughout Scotland as part of "A Scottish Diet Sheet Initiative" (1996) and among the dietitians in the South West part of Britain to provide uniform diet sheets, and between the commercial organisations and the BDA. There was no evidence of collaboration elsewhere. As a consequence of this it was evident that patients could move, between adjacent districts and be given totally different diet sheets.

"The best diet sheet is a blank sheet of paper" (personal communication, Keen, 1990) on which information is tailor-made to the patient's needs. The only dietitians achieving this were those who worked in private practice and who used a variety of information including that obtained from the BDA, and commercial sources as well as writing totally personalised information for patients. It was also of interest to note that a dietitian working in Harley Street had been delegated an extended role and advised on medication in conjunction with the consultant, tested urine and blood, weighed patients and advised extensively on lifestyle. Such a role has been assumed already in the NHS by Diabetes Specialist Nurses. Although the value of assuming such an extended role has been discussed by dietitians of DMEG in 1996, it was acknowledged difficult to achieve by them as the Diabetes Nurse Specialists had already taken on much of this work. However, if SRDs not able to undertake such a wider role by monitoring urine and blood glucose levels then they are unable to act as independent practitioners, unable to provide advice to a patient.
without relying on clinical measurements being provided by nursing staff. Alterations in diet may require a change in medication eg for the obese patient with IDDM the insulin dosage may require to be reduced to enable the patient to take less carbohydrate without experiencing a hypoglycaemic attack. While a diabetic team approach to patient care may provide comprehensive care it may not be possible for the dietitian working in a health centre to have such support. **Thus to extend the role of the dietitian (after training) could be of benefit to patients, satisfying to the dietitian and also more cost effective.**

This study showed a confusing array of diet sheets both with regard to presentation and content. "Dietitians are expected to know the standards for dietary modifications based on up-to-date knowledge of medical and dietetic research" (Thomas, 1994). Thus information, in diet sheets, should be an accurate reflection of dietetic standards of therapeutic dietetics. Researching, writing, preparation and updating of diet sheets can be a major task, as well as arranging for copying of them by printing, photocopying or word-processing according to strict budgets. Every department produced their own diet sheets, presumably because of lack of funds to purchase them. While no definition of a diet sheet was found in the Manual of Dietetic Practice (Thomas, 1994) early editions of Human Nutrition and Dietetics (Davidson and Passmore, 1969) included an appendix of "Diets". These were constructed to illustrate both the quantitative and qualitative aspects of diets required for the treatment of various diseases. An introduction to this section states "that in most diseases it is unnecessary to weigh accurately the amounts of different foods eaten". Sufficient accuracy was considered to be secured by using ; a small helping defined as approximately 1-2oz. (30-60g.), a medium one as 2-3oz. (60-90g.) and a large one as 4oz. (120g) or more. Twenty-two different diets were included and each had a title which included nutritional definitions. eg "Low Calorie Diet, For obesity, of: protein 60g., carbohydrate 100g., Cal., 1000". A menu was included and a list of foods "which may be taken" followed by a list of foods "to be avoided". Ways of varying the menu were included as well as brief cooking instructions. **It is recommended that such information is provided**
today in a text of diet sheets to provide a basis for dietitians to copy into a locally produced diet sheet.

An examination of the syllabuses of all Universities in Britain with undergraduate courses in dietetics indicated little syllabus time devoted to compiling diet sheets. Such skills would be expected to be acquired when the student dietitian had practical dietetic training at a recognised base or complementary hospital. No courses for dietitians, on the production of diet sheets have been advertised in the last 10 years in Dietetics Today (the publication of the British Dietetic Association). Nor have any papers (apart from those of Lambert and Dickerson, 1989; Frost et al 1991) been included in the Journal of Human Nutrition and Dietetics or the Proceedings of the Nutrition Society over a similar period. If dietitians receive little training in producing diet sheets, it is not surprising that we have the confusing array of diet sheets which were made available for this study. Provision of training in their production would therefore seem to be a matter of some urgency.

3.4.2; Costs of diet sheets

It was found that 63% of the diet sheets received from NHS Dietetic Departments contained errors, deletions and problems in stapling. This may result in problems for patients as well as raising questions of dietetic credibility. Presumably these errors were due to inadequate proof reading. No diet sheets produced by commercial, private sources or the BDA contained errors. In 1981, Hernshaw stated that "Diet sheets should be clear and easy to read, simple to understand, easy to amend and attractively set out". Also Blades (1985) emphasised that the logical presentation of information in a diet sheet for people with DM, is important as they may be given to a patient by a doctor or nurse with little or no explanation. Well-designed and attractively presented diet sheets are important for comprehension and retention of information and for patient motivation (Hartley, 1981). Frost et al (1991) undertook a study with an attractive presentation of diet sheets, using line drawings and showed that these improved the dietary knowledge and comprehension of the recipient.
Obviously more extensive studies are required but the present study has shown a poor standard of diet sheet presentation in the NHS. With the introduction of NHS reforms in the UK (Secretary of State for Health and Others, 1989) there has been a drive for an improvement in quality. Hospitals are encouraged to make themselves and their literature more attractive to patients. This would seem to include diet sheets, yet often there is minimal funding for their production and printing. Budgets of £0 to £1200 were quoted for all diet sheet production for dietetic departments in Bedfordshire (Bedfordshire Health Authority, 1995). The dietetic profession needs to demonstrate its effectiveness in providing dietetic advice to patients, and benefits accruing from such advice. Dietitians (De Looy et al, 1992) queried this effectiveness and indicated that the profession, as yet, knows little of it. Despite the recognised importance of diet sheets for people with DM, and the drive towards enhanced quality in patient care, there is no agreed definition in the dietetic profession of a diet sheet, its content and its layout. In the study of high fibre diets by Lambert and Dickerson (1989) they state "There are no definite rules about how dietary information should be presented in the written form" and 8 years later this appears still to be the case. Lambert and Dickerson (1989) also commented in their study on the lack of funding for diet sheets, and considered this to be one of the main constraints in their production and considered it to be unfair. They considered that dietitians may have to prove that "smarter" diet sheets are more effective, if budgets are to be increased. A minimum allocation for learning material for people with DM, of £4 per patient with NIDDM and £7 per patient with IDDM was recommended some time ago (BDA, 1987) and this should obviously include diet sheets. Thus dietitians need to prove that well presented diet sheets are more effective in providing dietary advice. They must then seek out such funds or possibly collaborate with others to produce regional or even nationally agreed diet sheets, or even charge patients to fund improved literature. The use of well illustrated commercial literature could provide a compromise for dietitians. Sponsorship from the food and pharmaceutical industry for the production of diet sheets could be sought. The sponsoring organisation should be featured in a restrained manner (DoH, 1996)
Numbers of diet sheets produced

Dietetic departments in the NHS provided between 1 and 22 diet sheets for DM, which varied in length from a single sheet of paper to 23 pages of text in a booklet. Seven departments provided only one diet sheet which was used for all with DM no matter what type, thus presumably the child would be given the same as the 80 year old person with obesity and NIDDM!

Eight departments provided specific information for NIDDM and 5 for those with IDDM. Only 1 department provided information for those with gestational DM, 5 diets for those with obesity and 1 department information for in-patients to enable them to make informed choices from the hospital menu. Great Ormond Street Childrens Hospital provided the only diet sheet specifically for children with DM. This appeared to be based on the recommendations for children produced by Magrath et al (1993). The rest of the departments produced a range of information from which dietitians selected information for patients according to their assessment of the patients requirements.

As indicated in chapter 1, DM is a relatively common disorder and Bennett et al (1993) estimated that the lifetime incidence of DM is 6% of the population. Thus people with a diagnosis of DM will have a wide spectrum of individual dietary needs, lifestyles, literacy and educational skills, food likes and dislikes and eating habits. Those from India have an increased risk of DM and thus suitable instructions are of paramount importance to their education on a suitable diet for DM but only 2 departments, the BDA, and Bayer produced information. Realities of time and scarcity of funding make it unrealistic for the SRD to give individually tailored advice but a range of material can be provided to recognise and reflect the different groups with DM. A dietetic department which serves a Hospital and Community Trust is recommended to provide diet sheets for the 5 main groups of people with DM. ie: people with IDDM, people with NIDDM, women with gestational DM, people with DM who are overweight, children with DM.
Obviously if the Hospital Trust is dedicated to a particular group of individuals, eg children, then it would be reasonable that only diet sheets for that group are provided. Diet sheets should also be produced for any specific cultural groups who follow a different eating pattern if they form a significant percentage of patients. Consideration of a vegetarian diet sheet for people with DM could also be useful. While the BDA provides a cookery book, there is a need for a diet sheet which could possibly be produced by a NHS dietetic department in collaboration with vegetarian groups. The production of suitable material for all of the 5 groups for whom diet sheets are recommended could be time consuming and expensive. Thus the purchase of diet sheets for specific groups, eg children is recommended for consideration by departments.

3.4.4; APPEARANCE AND LAYOUT OF DIET SHEETS

3.4.4.i; Presentation

Diet sheets from the NHS dietetic departments were mainly white and photocopied or green or blue. Any illustrations were as line drawings. Apart from Asda, who produced a diet sheet of white paper, all diet sheets from commercial sources or the BDA were in full colour. Colour of diet sheets, as provided by the use of different colour paper for the cover, content and type, can also give a more attractive appeal. Colour has not only a cosmetic appeal but also psychological importance well known to the advertising world. No research has been undertaken on the best colours for diet sheets, but this could provide an invaluable insight into helping to produce attractive diet sheets. Information from other sources on the use of colour indicates that for children, red is the most appealing colour, followed by green, orange and yellow (Walker, 1989). Therefore diet sheets for children should make use of this by including red, green and orange in them. Blue, used in many of the diet sheets is considered to be associated with "slimness" (Walker, 1989). This may not be the connotation that dietitians wish to give to their diet sheets for DM. Packages with earth coloured tones of tan, brown, amber and dull yellow denote to the consumer wholesome products (Walker, 1989). This may be a more useful colour for diet sheets for DM. Colour should be used sensitively, as a garish
confusion of colour can be difficult to read as can colour print on darkly coloured backgrounds (Hartley, 1981; Lambert & Dickerson, 1989). A colourful diet sheet is appealing and may be better for patient motivation than simple black type on a white background (Duchastel, 1978). Despite these recommendations most of the diet sheets were white, the colour of paper available in photocopying machines. It costs only a few pence extra to purchase coloured photocopying paper and this would give a better presentation to a diet sheet.

For the communication of "dietary information" to people with DM the approach used by the Department of Health (1995) in the production of the "Patients Charter" to provide information on standards of the NHS provides an excellent basis. This consisted of an A5 booklet printed on glossy paper. Colour drawings of people from all ages, cultures and abilities were included. Lower case was used for all headings and highlighting used for key points. Paragraphs were short and information was not crowded. There was an introduction and a logical sequence of information, pages were numbered and there was a contents page. The booklet was published in different languages reflecting major cultural groups in the UK. The information was also available in large print, Braille, a sign language video cassette and an audio cassette. Ideally diet sheets should be available in all of these formats.

Information was published in July 1996, by the Department of Health as part of the Health of the Nation initiative, on “Guidelines on Education Materials concerned with Nutrition”. The 12 guidelines contained could provide a basis for consideration when writing a diet sheet (Fig 3,10).

3,4,4,i; Readability

As discussed, most (63%) of diet sheets examined contained errors. Diet sheets should not contain spelling mistakes, errors or deletions. Not only is this confusing to the reader but shows a lack of consistency of message and poor credibility. Conflicting information confuses patients and does not help them to follow their diet (Blades, 1985). Health professionals are already considered by
HEALTH OF THE NATION GUIDELINES ON EDUCATIONAL MATERIAL CONCERNED WITH NUTRITION

From: Department of Health (1996)

Checklist

The following checklist, used in conjunction with the detailed guidelines, should help in assessing or producing educational materials.

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Guideline 1</strong></td>
<td>Does the material take account of current government health policy thinking and reflect recent overviews of scientific thinking? Does it acknowledge the main sources on which it is based?</td>
</tr>
<tr>
<td><strong>Guideline 2</strong></td>
<td>If there is controversy about any issue covered in the material, is this acknowledged?</td>
</tr>
<tr>
<td><strong>Guideline 3</strong></td>
<td>Is the material misleading?</td>
</tr>
<tr>
<td><strong>Guideline 4</strong></td>
<td>Are any comments or statements about nutrition placed in the context of a balanced and healthy lifestyle?</td>
</tr>
<tr>
<td><strong>Guideline 5</strong></td>
<td>Is the name and address of the producer and the name of any sponsor clearly stated? Have contact names and addresses been given for further information and comment?</td>
</tr>
<tr>
<td><strong>Guideline 6</strong></td>
<td>Is the date of the publication clearly marked on the material and is the material up-to-date? Are abbreviations and acronyms explained in full the first time they are used? Are the pages numbered? Would an index be helpful? Is there any guidance as to other sources of information on the same subject? Is there a glossary of technical terms used or words that are likely to be unfamiliar? Where relevant, have brief summaries of key points been included?</td>
</tr>
<tr>
<td><strong>Guideline 7</strong></td>
<td>Are logos and trade names in text and illustrations used sparingly and in a relevant context? Where there is reference to particular foods, are generic groupings used? If the use of a branded product can be justified in terms of helping users to identify particular types of products, is the use sparing and in a relevant context?</td>
</tr>
<tr>
<td><strong>Guideline 8</strong></td>
<td>Are the materials based on the principles of a balanced diet as put forward in government health information? Where foods are ordered into groups, is this in line with the five groups in: The Balance of Good Health or the Eight Guidelines for a Healthy Diet?</td>
</tr>
<tr>
<td><strong>Guideline 9</strong></td>
<td>Is the material appropriate to its intended users? Has consideration been given to the level of understanding required, the language used and the complexity of the ideas put forward? Is the layout and presentation appropriate for the target users (e.g. text size for the partially sighted) and has advice been sought from any relevant bodies (e.g. RNIB)? Have producers consulted users? Have materials been pretested (especially those aimed at children)?</td>
</tr>
<tr>
<td><strong>Guideline 10</strong></td>
<td>If the materials are designed for use in schools, have they been referenced to the National Curriculum, where appropriate?</td>
</tr>
<tr>
<td><strong>Guideline 11</strong></td>
<td>Is the material sensitive to the needs of all groups in society?</td>
</tr>
<tr>
<td><strong>Guideline 12</strong></td>
<td>Does the material recognise the complexity of the social and cultural messages attached to food and the effects that certain messages have on those who are most vulnerable?</td>
</tr>
</tbody>
</table>
the public to produce conflicting and confusing information on nutrition; 45% of the respondents in the MORI poll on consumers attitudes to food and nutrition messages by health professionals stated that "messages are conflicting and confusing" (Rudat, 1992). Errors in a diet sheet could help to perpetuate this belief. Attractively presented and well designed diet sheets are important for comprehension and retention of information by patients as well as for their motivation to follow a diet (Duchastel, 1978; Hartley, 1981). Diet sheets should be easy to open and lie flat when opened. Binders such as spiral and thermal ones should be used in preference to staples which can cause injury. Any staples should be correctly positioned. Diet sheets should be carefully proof read to prevent the inclusion of errors.

Print styles should be consistent throughout a printed document (Horn, 1985; Orna, 1985). Of the diet sheets included in this study, 23 had a print size of font size 12 and 4 had a font size 18. People with DM often have visual handicaps as a complication of DM but only 4 departments provided large print diet sheets. All departments should provide large print diet sheets and enlarging by photocopying or word processing can produce well presented diet sheets.

All diet sheets had blocking of text. In the commercially produced ones blocking used colour and borders. Blocking of text is thought to improve comprehension (Frase and Schwartz, 1979) and is often used in text books. The use of columns was used in 8 diet sheets to identify foods which were to be avoided and alternatives which could be taken instead and appeared an effective way of giving information to patients. Such lists are recommended by The Plain English Campaign (1987). Diet sheets should not be over-crowded with text, and contain plenty of blank spaces and use blocking of text in columns to separate information.

Spacing of sentences and ideas is important for ease of reader comprehension (Hartley and Burnhill, 1976). Sentences should be short in length to facilitate understanding, with no more than 20 words per sentence (Hartley, 1981).
Indeed the shorter the sentence the better, 4% of readers will understand a 27 word sentence at first reading, 75% will understand a 17 word sentence at first reading and 95% will understand an 8 word sentence at first reading (Industrial Society, 1989). There was good evidence that the diet sheets used short sentences to aid comprehension and a maximum sentence length of 24 words was found in only one diet sheet. The number of words per sentence used in diet sheets from Scotland had been counted to ensure they were below 20 words in length (Scottish Diet Sheet Initiative, 1996). Sentences should be below 20 words. Those sentences with a strong impact should contain less than 10 words.

Diet sheets should use simple words and phrases as professional jargon is unintelligible to most people (Bernstein, 1992). Dietetics abounds with "complicated" terms such as carbohydrate and cholesterol (and many people may not understand differences between the two). Terms like protein and carbohydrate should be fully explained (Blades, 1985). The Balance of Good Health the National Food Guide, (HEA, 1996) uses food and not nutrients. One diet sheet used information about "protein foods", with no definition of them. Information in a diet sheet for people with DM should focus on foods. The Balance of Good Health summarised definitions of nutrients and these could be used in a diet sheet for DM so that messages are kept as consistent as possible with other information available on "Healthy eating".

A diet sheet for people with DM is fundamental in providing information for them to undertake major changes in their life which may be stressful. Food is of socio-psychological importance and physiological, environmental, ethical and economic factors, affect food choice. Eating habits which have been assumed over years may, with a diagnosis of DM, be questioned and replaced; thus any diet sheet must be written in an empathetic way. All the diet sheets provided from the NHS, private commercial and charitable sources were written in a warm language and used the first person and contained the word "you", which is positive and helpful and assists understanding (Southgate, 1992). Those from commercial organisations and the BDA particularly emphasised this with
information on the prevalence of DM and words such as "It is usual to worry". An understanding of patients' concerns can be invaluable when compiling a diet sheet and words of reassurance included.

For a more positive and long term outcome, changes to dietary habits should be staged and diet sheets should include information on this. This can be in the form of check lists for patients similar to the "Dietary action plan" produced by the Health Education Authority (1996). Only one diet sheet, from Bayer included such an approach.

McRobbie et al (1993) found that in a study of commands in respect of nutrition, positive commands were more highly rated than negative ones. Positive words are more motivating (Industrial Society, 1989). All of the diet sheets included such positive instructions eg "eat". None used the term "forbidden". Instructions in diet sheets should be positive eg "eat" rather than "do not eat". Also instructions should be in stages.

3,4,4,iii; Illustrations

Illustrations enliven a printed text and often enable understanding particularly for those with literacy difficulties. Apart from Asda, all of the commercial diet sheets provided full colour photographs of food. None of the diet sheets from the NHS contained photographs, presumably due to the expense of obtaining these. Dietitians could use free information containing photographs from commercial sources and the BDA to give to those with DM.

3,4,4,iv; Size

Sizes of diet sheets varied in the NHS but those of commercial sources or the BDA were A5 or A6 size. The size of the diet sheet needs to be appropriate for its use (Hartley, 1981). Diet sheets can be used for a number of purposes including: a teaching aid, a source of extensive information, a reference menu at meal times, an aide memoire, a motivator, a shopping list and source of contacts for support. A large diet sheet i.e. A4, containing large size print is suitable for those with visual handicaps but it is too bulky to easily carry. If the
pages of this were attractively produced they could be used as attractive and informative small posters for pinning on a kitchen notice board. An example of a fibre chart suggested by Bernstein (1992) as a "mini-poster" is shown as Fig 3,11. Patients often pin diet sheets on walls, as evidenced by visits to patients' homes and drawing pin marks in diet sheets.

Patients also often need a reference document to carry with them. A small A6 size booklet, such as the "Dietary action plan" and "Food Diary" shown as Fig 3,12 (HEA, 1996) provide an excellent model for the size of such diet sheets which can be carried in the pocket. Lambert and Dickerson (1989) recommend a small size diet sheet which could be carried. Some people use "organisers" and a ready punched diet sheet as an insert could be useful. A5 size booklets are often used for health education material such as the Patient's Charter (DOH, 1995), and may be a useful size for a diet sheet to be used for reference purposes. Ideally 2 diet sheets would be given to people with DM. One of a comprehensive nature (A5 size) including a menu plan, and another (A6 size) containing brief information which could be carried in the pocket or handbag.

3,4,4,v; Titles of diet sheets
Headings should be in lowercase rather than capital letters which many people find difficult to read (Tinkler and Paterson, 1928; Poulton, 1967; Foster and Coles, 1977). Only the initial letter of words in headings should be in capitals, 22 of the NHS dietetic departments used sheets with capitals for the headings. None of the commercial organisations used capitals in the headings. Bold printing, different font styles and font sizes should be used for headings.

Blades (1985) recommended that titles should contain the word diabetes. Sixteen dietetic departments diet sheets were entitled "Healthy Eating", with diabetes featured in small font elsewhere. While the philosophy may be well motivated it could be meaningless to the person with newly diagnosed DM. All of the diet sheets from commercial organisations used diabetes in their title. Stockley (1993) commented that the public did not find avoiding disease by
Figure 3.11 YOUR FIBRE CHART (Bernstein 1992)

YOUR FIBRE CHART

High-fibre foods are satisfying to eat and positively good for you. In fact, your healthy eating aim should be to consume between 30 and 40 grams of fibre each day. So how best can you achieve this?

For a fibre-rich meal costing just 250 calories try any of the Crunch n’ Slim varieties. And here we list the highest-fibre home foods – use this chart in conjunction with your calorie guide when choosing slimming meals.

Crunch n’ Slim
AND
SURETHING MAGAZINE

Presented by Crunch n’ Slim
Changing what you eat

Food diary

Name ___________________ Date ______
healthy eating a motivating message. **Titles of diet sheets should be explicit and contain the word diabetes.**

Dietitians are considered to have an important role in the provision of dietary advice to people with DM indeed the BDA (1987) described them as the "key stone" (Clarke and Duncan, 1971; Hadden et al; 1975, Gale and Tatersall; 1979). **Diet sheets should show that they have been compiled by SRDs.**

The date of production enables patients to ensure that they receive regular updating. Patients of the dietitians using old photocopied diet sheets may have felt able to complain. All commercial diet sheets included the address and telephone number of the BDA for patients to seek further advice. This was only included in the diet sheets from Scotland. Giving the address of the BDA could be helpful as it was shown that people with NIDDM who joined the BDA had a greater knowledge of diet and DM than those who did not (Mullan, 1996). Thirteen diet sheets produced in the NHS gave no indication of origin or date. The diet sheets from the South West Region and also those from Scotland relied on the dietitian putting a small address label onto the cover. Thus a collaborative approach to producing diet sheets needs to ensure there is some way of including the address of the provider. A suggested method would be by the use of "sticky backed address labels" with large print, which can be obtained cheaply from commercial printers. **Diet sheets should show their origin so that any queries can be answered and should be updated regularly in line with new research findings and food products and contain the date of this.**

**3,4,4,vi; Introduction to diet sheets**

Information should be presented in a logical sequence. It should be consistent, coherent and continue with the same message (Bernstein, 1992). Thus diet sheets should begin with an introduction and end with a summary. All diet sheets examined in this study included an introduction but only those from commercial organisations had a summary. "Consistent dietary messages are of paramount importance" (Stockley, 1993). **Any diet sheet must be consistent in the messages it contains and also agreed by dietitians who will use it.**
The BDA recommends that all people with newly diagnosed DM should have a consultation with a SRD (BDA, 1993). The DoH (1996) recommends that educational material on nutrition should briefly acknowledge the main sources on which they are based. Reference to expert groups should be made in the diet sheet eg of dietitians and the BDA, as occurred in the commercial diet sheets. Dietary advice for people with DM is absolutely fundamental to the management of DM, and control of blood glucose and lipids is the cornerstone of the management of DM, and can help to delay and prevent complications (Servier et al, 1988). This important aspect of the effect of diet upon DM control should be stated in the introduction to the diet sheet using simple language.

3,4,5; INSTRUCTIONS IN DIET SHEETS ON FOOD AND NUTRITION

3,4,5,i; Aims of diet for DM

There was an almost complete lack of consensus on diet for DM as demonstrated by the diet sheets and this was a cause for concern. Each of the diet sheets reviewed in this study contained a list of "nutritional aims". The only aim that NHS dietetic departments were unanimous about was to avoid sugar! The rest of the aims varied according to the department producing them. While 26 departments advised regular meals and 24 departments recommended high fibre foods and a reduction of fat there was much less agreement about other nutritional goals. Two departments recommended less salt, 1 department an occasional treat, 1 department medium protein portions, and 11 had "watch weight". Although information was included later in the text it seemed likely that patients may be put off reading a diet sheet where a main aim is to "eat medium protein portions" with no explanation. Swift, et al (1995) commented on this matter and the distress it caused for children with IDDM and their parents. Not only does it lead to confusion and distress but also to the questioning of the need and value of dietary adherence. All of the commercial diet sheets used the nutritional aims of the BDA and thus had common aims. It is recommended that nutritional aims should be based on those in the BDA publications derived from Dietary recommendations for people with diabetes for
the 1990s (Nutrition Sub-Committee of the BDA, 1992). These are widely available to patients and thus a consistent message would be achieved.

In July 1996, 106 dietitians belonged to the Professional Services Section of the BDA. The membership of DMEG in July 1996 was 400 dietitians, which is only a small representation (12%) of the 3270 dietitians (British Dietetic Association, 1996) employed in Britain. The low level of membership of the BDA and DMEG may contribute to the lack of consensus evidenced by the information in diet sheets examined in this study. Individual SRDs should join these groups or departmental membership should be sought.

3,4,5,ii; Summary of information contained in diet sheets

Only the diet sheets from commercial, private and charitable sources contained a summary. A glossary was found in the diet sheets from the BDA, Sionon and those of the South West Dietitians Group. A glossary of nutritional terms, abbreviations, page numbers and index of contents is helpful in a diet sheet.

3,4,5,iii; Carbohydrate foods

While all the diet sheets were unanimous in recommending avoidance of sugar they contained extremely confusing information on other carbohydrates. Presentation of information on carbohydrates varied in the NHS diet sheets as did the terminology used which included "simple carbohydrates", "short acting carbohydrates" and sugars with no definitions. All diet sheets encouraged high fibre carbohydrates. Research on the effect of fibre on blood glucose control, was discussed in chapter 1. Frost et al (1994) found that educating patients on the glycaemic indices of foods based on the information provided by Haber et al (1977) enabled them to achieve a diet of a lower glycaemic index. Hockaday (1976) found viscous fibres reduced post prandial increases in plasma glucose and insulin consumption, improved glycaemic control and lowered lipid levels with a diet containing at least 35 grammes of fibre per day of which 50% was of the viscous type. Jenkins et al (1984) showed a cholesterol reduction on diets containing soluble fibre from barley, dried lentils, peas, beans and oat bran. Apart from the diet sheets of the BDA neither soluble fibre nor the
concept of the glycaemic index were discussed.

Foods that were permissible varied greatly as noted especially in the recommendations for biscuits and breakfast cereal. Burkitt et al (1995) recommended an increase in the consumption of starch-rich carbohydrates and reduced fat by focusing on an increase in starchy foods particularly breakfast cereals. It was noted that when there appeared to be confusion about a product eg biscuits or ice cream the food was not mentioned in the diet sheet. A policy statement was produced by the Nutrition Sub-Committee of the BDA (1990) based on the work on glycaemic indices suggested that consumption of refined sugars should be limited, but up to 25 g per day could be used in baking as part of a low fat and high fibre diet. Only 3 diet sheets made reference to this, thus leaving patients to attempt to read food labels and totally avoid sugar.

The method of varying the diet by use of the terms "swaps", carbohydrate exchanges or portions was suggested by 8 NHS department's diet sheets. The BDA, Bayer, Hoechst and Sionon referred to 10 gram exchanges and explained these may have been taught in the past. The rest used no exchange system and relied on patients replacing one food for another. Mitchell et al (1990) compared 10 gram carbohydrate exchanges with a simplified system and found no difference in HbAI. Frost et al (1994) showed reductions in the glycaemic index of patients diets when simplified information on the glycaemic index of foods was given. Although the 10 gram carbohydrate exchanges previously advocated (on which the BDA still provides information for those people with DM who were taught it and wish to continue using it), are outdated there does need to be a consistent alternative system for patients to use including foods of a low glycaemic index (Pearson et al, 1996). There needs to be an agreed list of carbohydrate foods to be included in a diet sheet for people with DM and a consistent mode of swapping one food for another.

3,4,5,iv; Fruit and vegetables

The WHO (1990) recommended an intake of 400g of fruit and vegetables per day for the general population, which has been interpreted as 5 portions in the
much publicised "Take 5 campaign" (National Heart Forum, 1997). This was taken further by the dietitians of the British Dietetic Association during "Food Awareness Week" as the "Give Me 5 Campaign" British Dietetic Association (1998). Increased levels of heart disease have been associated with reduced levels of fruit and vegetable consumption (Ness and Powles, 1997). The intake of adequate fruit and vegetables is important in DM where there is an increased level of heart disease. Unfortunately only 6 diet sheets advocated 5 pieces of fruit and vegetables recommended per day and the menu plans also were ambiguous in their content. **It is recommended that all diet sheets should advocate that at least 5 pieces of fruit and vegetables are eaten per day.**

3,4,5,v; Fats

Dietary fat is recommended to provide no more than 35% of energy per day for the general population (DOH, 1991) and for the person with DM and the associated risk of cardiovascular complications this advice is vital. All of the diet sheets from all sources encouraged a reduction of fat and 24 NHS dietetic departments and all of the others included this in their aims. Skimmed milk, and grilling rather than frying was recommended in all of the diet sheets. However no advice on the fat content of meals was included in any diet sheets nor was any advice given on how to read the labels for fat contents. The British Heart Foundation published a leaflet in 1997 on food labelling, aimed at those with heart disease. This contains a "credit card sized piece of information on food labelling" (Fig 3,13). This gives guidance on the amount of fat in foods and can easily be carried in a purse or wallet. **It is recommended that the use of this card is adopted for those with DM or something similar developed.** Overweight NIDDM have increased levels of blood triglycerides for which the intake of fatty acids such as the omega-3 fatty acids from fish oils can be beneficial (Lee & Arm, 1988, Gramenzi et al, 1990). **People with DM should be encouraged to eat oily fish twice per week.**

3,4,5,vi; Protein

There was great confusion regarding protein foods in the diet sheets. One diet
Heart and circulatory disease is the UK’s biggest killer but with a healthy lifestyle you can reduce the risk. For more information on heart health, call the British Heart Foundation’s Heart Information Line on 0990 200 656.

