AN EDUCATIONAL INVESTIGATION INTO CURRENT NURSING PRACTICE REGARDING DRUGS WHICH HAVE SPECIAL RECOMMENDATIONS IN RELATION TO FOOD

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ABSTRACT

Most drugs administered in hospital are given by mouth. An important part of the nurses’ work is to ensure that the drugs prescribed by the doctor and provided by the pharmacist, are administered to the patient safely and accurately. Safe, therapeutically effective drug administration is dependent on the nurses’ knowledge of medications and a careful monitoring of their effects on his/her patients. This aspect of care requires appropriate decision making and adherence to the UKCC Standards for the Administration of Medicines (1992).

This study is concerned with oral drugs which have special recommendations in relation to food. Previous unpublished pilot studies in this area Carr (1984), Hayden (1990) and Dronfield (1993) have shown that special recommendations which are important to the bioavailability of these drugs, are not always indicated on drug charts nor followed during their administration.

Research questions were developed concerning current practices regarding drug administration, nurses’ knowledge regarding these specific drugs and questions relating to some of the key concepts necessary for optimum nursing behaviour. A representative sample (n=107) was drawn from the population of qualified nurses in an acute NHS Trust.

Triangulation, involving various methodologies was used but the major approach was qualitative. Current practices were explored using an observation study. The administration by nurses of drugs with special recommendations for food was examined as well as the additional instructions needed from doctors and additional information required from pharmacists.
Nurses’ knowledge regarding these specific drugs was examined using a questionnaire survey. Nursing practice itself was investigated using a concept modelling method, Dynamic Concept Analysis (Kontiainen 1991). Five concepts, skill, knowledge, experience, preparation and power were used to create a general information structure from which 107 individual models were created.

The findings showed that from the observation study there was a 50/50 chance of the patients taking these oral drugs accurately. Nursing knowledge was found to be variable across Grades (C to G). The most senior nurses were not always the most knowledgeable. DCA showed that from the nurses who took part in the study, only 23, 21.5% could demonstrate practice which was closest to the optimum model. None were demonstrating optimum practice.

When specific nursing specialities were analysed, oncology nurses were seen to be administering the drugs in the most appropriate way. Nurses working in surgery medicine and orthopaedics were administering drugs safely but not always accurately according to food intake.

In order to improve the situation, educational implications were explored with an urgent recommendation for additional applied pharmacology to be included in pre and post registration curriculums.

Reflection was also explored both as an educational learning activity and as a method for developing creative/experiential practice.
There is an urgent need to review hospital policies and procedures regarding drug rounds. Most wards still use drug trolleys which appear to be a major contributing factor to these findings. Contemporary practice involving risk assessment, standard setting, and the development of clinical research-based guidelines must be implemented in order to prevent the therapeutic effect of these oral drugs being diminished.
ACKNOWLEDGEMENTS

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I also wish to thank the nurses who participated in the study and gave me such beneficial insights into clinical practice.

Many secretarial staff have helped me to produce this volume. I am grateful to all of them but especially so to Gwen Potter who has corrected the later drafts with such enthusiasm and patience.

Finally my thanks to Neil and my father, whose patience and sense of humour encouraged me in the completion of the study.

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<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>i</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>v</td>
</tr>
<tr>
<td>CHAPTER ONE: Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Clinical Perspectives, a review of the literature</td>
<td>3</td>
</tr>
<tr>
<td>CHAPTER TWO: Epistemological Perspectives, a review of the literature</td>
<td>28</td>
</tr>
<tr>
<td>CHAPTER THREE: Five Key Concepts Central to Nursing Practice</td>
<td>56</td>
</tr>
<tr>
<td>CHAPTER FOUR: The Design of the Study and Methods of Data Collection</td>
<td>78</td>
</tr>
<tr>
<td>CHAPTER FIVE: Results and Analysis</td>
<td>104</td>
</tr>
<tr>
<td>CHAPTER SIX: Discussion of the Findings</td>
<td>146</td>
</tr>
<tr>
<td>CHAPTER SEVEN: Educational Implications</td>
<td>199</td>
</tr>
<tr>
<td>CHAPTER EIGHT: Conclusions and Recommendations</td>
<td>214</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xiii</td>
</tr>
<tr>
<td>APPENDICES</td>
<td></td>
</tr>
<tr>
<td>REFERENCES</td>
<td>xv</td>
</tr>
<tr>
<td>PROLOGUE</td>
<td>xviii</td>
</tr>
<tr>
<td>GLOSSARY</td>
<td>v</td>
</tr>
</tbody>
</table>
CHAPTER ONE

1.1 Introduction 1
1.2 Clinical Perspectives, a review of the literature 3
1.3 Bioavailability and pharmaceutical issues 9
1.4 Gastrointestinal absorption 11
1.5 Gastrointestinal mobility 17
1.6 Splanchnic blood flow 18
1.7 Types of interactions between food and drugs 18
1.8 Drugs whose absorption is decreased by food 21
1.9 Drugs whose absorption is delayed by food 22
1.10 Drugs whose absorption is increased by food 23
1.11 Bioavailability and nursing issues 24

CHAPTER TWO

2.1 Epistemological Perspectives, a review of the literature 28
2.2 Truth and its relationship with knowledge 28
2.3 Practical knowledge 29
2.4 Personal knowledge 31
2.5 Practical skills 33
2.6 Research approaches 35
2.7 Quantitative approaches 36
2.8 A critique of quantitative approaches 42
2.9 Qualitative approaches 44
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.10</td>
<td>A critique of qualitative approaches</td>
<td>47</td>
</tr>
<tr>
<td>2.11</td>
<td>The arguments for and against combining approaches</td>
<td>48</td>
</tr>
<tr>
<td>2.12</td>
<td>Research approaches in nursing</td>
<td>50</td>
</tr>
<tr>
<td>2.13</td>
<td>Combining approaches in nursing research</td>
<td>52</td>
</tr>
<tr>
<td>3.1</td>
<td>Five Key Concepts Central to Nursing Practice</td>
<td>56</td>
</tr>
<tr>
<td>3.2</td>
<td>The concept of skill</td>
<td>57</td>
</tr>
<tr>
<td>3.3</td>
<td>The concept of knowledge</td>
<td>61</td>
</tr>
<tr>
<td>3.4</td>
<td>The concept of experience</td>
<td>66</td>
</tr>
<tr>
<td>3.5</td>
<td>The concept of preparation</td>
<td>69</td>
</tr>
<tr>
<td>3.6</td>
<td>The concept of power</td>
<td>72</td>
</tr>
<tr>
<td>3.7</td>
<td>The linkages between concepts</td>
<td>76</td>
</tr>
<tr>
<td>4.1</td>
<td>The Design of the Study and Methods of Data Collection</td>
<td>78</td>
</tr>
<tr>
<td>4.2</td>
<td>The Design of the Study</td>
<td>78</td>
</tr>
<tr>
<td>4.3</td>
<td>The purposes of the study</td>
<td>78</td>
</tr>
<tr>
<td>4.4</td>
<td>Methodological triangulation</td>
<td>80</td>
</tr>
<tr>
<td>4.5</td>
<td>Methods of Data Collection</td>
<td>82</td>
</tr>
<tr>
<td>4.6</td>
<td>Purpose 1</td>
<td>82</td>
</tr>
<tr>
<td>4.7</td>
<td>Purpose 2</td>
<td>87</td>
</tr>
<tr>
<td>4.8</td>
<td>Purpose 3</td>
<td>91</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>4.9</td>
<td>Purpose 4</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td><strong>CHAPTER FIVE</strong></td>
<td>104</td>
</tr>
<tr>
<td>5.1</td>
<td>Results and Analysis</td>
<td>104</td>
</tr>
<tr>
<td>5.2</td>
<td>Total drugs administered</td>
<td>104</td>
</tr>
<tr>
<td>5.3</td>
<td>Purpose 1</td>
<td>107</td>
</tr>
<tr>
<td>5.4</td>
<td>Results from the observation study</td>
<td>108</td>
</tr>
<tr>
<td>5.5</td>
<td>Total drugs administered</td>
<td>112</td>
</tr>
<tr>
<td>5.6</td>
<td>Purpose 2</td>
<td>113</td>
</tr>
<tr>
<td>5.7</td>
<td>Results from the pilot study</td>
<td>113</td>
</tr>
<tr>
<td>5.8</td>
<td>Results from the main study</td>
<td>113</td>
</tr>
<tr>
<td>5.9</td>
<td>Purpose 3</td>
<td>130</td>
</tr>
<tr>
<td>5.10</td>
<td>Results from the conceptual model development</td>
<td>130</td>
</tr>
<tr>
<td>5.11</td>
<td>Results from the descriptive study</td>
<td>141</td>
</tr>
<tr>
<td></td>
<td><strong>CHAPTER SIX</strong></td>
<td>146</td>
</tr>
<tr>
<td>6.1</td>
<td>Discussion of the Findings</td>
<td>146</td>
</tr>
<tr>
<td>6.2</td>
<td>Purpose 1</td>
<td>146</td>
</tr>
<tr>
<td>6.3</td>
<td>Antibiotics</td>
<td>148</td>
</tr>
<tr>
<td>6.4</td>
<td>NSAIDS</td>
<td>150</td>
</tr>
<tr>
<td>6.5</td>
<td>Corticosteroids</td>
<td>150</td>
</tr>
<tr>
<td>6.6</td>
<td>Comparisons between wards</td>
<td>151</td>
</tr>
<tr>
<td>6.7</td>
<td>Special concerns arising from Purpose 1</td>
<td>155</td>
</tr>
</tbody>
</table>
6.8 Purpose 2

6.9 “It is important that oral drugs and mealtimes should coincide because . . .”

6.10 “If a patient needs an oral drug which has special recommendations for food and no meal is available I would . . .”

6.11 “Some oral drugs should be given before meals because . . .”

6.12 “Three common examples of these drugs which should be given before meals are . . .”

6.13 “Some oral drugs should be given with meals because . . .”

6.14 “Three common examples of these drugs which should be given with meals are . . .”

6.15 Special concerns arising from Purpose 2

6.16 Purpose 3

6.17 Patterns of nursing practice for surgical nurses (n = 33)

6.18 Patterns of nursing practice for orthopaedic nurses (n = 12)

6.19 Patterns of nursing practice for medical nurses (n = 27)

6.20 Patterns of nursing practice for oncology nurses (n = 18)

6.21 Supplementary data from individual concepts

6.22 Conclusions from triangulation

6.23 Mitchell’s four principles

6.24 The limitations of the observation study

6.25 The limitations of the main study

CHAPTER SEVEN

7.1 Educational Implications
7.2 Reflective learning and nursing
7.3 Critical analysis of reflection
7.4 Using reflection as a learning process
7.5 Educational proposals made during the interviews

CHAPTER EIGHT

8.1 Conclusions and Recommendations
8.2 Restatement of the problem
8.3 Current practice
8.4 Nurses knowledge
8.5 Patterns of nursing practice derived from DCA
8.6 What has been achieved
8.7 Future work
8.8 A summary of recommendations for future work
8.9 Concluding remarks
<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1:</td>
<td>Drug interactions with Food</td>
<td>19</td>
</tr>
<tr>
<td>Figure 2:</td>
<td>Design of the Study</td>
<td>79</td>
</tr>
<tr>
<td>Figure 3:</td>
<td>Concepts and attributes</td>
<td>94</td>
</tr>
<tr>
<td>Figure 4:</td>
<td>Information structure for professional practice relating to drug administration</td>
<td>98</td>
</tr>
<tr>
<td>Figure 5:</td>
<td>Percentage of total drugs administered with and without recommendations regarding food</td>
<td>105</td>
</tr>
<tr>
<td>Figure 6:</td>
<td>The accuracy of prescription regarding information/instruction for antibiotics and the accuracy of their administration by nurses</td>
<td>108</td>
</tr>
<tr>
<td>Figure 7:</td>
<td>The accuracy of prescription regarding information/instruction for non-steroidal anti-inflammatory drugs and their administration by nurses</td>
<td>109</td>
</tr>
<tr>
<td>Figure 8:</td>
<td>The accuracy of prescription regarding information/instruction for corticosteroids and the accuracy of their administration by nurses</td>
<td>110</td>
</tr>
<tr>
<td>Figure 9:</td>
<td>Comparisons between wards concerning the accuracy of prescription regarding the instructions for drugs and their administration by nurses</td>
<td>111</td>
</tr>
<tr>
<td>Figure 10:</td>
<td>Pattern emerging across grades for nurses’ knowledge regarding drugs and mealtimes</td>
<td>116</td>
</tr>
<tr>
<td>Figure 11:</td>
<td>Pattern emerging across grades for nurses’ accurate knowledge of meal substitution</td>
<td>117</td>
</tr>
<tr>
<td>Figure 12:</td>
<td>Pattern emerging across grades for nurses’ accurate awareness of meal substitution</td>
<td>118</td>
</tr>
<tr>
<td>Figure 13:</td>
<td>Pattern emerging across grades for nurses’ accurate knowledge regarding the administration of drugs before food</td>
<td>121</td>
</tr>
<tr>
<td>Figure 14:</td>
<td>Pattern emerging across grades for nurses’ accurate awareness regarding the administration of drugs before food</td>
<td>122</td>
</tr>
</tbody>
</table>
Figure 15: Pattern emerging across grades for nurses’ accurate knowledge regarding 3 drugs taken before meals

Figure 16: Pattern emerging across grades for nurses’ accurate awareness of 3 drugs taken before meals

Figure 17: Pattern emerging across grades for nurses’ accurate knowledge regarding the administration of drugs with meals

Figure 18: Pattern emerging for nurses’ accurate awareness regarding the administration of drugs with meals

Figure 19: Pattern emerging across grades for nurses’ accurate knowledge regarding 3 drugs taken with meals

Figure 20: Pattern emerging across grades for nurses’ accurate awareness regarding 3 drugs taken with meals

Figure 21: Concept models according to grade

Figure 22: The model for Group 1 attributes, nurses who were closest to demonstrating optimum practice

Figure 23: Identical models, Group 1

Figure 24: The model for Group 2 attributes, nurses who were also demonstrating close to optimum practice

Figure 25: Identical models, Group 2

Figure 26: The model for Group 3 attributes, nurses who were also demonstrating close to optimum practice

Figure 27: Identical models, Group 3

Figure 28: An example of a Group 4 model showing variations within the group 2 attributes

Figure 29: The model for Group 5 which links only two concepts of practice

Figure 30: An example of a Group 6 model where no common representation of practice could be identified

Figure 31: The model for Group 7, nurses who were also the closest to demonstrating optimum practice
Figure 32: The model for optimum practice

Figure 33: Summary of concept models

Figure 34: Patterns of professional practice by Grade

Figure 35: Patterns of professional practice across speciality

Figure 36: Comparisons between specialities for DCA Groups 1 and 7, 2 and 3

Figure 37: Triangulation of methods: A tentative matrix of convergent validity
### LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1:</td>
<td>Nurses' knowledge, Question 4.2.1</td>
<td>114</td>
</tr>
<tr>
<td>Table 2:</td>
<td>Nurses' knowledge, Question 4.2.2</td>
<td>116</td>
</tr>
<tr>
<td>Table 3:</td>
<td>Nurses' knowledge, Question 4.2.3</td>
<td>120</td>
</tr>
<tr>
<td>Table 4:</td>
<td>Nurses' knowledge, Question 4.2.4</td>
<td>123</td>
</tr>
<tr>
<td>Table 5:</td>
<td>Nurses' knowledge, Question 4.2.5</td>
<td>126</td>
</tr>
<tr>
<td>Table 6:</td>
<td>Nurses' knowledge, Question 4.2.6</td>
<td>128</td>
</tr>
</tbody>
</table>
PROLOGUE

The background to this educational investigation derives from the author’s considerable experience as a ‘qualified nurse’ and teacher.

Having been a nurse teacher since 1975, lengthy periods of time have been devoted to issues concerning the relationship between education and practice. The author’s Master of Philosophy Degree is concerned with the assessment of supervised teaching practice and explored the links between education and practice in classroom and ward settings.

Practice, and how this activity is informed by education has for many years been a constant source of interest and investigation.

The author’s current post as Head of School for Post-Registration Degree and Diploma courses, has also informed the development of this thesis. It is evident from the literature that there are inconsistencies between competence, that is, being qualified to undertake certain skills and performance, that is, the day to day delivery to patients of those skills. It was the need to understand how these inconsistencies could be illuminated and rectified which lead the author to develop this study.

The skill chosen for the study, that is, administering oral drugs had been studied previously when inconsistencies between competence and performance had been
demonstrated. The drug round was also considered to be one of the last bastions of
task-centred care and was a procedure which appeared difficult to change.

The educational requirements necessary for nurses to effect such a change was
therefore seen to be an important part of the study.

From this background, which involved teaching pre-registration students, student nurse
teachers and latterly, post-registration students, came a desire to explore more
informally the links between education and clinical practice. It was also recognised
that the research approach and the methods used would have to reflect this
perspective.

A view was taken that the best way of achieving a balance between the educational
concepts to be developed in the study, and those for practice, was to use across-
method triangulation. Part of this powerful methodology would include a concept
modelling approach, Dynamic Concept Analysis (Kontiainen 1991). A glossary of
terms used in relation to DCA follows this Prologue.

The other methods chosen would involved an observation study, to establish what was
happening in practice, and a knowledge test.

It was anticipated that by combining research methods through triangulation, the
emerging descriptions of drug rounds carried out in various acute wards could be
cross-validated. The authenticity of the findings would then be used to suggest ways in which the educational preparation of nurses could be improved.