<table>
<thead>
<tr>
<th>Guide to Food Labelling</th>
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<tbody>
<tr>
<td><strong>A Lot</strong></td>
</tr>
<tr>
<td>10.0g of sugars</td>
</tr>
<tr>
<td>20.0g of fat</td>
</tr>
<tr>
<td>5.0g of saturates</td>
</tr>
<tr>
<td>3.0g of fibre</td>
</tr>
<tr>
<td>0.5g of sodium</td>
</tr>
</tbody>
</table>

For ready meals and foods you eat in large amounts, look at the amount per serving. Snacks and foods you eat in small amounts, look at the per 100g information. Work out from the table which there is a lot or a little of each nutrient in the food. Remember the most important nutrient to look for is FAT.
sheet suggested "moderate protein portions" as part of the "Aims", with no definition. All other diet sheets focused on a limitation of fat eg fatty meat rather than of actual protein foods. No quantification of portion sizes was found apart from in the diet sheets for people who were overweight and had DM. It was clear from the diet sheets that far more advice on protein foods needed to be included in the diet sheets and also more information on portion sizes. While the information in the diet sheets did include vegetarian sources of proteins specific information for vegetarians could be helpful.

3,4,5,vii; Salt

Only 2 NHS departments diet sheets mentioned salt. One department advocated "fish canned in brine rather than oil" which will contribute to the sodium intake as would snacks of crisps also suggested. To assist people with DM to reduce the amount of salt consumed far more information needs to be provided on salt, labelling and methods of cooking without salt.

3,4,5,viii; Fluid

Only 5 diet sheets, which were from NHS dietetic departments mentioned fluid. Adequate fluid is important particularly with the recommendations for consumption of a high fibre diet. The importance of adequate fluid consumption has been recognised since 1890 (Dodson and Kingston, 1890 cited by Lambert 1990) yet disappointingly this simple advice was not covered by all diet sheets. Soft drinks can provide large amounts of sugar and comprehensive lists of suitable soft drinks are required. The quantity of fluid to be taken and also suitable low sugar beverages should be included in diet sheets.

3,4,5,ix; Alcohol

Alcohol is an important topic for discussion and it was mentioned in all diet sheets. In general the maximum amount of alcohol permitted for people with DM is 21 units per week for men and 14 units per week for women. Alcohol can increase the risk of hypoglycaemia in those taking insulin and sulphonylureas and should not be taken on an empty stomach. "High sugar mixers" taken with
spirits can trigger reactive hypoglycaemia, which can mimic drunkenness. Unfortunately a study by Gregory et al (1990) showed that 49% of their patients with DM did not realise that alcohol can cause hypoglycaemia, and it would seem vital that appropriate information is given to patients. The information from Great Ormond Street Childrens Hospital included a discussion of alcohol and due to underage alcohol consumption it is recommended that this information is given to parents and older children with DM. **People with DM should be warned about reactive hypoglycaemia to alcohol and about not drinking and driving.** The alcohol content of drinks can be confusing for many people and information on this is useful for patients eg "Alcohol and Diabetes" produced by Bayer Diagnostics may be helpful to give to patients.

3,4,5,x; Specialist dietary products

All of the diet sheets were unanimous in their inclusion of sweeteners based on saccharin and aspartame. However there appeared to be confusion regarding the advice on sweeteners containing a minimal sucrose content such as Sucron (which contains 50% sucrose and is not recommended by the BDA). There was little information on the brand names of sweeteners which could be used by those with DM apart from in the diet sheet from the BDA. A more recent booklet entitled a "Sweetener Guide" has been published by the BDA (1996) at a price of 70p and gives extensive advice on which sweeteners are suitable, safety aspects of these, labelling of sugars and "sugary foods" and recipes. **While the information on recipes and food safety may be considered complex for some with newly diagnosed DM the list of suitable sweeteners could be used by dietitians in their diet sheets.**

The diet sheets recommended that diabetic foods should be avoided. However information was mainly in the text and only 9 diet sheets emphasised this in the aims. It is not surprising that a study by Fairchild et al (1990) showed that 74% of people attending an out patient diabetic clinic used such diabetic foods. **Diet sheets should clearly advocate an avoidance of diabetic foods.**
3,4,6; INSTRUCTIONS FOR SHOPPING, COOKING, MEALS AND SNACKS

3,4,6,i; Shopping and food labelling

Apart from those in care and possibly some men, everyone requires to shop for food, therefore information on suitable purchases would be invaluable especially for those with newly diagnosed DM. Four NHS dietetic departments and all of the commercial charitable and private organisations provided information on shopping which could be helpful. The BDA has recently produced a booklet of information on shopping which contains simple pictorial guidance on suitable food choices. **It is recommended that all people with DM should be given advice on which products they can buy.**

Practical information is of supreme help to people with DM and their carers and shopping tours such as those organised during National Diabetes week of June 1996 and 1997, in Sainsbury's by local dietitians and the BDA could be expanded to embrace other venues and occasions.

Three departments provided information on reading food labels. Guidance on how to read food labels would be extremely helpful to people with DM and would enable them to make informed choices of which foods are suitable for inclusion. Information on limits for fat, sugar and salt per meal or snack could be provided by dietitians to assist people in their choices. Use could be made of the information already mentioned provided by the British Heart Foundation (Fig 3,13). **Information on food labelling would be deemed to be an essential component of dietary advice for those with DM. Attractive and informative booklets on "Food Labelling" are available at no charge from Food Sense (MAFF,1996; Fig.3,14), supermarkets and food manufacturers also produce free booklets on food labelling which could be used by SRDs with patients.**

3,4,6,ii; Convenience foods

Despite convenience foods featuring in the diet today little mention was made of them in any diet sheets. Lists of suitable meals for microwaving and how to add extra carbohydrate by using potatoes, pasta, rice or bread may well be
FOODSsense, London SE99 7TT
Tel. 0645 556000
foodsense PB0549
food safety PB0551
about food additives PB0552
understanding food labels PB0553
food protection PB0554
healthy eating PB0550
the new microwave labels PB0779
food and pesticides PB0888
monitoring our food and nutrition PB0886
understanding radioactivity in food PB1212
natural toxicants in our food PB1286
food emergencies PB1568
keeping food cool and safe PB1649
chemicals in food managing the risks PB1695
genetic modification and food PB2052
organic food PB2085
useful to the person with DM who wishes to use them. Commercially prepared "low calorie" meals may require supplementing with additional potatoes, rice pasta or vegetables to provide more energy from carbohydrates. Ready made cook in sauces, pizzas, pasta meals, curries and pies often contain in excess of 20g of fat per portion. Advice on a choice of lower fat alternatives could be helpful for those with DM and such advice could be requested to be produced by supermarkets or food manufacturers.

3,4,6,iii; Cooking

All of the diet sheets made reference to cooking. Most people cook the majority of their meals and knowledge of suitable cooking methods can assist those with DM in achieving the nutritional targets. It is suggested that information is given on cooking methods eg how to roast meat and potatoes to reduce the fat content, making lower fat chips, using "stir fries" for quick meals, how to freeze rice, pasta and sandwich’s, baking with low fat spreads and making desserts with sweeteners. NHS dietitians could make good use of the recipes from the BDA. Also cooking and tasting demonstrations for people with DM could be invaluable in demonstrating appropriate recipes.

3,4,6,iv; Meal patterns

Twenty-six departments encouraged regular meals as part of the main aims of their diet sheets for DM. No definition of meals was made which may have suggested that it was a traditional cooked meal. Regular meals help to produce normalisation of blood glucose levels and regular low fat snacks of fruit and plain biscuits can prevent hunger and over-indulgence. As discussed in chapter 1 medication and the time at which it is taken in respect of meals is important. Insulin should be matched to meal patterns and life style of patients and not vice-versa. This was discussed only in the diet sheets from Scotland and Bayer. For those taking oral hypoglycaemic agents it is recommended that regular meals should be taken, with medication taken at least half an hour before the first meal (MIMS, 1996).
3.4.6,v; Education models for composition of meals

Diet sheets act as a teaching tool for dietitians to use during the consultation with a patient, therefore as described earlier the appearance and logical progression of advice is important. "A picture saves a thousand words" states an old English saying and visual teaching models are invaluable in promoting the understanding of complex concepts. Seven dietetic departments used the recommended "plate model" and 2 others models of 3 or 5 food groups for education. The use of a standard teaching model of a plate would prevent confusion for patients which could occur with the use of different models. It also reflects the Balance of Good Health (HEA, 1996). This was published after a study showed that among dietitians 13 different food group systems were used in nutrition education (HEA, 1991). Research to develop a model found that people's understanding and recall of "healthy eating messages" was greater when exposed to a tilted plate (Hunt, Gatenby and Rayner, 1994). Anderson & Lean (1996) also found that using a "plate model" approach enabled people with DM to increase their complex energy from carbohydrates. The use of a "plate" model in diet sheets could assist patient understanding and is recommended to be included in a diet sheet.

3.4.6,vi; Snacks

People often eat snacks when hungry. Snacks should be recommended between meals and at bed-time as a method of assisting glycaemic control (chapter 1). The diet sheets contained a range of advice on snacks, often not based on their nutritional content. Indeed there seemed to be a total lack of agreement on snacks which are suitable for a person with DM so that a patient with DM may be advised to eat a digestive biscuit as a snack in Bedford, choose garibaldi biscuits instead in London and not eat biscuits at all in Liverpool. This seems to again emphasise the lack of agreement and the need for homogeneous advice. The "Eight Guidelines for a Healthy Diet" gave healthy eating advice from H.M.Government (HEA, 1990) and was circulated to all health professionals. It contained information on "Ideas for Snacks" Fig 3,15) all of which are suitable for people with DM (HEA, 1997). It is
Here are some snacks which are in line with these guidelines:

Fresh fruit; low fat yogurts; raw chopped vegetables such as carrot and celery sticks; breakfast cereals, either straight from the packet or with skimmed or semi-skimmed milk; breadsticks; currant buns, scones or teabreads; small quantities of unsalted nuts (although these are not suitable for young children because of the risk of choking); plain popcorn.

Sandwiches, crispbreads, pitta breads, crumpets or muffins make good snacks. They are good with fillings such as cottage cheese and chives or chicken with salad; tuna and plain yogurt; sardines in tomato sauce; mashed banana.
recommended these should be included as a short list in all diet sheets for people with DM ie; diet yoghurts, fresh fruit, carrot and celery sticks, currant buns, scones, teabread, plain popcorn with a little cheese or paprika, roast chickpeas, sandwiches, crispbreads, pitta breads or chapattis with fillings of mashed banana with cinnamon, cottage cheese with a thin smear of crunchy peanut butter, reduced fat cheese, tuna and yoghurt, sardines in tomato sauce, smoked mackerel mashed with horseradish.

3,4,6,vii; Eating out

Only 4 of the diet sheets from all sources discussed eating out. Many people eat out frequently for social and business reasons. This may pose problems for those on a therapeutic diet as the foods available may not reflect traditional recipes and foods available. With a multicultural society a wide variety of different dishes appear on both general menus and also in the "ethnic" restaurant menus. Such foods are often high in fat due to being deep fried eg; samosas found on Indian menus and burgers in hamburger-cafes. People often eat a packed lunch or meal in a college or workplace restaurant. Many caterers provide menus in line with the "Healthy Eating" recommendations to achieve the Heart Beat Award which is a national award promoted by the Health Education Authority (1997). Caterers are required to provide low fat, low sugar and high fibre options on their menus. Many dietetic departments are involved in assessing the menu options for the award. No departments mentioned this award in their diet sheets and in Northampton the dietitians felt that the award was a community initiative with no impact for those following DM diets (SRDs at Northampton Hospital, 1996). Therefore information on packed lunches, suitable fast foods and how to choose from restaurant menus could be extremely helpful to people with DM and is recommended to be provided possibly in collaboration with caterers.

3,4,7; LIFESTYLE FACTORS

3,4,7,i; Exercise and smoking

Exercise reduces blood lipids and glucose levels (chapter 1) and is a powerful
tool in promoting the control of DM (Barmed, 1994). It also assists in the control of body weight, promotes cardiovascular function and enhances feelings of well-being (Ballo & Poehlam, 1994, Garrow & Sumerbell, 1995) and assisted weight loss in type 2 diabetic patients. It is to be noted that only 3 diet sheets advocated exercise. There is little emphasis of the benefits of exercise in the Manual of Dietetic Practice (Thomas, 1994) where the main emphasis is upon strategies for coping with exercise and possible hypo-glycaemia in IDDM. No diet sheets from the NHS department mentioned smoking while 3 of the commercial ones advocated not smoking. All diet sheets should include this advice in line with recommendations for DM (Rana & Boulton, 1993). It is recommended that people with DM are provided with information on employment, driving and other lifestyle factors as part of empowering them to live with DM (European IDDM Policy Group, 1993). Perhaps there is a need for diet sheets to be part of a pack of information on life style for people with DM, perhaps in the same way that a "regimen" was advocated in the past (see chapter 1).

3,4,8; DIETARY ADVICE FOR SPECIAL GROUPS

3,4,8,i; People with DM and obesity

The energy content of a diet in relation to energy requirements has the greatest influence on long term control of DM. Statistics show that 80% of people with DM have NIDDM and the majority (75%) of these are overweight (Lean, 1990). While obesity is complex and multifactorial a reduction of weight in NIDDM assists normalisation of blood glucose (Weinser, 1974). Therefore advice on weight control and reduction of body weight for those already overweight is vital advice for those with DM. However as was clearly demonstrated in the analysis of the "suggested menu plans" the intake recommended in these may have actually promoted a high energy intake and contributed to weight gain. A recent Position Paper of the British Dietetic Association (1997) states that "SRDs are committed to making a contribution to the prevention of obesity" and where better for them to do this than with those with DM. Advice to lose weight if overweight and not to gain weight was included in all of the diet sheets from
all sources. Only 11 diet sheets from the NHS dietetic departments included this in their "Aims". Only 5 NHS dietetic departments produced diet sheets for people with DM who were overweight. A daily deficit of 500 kcal mobilises fat and causes a weight loss of 0.5 - 1kg weight per week (Frost et al, 1991; O'Kane, 1993; Williams, 1994). Such prescriptions for energy deficits should be based on the age, sex and physical activity of the patient (Frost, 1991). The previous methods of weight loss by a simplistic approach of "making energy intake less than energy expenditure" (Davidson et al, 1979) and the use of severe restrictions in energy intake such as by the use of well known "1000 kcal and 800 kcal" diets has been questioned both ethically and for long term effectiveness (Garner and Wooley, 1991). A patient centred approach with agreed realistic targets for change such as encouraged by the Helping People Change Courses advocated by the HEA (1996) can be more supportive than a more dogmatic approach. Information on "Slimming groups" such as that run in Harrow by SRDs in 1988 should be provided. It has been found that obese NIDDM may progress better with such group treatment (Bush, 1988; Heller et al, 1988). Such group treatment is also more cost effective.

3,4,8,ii; Women with gestational DM

Despite women with gestational DM being found in every area of the country only one department provided information for this group. No information was provided by the BDA or any of the private or charitable groups. During pregnancy there are problems of morning sickness, heartburn and constipation which are not dealt with by any of the usual diet sheets examined in this study. Specific diet sheets need to be developed for this group possibly by a commercial group or department with a maternity hospital.

3,4,8,iii; People with DM from different cultural groups

In a multicultural society with different meal patterns and eating habits specific diet sheets need to be provided for specific groups. The BDA provides a range which could be purchased by departments for patients from different cultures. However the diet sheets did appear to be limited and not fully address specific
eating habits eg the problems of excessive salt intake in Afro-Caribbeans.

3,4,8,iv; In-patients with DM

Assistance with helping people to choose from hospital menus could be of great benefit to those with DM, especially if they are newly diagnosed. Only one department provided such information for people with DM. Hospital menus are often coded in various ways for people with DM or specific menus are produced. Information on suitable hospital food can be helpful both to patients, their carers, nurses and food service staff.

3,4,8,v; Children with DM

Most areas would have children with DM for whom diet sheets were required, while it may be appropriate to give the parents advice rather than the child the information contained in the general diet sheets for IDDM may not be appropriate to cover such items as school lunches and fast foods. The diet sheet provided by Great Ormond Street Childrens Hospital is available for purchase elsewhere and covered all aspects related to a child's diet and therefore it is recommended these are purchased for use elsewhere. Additionally BCL Pharmaceuticals provides a free 40 page illustrated booklet for children and their families, which covers all aspects of DM. This could also be obtained and given to children and their parents.

3,5; CONCLUSIONS

The analysis of diet sheets for people with DM carried out in this study has shown a total lack of consensus among dietitians as regards their mode of presentation, their nutritional content, and the range of sheets provided. Indeed there seemed to be little change since Trusswell et al (1975) concluded that "diabetic diets throughout Britain were often conflicting, incomplete and often misunderstood by patients". One can also agree with the dietitian from Tillery Valley Foods who stated "dietitians never agree".

If there is no real consensus among dietitians about nutritional information to be provided in diet sheets, despite publications on this topic in the dietetic
literature, it is hardly surprising that there is a lack of understanding of a DM diet among patients and poor compliance with a possible effect on the development of complications.

Dietitians are said to be "the lynch pin of learning and treatment for all those with DM" in the Minimal Education Requirements for the Care of Diabetics in the UK (BDA, 1987). However this study indicated that some of the diet sheets in use at the time of this study would do little to support this contention and there is a need for dietitians to examine and improve the diet sheets used. The recent publication by the British Dietetic Association on National Professional Standards for Dietitians Practising in Healthcare (1997) makes no specific reference to "diet sheets" other than in the Appendix in "a monitoring example of a resources review and development plan". If such an important document for the dietetic profession does not provide quality standards on diet sheets which have been often quoted as major tools of the dietitian (Lambert, 1990; Blades, 1985) then unless steps are taken to address the situation it is unlikely that improved and unified diet sheets will be produced.

The results of this study underline the need for consensus of essential user-friendly information which is easily understood and interpreted in the context of modern living in Britain. Drawing on the results of the study and the results of current research an attempt has been made to provide serious recommendations which have been highlighted in bold print for inclusion in a diet sheet for persons with DM.

Additionally in an attempt to provide further assistance a brief "check-list" of information to be included in any diet sheet has been compiled as Fig 3.16, which can be easily and simply used by SRDs as a quality audit when compiling a diet sheet for people with DM.
CHECK LIST FOR DIET SHEETS/NUTRITIONAL INFORMATION ON DM

CHECK THAT YOUR DIET SHEET CONTAINS THE FOLLOWING AND THAT YOU ANSWER YES TO EACH OF THE FOLLOWING

Title contains word diabetes
Presentation clear
Mistakes- checked that none are evident
Readability short sentences, large print, clear paragraphs
Illustrations
Aims
Summary of Information
Index

Nutritional Content in line with current recommendations and information on;
Carbohydrate
Fruit and Vegetables- 5 pieces per day
Fats
Protein
Salt
Fluid
Alcohol
Diabetic Foods
Shopping
Food Labels information available
Convenience Foods information
Cooking
Meal Patterns
Plate Education Model
Snacks
Eating Out

Information on lifestyle factors available
Smoking
Exercise
Obesity
Gestational Diabetes
For different Cultural Backgrounds

Does information contain;
Author
Date of Production
Other Information eg. addresses
Has the nutritional content been checked
Have you got consensus among the dietitians who will use the information
Have the views on patients been elicited
CHAPTER 4

AN ANALYSIS OF THE NUTRITIONAL CONTENT OF SUGGESTED MENUS FOUND IN THE DIET SHEETS PROVIDED FOR PEOPLE WITH DIABETES MELLITUS

An interpretation of the menu plans of the diet sheets by an individual acting as a patient with newly diagnosed DM, and the comparison of the nutritional content of these interpretations with official recommendations for people with DM.

4.1; INTRODUCTION

Compliance with an appropriately designed diet is recognised to delay the onset of complications of DM (Campbell et al, 1990). However it is recognised that patient compliance with dietary advice is one of the major problems in DM. (sections 1,6 and 1,7). This is further illustrated by a study of Moran (1989) which showed that 66% of patients with DM did not know which foods they could freely eat, and a study by Mc Cullock (1983) which showed that 40% of patients with IDDM could not remember their diet. But if the information on diet which is given to people with DM is itself flawed then it is not surprising that compliance with dietary advice does not achieve benefits of the prevention of complications.

The previous chapter concluded that there were a number of serious and worrying ambiguities, variances in presentation, lack of consensus, errors and an apparent lack of knowledge of the nutritional guidelines recommended for people with DM apparent in the diet sheets produced by dietetic departments in Great Britain. Indeed little seemed to have changed since the studies of Thomas et al in 1973 where they also commented on the variations in
presentation, large number of errors and bizarre instructions contained in some diet sheets for people with DM. However such inaccuracies in the diet sheets may have been counteracted by the person with DM being given a nutritionally sound suggested menu which specifies the food that they can eat each day. It was noted that in the previous study of diet sheets, that 8 of the diet sheets from NHS dietetic departments included detailed "suggested menus". A further 6 diet sheets included pro-forma menu plans which were designed to be completed by the dietitian (chapter 3, section 3,3,6,iv). The remainder relied on the patient compiling their own menu or presumably the dietitian providing a separate sheet not included in the diet sheets made available for the study. Only one diet sheet from private commercial and charitable sources contained a suggested menu.

The aim of the study presented in this chapter was to analyse the "suggested menus" provided by diet sheets for patients with DM produced by dietetic departments and commercial organisations. Recommendations on the nutritional content of the diet as "suggested menus" were analysed and compared with those for DM which were based on those of the Nutrition Sub-Committee of the BDA, (1992) and other research on diet and DM, summarised in chapter 1 (section 1,4,1 to 1,4,9).

Examination of the literature on diet sheets shows that the only study which critically examines the nutritional content of a diet sheet is that of Lambert (1990). In her study on the prescription of high fibre diets for IBS she calculated the amount of dietary fibre which was possible to be consumed by patients following the instructions in high fibre diet sheets. She calculated the largest and smallest amount of fibre a sedentary man could obtain each day when adhering to the advice in the sheets. It is apparent from the study, that Lambert herself who is a qualified SRD, had interpreted the diet sheets herself. This could be considered to be a criticism of the study as the interpretation by a SRD with her vast knowledge of food may be at variance with that of someone with no training in nutrition but who may be provided with a diet sheet. Also the
diet for those with DM is much more complex than the high fibre diets for IBS investigated by Lambert. The diet for DM requires an increase in dietary fibre particularly soluble fibres, a reduction in fat, inclusion of starchy carbohydrates at each meal, avoidance of sugar, inclusion of 5 portions of fruit and vegetables per day, avoidance of diabetic food products, caution regarding alcohol and an avoidance of becoming overweight (chapter 1 sections 1,4,1 to 1,4,9). Other studies which have examined the nutritional intake of people with DM such as that of Close (1993) and Humphreys et al (1994) have used 7 and 3 day food diaries to assess the intake of the subjects but make no mention of the diet sheets used. Therefore for this study of the nutritional contents of menu plans of diet sheets it was felt important to obtain an interpretation of them by an individual who was not trained in nutrition.

4.2; METHODS
The methods for obtaining diet sheets are described in the previous chapter section 3,2,1 and Table 3,1.

Nutritional analysis of any "suggested menus" ie food suggested to be eaten throughout the day, contained in the diet sheets was made using two interpretations of the menus. This interpretation was undertaken by giving the menus and instructions in the diet sheets to a 42 year old man who had no nutritional training. He provided a model for a man who had been given a diagnosis of IDDM or NIDDM and a diet sheet for DM which contained a suggested menu. He then wrote down which foods and quantities he would choose to eat for each of 2 days following the menu suggestions found in the diet sheets. He was asked to vary the foods selected at each meal. Portion sizes were selected by reference to pack sizes and weighing usual portion sizes of foods that he would eat. No alcohol was included. The nutritional content of the lists of foods listed by the man was analysed using Diet Plan 5 Analysis Programme (Forestfield Software Ltd based on the data provided from the 5th Edition of McCance and Widdowson, MAFF, 1994).
Advice on the nutritional analysis of the diet sheets was sought from a statistician at the University of Surrey and from another at Unilever Research Laboratories Ltd. Both recommended that a minimum of 2 days interpretation of the menus was undertaken. Both also cautioned that the collection of data on food choice and nutritional intake is a difficult one with great difficulties in obtaining accuracy. This is due to people not reporting intakes accurately and reporting what they feel the researcher wants rather than their actual intake. Therefore the subject was asked to provide the information to an intermediate rather than to the researcher who is known to be a SRD. It was felt that this eliminated some of the bias that may have occurred if a request had been made by the researcher.

4, 3; RESULTS
4,3,1; NHS Dietetic departments
Eight NHS dietetic departments (numbers 1, 4, 8, 11, 15, 16, 18 and 23) included suggested menus in their diet sheets. As described in methods, 2 day menus were devised by a man with no training in nutrition, following the instructions in the suggested menus in 8 diet sheets. He derived portion sizes of foods by reference to food weights and pack sizes that he normally consumed. No alcohol was included. No salt was added to food. The nutritional content of all the menus was analysed using Diet Plan 5 Analysis Programme. Thus 16 days menus were analysed.

4,3,2; Commercial, private and charitable sources
Only the Kelloggs diet sheet gave a menu plan (Figure 4,1). This was for a 7 day period and gave meals and snacks, and was stated as "providing 1500 kcal per day" and was recommended for weight loss. This was confirmed by analysing the menus provided using the Diet Plan 5 Analysis Programme.

4,3,3; Foods chosen as part of the "suggested menu plans"
The 42 year old man chose a range of foods including such foods with a high fat content as fish and chips. When an enquiry was made about this the answer
Here’s an example of a week’s menu to help you plan. It is designed for somebody who does not need insulin but who is mildly overweight. Each day’s food provides approximately 1500 kcalories. As well as the foods listed it is suggested that about 400 ml (2/3 pt) of skimmed milk should be included daily (130 kcalories) together with 10g of polyunsaturated margarine for spreading on breads (75 kcalories).

**NOTE:** Energy is expressed as kcal. 1 kcal = 1 Cal. All calorie values are approximate.

### DAY ONE
#### BREAKFAST
- All-Bran with sliced banana
- 2 slices of wholemeal toast
- 1 round of bran flakes

<table>
<thead>
<tr>
<th>Meal</th>
<th>Calories</th>
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</thead>
<tbody>
<tr>
<td>Br. Flakes</td>
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</tr>
<tr>
<td>Wholemeal</td>
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<tr>
<td>Daily allowance</td>
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</table>

#### SNACK*
- 1 banana

#### LUNCH
- 2 slices wholemeal toast
- Baked beans
- 1 slice grilled tomatoes
- 1 round of wholemeal toast

<table>
<thead>
<tr>
<th>Meal</th>
<th>Calories</th>
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<tbody>
<tr>
<td>Beans</td>
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<tr>
<td>Tomatoes</td>
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<tr>
<td>Wholemeal</td>
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<td>Daily allowance</td>
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#### EVENING
- 1 round of Sultana bran
- 1 round of baked beans

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<tr>
<th>Meal</th>
<th>Calories</th>
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<tbody>
<tr>
<td>Sultana bran</td>
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<tr>
<td>Baked beans</td>
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<td>Daily allowance</td>
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#### SUPPER*
- 1 round of wholemeal toast
- 1 round of skimmed milk

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<th>Meal</th>
<th>Calories</th>
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<tbody>
<tr>
<td>Wholemeal toast</td>
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<tr>
<td>Skimmed milk</td>
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<td>Daily allowance</td>
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### DAY TWO
#### BREAKFAST
- Bran-Flakes or Muesli
- 1 round of porridge

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<tr>
<th>Meal</th>
<th>Calories</th>
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<tbody>
<tr>
<td>Bran-Flakes</td>
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</tr>
<tr>
<td>Muesli</td>
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<tr>
<td>Round of porridge</td>
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#### LUNCH
- 2 slices of wholemeal toast
- 1 round of bran flakes
- 1 slice of wholemeal toast

<table>
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<tr>
<th>Meal</th>
<th>Calories</th>
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<tbody>
<tr>
<td>Wholemeal toast</td>
<td></td>
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<tr>
<td>Bran flakes</td>
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<tr>
<td>Wholemeal toast</td>
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#### EVENING
- 1 round of roasted tomatoes
- 1 round of wholemeal toast
- 1 round of wholemeal toast

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<th>Meal</th>
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<td>Wholemeal toast</td>
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### DAY THREE
#### BREAKFAST
- Wholemeal toast
- 1 round of porridge

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<th>Meal</th>
<th>Calories</th>
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<tbody>
<tr>
<td>Wholemeal toast</td>
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<tr>
<td>Round of porridge</td>
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#### LUNCH
- 2 slices of wholemeal toast
- 2 slices of wholemeal toast
- 1 slice of wholemeal toast

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<tr>
<th>Meal</th>
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<td>Wholemeal toast</td>
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<td>Wholemeal toast</td>
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#### EVENING
- 1 round of roasted tomatoes
- 1 round of wholemeal toast
- 1 round of wholemeal toast

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<th>Meal</th>
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### DAY FOUR
#### BREAKFAST
- Wholemeal toast
- 1 round of porridge

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<th>Meal</th>
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<tr>
<td>Wholemeal toast</td>
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<tr>
<td>Round of porridge</td>
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#### LUNCH
- 2 slices of wholemeal toast
- 2 slices of wholemeal toast
- 1 slice of wholemeal toast

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<th>Meal</th>
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<td>Wholemeal toast</td>
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#### EVENING
- 1 round of roasted tomatoes
- 1 round of wholemeal toast
- 1 round of wholemeal toast

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<th>Meal</th>
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### DAY FIVE
#### BREAKFAST
- Common Sense bran flakes
- 1 round of wholemeal toast
- 1 round of wholemeal toast

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<tr>
<th>Meal</th>
<th>Calories</th>
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<tbody>
<tr>
<td>Bran flakes</td>
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<td>Wholemeal toast</td>
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<td>Wholemeal toast</td>
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#### LUNCH
- 2 slices of wholemeal toast
- 2 slices of wholemeal toast
- 1 slice of wholemeal toast

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<th>Meal</th>
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#### EVENING
- 1 round of roasted tomatoes
- 1 round of wholemeal toast
- 1 round of wholemeal toast

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<th>Meal</th>
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### DAY SIX
#### BREAKFAST
- Wholemeal toast
- 1 round of porridge

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<th>Meal</th>
<th>Calories</th>
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<tr>
<td>Wholemeal toast</td>
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<tr>
<td>Round of porridge</td>
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#### LUNCH
- 2 slices of wholemeal toast
- 2 slices of wholemeal toast
- 1 slice of wholemeal toast

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<th>Meal</th>
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#### EVENING
- 1 round of roasted tomatoes
- 1 round of wholemeal toast
- 1 round of wholemeal toast

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<th>Meal</th>
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### DAY SEVEN
#### BREAKFAST
- Wholemeal toast
- 1 round of porridge

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<thead>
<tr>
<th>Meal</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholemeal toast</td>
<td></td>
</tr>
<tr>
<td>Round of porridge</td>
<td></td>
</tr>
</tbody>
</table>

#### LUNCH
- 2 slices of wholemeal toast
- 2 slices of wholemeal toast
- 1 slice of wholemeal toast

<table>
<thead>
<tr>
<th>Meal</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholemeal toast</td>
<td></td>
</tr>
<tr>
<td>Wholemeal toast</td>
<td></td>
</tr>
<tr>
<td>Wholemeal toast</td>
<td></td>
</tr>
</tbody>
</table>

#### EVENING
- 1 round of roasted tomatoes
- 1 round of wholemeal toast
- 1 round of wholemeal toast

<table>
<thead>
<tr>
<th>Meal</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholemeal toast</td>
<td></td>
</tr>
<tr>
<td>Wholemeal toast</td>
<td></td>
</tr>
<tr>
<td>Wholemeal toast</td>
<td></td>
</tr>
</tbody>
</table>

---

* Interchangeable  • Made with a small amount of sugar
received was; "nothing in the menu plans or sheets says I can't include them". It is noted that many people do eat fish and chips each week. Sugar was universally excluded by all of the menu plans.