Patients who are in hospital experiencing acute periods of illness are often in pain, vulnerable and frightened. It is the responsibility of all nurses to be educated to such a level that the care of these patients is not jeopardised at this time. Any cause for concern regarding adequate knowledge, appropriate skills, experience and educational preparation were considered by the author to be worthy of detailed investigation. Another intention was to explore the concept of power, since implementing any relevant changes which arise from increased educational activity rests on the nurses' ability to provide care more effectively and efficiently.

The costs therefore of any inconsistencies between competence and performance should be minimised for both patients, nurses and the Health Service in general. The purpose of this study is to illuminate these inconsistencies and make recommendations for their eradication. Education would then be seen as a bridge which would link the eradication of inconsistencies in practice with optimum care.

By educational means, the gap would be closed, ensuring that qualified nurses are demonstrating consistent optimum practice in their everyday activities with patients and clients.
GLOSSARY

Education

Education in relation to this study is concerned with investigating (through informal methods) the nature of nurses’ knowledge and nurses’ skills. The ways in which education influences the acquisition of knowledge and skill will also be explored.

Concepts used in Dynamic Concept Analysis:

1. **Skill**

   Skill relates to the timing of oral drug administration for drugs which have special recommendations regarding food.

   **Before food**
   
   Drugs should be given: at least 30 minutes before food
   at least 2 hours after food

   **With food**
   
   Drugs should be given: not more than 15 minutes before food
   not more 30 minutes after food

2. **Knowledge**

   Knowledge related to the nurses’ self-rating of their own understanding of drug and food interactions.

3. **Experience**

   Experience related to the period of time that qualified nurses had been in post:
   
   - more than 2 years
- more than 6 months but less than 2 years
- less than 6 months

4. **Preparation**

Preparation related to the nurses’ self-rating of their educational preparation concerning drugs and food interactions.

5. **Power**

Power related to the nurses’ self-rating regarding the power which they had to make the changes to drug administration process.
Chapter One

1.1 Introduction

The three specific classes of drug which will be investigated in this study are antibiotics, for example, ampicillin; steroids, for example, dexamethasone; and non-steroidal anti-inflammatory drugs, for example, indomethacin, (NSAIDS). The reason for this choice is that each class of drug has special recommendations regarding food.

Current research suggests that the relationship between circulating levels and therapeutic efficiency of antimicrobial agents is better understood, certainly better documented than any other therapeutic agent (Welling and Tse 1982). Several factors can interfere with the mechanisms for maintaining therapeutic levels of antibiotics and one of these is the presence of food in the stomach.

The presence of food is however a necessary factor in preventing the well documented effects of steroids and NSAIDS (Martindale 1989). Both drugs can cause gastroduodenal damage to a variable extent although the mechanisms by which this damage occurs is not well understood (Ivey 1991). It is important to minimise the risk of gastrointestinal side effects by administering corticosteroids and NSAIDS with, or just after, meals.

The setting for the study was a local NHS Hospital Trust. The wards involved were medical, oncological, surgical, orthopaedic. It also emerged that some wards contained a mixture of specialities. All these wards have approximately thirty-six beds and twenty members of nursing staff providing a twenty-four hour cover. Of the staff, 60% are qualified and the remaining 40% are nurses in training or health care assistants. Wards are busy, noisy and very
often, stressful environments. It was not the wish of the researcher to add any more pressure than was absolutely necessary in order to undertake and complete the study. Indeed consideration of the reality of practice environments were very influential in the choice of research methods (Mitchell 1986).

The drug round is traditionally undertaken by one qualified nurse who dispenses drugs from a large wheeled cabinet. The cabinet contains regularly prescribed drugs, for example, panadol, as well as those drugs prescribed for named patients, for example ampicillin. The number and timing of drug rounds may vary in different wards but there will always be a minimum of four undertaken at 6.00am, 12.00noon, 6.00pm and 10.00pm. Drug prescription charts are usually kept at the foot of patients beds so that the nurses can read the relevant prescription for every drug they administer. In order for the nurse to be able to check any confusing information regarding the drugs being given, every trolley should carry the current copy of the British National Formulary (Published by the British Medical Association and the Pharmaceutical Society of Great Britain). These Formularies are updated each year.

As well as being busy, noisy and stressful, wards may also be organised so as to take account of reduced staff numbers. This current reduction in staff also puts added pressure on staff to get tasks done quickly. Speed and patient safety should coincide but sometimes this relationship can appear rather fragile. The drug round may be rushed and procedures designed to ensure patient safety may be compromised.

The intention of this study is to explore the clinical and educational issues concerning this intervention.
1.2 Clinical Perspectives, a review of the literature

Most drugs administered in hospital are given by mouth. An important part of the nurses' work is to ensure that the drugs prescribed by the doctor and dispensed by the pharmacist are administered to the patient safely and accurately (Carr, Goodison and Dickerson 1990).

However accurate and detailed the prescribing, however efficient the pharmacy service, there can be no substitute for precise attention to detail when drugs are administered.

"The administration of medicines is an important aspect of the professional practice of persons whose names are on the Council's register. It is not solely a mechanistic task to be performed in strict compliance with the written prescription of a medical practitioner. It requires thought and the exercise of professional judgement which is directed to:

- confirming the correctness of the prescription;
- judging the suitability of administration at the scheduled time of administration;
- reinforcing the positive effect of the treatment;
- enhancing the understanding of patients in respect of their prescribed medication and the avoidance of misuse of these and other medicines; and
- assisting in assessing the efficiency of medicines and the identification of side effects and interactions."

Standards for the Administration of Medicines (UKCC 1992)

In meeting the standards set out in this document, nurses are also abiding by the Council's Code of Professional Conduct.

The relevant section indicates:

"As a registered nurse, midwife or health visitor you are personally accountable for your practice and, in the exercise of your professional accountability, must:

- act always in such a manner as to promote and safeguard the interest and well-being of patients and clients;
- ensure that no action or omission on your part, or within your sphere of responsibility, is detrimental to the interests, conditions or safety of patients and clients;
- maintain and improve your professional knowledge and competence;
- acknowledge any limitations in your knowledge and competence and decline any duties or responsibilities unless able to perform them in a safe and skilled manner."

Code of Professional Conduct (UKCC 1992)
These standards emphasise the fact that nurses must have the appropriate knowledge in order to administer these drugs correctly. Currently, although pharmacology is taught in the curriculum of pre-registration courses for nurses, this input may not be sufficient to consider in detail the timing of drug administration, particularly when the timing relates to drugs which have special recommendations regarding food.

Similarly in most English National Board post registration courses, pharmacology is included. At this level of professional practice, it is much more likely that applied pharmacology will be included in the learning outcomes. It is only recently however that the major specialities of medical and surgical nursing have had such courses available leaving many experienced staff without the benefit of a post registration course. Those nurses who chose to specialise in orthopaedics or oncology have had the appropriate clinical course available for some time. A further trend in clinical areas is that wards now admit patients from various speciality areas so that for example, surgical, medical and ophthalmic patients may be nursed in the same ward. This mixture of patients may have implications since the nurses' knowledge of drugs may not be extensive in each and every speciality (The Scope of Professional Practice, UKCC 1992).

Roles and responsibilities

It is the joint responsibility of the doctor, the nurse and the pharmacist to ensure that a hospitalised patient receives the correct drugs at the correct time.

The doctor

"Full responsibility rests with the physician to state clearly and without ambiguity, the drugs the patient is to be given".

(Downie et al 1995: 396)
The following items of information should be present on a written prescription before administration can take place:

- There should be a separate prescribing date for each individual drug prescribed.
- The approved name of the drug (the name in the British National Formulary) should be written in full, in capital letters.
- The dosage should be written in metric measurements.
- The route of administration should be written.
- The frequency and any other special directions should be written in full, eg, half-hour before meals.
- The prescription should be signed by the prescribing doctor (RCN 1983).

Following the prescribing policy explicitly is essential if errors are to be avoided. Bad handwriting remains the most potential common source of error.

The pharmacist

The pharmacist is responsible for the storage, labelling and distribution of drugs throughout the hospital.

The role of the pharmacist in drug therapy has been described as that of safety net and overseer. Any failure to carry out this role has serious implications for the safety and well-being of the patients (Downie et al 1995).

Errors or omissions in the labelling of drugs may cause difficulty, which may lead to an incorrect dose, or even the wrong dose being administered. In addition, drugs are often supplied to wards with little or no background information as to the actions, uses or dosage of the product. Ward staff may then have to rely on their own limited information sources, especially if a pharmacy-based information service is not available.
The nurse

The nurse is responsible for the safe and accurate administration of drugs to most hospitalised patients. In order to carry out these duties, the nurse must interpret the prescription, select the correct drug and make a record of the administration.

Some important recommendations to avoid errors in drug administration by the nurse are as follows (Downie et al. 1995):

- Do not administer any drug without a doctor’s prescription.
- Check the label to identify a drug. Do not rely on the drug’s colour, shape or location in the drug trolley.
- Check the label against the prescription three times: when obtaining the drug, when preparing the dose and when returning the container to storage or discarding it.
- When checking the drug name, pay particular attention to the spelling since many drugs have similar names. If there are any doubts check with the doctor or pharmacist.
- Administer the drugs as closely as possible to the time specified by the prescription and be especially punctual with drugs that must be maintained in certain blood concentrations for optimum therapeutic effect, for example, antibiotics.

The timing of drug administration in relation to food intake is an important aspect of clinical care. Drug absorption and therefore the therapeutic effect of many drugs may be lessened if attention is not paid by the nurse to specific recommendations which should be provided by the doctor and/or the pharmacist.
Despite developments in the way drugs are given, discussions between nursing and pharmacy staff suggest that the traditional methods of drug administration do not always use nurses' resources to their best advantage. Patients too, should receive their medication in a way which maximises its therapeutic effect. Many drugs need not only to be administered safely, that is using the correct dosage but there may also be additional instructions to be followed. A good example is drugs which have special recommendations regarding food. These specific drugs include some antibiotics, steroids, and non-steroidal anti-inflammatory medicines. Some should be taken before food, others should be taken with food (Karch 1992).

Returning to the issue of drug administration, there are several problems which arise from drugs being dispensed from one large trolley. First it is not an efficient use of time. Many drug rounds can take up to two hours and this may be repeated four or five times per day. The drug trolley is normally taken round the patients' beds from bay one to bay twenty-four. This means that those patients who have their drugs administered early in the round are more likely to comply with any special recommendations. For example, if they need to take oral drugs before a meal arrives on the ward they can do so. If they need to take their drugs after meals, patients in bay one to ten will probably have their meal trays served accordingly. For patients in bays eleven to twenty-four, the ward routines may disadvantage them since their meals may arrive before their drugs and in order not to let hot food get cold, they may be eating when the trolley arrives and any drug which should be taken on an empty stomach may be taken on a full one. Drugs arriving later than food is less of a problem if these drugs are the ones which patients should be taking after meals. A further concern relates to the early morning and late evening drug round when no meal is available. Patients who need to take drugs with food at these times may have to rely on the ingenuity and persistence of the nurses in order to comply with this recommendation (Johnson and Giles 1993).
The second problem with drugs administered from a trolley concerns the number of nurses required to undertake this procedure. Most NHS Trusts have written policies for the care, custody and administration of drugs. Part of this policy is to stipulate how many nurses should be involved in the procedure and currently it is normal practice for one qualified nurse to undertake the drug round. If, however, that nurse also has responsibility for the care of a group of patients, they may be deprived of that care for a considerable period of time whilst the drug round is being completed.

Thirdly the drug round undertaken in the traditional manner can also interrupt the continuity of nursing. This can be illustrated by a very ill patient who has been carefully positioned on their side, only to be lifted up five minutes later to take their drugs. Patients and nurses have often relied on the drug round for symptom control. Patients suffering pain would have to wait for the trolley to arrive at their bedside, and nurses indicated that patients would indeed have to wait for the trolley to present itself rather than dealing with the problem of pain when it arose (Jeanes and Taylor 1992).

Patients sometimes have their own ideas and routines about taking drugs especially if they have been taking them for some time. On the occasions when patients are allowed to self-administer drugs, their timing may not always fit in with ward routines.

The fourth problem is that little time is available for explaining the effects of drugs to new patients and for teaching them about their longer term implications. It appears that because the drug round takes so long anyway, nurses feel that they cannot stop for this sort of conversation at each bedside (Farrow 1992, Furlong 1996).
A similar criticism can be made in terms of the drug round being a learning experience for student nurses. When working in these acute wards, they need to accompany the qualified nurse and gain knowledge and skill in order to understand the therapeutic effects of the prescribed drugs. In many cases, specific drugs will not have been explained within the classroom setting so it is vital that explanations regarding safety, and special recommendations are provided. It would appear that in some cases this explanation and or discussion is not forthcoming since the qualified nurses know that the drug round will take even longer if lengthy explanations are needed for each drug. There is a risk therefore that nurses no longer see the drug round as providing any opportunities for creative or experimental practice. They may also become habitualised to the activity and cease to reflect on its current relevance and appropriateness (Johnson and Giles 1993).

The previous discussion has focused on the nursing implications of drug administration. The next section will concentrate on the pharmacological issues.

1.3 Bioavailability and pharmaceutical issues

"By the time a drug product appears on the market for general use, an enormous amount of time and money has been invested in developing a formulation that will have the optimum stability, appearance, bioavailability, and therapeutic effect. Much of this investment may be wasted if the absorption of a drug is inhibited by the presence of food or other agents in the gastro-intestinal tract at the time of dosing."

(Welling 1977b: 73)

Bioavailability is explained by Routledge (1978) as the rate and extent to which a drug appears in the circulation, and it is dependent upon several factors including the drug itself and the patient to whom the drug is given. The intensity of effect is in most cases directly related to the concentration of drug in the interstitial fluid, which is in turn dependent upon its
concentration in the blood (Marks 1986). Another factor to be considered is that gastric emptying may be effected by the activity of receptors situated in the duodenum and small intestine. Three types of receptors have been proposed. The first responds to osmotic pressure; the second responds to acidic molecules with a pH lower than 5; the third type responds to fats or salts of fatty acids. It appears that the higher the osmolarity of a solute entering the duodenum the lower will be the rate of stomach emptying. The acid and fatty acid receptors similarly slow down the rate of gastric emptying when they are stimulated by entry of low pH or high-fat solutes into the upper small intestine (Welling 1997a).

Bioavailability refers to the relative amount of an administered drug dose which reaches the circulation and the rate at which this occurs. It is influenced by many factors, including the physical properties of the drug, its formulation characteristics and diverse physiological factors notably interactions either with food or other drugs in the gut, first pass metabolism in the liver and gastrointestinal mucosa, splanchnic blood flow, gut motility and the surface area available for absorption (Rogers and Spector 1984).

During preclinical trials, bioavailability is determined after single dose oral administration by comparing serial measurements of the plasma concentration of the drug with those obtained after intravenous administration, for which bioavailability is 100%. Such preliminary bioavailability of new, orally administered drugs is commonly carried out in young healthy individuals under controlled and generally fasting conditions. Such procedures are required for regulatory agencies. In clinical practice however orally administered drugs are rarely given under such ideal conditions. An editorial in the British Medical Journal (1979) has suggested that pharmokinetic studies on new drugs should be carried out under both fasting and non-fasting conditions using standardised test meals, to establish the effects of food on drug
absorption. Guidelines could then be made available to clinical staff who are responsible for prescribing and administering such drugs.

The interaction between drugs and food may have a profound influence on drug absorption as a result of physiological changes in the gastrointestinal tract or of physiochemical interactions between particular food components and drug molecules. Depending on the type and degree of interaction, drug absorption may be reduced, delayed or unaffected. McPherson (1993) defines bioavailability as the fraction of a drug administered that reaches the systemic circulation. Oral bioavailability is affected by the pharmaceutical properties of a drug such as particle size and crystallisation as well as physiological factors influencing absorption or increased by the presence of food. Despite these factors, interactions between drugs and food are often overlooked as a possible cause of treatment failure. In hospitals the timing of drug administration is frequently dictated by drug round schedules which vary in relation to meal times (Petrick 1975).

Food intake exerts a complex influence on the action of drugs and different foods can have both a positive and negative effect on drug efficacy. It is not always possible to predict these effects and further study is needed to provide information specific to different drug and food types (Shah et al 1990, McPherson 1993).

1.4 Gastrointestinal absorption

Most drugs are absorbed from the gut by diffusion, although a few specialised mechanisms do exist. Bates and Gibaldi (1970) describe the mechanism of minimum effective concentration (MEC) that is, how the therapeutic level of drug in the blood is achieved.
The gastrointestinal mucosa is a semipermeable membrane across which are transported various nutrients as well as substances foreign to the body. These compounds are normally absorbed across the membrane into the blood by passive diffusion, pore transport, active transport, facilitated transport or diffusion.

Most lipid soluble drugs are transported across biological membranes by simple diffusion. The drug molecules diffuse from a region of high drug concentration (gastrointestinal fluids) to a region of low drug concentration (blood). Since the drug is distributed into a large volume, when it enters the blood the concentration in the blood will usually be quite low with respect to the fluid in the gastrointestinal lumen. As a result, a fairly large concentration gradient driving force is maintained during the absorption process.

Although most drugs are absorbed from the gastrointestinal tract by passive diffusion, a number of lipid insoluble compounds are absorbed by means of an active transport mechanism. Active transport is a process by which materials can be transported against a concentration gradient; that is, transport occurs from a region of lower concentration to one of higher concentration. This mechanism is specific for the transport of natural substances such as vitamins, sugars and amino acids (Welling 1980). Only drugs that are structurally similar to these compounds will be absorbed in this way. For example, levodopa is absorbed by the active transport system specific for amino acids (Welling 1980).

A few highly fat-soluble drugs such as griseofulvin are absorbed from the gastro-intestinal tract with long-chain fatty acids and cholesterol. The absorption of such drugs will be facilitated if administered with a meal, particularly one with a high fat content.
The rate of gastrointestinal absorption and the overall bioavailability of drugs is affected by numerous factors all of which may be influenced by food. The first to consider is the effect of pH on gastro-intestinal contents. Drugs which are absorbed by passive diffusion only, cross the mucosal membrane if they are in the un-ionised form. The percentage of drugs un-ionised is determined by both the acidity of a drug and its environment. Acidity varies throughout the gastrointestinal tract; at a low pH as occurs in the stomach, acidic drugs will be un-ionised and therefore will be well absorbed. Conversely, basic drugs will be ionised and hence not absorbed. Some drugs for example, benzylpenicillin are chemically unstable at a low pH and so relatively inactive when administered orally. Enteric coating of tablets has been employed as a technique to protect acid-labile compounds from disintegration in the stomach as well as to protect the gastric mucosa from irritant drugs.

The second factor to consider is the surface area available for absorption. The small intestine has a surface area of approximately 200m$^2$ and is the main region for absorption. The absorbing area of the stomach is small in comparison and consequently even when the physio-chemical characteristics of a drug would favour gastric absorption, most absorption is likely to take place in the small intestine.

The third factor is drug dissolution. Generally the rate of absorption is proportional to the rate of drug dissolution. Drug dissolution is mainly affected by pharmacological formulation but, the volume of gastrointestinal content is also important. The concentration of dissolved drug will be greatest if taken on an empty stomach.
The fourth factor is transit time. Absorption requires sufficient contact time between dissolved drugs and mucosal membranes which is determined by the propulsive activity of the stomach and small intestine. Drugs taken with a meal will be emptied from the stomach slowly and therefore reach the intestine later than if they had been taken on an empty stomach. Transit time through the small intestine invariably lasts two to four hours whereas that for the stomach fluctuates significantly after eating (McPherson 1993).

After eating, the pyloric sphincter acts as a sieve, allowing only particles smaller than 7mm to enter the duodenum and this continues until the stomach is empty. In addition strong muscular contractions known as peristalsis occur every two hours throughout the length of the gastrointestinal tract. These contractions are responsible for clearing any undigested material. Food inhibits this mechanism and this can result in large preparations being retained in the stomach for prolonged periods. This effect can be critical in determining the efficacy of drugs. Controlled release formulations should minimise this problem as well as to reduce dose frequency but it is still recognised as a common cause of treatment failure (McPherson 1993).

A number of drug interactions with food have been attributed to gastric emptying time for example, aspirin (Welling 1980). In this study, Welling found that aspirin absorption was both delayed and reduced by food, while circulating levels of salicylate were only slightly reduced. Although the bioavailability of aspirin is reduced by food, it should always be taken on a full stomach that is 250ml milk and a biscuit, to avoid gastric irritation.

Fluid will also affect absorption. A volume of 250mls, in most cases, is enough to make drug absorption more efficient and uniform (Welling 1977a). Greater drug absorption is often achieved by dilution. This relates back to the processes of diffusion described previously.
Differences in absorption rate are important when an immediate effect is required, as with analgesics or hypnotics, but are less important for drugs that are administered over a long period. Here, the concentrations of the drug may remain low. The rate of absorption and sometimes the extent of absorption, is influenced by the pharmaceutical dose form in which the drug is administered. The dose forms in decreasing ability to make the drug available are, solutions, suspensions, oil-in-water emulsions, capsules and tablets, sustained action and delayed action tablets and capsules (De Souich et al 1990).

An aqueous solution taken on an empty stomach will rapidly reach the duodenum and absorption starts almost immediately. Suspension and solutions are generally considered to be less susceptible to the action of food than other dosage forms because of their diffuse nature, greater mobility within the gastrointestinal tract, and the relative ease with which they can diffuse from the stomach into the small intestine. The release of the drug from conventional tablets and hard gelatine capsules follows the disintegration in the stomach and small intestine. The site of disintegration will depend on the characteristics of the dose form, and the amount of fluid taken before food.

In a study by Hayden (1990) an evaluation was undertaken into the effects of frusemide with or without food. The study consisted of eleven subjects living in the community who were on daily frusemide therapy prescribed by their General Practitioner. Frusemide is a potent loop diuretic which is often combined with amiloride. It is commonly used in the treatment of oedema cause by various pathological processes.
Frusemide was administered one hour before food on one study day and with food on the next study day. The author reported that the influence of food on the diuretic effect of frusemide was very variable and that generally food did not appear to cause a significant decrease in the diuretic effect. She did however suggest from her findings that subjects with a decreased renal clearance of frusemide and in particular patients with moderate to severe heart failure could show an enhanced diuresis and natriuresis if frusemide was taken before food.

In the 1970s it was widely accepted that food impaired the absorption of drugs and they were taken on an empty stomach whenever possible (Welling 1977b, 1980, Melander 1978, Toothaker and Welling 1980). A review article reported that in a study of fifty five drugs only four were unaffected by food. Of the remaining fifty one products, drug bioavailability was reduced or delayed in some cases and increased in others.

“'It is intriguing to consider that the most sophisticated formulation may be, and frequently is, entirely wasted if the bio-availability of drug from that product is markedly altered by the presence of food'”

(Welling 1977a: 292).

Some of the drugs to which he was referring included cardiac glycosides, hypotensive agents, anticoagulants and other drugs that have to be titrated to a patient’s condition. Antibacterial drugs, particularly bacteriostatic agents whose effectiveness is dependent on maintenance of a minimum inhibitory concentration (MIC) for susceptible organisms in blood and tissues also came into this sophisticated formulation category.
1.5 Gastrointestinal motility

The factors controlling gastric motility and emptying were reviewed by Welling (1977a).

In the review he cited work by Hunt and Knox (1968) and Bates and Gibaldi (1970). During this period most quantitative studies on gastric and intestinal motility had used liquid or semi-liquid meals. The influence of solid meals on the gastro-intestinal physiology had not been investigated to the same extent.

In studies by Hunt and McDonald (1954) and Hopkins (1966) it has been shown that the presence of food may increase the rate of stomach emptying, probably as a result of the activation of tension receptors in the stomach wall. The predominant effect of food ingestion is that of inhibition of the stomach emptying, due to feedback mechanisms from the osmoreceptors, acid receptors, fat and fatty acid receptors situated in the proximal small intestine (Hunt and Knox 1968). A decrease in gastrointestinal motility will tend to slow the rate of, but not alter, the extent of drug absorption. However, enteric coated tablets are particularly susceptible to food interactions, as the presence of food may cause the intact dosage form to remain in the stomach for several hours after dosing. This may mean that absorption is considerably delayed.

Food reaching the small intestine stimulates intestinal motility and this may increase drug dissolution and also decrease the diffusional path of drug molecules to the intestinal epithelium (Welling 1977a). However, increased gastric motility may also lower absorption efficiency as a result of the increased transit rate of drug through the intestine.
1.6 Splanchnic blood flow

Welling (1977a) describes in great detail the importance of blood flow on the regulation of gastric motility and emptying. Any changes in the rate of splanchnic blood flow, due to food ingestion might therefore be expected to have some influence on the absorption efficiency of food components or any other compound available for absorption.

High protein liquid meals have been shown to increase the rate of estimated splanchnic blood flow (ESBF), while high glucose liquid meals cause a small and transient decrease (Brandt et al., 1955). Passive drug absorption may be affected by an altered ESBF due to an increase or decrease in the transmural concentration gradient. Brandt et al. (1955) found an increased 35% in splanchic blood flow after a protein meal. Increases in splanchic blood flow, typical of those found after a meal, can have a significant effect on the bio-availability of drugs. Such effects could be of considerable clinical interest if they were to occur with drugs having a narrow therapeutic index, for example, some antibiotics.

1.7 Types of interactions between food and drugs

Food can give rise to a variety of possible interactions which might influence drug absorption (Roe 1979, 1982, 1984, Cerrato 1987, Garrabedian-Ruffalo and Ruffalo 1986).

Garrabedian-Ruffalo and Ruffalo (1986) suggests that diet composition and meal patterns can modify drug absorption. Depending on the drug, absorption may be increased, delayed or decreased by simultaneous ingestion of food, by the food itself, by the specific nutrients in the food or by the non-nutrient component of the diet. The following table outlines some specific drugs which may be classified according to their interaction with food.
**Figure 1. Drug interactions with food (Roe 1979)**

<table>
<thead>
<tr>
<th>Drugs with absorption decreased by food in the stomach</th>
<th>Drugs with absorption delayed by food in the stomach</th>
<th>Drugs with absorption increased by food in the stomach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>Piroxicam</td>
<td>Erythromycin</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>Phenytoin</td>
<td>Griseofulvin</td>
</tr>
<tr>
<td>Penicillin V</td>
<td>Amoxicillin</td>
<td>Lithium</td>
</tr>
<tr>
<td></td>
<td>Frusemide</td>
<td>Carbonarnazepine</td>
</tr>
<tr>
<td></td>
<td>Digoxin</td>
<td></td>
</tr>
</tbody>
</table>

The nature of food itself was explored by Bates and Gibaldi (1970). In their review, they referred to the volume of a meal, its temperature, composition, viscosity, and acidity. The patient's body position, their emotional state and the effects of other drugs are also considered.

As the volume of liquid present in the stomach is increased, the rate of gastric emptying normally decreases. With small volumes there is an initial phase when gastric emptying is slow, followed by a more rapid emptying rate. If the volume of fluid initially swallowed is more than 330 ml there is a rapid initial rate of gastric emptying, followed by a progressive decrease (Hunt and Macdonald 1954, Borowitz *et al* 1971).
The temperature of a meal appears to cause changes to gastric emptying. Cold food increases the rate and hot food decreases the rate of emptying (Davenport 1961, cited in Bates and Gibaldi 1970).

The composition of a meal is also thought to significantly effect the rate of gastric emptying. It has been proposed that fat not only inhibits gastric secretion but reduces the rate of gastric emptying. Proteins and starch have also been shown to have an inhibitory effect on gastric emptying (Bachrach 1959, cited in Bates and Gibaldi 1970). As the viscosity of a meal increases, there is a corresponding decrease in the emptying of gastric contents (Levy and Jusko 1965, cited in Bates and Gibaldi 1970).

If the acidity of the duodenal contents is increased by emptying of highly acidic chyme into the upper intestine, the intestinal mucosa becomes irritated. This in turn causes a constriction of the pyloric sphincter and the rate of gastric emptying slows down (Lagerlof et al 1960, cited in Bates and Gibaldi 1970).

The position of the patient may also effect the rate of gastric emptying. If they are lying on their left side this will result in reduced gastric emptying since the natural curvature of the stomach will cause an uphill path leading to the duodenum. If the patient is lying on the right side, however, gastric emptying will be assisted (Lewis and Said 1961, cited in Bates and Gibaldi 1970). Positioning may therefore be an important consideration when evaluating the pharmacological activity of certain drugs. The emotional state of the patient may also effect gastric motility depending on whether the emotion is aggressive or depressive (Wagner 1968, cited in Bates and Gibaldi 1970).
A number of drugs are known to inhibit the rate of gastric emptying although much of this research is based on studies of rats (Varga 1966, cited in Bates and Gibaldi 1970).

Methods of cooking and their effect on drug absorption have also been documented in the literature. Such studies involving charcoal-broiled beef have been written by Pantuck (1976), Conney et al (1976) and Kappas (1978). In the study by Kappas (1978), the influence of a short period of ingestion of charcoal-broiled beef on the metabolism of a theophylline and antipyrine in normal male volunteers was investigated. This dietary regime had been shown previously to decrease bioavailability of orally administered phenacetin by enhancing its effectiveness in the intestine or during its first pass through the liver. Eight normal male volunteers between the ages of twenty-two and thirty-two were studied. Three dietary periods were studied, control diet, charcoal-broiled beef diet, control diet for a second time. Drugs were administered according to the prescribed research regime. The findings showed that charcoal-broiled beef enhances the hepatic metabolism and therefore the absorption of theophylline and antipyrine.

More recently, the general influence of food on various drugs have been published. Greenblatt (1978) the effects of antacids and food; Du Souich et al (1990) the effect of food on diltiazem; Tsutsumi (1992), the influence of food on beta-methyldigoxin and Hilleman (1992), the impact of food on encaïnide.

1.8 Drugs whose absorption is decreased by food

Many drugs show reduced absorption if given after food. Iron absorption is reduced if food has been eaten within the previous two hours. Nausea is more likely though if iron is taken on an empty stomach and for this reason it should be given with food (Trounce 1994).
If the range between therapeutic levels and toxic levels is narrow the timing in relation to food is crucial. McCracken et al (1978) reported 40% decreases in the six hour area under the blood levels versus time curve, for tablets of caphalexin and penicillin V. Delayed absorption of caphalexin from capsules has also been reported by Welling (1977b). Inhibitions of the absorption of tetracyclines, due to milk and dairy products has been reported (Neuvonen et al 1974, Poiger et al 1978). Absorption of erythromycin has been shown to be reduced by 50% by food and by 40% when given with small amounts of fluid (20mls). Contrary to the majority of evidence, Malmborg (1978) reported that giving erythromycin in the presence of food results in faster absorption and higher peak antibiotic levels in the circulation. It may not be sufficient therefore to list in tabular form the drugs which are affected or unaffected by ingested food. Such generalisations might be inappropriate since in most cases the manufacturers instructions are often incomplete and do not specify the nature of the food to be given (Ali 1982).

1.9 Drugs whose absorption is delayed by food

When a drug is taken concurrently with a meal, delayed absorption may occur resulting in lower peak serum levels. Among the drugs affected in this way are amoxicillin, cephalexin digoxin and frusemide. Delayed absorption when a drug is taken with food does not necessarily imply that less drug is totally absorbed. Rather it signifies that the time required for total absorption will be prolonged. Therefore the time it takes a drug to reach peak serum levels is also prolonged which usually results in lower peak serum drug levels. (Toothaker and Welling 1980). The effect of this low drug level on patient care may relate to a prolonged time for wound healing or a prolonged recovery from a urinary tract infection.
1.10 Drugs whose absorption is increased by food

In some drugs, absorption and bioavailability may be enhanced by food intake. Such drugs include griseofulvin, lithium and carbamazepine (Welling 1977b).

"The most likely explanation for the increased bioavailability is a reduction in presystematic clearance due to an increase in hepatic blood flow. The increase in hepatic blood flow increases the presentation of drug to the liver. This results in an increased amount of drug that bypasses the metabolism and enters the systemic circulation, resulting in increased serum concentrations. Although this is a plausible explanation for food-induced increases in drug bioavailability, it is probably not the sole mechanism responsible for this phenomenon."

(Hilleman 1992:836)

From this review of literature, two interesting issues emerge. The first is that many of the studies are inconclusive, for example, Lönnerholm (1989), Du Suich (1992) and Tsutsumi (1992). These authors suggest that more studies need to be undertaken.

The second issue is that there is no uniformity of definition regarding a meal. Some studies do refer to test meals, Welling (1977b), Toothaker & Welling (1980), but others when describing a standard breakfast range from 400 kilocalories (Hillman 1992:883) to 800 kilocalories (Du Suich 1990:139). The contents in terms of fat, protein and carbohydrate also differs from one study to another. The implications from this lack of uniformity are that the results from research studies will always be open to criticism, since no standard meal has been used. The differing amounts of fat, protein and carbohydrate will produce differing results in terms of gastric emptying and absorption.

1.11 Bioavailability and nursing issues

"It is very important for doctors, pharmacists and nurses to be able to predict the risk of drug-food interactions from their knowledge of the drug, the patient’s nutritional status and the timing of the medication in relation to meals. They should also know
what appropriate interventions are required both to reduce the risk of problems and to handle the effect of those drug interactions.”

(Roe 1982: 765).


A number of surveys have shown that problems occur in relation to the methods by which nurses administer drugs. Jeanes and Taylor (1992) found in an evaluation study which was part of a strategy to introduce primary nursing, that the drug round was still seen as a ritualistic, routine task. Because of this approach, many drugs were not given at the correct time. Part of the problem was that two nurses were required to undertake each drug round and the drug round itself was not an efficient use of time. Solutions to these problems were developed through staff discussions, individualised care and educational sessions. The educational sessions related to applied pharmacology and four one-hour lectures were given at weekly intervals to certain nurses who, having reached the required standard could then administer drugs on their own. By this means, extra time and resources become available which could be spent more efficiently with patients.

The new system for drug administration was evaluated regularly and apart from some initial confusion, the nurses and patients pronounced the changes beneficial. Students continued to administer drugs with another nurse although it was found that generally their knowledge of applied pharmacology was poor.
Johnson and Giles (1993) undertook a study to find the ideal drug administration system which would provide patients with a more personalised service. In their view, an ideal system would:

"Fulfil the requirements for safe administration laid down by relevant drug administration policies.

Enable medications to be administered to individual patients in accordance with the pharmaceutical companies’ recommendations and Pharmaceutical Society guidelines.

Make the most effective use of nursing resources."

(Johnson and Giles 1993:42)

Within the hospital where the study was undertaken, five systems of drug administration were being used. One related to a traditional drug round and four were part of a team nursing approach. Comparisons were made and the advantages and disadvantages of each system were analysed. A number of concerns were highlighted regarding the traditional drug round, including lack of staff and time, too many interruptions, and drugs not being given at the correct time in relation to meals. There were fewer problems on those wards where team nursing was practised since drugs were given simultaneously to several patients either because two trolleys were in use or because drugs were stored in locked boxes near the patients’ beds. Using these team nursing systems there were very few drugs which were not given at the correct time.