4,3,4; Energy content of "suggested menu plans"

Energy contents provided by the 8 menus from the diet sheets from the NHS dietetic departments varied for each of the 2 days menus and for each interpretation as shown in Table 4,1. A range from 2,105 kcal (9,215 kJ) for day one for the menu from diet sheet code number 18 to 4,450 kcal (18,680 kJ) for day 2 from diet sheet code number 8 was obtained. The mean energy provided by each pair of menu plans was 3,255 kcal (10,685 kJ) for diet sheet code number 18 to 3,650 kcal (15,230 kJ) for diet sheet code number 8. The mean energy value of the 8 pairs of diet sheets was 3,250 kcal (13,660 kJ).

4,3,5; Energy provided by different macronutrient groups in " menu plans"

The analysis showed wide variations in the percentage of energy from fat, carbohydrate and protein as shown in Table 4,2 both between diet sheets and between the 2 days' interpretations of a single menu. The percentage energy for macronutrients was compared with the recommendations of the Nutrition sub-committee of the BDA (1992), ie a minimum of 50-55% energy from carbohydrate, a maximum of 35% energy from fat and a maximum of 12% energy from protein. Energy from carbohydrate from the menus ranged from 31.8% to 59.3%, mean 42.3%. From the interpretations of the menus only on 1 days interpretation of diet sheets 15, 18 and 23 showed that the energy content derived from carbohydrate was satisfactory and 50% of energy was derived from carbohydrate. On other days this fell as low as 30.2% for diet sheet code number 23 and thus the energy content of the menus from carbohydrate was unsatisfactory.

Fat provided in excess of 35% of the energy per day in all diet sheets, except for diet sheets code number 18 on both days, day one diet sheet code number 4 and day one of diet sheet code number 23. Fat provided a contribution to
Table 4,1

AMOUNT OF ENERGY PROVIDED BY MENU PLANS FOUND IN DIET SHEETS PRODUCED BY NHS DIETETIC DEPARTMENTS

<table>
<thead>
<tr>
<th>Diet Sheet Code</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3105</td>
<td>4135</td>
<td>3620</td>
</tr>
<tr>
<td>4</td>
<td>3140</td>
<td>3370</td>
<td>3255</td>
</tr>
<tr>
<td>8</td>
<td>2850</td>
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<td>3650</td>
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<tr>
<td>11</td>
<td>2480</td>
<td>3960</td>
<td>3225</td>
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<tr>
<td>15</td>
<td>2490</td>
<td>4210</td>
<td>3365</td>
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<td>16</td>
<td>3260</td>
<td>3940</td>
<td>3600</td>
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<td>2195</td>
<td>2895</td>
<td>2545</td>
</tr>
<tr>
<td>23</td>
<td>2105</td>
<td>3425</td>
<td>2765</td>
</tr>
<tr>
<td>MEAN</td>
<td></td>
<td></td>
<td>3250</td>
</tr>
</tbody>
</table>
Table 4.2

ANALYSIS OF MENUS FROM DIET SHEETS PROVIDED BY NHS DIETETIC DEPARTMENTS TO SHOW PERCENTAGES OF ENERGY (kcal) DERIVED FROM PROTEIN, CARBOHYDRATES AND FAT

<table>
<thead>
<tr>
<th></th>
<th>PROTEIN</th>
<th></th>
<th></th>
<th>CARBOHYDRATE</th>
<th></th>
<th></th>
<th></th>
<th>FAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>14.1</td>
<td>Day 1</td>
<td>43.0</td>
<td>Day 2</td>
<td>35.0</td>
<td>Mean</td>
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<td>16.0</td>
<td>Day 2</td>
<td>35.0</td>
<td>Day 2</td>
<td>39.0</td>
<td>Mean</td>
<td>44.5</td>
<td>Day 2</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td>Mean</td>
<td>39.0</td>
<td>Day 1</td>
<td>42.0</td>
<td>Mean</td>
<td>31.0</td>
<td>Day 2</td>
</tr>
<tr>
<td></td>
<td>19.0</td>
<td></td>
<td>44.5</td>
<td>Day 2</td>
<td>31.0</td>
<td>Mean</td>
<td>44.0</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>47.0</td>
<td></td>
<td>44.5</td>
<td>Day 1</td>
<td>42.0</td>
<td>Mean</td>
<td>47.0</td>
<td>Mean</td>
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<tr>
<td></td>
<td>36.0</td>
<td></td>
<td>42.0</td>
<td>Day 2</td>
<td>39.0</td>
<td>Mean</td>
<td>47.0</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>40.0</td>
<td></td>
<td>43.0</td>
<td>Day 1</td>
<td>51.0</td>
<td>Mean</td>
<td>47.0</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>53.0</td>
<td></td>
<td>44.0</td>
<td>Day 2</td>
<td>40.0</td>
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<td>47.0</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>35.0</td>
<td>Mean</td>
<td>30.0</td>
<td>Day 2</td>
<td>50.0</td>
<td>Mean</td>
<td>40.0</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>50.0</td>
<td>Mean</td>
<td>45.0</td>
<td>Day 2</td>
<td>40.0</td>
<td>Mean</td>
<td>50.0</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>23.0</td>
<td>Mean</td>
<td>53.0</td>
<td>Day 2</td>
<td>19.0</td>
<td>Mean</td>
<td>30.0</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>22.5</td>
<td></td>
<td>19.0</td>
<td>Day 1</td>
<td>30.0</td>
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<tr>
<td>MEAN</td>
<td>17.7</td>
<td></td>
<td>42.5</td>
<td>MEAN</td>
<td>38.7</td>
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<td></td>
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</tr>
</tbody>
</table>
energy of a mean of 38.75% for the 8 suggested menus in the diet sheets.

Protein provided a mean contribution to energy of 17.7% with a range from 14.0% of the energy per day for diet sheet code number 8 to a maximum of 23.0% of the energy from protein for diet sheet code number 18. Table 4,2 shows the contribution to energy of the macronutrients from the interpretations of the 2 days menus. It was evident that the menu from diet sheet 18 had one of the higher percentages of energy from carbohydrate, lower percentages of energy from fat but highest contributions to energy from protein (mean 22.5%). This diet sheet specified in great detail sugar-free deserts, fruit, mode of cooking potatoes and reduced sugar jams.

4,3,6; Non-starch polysaccharide, fruit and vegetables in "menu plans"

Examination of the interpretations of the menus for non-starch polysaccharide was compiled as Table 4,3 using results for analysis based on both the Englyst and Southgate methods as provided by the dietary analysis package. These results were then compared with the recommendations for DM based on the Southgate method for analysis of 30g fibre and 12-18g based on the Englyst method (DHSS, 1979; DoH, 1991,). It was noted that for day 1 and 2 diet sheet 23 provided less than 30g of fibre based on the Southgate method for analysis and less than 15g based on the Englyst method.

Examination of the numbers of portions of fruit and vegetables for each of the interpretations of the menus was noted as varying between 2 and 7 portions of fruit and vegetables per day (Table 4,4).

4,3,7; Micronutrients provided by the "suggested menu plans"

The nutritional analyses of the diet sheets revealed that all provided in excess of the RNI (DoH, 1991) for the water soluble vitamins, thiamine, riboflavin, niacin, vitamin B6 and folate. Vitamin C was inadequate on 3 days of the menu interpretations ie 31 mg on day 2 of diet sheet code number 1, 32 mg on day 2 of diet sheet code number 16 and 15. Also vitamin C was 45 mg per day for
Table 4.3

ANALYSIS OF MENUS FROM DIET SHEETS PROVIDED BY NHS DIETETIC DEPARTMENTS TO SHOW AMOUNT OF NON-STARCH POLYSACCHARIDES

<table>
<thead>
<tr>
<th>Diet Sheet Code</th>
<th>DAY 1</th>
<th></th>
<th>DAY 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S (g)</td>
<td>E (g)</td>
<td>S (g)</td>
<td>E (g)</td>
</tr>
<tr>
<td>1</td>
<td>26.2</td>
<td>25.0</td>
<td>34.2</td>
<td>19.7</td>
</tr>
<tr>
<td>4</td>
<td>40.5</td>
<td>32.7</td>
<td>40.9</td>
<td>25.1</td>
</tr>
<tr>
<td>8</td>
<td>37.4</td>
<td>21.7</td>
<td>39.4</td>
<td>28.3</td>
</tr>
<tr>
<td>11</td>
<td>30.8</td>
<td>23.0</td>
<td>41.3</td>
<td>27.2</td>
</tr>
<tr>
<td>15</td>
<td>30.6</td>
<td>23.3</td>
<td>35.5</td>
<td>20.4</td>
</tr>
<tr>
<td>16</td>
<td>55.3</td>
<td>42.1</td>
<td>38.3</td>
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<td>18</td>
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<tr>
<td>23</td>
<td>33.3</td>
<td>22.7</td>
<td>17.3</td>
<td>9.4</td>
</tr>
</tbody>
</table>

S = Southgate Method of Analysis of NSP (g)
E = Englyst Method of Analysis of NSP (g)
<table>
<thead>
<tr>
<th>Diet Sheet Code</th>
<th>Day 1</th>
<th>Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
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<td>4</td>
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<tr>
<td>8</td>
<td>5</td>
<td>3</td>
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<tr>
<td>11</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td>3</td>
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<tr>
<td>16</td>
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<tr>
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<td>5</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>
diet sheet code number 18 and 42 mg for diet sheet 23 and 4 which is only slightly excess of the RNI of 40 mg per day for Vitamin C. The menu interpretations of the diet sheets all provided in excess of the RNI for fat soluble vitamins D and E.

The amount of sodium taken each day by the menu interpretations was calculated and the figures rounded down (Table 4,5). The range of sodium was from 3,000 to 9,500 mg per day. Sodium exceeded the RNI (DoH, 1991) of 1,600 mg per day on every interpretation of the menus by a factor of 1.9 or more. People with DM are recommended to take no more than 6g of salt (sodium chloride) per day (section 1,4,7). This equates to 2,358 mg of sodium and as can be seen this amount was also exceeded on every interpretation of the menu.

4, 4; DISCUSSION
This discussion aims to comment on the findings of the nutritional analysis of the suggested menu plans. It also aims to make recommendations and these are emphasised by being presented in highlighted text.

What people actually eat is extremely difficult to assess and such studies are full of pitfalls. In this study researcher bias was excluded but the man who interpreted the menus obviously had his own preferences for foods and therefore the interpretations were likely to have been different if another individual interpreted the menus. Much more study of how individuals interpret instructions on food and diet, would appear to be required so that an appropriate diet can be specified.

4,4,1; NHS Dietetic departments
Only 8 NHS dietetic departments (numbers 1, 4, 8, 11, 15, 16, 18 and 23) and Kelloggs included suggested menus in their diet sheets. Six dietetic departments provided pro-forma menu plans for dietitians to complete to provide patients with advice on food to eat for meals and snacks. Four
### Table 4.5

**AMOUNT OF SODIUM PROVIDED EACH DAY BY 'SUGGESTED MENU PLANS'**

<table>
<thead>
<tr>
<th>Diet Sheet Code</th>
<th>Day 1</th>
<th>Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,000</td>
<td>8,000</td>
</tr>
<tr>
<td>4</td>
<td>4,500</td>
<td>6,000</td>
</tr>
<tr>
<td>8</td>
<td>6,000</td>
<td>9,500</td>
</tr>
<tr>
<td>11</td>
<td>8,000</td>
<td>3,000</td>
</tr>
<tr>
<td>15</td>
<td>4,000</td>
<td>8,000</td>
</tr>
<tr>
<td>16</td>
<td>5,000</td>
<td>8,500</td>
</tr>
<tr>
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<td>3,500</td>
<td>7,000</td>
</tr>
<tr>
<td>23</td>
<td>4,500</td>
<td>4,500</td>
</tr>
</tbody>
</table>
departments said they provided individualised menus and presumably the remainder also did so. However as diet sheets are often given to patients by other health professionals without reference to a dietitian it is unlikely they would complete pro-forma menu plans or provide individualised ones. Thus a "suggested menu plan" can be a useful component of a diet sheet not only to give suggestions for the composition of meals and snacks but also for their timing and information on portion sizes and suitable foods.

The menu plans included were of a very traditional meal pattern and hardly of help to the person who works shifts, the vegetarian, anyone who eats a range of convenience foods, the pregnant woman who suffers from nausea and needs frequent snacks to mention but a few individuals. It was apparent in chapter 3, section 3, that seven departments only produced one diet sheet which was considered to be suitable for everyone with a diagnosis of DM. As already discussed in chapter 3 section 4,3, it is recommended that departments produce a range of information for people with DM, these should include suggested menu plans.

4,4,2; Commercial, private and charitable sources
Only the Kelloggs diet sheet gave a menu plan which provided 1500 kcal per day. This could be helpful for those individuals such as overweight sedentary women and could be useful for NHS departments to use with such individuals.

4,4,3; Foods chosen as part of the "suggested menu plans"
Most of the menu plans were extremely vague in their advice and "stated meat or fish" without any specification of portion size or mode of preparation. Thus people could easily assume this includes fried fish in batter or breadcrumbs. The menu plan which most closely met the nutritional recommendations most closely specified the types of foods to be included for example reduced sugar jams.
Energy content of "suggested menu plans"

The diet sheets provided a mean of 3,250 kcal per day which is in excess of 2,710 kcal, the requirements for an active male of age 19-50 years of age (DoH, 1991). However the menu plans were aimed at all types of people with DM and such an intake could be excessive for the obese and sedentary individuals and actually lead to weight gain. While it is appreciated that there is variation between daily food intakes, as was shown by the subject who interpreted the menus, the menus did enable an interpretation providing an excessive amount of energy to be made. Yet such individuals would consider they were following a diet suitable for them.

Energy intake should be consistent with the maintenance of a BMI in the range 20-25. Obesity is a major causative factor in the onset of NIDDM (Salen, 1987; Lean et al, 1990) and weight loss is effective in normalising blood glucose levels (Weinser, 1974) and improving insulin secretory capacity (Hosher et al, 1993). Seventy-five percent of people with NIDDM are overweight and loss of weight can be a major factor in the management of DM (Salen, 1987; Lean et al, 1990). Overweight is associated with ischemic heart disease, dyslipidaemias and hypertension. Therefore weight loss must be one of the major aims for this group. Benefits of weight loss include a reduction in hyperglycaemia, hyperlipidaemia and hypertension. Weight loss is also the only factor shown to improve life expectancy in NIDDM (Lean et al, 1990). Even small weight losses are beneficial to those who are overweight and have DM. 1kg weight loss in the first year after diagnosis is associated with an extra 3-4 weeks survival and a 10kg weight loss increases life expectancy by 35% (Lean et al, 1990; Wales, 1992). Thus any diet sheet should promote these concepts and not, as became apparent that the menu plans, when interpreted by a man could actually promote an excessive energy intake.

Information on the importance of not becoming overweight and losing weight if already overweight must be detailed in diet sheets and menu plans must reflect this advice by preventing an overconsumption of energy. Indeed Albrink
and Davidson (1971) suggested that a diet to promote weight loss in the overweight person with DM and to prevent weight gain in those of normal weight was the only diet really justified for DM.

The use of a BMI chart as found in the Kellogs diet sheet could be much less threatening to those who are overweight than a height weight chart. Such charts as that adapted from Garrow in Obesity and Related Diseases (1988) which shows the health risks associated with different BMIs could be helpful. Recent research also suggests that hip-waist ratios, and the high levels of visceral obesity they represent, are a better predictor of coronary heart disease than just weight or BMI (Ashwell et al, 1996). This could also be simply explained as part of a diet sheet.

Thus it is recommended that in any diet sheet and menu plan the energy content is consistent with a maintenance of a BMI of 20-25 or weight loss if the person with DM is overweight. Far more information needs to be included in the menu plans of diet sheets on the suitability of foods and portion sizes to prevent a consumption of excess energy. Also it is recommended that advice on not becoming overweight is included in diet sheets.

4,4,5; Energy provided by different macronutrient groups in" menu plans"

Diets for people with DM containing increasing amounts of carbohydrates have been recommended over the last 50 years, with the most recent recommendation having been made by the Nutrition Sub-Committee of the BDA (1992) that carbohydrate should provide 50-55% of the total energy. Based on the work, for example of Fuessel et al, 1987; Vinik and Jenkins, 1988 most of this carbohydrate is recommended to be in the form of fibre rich polysaccharides. Additionally foods of low glycaemic indices have been shown beneficial in assisting the control of blood glucose levels (Haber et al, 1977).

Yet the information in the suggested menus did not promote such an intake of high fibre foods. Analysis of the 8 menus for each of the 2 days interpretation of the meal patterns contained in the diet sheets showed wide variations. Only
the analysis of 3 days menus, was shown to provide in excess of 50% energy being derived from carbohydrate with that on the remaining 13 days being in the range 30.%-50.% (Table 4,2). This is consistent with other studies such as those of Humphreys et al (1994), who measured intake using a 3 day diary, and found 42% of energy was derived from carbohydrate. This indicated that few people with DM achieve the recommendations for carbohydrate and indeed this level of energy from carbohydrate was challenged by Close et al (1993) as being excessive and difficult to achieve.

To assist the achievement of 50% of energy being derived from "starchy" carbohydrate far more information on portion sizes of bread, potatoes, pasta and rice needed to be included together with information on suitable snacks, and limitations on portion sizes of foods containing fat and protein. Information on assisting those with DM in making such choices should be included in a diet sheet and menu plans in a practical form. High fibre foods such as wholemeal bread, brown pasta and rice, and foods of a low glycaemic index, should be encouraged. Foods such as breakfast cereals, bread, pasta, potatoes and noodles should be encouraged to provide the larger part of the meal on the plate (Nydhal, 1993) and diagrammatic representations of this given. Breakfasts of porridge and other high fibre cereals of a low glycaemic index and bread should be encouraged rather than the traditional egg and bacon.

The concept of carbohydrate allowances for people with DM is out-moded. But for those taught a 10 gram carbohydrate exchange system and who wish to use it, a short list of "exchanges' should be given for staple foods, ie. bread, potatoes, rice and pasta be based on the exchanges still available from the BDA (1990). But, to promote more carbohydrate, these exchanges should be expanded to give larger portions of carbohydrates, ie. based on 30 grammes of carbohydrates consistent with 1 large slice of bread or 6oz potatoes as well as taking into consideration the glycaemic index of various foods. As already recommended in chapter 3 section 3,4,3 there needs to be an agreement in the mode of swapping one food for another.
Sugar was excluded by all of the suggested menu plans and earlier (chapter 3 section 3,4,4,i) it was noted that it was the only advice upon which there was universal agreement. Despite the knowledge that the glycaemic index of sucrose is only 60% of that of glucose (Jenkins et al, 1984), it is still advisable for people with DM to avoid added sugar in their diet and sugar rich foods such as sweets due to the rise in blood glucose levels it causes. The Nutrition Sub-Committee of the BDA (1990) advises that 25 grammes per day of added sugar may be used per day in baked items but artificial sweeteners such as aspartame, saccharine and acesulfame K should be used in drinks, cereals and puddings. Advice on this should be given in the diet sheets including a full range of suitable sweeteners, drinks and foods. The information provided from the BDA on sweeteners (1996) could be useful for departments to give to patients.

Sugar in limited amounts should therefore be permitted as an ingredient in foods, eg. ice cream. A list of suitable puddings should be given in menu plans eg fruit, low sugar jelly and whips, diet yoghurts, blancmanges made with sweetener and semi-skimmed milk, charlotte, baked fruits, fruit in natural juice and plain ice creams.

Dietary fat is recommended to provide no more than 35% of energy per day for the general population (Nutrition Sub-Committee of the BDA, 1992; European Policy Group on Diabetes, 1993). Bearing in mind the increased risk of cardiovascular complications (previously discussed in chapter 1) in the person with DM this advice is even more important. From the interpretations of the menus, fat provided a mean of 38.75% which is in excess of 35% of the energy per day recommended. Again this result agrees with that of Humphrey et al (1994) who found an average contribution of 37% of energy from fat in their study of DM and diet.

Menu plans in diet sheets should recommend a limitation of fat to 35% of energy to assist in the prevention of cardiovascular disease which is one of the
major complications of DM. For an average person taking 2000 kcals per day, this represents 70 g fat per day. To achieve this reduction in fat the recommendations in the Manual of Dietetic Practice (Thomas, 1994) which have been made comprehensible to the "lay" reader should be followed i.e.:
* cut down on fried and fatty foods such as butter, margarine, fatty meat and cheese
* buy lean meat and trim off visible fat, choose fish and poultry more often or replace meat with pulses such as beans and lentils
* try using low or reduced fat spread rather than butter or margarine, polyunsaturated or monounsaturated spreads are preferable
* use as little oil in cooking as possible, choose an unsaturated oil such as olive oil, rapeseed oil, corn oil or sunflower oil
* use low fat dairy products, eg. semi-skimmed or skimmed milk, low fat yoghurt, half fat hard cheese or cottage cheese
* cut down on crisps, cakes, pastries and biscuits
* grill, steam, poach, boil or microwave food rather than frying it, fry in a non-stick pan without adding fat
* eat fewer manufactured meat products such as beefburgers, sausages and pies

For ready made meals purchased from shops and supermarkets, dishes containing less than 11g fat per main course and 2 g fat per pudding advocated. Advice on reading food labels should be given, and the free leaflet from Food Sense entitled Understanding Food Labels (MAFF, 1994) could be a useful resource for patients.

Suggestions of snacks consistent with those of the Guidelines for a Healthy Diet from H M Government (HEA, 1990 as described in chapter 3 section 4,5,vii) should be given in suggested menus to prevent consumption of more fatty foods. A list of suitable biscuits, ie. rich tea, digestive, garibaldi, oat, marie, ginger nuts, and rice cakes should be included.

A limitation of protein intake to no more than 12% dietary energy is
recommended (Nutrition Sub-Committee, BDA, 1992) due to the increased risk of renal disease in DM (see chapter 1). Restriction of protein can reduce albuminuria in patients with early nephropathy (Viberti, 1988). Protein provided an energy contribution in excess of 13.8% each day from the menus analysed in this study, with a mean contribution to energy of 17.7% per day. To achieve this the use of the "plate model" (Nydal, 1993) and an advocacy of starchy carbohydrate snacks may assist people in achieving this. Additionally information on portion sizes for protein foods should be given as part of the menu plan.

4,4,6; Non-starch polysaccharide, fruit and vegetables in "menu plans"
The non-starch polysaccharide (NSP) content of the menus was examined. It was noted that for days 1 and 2 diet sheet 23 provided less than 30 g of NSP based on the Southgate method for analysis of fibre (Southgate and Englyst, 1985) nor the 35 g of fibre recommended for people with DM by Hockaday (1976) and Jenkins et al (1992). Far more specific information on quantities of foods eg amounts of fruit and vegetables, cereals to be included in the diet sheets to achieve the targets recommended for NSP.

The numbers of portions of fruit and vegetables for each of the menus from the diet sheets was found to be 2-7 portions per day. This did not meet the recommendation for 400 g (WHO, 1990) or the much publicised "5 portions per day " of fruit and vegetables (HEA, 1996). It is of concern that the diet sheets did not appear to encourage the inclusion of sufficient fruit and vegetables which is simple and positive advice. Diet sheets and suggested menus should promote an intake of at least 400g of fruit and vegetables per day excluding potatoes (WHO, 1990). This promotes antioxidant levels beneficial to the prevention of coronary heart disease (Kushi et al, 1985; James et al, 1988; Gramenzi et al, 1990). This should be interpreted as 5 pieces of fruit and vegetables per day with examples.

Also it is noted that urine testing strips used for detecting glucose are available
eg. Meditest Combi (BHR Pharmaceuticals) which also detect levels of vitamin C excreted, yet nowhere is this noted in medical records and no studies have been undertaken on this. It is recommended that this avenue of assessment of adequacy of vitamin C of intake is monitored both from a clinical and patient perspective.

**4,4,7; Micronutrients provided by the "suggested menu plans"**

From the nutritional analysis of the diet sheets it appeared that they all provided in excess of the RNI (DoH, 1991) for vitamins D, E, thiamine, riboflavin, niacin, B6 and folate. However Vitamin C was inadequate on 3 days analysis of the menus and only 5 mg above on 3 additional days. Antioxidants such as vitamin C are felt to have both a preventative effect on the development of coronary heart disease which is the major complication in DM (chapter 1). Therefore encouraging the addition of more fruit and vegetables would have rectified this.

It was of concern that the diet sheets did not sufficiently emphasise the importance of taking adequate amounts of fruit and vegetables and hence Vitamin C, as this is extremely simple advice.

Sodium was found to be in excess of the RNI by a factor of at least 1.9 on every interpretation of the menus which is of concern as people with DM are at greater risk of hypertension (chapter 1) which is exacerbated by excessive quantities of sodium. Additionally the male who interpreted the menus did not add salt to foods, and for individuals adding salt the level of sodium would be even higher.

Hypertension is an additional complication in people with DM and it is recommended that they do not take excessive amounts of salt or manufactured foods. Dodson et al (1989) suggested that people with DM may be salt sensitive and that moderate sodium restriction results in significant reductions in systolic blood pressure. **Total salt consumption should be limited to 6g per day (Nutrition Sub-Committee of the BDA, 1992) or less than 7g (European Policy Group, 1993).** For people with DM to reduce the level to a more
moderate one requires much more information to be included in the diet sheets on cooking methods, not adding salt to food at the table and suitable snacks which are low in salt.

From this study it was apparent that the RNI for sodium (DoH, 1991) is not easily achievable and it is recommended that there are studies undertaken on the level of sodium in the diet and how easy it is to comply with the RNI.

4.5; CONCLUSIONS

The nutritional content of any diet should be adequate in all respects and should also be consistent with the Dietary Recommendations for People with Diabetes for the 1990's (Nutrition Sub-Committee of the BDA, 1991) which are considered to promote a normalisation of blood glucose and lipids and prevent complications (Pirart, 1978; Serviour et al, 1988). Any suggested menus should reflect these recommendations. However there appears to be a great need for more examination of the practicality and achievability of recommendations by people with DM.

It was evident from the menus that there was little evidence of any achievement of the nutrient intakes recommended for the general population (DoH, 1991) let alone those for DM (BDA, 1992). Not a single menu interpretation achieved the limitation of protein to 12% recommended and indeed the menus may well have actually promoted an increased intake of protein due to insufficient explanation. Also the menu plans could easily be interpreted in a way such as to provide an excessive energy intake and thus promote weight gain, which is harmful in DM. But patients following the advice will consider that they are following a diet and that this has failed or they have not complied with the advice rather than the information in the diet sheet was incorrect. The only diet sheet, code no 18 which achieved one of the higher percentages of energy from carbohydrate and lower percentages of energy from fat specified in great detail sugar free deserts, fruit, mode of cooking potatoes and reduced sugar jams. These findings indicated that information in diet sheets needed to give far more detail
on which food should be included and the preferred cooking methods. Much more information was needed on "sugar free", "low fat" and "low calorie" products and their suitability for inclusion in DM diets. Information on reading labels and amounts of nutrients suitable for inclusion may also be useful.
CHAPTER 5

A CRITICAL STUDY OF PATIENTS ATTENDING THE DIABETIC CLINIC AT BEDFORD HOSPITAL

A 3 year audit of patients referred for dietetic advice, and a critical survey of 100 patients with Diabetes Mellitus.

5.1: INTRODUCTION

As already discussed diet is fundamental to the clinical management of individuals with DM. The main aims of dietary therapy for people with this condition, as stated by Thomas and the Nutrition Sub-Committee of the BDA (1992) and reiterated by Tinkler (1994), an American dietitian, are to attain or maintain ideal body weight and keep the blood glucose level under control (see chapter 1). Good control of blood glucose levels on a daily basis is vital in the prevention of long term complications such as stroke, heart disease, vascular disease and renal and retinal disease (Stillwell, 1992).

Changes in the management of the NHS have facilitated changes in the clinical care of patients with various disorders including DM, due to a greater awareness of the number of people seen, their modes of treatment and the associated costs (Secretary of State for Health, 1989). Dietetic departments are required by the Department of Health to provide information on the dietetic workload based on the requirements of the Korner Report (DoH, 1983). Dietetic standards have been developed recently as part of quality initiatives, of which audit is a feature of quality in health care (British Dietetic Association, 1997). Multidisciplinary clinical audit, examining all aspects of patient care, including nutrition, is being encouraged in the NHS. The DoH (1996) has also encouraged staff in the NHS to examine their clinical practice to ascertain if it is effective in promoting a beneficial outcome for patients. Thus dietary advice
and all aspects of the work of a dietitian, can feature both in standards for services, quality audits and an examination of various clinical outcomes.

The cost of treating patients with DM is approximately 5% of the NHS budget of £39 billion per year (National Association for Health Authorities and Trusts, 1996). No breakdown of these costs was available nationally or locally. Directors of Finance for both Northamptonshire and Bedfordshire Health Authorities were unable to provide costs for DM in their areas. Attention to NHS funding issues has increased, focusing on money spent on the treatment of patients with various disorders. Thus, if the SRD is able to offer support which is shown to be cost effective this is likely to be taken up. This raises the question of how much support is required and how effective is it? Dietitians have a major role in giving dietary counselling to individual patients and this may enable more relevant advice which can be personalised according to the medication, lifestyle and eating pattern of the individual. Such advice may be found to be helpful to people with DM and to negate the variances in advice in the diet sheets which were found. The question to be raised is did such a consultation enable patients to have superior control of blood glucose levels, better management of weight and the development of fewer complications? Therefore it seemed essential to obtain information which would make it possible to assess the effectiveness of dietetic advice. Are there patients who would benefit from being advised more closely and others for whom the dietitian's services contribute little to the clinical outcome? It was therefore decided to conduct a detailed examination of the medical notes of patients with DM whose care had been the responsibility of the Diabetes Team at Bedford General Hospital and their referral for advice from a SRD and the benefits, if there should be any, of such advice.

The St Vincent Task Force for Diabetes (BDA, 1993, DoH, 1995) recommended that each Health Authority should have a "clearly planned and audited service for people with diabetes" which would address screening and management. Such comprehensive services included dietary advice. In the North of
Bedfordshire a Diabetes Advisory Group was set up by the Consultant Diabetologist for Bedford Hospital Trust to co-ordinate and improve the care to people with DM. The group consisted of 12 people; the Consultant Diabetologist, 4 GPs, the manager of dietetic services, 2 diabetic nurse specialists, 1 practice nurse, 2 members of the Health Authority and a patient representative from the local branch of the BDA. Guidelines on the management of DM were produced by the Diabetes Advisory Group in 1993. These recommendations included those of the Nutrition Sub-Committee of the BDA's Medical Advisory Committee (1986, 1992) and the BDA (1993). As far as diet was concerned the recommendations were that every person with newly diagnosed DM should receive advice from a SRD within a year of diagnosis and that every person with DM should receive an annual update from a SRD. The guidelines were distributed to every GP in North Bedfordshire and all staff involved in the management of DM.

Records of the management of people with DM in North Bedfordshire showed that they were mainly managed by their GP, with assistance from the practice nurse (Diabetes Advisory Group, 1993). Patients were referred to the Consultant Diabetologist at Bedford Hospital for further advice as required. Diabetic clinics at Bedford Hospital, were held on Wednesday and Thursday mornings. Additional clinics were held for children, young people (age 14-19) and pregnant women on other occasions. Each patient who attended the clinic had information entered into their medical records on the status of their DM. Thus an examination of the information in the medical records of patients with DM would provide information to enable the researcher to ascertain if patients had been referred for dietetic advice and the outcome of this.

The Nutrition & Dietetic Department for Bedford Hospital was established in 1970. It received referrals of people with all types of disorders requiring dietetic advice, including those with DM, from GPs, hospital medical staff, community nurses and paramedical staff (chapter 2). Patients were referred for dietetic advice as in-patients and out-patients. Additionally, a facility was arranged by
the manager of the dietetic service so that all patients attending the DM clinic could be seen there. All patients referred to the dietetic department at Bedford Hospital had details of; name, address, date of birth, referring agent, GP, diagnoses, date when seen, where seen, advice given and by which SRD, recorded on a computer system as well as in the patients' medical records. Unless people are seen by a SRD they are unlikely to obtain any benefits of advice from him or her, yet no information is available in the literature or in DoH statistics on dietetics, which details the numbers of people with DM referred for dietary advice, or of any audit against the 1995 standards set by the BDA. Therefore it was decided to ascertain the number of people with DM who were referred for advice from a SRD, to seek information on the effectiveness of this advice by an examination of the medical records for details of control of the patients, their weight management and the development of complications.

5, 2; METHODS
Permission was obtained from the Chief Executive of Bedford Hospital to examine the medical notes of patients with DM who were in the care of the DM clinic at Bedford Hospital in April 1993. Information extracted from the medical notes was requested to be kept strictly confidential with no record of the patients' name or address. It was considered by the Chief Executive that if identifying data was to be kept, in line with the policy of the Medical Ethical Policy for the Trust, an agreement of consent to participate in the study would need to be sought from each patient. To obtain such consent was considered by the researcher to impose a bias towards those patients of a higher social class and who were English speaking. As Bedford is a multicultural community it was felt important to obtain information on a fully representative sample of patients with DM and thus not impose a bias of requesting consent. Thus all information was kept fully confidential and no personal details were recorded.

5, 2, 1; Statistical considerations
Statistical advice was sought from statisticians at the University of Surrey, North Thames Regional Statistician and Local Audit Department about the studies to
be undertaken firstly, the number of patients referred for dietetic advice from
the DM clinic at Bedford hospital and then an examination of the effectiveness
of dietary advice from a dietitian upon future control and prevention of the
development of complications. All 3 experts recommended that a sample size
of at least 100 medical records of adults chosen sequentially from the medical
records of patients attending the clinics on Wednesday and Thursday mornings
was used. Such a sample size of at least 100 was regarded as representative
of all records available and could be used to demonstrate any significant
difference between patients who had seen a SRD versus those had not at the
5% level, (if any such differences existed) using a Student t test and Chi square
test. The statisticians advised that a sample size of 30 to 50 patients with
NIDDM and 30 to 50 with IDDM was recommended to be a sufficiently large
sample to provide statistically useful data on their control.

5.2.2; Preliminary investigations
A preliminary investigation of the records of people who attended the clinic,
during 1992 showed that 100-220 people attended the DM clinic each month.
Medical records on each patient were kept in an A4 sized folder which
contained all pertinent information. They were hand-written in by all medical
staff while patients were in hospital, and also at any out-patient consultations.
Biochemical test results, physiological measurements and correspondence
pertaining to the patient were also included in the medical records. Dietitians
also recorded consultations in the medical records both while the patient was
an in-patient and during out-patient consultations. The medical records of
patients were very comprehensive and complex documents. If patients had a
chronic condition or received medical treatment on a number of occasions the
records were likely to contain several hundred pages.

5.2.3; Logistical considerations
A discussion of the logistical considerations of the proposed study was
undertaken by the investigator with medical records staff. This included;
transporting the notes, storing them in such a way as to make them readily
accessible for urgent access if required when a patient was admitted. Fifty sets of notes were advised by the medical records manager to be the maximum that could be made available for research at any one time. This number of notes, filled 3 supermarket trolleys (the usual mode of transport in hospitals for medical records) but was not of too large a size to be securely accommodated in the dietetic department and also could be rapidly searched for any urgently needed records by staff of the Medical Records Department. Additionally the Fire Officer for Bedford hospital stated that storage of in excess of 50 medical records in an undesignated area may be a fire risk and hazard for staff.

Examination of the overall process of the organisation of the diabetic clinic, handling of medical records and discussions with staff indicated that the Consultant Diabetologist's medical secretary collected all medical records from the clinics and immediately typed letters to the patients' GPs. The medical records were then collected by the portering staff for return to the medical records department. To facilitate a logical procedure for the collection of data from the medical records to the Dietetic Department it was decided that the medical records would be kept by the Consultant Diabetologist's secretary and carried by porters to the researcher, who would then return them to medical records after undertaking a full examination of them. Thus only approximately 50 records at a time would be released for investigation in line with the recommendations of the medical records department staff and Fire Officer.

In order to provide sufficiently large numbers of medical records for the study it was decided to undertake the study for a 4 week period which would provide in excess of 100 records. Additionally a 4 week period was considered sufficiently long by the statistical advisers, for the representation of referral patterns to be shown, based on the information from the preliminary investigations. It was decided to repeat the study for 4 weeks per year over 3 years to provide both an increased volume of data as well as inter-year comparisons.
5,2,4; Timing of study

Discussions on the timing of the study period were undertaken with the Consultant Diabetologist, clinic staff, secretarial staff and personnel department. From the records of DM clinics held in 1990-1992 it was noted that clinics in July, August, September and December were reduced because of holiday periods. During late May, October, February and early April adult DM clinics were replaced on 1 or 2 occasions with clinics for young adults. During March (the end of the annual leave year in the NHS) staff were found to use up any leave that they had saved, so staff shortages were common among nursing, portering and medical records staff. As the study was to be repeated on 3 occasions annually it was essential that the researcher and other key staff were not absent during the research period. It was therefore decided to undertake the study during a 4 week period from mid-April to mid-May since this would provide a time of a continuity of clinic resources and staff. Although the period contained May Day as this falls on a Monday it did not affect the DM clinics.

For a 4 week period, mid-April to mid-May over a 3 year period 1993, 1994 and 1995 the medical records of all patients seen in the diabetic clinic held on Wednesday and Thursday mornings were examined (8 clinics per year). Records from other clinics for children, young adults and pregnant women with DM were excluded.

Non-attendance at clinics without prior notification is referred to in the NHS as DNA (Did Not Attend) rates. Requests to tabulate such rates were made by the researcher but permission to do so was refused by the Consultant Diabetologist, as this was considered to be confidential information.

5,2,5; Medical records

Each set of medical notes records for patients attending the diabetic clinic was thoroughly examined. Information was noted with respect to the patient's DM on a recording sheet. This included; gender, date of birth and age, year of diagnosis, type of DM recorded, medication, date of patient's referral to the
dietetic department and other medical conditions where dietary advice was considered to be appropriate (according to research literature and normal dietetic practice in the department). The data was collected manually and tabulated on a recording sheet developed for the purpose. All patients were allocated a code number for recording purposes and to maintain confidentiality. The data collected during 1993 and 1994, was made available for use by a final year student in the School of Mathematics at the University of Surrey for a project on statistics (Johnson, 1995).

5,2,6; Selection of records for the study of the effectiveness of advice from a dietitian and data recording

The records of the first 50 consecutive patients with a diagnosis of NIDDM and also the first 50 consecutive patients with a diagnosis of IDDM recorded in the medical records, who had attended the diabetic clinic in April 1993 at Bedford Hospital were chosen. No patients were excluded.

Each patient was allocated an identification number, (1-50 for IDDM and 1-50 for NIDDM - these identification numbers differed from those code numbers referred to in section 5,2,5), to comply with the requirements for patient confidentiality. The records of each patient were carefully scrutinised by the researcher. The following key data (known from a literature search to be significant in the development and control of DM, chapter 1) was recorded for each patient as at April 1993. (For brevity in tabulation abbreviations were used and are indicated In Fig 5,1): Gender, marital status; age in years; duration of diagnosis of DM as at April 1993; ethnic origin (this was examined as Bedford is a multicultural town); BMI as at April 1993 and at the time of diagnosis; presence of complications attributable to DM; age at diagnosis of DM; number of times seen by a dietitian; improvement of random venous blood glucose levels to <10 m mol per litre (Diabetes Advisory Group, 1993) after a dietetic consultation was recorded; diabetic control; for those with a diagnosis of IDDM recorded in the medical records any previous treatments for DM were also recorded while for those with a diagnosis of NIDDM the present treatment was
ABBREVIATIONS FOR DATA RECORDED ON PATIENTS WITH DM

1. Gender - male (M) or female (F)
2. Marital status - married (M), single (S), divorced (D), widowed (W)
3. Age in years
4. Duration of DM - number of years since first diagnosis with DM (as at April 1993)
5. Ethnic origin - British (B), Asian (A), Italian (I), Greek (G),
6. Complications attributable to DM : present Yes (Y) or absent No (N)
7. Age at diagnosis of DM
8. Number of times seen by a dietitian
9. Improvement of random venous blood glucose levels to < 10 m mol per litre (Diabetes Advisory Group, 1993) after a dietetic consultation was recorded as Yes (Y) or No (N) if this did not occur.
10. Diabetic control - good (G) if the random venous blood glucose level measurements were < 10 mmol/L, poor (P) if > 10 m mol/L.
11. For those with a diagnosis of IDDM recorded two previous treatments for DM were recorded as by insulin (I), oral hypoglycaemic agent (T) or diet alone (D).
12. For NIDDM, present treatment was recorded as oral hypoglycaemic agent (T) or diet alone (D).
13. Number of attendances at the diabetic clinic.
14. The BMI of the patient as at April 1993 was recorded.
15. The BMI at the time of diagnosis of DM categorised according to the following ; underweight, U=BMI below 19 kg/m²; normal weight, N=BMI 20-25 kg/m²; overweight, O=BMI 26-30 kg/m²; obese OB=BMI 31-41 kg/m²; very obese VO=BMI greater than 41 kg/m².
16. Number of days admitted to Bedford Hospital for management of DM or a complication of DM.
recorded; number of attendances at the diabetic clinic; the number of days admitted to Bedford Hospital for management of DM or a complication of DM.

The results for all patients were entered onto a database (Microsoft Access) and the data was analyzed by means of correlation coefficient tests using Microsoft Access and Quattro computer packages. The data on the patients with NIDDM and IDDM was analyzed separately using the statistical tests described in section 5,2,1 using the SYSTAT computer package (SPSS Inc., Chicago, USA).

5.3; RESULTS
Due to the complexity and length of the medical records, the examination of the clinic notes took approximately 35 hours for each 4 week study period, even though the researcher was experienced in finding her way through the medical records and was familiar with the handwriting of doctors. The task of examining the many thick sets of records and lifting them was physically demanding and also dirty. Patients were noted to have very thick medical records and in the case of 10 patients with a diagnosis of IDDM recorded the records were extensive and comprised 3 volumes, each volume being 2 inches thick.

The data for the 50 patients with a diagnosis of IDDM recorded in the medical records was presented in a table as was that for the 50 patients with NIDDM. It was noted that 18 of the 50 patients with a diagnosis of IDDM recorded had previously been managed on diet and also oral hypoglycaemic agents. Therefore these 18 patients were considered to have a diagnosis of "insulin requiring DM" (see section 1,2,2,ii ) and the records of this group of patients were analysed seperately from those 32 patients who had IDDM .

5.3,1; Patients referred from the diabetic clinic for dietetic advice
During the 4 week period, 14th April to 12th May 1993, 183 patients (91 female 92 males) were seen by the Consultant Diabetologist or one of his medical team in the diabetic clinic held at Bedford Hospital. As shown in Table 5;1, the
Table 5.1

METHODS OF CONTROL OF DIABETES MELLITUS IN PATIENTS ATTENDING THE DIABETIC CLINIC AT BEDFORD HOSPITAL DURING THE 4 WEEK STUDY PERIOD IN 1993

<table>
<thead>
<tr>
<th>AGE RANGE (YEARS)</th>
<th>INSULIN</th>
<th>TABLETS</th>
<th>DIET ALONE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>20-29</td>
<td>14</td>
<td>1</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>30-39</td>
<td>13</td>
<td>3</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>40-49</td>
<td>13</td>
<td>4</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>50-59</td>
<td>21</td>
<td>15</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>60-69</td>
<td>25</td>
<td>12</td>
<td>10</td>
<td>47</td>
</tr>
<tr>
<td>70-79</td>
<td>12</td>
<td>11</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>80-89</td>
<td>6</td>
<td>2</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>48</td>
<td>29</td>
<td>183</td>
</tr>
</tbody>
</table>
patients were between 19 and 84 years of age. Of the 183 patients seen, 106 (58%) patients were receiving insulin, 48 (26%) were receiving oral hypoglycaemic agents and 29 (16%) were managed by diet alone. In the medical records 106 (58%) patients were noted as having IDDM and 77 (42%) as having NIDDM.

Table 5.2 shows the numbers of patients referred for dietary advice. Of the 183 patients seen in the diabetic clinic 121 (66%) had seen a dietitian within one year of diagnosis. Thirty two (17%) patients had never seen a dietitian for dietary advice. Forty four (36%) of the 121 patients with newly diagnosed DM, were referred for dietetic advice while in-patients at Bedford Hospital by consultant medical or surgical staff. Forty (33%) of the 121 patients were referred by their GP to the dietetic department for advice as out-patients. The Consultant Diabetologist or one of his team from the diabetic clinic referred 37 (31%) for advice as an out-patient. Other medical problems for which dietary advice has been considered appropriate (Table 5.3) were noted in 18 (56%) of the patients who had never seen a SRD for dietary advice for the management of DM and they had also not been referred for help with these conditions. Examination of the records of the weights and heights of the patients in the study showed that 68 (37%) had a weight in the normal range for their height and a Body Mass Index (BMI) of 19-25 kg/m², 4 (2%) were underweight with a BMI of 18 kg/m² and below, 84 (46%) patients were overweight with a BMI of 26-30 kg/m² and 20 (11%) were obese with a BMI of 31 kg/m² and over. Seven (4%) of patients had no height or weight recorded. A chart of the distribution of weights in each treatment group (Figure 5.2) showed a slight trend towards people who were overweight and obese being treated with tablets or by diet alone.

The study was repeated again in 1994 using the methodology as before. It should be noted that since the previous study a dietitian specialist for people with diabetes had been appointed to the dietetic department at Bedford Hospital. The data from the previous study, of the numbers of people with DM
Table 5.2

PATIENTS REFERRED TO THE DIETETIC DEPARTMENT FROM THE DIABETIC CLINIC IN 1993, 1994 AND 1995

<table>
<thead>
<tr>
<th></th>
<th>1993</th>
<th>% OF TOTAL</th>
<th>1994</th>
<th>% OF TOTAL</th>
<th>1995</th>
<th>% OF TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATIENTS SEEN IN CLINIC</td>
<td>183</td>
<td></td>
<td>202</td>
<td></td>
<td>129</td>
<td></td>
</tr>
<tr>
<td>SEEN BY DIETITIAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WITHIN 1 YEAR OF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIAGNOSIS</td>
<td>121</td>
<td>66</td>
<td>130</td>
<td>64</td>
<td>79</td>
<td>61</td>
</tr>
<tr>
<td>SEEN BY DIETITIAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR UPDATE</td>
<td>35</td>
<td>19</td>
<td>104</td>
<td>51</td>
<td>84</td>
<td>65</td>
</tr>
<tr>
<td>NEVER SEEN DIETITAN</td>
<td>32</td>
<td>17</td>
<td>33</td>
<td>16</td>
<td>23</td>
<td>18</td>
</tr>
</tbody>
</table>

mab/ds/tab4.6
Table 5.3

DISORDERS OCCURRING IN UNREFERRED PATIENTS WITH DM, IN 1993, FOR WHICH DIETETIC ADVICE WAS ALSO NOT SOUGHT

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>NUMBER OF PATIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular disease</td>
<td>6</td>
</tr>
<tr>
<td>Diverticular disease</td>
<td>2</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Renal disease</td>
<td>1</td>
</tr>
<tr>
<td>Irritable bowel syndrome</td>
<td>1</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>2</td>
</tr>
<tr>
<td>Gastritis</td>
<td>2</td>
</tr>
<tr>
<td>Oesophagitis</td>
<td>1</td>
</tr>
<tr>
<td>Anaemia</td>
<td>1</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>
Figure 5.2
DISTRIBUTION OF WEIGHTS IN EACH TREATMENT GROUP IN 1993

Each block shows the percentage of people in each treatment group.
who received no dietary advice, was presented to the Management at Bedford Hospital Trust and was a powerful argument for funding this post. During the 4 week period, 14th April to 12th May 1994, 202 patients (95 females & 107 males) were seen by the Consultant Diabetologist or one of his medical team. Of the 202 patients seen 97 (48%) patients were receiving insulin, 86 (43%) were on oral hypoglycaemic agents and 19 (9%) were on diet alone. Ninety seven patients (48%) were recorded in the medical notes as having IDDM and 105 (52%) as having NIDDM. As shown in Table 5,2, of the 202 patients seen in the diabetic clinic 130 (64%) had seen a dietitian within one year of diagnosis, 104 (51%) patients had seen a dietitian for an update and 33 (16%) patients had never seen a dietitian for dietary advice. None of the patients were found to have any other disorder which would benefit from dietetic advice.

By the time the study was repeated for the third time in 1995 using the same methodology, a Diabetes Centre had been developed at Bedford Hospital. It was dedicated to the care of people with DM and all out-patients with DM were seen there. The dietitian specialist for diabetes also worked there. During the 4 week period, 14th April to 12th May 1995, 129 patients (71 female 58 males) were seen by the Consultant Diabetologist or one of his medical team. Of the 129 patients seen, 64 (50%) patients were receiving insulin and recorded as having IDDM, 52 (40%) were on oral hypoglycaemic agents and 13 (10%) were on diet alone. Thus 65 (50%) patients were recorded with a diagnosis of NIDDM. Table 5,2 shows that of the 129 patients seen in the diabetic clinic 79 (61%) had seen a dietitian within one year of diagnosis and 84 (65%) patients had seen a dietitian for an annual update. Twenty three patients (18%) had never seen a dietitian for dietary advice. As in year 2 of the study none of the patients were found to have any other disorder which would benefit from dietetic advice.

The data from the 3 years was compared (Table 5,2), and showed that the number of patients referred for years 1993 and 1994 ie 66% and 64% respectively was similar. The number of patients referred in 1995 (61%) was
reduced. In 1993 (17%) and in 1994 (16%) of patients had never seen a SRD for dietary advice. Then in 1995 18% of patients never saw an SRD which was no real increase. In 1993 only 19% patients were seen for an update from an SRD, in 1994 this increased to 51% and in 1995 there was a further increase to 65%. The data from the study was further explored using contingency tables. This form of chi-square test aims to compare the relative frequencies of occurrence of some characteristic (in this case patients who had been advised by a SRD versus those who had not seen a SRD) by sub-groups of the sample population. Age of patient, sex, treatment, year of diagnosis and weight were all examined for each of the data sets. There was no evidence that any of the factors listed above influenced whether a SRD was seen by a patient with DM or not. A further analysis of the influence of the variables on when a patient was seen was carried out by a least squares test using a GLIM computer package. No significant models were found and thus it appeared that no single factor which influenced when or if the SRD was seen by patients with DM. Examination of combined variables eg age and year of diagnosis, was calculated for the data. No significant relationship was found.

Throughout the study it was noted that there was a high non-attendance (DNA) rate for the diabetic clinics. A request to tabulate this rate was declined both by the Consultant Diabetologist, diabetes nurse specialists and audit department. Therefore, because of these refusals and also because of confidentiality it proved impossible to obtain this information.

5.3.2; Presentation of results in Bedford
The results of the study for year 1 were discussed with the Consultant Diabetologist in July 1993. He considered that the main reason why 17% of patients had never received advice from a dietitian and that 19% had not received an annual update was that there was a lack of dietetic staff. This was also the view of the Diabetes Advisory Group, when the results were presented to them a week later and this gave powerful support for the funding and recruitment of a dietitian dedicated to work with people with DM.
In order to gain the views of patients with DM upon the dietetic service, a request was made by the researcher to attend a meeting of the local branch of the BDA to discuss the results with patients who attended the group. This was agreed, and the researcher attended a meeting of 23 patients with DM in September 1993. The patients were asked to discuss the results in focused discussion groups of 4 people and to focus on the reasons why people chose not to attend dietetic appointments. From these discussion groups, patients indicated that they found the extra time added to their hospital diabetic clinic appointment for a dietetic consultation inconvenient. This was especially the case for those who had to return to work or collect children. Sixteen of the patients said that they had required different medication which they had to collect, further tests or the arrangement of other appointments, which took priority over the dietetic appointment. Additionally 8 patients remarked that they required refreshments which took priority over seeing a dietitian. All patients indicated that dietetic clinics at their GP premises were more convenient.

5.3.3; Medical record analysis of 100 patients with DM
The data for each patient was collated in tabular form for analysis. Data is presented in Table 5.4 for patients with a diagnosis of IDDM and in Table 5.5 for those with a diagnosis of NIDDM recorded in the medical records. As described in section 5.3 eighteen of the patients with a recorded diagnosis of IDDM had previously been managed on diet and tablets therefore they were likely to have been more correctly categorised as having insulin requiring DM. The data on these 18 patients is shown in Table 5.6 and that on the remaining 32 patients with a true diagnosis of IDDM is shown in Table 5.7.

The data for the 3 groups of patients (ie 50 with NIDDM, 18 with insulin requiring DM and 32 with IDDM) was analysed by the Mann Whitney test, Student's t-test and Chi-Square statistical test to ascertain if a consultation with a dietitian was associated with reduced blood glucose levels due to enabling patients to improve their diet. Table 5.8 shows the data on the 36 patients with NIDDM who had seen a dietitian and Table 5.9 that for the 14 patients with NIDDM who had seen a dietitian and Table 5.9 that for the 14 patients with
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DATA COLLECTED ON 50 PATIENTS WITH IDDM RECORDED

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Table 5.6

DATA COLLECTED ON 18 PATIENTS WITH INSULIN REQUIRING DM

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Table 5.7

DATA COLLECTED ON 32 PATIENTS WITH IDDM

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**Note:** Table 5.8 presents data collected on 36 patients with NIDDM who had seen a dietitian.
Table 5.9   DATA COLLECTED ON 14 PATIENTS WITH NIDDM WHO HAD NOT SEEN A DIETITIAN

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NIDDM who had not seen a dietitian. Table 5.10 shows the data on the 17 patients with insulin requiring DM who had seen a dietitian and Table 5.11 that for the one patient with insulin requiring DM who had not seen a dietitian. Table 5.12 shows the data on the 26 patients with IDDM who had seen a dietitian and Table 5.13 that for the 6 patients with IDDM who had not seen a dietitian.

Data on complications found in the groups of patients with DM was also extracted. Table 5.14 shows the data on the 37 patients with NIDDM who had no complications and Table 5.15 that for the 13 patients with NIDDM who had a complication. Table 5.16 shows the data on the 8 patients with insulin requiring DM who had no complications and Table 5.17 that for the 10 patients with insulin requiring DM who had a complication. Table 5.18 shows the data on the 28 patients with IDDM who had no complications and Table 5.19 that for the 4 patients with IDDM who had a complication.

The presence of complications found in people with DM was assessed for those people with DM who had seen a dietitian and compared with those who had not as improved glycaemic control is associated with the prevention of complications in people with DM.

As obesity in patients with DM also has an effect on the control of the condition the BMI of patients with DM was also examined to ascertain if a consultation with a dietitian assisted those patients who were overweight to reduce their weight when compared with those patients who had not seen a dietitian.

Additionally comparisons were made between the 3 groups of patients to ascertain if any difference existed for BMI, age, duration of diagnosis of DM and length of stay in hospital.
Table 5.10  DATA COLLECTED ON 17 PATIENTS WITH INSULIN REQUIRING DM WHO HAD SEEN A DIETITIAN

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|----|-----|----------|-----|---------|----------|---|-------------|--------|-----|------|-------------|-------------|-----------|----------|-----------|------------|------------|
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Table 5.12

DATA COLLECTED ON 26 PATIENTS WITH IDDM WHO HAD SEEN A DIETITIAN

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Table 5.16  DATA COLLECTED ON 8 PATIENTS WITH INSULIN REQUIRING DM WITHOUT COMPLICATIONS

| ID | MF | Mar Stat | Age | Yrs Diag | Eth Orig | C | Age at Diag | No Seen | Imp | Conl | Prev Treat 1 | Prev Treat 2 | DM Clinic | BMI 1963 | BMI at Diag | Dagi Ad DM |
|----|----|----------|-----|----------|----------|---|-------------|---------|-----|------|-------------|-------------|-----------|----------|-----------|-------------|-------------|
| 2  | F  | W        | 72  | 6        | B        | N | 66          | 1       | N   | G    | T           | I           | 12        | 28       | O         | 6           |
| 6  | F  | M        | 67  | 19       | A        | N | 48          | 6       | N   | P    | D           | T           | 30        | 47       | OB        | 41          |
| 7  | M  | S        | 60  | 1        | B        | N | 59          | 2       | Y   | G    | D           | T           | 5         | 25       | VO        | 9           |
| 10 | F  | M        | 71  | 1        | B        | N | 70          | 3       | Y   | Q    | D           | T           | 4         | 25       | O         | 14          |
| 12 | M  | S        | 71  | 13       | B        | N | 56          | 1       | N   | P    | D           | T           | 31        | 17       | N         | 21          |
| 26 | F  | M        | 60  | 19       | B        | N | 41          | 7       | N   | P    | D           | T           | 34        | 26       | OB        | 16          |
| 47 | M  | M        | 47  | 9        | B        | N | 38          | 16      | N   | P    | D           | T           | 61        | 24       | U         | 17          |
| 48 | F  | M        | 73  | 26       | B        | N | 47          | 7       | Y   | P    | D           | T           | 14        | 37       | OB        | 5           |
Table 5.17
DATA COLLECTED ON 10 PATIENTS WITH INSULIN REQUIRING DM WITH A COMPLICATION

| c/dm | M/F | Mar Stat | Age | Yrs Diag | Eth Orig | C | Age at Diag | No Seen | Imp | Cont | Prev Treat 1 | Prev Treat 2 | DM Clinic | BMI 1993 | BMI at Diag | Days' Ad DM |
|------|-----|----------|-----|----------|----------|---|-------------|---------|-----|------|-------------|-------------|-----------|----------|-----------|------------|-------------|
| 16   | M   | S        | 61  | 17       | B         | Y | 48          | 19      | Y   | P    | D           | T           | 43        | 54        | OB        | 298        |
| 18   | M   | M        | 61  | 5        | B         | Y | 56          | 4       | N   | P    | D           | T           | 20        | 37        | OB        | 41         |
| 19   | F   | W        | 62  | 4        | B         | Y | 78          | 3       | N   | P    | D           | T           | 10        | 34        | OB        | 19         |
| 20   | F   | M        | 63  | 11       | B         | Y | 52          | 3       | Y   | P    | D           | T           | 21        | 26        | OB        | 7          |
| 21   | M   | M        | 57  | 10       | B         | Y | 47          | 4       | N   | P    | D           | T           | 30        | 27        | N         | 21         |
| 24   | M   | M        | 67  | 20       | A         | Y | 47          | 5       | N   | P    | T           | I           | 10        | 34        | OB        | 6          |
| 30   | M   | S        | 81  | 4        | B         | Y | 77          | 5       | N   | P    | T           | I           | 10        | 16        | U         | 23         |
| 39   | M   | D        | 64  | 1        | B         | Y | 63          | 0       | N   | P    | D           | T           | 7         | 24        | N         | 135        |
| 42   | F   | M        | 61  | 5        | A         | Y | 56          | 1       | N   | P    | D           | T           | 19        | 24        | U         | 19         |
| 50   | M   | M        | 72  | 13       | B         | Y | 59          | 7       | Y   | P    | D           | T           | 24        | 32        | VO        | 71         |
Table 5.18
DATA COLLECTED ON 28 PATIENTS WITH IDDM WITHOUT COMPLICATIONS

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<td>7</td>
<td>Y</td>
<td>P</td>
<td>I</td>
<td>I</td>
<td>31</td>
<td>27</td>
<td>O</td>
<td>6</td>
</tr>
<tr>
<td>34</td>
<td>M</td>
<td>M</td>
<td>33</td>
<td>5</td>
<td>A</td>
<td>Y</td>
<td>28</td>
<td>7</td>
<td>Y</td>
<td>G</td>
<td>I</td>
<td>I</td>
<td>17</td>
<td>29</td>
<td>O</td>
<td>6</td>
</tr>
</tbody>
</table>
5,3,4; Demographic analysis

The 50 patients with NIDDM were composed of 23 males (46%) and 27 females (54%). Of the 23 males 15 (65%) had seen a dietitian. Of the 27 females 21 (78%) had seen a dietitian (Table 5,20). This difference was not statistically significant (Chi-square p=0.32). There was no statistically significant difference for marital status among the patients with NIDDM who had seen a dietitian and those who had not (Chi-square p=0.89). There was also no statistically significant difference for ethnic origin between the group who had seen a dietitian and those who had not (Chi-square p=0.73).

The 18 patients with a probable diagnosis of insulin requiring DM as shown in Table 5,20 were composed of 10 males (56%) and 8 females (44%). Of the 10 males 9 (90%) had seen a dietitian. All of the 8 females (100%) had seen a dietitian. As only one individual patient (a male number 39, shown in Table 5,11) had not seen a dietitian statistical tests of those patients who had seen a dietitian versus those who had not, were not valid.