Another study by Fuller (1995) considered the introduction of individual drug dispensing boxes for ward use. These boxes allowed patients in an elderly care ward to begin a programme of self medication. Each team leader was supplied with a master key in the early stages and so could distribute the drugs as required. This meant that no one had to wait for their drugs and more than one patient could receive their drugs at the same time. Drugs that needed to be taken with food were easily accessible at the right time.
Even earlier, Parker and Whelan (1981) found that in an evaluation survey of prescription charts used on hospital wards, most of the information required by law was not present on the chart. The requirements are that the approved name of the drug should be used and written in full in capital letters; the quantity expressed in metric measurements and the frequency plus other special directions written in full, for example, 30 minutes before food. The order should be signed by the prescribing doctor.

Although directives exist regarding written prescription interpretations can vary, for example local hospital policies for drug administration. Petrick and Kleinmann (1975) in a study of 132 hospitals in New York City were concerned with the administration of oral antibiotics.

Their study was designed to determine:
- The usual drug administration and meal serving time schedules.
- If oral antibiotics recommended to be given on an empty stomach were actually administered with or near meals.
- Who was responsible for establishing drug administration time schedules.

The findings showed that meal serving times were in close proximity to drug administration times. This close proximity created problems for orally administered antibiotics which should be taken on an empty stomach for optimal absorption and therapeutic effect. Meal interference with absorption was shown to be most marked, 64%, with twice a day administration at 10 am and 6 pm. The range of interferences was 35% to 64%. A solution to this problem was to introduce a formal dosage schedule for oral antibiotics only. The
administration times for these drugs was also changed so that they would not coincide with meal times. The local hospital policy was then amended accordingly.

The degree to which inaccurate timing of drugs and food constitutes a drug error is not well documented in the literature. Other manifestations of drug error are reported (Henney 1976, Walters 1992, Arndt 1994, Gladstone 1995, Inkster and Sehati 1995). One study, Martin (1994) makes recommendations for professional updating (delivered through open learning) as a means of reducing drug errors.

Although it has been known for many years that the interval between doses and times of administration are critical variables which modify the action of drugs, few studies have investigated problems of drug administration at ward level. Given the recent emphasis on more individualised approaches to nursing (Watson 1979, Benner 1984, Powell 1989, Kyle 1995, Abdullah 1995) it would be of interest to investigate how far this concept extends to the timing of drug administration.

The literature relating to clinical perspectives has demonstrated from a pharmaceutical point of view that problems concerning sustained therapeutic effect will occur if certain oral drugs are not given at the correct time in relation to food. From a nursing point of view the literature has shown that problems do occur in ensuring that these specific oral drugs are given at the correct time in relation to food.

The following chapter will examine approaches and methods by which clinical nursing practice can be explored.
CHAPTER TWO

2.1 Epistemological Perspectives, a review of the literature

“The overall purpose of research for any profession is to discover the truth of the discipline.”

(Carr 1994:716).

The purpose of this chapter is to examine different approaches and methods by which truth, related to professional practice may be explored and illuminated.

2.2 Truth and its relationship with knowledge

Scheffler (1965) sought to respond to the questions about knowledge as truth propositions when he distinguished between three ways of verifying knowledge: rational-logical, empirical and pragmatic. Rational-logical knowledge is that acquired when a mathematical problem is solved since logical rules have been followed and a conclusion has been reached. Empirical knowledge is that which people gather through their senses. Pragmatic knowledge refers to something which works in practice. In this sense it is a form of scientific knowledge and should underlie a great deal of professional practitioners’ actions (Jarvis 1994).

Habermas (1971) also suggests three forms of knowledge or processes of enquiry; the technical-cognitive, the historical-hermeneutic and the emancipatory. The technical-cognitive refers to practical knowledge. His contribution which is of particular interest here, is to begin to explain why people act in certain ways and why others do not.
Gilbert Ryle raised the issue of practical knowledge in a seminal study in 1949. Later, he distinguished between knowing how and knowing that suggesting that:

"In ordinary life we are much more concerned with people's competencies than with their cognitive repertoires, with the operations rather than with the truth they learn."

(Ryle 1963:28)

Ryle's contention is that knowing how and knowing that are synonymous. Not everyone, however, would agree with this proposal.

"Firstly, the two notions are clearly not equivalent. A person may know how to drive but not be able to drive because, for example, he has a broken leg, or because his car has broken down."

(Scheffler 1965:92)

Smith, (cited in Nyiri, 1988) proposes that although forty years have passed since Gilbert Ryle published his paper, the problem of practical knowledge has still failed to establish itself a secure position as a topic to be dealt with by analytic philosophers.

"Thus even today it can safely be asserted that it is discursive or theoretical knowledge, knowledge linguistically expressed, above all knowledge in the form of propositions, that holds centre stage in analytic treatments of epistemology and cognition."

(Smith cited in Nyiri:1988:i 1)

2.3 Practical knowledge

Questions as to the role and nature of practical knowledge were addressed by the classical Greek philosophers not least by Plato and Aristotle (Hare 1982).
Practice originates in verbs and nouns associated with ‘doing’. Prasso means I do, accomplish, fare and act. The noun praxis means a “doing”. But there is an important distinction between Greek words for actions. Contemplation is in some ways “doing” but it is not practice (Allmark 1995). This distinction is echoed somewhat by Leonardo Da Vinci’s statement that:

“To reflect is noble to realise is servile.”

(McCue 1994:17)

Here, the distinction between “contemplating” and “doing” is very stark and it is obvious that the writer held the ability “to do” in very low regard.

Returning to Greek philosophers, they made distinctions in their verbs for different kinds of activity. Ponos, was the verb for hard labour predominantly done by slaves and about which little is written. Poiesis was the Greek equivalent of our verb “to make”. The importance for all the verbs mentioned so far is that Aristotle believed that each required a different type of knowledge and possessed different criterion for success. Practical knowledge and as a result practical wisdom, was linked by Aristotle through the word happiness or flourishing. Therefore a happy life was one which consisted of praxis and theoria, that is, practice and theory. The word theory used in the Greek context, referred to an enviable life, filled with observation and contemplation: the nearest man could get to divinity.

At the heart of Aristotle’s conception of practical wisdom lies the imperative of taking action. The actions taken by nurses who profess to possess practical wisdom differ from
actions taken by architects and engineers as they are actions taken in the pursuit of human good. Aristotle's notion of practical wisdom views the practical professions such as nursing, as having to bring about a good end for humans in general and for each unique individual (Lauder 1994). In order to achieve this good outcome, practical thinking is required. This practical thinking proceeds by deliberation and terminates in choice. More recent philosophical literature has demonstrated continued attempts to unravel concepts related to practical knowledge.

2.4 Personal knowledge

The work of the Hungarian philosopher Michael Polanyi is centred around the notion that science, far from being a purely rational enterprise of cognition and calculation, involves of necessity a non-formalisable, non-mechanistic human phenomenon which could be called judgement, intuition or using Polanyi's own term, "personal knowledge" (1962, 1969).

This tacit or personal knowledge can be demonstrated by the scientists ability to recognise spontaneously a new pattern arising from a set of results or the ability of a nurse to recognise the pattern of some internal catastrophe that a patient may be experiencing for example, an internal haemorrhage.

This personal dimension Polanyi contends, is not capable of being rendered explicit and codified into rules since the higher forms of human activity are always such that the rules for their performance are not and cannot be fully known to the performer. This implies the
indispensable nature of the relationship between master and pupil and of the process of learning by doing.

Learning by doing can focus the pupils attention away from the activity which first claims his attention. These first claims are often specific and narrow in focus. For example in learning to administer drugs the pupil will be primarily concerned with reading the drug chart accurately and locating the correct medicine. Under the guidance of an experienced, skilled nurse, the pupil will begin to focus on the more global issues regarding the appearance and demeanour of the patient and whether the drug to be given has any additional specific recommendations, for example, to be given before or after food.

Polanyi makes much of the way in which an experienced person will encourage his pupil to use their skills and/or equipment so that their attention is focused constantly on the object or person involved and to a lesser extent the methods by which the outcomes are achieved.

These methods, Polanyi equates to theories, languages and interpretative frameworks. The pupil must learn to “dwell within them” so that far from being abstract objects, they become social formations nurtured and developed by the practice activity within any scientific community. These social formations in turn assist the pupil to see more clearly the relationship between words used in a lecture and the meanings of the words when they are linked to practice. For example the symptoms of heart failure may be outlined in a lecture through the use of theories, language and interpretative frameworks. These concepts then need to be integrated at the patient’s bedside in order for the pupil to practice
seeing more global patterns from which they can diagnose the patients problems and take appropriate action.

“One becomes an expert not simply by absorbing explicit knowledge of the type found in textbooks, but through experience, that is, through repeated trials, ‘failing, succeeding, wasting time and effort, getting to feel the problem, learning when to go by the book and when to break the rules.’ Human experts thereby gradually absorb ‘a repertory of working rules of thumb, or “heuristics”, that, combined with book knowledge, make them expert practitioners’. This practical, heuristic knowledge, as attempts to stimulate it on the machine have shown, is ‘hardest to get at because experts - or anyone else - rarely have the self-awareness to recognise what it is’. So it must be mined out of their heads painstakingly, one jewel at a time.”

(Nyiri 1988:20)

2.5 Practical skills

A useful taxonomy of practical skills has been outlined by the American philosopher Hubert Dreyfus. In “Mind over Machine” (1986), written with Stuart Dreyfus, the authors propose a taxonomy of levels of human skill.

First, there is the skill of the novice who has learned a collection of context-free rules which he then allows to govern his step by step behaviour. The novice is unable to pick out global features of the objects with which he is working and has no sense of the overall task. The second level is that of the advanced beginner who has learned both situational and context free rules so that he is able to recognise global features though he cannot say how he does this. Thirdly there is the level of competence where the beginner having begun to be constrained by too many rules not all of which can be put into practice at once, has succeeded in internalising a network of hierarchical procedures enabling him to bring some strategic order to his rule-following behaviour. Competence therefore implies the ability to
recognise what is important and unify a collection of separate elements within an overall plan.

The fourth level of skill is proficiency which signifies that the practitioner is no longer confined to a fixed number of rule-governed responses. He is now so intimately bound to his environment and to the instruments with which he works that he can spontaneously recognise complete collections of situations as whole entities and choose immediately which skilled behaviours are required to tackle them. The fifth level is that of the expert. These practitioners have acquired a deep situational understanding of their craft to the extent that they have become one with their patients, planes, buildings or piano. The expert does not in normal circumstances, solve problems or follow rules or make decisions. He simply does what normally works and his smooth performance depends upon the absence of planning and conscious reflection. His level of practical knowledge is of the very highest degree. This taxonomy has been used in the nursing literature especially by Patricia Benner (1984).

Skill approached from a different perspective is found in a paper by Barrow (1987). He suggests that the word skill is used far too indiscriminately in the education literature. It is used to describe motor, intellectual and social skills. No distinction is made between the differing level of skill for example, clicking fingers or riding a bicycle, carving wood or solving an equation. Barrow also suggests that:

“The skills of the historian, whatever they are, are of a higher order than the skills of the philatelist.”

(Barrow 1987:189)
In describing his view of the word “skill”, Barrow isolates intellectual skills and argues that these are a different order of activity and cannot simply be taught by practice. He also suggests that the dictionary definition of “skill”, ignoring as it appears to do any reference to understanding, may also be out of date. In this comment, he acknowledges that skill is not just a physical activity but that the activity has a cognitive element as well.

In his concluding paragraphs, a reference is made to the concept of caring. He is critical of a suggestion made in another paper that caring is a skill to be taught. Barrow contends that:

“One does not teach people to care; one cultivates the values, emotions and understanding that enable them to care.”

(Barrow 1987:194)

2.6 Research approaches

In order to explore nursing practice, two major approaches were examined, that of quantitative research and qualitative research. Before deciding which approach or combination of approaches was appropriate to the nature of the study, a review of their advantages and disadvantages was undertaken.

Quantitative and qualitative approaches have been traditionally associated with different paradigms (Haase and Myers 1988). A paradigm is defined as a set of beliefs, values, laws, principles, theories and methodologies, a way of application and instrumentation (Kuhn 1970).
The quantitative approach has been primarily associated with the dominant empirical-analytical paradigm that has laid claim to the term “the scientific method”. The qualitative approach has been primarily a function of specific socio-historical forces whereby the researcher, via distinctly human, as opposed to merely technical activities, creates knowledge rather than discovering or revealing it (Moccia 1988). It is important to consider some of the thinking which underpins the epistemology of these two approaches, that is, what is to be considered acceptable knowledge.

2.7 Quantitative approaches

Quantitative research has been described by the terms “empiricism” Leach (1990) and “positivism” (Duffy 1985). It derives from the scientific method used in the physical sciences. This paradigm adopts the view that there is a body of facts and principles to be discovered and understood, that are independent of any historical or social context. This search for truth seeks principles that are abstract, general and universal (Tinkle and Beaton 1983). The critical assumption of this paradigm is the belief in the existence of an independent autonomous ordering of facts that are not related to history or context. Quantitative methodologies test theory deductively from existing knowledge through developing hypothesised relationships and proposed outcomes for study. It is considered by quantitative researchers that only findings produced by these processes can be added to the current stock of knowledge.

Research is generally conducted in artificial contexts in order to unambiguously infer the existence and direction of causal relations. These causal relations can then be generalised to all individuals with little regard to situation.
The research approach is an objective, formal, systematic process in which numerical data is used to quantify or measure phenomena and produce findings. It describes tests and examines cause and effect relationships (Munhall 1981), using a deductive process of knowledge attainment (Duffy 1985).

Positivism then seeks to verify facts and causal relationships. The true experiment is the classical example of positivism and later, logical positivism. The logical positivists devised two classes of statements: formal propositions based on logic or mathematics and factual propositions which are to be empirically verified (Harris 1979). To reach the goal of general and universal principles, the methodology isolates and reduces variables of human beings to object status. Then, like the contents of a test tube, these variables are observed externally by the researcher to ascertain the effectiveness of experimental variable in producing the outcome. The observations are quantified and analysed to determine statistical probabilities or the certainty of a particular outcome. According to Popper (cited in Harris 1979), hypotheses can only be falsified, not verified.

The success of the true experiment relies firstly on the development of a very specific sampling criteria rooted in the theoretical framework of the theory or statement being tested. The second necessity for success is meeting the assumptions of the statistical tests to be used (Duffy 1985).
The sampling criteria must also be representative of the population from which the sample is drawn. Randomisation is also of great importance in controlling non-spurious relationships, a necessary condition for the true experiment.

The sampling technique of the true experiment must therefore follow a logical process based on statistical probabilities and inferential statistics.

**Validity and reliability**

Validity is a judgement of the extent to which a component of research reflects the theory, concept or variable that the researcher intends (Seaman 1987, Polit and Hungler 1991). A valid instrument measures what it supposed to measure. Some methods of judging validity include content validity, construct validity, internal validity and external validity. A number of extraneous variables can jeopardise the internal validity of a study such as history, maturation, testing, instrument or observer drift. External validity is the ability to generalise from the study sample to the population. External validity is jeopardised by any factor that interferes with the representativeness of the sample for example, selection biases or prior testing. The Hawthorne effect can also be a threat and refers to the unnatural behaviour that results when subjects know that they are being watched. Reliability is the extent to which a specialised procedure, such as measurement, yields consistent observation of the same facts for one occasion to another and from one situation to another (Seaman 1987). Reliability refers to the stability, consistency, equivalence and dependability of an instrument or measurement. If a test is reliable, repeating it will yield the same result. Some concepts of reliability have been developed further to demonstrate the influence of unknown extraneous variables.
Stability has been developed through the use of test-retest reliability studies. The researcher can then compare and analyse repeated measures which have been produced by using the test with a sample of study subjects, on more than one occasion. Consistency is the extent to which all of the subparts of an instrument measure the same characteristic. To determine internal consistency, the items on a test are split into two parts and scored independently. The scores on each part are then used to compute a correlation coefficient. If the instrument is internally consistent the correlation should be high. Equivalence refers to two processes: inter-rater reliability and the extent of agreement between the measurement of two instruments. Inter-rater reliability is estimated by two or more researchers observing and measuring the same study subjects at the same time. Using the formula,

\[
\frac{\text{Number of agreements}}{\text{Total number of agreements + disagreements}}
\]

will indicate the percentage of agreement between the observer's data (Polit and Hungler 1991).

"The essential basis for success was the possibility of repeating the experiments. We can finally agree about their results because we have learned that experiments carried out under precisely the same conditions do actually lead to the same results."


**Ethical issues**

The ethical issues for both quantitative and qualitative research are the same: safety and protection of human rights.

"In research on man, the interest of science and society should never take precedence over considerations related to the well-being of the subject."

(Downie and Calman 1987: 255)
Research must, however proceed from an epistemological basis. The way in which the world is perceived and human action understood will be reflected in the research approach.

For quantitative researchers, their goal is to search out objective, generalisable laws, which can then be applied to a larger population. The most frequently used methodology for this outcome is the experiment. In ethical terms, the experiment is not without problems, particularly in relation to randomisation and informed consent (Wilson-Barnett 1991). The conduct of this type of research, when applied to medicine, is set out in the World Medical Association’s Declaration of Helsinki of 1964 and 1975. The object of the declaration is to maintain professionalism high standards in biomedical research and to set out procedures to ensure that these standards are followed. The declaration also stresses the need for competence by experimenters and for scrutiny of experimental designs by qualified professionals. The consent of subjects should be freely given in the light of full and honest assessment of the risks involved. The welfare and privacy of the research subjects should be maintained at all times (Homan 1991). This code for medical research differs in some respects from those suggested for social researchers (who include sociologists and psychologists) (The British Psychological Society 1993).

Ethical problems which occur in the experimental approach may relate to randomisation. This process enables control and experimental groups to be established and a comparison made between the two. The control group will be treated by a substance or a therapy in the traditional manner. The experimental group will be given a different treatment, thought to be
more beneficial. This division leads to a situation where people may be excluded from a treatment regime which may have had beneficial results.

The essence of the principle of informed consent is that the human subjects of research should be allowed to agree or refuse to participate in the light of comprehensive information concerning the nature and purpose of the research (Homan 1991).

For some quantitative researchers, particularly psychologists and sociologists, this provision of absolute information, they would argue, may jeopardise the conduct of an experiment.

"Inquiries involving human subjects should be based as far as practicable on the freely given consent of the subjects."


Whilst codes may vary between professions, there is a standard formulation of the principle in terms of four elements.

"Informed, assumes:
- That all pertinent aspects of what is to occur and what might occur is disclosed to the subject;
- That the subject should be able to comprehend the information.

Consent, assumes:
- That the subject is competent to make a rational and mature judgement;
- That the agreement to participate should be voluntary, free from coercion and undue influence."

(Bulmer 1980, cited in Homan 1991: 71)
In an experiment, information given to subjects may alter their normal behaviour. It may be that this normal behaviour is the very issue which the researcher needs to study. It has been observed that if the principle of informed consent were strictly applied:

"entire classes of experimental and other investigations could no longer be carried out in a meaningful way".


Observational studies may also contain elements about which the research subjects are unaware. Examples, such as studies undertaken in Mental Hospitals, can be cited where the appropriate Authority gave its consent but individual patients did not. In these situations, the quantitative researcher may be embarking on the use of covert methods (Milgram 1974, Dingwall 1979, cited in Homan 1991).

It is extremely important that the quantitative researcher considers these ethical dilemmas very carefully before finalising their research design.

2.8 A critique of quantitative approaches

Benefits

In summary, the following issues may be considered the benefits of taking a quantitative approach to research.

- Theory is tested deductively from existing knowledge.
- Theories can be verified.
- A structured approach is fixed before the data collection begins.
- General law-like findings arise from the nomothetic approach. These finding will hold irrespective of time or place.
- Large populations can be surveyed.
- Hard, rigorous, valid, reliable and powerful data is generated.
- The subjectivity of the researcher is minimised.

In summary, the following issues may be considered a criticism of taking a quantitative approach to research.

**Criticisms**

"The imposition of a pre-ordained theoretical framework is deleterious because it may excessively constrain the research and also may exhibit a poor fit with the participants' perspectives"

(Bryman 1988: 68).

- There is very little contact with the participants.
- The researcher is outside the situation, looking in.
- Strict randomisation of samples is often not possible.
- No account is taken of the processes which may be acting on the independent and dependent variables.
- Social reality is seen as external to the participants.
- The data is superficial.
- This is a poor method of studying people.
2.9 Qualitative approaches

The aim of qualitative research is to describe certain aspects of phenomenon, with a view to exploring the subject of study (Cormack 1991, Pope and Mays 1995). The methodology itself is also described as phenomenology (Duffy 1985) or, as enriched context by Moccia (1988) and, a reconnaissance (Gans 1962, cited in Bryman 1988). Knaff and Howard (1984) make reference to an approach equated with data gathering techniques which generate narrative as opposed to numerical data. These descriptions reflect the origins of qualitative methods as coming from history, philosophy, anthropology, sociology, psychology (Cormack 1991). This paradigm assumes the world to be in a dynamic state of flux and that truth is found in changing patterns composed of differences as well as similarities (Haase and Myers 1988). The changing patterns can be linked to social science and the place of people and social reality within the discipline of social science.

The qualitative approach has been linked to phenomenology (Schutz 1970), ethnomethodology (Garfinkel 1967) and symbolic interactionism (Mead 1934). The most fundamental characteristic of qualitative research is its express commitment to viewing events, actions, norms, values, etc, from the perspective of the people who are being studied (Bryman 1988). This relates to “seeing reality as others see it”. In order to gain the correct vantage point from which to make these observations and penetrate these frames of meaning, it is necessary to have access to sustained periods of involvement. The research is generally conducted within a natural setting, for example, a classroom, a ward, a factory. This contextualism is almost inseparable from another important qualitative theme, holism (Bryman 1988). Holism entails an undertaking to examine social entities as wholes to be explicated and understood in their entirety.
Because of the in depth nature of these studies and the analysis required, it is usual to consider a small selective sample. Within this sample, as the researcher and the subjects spend more time together, the data is more likely to be honest and valid. The qualitative approach includes methods such as grounded theory and ethnographic research (Denzin 1979). The strength of the methodology employed lies in the fact that it has an holistic focus allowing for flexibility and attainment of a deeper, more valid, understanding of the subject than could be achieved through a more rigid approach (Duffy 1985). It also allows issues to be raised by the subjects themselves, which may not have occurred to the researcher. This so-called “soft” data provides a rich, illuminating model of the subject with many facets available for conjecture and development.

Validity and reliability

Qualitative research is based on a set of assumptions about the study of social reality (Bryman 1988, Lincoln and Denzin 1994). These assumptions guide the qualitative researcher in establishing how knowledge can be legitimately produced and interpreted. This commitment to explaining the nature of social reality through “another person’s eyes” raises issues concerning validity and reliability. Qualitative researchers are required to demonstrate that their interpretations of other people’s experience is valid, that is unbiased by factors other than those which the researcher is observing. This issue of unbiased interpretation has been the subject of much debate which in turn has lead to concerns regarding the reliability of qualitative findings (Pope and Denicolo 1986, Gilbert 1993, Clarke 1995). Qualitative work must be both credible and creditable, that is, it must have authenticity.
The reliability of qualitative research needs to be demonstrated by similar findings being evident following similar studies. In other words, the same results should be achieved regardless of who is undertaking the measurement. Reliability may be more difficult to demonstrate in single case study research but strategies such “respondent validation” or “multiple case study” approaches may be appropriate for some investigations (Bryman 1988). Another process involving an understanding of the rules in a natural setting allows a test of congruence or verifiability to be applied to the data (Fielding (1981) cited in Gilbert 1993).

Ethical issues

The goal of qualitative researchers is to seek out descriptions of complex phenomenon. Earlier mention has been made of the major ethical concerns regarding safety and the protection of human rights. In paradigm two research, the ethical issues are different from those suggested for paradigm one (McDermott and Pyett 1993, Lincoln and Denzin 1994).

The exact nature of the research may not be fully developed when the subjects are being involved. By using the inductive process, theoretical concepts may not be identified until the study is well under way. As a consequence, it may not be possible to fully inform the subjects of exactly what the researcher is doing. How the subjects, therefore, are able to give their informed consent can be an issue of some concern. An important example of this dilemma relates to interviewing. Interviews are often used in phenomenology (Smith 1992, and Barriball 1994). These encounters, seemingly straightforward, can be fraught with ethical difficulties. For example, the interpretation of interview data is never wholly objective, despite efforts to make it so. The context in which the interviews take place can exert an influence on
the data collected. This dilemma is described in detail by Smith (1992) in her study of women who had problems with drinking excess alcohol.

The nature of the sample, that is, whether the subjects are volunteers or conscripts, can create ethical difficulties. As research time is always at a premium, there is a danger that researchers will become more coercive if arrangements for interviews are changed.

Familiarity with the research setting has also been explored from an ethical perspective. The advantages and disadvantages of having subjective knowledge of the setting are explored as well as having an understanding of the cultural norms and values of the health care professionals involved (Hanson 1994).

2.10 A critique of qualitative approaches

Benefits

In summary, the following issues may be considered the benefits of taking a qualitative approach to research.

- Rich, deep, penetrating data provides detailed descriptions of the phenomenon being studied.
- The descriptions can then be analysed to develop themes and meanings.
- The researcher is inside the situation, looking out.
- Uncertainty and a certain measure of luck can be incorporated.
The idiographic approach locates its findings in specific time periods and localities.

The subjectivity of the research is maximised.

Criticisms

In summary, the following issues may be considered as criticism of taking a qualitative approach to research.

- The claim of the researcher to be able to see through the eyes of another and interpret their view may be an unrealistic claim.

- There may be little relationship between theory and the emergent research.

- Data derived from case studies cannot be generalised to a larger population.

- An unstructured approach may result in copious, overwhelming data.

- Soft, invalid, unreliable, non-rigorous, powerless data is generated, which is often small, non-random and not representative of the population.

2.11 The arguments for and against combining approaches

Having explored the nature and purpose of both research approaches, the author will examine the literature which suggests that combining the approaches is on the one hand impossible and, on the other, possible. Authors who argue against combining the approaches make the point that this issue relates to more than a simple wish to combine processes of data collection.

"Quantitative or qualitative methods are more than just differences between research strategies and data collection procedures. These approaches represent fundamentally different epistemological frameworks for conceptualising the nature of knowing, social reality and procedures for comprehending these phenomena."

(Filstead 1979, cited in Cook and Reichardt 1979: 45)
“When we speak of “quantitative or qualitative” methodologies, we are in the final analysis speaking of an interrelated set of assumptions about the social world which are philosophical, ideological and epistemological. They encompass more than simply data gathering techniques.”

(Rist 1977, cited in Bryman 1992:50)

Both Filstead and Rist make reference in their writings to paradigms (Kuhn 1970). The use of this word underlines the fact that from their position, the epistemologies of quantitative and qualitative research are different and divergent and cannot be used together. Guba (1988) also argues vehemently against the idea that the two approaches can be reconciled. In his view, attempts to combine the two fail to recognise the distinction between a paradigm and a method. He argues that the idea of dovetailing rests on the idea that the two approaches represent only methods of investigation. In fact, researchers must respond to an “either, or” situation and pledge their allegiance accordingly. In this way, Guba is supportive of Kuhn’s (1962) position.

Views which oppose the divergent nature of the approaches are often described in “technical” rather than “epistemological” terms. For example, qualitative approaches are often decided upon, based on the nature of the research question and its technical requirements, rather than decisions relating to epistemology.

“As with all social research, the methods adopted in this enquiry were largely dictated by the nature of the research problem. We set out to study the dynamics of small-scale capital accumulation and the social processes which account for the reproduction of the entrepreneurial middle class. Consequently, we undertook an intensive study using semi-structured interviews which were to a considerable extent, shaped by the personal experiences of the respondents.”

It would appear that there is less difficulty for a qualitative researcher to justify the combination of both approaches than for a quantitative researcher to justify and incorporate both strategies. An example of combined approaches can be found in the mainly ethnographical study of a school undertaken by Woods in 1979. He combined ethnography with a survey of parental attitudes.

2.12 Research approaches in nursing

Quantitative

Questions about the adequacy or appropriateness of the scientific method as a means of inquiry into nursing have been among the most common themes in the nursing literature over the last two decades. In theory, nurse researchers have always had the opportunity to choose from among several research methods, although the dominant ideology of logical positivism had obscured such possibilities until the discussion involving different approaches emerged in the late 1970s.

"The scientific method is the most prevalent, encouraged and rewarded model used in nursing research for understanding man's place in the world".

(Munhall 1981: 176)

She went on to suggest that this is the case because nurse research is dominated by the investigation of nursing problems through the use of paradigm one. The paradigm structures the questions to be asked while simultaneously excluding the questions which cannot be asked within the concepts which the paradigm displays.
Given that paradigm one was to be the foundation on which nursing knowledge might be erected, Munhall expressed concern that the values and beliefs contained within paradigm one should be congruent with the values and beliefs of nursing. She used the following question as the title of an academic essay which explores these issue further.

"Nursing philosophy and Nursing research: in apposition or opposition?"

(Munhall 1981:176)

Several authors have pursued this question (Tinkle and Beaton 1983, Duffy 1985, Bargagliotti and Trygstad 1987, Bockman 1987, Morse 1991). They argue that because of the holistic nature of nursing, with its strong emphasis on the personal, social and moral context of care, the exclusive use of quantitative research approaches to generate nursing knowledge can never provide comprehensive explanations.

Qualitative

In the past ten years there has been a noticeable increase in the number of published nursing studies which employ the use of qualitative techniques. Almost all of this work supports the notion that behaviour can only be understood in the context where it occurs (Clarke 1995). Primarily this approach is inductive although emerging hypotheses are deductively tested so as to arrive at ‘an optimal fit’ between the collected data and subsequent theory (Field and Morse 1985).

Nursing is a profession considered by many to be humanistic and based on a philosophy of individuality and freewill (Munhall 1981). From this premise it can be argued that the application of rigid, predetermined, and objective research methods will not yield the sort of data needed to illuminate such a philosophy.
2.13 Combining approaches in nursing research

As a result of the current debate concerning differing research approaches, the discussion has shifted from the merits of one approach over another to whether the acknowledged approaches, that is, paradigm one and two can be used in combination. As in the more general sociological debate mentioned earlier, there is a spread of opinion within nursing.

Several authors (Powers 1987, Haase and Myers 1988, Moccia 1988, Corner 1991, Kim 1993a, Carr 1994), have explored similar issues raised earlier in this chapter. They have explored the relationship between paradigm one, paradigm two and the nature of nursing knowledge.

Their analysis of the issues have concentrated on the epistemological nature of positivism and phenomenology and they have sought to examine which approach is best for nursing.

Although acknowledging that paradigm one with all its particular epistemological positions cannot be used exclusively to generate nursing knowledge, they express caution in abandoning all reference to paradigms for either approach.

Powers advocates that methodological strategies should always be guided by a larger theoretical framework. She also urges caution in the interpretation of a study containing more than one paradigm:

"Research, at any given phase, is guided by a particular mind set, which is the function of the paradigm. There is no problem with subordinating certain techniques to others in performing research in either the quantitative or the qualitative tradition. There is a big problem when a study is labelled qualitative or quantitative on the basis of the data management techniques used, instead of on the basis of its purpose and paradigmatic connections. In single studies that use qualitative or quantitative data sets, the
paramount concern must be with stating or uncovering the dominant paradigm that guides the research.”

(Powers 1987:126)

This view can be contrasted with the following statement:

“A linkage between paradigm and method is neither an inherent nor necessarily consistent requirement. Trying rigidly to link paradigm with method will inevitably lead to research that is conducted inappropriately and which, therefore, will produce findings which lack credibility”.

(Cook and Reichardt 1979, cited in Goodwin and Goodwin 1984:379)

In between the opposing views of Goodwin and Goodwin (1984) and Powers (1987), other authors are continuing the debate by addressing the issue of triangulation as a rationale for combining quantitative and qualitative approaches (Mitchell 1986, Duffy 1987, Corner 1991, Morse 1991, Cowman 1993, Hanson 1994, Taylor 1993). Triangulation is a term originally used to describe the navigation and military strategy of taking multiple reference points to locate an unknown position accurately. The idea of triangulation was first applied to research methodology by Campbell and Fiske in 1959. They referred to it as multiple operationism or the multimethod/multirait method and used it to promote convergent validation. Denzin (1970) defined triangulation as the combination of multiple methods in a study of the same object or event to depict more accurately the phenomenon being investigated. The purpose of multiple methods in a study design is to overcome the deficiencies and biases that stem from any single method. This ability gives triangulation considerable power.

There are several types of triangulation: For example, data, investigator, theoretical and methodological. When two or more different examples of a particular type of triangulation are
present within a single study, the study is triangulated. When more than one type of triangulation is represented in a study, this more complex form is called multiple triangulation.

It is acknowledged by Cowman (1993) and Dootson (1995) that the literature exploring the merits of triangulation is incomplete. Mitchell (1986) also reports that guidelines for triangulation, particularly in relation to data analysis are lacking. She goes on, however, to suggest that multiple triangulation offers flexibility and an in-depth approach that is not always available with more simple designs, so long as four principles are adhered to:

“1. The research question must be clearly focused.
2. The strengths and weaknesses of each chosen method must complement each other.
3. The methods should be selected according to their relevance to the nature of the phenomenon being studied, and
4. Continual evaluation of the approach should be undertaken during the study.”

(Mitchell 1986:22)

This issue of analysing qualitative data in triangulation studies is also described by other scholars.

“While there are numerous textbooks on the methodology of both quantitative and qualitative research designs, they focus chiefly on data collection rather than data analysis”.

(Fielding and Fielding 1986:9)

They go on to suggest that the literature on the inter-relation of data derived from quantitative and qualitative methods is seldom explicitly about analytical procedures. Most authors advocating the use of triangulation make little mention of epistemological considerations or paradigms except to say that consideration of these two notions often restricts the development of nursing knowledge. An exception to this can be found in Capra 1986 (cited in
Haase and Myers 1988) who in stating the need for elements of more than one paradigm argued that, in research, integration rather than a shift in paradigms, is possible.

Triangulation then is advocated by nurse researchers since they suggest that neither positivism nor phenomenology on their own can provide an understanding of human beings and their health-related needs. The polarisation, which has arisen, is based on the disparate nature of the principles constituting the two paradigms and has created a separatist versus a combinationist debate (Cowman 1993). The common goal of both approaches is to gain understanding, although the emphasis is different in each. The empiricist-analytical paradigm emphasises confirmation of theory by explaining. The human science paradigm emphasises discovery of meaning by describing. Thus, the common goal of understanding becomes the orienting factor in reconciling the assumptions that underlie quantitative and qualitative approaches (Haase and Myers 1988).

This Chapter has explored approaches and methods by which nursing practice can be explored. A decision to use triangulation has been made and a description of the study design based on this methodology can be seen in Chapter Four. Chapter Four also contains a detailed explanation of Dynamic Concept Analysis (DCA) (Kontiainen 1991) which is one of the methods to be included in the triangulation process. In order to implement DCA key concepts have to be identified which will illuminate nursing behaviour through the development of conceptual models.