The 32 patients with IDDM were composed of 21 males (66%) and 11 females (34%). Of the 21 males 17 (81%) had seen a dietitian. Of the 11 females 9 (82%) had seen a dietitian (Table 5,20). This difference was not statistically significant (Chi-square p=0.53). There was no statistically significant difference for ethnic origin between those patients with IDDM who had seen a dietitian and those who had not (Chi-square p=0.25). Nor was there any statistically significant difference for gender between the group with IDDM who had seen a dietitian and those who had not (Chi-square p=0.95). However it should be noted that the data in the cells used for the Chi-square test on both marital status and ethnic origin was sparse and that the reliability of the tests was therefore suspect.

While the main purpose of the study was to ascertain if there was any statistically significant difference between the group who had seen a dietitian
Table 5.20

GENDER OF PATIENTS WITH DIFFERENT TYPES OF DM WHO HAD SEEN OR WHO HAD NOT SEEN A DIETITIAN

<table>
<thead>
<tr>
<th></th>
<th>MALES</th>
<th></th>
<th>FEMALES</th>
<th></th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SEEN</td>
<td>NOT SEEN</td>
<td>SEEN</td>
<td>NOT SEEN</td>
<td></td>
</tr>
<tr>
<td>NIDDM</td>
<td>15 (65%)</td>
<td>8 (35%)</td>
<td>21 (78%)</td>
<td>6 (22%)</td>
<td>50</td>
</tr>
<tr>
<td>IRDM*</td>
<td>9 (90%)</td>
<td>1 (10%)</td>
<td>8 (100%)</td>
<td>0 (0%)</td>
<td>18</td>
</tr>
<tr>
<td>IDDM</td>
<td>17 (81%)</td>
<td>4 (19%)</td>
<td>9 (82%)</td>
<td>2 (18%)</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>13</td>
<td>38</td>
<td>8</td>
<td>100</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
and those who had not, the 3 groups of patients with DM were compared with each other but no statistically significant difference was established for gender, marital status or ethnic origin. Due to the scarcity of numerical data in cells used in the Chi-square test the data was considered to be insufficiently robust for conclusions to be drawn between the groups.

The 36 (72%) patients with NIDDM who had seen a dietitian had an average age of 58.3 years (range 38-84 years) as shown in Table 5,21. The 14 (28%) patients with NIDDM who had not seen a dietitian had an average age of 59.4 years (range 36-84 years) as shown in Table 5,21. There was no statistically significant difference for age between the two groups (Student's t-test p=0.72). Patients with NIDDM who had seen a dietitian had been diagnosed with DM for an average of 4.8 years, (range 1-19 years). Those patients with NIDDM who had not seen a dietitian had been diagnosed with DM for an average of 2.3 years (range less than a year to 7 years) (Table 5,22). Three patients who had not been seen by a dietitian had been diagnosed for less than a year. Comparison of the duration of diagnosis of DM showed that those patients with NIDDM who had seen a dietitian had been diagnosed for a statistically significantly longer period than those patients with NIDDM who had not seen a dietitian (2 sample t-test p=0.02).

The 17 (94%) patients with probable insulin requiring DM who had all seen a dietitian had an average age of 66.3 years in April 1993 (range 47-82 years) and had been diagnosed for an average duration of 10.8 years (range 1-26 years) as shown in Table 5,21 and Table 5,22. The one patient with probable insulin requiring DM who did not see a dietitian was a male of 64 years of age in April 1993 and had been diagnosed with DM for one year. As there was only one patient who had not seen a dietitian statistically valid tests to compare patients who had seen a dietitian versus those who had not were not able to be performed.

The 26 (81%) patients with IDDM who had seen a dietitian had an average age
Table 5.21

AGES AS AT APRIL 1993 OF PATIENTS WITH DIFFERENT TYPES OF DM WHO HAD SEEN OR WHO HAD NOT SEEN A DIETITIAN

<table>
<thead>
<tr>
<th></th>
<th>SEEN BY A DIETITIAN</th>
<th>NOT SEEN BY A DIETITIAN</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER</td>
<td>AVERAGE AGE (years)</td>
</tr>
<tr>
<td>NIDDM</td>
<td>36</td>
<td>58.3</td>
</tr>
<tr>
<td>IRDM*</td>
<td>17</td>
<td>66.3</td>
</tr>
<tr>
<td>IDDM</td>
<td>26</td>
<td>43.7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>79</td>
<td>21</td>
</tr>
</tbody>
</table>

* patients with insulin requiring DM
<table>
<thead>
<tr>
<th></th>
<th>SEEN BY A DIETITIAN</th>
<th>NOT SEEN BY A DIETITIAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER</td>
<td>AVERAGE DURATION OF DM (YEARS)</td>
</tr>
<tr>
<td>NIDDM</td>
<td>36</td>
<td>4.8</td>
</tr>
<tr>
<td>IRDM*</td>
<td>17</td>
<td>10.8</td>
</tr>
<tr>
<td>IDDM</td>
<td>26</td>
<td>13.3</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
of 43.7 years in April 1993 (range 23 to 71 years) and had been diagnosed for an average period of 13.3 years (range 1-38 years) as shown in Table 5,21 and Table 5,22. The 6 (19%) of patients with IDDM who had never seen a dietitian had an average age of 33.5 years in April 1993 (range 22-56 years) and had been diagnosed for duration of an average of 5.3 years (less than one year to 12 years). There was no statistically significant difference for age of diagnosis between the group of patients who had seen a dietitian and those who had not (Student's t test p=0.72).

Although the main aim of the study was to examine the beneficial effect that a consultation with a dietitian may have on the management of people with DM it was felt to be of interest to make a comparison of the age of diagnosis for the group of patients with probable insulin requiring DM and those with IDDM. This showed that those with probable insulin requiring DM were statistically significantly older than the other two groups (2 sample t-test p<0.001).

Comparison of the duration of diagnosis between the groups showed that there was no statistically significant difference for the number of years diagnosed for patients with insulin requiring DM compared with those with IDDM (2 sample t-test p=0.53).

5,3,5; Weight at diagnosis and changes in weight
The 36 patients with NIDDM who had seen a dietitian had an average BMI as recorded at April 1993 of 29.4 kg/m.² (range 23-54 kg/m.²) and those 14 patients who had not seen a dietitian had an average BMI of 26.7 kg/m.² (range 22-29 kg/m.²) as shown in Table 5,23. There was no statistically significant difference between the 2 groups (2 sample t-test p=0.07).

The 17 patients with probable insulin requiring DM who had seen a dietitian had an average BMI as recorded in April 1993 of 30.2 kg/m.² (range 16-54 kg/m.²). The one male patient with probable insulin requiring DM who did not see a dietitian had a BMI of 24 kg/m² (Table 5,23). As there was only one
Table 5.23

AVERAGE BMI OF PATIENTS WITH DIFFERENT TYPES OF DM WHO HAD SEEN OR WHO HAD NOT SEEN A DIETITIAN

<table>
<thead>
<tr>
<th></th>
<th>SEEN BY A DIETITIAN</th>
<th></th>
<th>NOT SEEN BY A DIETITIAN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER</td>
<td>BMI (kg/m²)</td>
<td>RANGE OF BMI (kg/m²)</td>
<td>NUMBER</td>
</tr>
<tr>
<td>NIDDM</td>
<td>36</td>
<td>29.4</td>
<td>23-54</td>
<td>14</td>
</tr>
<tr>
<td>IRDM*</td>
<td>17</td>
<td>30.2</td>
<td>16-54</td>
<td>1</td>
</tr>
<tr>
<td>IDDM</td>
<td>26</td>
<td>26.1</td>
<td>18-51</td>
<td>6</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
The 26 patients with IDDM who had seen a dietitian had an average BMI as recorded in April 1993 of 26.1 kg/m² (range 18-51 kg/m²). The 6 patients with IDDM who had not seen a dietitian had an average BMI of 24.7 kg/m² (range 23-27 kg/m²) as shown in Table 5,23. There was no statistically significant difference between the two groups (2 sample t-test p=0.33).

A comparison of the BMI at diagnosis and weight in April 1993 was made for the 36 patients with NIDDM who had seen a dietitian versus the 14 who had not. It was noted that 9 (64%) of those who did not see a dietitian did not change their weight while the remaining 5 (36%) of those who did not see a dietitian reduced their weight from a BMI in excess of 25 kg/m² to one in the range 20-24 kg/m². For those patients with NIDDM who had seen a dietitian 19 (53%) did not lose weight and 17 (47%) lost weight reducing their BMI to one in the range 20-30 kg/m². Examination of this showed a trend for 17 (47%) of patients to lose weight after seeing a dietitian, while this was not significant it did indicate a trend for weight loss after seeing a dietitian compared with only 36% of those who did not see a dietitian.

5,3,6;Number of days spent in hospital and attendances at the DM clinic
Fifty patients with NIDDM spent 185 days in hospital with an average of 3.7 days per person (range 0-17 days). The 36 patients with NIDDM who had seen a dietitian had spent an average of 4.3 days in hospital (range 0-17 days) and those 14 patients with NIDDM who had not seen a dietitian had spent an average of 2.0 (range 0-16 days) days in hospital (Table 5,24). There was no statistically significant difference between the 2 groups (2 sample t-test p=0.08).
Table 5.24

AVERAGE NUMBER OF DAYS SPENT IN HOSPITAL BY PATIENTS WITH DIFFERENT TYPES OF DM WHO HAD SEEN OR WHO HAD NOT SEEN A DIETITIAN

<table>
<thead>
<tr>
<th></th>
<th>SEEN BY A DIETITIAN</th>
<th>NOT SEEN BY A DIETITIAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER</td>
<td>NUMBER OF DAYS</td>
</tr>
<tr>
<td>NIDDM</td>
<td>36</td>
<td>4.3</td>
</tr>
<tr>
<td>IRDM*</td>
<td>17</td>
<td>35.2</td>
</tr>
<tr>
<td>IDDM</td>
<td>26</td>
<td>8.5</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
Eighteen patients with probable insulin requiring DM who had been in hospital for a total of 739 days with an average of 41.1 days per patient (range 5-268 days). The 17 patients with probable insulin requiring DM who had seen a dietitian had been admitted for a total of 604 days an average of 35.2 days (range 5-268 days) (Table 5,24). The individual patient with probable insulin requiring DM who had not seen a dietitian had been admitted for a total of 135 days. As there was only one patient with probable insulin requiring DM statistically significant comparisons of those patients who had seen a dietitian with those who had not were not possible.

Thirty two patients with IDDM who had been in hospital for a total of 252 days, with an average of 7.9 days per patient (range 2-23 days). The 26 patients with IDDM who had seen a dietitian had been admitted for a total of 221 days with an average of 8.5 days (range 3-23 days). The 6 patients with IDDM who had not seen a dietitian had been admitted for a total of 31 days with an average of 5.1 days (range 2-10 days) (Table 5,24). There was no statistically significant difference between the 2 groups (2 sample t-test p=0.08).

It was noted that all 32 patients with IDDM and all 18 patients with probable insulin requiring DM, (which comprised the total of 50 patients who had a diagnosis of IDDM recorded in the medical records), had all been admitted to hospital for the control or treatment of DM. The total number of days of in hospital of the 50 patients identified in their medical notes as having IDDM recorded was 991 - an average of 19.8 days per person (range 2-268 days) (Table 5,4). Therefore all patients with a diagnosis of IDDM had spent at least 2 days in hospital while only 23 patients with NIDDM had spent time in hospital, with an average of 8.0 days per patient who had been admitted.

Comparison of the lengths of stay in hospital for the 3 groups of patients (those with IDDM, probable insulin requiring DM and NIDDM) showed that the group of patients with probable insulin requiring DM had spent a statistically
significantly longer period of time in hospital than those with NIDDM and IDDM (analysis of variance p<0.001). Because of the wide variation in the number of days admitted to hospital due to factors such as poor compliance and other disorders which exacerbated the control of the DM the statistical analysis of comparative lengths of stay of the different groups could not be undertaken with any validity and the role of the dietitian for such patients ascertained.

The 36 patients with NIDDM who had seen a dietitian had attended the diabetic clinic for an average of 6.4 times (range 1-21 times) (Table 5,25). The 14 patients with NIDDM who had not seen a dietitian had attended the diabetic clinic for an average of 4.3 times (1-14 times). When the two groups were compared it was found there was no statistically significant difference between the 2 groups (2 sample t-test p=0.14).

The 17 patients with insulin requiring DM who had seen a dietitian had been seen at the diabetic clinic an average of 22.4 times (range 4-61 times). The patient with insulin requiring DM who had not been seen by a dietitian had visited the diabetic clinic 7 times (Table 5,25). As mentioned before in previous sections of the study statistically valid comparisons were unable to be made between the group of patients with probable insulin requiring DM who had seen a dietitian and those who had not.

The 26 patients with IDDM who had seen a dietitian had attended the diabetic clinic for an average of 20.9 times (4-49). The 6 patients with IDDM who had not seen a dietitian had attended the diabetic clinic for an average of 11 times (range 2-27 times) (Table 5,25). When the two groups were compared it was found that the patients with IDDM who had seen a dietitian attended the DM clinic statistically significantly more times than those patients with IDDM who had not seen a dietitian (2 sample t-test p=0.005).

5,3,7; Glycaemic control in patients
Twenty-seven patients with NIDDM had good glycaemic control and were seen
Table 5.25

ATTENDANCE AT THE DM CLINIC BY PATIENTS WITH DIFFERENT TYPES OF DM WHO HAD SEEN OR WHO HAD NOT SEEN A DIETITIAN

<table>
<thead>
<tr>
<th></th>
<th>SEEN BY A DIETITIAN</th>
<th>NOT SEEN BY A DIETITIAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER OF PATIENTS</td>
<td>AVERAGE NUMBER OF TIMES ATTENDED DM CLINIC</td>
</tr>
<tr>
<td>NIDDM</td>
<td>36</td>
<td>6.4</td>
</tr>
<tr>
<td>IRDM*</td>
<td>17</td>
<td>22.4</td>
</tr>
<tr>
<td>IDDM</td>
<td>26</td>
<td>20.9</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
for an average of 2.2 times (SD 1.79) by a dietitian. Twenty-three patients had poor glycaemic control and were seen for an average of 4.8 times (SD 4.35) by a dietitian (Table 5,26). Those with poor glycaemic control were seen more than twice as many times by a dietitian as those with good control, which was highly statistically significantly different (2 sample Student's t-test p=0.003).

Of the 36 patients with NIDDM who were seen by a dietitian 19 (53%) had good glycaemic control and 17 (47%) poor control. This was not statistically significant (Chi-square p=0.78). Of the 14 (28%) patients with NIDDM who had not seen a dietitian 8 (57%) had good control. Due to the small number in each group it was not possible to perform statistically valid tests.

Of the 17 patients with probable insulin requiring DM 14 (82%) had poor glycaemic control and 3 (18%) had good glycaemic control. Statistically valid comparisons were unable to be made between the group of patients with probable insulin requiring DM who had seen a dietitian and those who had not as the later group only consisted of one individual.

The 14 patients with poor glycaemic control had all been seen by a dietitian for an average of 6.3 times by a dietitian and the three patients with good glycaemic control for an average of 2 times by a dietitian. The patient who had not been seen by a dietitian had poor glycaemic control. Because of the small numbers of patients with probable insulin requiring DM statistical tests on comparisons between the different groups were not valid.

The 26 patients with IDDM who had seen a dietitian of these 17 had good glycaemic control and 9 poor control. Those with good control had been seen for an average of 2.8 times and the 9 with poor control 4.2 times (Table 5,26). Six patients with IDDM who had not seen a dietitian of these 4 had good control and 2 had poor control. Because of the small numbers in the groups who had complications statistical analysis using a Chi-square test was not valid.
Table 5.26

GLYCAEMIC CONTROL OF PATIENTS WITH DIFFERENT TYPES OF DM

<table>
<thead>
<tr>
<th>Type of DM</th>
<th>Good Glycaemic Control</th>
<th>Poor Glycaemic Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Patients</td>
<td>Average Number of Times Seen by Dietitian</td>
</tr>
<tr>
<td>NIDDM</td>
<td>27</td>
<td>2.2</td>
</tr>
<tr>
<td>IRDM*</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>IDDM</td>
<td>17</td>
<td>2.8</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
Using a Chi-squared test of numbers of individuals in all 3 groups who improved their glycaemic control after seeing a dietitian it was shown that almost 77% of those who saw a dietitian improved and this was highly statistically significant ($p=0.004$).

5,3,8; Complications in patients with DM

Of the 50 patients with NIDDM 13 had complications and 37 had none (Table 5,27). There was no obvious association between gender, marital status or ethnic origin in those patients who had complications and those who did not. Twelve of the patients with complications had previously been poorly controlled. Fourteen patients with NIDDM had never seen a dietitian and of these 2 patients had complications as had 11 of those who had seen a dietitian.

Of the 18 patients with probable insulin requiring DM 10 had complications and 8 had no complications (Table 5,27). There was no obvious association between gender, marital status or ethnic origin for those who had complications and those who did not have complications.

Of the 32 patients with IDDM 4 had complications and 28 had no complications (Table 5,27). Again there was no association between gender, marital status or ethnic origin for those patients with complications and those who had none. Among the 6 patients who had not seen a dietitian there were no complications and in the group of 26 patients who had seen a dietitian 4 had complications.

There was no obvious association between whether a patient who had complications has seen a dietitian or not (Table 5,28). Because of the small sample size of patients with complications that comprised each of the 3 groups it proved impossible to statistically analyse the data with any validity.

5,3,9; Information on patients with DM

During the collection of the data from the medical records, on the 100 patients
### Table 5.27

**COMPLICATIONS FOUND IN PATIENTS WITH DIFFERENT TYPES OF DM**

<table>
<thead>
<tr>
<th></th>
<th>NUMBER OF PATIENTS WITH COMPLICATIONS</th>
<th>NUMBER OF PATIENTS WITH NO COMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIDDM</td>
<td>13</td>
<td>37</td>
</tr>
<tr>
<td>IRDM*</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>IDDM</td>
<td>4</td>
<td>28</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
Table 5, 28

NUMBER OF PATIENTS WITH COMPLICATIONS WHO HAD DIFFERENT TYPES OF DM WHO HAD SEEN OR WHO HAD NOT SEEN A DIETITIAN

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER</td>
<td>NUMBER OF PATIENTS WITH COMPLICATION PRESENT</td>
</tr>
<tr>
<td>NDDM</td>
<td>36</td>
<td>11</td>
</tr>
<tr>
<td>IRDM*</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>IDDM</td>
<td>26</td>
<td>4</td>
</tr>
</tbody>
</table>

* Patients with insulin requiring DM
with a recorded diagnosis of DM it became apparent that the group was heterogeneous one with wide variations. A number of individual patients showed interesting facets of the management of DM. Therefore abbreviated notes have been made on these patients to demonstrate the wide variation in diagnosis, management, lifestyle, compliance and onset of complications found in patients with a diagnosis of DM in this study.

5.3.9, i; Patients with a diagnosis of NIDDM
Information extracted from Table 5.5.

Patient 4 was very obese initially at diagnosis but lost weight with an improvement in control.

Patient 11 was initially very obese but lost weight and attained a good control.

Patient 12 was referred to the dietitian on 2 occasions but refused to attend.

Patient 19 was a very obese man with poor dietary adherence and a low intake of NSP. He was admitted to the hospital with chest and stomach pain as having a suspected heart attack. He was later diagnosed as having constipation and "trapped wind".

Patient 22 was referred to the dietitian by the Consultant Diabetologist but never attended the appointment.

Patient 24 developed sarcoidosis which affected the control of DM

Patient 28 refused to attend dietetic appointments but was seen as an inpatient by a SRD.

Patient 44 was a nurse and was not referred to a dietitian by the Consultant Diabetologist, but as she worked at Bedford Hospital requested to see a dietitian herself.

Patient 45 was a biochemist and was not referred to a dietitian by the Consultant Diabetologist.

5.3.9, ii; Patients with a probable diagnosis of "insulin requiring" DM
Information extracted from Table 5.6

Patient 7 was very obese at diagnosis and required insulin for stabilisation. He then lost weight with a consequent marked improvement in diabetic control.

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Patient 12 was a heavy smoker (60 cigarettes per day), had an excessive alcohol consumption (30 units per week) and took snacks of confectionery. He was underweight and random venous blood glucose levels were noted to be > 17 m mol per litre blood on 80% of the occasions on which such tests were performed. The lack of compliance in avoiding sugar rich confectionery (as well as other life style factors) clearly contributed to the continual raised blood glucose levels.

Patient 16 lost weight when seen by a dietitian weekly and regained it if not seen. He was a single, retired, well off ex-market trader who had always lived with his mother until she died and then lived alone.

Patient 21 continued to gain weight after diagnosis and had poor control on both diet and oral-hypoglycaemic agents. When transferred to insulin the dietary management improved and also his diabetic control.

Patient 39 was noted as having "no intention of keeping to a diet". He was referred to the dietitian but did not keep 3 separate appointments.

5,3,9, iii; Patients with a diagnosis of IDDM

Information extracted from Table 5,7

Patients 4 and 5 were both typical younger patients one male and one female admitted via the casualty department with ketoacidosis, coma and weight loss (the classical symptoms of IDDM described in chapter 1) from which IDDM was diagnosed.

Patient 28 came to the casualty department as a medical emergency with IDDM at the age 58 with ketoacidosis and weight loss.

Patient 29 was a shift worker at a local factory and found maintaining control of insulin and diet difficult.

Patient 32 had chronic asthma which caused erratic control of DM.

5,4; DISCUSSION

5,4,1; Patients referred from the diabetic clinic for dietetic advice

If the dietetic profession is to survive it must demonstrate its value to the patients it provides advice for. At a study conference entitled "Dietitians of the
"Future", (Brereton and Connolly, 1977) emphasised how important it is for SRDs to collect information on their service from day to day and use this to convince people that they are an essential part of patient care. Also De Looy et al (1992), emphasised the importance of dietitians in showing that they provide an effective service. Twenty years later there has been a focus on this with the development of "National Professional Standards for Dietitians Practising in Health Care" (British Dietetic Association, 1997). These standards provide a framework for SRDs but do not include any standard for the management of people with DM other than a general suggestion for formulating a nutrition care plan. Therefore, such studies as this one can be invaluable as a start in quantifying workload and resources. If patients are not seen they are unlikely to benefit from dietetic advice!

While this study appeared simple it was extremely difficult to organise because of logistical considerations of examining medical records and also very time consuming to execute and demonstrate. No such other studies have been carried out.

In compliance with the recommendations of the Guidelines on the Management of Diabetes in North Bedfordshire (Diabetes Advisory Group, 1993) which forms the local standard of care, 66% of patients attending the diabetic clinic were given dietetic advice within 1 year of diagnosis in 1993. It was noted that the majority of these patients (70%) were referred to the dietetic department for advice as either in-patients while on the ward at Bedford Hospital or by their GP prior their appointment. It was of concern that 32 (17%) of the patients had never seen a dietitian for dietary advice. In an audit of DM patients at a GP practice Kempton and Heyter (1992) found that only 59% of newly diagnosed patients had seen a dietitian.

At Bedford 18 (56%) of the 32 patients who had not seen a dietitian were identified as having other clinical conditions that might benefit from dietary advice. Dietary advice is generally much more cost effective than medication.
Mann (1989) describes how the cost of oral hypoglycaemic agents could be cut by sensible dietary advice. Such advice also provides patients with some degree of control of their own treatment. For example, two of the patients had diverticular disease which benefits from a high fibre diet. But in both cases the patients had not been referred for dietary advice but had been prescribed bulking agents (Fybogel produced by Reckitt and Coleman) at a cost to the NHS of £60 per patient per year. While a dietetic consultation, follow up consultation and provision of a high fibre diet sheet would cost £20 per patient. (based on dietetic salaries in the NHS, 1994). This lack of referral may have been due to lack of medical knowledge of the role of dietary advice, or lack of dietetic availability. Lack of knowledge of nutrition by doctors has been well documented in the literature by Gray (1983), Brett et al (1986), Hopper and Barker (1995). This problem is becoming increasingly recognised and recommendations for improving it have been made by the Department of Health (1992).

It was noted that only 19% of patients with DM had received an annual update from a dietitian. This was of concern, since if patients are not seen by a dietitian it is assumed they are unlikely to derive benefit. Discussion with patients indicated factors which prevented them from keeping dietetic appointments included the protraction of the appointment time, lack of refreshments and preference to be seen at a local GP surgery. The former 2 points require to be addressed as simple operational factors in the running of the out-patient department. The final point indicated that a greater shift in dietetic resources may be required from the hospital to the primary care setting. Much more discussion with patients with DM is required to elicit their views of dietetic (and other) services. Additionally more patient involvement is recommended on any Diabetes Management Groups rather than only one patient as was involved in the Bedford Group. Obesity is associated with a higher risk of DM (Herberg, 1991) therefore it was hardly surprising that 46% of the patients seen in the DM clinic were overweight and 11% were obese.
As detailed earlier, a dietitian dedicated to the care of people with DM was appointed in October 1993 and was carrying out the full range of her duties by the time the study was repeated. She was accommodated in the dietetic department and also carried out clinics there, which was at some distance from the Diabetic Clinic, and patients had to walk across a car park to the dietetic department. In year 2 of the study, of the 202 patients seen in the diabetic clinic 130 (64%) had seen a dietitian within one year of diagnosis. During the previous 12 months 104 (51%) of patients had seen a dietitian for an update. This is an increase from the previous level of 19% of patients and demonstrates the advantage of an extra member of dietetic staff in providing an enhanced level of patient care. However despite the best efforts of the dietitians 33 (16%) patients had never seen a SRD for dietary advice. Presumably this was because they were not referred for advice for example as shown by the nurse and the biochemist or because they did not choose to attend an appointment with a SRD as shown by the patients who refused to attend dietetic appointments (section 5,3,3). It is recommended that much more discussion with patients is required to elicit their views.

The Diabetes Centre for Bedford Hospital, was opened in the Autumn of 1994 and was fully functional by the time of the third year of the study. The dietitian specialist for DM was accommodated there, which meant that patients could be seen in an adjacent clinic room for a dietetic update, immediately after seeing the Consultant Diabetologist or one of his team. Of the 129 patients seen in the diabetic clinic 79 (61%) had seen a dietitian within one year of diagnosis. During the previous 12 months 84 (65%) of patients had seen a dietitian for an update. This was a substantial increase on the number of updates compared with those in the previous year and demonstrated the importance of a diabetes specialist dietitian being part of the DM team and having accommodation close to the DM clinic. The BDA emphasises the importance of the team approach in managing DM, and that a dietitian should be a member of that team (1995). It also suggested a differing mode of care with the dietitian becoming more part of the DM team than the dietetic department. No matter
what efforts were made by the DM team, 23 (18%) patients never saw a dietitian for dietary advice. This disappointing outcome was despite the fact that staff and patients were reminded that they had a dietetic appointment, and the dietitian even waited outside the Consultant Diabetologist's out-patient clinic to "catch" patients as they left. However, it was noted that patients (identifying numbers 12 and 39) with IDDM both told the dietitian they had no time to attend a dietetic appointment. It is recommended that much more research is required in this area.

While the high number of patients who had never seen an SRD is extremely worrying (as without being seen, patients are hardly likely to be able to benefit from dietary advice) it was considered that further research on these patients and comparisons with studies elsewhere could prove extremely useful. Possibly it may not be appropriate in all patients with newly diagnosed DM to see a SRD during the first year. Also, there seemed to be a group of patients who do not wish to see a dietitian for advice. This group of patients who did not wish to see a dietitian could merit further investigation. Is this because of a poor perception of advice that would be given, or for other reasons? It was encouraging to note that no patient with DM and any other disorder where dietary advice is appropriate missed seeing a dietitian for advice. This is due to the dietitian prioritising such patients and advising medical staff upon the importance of referral.

As noted in the results there was an increase in people receiving an update on dietetic advice. With 49 (46%) of the men and 55 (58%) of the women attending the diabetic clinic in 1994 receiving an update in the preceding 18 months compared with a total of only 35 (19%) in 1993. This figure increased even further to 65% when the diabetes specialist dietitian was accommodated in the DM centre. This was made possible by the appointment of a dietitian specialist for people with diabetes. The recommendation that all people with DM should receive an annual update on diet is probably unrealistic and a more appropriate standard would be that a bi-annual dietetic update should form the
standard, also it would seem that patients should be prioritised for referral.

The statistical analysis of the data showed that no single factor had an effect on the referral of patients to a dietitian but a combination of factors influenced this. While age and sex and age and year of diagnosis had an effect on the referral to a dietitian these variables were not ones which could be affected in any way and it was hardly surprising that those patients who had been diagnosed for a longer time were more likely to have been referred to a dietitian than the rest.

5,4,2; Dietetic workload

It is recommended that every person with newly diagnosed DM should be seen as soon as possible after diagnosis for dietetic advice and annually for an update (Nutrition Subcommittee of the British Dietetic Association, 1992 and Diabetes Advisory Group, 1993). As described in chapter 2 on the role of the SRD, 3,810 people with a diagnosis of DM had been found currently registered in the dietetic department of Bedford Hospital. If the above standards were to be maintained, all of these individuals would require to be given an annual dietary update. However the dietetic records are reflective of the people known to the department and not the prevalence of DM. In a unique study of the prevalence of DM in Bedford it was found there was a prevalence of glycosuria in 12% of the population (Butterfield, 1964). Therefore with a population of 260,000 in North Bedfordshire (personal communication, Bedfordshire Health Authority, 1995) using the figure of 12% prevalence, a maximum of 31,200 people may require an update on diet and DM. A quantification of the amount of dietetic time required for consultations, was made by the BDA in 1986, who used figures based on a prevalence of DM as 1.5%, and dietetic data obtained from around the country. They recommended that 15 hours dietetic time per week per 100,000 population should be dedicated to people with DM. Using these figures and also those obtained from the actual dietetic time that is required for a consultation the following calculations were made;
The population of North Bedfordshire (the area served by the dietetic department at Bedford Hospital) is 260,000. Therefore using the figures proposed by the BDA it could be estimated that allowing 15 hours per week per 100,000 population there should be 39 hours dietetic time per week designated to dietary advice for people with DM. Allowing for paid annual leave and the hours worked per week by dietitians, which are given in more detail later, this equates with 1.1 whole time equivalent dietitians. The requirements for dietetic time for consultations for advising people with DM were also calculated using an analysis of the actual work load, that providing an annual update for all of the 3,810 people known to have DM would constitute (Dietetic Records, 1995). From dietetic work patterns, and appointment times it is known that the average update consultation is 20 minutes in length (chapter 2). An additional 10 minutes per patient is required for record keeping, entering data on the computer and associated administrative tasks (chapter 2). Therefore to provide dietetic updates for the 3,810 people with registered with the dietetic department, an additional 1,905 hours would be required. (The dietitians working week in the NHS is 36.5 hours, thus 52.19 weeks of extra dietetic time per year would be required. Dietitians are entitled to a minimum of 5 weeks annual leave and 10 days bank holidays and 2 days statutory leave (Whitley Council, 1994), an allowance for illnesses, maternity leave and compassionate leave of 2 weeks per year plus a further 2 weeks for training and attendance at meetings (Personnel Department Bedford Hospital, 1995) is required. This limits the actual working weeks to an average of 41 weeks per year. Therefore to provide a service of updating all of the patients with DM currently registered with the dietetic department an extra 1.27 dietitians would be required as a minimum. This timing does not allow for any of the patients to be provided with additional or extended consultations beyond 20 minutes each). Additional costs of appointment provision for the 3,810 patients was £1,143 (£381 for stationery and £762 for postage). Ambulance transport costs for those requiring it, costs of medical records staff in selecting patient records and of out-patient appointments staff are not included nor are the costs of a clinic room and telephone. If the figure of 31,200 patients with DM, (based upon the prevalence
of DM) were required to be given an annual dietetic update, this would take 10.4 whole time equivalent (WTE) dietitians. As the department only consisted of 7 (WTE) dietitians able to undertake such clinical work, the whole of the department would need to be dedicated to updating people with DM, and no other tasks. Additional resources would be required for postage of appointment cards to patients, the appointment cards, information sheets which are sent to every patient and recording sheets.