The following Chapter will explore the key concepts which have been chosen and the rationale for their inclusion will be provided.
3.1 Five Key Concepts Central To Nursing Practice

Illuminating what nurses do

Following an examination of the approaches and methods by which clinical practice can be explored, the author wishes to describe five key concepts. The five concepts are skill, knowledge, experience, preparation and power. These are of course not a complete set of variables which might be suggested could make up the totality of what professional nurses do. They are rather a subjective choice based on the author’s involvement in nursing, nurse teaching and educational management. This involvement, spanning several decades has allowed the author a considerable amount of experience regarding nursing practice and its link with nursing education. This experience has been very influential in the choice of concepts but other variables such as standard setting, decision-making, reflection, motivation, do of course, contribute to nursing behaviour. The use of reflection, as one of the five concepts was considered at an early stage in the study design. After considerable thought it was decided that the activity of reflection was very much part of DCA and would therefore be informing the study from a different perspective. In Chapter Seven reflection is also explored as a learning activity where the findings from the study will be linked with educational implications.

The justification for the use of the five concepts can firstly be supported from contemporary nursing literature and research. Of the chosen concepts however, power does not as yet have a large body of nursing data from which to draw. It is evident, as the appropriate section will
show, that this concept is of vital importance to effective nursing practice and that more studies concerned with power must be undertaken.

Personal conversations with clinical experts and nurse teachers also verified that the choice of concepts was appropriate. The five key concepts will now be explored in more detail. Further linkages between them will be discussed at the end of the Chapter.

3.2 The concept of skill

In terms of skill, there has been a recent revisiting of this notion in the literature, Bjork (1995), Waterworth (1995), and Butterworth and Bishop (1995).

It is Bjork’s contention that the patient’s body has moved out of focus in nursing. She revisits the research on the patient’s perceptions of good nursing and their view that competence is paramount and asks how nursing as a practical discipline can continue to ignore these results, putting all their efforts seemingly into emotional and interpersonal competence.

Patients’ views of the most important nursing caring behaviours have been consistent in the research undertaken since the 1950s. This is a good reason for the nursing profession to acknowledge this conflict and reconsider the importance of practical nursing actions aimed at patient comfort, hygiene and medical treatment.

The increasing lack of preparation for practical aspects of nursing can be seen in part, with the move of nurse education towards Institutes of Higher Education and away from traditional
Schools of Nursing. New curriculums based on Project 2000 principles should be 50% theory and 50% practice. It was also the intention that theory and practice would be closely integrated so as to produce a "knowledgeable doer".

In a practice profession, expertise requires practice. A reduced emphasis on practical nursing during education is a natural effect of discarding the apprenticeship model of education. Research studies are supporting this decline in the number of practice hours taught, (Bjork 1988). In 1995 a Norwegian student nurse will have 1600 study hours in the practice area; in 1963 the hours would have been 5100. As a result, although the students may "know that" they frequently do not "know how".

This concern implies a necessity to consider the general question of how the newly qualified nurses manage to conflict of still needing to learn how to nurse whilst being expected to function at a competent level.

Research in the area of practical skills is very limited and has largely been written from a psychomotor viewpoint often using a laboratory setting rather than the real world (Love et al 1989). There appears to be a lack of interest in and a neglect by researchers of practical aspects of nursing.

In a recent study undertaken by Butterworth and Bishop (1995), key characteristics of optimum practice, made up from seventy-seven sub-item categories were identified from a questionnaire survey. From these eighteen characteristics, three are particularly relevant to this study.
First, nurses and midwives providing optimum practice "can demonstrate expertise". This was defined as: having a broad experience which allows the demonstration of expert practice; having competence, being up to date; being a model of expert practice; and being able to teach advanced practice skills to other nurses.

Secondly, nurses and midwives providing optimum practice "are innovators". This was reported as: having the ability to take on new ideas; being reflexive and reflective and being forward thinking and innovative.

Thirdly these nurses and midwives need to have "political awareness". This is obtained: through knowledge of influential groups and individuals at a local and national level: and by being able to debate and persuade within a multi-disciplinary setting.

The definition of "skill" for the purposes of this study, is defined as "expert knowledge, a craft or accomplishment" (Chambers Twentieth Century Dictionary 1977). It is, however, useful to consider the other concepts which relate to this definition and in particular the confusion between competence and performance.

In While (1994), which reviews the extensive literature in the field of competence and performance, it is suggested that since nurse pre-registration education is concerned with producing nurses who consistently provide care of a high quality, greater emphasis should be placed upon performance in the real-life clinical setting rather than upon competence.
Competence, it is suggested, has no universally agreed definition. Some authors regard it as a behavioural objective while others see it involving both knowledge and skill. The description by the Unit for the Development of Adult Continuing Education (1989) is perhaps the most useful; competence is concerned with what people can do rather than what they know.

Doubt is also expressed about whether an individual who may be competent on day one, will still be competent on day twelve. In other words competence may not always correlate with performance.

Performance also has varying definitions but it is now accepted that high quality nursing involves psychomotor, cognitive and affective skills. Indeed it is important that nurse education should prepare practitioners capable of using their skills and knowledge effectively.

There is, however, an increasing body of empirical literature which indicates that apparently competent registered nurses do not always perform at an adequate level. For example, hand-washing is not always carried out as frequently as necessary (Gould and Ream 1993).

It could be argued that nurse teachers should focus more closely on the performance of students in the reality of the practice settings. Teachers should also be supporting the clinicians who act as the students' assessors of practice to ensure that those students who cannot perform the required standard are failed. In this way these under-achieving students do not risk being pronounced competent at the end of their training when in reality they cannot perform their clinical skills safely. One approach to producing a more reliable scale against which to measure the students' performance has been suggested by Bondy (1984).
Following this review of the literature, the author felt that the use of skill as one of the concepts for DCA was justified.

3.3 The concept of knowledge

As is evident through history, the arduous pursuit of knowledge is a most revered quest, Cull-Wilby (1987). The pursuit of knowledge in nursing has not been any easy quest and it is possible to trace this endeavour back to the 1860's, when Florence Nightingale was describing nursing as both an art and a science. Between the 1860's and the emergence of more contemporary theories of nursing, two predominant issues have been influential. Firstly the medical model which Nightingale actually resisted, and the logical empiricist movement. There is evident overlap of these two influences.

The medical model was for some time the way in which the context of nursing was defined. It saw its phenomena in terms of signs, symptoms, disease and medication.

The medical model itself reflected logical empiricism, the predominantly accepted paradigm of science at the time. It was not until the 1950's that nurses began to re-identify and re-shape the parameters necessary to create a new body of knowledge. This process was undertaken through the development and testing of nursing theories (Chinn and Jacobs 1983, Fawcett 1992).
Some authors have suggested typologies or domains of nursing knowledge. Kim (1987) suggested four domains; the client domain, the client-nurse domain, the practice domain, the domain of environment. The practice domain is of particular interest here and the author defines practice as:

"the cognitive, behavioural and social aspects of professional actions taken by a nurse in addressing clients problems. The effectiveness of nursing practice depends on an understanding of how nurses think, make decisions, transfer knowledge into actions, or use available knowledge (both universal and personal) in actual practice."

(Kim 1987:107)

It is also suggested that there are two variables, exogenous and intrinsic which need to be considered when studying the practice domain. The exogenous variable can be divided into four areas; organisational, structural, cultural and spatial. The intrinsic variable relates to personal knowledge systems, cognitive style, previous experience, skill level, attitude and commitment. Kim also makes reference to the emergence of decision-making literature and to the work of Benner regarding the nature of nursing practice and nursing expertise.

The development of nursing knowledge into nursing theories has opened up a potential theory-practice gap. This issue is important in describing the relationship between learning and professional practice (Nolan and Grant 1992, Kim 1993, Dale 1994, Allmark 1995).

It is further proposed that:

"it is becoming increasingly difficult for nurses to manage multiple theories and conflicting knowledge claims for their use in practice."

(Kim 1993b: 1633)
The assumed correlation between an expanding selection of scientific knowledge and improved nursing practice is challenged by the author. She cites several studies where considerable concern has been expressed that exactly the opposite correlation may be applied. In other words, nursing practice is not benefiting from its emergent scientific literature. It could be argued that all practice disciplines are faced with the same challenges of grounding theory in practice. These challenges appear to arise from two different directions. Firstly, the production of theories and research; secondly the application of theory and research in practice. Kim proposes four modes for applying theory to practice. The coherence mode, the integrative mode, the pragmatic/eclectic mode and the reflective mode.

The reflective mode is of particular interest for this study and it is described as an activity in which theory is entrenched in reflections by practitioners.

“New theories and empirical approaches are adopted for their congruence with the view of the situation and the meaning of the problems gained from the practitioner’s reflections about their own actions, reflections on their situation, and on reflections with the clients.”

(Kim 1993b: 1637)

Kim supports this statement by referring to Argyris et al (1985) and their work on action science. They consider reflection as the key to developing effective professional practice since practitioners in general tend to be entrenched in a manner of practice that does not promote new learning.
Whilst the four modes of theory application to practice emphasise possible processes of combining public and personal knowledge, there are certain criteria which Kim suggests must be applied as guidelines for the use of each mode. The five criteria are:

1. Being able to distinguish the well tested theories from those which are not tested adequately.

2. Probabilities need to be addressed, maximising the likelihood of gains and minimising the losses from the application of theory to practice.

3. Ethical issues require the practitioner to be competent and conscious of the moral consequences of the decisions being made.

4. A constant monitoring mechanism through critical self-reflection must be in evidence.

5. The well-being of all clients must be safeguarded.

It might be assumed that knowledge is inextricably linked to skill. In order to be skilful, a practitioner must be knowledgeable. Various studies have sought to demonstrate this link (Benner 1984, Benner and Wrubel 1989, Powell 1989, Grobe et al 1991, Jaspers 1994). One study however, Wilson (1975) demonstrated that the knowledge base of nursing practice regarding the biological sciences was in many cases lacking. A survey of the literature appeared to confirm the view that there was no clear definition of the extent of the knowledge of biological sciences required by practising registered nurses.

Following a period of observation in clinical areas, specific skills were isolated and multiple choice questions were devised to ascertain the level of biological science knowledge on which the skills depended.
Data was also gathered from medical staff. They were asked to classify levels of knowledge which they thought the nurses would possess.

One of the skills being investigated was the administration drugs by different routes, oral, rectal or by injection. The question was as follows:

“A patient is on sulphonamide therapy for the treatment of a condition which necessitates the maintenance of a therapeutic blood level of the drug. The following is a list of circumstances in which the dose could not be administered or retained at the prescribed time. Place a tick beside those occasions in which you consider the staff nurse should initiate the restoration of the therapeutic blood level of the drug.

1. Because the patient has just vomited a dose.
2. The 2.00am dose was omitted because the patient was asleep.
3. The patient was absent from the ward for some diagnostic or therapeutic reason.
4. The patient was being prepared for another test and not allowed to take anything by mouth”.

(Wilson 1975:56)

In prescribing these drugs, doctors are obviously concerned to maintain the blood concentration at the therapeutic level. They were asked by the researcher to indicate when they would expect the nurse to take the initiative in restoring the therapeutic blood levels of the drug. The staff nurses were asked to select from a list of factors, those which would affect the blood concentration of a drug:

“A specific blood concentration of a drug must be maintained in order to provide effective treatment of the condition from which the patient is suffering. Place a tick beside those factors in the following list which affect the blood concentration of the drug.

1. The rate of absorption from the alimentary tract
2. The toxicity of the drug
3. The size of the patient
4. The volume of urine excreted
5. The amount of exercise taken by the patient
6. The frequency of dosage
7. The fact that the drug acts selectively on some tissues and not on others
8. The solubility of the drug I body fluids

65
The results demonstrated that the staff nurses' knowledge of the biological sciences was considerably less than the expectations of the doctors.

Although the study did not examine the staff nurse's technical abilities, the findings raised doubts as to whether there was a similar gap between the staff nurse's performance and the doctor's expectation of their performance.

"If it is believed that the staff nurse's knowledge is related to her technical ability, it is necessary to consider what action should be taken to bring this knowledge and the doctor's expectation of this knowledge into closer proximity".

(Wilson 1975:71)

More recent studies by Akinsanya (1987), Trnobranski (1993), Jordan (1994) and Rhodes (1994), have also raised concerns about nurses' knowledge of the biological sciences and the effect of this deficit on nursing diagnosis and action and therefore skill.

3.4 The concept of experience

The concept of experience has featured largely in the work of Patricia Benner. She has applied the Dreyfus Model of Skill Acquisition to the study of nurses (Benner 1984). The model describes individual learning through five stages: novice, advanced beginner, competent, proficient and expert. In learning a skill or a task the novice relies on context-free features and strict rules. The advanced beginner adds situational aspects as part of the view of the task. Based on experience the competent person recognises more situational aspects,
organises them according to importance and chooses a perspective and a goal. To the proficient nurse, the situation presents itself with a perspective. It is immediately obvious what is happening and what action should be taken. Finally the expert, through lengthy experience, has gained a deep situational understanding based on holistic pattern discrimination. The expert normally knows what to do intuitively, that is, without reasoning.

Through a phenomenological approach, Benner (1984) has described nursing practice at all stages of skill acquisition. A major interest within her study is a wish to illuminate the hidden and significant work that experts do, to legitimise and value caring practices gained through experience and expert knowledge. She does not however, consider the development of practical aspects of nursing (Bjork 1995) but does acknowledge that further work needs doing with her practice domain entitled "Effective management of rapidly changing situations". Benner’s work has been disputed especially in relation to her notion of “expert”.

English (1993) challenges Benner’s assumption that expertise, skills, knowledge and experience can be positively correlated. He acknowledges the logical appeal of the Dreyfus and Dreyfus model but argues that not all nurses will acquire levels of skill in the time-scales stated. For example, a claim is made by Benner that an expert will only practice “expert nursing” after at least five years experience. The notion of intuition is also challenged. He questions what is meant by “intuition” and how intuition is acquired.

He suggests that:

“Whatever feelings it evokes, it is a subjective and questionable entity and hence, until empirically and unequivocally validated, has limited applicability in a nursing profession which is attempting to develop a research base to support its actions”.

(English 1993:390)
In offering a modified view of what intuition might mean, English refers to cognitive psychology. He describes "perceptual activity" as arising from extensive experience in similar situations. This enables a nurse to build up cognitive pictures of various expected events. With experience, atypical or unexpected events which do not conform to the expected picture would be noticed. From noticing some incompatibility between the expected and the actual event would come the appropriate action.

In a concluding section of his paper, he states:

"As the expert nurse is held in the Benner model to be a paragon of excellence, and someone to be emulated, then an accurate description of expertise is required".

(English 1993:392)

Jasper (1994) has responded to this challenge by exploring further attributes necessary for defining expertise. The attributes suggested are, extensive experience in a field of practice, possession of a specialised body of knowledge and skill, highly developed levels of pattern recognition, and recognition by others.

Following the framework for concept analysis (Walker and Avant 1988), Jasper examines various dictionary definitions and Latin roots for the word "expert". Three of the four Latin roots for expert, reveal words such as experience, skilful, cunning, sly. Cunning and sly which at first sight might be thought to be negative attributes, could be linked to the notion that experts can manipulate situations using their own hidden strategies. These strategies may not conform to the more rigidly applied operational processes used by competent or proficient practitioners.
The importance of experience is also highlighted in a paper by Holden and Klingner (1988). Here the authors were investigating the effects of experience on problem-solving and subsequent nursing actions. Previous research had demonstrated that experienced nurses tended to view problems from a broader view in contrast to less experienced nurses who used a much narrower perspective. In their study, paediatric nurses with more than two years experience were identified as being able to make the fastest, and most accurate diagnoses as to the reason why a baby was crying, although the study did not follow up the results of diagnosis with the observation of practice, the analysis of problem-solving mechanisms based on experience is nevertheless interesting.

A more recent study by Greenwood and King (1995) contradicts these findings by demonstrating that expert and novice orthopaedic practitioners use their experience base in very similar ways.

3.5 The concept of preparation

The design and implementation of a coherent, structured curriculum is an essential element for preparing students to become skilled practitioners. Such curriculums relate directly to the preparation of practitioners whether they are undertaking pre-registration courses or those designed for post-registration (Quinn 1995).

Each curriculum has an agreed set of learning outcomes relating to both theory and practice. The theory outcomes then enable the practitioner to identify and understand certain situations
and from this understanding, apply specific purposeful actions. This understanding can also, with experience, enable practitioners to identify purposeful actions which will stop the situation arising in the first place, that is, it becomes possible to predict and control situations. An example of this process is the nursing actions required to prevent pressure sores developing in for example, post-operative surgical patients.

The practitioner who is using theory-based practice will therefore be able to describe, explain, predict and control nursing events and initiate preventive action. These actions can also be justified on the basis of theory and such justifications will in turn demonstrate the practitioner's accountability. A practitioner who is demonstrating accountability, that is, theory-based nursing, will be delivering purposeful, planned activity. Therefore, activity which is not based on theory will be unplanned and random. Nursing should be neither unplanned nor random.

The literature however suggests that there is a gap between the preparatory theory and the subsequent practice (Crotty 1993, Ferguson and Jinks 1994, Dale 1994).

These authors suggest that a major contribution to the preparation of the learner's theory-based practice, should come from nurse teachers. In other words, having taught the theory of practice in a classroom setting, nurse teachers should be in the clinical setting, working with learners to ensure that there is no gap between theory and practice (Cave 1994, Clifford 1995).
Dale (1994), suggests that this integration of theory, (propositional knowledge) and practice (practical knowledge) form a third dimension to preparation; that is, experiential knowledge. The author goes on to suggest that it is the absence of this integration in practice settings which creates the gap between theory and practice. The experiential knowledge should enable students to reflect on their actions and gain a deeper understanding of their meaning (Boud et al 1985).