Using the figures based on both actual patient numbers and also the recommendations of the BDA (1989) a proposal for an additional dietitian to provide a service for people with DM, was put forward to management. Support for this was given by members of the Diabetes Advisory Group and funding for a post of a full time dietitian was provided in October 1993. This clearly demonstrated the value of the collection of data on patient referrals to a dietetic department, in presenting proposals for additional funding for dietetic staff and dietitians elsewhere should be encouraged to validate proposals in this way.

As already discussed, the study was very time consuming and logistically difficult to carry out. The procedure was assisted by the pages which had been written on by the Consultant Diabetologists being colour coded. The dietetic department used a blue cornered recording sheet which is also easily identified in the medical records. It is recommended that dietitians elsewhere examine the use of such distinctive recording sheets which would enable them to rapidly find dietetic information in bulky patient medical records. Because of these difficulties it was considered unlikely that other dietitians will carry out such a study. However as hospitals introduce comprehensive computer systems such studies should be easier to repeat, provided that dietitians keep data on computer databases and relevant information is recorded.

5,4,3; Attendance at the diabetic clinic
The number of outpatients seen in the 4 week period in the diabetic outpatient clinic was similar over the 2 years ie 183 in 1993 and 202 in 1994. But in 1995
only 129 patients with DM were seen. There was a suggestion that this was due to GPs taking on a greater role in the care of DM and the Consultant Diabetologist concentrating on those patients receiving insulin and where control was more difficult. The number of those on insulin seen in the clinic, ie 50%, did not substantiate this suggestion. Possibly patients did not like the new diabetes centre and preferred to be seen by their GP. With the new Guidelines on the Management of Diabetes (Diabetes Advisory Group, 1993) and more readily available updating on the management of DM from the diabetic team, GPs were able to provide a more comprehensive service for people with DM. The receptionist at the diabetic clinic said that an increased number of people did not attend their appointment since the transfer to the new Diabetes Centre. Some patients did comment informally to the researcher that they preferred to be seen at their GP surgery for dietary advice. This is certainly in agreement with other studies by Ruben (1979) and Dornan et al (1983) who showed that patients expressed a preference for their GP to manage their DM. As shown in chapter 2 the dietetic department had a facility to provide a service at GP premises. It was also shown that patients with DM were referred for dietary advice by their GPs (section 5.3.1). Possibly, the lack of attenders to the Diabetes Centre influenced the Consultant Diabetologist to refuse an audit of non-attendance to be undertaken. "DNA" rates are extremely important in demonstrating patients perceived quality of the service and even if there is an improved environment, other factors such as extended waiting times, variation in staff and lack of refreshments could deter people from attending. It is therefore recommended that diabetic and dietetic clinics should have an examination of their "DNA" rates made.

It was noted that the age range of people with DM in 1993 and 1994 was similar ie 19-84 years in 1993 and 17-84 years in 1994 and 1995. It was noted that fewer patients were controlled by diet alone in 1994 ie 19 (9%) compared with 29 (14%) in 1993 and 13 (10%) in 1995. The number of people controlled by oral hypoglycaemic agents increased ie 48 (28%) in 1993 and 86 (43%) in 1994 and 52 (40 %) in 1995. This trend reflected the improved co-ordination of
the service for people with DM, which enabled people controlled by diet alone to be managed by their GP.

5.4.4; Role of practice nurse

Increasingly practice nurses are involved in the management of chronic disorders such as DM and 80% of practice nurses in studies were found to be involved in giving advice on all aspects of DM including diet (Kempton and Heyter, 1991, Jewell and Turton, 1994). As patients may well have received some dietary advice from practice nurses, this may be considered by them to have been sufficient. Education and updating of practice nurses was already being carried out by the dietetic department at Bedford Hospital in 1991 prior to this study. Practice nurses are more likely to see patients frequently at GP surgeries and as part of the consultation they can provide information on diet. As was seen from the details of the dietetic workload discussed in chapter 2 practice nurses already referred patients for dietetic advice to the dietetic department at Bedford Hospital. A study on practice nurses involved in the management of NIDDM, by Kirkham (1994) showed they were more likely to refer patients to a dietitian for advice if they are already being involved in regular updates on diet from the dietetic department. Such updating enabled them to expand their role and correctly advise patients with DM who required basic dietary advice and to refer those patients who require more complex advice to a dietitian. This role of the SRD in educating practice nurses and personally providing additional dietetic expertise to those patients who need it makes much better use of specialist dietetic knowledge and should be encouraged.

As mentioned in chapter 1 there has been much debate in "Dietetics Today" the monthly publication, produced by the British Dietetic Association, (the association for SRDs) on the role of nursing staff and in particular practice nurses in giving dietary advice.

It was evident that there was a certain amount of caution experienced by the
dietetic profession in educating practice nurses as it was felt they may take over the dietitian's role. However as shown from the figures of referral from general practice shown in Chapter 2, practice nurses referred patients for dietetic advice, which demonstrates that such worries by dietitians may not be valid. Discussions with patients in 1993 also demonstrate they preferred to receive advice at their GP premises.

5,4,5; Medical record analysis of 100 patients with DM
The benefits of dietary modification to patients with a diagnosis of DM were discussed in chapter 1 after a comprehensive study of the research literature on the subject. Such benefits include an improvement in the symptoms of DM, improvement in glycaemic control, reduction and delay in the development of complications of DM, and weight loss in those who are overweight (section 1,7). The dietitian is seen to have a key role in advising individuals with DM upon a diet appropriate for their DM (BDA, 1993). Therefore as hypothesised in the aims of this study (described in section 1,8) it could be anticipated that the examination of the medical records of those patients with DM who had seen a dietitian had an improved diet compared to those who had not seen a dietitian and as a consequence had statistically significant improvements in glycaemic control, developed statistically significantly less complications and that those patients who were obese lost weight when compared with those patients who had not seen a dietitian.

5,4,5,i Diagnosis of different types of DM
As described in the results an interesting fact that emerged early in the study of the results was that those patients who were in receipt of insulin were categorised in the medical records as having IDDM. It appeared that 18 of those categorised as having IDDM should probably have been more correctly described as "insulin requiring" DM (section 1,2,2,ii). This finding caused some difficulty in undertaking the statistical analysis of the groups, as instead of the originally intended 2 groups of patients with DM; notably 50 patients with IDDM and NIDDM it was evident that the former group consisted of 18 patients with
probable insulin requiring DM and 32 patients with IDDM. Consequently when comparisons were made between the groups of patients, who had seen or who had not seen a dietitian, statistical analysis was difficult due to the reduced numbers in the groups of patients with probable insulin requiring DM and IDDM.

These 18 patients who appeared to be have been given an incorrect diagnosis in the medical records demonstrates the difficulty in the categorisation of DM which was discussed in chapter 1. While the categories of IDDM and NIDDM are well known, that of insulin requiring DM appears less well known. Discussions with medical staff of both Bedfordshire and Northamptonshire Health showed that the whole area of categorisation of DM is fraught with difficulties as some doctors may commence insulin treatment in individuals with DM while others would not. Anecdotal information was provided by doctors and it became evident that patients who had been mis-managed on insulin and gained enormous amounts of weight, then lost weight when insulin was withdrawn (a case history shows this in section 6,3,6) Furthermore discussions with the dietitians of Life Span Trust of Cambridge (personal communication, 1999), which has a particular focus of care of the elderly including those with DM, indicated they had no knowledge of "insulin requiring" DM.

It is not surprising that there is so little recognition of insulin requiring DM as a computer assisted literature search for relevant information published over the last 10 years listed over 11,000 papers on an aspect of insulin dependant DM and only 106 papers on an aspect of insulin requiring DM. An enquiry to the BDA about insulin requiring DM elicited the response that "there is relatively little information" and recommended it to be an area for future reserch (personal communication BDA, 1999). While the main aim of the study of the patients with DM was to ascertain if consultations with a dietitian provided benefits to the glycaemic management and reduction in complications it was of interest to examine the information obtained on those patients with probable insulin requiring DM as they were an interesting and as shown by the comments of the dietitians at Life Span, a poorly recognised group.
Therefore it would be of interest to undertake a survey of dietitians to ascertain if they recognised the group of patients who have insulin requiring DM. If the results of this survey confirmed there was little knowledge of insulin requiring DM among dietitians, suitable information could be developed to inform them about this important group of patients and how to advise them.

The 18 patients with probable insulin requiring DM were significantly older than those with true IDDM (section 5.3.4) which could be expected because of the extended duration of NIDDM during which the patients' insensitivity to their own insulin becomes greater and hence glycaemic control is more difficult. This situation is exacerbated as weight is gained and insulin resistance increases due to the development of additional adipose tissue. Patients with NIDDM who are hyperglycaemic, despite diet and maximum oral hypoglycaemic therapy benefit from insulin as well as in certain special situations such as pregnancy or during intercurrent illness (Mead, 1999). Oral hypoglycaemic agents and diet were shown and found to have failed in 18 patients, before the initiation of insulin was required for control in those patients with probable "insulin requiring" DM. "Diet is the cornerstone of the treatment of DM; unfortunately the tendency to crumble often tends to undermine the entire management" (Williams, 1994). While for some of these patients their lack of glycaemic control may have been due to a gradual failure of insulin production, in others it may have been totally due to lack of compliance with any diet. Hillson (1990) gives a good "mini-case history" of such a patient with NIDDM who was already overweight at diagnosis, did not comply with a diet, continued to gain weight which further exacerbated her insulin resistance, suffered from hyperglycaemia and recurrent infections of "thrush" and who required the initiation of insulin in large doses to control her blood glucose levels. Certainly the patient with probable insulin requiring DM who did not see a dietitian refused to comply with a diet and insulin was prescribed to improve his glycaemic control, however had he been more willing to comply with a diet and thus achieve glycaemic control it may not have been prescribed.
As described earlier, insulin is often initiated to produce an improvement in blood glucose levels. Initiation of insulin is likely to lead to weight gain over a period of years as is well documented in the studies by the UK Prospective Diabetes Study (UKPDS) Group (1998). This study by the UKPDS examined the effect of intensive blood glucose control in Type 2 DM by the use of insulin or oral hypoglycaemic agents. It demonstrated the benefits of intensive control on reducing the number of DM related deaths. It also showed that those patients who were controlled upon insulin gained more weight than those controlled on oral hypoglycaemic agents. The study also clearly demonstrated the usage of insulin in the control of NIDDM. Due to the likelihood of weight gain for patients with NIDDM who are transferred to insulin it is important that this is fully discussed with the patient and that the reason for the use of insulin is solely to improve their glycaemic control. **Dietitians are recommended to provide appropriate information to people with insulin requiring DM advising them of the likelihood of weight gain and that insulin is being introduced to improve their glycaemic control.**

Practical advice to practice nurses on managing the change to insulin therapy in NIDDM has been published in "Practice Nurse", the journal for nurses in general practice by Gaunt (1999) and by Avery and Mann (1999) as a "fact-sheet". Practice nurses are likely to be involved in advising patients with DM on the management of their condition. However only Avery and Mann briefly mention the aspect of weight gain that patients transferred to insulin may experience. Therefore it is even more important that dietitians discuss this probable weight gain with patients as it may be overlooked by nurses. **Publication of practical advice to dietitians on the subject of the management of insulin requiring DM in one of the publications read by dietitians, is recommended in order to update them in this important area.**

As yet the matter of advice on diet and control of patients with insulin requiring DM appears to be somewhat vague. In the forthcoming October 1999 edition of "Balance", the magazine distributed to the members of the BDA, an article
on the UKPDS study of 1998 will be described in simple terms. Patients with NIDDM will be encouraged to seek a tighter control of their blood glucose level, to ensure that their blood pressure is regularly checked and that if they require insulin the effect it is likely to have in causing a weight gain. In this way the BDA will again be a catalyst (as was described in section 1,3,18) for encouraging a wide awareness of the management of NIDDM among patients and NHS staff who will obviously be required to respond to patient enquiries.

As already described in section 1,2,2,ii when DM has been diagnosed its classification into different types of DM is traditionally carried out according to clinical criteria. As shown in this study this is fraught with difficulties and patients can be wrongly classified (Pickup and Williams, 1997). In the future such difficulties with the diagnosis of the different types of DM may be prevented as the role of C-peptide in the diagnosis of DM is currently being researched. C-peptide is released from the pancreatic beta cells into the circulation in amounts equimolar with insulin. It has a role in the assembly of the insulin chain structure but until recently was considered to be biologically inactive. However during the last few years it has been found to have physiological effects in DM which have included effects on the glomerular filtration rate, glucose utilisation and autonomic nerve functions (Forst et al, 1998). High levels of serum C-peptide (above 2.2 ng/ml) have been shown to be associated with obesity, elevated serum triglycerides and hypertension in patients with Type 2 DM (NIDDM). Low levels of C-peptide (below 0.7 ng/ml) have been shown to be associated with the progression of microangiopathies such as retinopathy and nephropathy (Inukai et al, 1999). Cisse et al (1997) made comparison of the classification of the different types of DM by the use of plasma C-peptide and plasma glucose estimations after a glucose tolerance test. Prando et al (1996) showed that patients with Type 2 DM (NIDDM) who require insulin treatment could be characterised by post-prandial C-peptide plasma levels and noted that those patients with low C-peptide levels had significantly poorer metabolic control. They concluded that those patients with C-peptide levels below 1.0 ng/ml require insulin treatment. In this study of 100
patients at Bedford it would have been of interest to have examined the C-peptide levels to determine which patients required insulin for their management. However the information on the patients was obtained in 1993 and at that time research on C-peptide was only just beginning and even now, (September 1999), there are no facilities to undertake C-peptide estimations at Bedford nor is it used, apart from on one or two occasions each year.

5,4,5,ii; Critique of study
Examination of the medical records to determine the effectiveness of dietetic intervention upon 100 patients with DM was very time consuming to perform and seems not to have been attempted before. Computerisation of records of people with DM such as are being encouraged by the setting up of diabetes registers (Diabetes Services Advisory Committee BDA, 1993) should enable similar studies to be carried out more easily in the future. However it was evident that the FIP computer system at Bedford hospital was unable to be interrogated for information on the number of patients with a diagnosis of DM (section 2,4,7). Therefore to prevent any future similar occurrences it is important that dietitians should be involved in early discussions of data that is to be collected and in the implementation of any new computer systems. Dietitians should ensure that the data collected upon patients will provide a useful means of assessing the effectiveness of their work.

While this study provided some interesting information there were a number of difficulties encountered with it and which should be addressed in any future studies. Firstly it demonstrated the difficulty in obtaining an accurate diagnosis for the type of DM from the medical records and that it would be preferable to initiate a study on people with DM by use of independent clinical assessments and biochemical tests such as described in the preceding section. It was also evident that both lack of compliance, factors such as shift work and other illness affected the control of DM. Thus while the selection of 100 consecutive patients does give a good degree of randomisation, patients whose control is affected by other factors, which could mask the effect of dietetic advice should
be excluded.

Additionally it would have been useful to have had blood glucose measurements assessed by measuring HbA1c (section 1.7.3). These give information on the blood glucose control over the preceding 6-12 weeks rather than the less reliable information on the control being provided by blood glucose measurements. However as this was the only information available in the medical records at the time of the study then this was the only possible assessment of control.

A study of a greater duration would have more clearly demonstrated the role of dietetic advice on the prevention of complications. As already described complications take many years to develop and indeed in the case of NIDDM may have already become established before the NIDDM is recognised. Therefore future studies should ideally be of at least a decade.

Finally it would be useful to have future studies of a much larger size to give greater statistical validity to any results.

5.4.6; Demographical analysis
As already described in section 5.3.4 there were no statistically significant differences between the 2 groups (seen dietitian and not seen by dietitian) in any demographical parameter that was examined. Dietitians were available to see all patients at Bedford Hospital and were able to adapt dietary advice to the individual patient, no matter what their age, marital status, ethnic background or gender. Bedford is a multicultural community with large numbers of people from Italy, India and the Caribbean represented in Bedford. All diet sheets are available in the different languages and interpreters are available.

No statistically significant difference was found in the age at diagnosis of patients with IDDM or NIDDM who had seen a dietitian or who had not seen a dietitian. As anticipated and already described in the results and section
patients with probable insulin requiring DM were found to be significantly older than those with IDDM.

5,4,7; **Weight at diagnosis and changes in weight**
No statistical significance was found for weight at diagnosis for patients with IDDM, insulin requiring DM or NIDDM who were seen or not seen by a dietitian.

Examination of weight changes that occurred between the time of diagnosis and April 1993 for the 50 patients with NIDDM showed a trend for those who had seen a dietitian to reduce their weight to the normal weight range ie a BMI 20-24 kg/m². Weight loss is important to the control of patients with DM (Lean et al, 1990) and dietary advice from a dietitian (see chapter 2) can be an important facet of enabling this weight loss. This study indicated that a trend of weight loss was produced by seeing a dietitian in those patients with NIDDM who saw a dietitian. It would be helpful for further randomised studies on weight changes on a larger sample size of patients with DM who had seen a dietitian to be carried out to ascertain if this trend is still evident and reaches statistical significance.

While it would have been expected that the group of patients with NIDDM and those with insulin requiring DM would have been significantly more obese than those with IDDM as has been previously described in the literature, this was not shown in this study. Possibly the small sample size accounted for this finding.

5,4,8; **Number of days spent in hospital and attendances at the diabetic clinic**
The range of days admitted to hospital for those with NIDDM varied from 0-17 days. Twenty seven patients with NIDDM were never admitted to hospital. Those admitted for the greatest number of days were often non-compliant with dietary advice. For example patient number 19 with NIDDM was admitted for 16 days and was noted "to not keep to his diet". As well as poor control of DM he was also admitted to hospital on one occasion with stomach and chest pains which were investigated and found to be due to "constipation and trapped
"wind", both of these conditions are also related to a poor diet.

Patients with NIDDM who had been diagnosed for a statistically significantly longer period had seen a dietitian rather than those who had not seen a dietitian. Also patients who had seen a dietitian had been admitted to hospital for statistically significantly longer period. This was in line with expectations as patients were often seen in hospital for a dietetic consultation (section 5,4,1) It was not surprising that those patients who had been diagnosed for shorter periods were less likely to have seen a dietitian. As shown in section 5,3,2 which described discussions with patients suffering from DM, it was found that organising prescriptions and other tests took priority over a dietetic consultation.

The results show that those patients with complications were admitted to hospital for more days than those without complications. This result is very much in line with the expectation that those needing more intensive treatments were admitted to hospital for long periods while such care was provided. For example patient number 16 with a diagnosis of probable insulin requiring DM was admitted for 268 days to hospital and was noted to be unable to manage his diet or condition. He had numerous infections of his foot which required prolonged admissions to hospital for treatment in order to prevent the onset of gangrene and possible amputation. Patient 39 with a probable diagnosis of insulin requiring DM was noted as "not keeping to his diet" and "refusing to see a dietitian". He spent 135 days in hospital with serious foot infections. The greater number of days admission to hospital of such non-compliant patients was noted to disproportionately increase the average period of admission. This clearly demonstrates the need to encourage individuals with DM to take responsibility for their condition both for the benefit of their own health and well being and also for obvious cost benefits to the NHS. Possibly a more lateral approach to such situations may be needed and possibly a live-in carer for patient number 16 may have brought benefits and reduced complications and hospital stays.
This emphasises the importance of patients being encouraged to control their DM themselves, and being given information and help with this. Setting personal targets for patients for their control may be more helpful and pertinent to this than aiming for clinical normality of blood glucose levels and a normal BMI (Williams, 1994). Jones (1989) showed that patients who attended the dietitian at a diabetic clinic most frequently were the ones who lost the most weight. Diet is an important facet of this type of management, as obesity worsens insulin resistance and weight loss lowers blood glucose and lipid levels and also reduces blood pressure (Lean et al, 1990).

It was noted that patients managed upon insulin had all been admitted to hospital for at least 2 days. This was in accordance with the policy for the initial stabilisation of those with IDDM onto insulin by admission to hospital for 3 days (Diabetes Advisory Group, 1993). The average admission to hospital for patients with insulin requiring DM was longer than that for those with IDDM and those with NIDDM. The number of days admitted to hospital in all 3 groups of patients with the 3 different types of DM was noted to be very wide due to the great variation of individuals and this made statistical validation difficult.

5.4.9; Glycaemic control in patients
Results for all 3 groups of patients showed that they improved their glycaemic control after they had seen a dietitian versus those who had not seen a dietitian. However an improvement in glycaemic control was recorded as an improvement in blood glucose levels of less than 10 mmol/l at the next appointment at the DM clinic after seeing the dietitian. Although this occurred in patients after a dietetic appointment it was noted that patients were seen less times by a dietitian than at the diabetic clinic and this improvement in glycaemic control may not have been sustained.

The glycaemic control was established by the measurement of blood glucose levels rather than HbA1c. Patients can more easily manipulate their blood glucose levels by adhering to the correct diet for a few days prior to their
appointment at the diabetic clinic.

Consequently while there was evidence of improvements in patients after seeing a dietitian this was not sufficient to elicit good glycaemic control in the group of patients who had seen a dietitian versus those who had not. Disappointingly the results of an examination of the control of patients with IDDM and NIDDM showed no statistically significant difference between the groups who had seen a dietitian and those who had not. Results also showed that those with poor control were seen more frequently than those who had good control which indicates that the dietetic advice may have done little to assist patients. Patients with poor glycaemic control were more frequently referred to the dietitian this poor glycaemic control may have been due to the worsening of the DM or that patients were unable or unwilling to comply with dietary advice.

Additionally at the time of the study, in 1993, the target for control of DM was given as blood glucose levels of less than 10 mmol/l, however this is somewhat higher than the present target of below 7 mmol/l and were the study to be repeated using this level a different outcome may have been found.

5,4,10; Complication in patients with DM

It was noted that there was no association for those with complications of DM, for either those with IDDM, probable insulin requiring DM or NIDDM, for either sex, marital status or ethnic origin.

Results for both IDDM and NIDDM for complications in patients who had seen a dietitian and those who had not showed no statistically significant difference. Possibly a larger sample size of patients may have shown a different result and further larger studies would be of interest. Despite the patients being seen by a dietitian it did not seem to have assisted in enabling them to achieve good control and a reduction in complications. While there was a trend towards weight loss for all groups of patients with DM and also an improvement of blood
sugars after seeing a dietitian, these improvements were obviously not of a significant enough proportion nor of sufficient duration to achieve a normalisation of blood glucose levels and prevention of the development of complications.

As already described in chapter 1 the development of complications may take many years and many people who are found to have NIDDM first seek medical advice not because of the symptoms of DM but due to a complication already having developed. In such a case dietetic advice would have little effect. Additionally patients had been diagnosed for varying periods of time and during this both the management of DM had changed as well as the approach of medical staff to this. Therefore this made the whole area of investigation of the effect of dietetic advice upon the prevention of complications extremely difficult to evaluate.

5,4,11; individual patients with DM

It has already been noted in this discussion that a number of patients had never seen a SRD. It became evident from the information on individual patients some were never referred and that other patients refused to see a dietitian. Additionally it was evident from the notes on individual patients that the patient's control of DM was often affected markedly by their own willingness to comply with advice and that this impacted on length of time they spent in hospital and the development of complications. Therefore it was decided to further investigate this by compiling case histories of patients with DM as shown in chapter 6 to demonstrate the great variation in patients with DM.

5,5; CONCLUSIONS

This study has shown the difficulties that exist in deriving data from medical records and discussed the limitations of the study and suggested that other studies should be undertaken and how these could be improved. Results have also highlighted a group of patients who were considered to have "insulin requiring" DM and noted that they were older than those with IDDM and often
obese. Indeed this group of patients is one upon which there is relatively little published information and could provide an interesting group for dietetic and lifestyle intervention studies. Additionally it is one upon which it is recommended more information is provided for dietitians to enable them to give appropriate advice to patients.

This study provided information on the referral of patients with DM for dietetic advice. Over the 3 year period it was noted that 61% to 66% of patients were given dietetic advice within 1 year of diagnosis. Despite all efforts to improve the referral of people with DM for dietary advice there seemed a worrying number of patients, 16-18%, who never received dietetic advice and research into the reasons for this is required. It was evident that the appointment of a specialist dietitian for diabetes assisted in enhancing the number of people with diabetes who received a dietetic update, from 19% to 65%. There was no evidence that age, body weight, year of diagnosis, ethnic group or gender had an influence upon the referral of people with DM to a dietitian. This indicated that much more research is required to be undertaken on which patients would be most likely to benefit from the advice of a dietitian and to develop appropriate referral protocols. Such research is recommended to have a strong patient focus to ascertain patient views.

The results of the effect of dietary advice to patients with DM by the provision of consultations with a dietitian did not demonstrate any significant benefits on the prevention of the development of complications in either patients with IDDM or NIDDM who were seen by a dietitian at Bedford Hospital. Therefore the patients who did not see a dietitian as noted in the 3 year study of records of patients attending the DM clinic at Bedford Hospital may not have been a cause for concern. There was a trend for patients who were overweight who had seen a dietitian to reduce their weight in comparison with the group of patients who had not seen a dietitian. Such reductions in weight have undisputed benefits, and life expectancy may be prolonged by 3-4 months for each kilogram of weight lost during the first year of treatment (Bailey, 1992).
Yet with the setting of NHS contracts for dietetic services the area of weight management is one that is often not considered appropriate for the expertise of a dietitian, but appeared to be the one area where there were benefits from dietetic advice and it is one that should be recommended for dietitians to develop further. It was evident from variations in patients and their refusal to both comply with a diet and even to see a dietitian (as noted by comments of individual patients which were possibly due to poor expectations from such advice) that there is an enormous agenda for dietitians to achieve an improvement in their image. Possibly the poor expectations had been exacerbated by the variable nature of advice from diet sheets obtained elsewhere in the country as was found in the study of them. However in some individuals failure of diet and obesity were factors which contributed to the failure of oral hypoglycaemic agents and lack of control which led to the initiation of insulin. From the results of this study it would seem that although diet can provide enormous benefits to the person with diabetes, the dietitian does little to contribute to this. Much more work needs to be undertaken on targeting patients who would benefit from the intervention of a SRD, improving the image of dietitians and improving advice to patients with DM who are also obese as well as carrying out further extended studies on the outcomes of dietetic advice and ways that this advice should be provided.
CHAPTER 6

A SAMPLE OF CASE HISTORIES OF PEOPLE WITH DIABETES MELLITUS

Six condensed case histories of people with DM seen by dietitians at Bedford Hospital

6, 1; INTRODUCTION

Each person with DM is totally different and none have identical lifestyles, dietary habits, progress of DM or abilities to deal with the diagnosis as was shown in chapter 1. This is illustrated by the sample of 6 short case histories that have been extracted and described in this chapter.

6, 2; METHODS

All the information given in the case histories was obtained from material in the medical and dietetic records from Bedford Hospital.

Details of the mode of diagnosis of DM, management, social history and complications were extracted from the medical notes. These details form the following condensed case histories described in this chapter. They illustrate individuals with IDDM and NIDDM and have been chosen to include; typical times of diagnosis eg during gestation and before surgery as an in-patient. The attention has focused on the effect that the diagnosis of DM had upon the individuals, difficulties encountered in complying with advice to alter lifelong dietary and other habits; their body weight and the difficulties that obese individuals had in losing weight, types of management of DM, compliance with advice, non-compliance with advice and the development of complications. The information extracted to form the condensed case histories is presented in the same form as it had been written in the records and the same phraseology has
been used.

The 6 individuals were selected from a list of people with a diagnosis of DM given an appointment at the diabetic clinic at Bedford hospital in 1993. They were not chosen from the 50 individuals selected for the study of patients with IDDM or the 50 with NIDDM (see chapter 5). All records on the 6 patients were updated to June 1997 by referral to recent medical and dietetic records. Thus patient ages and the period of treatment were commensurate with June 1997. For reasons of confidentiality they were each identified by the allocation of a patient number rather than by initials. Identification by initials was considered to be inappropriate as it could easily enable identification of patients who live in small villages where there are only a few patients with DM.

6, 3; CASE HISTORIES

6,3,1; PATIENT NUMBER 1

This patient was a 66 year old woman whose DM was diagnosed in 1966, when she was 36 years of age and during her second pregnancy which resulted in the birth of her second son, at the maternity clinic of Bedford Hospital. Detection was by routine urine testing which showed the presence of glucose (noted as glucose +++). No records of blood glucose levels were noted in the medical records. Although this woman had "gestational DM" no record of this diagnosis is noted and she was informed she had "sugar in her urine".

When she was seen, she was married and had 2 sons. She lived in one of the more prosperous areas of Bedford. She was not employed outside the home. There was no mention of other factors in the records except that she "walks the dog regularly".

6,3,1,i; Clinical management

Initially she was managed by "diet" alone. In the medical records there was no mention of the type of diet, or of a referral to a dietitian, just the word "diet".
The patient's DM remained well controlled with diet during her second pregnancy and she had a normal delivery of a son. She was discharged to the care of her GP and remained under his care for 7 years without any significant illnesses.

In June 1973 she went to her GP complaining of polyuria, polydipsia, recurrent infections and tiredness. He referred her to the Consultant Diabetologist at Bedford Hospital.

When she attended the DM clinic in July 1973, her blood glucose was found to be 17 m mol/l glucose (normal range 4-7 mmol/l). A urine sample was tested and the presence of glucose but no ketones was noted. Her blood pressure was measured and noted to be 120/80mm Hg (normal). The patient was weighed and her height requested, these were recorded as "60 kg and 5 ft 6 ins" respectively. Physical examination showed there was "no absence of peripheral pulses". The patient was noted to be following a "sugar-free diet".

NIDDM was recorded as diagnosed in the notes. An oral hypoglycaemic agent, Tolbutamide (Rastinon produced by Hoechst which is one of the range of sulphonylureas) 500mg per day was prescribed. An appointment for a review in a month's time in August 1973 at the DM clinic was arranged.

At this appointment the patient's weight was noted as 61kg, and her blood glucose was 6.8 m mol/l. This was assessed by the Consultant diabetologist as "good control of DM", and a follow-up appointment 6 months later in February 1974 arranged. Control remained good for a period of 4 years during which time she was seen six-monthly in the DM clinic and in 1978 she was transferred back to her GP for further management.

In 1992 she was again referred to the DM clinic by her GP because of glycosuria, infections and weight loss. Her blood glucose was 19.5 m mol/l.
She was admitted to Bedford Hospital the following week for 3 days for stabilisation on insulin. IDDM was then recorded as the diagnosis in the medical notes (however this diagnosis could have been more correctly defined as insulin requiring NIDDM see chapter 1). Two injections of Actrapid (Novo Nordisk) were used to manage the DM, one before breakfast and another before dinner. She was instructed in insulin injection techniques by the nursing staff, recognition of a hypoglycaemic attack and assessment of blood glucose using a Glucometer. The nursing staff referred her to the dietitian for advice on diet in line with the policy on dietetic advice (chapter 2). A visit to the DM clinic 10 days after discharge was made.

Thereafter, a good control of blood glucose levels was maintained. A Glucometer (Bayer Diagnostics) was purchased by one of the sons to assist in the management of her DM. She became a member of the BDA in order to obtain the information provided, but no local BDA meetings were attended.

6,3,1,ii; Attendance at the diabetic clinic
In 1973 after initial referral 3 visits to the clinic were made. Two visits per year to the clinic were made between 1974 and 1978. In 1992 four visits to the DM clinic were made and thereafter from 1992 to 1996 two visits per year were made. A further visit to the DM clinic was made in February 1997. All appointments were kept.

6,3,1,iii; Body weight and dietary management
The patient maintained a body weight which was always in the ideal range for height, ie 60-63 kg for a height of 5ft 6ins. The initial advice on diet from the maternity clinic in 1966 was verbal and no notes were made of the type of diet. The first referral for dietetic advice was in 1992, while an in-patient. The diet as assessed by the dietitian in 1992 (Fig 6,1) included no sugar, or high sugar foods such as chocolate or sweets, 5 portions of fruit and vegetables were taken each day. The patient did not eat fried food. Wholemeal
DIET FOR PATIENT NUMBER 1 AS NOTED BY THE DIETITIAN IN 1992

BREAKFAST; 2 WEETABIX, POSSIBLE TOAST- WHOLEMEAL

MIDMORNING; 2 RICH TEA BISCUITS

LUNCH; SOUP- HOME MADE OR PACKET, 2 SLICES OF BREAD OR ROLL-WHOLEMEAL OCCASIONAL FRENCH STICK, CHEESE OR HAM, FRUIT EG BANANA, OCCASIONAL PACKET OF CRISPS

MID-AFTERNOON; APPLE

DINNER; MEAT OR FISH NOT FRIED, POTATOES, 2 VEGETABLES EG CAULIFLOWER AND SWEDE, BAKED APPLE, FRUIT AND CUSTARD-NO SUGAR, DIET YOGHURT.

SUPPER; APPLE OR POSSIBLY SLICE OF TOAST

USES NO SUGAR, NO SWEETS, NO DM PRODUCTS, ALCOHOL ON SPECIAL OCCASIONS, FLORA MARGARINE, SEMI SKIMMED MILK APPROX 1 PINT A DAY, CHIPS AND PASTRY RARELY.
bread and wholewheat breakfast cereals were eaten regularly. She had obtained recipes for puddings from library books. Regular meals were eaten with snacks of fruit or plain biscuits mid-morning, mid afternoon and at bedtime. The patient only drank alcohol on special occasions. The dietitian who saw the patient noted the diet was "good" and requested the patient to continue with it. An analysis of the nutritional content of the diet as detailed by the dietitian in 1992, was undertaken using Diet Plan (Forestfield, Software Ltd.) which showed it provided 1,593 kcal (6,728 kJ) per day. The contribution of energy from fat was 23%, carbohydrate 55% and protein 22% respectively. The analysis showed that all of the micronutrients provided were in excess of the RNIs (DoH, 1991) and 8 g of salt per day was provided.

The patient was seen in the DM clinic by a more experienced dietitian in 1994 (Figure 6.2). Nutritional analysis of the diet found it provided 2,294 kcal (9,641 kJ) per day. Fat provided a contribution to energy of 20%, carbohydrate 63% and protein 17% respectively per day. Again the analysis showed that all micronutrients provided by the diet were in excess of the RNIs. Again salt was in excess of the recommended 6 g salt per day (Nutrition Sub-Committee of the BDA, 1992) at 10 g per day. It was noted she had an interest in cooking and recipe books were suggested by the dietitian. The patient was congratulated on her diet and encouraged to continue.

6, 3,1,iv; Complications

No complications were noted. Examinations in the DM clinic showed that peripheral pulses were present. There was no visual impairment and no ketones were detected in the urine.

6,3,1,v; Summary

Despite the worsening of the DM and insulin being necessary for clinical management, the patient remained well controlled. Although a diagnosis of IDDM was recorded in the medical records, she would have more correctly
DIET FOR PATIENT NUMBER 1 AS NOTED BY THE DIETITIAN IN 1994

BREAKFAST; 2 WEETABIX, PORRIDGE IN WINTER, POSSIBLE TOAST-WHOLEMEAL

MIDMORNING; 2 RICH TEA BISCUITS OR DIGESTIVES OR FRUIT

LUNCH; SOUP- HOME MADE OR SUPERMARKET LOW CALORIE OR WEIGHT WATCHERS, 2 SLICES OF BREAD OR ROLL WHOLEMEAL OR GRANARY, POSSIBLE JACKET POTATO, BEANS ON TOAST, SALAD WITH MIXTURE OF SALAD VEGETABLES. FRUIT EG BANANA, ORANGE, DIET YOGHURT, PACKET OF CRISPS

MID-AFTERNOON; APPLE OR BISCUIT POSSIBLE SCONE- HOME MADE DINNER; MEAT OR FISH ROAST, CASSEROLE, GRILLED CHOP, POTATOES JACKET OR BOILED, PASTA OR RICE APPROX ONCE A WEEK, VEGETABLES OCCASIONALLY AS STIR FRY OR CURRY, FRUIT AND DIET YOGHURT. MILK PUDDING-NO SUGAR, SUGAR FREE JELLY, BAKED PUDDING FROM DM RECIPE.

SUPPER; BANANA, OR TOAST OR BISCUIT

USES NO SUGAR, NO SWEETS, NO DM PRODUCTS, ALCOHOL ON SPECIAL OCCASIONS, FLORA MARGARINE, SEMI SKIMMED MILK APPROX 1 PINT A DAY, CHIPS AND PASTRY RARELY. USES DM RECIPES FROM LIBRARY BOOKS AND BALANCE.
have been diagnosed as having insulin requiring DM (see previous chapter).

The case history demonstrates how well the patient maintained her weight and blood sugar by dietary adherence even though she was not seen by a SRD until 1992. The patient was interested in her condition and had sought information on recipes. She was supported by her family as shown by their purchase of a Glucometer.

**6,3,2; PATIENT NUMBER 2**

This man initially lived in London but moved to Sandy in Bedfordshire in 1996 at age 52 years. Initial diagnosis, according to the patient, (as noted in the dietetic records during a dietetic consultation at Sandy Health Centre in 1996), was made in 1993, at age 49, on a visit to the Accident and Emergency Department of Bedford Hospital after a fall which caused a broken rib. (This time of diagnosis was also recorded in the medical notes). At this visit to the Accident and Emergency Department a reference to the patient's continual thirst was made by his wife who accompanied him, and tests on a urine sample showed the presence of glucose (Glucose +++). The patient was referred to his GP for further care of his DM and broken rib. However there is a record dated 1995 in his medical notes, from a diabetologist during a consultation at the diabetic clinic, of a diagnosis of NIDDM, at age 38, made by his GP, therefore there seems some confusion about the initial diagnosis.

After his fall the patient saw his GP who diagnosed NIDDM. A physical examination by the GP detected; "peripheral neuropathy, hypertension and retinopathy" as noted in the medical records but no measurements had been included to verify this, for example a note of absence of peripheral pulses to indicate peripheral neuropathy. The GP referred him to the locally outposted diabetic clinic of St Bartholemew's Hospital. Over the next 3 years (as detailed later) the patients condition worsened with resultant amputations for gangrene, myocardial infarction, deteriorating vision due to retinopathy, impotence, chronic
obstructive airways disease, oral carcinoma, anaemia, dizziness and recurrent chest and skin infections.

The patient resided in a council flat in the East End of London, until August 1996 when he and his wife had moved to Sandy in Bedfordshire to be near his 28 year old married daughter as his health had deteriorated and he had become almost blind and confined to a wheelchair. (It was on a previous trip to his daughter in 1993, that he sustained the fall, which precipitated his visit to the accident and emergency department of Bedford Hospital).

He had a caring wife, who always accompanied him to hospital and GP appointments. Additionally she wrote, on 13 occasions to the GP asking for earlier hospital appointments, repeat prescriptions and enquired on 2 occasions about benefits. To which the GP always replied and enclosed repeat prescriptions, earlier hospital appointments and letters to the Department of Health & Social Security regarding benefits. There was no mention of employment in his records.

Both the patient and his wife only acknowledged the diagnosis of DM in 1993. They had changed their GP in London in 1993 as they were unhappy with the previous one. No mention of GP consultations for DM, were noted prior to 1993 only a mention by a Consultant Diabetologist in 1995, of a previous diagnosis.

The patient smoked 50 cigarettes and drank 6 pints beer per day (there was a record of this increasing in 1994) ie a minimum of 84 units of alcohol per week. Despite advice from the GP to curtail alcohol and cigarette consumption, the patient did not comply until 1995 when he developed oral carcinoma.

6.3.2.1; Clinical management

After diagnosis at Bedford Hospital Accident and Emergency department the patient was seen by his GP in London who found he was hypertensive with a
blood pressure of 160/100 mm Hg, obese with a recorded weight of "95 kg and height 5 foot 8 inches" (BMI 33 kg./m²) and had retinopathy and peripheral neuropathy. Metformin, 50 mg (Glucophage a biguanide produced by Lipha) and Glibenclamide, 5 mg, (Euglucon a sulphonylurea produced by Roussel) per day were initiated and an appointment to the DM clinic made.

The patient made 4 visits to the GP prior to the appointment at the DM clinic 6 weeks later. During this period his blood glucose level increased from 11.7 m mol/l to 13.3 m mol/l. Boils under his arms were noted by the GP, and recorded to be due to poor DM control. The patient then made a total of 52 visits to the GP during the period of March 1993 to August 1996, (additionally 4 appointments were made but not attended by the patient). The GP monitored the patient's DM condition and treated complications. After moving to Sandy the patient registered with a local GP. He was seen by this GP, 7 times during the period August 1996 to June 1997, for monitoring and advice.

In March 1997 the patient was referred to a local support group for people with chronic illness. This he attended every fortnight and was noted to find it "helpful" and had "made friends who understood".

The patient had 5 admissions to hospital for management of DM and complications. These were; 4 days in October 1995 for management of gangrene, 10 days in November 1995 for right foot amputation, 12 days in January 1996 for below knee amputation due to infection, 10 days in February 1996 for infection of the wound and 10 days in May 1996 days for radical surgery of oral carcinoma.

6,3,2,ii; Attendance at the diabetic clinic

Initially the patient attended the local DM clinic in London. This clinic was held at a health centre as an "out posted diabetic clinic". At the first appointment a full examination of the patient was made and a raised blood glucose level of
11.3 m mol/l noted, a raised blood pressure of 170/110. His weight was 95 kg and an absence of peripheral pulses was detected. Extensive retinopathy was also noted and laser treatment arranged.

The Consultant Diabetologist advised the patient to stop smoking and drinking 6 pints of beer per day and the patient agreed to this. Further advice on the advanced diabetic complications, was sought by referral to a Professor specialising in DM at St Bartholemew's Hospital. The oral hypoglycaemic agents were "continued as before".

Meanwhile a review was arranged at the out posted diabetic clinic. The patient was seen a total of 14 times in the diabetic clinic. Additionally he was seen for laser treatment of retinopathy by an Ophthalmologist 5 times, 3 times for his impotence by a Neurologist, by a Surgeon 3 times, Cardiologist 6 times, a different Neurologist 5 times, Physiotherapist 3 times, Occupational Therapist twice, limb fitter twice and Chiropodist once. The patient kept all clinic appointments, but one appointment was noted to have been curtailed by the patient due to the protracted waiting time.

6,3,2,iii; Body weight and dietary management
The patient's weight was noted to be 95 kg (BMI 33 kg/m²) on each of the records between 1993 and the amputation in 1996. No weights were noted after his amputation. At the dietetic appointment in January 1996 the patient refused to be weighed probably due to his mobility difficulties. Both the patient and his wife considered he had lost weight since he had a "sore mouth" and was unable to eat well. A dietary assessment was undertaken by the dietitian and indicated a diet of soft food such as cereals and soups as shown in Fig 6,3. A more varied diet and vitamin supplements were recommended. Nutritional analysis of the diet showed it provided 2,113 kcal (8,870 kJ) per day. Fat contributed 40% of the energy, carbohydrate 42% and protein 18% respectively per day. Again the analysis showed that all micronutrients provided
DIET FOR PATIENT NUMBER 2 AS NOTED BY THE DIETITIAN IN 1996

BREAKFAST; CORNFLAKES OR PORRIDGE SILVER TOP MILK

MIDMORNING; 2 RICH TEA BISCUITS DUNKED IN TEA

LUNCH; SOUP- TINNED TOMATO BUDGENS OR HEINZ, 2 SLICES OF BREAD WHITE. RICE PUDDING OR CUSTARD- HOME MADE USING CANDEREL

DINNER; MINCE OR FISH BOIL IN BAG TYPE, POTATOES MASHED, VEGETABLES PEAS AND CARROTS, APPLE STEWED AND CUSTARD- NO SUGAR, DIET YOGHURT.

SUPPER; BANANA, OR TOAST OR BISCUIT

USES NO SUGAR, NO SWEETS, DM PRODUCTS SOMETIMES AS PRESENTS, MILK 1 PINT PER DAY AT LEAST
were in excess of the RNIs but sodium was in excess of the recommended 6 g salt per day (Nutrition sub-committee of the BDA, 1992) at 9 g per day.

The patient had been seen by a dietitian regularly at the 14 DM clinic appointments in London between March 1993 and August 1996. This was recorded in the notes by the Consultant Diabetologist but not by the dietitian. Both the patient and his wife recalled seeing the dietitian on a number of occasions. The patient took no sugar and his wife prepared food without sugar or additional fat. Little fruit was taken as he did not like it, but he enjoyed vegetables and ate these each day. No dietetic advice had been given to the patient between February 1996 and January 1997 during his period of eating difficulties and treatment of oral carcinoma.

Throughout the records of the hospital visits, the patient had been advised to give up both alcohol and smoking with which it was noted the patient always agreed. This seemed to have become an area of conflict with the Cardiologist who made numerous remarks about the patient's lack of ability to comply and put exclamation marks after the patient's records of agreement to comply. No record was made of assistance being given to support such steps. Since having oral surgery the patient had given up alcohol and smoking due to oral pain.

6,3,2,iv; Complications
The patient had numerous complications of uncontrolled DM; gangrene, myocardial infarction, deteriorating vision due to retinopathy, impotence, chronic obstructive airways disease, oral carcinoma, anaemia, dizziness resulting in falls, CVA and recurrent chest and skin infections.

6,3,2,v; Summary
This patient showed the tragedy that can result from poor DM control. Initially he did not recognise a diagnosis by his GP in 1984, possibly because it was not correctly explained or he did not wish to acknowledge it. Nine years later
with no alterations of life style or clinical management he was diagnosed with NIDDM and associated complications. Already complications had developed and the patient made a total of 63 visits to GPs in London and Sandy, 14 attendances to the DM clinic, 15 dietetic appointments, 17 out-patient appointments with various other Consultants as well as 5 admissions to hospital, the cost of which would have been enormous. The average individual cost of consultation with a Consultant for a patient as priced for fundholding purposes was £67, plus costs of any tests, average cost per hospital admission was £3000 for up to 5 days (Practice Manager Sandy Health Centre, 1997). Possibly if the initial diagnosis had been handled better and the patient given more information he may have had a different prognosis.

His alcohol intake was noted to be high, yet no offer of support for alcohol dependency was given. Indeed the lack of ability to comply seemed to be a matter of conflict between the patient and medical staff. The patient smoked 50 cigarettes per day throughout, despite advice to give up, no support to assist the patient in carrying out this recommendation was recorded. Both nicotine and alcohol are addictive and initial support for giving up these may have produced a better outcome for the patient as well as being more cost effective for the NHS. Dietary advice, apart from that regarding alcohol intake, was taken up by the patient and his family on his behalf. However when oral surgery was undertaken no dietetic advice appeared to have been given and the patient's nutritional intake deteriorated. This demonstrated the problems encountered regarding the referral of patients with disorders such as cancer not being given adequate nutritional support. As shown in his case history his blood glucose remained above the normal level of 4-7 m mol/l, and until his amputation (after which he refused to be weighed) he was always obese and weighed 95kg.

6,3,3; PATIENT NUMBER 3

Patient number 3 was a 55 year old woman, who had NIDDM diagnosed in August 1992, at 50 years of age, during a visit to her GP. This visit was made
to discuss her longstanding knee and hip pains which had been attributed to osteoarthritis. Her GP noted that she was obese. A urine sample was tested with Diastix (plastic reagent strips for the detection of glucose in urine) and the presence of glucose noted. This was followed by a random blood glucose measurement which was assessed at 12.9 m mol/l using BM sticks (plastic reagent sticks used to detect blood glucose in the range 1 - 44 m mol/l produced by Bayer Diagnostics) and a Refluxmeter (used to give accurate readings of the reagent strips produced by BM Diagnostics).

She was advised by the GP of the diagnosis of DM and told it could be managed by diet alone. An appointment with the dietitian was arranged. No symptoms of DM had been noted by the patient, nor were any complications of DM found by the GP when he examined her. The patient had been prescribed Hormone Replacement Therapy (Estracombi "patches" containing oestrogen and progesterone for systemic application, produced by Ciba) for post-menopausal symptoms and analgesics for osteoarthritis.

The patient resided with her husband in a council house in a village in Bedfordshire. A note of "husband also DM" had been recorded in her medical records. He was currently unemployed. The patient worked part-time as a clerical officer in Bedford, 12 miles away and expressed financial difficulties due to her husband being unemployed. She also had a demanding mother-in-law, whom her husband did "not get on with" and for whom she did shopping, housework and other duties. The mother-in-law telephoned her several times each day for help. There were 4 notes in the medical records belonging to her GP, of requests for medical information by the DHSS, during periods of extended sickness.

At the dietetic appointment the patient seemed willing to alter her diet and keen to achieve a weight loss, but expressed difficulties she might find in doing this. She also appeared to be somewhat concerned that she would be unable to
make extensive changes to her lifestyle due to her financial and time constraints. She kept all dietetic appointments and at each of them the patient seemed pleasant even if somewhat harassed and brought in bags of shopping that she had just bought. The patient did not smoke or take alcohol regularly.

6,3,3,i; Clinical management

After diagnosis the patient was seen 14 times by her GP between August 1992 and June 1997. Additionally she was seen 5 times by a dietitian. Seven of the appointments with the GP were requested by the patient; on 5 of these occasions for knee and back pain, on one occasion for sore eyes and on one occasion for a urinary infection. The remaining 7 appointments were arranged by the GP to monitor the patient's DM. Additionally on 2 of the occasions when the patient consulted the GP for back pain blood glucose measurements were taken. The practice nurse monitored her DM and weight every year from September 1994. No hospital admissions occurred for DM or any other reasons.

6,3,3,ii; Attendance at the diabetic clinic

A DM clinic appointment was made for her in April 1993, but this was cancelled by the patient. Thereafter she was managed by her GP.

The only attendances the patient was recorded to have made to hospital clinics were to the orthopaedic clinic prior to the diagnosis of DM. At these appointments the Consultant Orthopaedic Surgeon, diagnosed osteoarthritis and recommended weight loss to alleviate back and knee pains.

6,3,3,iii; Body weight and dietary management

At the orthopaedic clinic appointment in February 1992 the patient's weight was noted as 78.5 kg, (12 st 5 lbs), height 5ft 1 inch (BMI 33 kg/m²).

After the initial diagnosis of DM by the GP during a morning appointment the
patient was given a dietetic appointment for the same day. A weekly dietetic clinic was held at the surgery and a cancellation enabled the patient to be offered an immediate appointment.

At the dietetic appointment in August 1992 the patient was found to weigh 85 kg, BMI 38 kg./m². Her normal diet was assessed by the dietitian (as shown in Fig. 6.4) and the importance of weight loss stressed. A discussion of the changes the patient felt able to make was made and agreements included; eating fruit rather than biscuits as snacks, to substitute ice cream and diet yoghurt for puddings. The rest of the diet, as detailed by the patient, did not include foods containing a high fat or high sugar content. Exercise was encouraged by the dietitian. Although the patient was limited on the amount of exercise she could perform due to her back and knee pains she agreed to undertake an exercise programme, which had been advised by the orthopaedic department using a video. An appointment was arranged for a follow up consultation in 4 weeks time. A diet sheet was sent to the patient and also a letter of the agreed dietary changes.

Nutritional analysis of the diet as detailed by the patient showed it provided 1,595 kcal (6,728 kJ) per day. Fat provided 23% of the energy, carbohydrate 55% and protein 22% respectively per day. The analysis showed that all micronutrients provided were in excess of the RNIs but salt was in excess of the recommended 6 g salt per day (Nutrition sub-committee of the BDA, 1992) at 8 g per day. Due to the patient's obesity it was considered by the dietitian that she may have under-estimated her actual intake.

At the follow up appointment the patient was weighed and found to have lost 0.5 kg (weight 84.5 kg). At this appointment she said she had kept to her diet as agreed previously (shown in Fig. 6.5), but felt unable to undertake exercise due to back and knee pains. She complained of stomach pains and also of protein in her urine (but had no method of detecting this and no real reason
DIET FOR PATIENT NUMBER 3 AS NOTED BY THE DIETITIAN IN AUGUST 1992

BREAKFAST: "FRUIT AND FIBRE" AND MILK

MIDMORNING: 2 RICH TEA BISCUITS AND FRUIT JUICE

LUNCH: SOUP- SANDWICH WITH BANANA, LOW FAT FRUIT YOGHURT

DINNER: CHOP, CHICKEN COOKED IN THE OVEN, POTATOES MASHED, OR JACKET, VEGETABLES RANGE OF FRESH ONES, APPLE PIE AND CUSTARD, SPONGE, YOGHURT.

SUPPER: BISCUITS

USES NO SUGAR, NO SWEETS, NO DM PRODUCTS, USES FLORA LITE, SEMI SKIMMED MILK, RARELY ALCOHOL - WEDDINGS AND DANCES.
DIET FOR PATIENT NUMBER 3 AS NOTED BY THE DIETITIAN IN OCTOBER 1992

BREAKFAST; FRUIT AND FIBRE AND MILK

MIDMORNING; FRUIT EG APPLE AND TEA

LUNCH; SOUP- SANDWICH WITH BANANA, DIET YOGHURT

DINNER; CHOP, CHICKEN COOKED IN THE OVEN, POTATOES MASHED, OR JACKET, VEGETABLES RANGE OF FRESH ONES, FRUIT, DIET YOGHURT, LOW SUGAR JELLY, FRUIT SALAD.

SUPPER; ONE DIGESTIVE BISCUIT

USES NO SUGAR, NO SWEETS, NO DM PRODUCTS, USES FLORA LITE, SEMI SKIMMED MILK, RARELY ALCOHOL - WEDDINGS AND DANCES. CHOOSING MORE FRUIT,
for complaining of it), she was advised to seek advice from her GP. Her blood glucose was measured prior to the dietetic consultation by the practice nurse and found to be 9.7 m mol/ l.

Nutritional analysis of the diet as detailed in Fig 6,5 by the patient showed it provided 1,190 kcal (5,053 kJ) per day. Fat provided 20% of the energy, carbohydrate 63% and protein 17% respectively per day. The analysis showed that all micronutrients provided were in excess of the RNIs. Only 3.5 g salt per day was provided.

She attended a follow up dietetic appointment in October 1992. At this appointment she seemed much happier and had taken up cake making and sugar craft at a local college which she found enjoyable. Not only did she meet people but also derived a small income from selling decorated cakes. Additionally (and probably an important reason), she said that during the intricate icing of cakes she unplugged the telephone as if she were disturbed it could spoil a design and she had been able to convince her mother-in-law of the need for this and thus obtain some respite from her continual demands.

Her weight was 82.5 kg, a loss of 2 kg. Her diet was assessed by the dietitian and details from this indicated that she had complied with the recommendations previously given. She was congratulated on her weight loss and compliance with diet and encouraged to continue with it. As the patient expected to be busy with Christmas activities and preparing cakes for college assignments, during the festive period she declined to be seen before Christmas. A follow up dietetic appointment was made for the following January.

Prior to the dietetic appointment in January it was noted that she had been seen on 3 occasions by the GP. At the first appointment in December a blood sample had been taken for measurement of HbA1c levels by the practice nurse and sent to Unipath Pathology Laboratories (Stevenage, Hertfordshire) used by
the GP practice. This level was found to be slightly raised at 6.4% (normal range 4.3-5.9%) and was discussed with the patient by the GP at a consultation a week later when she visited him to discuss her back ache. A further random blood glucose measurement in early January was taken by the practice nurse on behalf of the GP, prior to an assessment of the DM, using a BM stick and a Refluxmeter. This was raised at 13.1 m mol/l glucose and the patient was encouraged to adhere to her diet by the GP.

At the dietetic appointment in January 1993, she was found to have regained the weight lost previously and again weighed 85 kg. She attributed this to eating extra items during the Christmas period such as Christmas cakes, puddings and mince pies as well as attending numerous functions where meals were provided. She said that she had resumed her diet again and hoped to soon lose the weight she had gained. Re-assessment of her diet showed that she had resumed her previous habit of taking biscuits as between meal snacks rather than fruit, ate pastry and low fat yoghurts rather than diet yoghurts. She was advised how to alter her diet to achieve a weight loss and improve blood glucose control. A follow up appointment was arranged for February 1993.

This appointment was kept and a weight loss of 2 kg noted (weight 83 kg) and the patient was noted to have kept to her diet. A random blood glucose was found to be 5.3 mmol/l. She was told of the improved results and the relationship with her diet emphasised, and was encouraged to continue to adhere to her diet.

She was then followed up annually by the practice nurse and blood sugar measurements were noted to be 6.7 mmol/l, 7.8 mmol/l and 7.4 mmol/l and weight 86 kg, 85 kg and 87 kg in September 1994, October 1995 and November 1996 respectively.
**6.3.3.4; Complications**

No complications were noted by her GP at the initial appointment in August 1992 and normal blood pressure, normal peripheral pulses, normal vision were noted. No ketones or protein were found in the urine. At a follow up DM screening appointment in January 1993 no complications were noted other than glucose in the urine and a random blood glucose level of 13.1 mmol/l. Cholesterol levels and triglyceride levels were noted to be within normal limits at 4.6 and 0.93 mmol/l litre respectively.

**6.3.3.5; Summary**

This patient was an obese lady with NIDDM for whom continual dietary adherence and weight loss proved extremely difficult to achieve as shown by her weight and blood glucose levels.

Not only did the patient have an incentive to lose weight to achieve control of DM but also to improve her back and knee pains. Although she was given dietetic assistance to lose weight she did not seem to comply with the advice long term as shown by the maintenance of her obesity between 1994 and 1996. This could cause the value of the dietetic advice to be debated. However it is noted that although she had been advised by a consultant orthopaedic surgeon she had not lost weight but had continued to gain it, until dietetic advice from a SRD was given. After this advice she achieved not only weight loss but a diet containing a contribution of 63% energy from carbohydrate, and only 20% energy from fat in line with the recommendation of the Nutrition Sub-Committee of the BDA (1992) for people with DM to take a diet providing a contribution to energy of 50-55% from starchy carbohydrates and less than 35% energy from fat. She also achieved the recommendation of the limitation for sodium of less than 6 g salt per day by taking only 3.5 g per day.

She may well have benefitted from more intensive dietetic group support on a weekly basis rather than the more irregular dietetic appointments.
6,3,4; PATIENT NUMBER 4

Patient number 4 was a 72 year old man who had NIDDM diagnosed in March 1993 during a 6 day stay at Bedford hospital for a prostatectomy. This patient was a retired businessman who lived with his wife in a bungalow in a village in Bedfordshire. His wife was disabled with Parkinson's disease and he did all the shopping and house work. Due to her illness he did not like to leave her for long. He had 2 adult daughters who lived some distance away. He did not smoke or take alcohol other than socially.

After admission to hospital and prior to his operation his urine was routinely tested for glucose and found to contain in excess of 2%. A routine blood glucose measurement using BM sticks (Bayer Diagnostics) showed 27 mmol/l. The diagnosis of DM was explained to him by the house officer and arrangements made for him to be seen by the Consultant Diabetologist. He was seen and examined and declared fit for operation. Treatment was initiated with Glibenclamide (Euglucon a sulphonylurea produced by Roussel) 40 mg per day post-operatively. A diabetic nurse specialist and a dietitian also visited him and provided advice on the management of DM. His weight was 11 stones 12 lbs (75 kg) height 5 ft 7 ins (BMI 26kg./m²). A diet suitable for DM was advised by the dietitian. This was provided by the catering department of the hospital to in-patients.

Due to the diagnosis of DM the operation was delayed for 2 days and the hospital stay extended. A further review by the Consultant Diabetologist was arranged in the DM clinic in late April after his discharge. The operation was successful and at an out patient review the Urologist recorded his "water works were functioning correctly", and no further appointments were required. His GP reviewed his DM after two weeks and found no glycosuria. Prior to the complaint of urinary frequency for which he was referred to the Urologist he rarely consulted his GP and had no other major health problems.
6,3,4,i; Clinical management
After diagnosis and discharge from hospital the patient was seen 3 times by the GP in the initial 2 months and twice by the dietitian and thereafter annually by the practice nurse at a practice DM clinic. The patients control on these occasions remained excellent with blood glucose levels of 6.1, 6.0 and 5.8 mmol/l respectively and no complications noted. The patient was also seen twice by the dietitian at his GP practice. No hospital admissions occurred for DM, but the condition was detected during a hospital stay for elective surgery.

6,3,4,ii; Attendance at the diabetic clinic
One attendance at the DM clinic was made by the patient, after discharge from hospital. The only other attendances made to hospital clinics were to the urology clinic prior to and after the operation for prostatectomy.