In order to facilitate the integration and therefore increase experiential knowledge both teachers and clinical practitioners need to be fully involved with the preparation of their learners. Clinical practitioners need to have appropriate levels of propositional knowledge, that is, knowledge of the relevant curriculum(s), it’s level (Diploma, Degree, Masters) and expected learning outcomes.

Nurse teachers need to have appropriate levels of practical knowledge in terms of skilled action for example, undertaking drug rounds or catheterization. The author then goes on to recommend that the theory-practice gap can best be closed by the role of lecturer practitioner. In time, the development of this role will result in practitioners who:

“have acquired theoretical meaning of practice as well as having a knowledge of propositional and practical theory”.

(Dale 1994 : 523)

The degree to which nurse teachers are present in clinical areas and retain their clinical credibility is also well documented in the literature (Alexander 1983, McCaugherty 1991, D’A Slevin 1992, Clifford 1996).
Most of these studies indicate that the majority of nurse teachers are secluded within the theoretical world of classrooms; visit clinical areas occasionally and do not consider themselves clinically credible. This affects their degree of influence over the preparation of learners.

3.6 The concept of power

The fifth concept, power, is of particular interest to the author since the power which qualified nurses have to direct the development of professional practice ought to be considerable (Hewison 1995). Power is also interesting when the etymology of the words ‘care’ and ‘cure’ are being used. Dunlop (1986) suggests that power remains with the latter word whilst ‘care’ denotes a subordinate, feminine low-status activity. Several other studies support this view, (Wheeler and Chinn 1989, Raatikainen 1994, Jacono and Jacono 1994).

Power can also be divided into two concepts; “power over” and “power to” (Hawks 1991 and Raatkainen 1994). “Power over” that is, using dominance and control, is usually discarded by most researchers and the “power to” is the concept which receives their attention.

Hawks has undertaken a concept analysis of power using the approach of Walker and Avant (1988). In her paper, power is defined as:

“the actual or potential ability or capacity to achieve objectives through an interpersonal process in which goals and means to achieve the goals are mutually established and worked towards”.

(Hawks 1991:758)
The literature review explores the distinction between “power over” and “power to”. One particularly useful contribution related to “power to” suggests that there are paths to obtaining power and that these paths can indicate forcefulness (the ability or official capacity to exercise control) and effectiveness (the ability to act and perform effectively). Power as effectiveness includes the capacity (the role), and the ability (the competence), to achieve objectives and includes helping others to formulate goals and the means for achieving them. The antecedents therefore of “power to” are:

- The actual or potential ability or capacity to achieve objectives or attain goals
- An interpersonal process
- Mutual establishment of goals and the means to achieve the goals
- Mutually working towards goals

These antecedents lead Hawks to propose the following definition for the “power to”:

“the actual or potential ability or capacity to achieve objectives”

(Hawks 1991:757)

Amongst the sources of power is “expert power”, based on having superior skills or knowledge.

Following a review of the literature and the development of an operational definition of power, Hawks suggests that the definition needs testing. She proposes six hypotheses, two of which are:

1. The more people participate in mutual goal-setting, the more they will use power to attain objectives.
2. The greater the self-confidence of two people, the more they will use power to attain objectives.

The recommendation is that the six hypotheses generated through a concept analysis should be tested.

“Power to” is explored from a different perspective in a study by Raatikainen. Here the researcher was interested in the relationship between power and the ability to effect change in nursing practice. The goals of the study were to clarify differences between powerful and powerless nurses in the following respects:

- Knowledge about patients’ needs.
- Motivation related to patient care and the nurse’s own professional growth.
- Principles of patient care.
- Nursing action related to areas of responsibility, nursing methods and planning.
- Collaboration within an organisation.

Following the distribution of a questionnaire, two groups of powerful and powerless nurses emerged from responses to the following statement:

“I have power enough to enable me to improve the quality of nursing practice.”

The results for each specific section demonstrated that powerful nurses had better knowledge than those who were powerless. Powerful nurses were also better motivated and could obtain educational opportunities through which their own professional growth would be enhanced. In terms of patient care, responsibility and collaboration, the powerful nurses were in general,
more able to articulate the rationale for their actions. They were also more able to assist their own patients to become more assertive and knowledgeable:

"The powerful nurses had helped the patients significantly more often by preventing increase of disability, and by supporting adjustment to home care".

(Raatikainen 1994: 428)

It was suggested that indifference may be a characteristic of a powerless nurse. Powerful nurses also stressed the importance of a science based education and an implication here is that powerful nurses use reflective learning to unite theory with practice. Team work was also viewed by powerful nurses as being very important and they stressed that collaboration between physicians and nurses was a crucial criterion for high quality care. A typical characteristic of a powerful nurse was therefore successful interaction based on autonomy and mutuality. Advanced nursing education was seen to be the means by which the power of nurses could be increased.

This view is also expressed by another writer:

"Continuing education in and out of hospital becomes a critical variable in obtaining this power base."

(Willey 1987: 28)

Willey is particularly concerned with expert power and suggests that this power derives from knowledge, ability and credibility.

From this review of the sparse literature concerning the use of power by nurses, the author felt justified in using this concept to describe professional practice.
3.7 Linkages between concepts

The literature relating to the five key concepts has been considered. Although it is necessary to consider each concept separately for the purpose of DCA, the way in which each one links with the others is of equal importance. Several of the research studies referred to have major concepts within them, for example Benner (1984). Although this study related primarily to experience, the importance of skill, knowledge, preparation and power is also acknowledged.

In a study where the major concern was skill (Bjork 1995), the necessary preparation, knowledge and experience required to develop effective practical skills was explored. A third example, relating to the concept of knowledge (Kim 1987) emphasises the intrinsic variables of previous experience, skill level and preparation.

It is therefore evident from the literature that linkages and therefore direct relationships exist between the five concepts chosen. This evidence will be used to create a general information structure from which individual conceptual models will be created.

Having so far considered the clinical and epistemological perspectives for the study, the author will now summarise the major considerations which will direct its design and data collection. It is evident that there are concerns to be explored regarding the educational preparation and therefore the knowledge which nurses have regarding drugs which have special recommendations concerning food. There are also concerns relating to clinical practice which encompass skill, knowledge, experience, preparation and power. A view has been taken by
the author that triangulation will provide the most powerful source of data to examine these concerns.

The illumination of what nurses do will relate to the task of drug administration where oral drugs have special recommendations regarding food. The methodology to be used is Dynamic Concept Analysis (DCA) (Kontiainen 1991), a detailed description of which is contained in Chapter Four, along with other methodological issues.
CHAPTER FOUR

4.1 The Design of the Study and Methods of Data Collection

In wishing to undertake a research study which aimed to develop understanding regarding professional nursing practice, the need to combine different research approaches and methods became apparent. Triangulation as a research strategy seemed to offer a suitable solution.

4.2 The Design of the Study

The design of the study needed to recognise that the participants are subject to many influences, clinical, educational and managerial. The design also needed to take account of the current pressures and massive changes occurring within the NHS which has had in turn an enormous effect on how clinical areas function. Wards are busy, noisy and very often stressful environments. It was not the wish of the researcher to add any more pressure than was absolutely necessary in order to undertake and complete the study. Indeed considerations of the reality of practice environments were very influential in choosing the research approach.

4.3 The purposes of the study

- To investigate current practices regarding the prescription and administration of drugs which have special recommendations regarding food.
- To establish what knowledge different grades of nurses have regarding the timing of drug administration and its relation to food intake.
To describe patterns of nursing behaviour relating to this intervention using dynamic concept analysis.

To make recommendations regarding how the educational and clinical needs of nurses can be met in relation to this intervention.

In order to achieve the four purposes of the study, Figure 2 describes the methodology used.

**Figure 2 - Design of the Study**

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<thead>
<tr>
<th>Purpose 1</th>
<th>Methodological</th>
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<tr>
<td>To investigate current practice</td>
<td>Triangulation</td>
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<td>A. Observation study</td>
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<td>Evaluation</td>
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<th>Purpose 2</th>
<th>Mitchell’s four principles</th>
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<td>To establish the knowledge base</td>
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<td>B. Pilot study</td>
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<td>Evaluation</td>
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<td>C. Main Study</td>
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<td>Evaluation</td>
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<td>To describe patterns of nursing practice</td>
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<td>D. Conceptual Model development</td>
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<td>Evaluation</td>
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<td>E. Descriptive study of nursing practice</td>
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<td>To make recommendations concerning educational implications</td>
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<td>Reflective learning and practice</td>
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<td>Evaluation</td>
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4.4 Methodological Triangulation

In choosing multiple triangulation a detailed consideration has been made of Mitchell's four principles (1986).

1. **The research question(s) must be clearly focused.**
   
   The four questions to be explored are:
   
   - What current practices are being used regarding the prescription and administration of drugs which have special recommendations regarding food?
   - What knowledge do different grades of nurses have regarding the timing of drug administration and its relation to food intake?
   - What patterns of nursing practice can be identified relating to this intervention, using dynamic concept analysis?
   - Which recommendations should be made regarding how the educational and clinical needs of nurses can be met in relation to this intervention?

2. **The strengths and weaknesses of each chosen method must complement each other**

   The methods for the study have been implemented as far as possible to maximise their benefits and minimise their drawbacks. It is always possible to be critical of any research methods and due care will be paid to the literature which addressed these criticisms. The author will also include her own critical analysis of the chosen methodology as it emerges in the study.
3. The methods should be selected according to their relevance to the nature of the phenomenon being studied

The nature of the phenomenon being studied concerns professional nursing practice. This professional practice must in the first instance be observed. The phenomenon will then be investigated in more detail using specific concepts which contribute to the maintenance and development of professional nursing practice.

Following an analysis of how these specific concepts relate to one another using conceptual modelling, interviews with participating nurses will be undertaken. Each of these methods is therefore relevant to the nature of the phenomenon being studied.

4. Continual evaluation of the approach should be undertaken during the study

The use of triangulation will be evaluated during the study in several ways. Firstly, the data collecting instruments will be designed so that the emerging information best reflects the nature of the phenomenon. Once the data has been collected, the methods for its analysis will be evaluated to ensure that they are as valid and reliable as possible. Thirdly, the presentation of the findings will be continually evaluated to ensure that they represent as comprehensively as possible, the nature of professional nursing practice.
4.5 Methods of Data Collection

4.6 Purpose 1

To investigate current practice

The current practices being observed were:-

a.i the accuracy of prescription, regarding information/instruction for antibiotics and the accuracy of their administration by nurses (Appendix B).

a.ii the accuracy of prescription regarding information/instruction for non-steroidal anti-inflammatory drugs (NSAIDS) and the accuracy of their administration by nurses (Appendix B).

a.iii the accuracy of prescription regarding information/instruction for corticosteroids and the accuracy of their administration by nurses (Appendix B).

a.iv comparisons between wards concerning the accuracy of prescription regarding instruction for drugs and their administration by nurses.

Both lunchtime and supper time drug rounds were observed but the order in which the wards were visited relied on the willingness of the staff to allow the researcher to be present.

The wards used were based on a representative sample and enabled the researcher to observe practice during four surgical drug rounds on four surgical wards, three medical drug rounds on two medical wards and three oncology drug rounds on two oncology wards.
The timing of the rounds were again undertaken at the convenience of the staff and included mostly lunch-time rounds although two supper-time rounds were observed on oncology wards. The nature of the sample did restrict the collection of observation data in that it was not possible to create a specific sampling frame. This issue will be referred to again in relation to the discussion of the findings. Subsequent conclusions and recommendations will also reflect the limited nature of the observation data.

**Ethical approval**

In November 1992, before the observation study commenced, ethical permission was granted from the relevant District Health Authority Ethics Committee (Appendix A). Granting of approval followed the Ethics Committee’s scrutiny of the researcher’s proposal which assured them that patients would not be directly involved. Their safety and privacy would not be put at risk and that all data would be handled confidentially.

**A. Observation study**

**a.1 The setting for the observation study**

The setting for the observation study involved ten clinical wards within an NHS Hospital Trust. The purpose of the observation study was to watch qualified nurses administering oral drugs which had special recommendations regarding food. From these non-participant observation periods, it would be possible to describe current practices (Carr 1991, Mays and Pope 1995).
Development of the observation checklist

Following a review of the literature, three classes of drugs known to have special recommendations regarding food were selected for investigation. The classes were, antibiotics, non-steroidal anti-inflammatory drugs (NSAIDS) and corticosteroids. Corticosteroids and NSAIDS are recommended to be taken with food whereas many antibiotics should be taken before food. Some antibiotics, for example, cefuroxine are however recommended to be taken with food.

Having decided on the classes of drug which would be investigate, an observation checklist was formulated to facilitate data collection. It contained a list of 17 drugs which were the most commonly used from the three classes chosen (Appendix B). The checklist also contained space for recording what time the drug was swallowed, what time the previous and subsequent meal was taken and whether the information given by doctors and pharmacists was correct.

Definitions of accurate prescription/information/instruction

Correct prescription was defined as accurate instructions on administration of the drug with respect to food ingestion. An incorrect prescription was identified if the instructions with regard to food intake were either inaccurate or absent from the drug prescription chart (Carr, et al 1990).
a.4 Definition of accurate administration

For drugs that are recommended to be taken with food, correct administration was defined as not more than fifteen minutes before a meal and not more than thirty minutes after a meal. Drugs that are recommended to be taken before food or on an empty stomach were defined as administered correctly if they were given at least thirty minutes before a meal, or two hours after a meal (Martindale 1989).

The term “meal” was defined as a nutritionally balanced collection of food containing at least four hundred kilocalories.

a.5 Inter-rater reliability

In order to test the reliability of the observation recorded on the checklist, an inter-rater reliability test was performed (Appendix N). This involved two researchers observing the same situation at the same time, and noting their observations independently (Tomalin et al. 1993). As only three drugs rounds were observed for this purpose the inter-rater reliability was calculated by percentage agreement. The calculations showed that there was an overall 73% agreement between observers for the administration of drugs and 100% agreement between observers for both doctor’s instructions and the pharmacist’s information. The 100% level of agreement between observers was considered to be acceptable. The 73% agreement between observers for the administration of drugs was considered to be only a reasonable level of agreement. Although a test-retest of reliability was not undertaken, this would have
been useful and an appropriate method for increasing the percentage of observer agreement (Seaman 1987, Polit and Hunger 1991).

Consideration was also given to the validity of the observational data. Validity can sometimes be more difficult to establish than reliability (Carr 1991).

In an observational study the validity of the data concerns the degree to which the data represents what actually happened. Many aspects of the design may affect its validity such as, the length of the observation period, the number of events being observed and the effect of the observer on the research setting. The last aspect is thought to be a major threat to the validity of an observational study through its effect is difficult to determine. To minimise the Hawthorne effect of observing behaviour with a checklist (which might alter the nurses’ activity), the researcher watched several initial drug rounds without a checklist to acclimatise the nurses to her presence.

a.6 Using the observation checklist

A further ten drug rounds were observed using the checklist and the permission of the nurse in charge was sought a few days prior to the observation taking place. The permission of the nurse administering the drugs was also obtained on arrival in the ward. To avoid bias, nurses were given limited information concerning the purpose of the study. They were told that the study was to compare the timing of administration of specific drugs on different wards. The results from the observation study appear in Chapter Five.
4.7 Purpose 2

To establish the knowledge base

B Pilot study

b.1 The sample for the pilot study

The pilot study involved fifteen nurses attending English National Board courses. They were all representative of the grades used in the study. None were working in the local NHS Trust Hospital. The purpose of the pilot study was to refine the tool which would demonstrate what knowledge nurses have regarding the timing of drug administration and its relation to food and enable patterns of nursing behaviour relating to this intervention to be developed. The nurses’ knowledge related to the definitions of administration as described in the observation study.

b.2 Development of the survey questionnaire

Following a review of the literature in Chapter One and a description of the key concepts identified for the study in Chapter Three, a descriptive survey questionnaire was developed in six sections (Appendix E).

The reliability and validity of the questionnaire was considered during its pilot study (Oppenheim 1992).
Section One - Employment details

This section allowed information relating to grade, time in post, and type of ward to be collected.

Section Two - Qualification details

This section allowed information regarding the year of initial qualification, subsequent qualifications and current courses to be recorded.

Section three - Drug round

This section enabled the respondents to identify the method of drug administration used on their ward. It also asked for the number of rounds undertaken and their timing.

Section Four - Mealtimes

This section asked for the approximate start and finish of mealtimes, ie, breakfast, lunch and supper. It also included the specific question relating to nurses' knowledge regarding the timing of drug administration in relation to food. The questions took the form of incomplete sentences as well as a forced response to the definition of “before” and “with” meals.
Section Five - Education and training details

This section involved a numerical scale and asked the respondents to rate themselves on a line of one to ten where one was poor and ten was excellent. They were asked to respond to statements relating, for example, to the teaching of drug-food interactions, their understanding of bioavailability, instruction provided by pharmacists and the power which they had to make changes to drug administration methods.

Section Six - Opinions regarding drug rounds

This section, using a Likert scale, asked the respondents to agree or disagree with nine statements relating to drug administration. In particular, the statements make reference to the frequency with which doctors write up information relating to drugs, special recommendations, and the need for a different system of drug administration to be used.