6,3,4,iii; Body weight and dietary management
Weight was noted at 11 st 12 lbs, (75 kg) height 5ft 7 inch (BMI 26 kg./m²) during the hospital admission. After the initial diagnosis of DM the patient was advised on a diet for DM by a dietitian. His diet was assessed and he was advised to give up sugar and reduce fatty food and "lose a little weight". A diet sheet was provided. No record of his intake was noted.

After discharge from hospital the patient was seen by the dietitian who attended the GP practice to provide dietetic advice. Due to the patient being late, the clinic appointments were unavoidably disrupted and the patient was seen 20 minutes after his appointment time. He was recorded to have been extremely angry about this and complained to the dietitian. He was also angry about his treatment in hospital, in particular "delays and confusion about timing of operation, tests and length of stay". He said that the condition of DM had not been adequately explained and he felt that both the dietitian and Consultant Diabetologist had emphasised "weight loss" and he did not consider he was overweight. There was also confusion among the nurses about which food was
suitable for him. Having complained at great length about the treatment in hospital the patient then apologised, and admitted that he was extremely worried about the diagnosis of DM. This had caused him great concern both for his own future health and his ability to care for his wife. The dietitian reassured him that it was normal to feel upset at a diagnosis of DM and apologised for any lack of care in hospital and advised him of channels for complaints. It transpired that he was to see the Consultant Diabetologist at the DM clinic in 7 days time, and it was recommended that he seek more information from him.

The patient was weighed and found to have lost 7 lbs (3 kg). and weighed 11 stones 5 lbs (72 kg). His diet was assessed and it was found that he had given up sugar and was avoiding fried foods and pastry.

The patient was seen at the DM clinic at Bedford Hospital. At this appointment the patient's blood glucose was 5.6 mmol/l. A physical examination by the Consultant Diabetologist showed no evidence of complications. He was congratulated on his dietary vigilance, reassured that he was controlling his DM very well and was therefore unlikely to have any long term health problems. His treatment was changed to Glipizide 2.5 mg per day (Minodiab a sulphonylurea produced by Pharmacia). He was discharged from the Diabetic Clinic to the care of his GP. It was also arranged for him to see the diabetic nurse specialist at the DM clinic for further advice and explanation of DM.

At the dietetic appointment in February 1995 the patient had regained 5 lbs weight and was 11 stones 10 lbs (74 kg). The patient attributed this to advice given by the diabetic nurse specialist to take 2 biscuits mid-morning, mid-afternoon and before bedtime, in addition to the extra food which eaten at Christmas.

The dietitian advised on low fat snacks and fruit to be taken. The patient was advised to continue with his diet and to seek a dietetic appointment in a year's
time if required. The patient again apologised for the initial complaints, but said it had been "a relief to be able to discuss his concerns". The patient has not been seen again for a dietetic appointment, nor has he been seen for any other reason. He is due to visit the practice nurse for a review of his DM in December 1997.

6,3,4,iv; Complications
No complications were noted by the Consultant Diabetologist at either the initial examination in hospital or at the DM clinic or by the GP. Normal blood pressure, peripheral pulses, vision and retinal examination were noted on examination of the patient. No ketones or protein were detected in the urine.

6,3,4,v; Summary
This patient's case history showed one of the instances when an in-patient for elective surgery may be diagnosed as having DM. It also demonstrated the concern that such a diagnosis may cause to the patient who is having to cope with surgery and domestic difficulties. Time is needed for full explanations and discussion and this had obviously not been given to this patient. In a busy hospital ward little time may be devoted to explanations and written information; empathising with the patients concerns could be of help as also could a telephone number for the BDA and recommendations to contact the Association if required.

Patients expect that nurses will have some dietetic expertise and are not surprisingly upset when given incorrect diets in hospital. Unfortunately, errors in feeding patients in hospital can be common. Additionally this patient showed the over emphasis that can be put on weight loss. This can be unnecessary and even offensive.

6,3,5; PATIENT NUMBER 5
This patient was a 72 year woman who had been diagnosed as having NIDDM
in December 1992 during a visit to her GP which she had arranged due to her "hip and knee pains". At this visit the GP diagnosed rheumatoid arthritis. The patient's weight of 100 kg was noted, height 5 ft 1 in (BMI 44 kg/m²). Glycosuria was detected by the GP with a Clinistix (a plastic stick produced by Bayer Diagnostics to detect glucose in urine). The patient was told of a diagnosis of a NIDDM and advised to lose weight and to make an appointment to see the dietitian. An appointment for the diabetic clinic was also arranged.

Other than the consultation for hip and knee pain the patient had not seen the GP for 5 years. She had no other major health problems.

The patient lived with her husband in a bungalow in a village in Bedfordshire. Her husband was a retired farm worker, and both were noted to be keen gardeners who grew all their vegetables and flowers. The village had no bus service and they were reliant on friends and neighbours for any transport out of the village. They shopped in the village and milk was delivered by a milk man. At her dietetic appointment the patient said that she was very happy with village life, enjoyed working on her garden and partaking in village activities. She said she did not like travelling far even when friends took her out. The patient did not smoke or take alcohol other than socially.

6,3,5,i; Clinical management

After diagnosis the patient was not recorded to have been seen again by the GP for management of her DM or for any other reason. A follow-up appointment was offered but declined by the patient. There was no record of her demise or moving from the area. The patient was seen for one appointment by the dietitian at the GP practice, but admitted that she only attended the appointment because a neighbour had insisted on bringing her.

6,3,5,ii; Attendance at the diabetic clinic

No hospital admissions occurred for DM or any other reasons, nor did she
attend the DM clinic even though she was given an appointment.

6,3,5,iii; Body weight and dietary management
As mentioned above, body weight was noted as 100 Kg, height 5ft 1 inch (BMI 44 kg./m²) at the initial GP appointment.

The patient was seen within a month by the dietitian who attended the GP practice. She was weighed and her weight was still 100 Kg (BMI 44 kg./m²); her diet was assessed. She was recorded to have already given up sugar and although she realised it would be beneficial for her to lose weight she did not feel she would be able to do so. A dietary history was taken by the dietitian (Figure 6,6) which indicated that the patient took: full cream milk, thickly spread butter and a fried meal in the evening. The patient was advised to reduce her fat intake but declined to do so as she and her husband enjoyed fried food. She stated that her husband "weighed 21 stones" but was happy and active despite this. He was also claimed to like his wife to be plump. She felt that as they were both retired and had no dependants, they should be able to eat as they liked even if it may shorten their life. Further information was offered by the dietitian. The patient declined this and also any further appointments. She was recorded as "not worried about her weight or condition, only about getting back to her husband and garden".

Nutritional analysis of her intake as detailed in Fig 6,6 was undertaken and showed it provided 3,045kcal (12,792 kJ) per day. The contribution of energy from fat was 42.5%, from carbohydrate 42.5% and from protein 15%. The diet provided in excess of the RNIs for all nutrients, 10 g of salt was provided per day.

The patient did not attend the surgery again. She was last seen in August 1996, when she was apparently fit and well but obese at a village WI meeting, at which the dietitian spoke.
Figure 6,6

DIET FOR PATIENT NUMBER 5 AS NOTED BY THE DIETITIAN IN FEBRUARY 1992

BREAKFAST; ALL BRAN AND MILK, 2 SLICES OF BREAD - WHITE OR BROWN WITH BUTTER AND HOME-MADE MARMALADE.

MIDMORNING; 3 DIGESTIVE BISCUITS

LUNCH; SOUP- SANDWICH WITH CHEESE - 2 OR 4 SLICES OF BREAD

MIDAFTERNOON; 3 DIGESTIVE BISCUITS

DINNER; 2 CHOPS - FRIED, CHICKEN ROAST, FRIED FISH IN BREADCRUMBS, FRIED BACON, SAUSAGES AND EGGS, POTATOES MASHED, OR CHIPS, VEGETABLES RANGE OF FRESH ONES, STEWED APPLE OR FRUIT FROM FREEZER OR GARDEN.

SUPPER; BISCUITS AND ORDINARY HORLICKS

USES NO SUGAR, NO SWEETS, NO DM PRODUCTS, USES BUTTER, TAKES AT LEAST A PINT OF HOMOGENISED FULL CREAM MILK PER DAY, RARELY ALCOHOL
6,3,5,iv; Complications
Other than obesity no complications were noted by her GP.

6,3,5,v; Summary
This patient was unusually honest about not wishing to comply with dietary advice. In the circumstances both the dietitian and the GP respected her wishes but other dietitians may feel that the patient should be visited and encouraged to comply or even admitted to hospital for weight loss.

6,3,6; PATIENT NUMBER 6
Patient number 6 was a 55 year old man who was found to have NIDDM in December 1990 at age 49 years, during a visit to the GP complaining of thirst and urinary frequency. At this visit the patient was weighed and found to be 19 stones (121 kg); glucose was detected in his urine (+++). On examination no complications of DM were noted. The patient was advised to lose weight and Metformin (a biguanide oral hypoglycaemic agent produced by Lipha) 850 mg per day was initiated. No referral for dietary advice was made and there was no mention in his records of a diet sheet being provided. The patient did not see his GP again until November 1992 when he consulted him with a recurrence of symptoms. His weight was then 21 stones (133 kg) and glycosuria was present. An immediate referral to the Consultant Diabetologist was made for a private appointment. The patient was admitted to a side-ward (as a private patient) at Bedford Hospital for management of DM.

The hospital records showed that the patient lived in a small town in Bedfordshire. He had been extremely successful in business in Britain and Europe and was very wealthy. He had a hectic business schedule and active social life. One of his businesses was recorded as importing wines and he was noted to be engaged in a great deal of dining out. He was an intelligent man with a dislike of taking medication and "little time for hospitals". He was twice divorced and had no children. He did not smoke but drank alcohol regularly in
variable amounts.

6,3,6,1; Clinical Management

After the initial diagnosis the patient only saw his GP on one occasion when the symptoms of DM had recurred. During the subsequent 2 year period he was managed on oral hypoglycaemic agents. Later he was transferred to soluble insulin. After he lost some weight he was managed on oral hypoglycaemic agents and finally no medication at all.

During the 3 day admission for stabilisation and management of DM, the patient had a full physical examination. He was confirmed to be obese, with a body weight of 21 stones (133 kg), height 5ft 8 ins, hypertensive, with a blood pressure of 180/140 mm Hg, and hyperglycaemic (23 mmol/l glucose). Due to his lifestyle, inability to control his weight and symptoms it was considered by the Consultant Diabetologist that his DM would be more effectively controlled by 2 injections of soluble insulin (Human Actrapid produced by Novo Nordisc) per day. The diabetes nurse specialist advised him on how to give insulin injections, vary the amounts of insulin, the use of blood glucose testing meters and what to do in times of illness and hypoglycaemia. A dietitian also visited him to advise on a suitable diet to fit in with his lifestyle and insulin injections. A follow up appointment in the DM clinic was arranged.

6,3,6,2; Attendance at the diabetic clinic

The patient cancelled the appointment in the DM clinic and the subsequent 2 other appointments that were made for him due to pressure of business. Nor did he attend the dietetic clinic. He obtained supplies of insulin from his GP by repeat prescriptions. A discussion between the GP, Consultant Diabetologist and dietitian occurred and their concerns about his non-attendance were recorded. A letter was sent to the patient saying that his GP would not continue to provide repeat prescriptions of insulin, unless he was reviewed.
The patient was seen in April 1993 in the DM clinic and fully reviewed. His weight was found to be 17 stones 5 lbs (112 kg), a loss of 3 stones 9 lbs (21 kg., BMI 39 kg/m²), blood pressure 130/80 mm Hg (normal) and blood sugar 5.3 m mol glucose per litre. This was considered to be good control and he was congratulated on his weight loss and adherence to an exercise programme of daily swimming. He enquired if he could cease the insulin injections and the consultant diabetologist agreed to this and prescribed Metformin 850 mg per day. The patient had regularly monitored his blood using a glucose-meter and produced records of daily blood glucose levels below 7 m mol/l.

He was asked to see the dietitian for further dietary advice, (but he did not wait to see her), and a further appointment at the DM clinic was arranged. He cancelled this appointment and also a further 2 appointments in the DM clinic. In August 1993 the Consultant Diabetologist wrote to the dietetic department suggesting he may wish to include him in a "Look After Yourself Course" that was proposed for obese people with DM. This course was held for a 2 hour period over 10 weeks and followed a programme of dietary advice, exercise, advice on smoking, alcohol consumption and relaxation prescribed by the Health Education Authority, which aimed to encourage lifestyle changes to reduce the risk of coronary heart disease.

6,3,6,iii; Body weight and dietary management

The patient's weight was noted at 19 (121 kg) stones initially in December 1990 which increased over approximately 2 years to 21 stones (133 kg). After the initial diagnosis of DM by the GP the patient was advised to lose weight but there is no evidence he was given advice on how to achieve this.

While in hospital the patient was visited by a dietitian and his diet assessed. He was not taking added sugar in drinks or on cereal, but his diet was found to be erratic with both a high fat and energy content. Meals were often taken in hotels and restaurants and included a fried breakfast, a three course lunch and
evening meal. He enjoyed large portions of meat and often ate 16 oz steaks. Rather than desserts he chose cheese and biscuits. Although he did not eat snacks on a regular basis, he usually purchased bars of chocolate when he filled his car up with petrol. The patient was advised to reduce the portions of meat and cheese at meals, to avoid chocolate, to choose less fatty dishes and to take more fruit. He seemed willing to comply and a diet sheet was provided. No dietary assessment was noted due to the erratic nature of his eating habits. A follow up appointment was given for him to see a dietitian. He did not keep this appointment nor the one with a dietitian after his visit to the DM clinic.

The first invitation to the "Look After Yourself" course which the dietitian sent elicited no reply from the patient. Therefore a second invitation was sent and a reply was received stating that due to pressure of business he was unable to attend. In the letter he said he had followed the advice given in hospital and had lost 6 stone in weight. He thanked the dietitian for her help and concern. The dietitian informed the Consultant Diabetologist and the GP of this. Neither had received any contact from him and it was then realised by the GP that he had not had any repeat prescriptions for oral hypoglycaemic agents. It was recorded that he managed to contact the patient by telephone and found that the patient felt well, had normal blood glucose levels was continuing with his diet and exercise, and now weighed 14 stones 5 lbs (91 kg). The patient had reduced and then ceased his medication.

6,3,6,iv; Complications
Initially the patient had obesity, hypertension and hyperglycaemia. Once he adhered to a diet and lost weight these symptoms of complications ceased.

6,3,6,v; Summary
This patient clearly demonstrated the vital role of diet and weight loss in the management of NIDDM and how a patient with motivation can control his own disease state. Once his diet and weight was controlled he no longer required...
insulin or oral hypoglycaemic agents. Although the patient did not keep appointments with medical and dietetic staff he adhered to the advice given.

6.4; DISCUSSION

Each patient is unique and the use of case histories in the study of patients with acute strokes by McLaren (1994) provided a fascinating insight into their lives. Similarly this study of case histories demonstrated the great variety of ways in which people with DM were diagnosed, clinically managed and coped with their condition. It also showed the importance of dietary advice and weight control in managing DM. While food intakes as recorded in the medical records were recorded it must be remembered these are for individual days and may not be totally typical of the normal intake. Obtaining such information from medical records took many hours of research and simplification of records into a simple summary form (possibly on a computer) would have been of enormous help in carrying out the research. Additionally although body weights are presented in the text in both imperial and metric measures they varied between either in the medical and dietetic records. It is recommended that weights are stated in both stones and kg in records and to patients.

Patient number 1 was able to work out and adhere to a suitable diet without advice from a dietitian. Others found that dietary advice was helpful and patients 3 and 6 did not lose weight until they had seen a dietitian. However patient number 3 demonstrates the great difficulty that some individuals have in adhering to a diet and losing weight and despite dietetic advice resumed a high energy intake, probably due to finding that health benefits were less motivating than the comforting effect of eating.

Patient 6 was a person able to manage a diet once advice had been given and did not require continual dietetic help to do so. For this patient the question can be posed that if he had received appropriate dietary advice when his DM was first diagnosed, possibly he would have lost rather than gained
weight and may never have required medication. It also raised the question of how many patients are simply given medication rather than dietary advice for management of DM in contravention of the recommendations for management of DM (Diabetes Advisory Group 1993).

Patient 2 was a person with apparent alcohol and nicotine addiction. His inadequacy to cope with this appeared to have been an area of conflict with the very people who should have been offering support as was demonstrated by the remarks of the Consultant. Early sympathetic help may well have promoted a much better outcome both in terms of expense to the NHS and well being of the patient.

Patient 4 demonstrated the need for sensitivity in dealing with patients who are given a diagnosis of DM at the time of surgery. More support may be needed to deal with queries on diet and DM generally, after recovery from surgery rather than before it. Also it showed the confusion of nurses in providing the correct diet and the distress that this caused. There has been much discussion about the inadequacies of hospital food and this patient highlights the importance of the correct diet to a hospital patient.

Finally patient 5 was an elderly lady who did not wish to change her diet or lose weight and was willing to accept the consequences. She made a refreshing change by her honesty about the situation rather than taking up resources of appointments but not complying with advice given. While the researcher and supervisor both agreed with this approach, another advisor strongly disagreed feeling that the patient would eventually suffer complications which would cause admission and expense to the NHS. This case clearly demonstrated the subjectivity that occurs in such situations in making judgments on the management of patients.

The study of the case histories demonstrated the key role of both diabetes
nurse specialists and practice nurses in advising people with DM; this advice included that on food and diet and therefore highlighted the need for suitable training for nurses.

While the recommendations of the BDA (1993) and Diabetes Advisory Group (1993) were for each person with newly diagnosed DM to be seen by a dietitian for advice and thereafter annually for an update, these case studies demonstrated that this may not be necessary for every patient. While all patients would have benefitted from advice after diagnosis an annual follow up was unnecessary. Patients 4, 5 and 6 did not attend such appointments due to other pressures. Such an appointment was unnecessary for patient number 1 who complied with her diet. Patient 2 may have benefitted from group therapy at an earlier stage. Therefore it would seem that both the standards for dietetic follow up recommended by the BDA (1993) and of the Diabetes Advisory Group (1993) were inappropriate and a postal service for dietetic follow up and information may have been more helpful and cost effective. Full studies on the use of a postal dietetic service are recommended to be undertaken.

The study also touched on the impact that a diagnosis of DM had for patients and how they coped with it. If the study were to be repeated then a more patient-focused aspect would be recommended, with a full investigation into how the individual patients felt about the diagnosis of DM. It is recommended that any future studies include this aspect.
CHAPTER 7

FINAL DISCUSSION AND CONCLUSIONS

A summary of the results of this study and proposals for further work

7.1; INTRODUCTION

The dietetic profession is being encouraged to examine the effectiveness of the work it undertakes (British Dietetic Association, 1997). However, dietetics as a profession is often not critically evaluated (Lambert, 1990). Eight years later this is still the case. There are no results of comprehensive studies available in the literature on its effectiveness. Indeed there is only one other study (Hankey et al, 1991) apart from this one on the work load of dietitians. One of the major areas where dietitians are involved in the clinical setting is in providing dietary advice for people (both IDDM and NIDDM) diagnosed with Diabetes Mellitus (DM). But again there is no information in the literature detailing how much time this takes for a dietetic department.

This study has attempted to assess the recommendations for dietary modifications in DM and to examine the contribution of SRDs in providing this advice and the benefit this makes to the management of patients with DM. It did this by examining the scientific literature on dietary advice in DM and the literature on the role of dietitians. A study of the work load of the dietetic department at Bedford Hospital was undertaken, as well as a critical examination of 127 diet sheets produced by dietetic departments in Great Britain for people with DM. A survey of patients attending the diabetic clinic at Bedford Hospital for 4 weeks in 1993, 1994 and 1995 and an examination of the referral patterns to the dietetic department was made. Also a critical examination of the medical records of 100 of the patients attending the diabetic
clinic was made to evaluate any benefits derived by those in receipt of advice from a SRD. Finally, a compilation of case histories of people with DM was made to show a more detailed patient perspective of the dietary management of DM.

7.2; DIETARY ADVICE FOR DM

As was shown in the literature review, the value of dietary modification for people suffering from DM has been recognised for over 4,000 years and today is well recognised. However, there is a distinction between the dietary advice for people with DM and the role of the SRD in providing it. The need for people with DM to exclude added sugar (sucrose) and honey, which is well known today, became established over 200 years ago. Indeed it was the only dietary recommendation which was common to all diet sheets for people with DM provided by SRDs, which were examined in this study.

"Dietary Recommendations for People with Diabetes - An Update for the 1990s" was developed by the Nutrition Sub-Committee of the BDA (1992). These recommendations aimed to abolish the primary symptoms of DM (ie. polyuria, polydipsia and weight loss which are related to hyperglycaemia), to minimise the risks of hypoglycaemia which occurs mainly in IDDM and to minimise the long term macrovascular and microvascular complications which result in the morbidity and shortened lifespan of people with DM. The nutritional recommendations for DM were summarised from the literature and those of the Nutrition Sub-Committee of the BDA (1992) in chapter 1 as :-

* 50-55% of energy should be obtained from dietary carbohydrate and soluble fibres and carbohydrates with a low glycaemic index should be promoted.

* 400g of fruit and vegetables (excluding potatoes) should be included in the diet each day.

* Sugar (sucrose) should be avoided, but 25g of sucrose per day can be taken in baked items.
"Diabetic foods" are not recommended.

Excessive quantities of protein should not be promoted and no more than 12% of dietary energy should be derived from protein.

Total fat should be restricted to provide no more than 35% of dietary energy and no more than 10% of dietary energy should be from saturated fat. Oily fish should be encouraged to be included 2-3 times per week.

The diet should contain no more than 6g of salt per day.

Alcohol should be limited to a maximum of 3 units per day for men and 2 units per day for women. Overweight individuals should not take more than 5 units per week. Alcohol should be taken with food. Low calorie mixer drinks should be used.

A plate model and "food swap list" should be included in dietary advice for those with DM.

As stated, these recommendations were derived from the research literature and the recommendations of the Nutrition Sub-Committee of the BDA (1992). Thus the emphasis of the recommendations appeared to be from a scientific study basis rather than a long term practical implementation such as occurs in the patient situation. This became apparent when examining an analysis of the nutritional content of the diet sheets and also the reported daily intake of individuals with DM. From the recommendations for the inclusion of different foods in the diet sheets it was apparent that many dietitians appeared to be totally unclear of the recommendations or nutritional content of food stuffs. It is recommended that dietitians are encouraged to keep up to date.

7.3; ROLE OF THE STATE REGISTERED DIETITIAN

The role of the SRD is to provide individuals (and their carers) with dietary advice to benefit their medical condition. This role is considered to be extremely important in the management of those with DM and it is recommended that all with a diagnosis of DM are advised by a SRD (BDA, 1992). This role is only of
value if the dietary modifications promoted do actively provide clinical benefits to the person with DM ie. a greater management of the blood glucose levels and also weight loss in the obese. The study of 100 patients did not demonstrate any statistically significant benefit in the control of patients who had seen a dietitian. It was only when individual patient records were examined that such benefits were noted.

Dietary advice is provided by SRDs both by a provision of written information in diet sheets and during patient consultations. Other groups of professionals, primarily GPs, practice nurses and diabetes specialists, were found to provide dietary advice to people with DM, often using information provided by dietitians or by pharmaceutical companies, the BDA or supermarkets.

It was noted that a group of patients with DM never saw a SRD as shown from the survey of patients attending the diabetic clinic at Bedford Hospital. This was either because of their refusal to do so as evidenced by individual patients briefly described in the examination of the records of patients with DM, or the lack of referral by medical staff. It was noted from the records of individual patients that they did not wish to see a SRD and some categorically refused to see one. Research on this aspect of dietitians needs to be urgently undertaken and SRDs need to promote a much more positive image. Some patients as shown in the case histories are quite able to maintain an appropriate diet for themselves and derive little further benefit from advice from a SRD. The study of patients attending the diabetic clinic showed there was no clear pattern of patients with DM who were referred for dietary advice nor of those who would benefit most. Therefore, much more research requires to be performed on which patients would derive benefit from the advice of a SRD and those who would not and also those who are able to be advised by other health professionals such as diabetes nurses, specialists and practice nurses. Other professionals already provide dietary advice to people and it would seem most appropriate for SRDs to research the needs of these groups for dietary
education. Based on these findings it is recommended that SRDs should promote a strategy providing education and updating of materials for these professionals, thus providing a much more cost effective and comprehensive service to those with DM. Over 20 years ago Lee (1977) said "dietitians should put their own house in order", share expertise and evaluate their work and sadly in many instances this still seems to be required.

7.4; STUDY OF DIET SHEETS FOR PEOPLE WITH DM PROVIDED BY DIETETIC DEPARTMENTS IN GREAT BRITAIN.
This study of diet sheets for people with DM showed that diet sheets varied greatly in both presentation and nutritional content. Indeed as already mentioned, the only part on which there was any agreement in the diet sheets was on the avoidance of sugar. Such a lack of consensus in the diet sheets of dietary information for people with DM was reported on earlier by Thomas et al (1974) and 24 years later this is still the situation. This can only have a detrimental effect on patient understanding and confidence with the dietary information. Research on the best methods of presentation of information in a diet sheet need to be addressed. More urgently, an agreement between SRDs on the inclusion of foods permitted and those to be avoided in a diet sheet for people with DM needs to be examined as a priority. In the meantime, dietetic departments could purchase diet sheets from the BDA and thus provide a unifying message. This will require SRDs to acquire funding for such purchases.

7.5; NUTRITIONAL CONTENT OF DIET SHEETS FOR PEOPLE WITH DM.
From the calculations of the suggested menus in the diet sheets for people with DM it was apparent that the instructions were far too vague as regards quantities and types of food for a person to achieve the nutritional recommendations for people with DM (Nutrition Sub-Committee of the BDA, 1992). Indeed far more information needed to be specified in diet sheets as to types and brands of foods generally suitable for inclusion in a DM diet, eg.
types of biscuits, puddings, convenience foods etc. Such information could be produced by a consensus group of dietitians and produce a national diet sheet in much the same way that the Scottish dietitians have done. Additionally information requires to be compiled and provided on food labelling and the "Guide to Food Labelling" already produced by the British Heart Foundation is recommended for the immediate use by people with DM - until SRDs develop and provide information. Also it was clear specific information requires to be produced for such groups as people with diabetes who are vegetarian.

7.6; NUTRITIONAL RECOMMENDATIONS FOR PEOPLE WITH DM
As already stated, the nutritional recommendations for people with DM have been compiled from scientific studies. However, such recommendations may be very difficult for a person to achieve if eating a normal diet such as would be purchased and consumed in Britain today. The analysis of the suggested menus showed that none of the menus achieved the dietary recommendations. Also the analysis of the individuals who have mini-case histories presented also showed that they did not achieve the recommendations. An extensive study is required on the achievability of the nutritional guidelines for people with DM rather than perpetuating ideals which appear to be virtually non-achievable. Of particular concern was the recommendation for salt as using ready made foods such as bread, breakfast cereals and biscuits provided an intake of salt more than twice that recommended. Also there seemed to be a "see-saw" effect regarding the energy content derived from fat and protein. Dietary energy from protein increased as that from fat fell. It appears that far more research on achieving the recommendations for energy from fat and protein needs to be undertaken.

7.7; DIAGNOSIS OF DIFFERENT TYPES OF DM
One of the points that became apparent from the analysis of information derived from the medical records of patients with DM was the difficulty in giving the correct diagnosis for the different types of DM. It was evident that patients...
who were in receipt of insulin had been given a diagnosis of IDDM when they would have been more correctly defined as having insulin requiring DM. The group of patients with insulin requiring DM were found to be a poorly recognised group and one upon which much more research is required. Certainly because of the problem of weight gain that those patients with NIDDM who are managed upon insulin experience, it is an area which merits much more advice to be provided to patients by dietitians on both diet and exercise. It is recommended that an examination of the most effective type of advice that would be helpful to patients is made by dietitians.

7.8; BENEFITS OF DIETARY ADVICE
Apart from individual patients who clearly achieved improved management of their DM with dietary advice and weight loss as shown in the mini-case histories, there was no clear statistical benefit for the group of patients who had seen a SRD versus those who had not. Therefore, in line with the development of a strategy for dietary advice for DM there needs to be more research into which patients benefit from such advice and when and how they should be selected. Indeed while this study examined dietetic advice for those with DM studies on dietetic intervention in other disorders for example rheumatoid arthritis is also recommended.

7.9; CLINICAL BENEFITS OF DIETARY MODIFICATIONS IN DM
Dietary modification is only of value (whether from a SRD or others) to those patients with DM if it actually produces a clinical benefit. From the examination of the literature on diet and DM it appears that there are far too few studies which can be interpreted in the practical situation. For example, despite all the information on the glycaemic indexes of foods there are no studies on simple mixed needs such as people may take at breakfast. For example, there is no research to show whether it is more beneficial on blood glucose levels for the individual with DM to eat wholemeal toast with low fat spread or reduced sugar jam. As mentioned previously the salt level of 6g per day is virtually non
achievable and far more research needs to be undertaken on clinical outcomes of various aspects of salt in a DM diet. Therefore far more practical research to underpin the recommendations needs to be undertaken.

8.0; FINAL CONCLUSIONS
This study concludes that SRDs urgently need to examine their role in respect of the provision of dietary advice to people with DM. It is suggested that a dietary strategy for management of DM by SRDs educating and providing information to other health professionals could be an avenue for examination. There was a great deal of room for improvement in the design and content of diet sheets for people with DM. A consensus among SRDs on the dietary recommendations for people with DM needs to be urgently sought. Much more research needs to be undertaken on the best mode of presentation of information to people with DM and their involvement in answering these questions is encouraged. Additionally, research needs to be performed on the physiological and biochemical effects on various types of diets for those with the various types of DM to underpin any nutritional recommendations. Methods of selecting patients with DM who would benefit best from counselling from a SRD should also be sought, to differentiate from those who would benefit from advice from other health professionals such as practice nurses and those who require intensive advice from wider groups of professionals including counsellors, home economists and diabetes nurse specialists.
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Appendix
Appendix 1. LIST OF ADDRESSES OF ORGANISATIONS REFERRED TO IN THIS THESIS

Bedfordshire Health Authority, Charter House LUTON

British Diabetic Association, 10 Queen Anne St., LONDON

British Dietetic Association, 7th Floor, Elizabeth House, 22, Suffolk St., BIRMINGHAM. B1 1LS

Diabetes and Management Education Group, British Dietetic Association, 7th Floor, Elizabeth House, 22, Suffolk St., BIRMINGHAM. B1 1LS

Forestfield Software Ltd., 6, Forestfield, HORSHAM. W Sussex. RH13 6DZ

British Heart Foundation The Heart Research Charity, Area Organiser 9 Grayling Close, CAMBRIDGE CB4 1NP

Northamptonshire Health Authority, Highfield, Cliftonville Road, NORTHAMPTON NN1 5DN

Ross Products, Abbott House, Norden Road, MAIDENHEAD, Berks SL64XE