Section Seven - Any further comments

The last page of the questionnaire invited respondents to make any further comments they felt would be useful.

b.3 Using the pilot survey questionnaire

The survey questionnaire was piloted using a representative sample of fifteen qualified nurses. These nurses were all attending English National Board Courses. None of
them were working in the Trust Hospital used for the main study. Several nurses made very helpful comments and a few changes to the questionnaire were made which improved its content validity.

C. Main study

c.1 The setting for the main study

Following the approval of the Director of Nursing and Quality, the setting for the main study involved all the medical, surgical, orthopaedic and oncological wards in a local NHS Trust Hospital. The population surveyed was all the qualified nurses who were employed in April 1994 (n=285). Each nurse received a questionnaire and a covering letter, explaining the purposes of the study and asking for their co-operation in completing and returning it by a specified date. A second letter of reminder was sent, if necessary, the following month.

Of the 285 questionnaires sent out, 107 were returned. This situation enabled the researcher to begin the analysis of the questionnaire in terms of demonstrating nursing knowledge and to create 107 concept models to describe nursing behaviour, some of which would be verified with a semi-structured interview. The results appear in Chapter Five.
4.8 Purpose 3

To describe patterns of nursing practice

Following a consideration of case study development (Patton 1990) the author had decided to use a method called Dynamic Concept Analysis (DCA). This method was mentioned at the end of Chapter Three where a description of the five concepts chosen for the study was presented.

D. Conceptual model development

d.1 Dynamic concept analysis

Dynamic Concept Analysis (DCA) (Kontiainen 1991) is a method of integrating information about complex situations which may be quantitative or qualitative. A conceptual model is constructed which enables identification of relationships between different variables and provides a picture of the ways in which different aspects or attributes of a concept may be related. Another useful metaphor for this process is to consider that it is acting as a lens focused on some aspect of reality. The lens allows the sum of the parts to be viewed at close quarters and therefore can illuminate issues which, by using other methods, might not be revealed. The method was described by Kontiainen in 1973 and 1989 and developed further by Kontiainen and Hobrough (1991) in studies involving students and their supervisors' perceptions of their respective roles. Several other studies have now been undertaken including Kontiainen and Manninen (1991) which considered individual models related to unemployment,
and Wilson (1991) which investigated the compliance of diabetic patients with their treatment.

d.2 Different types of relations

Kontiainen and Hobrough (1991) describe five different ways in which concepts may be related to one another:

1. There is no direct relationship

2. There is a one-way relationship

3. There is a two-way relationship between concepts

4. A and B do not have a direct relationship with each other, but the relation will be found via a third concept

5. There is a relationship through a longer chain of relationships

Information concerning types of relationships is entered into an information structure using chosen concepts to form a conceptual model. An information structure is defined as a matrix of concept relations where the information needed for conceptual analysis and for constructing conceptual models is available in a coherent form. A conceptual model is a network of concept relationships as in 5 above; although
different types of relationship from 1 - 5 may be present in the model. A concept model will show the role and function an attribute has in a given concept (Kontiainen and Hobrough, 1991). The following discussion describes the process applying DCA to the case study data.

d.3 Specifying the concepts and attributes

The first stage in the process is to specify the concepts which will be used and then to build an information structure of the relationships between their attributes. A decision had been made to use five concepts which were central to professional nursing practice. The five concepts were skill, knowledge, experience, preparation and power, described in Chapter Three. For each concept a positive, neutral or negative attribute provides a sub set shown in Figure 3.
### Figure 3 - Concepts and attributes

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<thead>
<tr>
<th>Concept</th>
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<tbody>
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<td>Very skilful</td>
<td>1 a</td>
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<tr>
<td>2</td>
<td>Rather skilful</td>
<td>1 n</td>
</tr>
<tr>
<td>3</td>
<td>Not very skilful</td>
<td>1 b</td>
</tr>
<tr>
<td>4 Knowledge</td>
<td>Very knowledgeable</td>
<td>2 a</td>
</tr>
<tr>
<td>5</td>
<td>Rather knowledgeable</td>
<td>2 n</td>
</tr>
<tr>
<td>6</td>
<td>Not very knowledgeable</td>
<td>2 b</td>
</tr>
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<td>7 Experience</td>
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<td>Rather experienced</td>
<td>3 n</td>
</tr>
<tr>
<td>9</td>
<td>Not very experienced</td>
<td>3 b</td>
</tr>
<tr>
<td>10 Preparation</td>
<td>Very well prepared</td>
<td>4 a</td>
</tr>
<tr>
<td>11</td>
<td>Rather well prepared</td>
<td>4 n</td>
</tr>
<tr>
<td>12</td>
<td>Poorly prepared</td>
<td>4 b</td>
</tr>
<tr>
<td>13 Power</td>
<td>Very powerful</td>
<td>5 a</td>
</tr>
<tr>
<td>14</td>
<td>Rather powerful</td>
<td>5 n</td>
</tr>
<tr>
<td>15</td>
<td>Powerless</td>
<td>5 b</td>
</tr>
</tbody>
</table>

d.4 The Five Key Concepts

The five key concepts chosen for the study were previously described in Chapter Three. They were judged by the author to be the most relevant for this particular investigation and were carefully evaluated before their inclusion. This evaluation
involved the author’s personal knowledge, conversations with clinicians and a consideration of the relevant literature.

**Concept One - Skill**

This concept related to the accuracy with which drugs having special recommendations with regard to food were given. Information for this concept was abstracted from the questionnaire data. Depending on the nurses’ definition of “before” or “after” meals, their responses were categorised into the following attributes:

1(a) Very skilful - the subject’s written answers were correct within acceptable time periods.

1(n) Rather skilful - the subjects’ written answers had only one error out of four responses.

1(b) Not very skilful - the subjects’ written answers had more than one error out of four responses.

**Concept Two - Knowledge**

This concept related to question 5.6 in the self-assessed questionnaire. Nurses were asked to rank themselves on a scale of 1 - 10 in relation to their current understanding of drugs which have special recommendations regarding food.

2(a) The subjects’ responses indicated that their level of understanding was excellent.
2(n) Rather knowledgeable - the subjects indicated that their level of understanding was reasonable.

2(b) Not very knowledgeable - the subjects indicated that their current understanding of drugs which have special recommendations relating to food was poor.

Concept Three - Experience

This concept related to the number of years in which the nurses had worked in specific grades. Again, the data was taken from the questionnaires.

3(a) Very experienced - the subjects indicated that they had been employed at their present grade for more than two years.

3(n) Rather experienced - the subjects indicated that they had been employed at their current grade for less than two years but more than six months.

3(b) Not very experienced - the subjects indicated that they had been employed at their current grade for less than six months.

Concept Four - Preparation

This concept related to question 5.2 on the self-rating questionnaire and asked the nurses to indicate the quality of their initial training in relation to drug interactions with food.

4(a) Very well prepared - the subjects indicated that their preparation had been excellent.
4(n) Well prepared - the subjects indicated that their preparation had been adequate.

4(b) Poorly prepared - the subjects indicated that their preparation relating to drug interactions with food had been poor.

**Concept Five - Power**

This concept related to question 5.11 on the self-rating questionnaire. The nurses were asked to indicate the power they had to change the method of drug administration in relation to their grade.

5(a) Very powerful - the subjects indicated that the power they had to make changes was excellent.

5(n) Rather powerful - the subjects indicated that the power they had to make changes was reasonable.

5(b) Powerless - the subjects indicated that the power they had to make changes was poor.

**d.5 Building an information structure**

The second stage in the process is to build an information structure of concept relations. The relationship between conceptual categories can be derived from different sources for example, the subject literature, research findings, observation and the judgement of experienced clinical nurses. The sources will determine the level of subjectivity of the model. However, if the relationships are supported, as in this study, by research findings, Kontiainen suggests that this will reduce the subjectivity of the model. Five concepts were entered into the matrix because it was felt that they were key elements involved in the relationship between clinical practice and educational processes. Statements regarding the relationship between concepts were proposed (Appendix C).
Two-way relationships were constructed for each concept and these appear on pages 98a, b, c, and in Appendix D. Following this activity, a matrix depicting these two-way relationships was produced using a specific computer programme, Figure 4. The two-way relationships are entered into each cell by matching concepts and attributes. For example, in Cell 2, matching very knowledgeable 2A with very skilful 1A, places an “a” in the cell.

**Figure 4 - Information Structure of professional practice relating to drug administration**

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<td></td>
<td>Cell 1</td>
<td>Cell 2</td>
<td>Cell 3</td>
<td>Cell 4</td>
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<td>a n b</td>
<td>a n b</td>
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<tr>
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<td>n b</td>
<td>b b</td>
<td>b b</td>
<td>b b</td>
</tr>
<tr>
<td>2. Rather skilful</td>
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<td>n b</td>
<td>b b</td>
<td>b b</td>
<td>b b</td>
</tr>
<tr>
<td>3. Not very skilful</td>
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<td>n b</td>
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<td>b b</td>
<td>b b</td>
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<td>a</td>
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<td>NR</td>
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<tr>
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<td>b</td>
<td>a</td>
<td>a</td>
<td>NR</td>
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<tr>
<td>5. Rather knowledgeable</td>
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<td>n</td>
<td>b</td>
<td>NR</td>
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Constructing type two relationships between concepts and attributes

Skill

C.2 - C.1

What kind of effect knowledge might have on skills

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C.3 - C.1

What kind of effect experience might have on skills

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C.4 - C.1

What kind of effect preparation might have on skills

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C.5 - C.1

What kind of effect power might have on skills

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Knowledge

C.1 - C.2

What kind of effect skill might have on knowledge

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for example

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### C.3 - C.2

What kind of effect experience might have on knowledge

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</table>

### C.4 - C.2

What kind of effect preparation might have on knowledge

<table>
<thead>
<tr>
<th>Row 4</th>
<th>very well prepared 4a</th>
<th>2a very knowledgeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row 6</td>
<td>poorly prepared 4b</td>
<td>2b not very knowledgeable</td>
</tr>
</tbody>
</table>

### C.5 - C.2

What kind of effect power might have on knowledge

none

### Experience

### C.1 - C.3

What kind of effect skill might have on experience (time in post)

none

### C.2 - C.3

What kind of effect knowledge might have on experience (time in post)

none

### C.4 - C.3

What kind of effect preparation might have on experience (time in post)

none

### C.5 - C.3

What kind of effect power might have on experience (time in post)

none
Preparation

C.1 - C.4

What kind of effect preparation might have on skill

Row 10  very well prepared 4a → 1a very skilful
Row 11  well prepared 4n → 1n rather skilful
Row 12  poorly prepared 4b → 1b not very skilful

What kind of effect preparation might have on knowledge

Row 10  very well prepared 4a → 2a very knowledgeable
Row 11  well prepared 4n → 2n rather knowledgeable
Row 12  poorly prepared 4b → 2b not very knowledgeable

What kind of effect preparation might have on experience

none

What kind of effect preparation might have on power

none

Power

C.1 - C.5

What kind of effect might skill have on power

Row 13  none
Row 14  none
Row 15

C.2 - C.5

What kind of effect might knowledge have on power

Row 13  very knowledgeable 2a → 5a very powerful

C.3 - C.5

What kind of effect might experience have on power

Row 13  very experience 3a → 5a very powerful

C.4 - C.5

What kind of effect might preparation have on power

Row 13  none
Row 14  none
Row 15
Combining the attributes

A description of the process of combining the attributes to form rows will serve to illustrate how the matrix is used to construct models representing each of the 107 subjects. In the matrix, all attributes are listed on the left and each row shows the attributes which are most likely to combine with each of the fourteen other attributes in the matrix. Each row shows a Type two (1-way) direct relationship to the attribute in question, while two others together may alter the relationship to Type 3 (2-way) relationship. Row 1 describes Type 2 relations on skill with knowledge, experience, preparation and power. A comprehensive picture of all the relations which exist between these five attributes can be obtained using information from Figure 4.

The relationship between the five key concepts and their attributes has been discussed. No logical relationship could be found between some concepts, for example power and skill. Certain cells in the matrix have therefore been allocated the letters NR indicating that no relationship exists. Another example of NR is to be found between preparation and power. It is important however to emphasis that the NR between concept 3 “experience”, relates to the very precise definition used in the study for this word. Experience related only to the time a nurse had been employed, not to the totality of her experience during that time.

One of the purposes of this analysis is to explore the potential of these concepts to illuminate problems and challenges. The conclusions may result in concepts being added to or subtracted from the matrix in an attempt to get even closer to the nature of these complex relationships.
When the study was in its early stages, the concept of reflection was considered. Through a process of reading and observation however, it was decided that reflection was too complex to fit into the pattern for the matrix and that it would be more useful to consider reflection as a learning process and as a major theme in the interview schedule. Hence it is always possible to be critical of the concepts chosen and to venture further suggestions for future research as a result.

Having undertaken the processes described so far, a model would then be constructed for each respondent using the information obtained from their questionnaire data in the main study. The data was subjected to interpretation as described in the discussion regarding the nature of the concepts and their attributes. The results are presented in Chapter Five.

E. Descriptive study
e.1 Initial patterns and groups

Various methods were used to analyse the models derived from the concept analysis. An initial set of patterns emerged, followed by a more specific set referred to as groups. It was then possible to compare groups within specialist practice areas and across different grades of nurse.

Interviews
As a means of increasing the convergent validity of DCA, follow-up interviews with some respondents are recommended (Kontiainen 1991). An interview schedule was therefore developed in four sections (Appendix F).

Section One
This section allowed nurses to agree or disagree with the conceptual model developed from their questionnaire responses. They were invited to make any comments relating to the relationships between skill, knowledge, experience, preparation and power. These could be noted by the researcher on the schedule.

Section Two
Section two related specifically to the concept of power. It was included because the respondents when completing the numerical scale referring to their power to change practice, had almost universally rated themselves as being powerless (3 or less on a scale of 1 to 10). Questions exploring this response were therefore included.

Section Three
This section related to learning practical knowledge and was an attempt to explore how or if reflective learning was used in practice. The questions allowed the respondents to consider whether they used the drug round, and drug-food interactions specifically, as a learning experience, before, during, and after the round. It also
allowed the researcher to ask questions about reflective/creative/experimental practice and the degree to which external pressures prevented this type of practice from occurring.

Section Four

Section Four was concerned with maintaining and improving nursing practice. The respondents were asked how their clinical and educational needs could be met in relation to the specific intervention of drug administration.

Whenever possible, and before the planned interview, the researcher observed the nurse undertaking a drug round. The observation checklist was used for this activity.

The findings from these interviews are explored and evaluated in the discussion which can be found in Chapter Six.

4.9 Purpose 4

To make recommendations concerning educational implications

As part of the evaluation process incorporated into the study (Mitchell 1986), educational implications will be considered throughout each stage of the analysis. These implications will be particularly important during the analysis of the DCA data which in itself, is a reflective activity. It is anticipated that reflective learning and
practice will be a constant theme when these issues are addressed in Chapters Six, Seven and Eight.
CHAPTER FIVE

5.1 Results and Analysis

The tools for date collection were described in Chapter Four.

Their purpose was:

1. To investigate current practices regarding the prescription and administration of drugs which have special recommendations regarding food.

2. To establish what knowledge different Grades of nurses have regarding the timing of drug administration and its relation to food intake.

3. To describe patterns of nursing behaviour relating to this intervention using dynamic concept analysis.

4. To make recommendations regarding how the educational and clinical needs of nurses can be met in relation to this intervention.

5.2 Total drugs administered

A total of 206 drugs were administered during the 10 drug rounds observed. Of these 60 required specific recommendations with regard to food intake, and 146 required no recommendations with regard to food.

The total number of drugs administered as shown in Figure 5, the majority of drugs did not require any recommendations with regard to food. Of those drugs which did have recommendations (n=60), there were more antibiotics than corticosteroids and NSAIDS.
Figure 5: Percentage of the Total Drugs administered with and without recommendations concerning food (n=206)

The observations related to seventeen drugs. The categories of drug were antibiotics, steroids and non-steroidal anti-inflammatory drugs (NSAIDS). The reason for this choice of drug was their specific requirements for administration in relation to food intake described in the literature review.

As described previously in Chapter One, it is the joint responsibility of the doctor, the nurse and the pharmacist to ensure that hospitalised patients receive the correct drug at the correct time.
Definition of accurate prescribing regarding information and instruction

In order to develop a definition of accurate prescribing, consideration had to be given to the role of the doctor and the pharmacist. Specific tasks were identified in terms of documentation. It was then possible to observe whether specific, additional information and instruction was provided on the drug prescribing/recording form. Accurate prescribing was defined by correct information from the medical staff being written on the drug prescribing/recording form relating to specific requirements concerning food. Inaccurate prescribing was defined by incorrect or absent information from the medical staff being written on the drug prescribing/recording form, relating to specific requirements concerning food, (Carr, Goodinson and Dickerson 1990).

As far as the pharmacy staff were concerned, accurate instructing was defined by correct instructions from the pharmacy staff being written on the drug prescribing/recording form, relating to specific requirements concerning food.

Inaccurate instructing was defined by incorrect or absent instructions from the pharmacy staff being written on the prescribing/recording form relating to specific requirements concerning food.

Definition of accurate administration

In the case of the nurses, accurate administration of drugs with food by nurses was defined as not more than fifteen minutes before a meal or not more than thirty minutes after a meal. Accurate administration of drugs before food or on an empty stomach were defined as being given at least thirty minutes before a meal or two hours after a meal (Martindale 1982).
Inaccurate administration was defined by patients receiving these drugs outside the specified time limits.

5.3 PURPOSE 1

To investigate current practice

The current practices being observed were,

a.i the accuracy of prescription regarding the information/instruction for antibiotics and the accuracy of their administration by nurses.

a.ii the accuracy of prescription regarding the information/instruction for non-steroidal anti-inflammatory drugs (NSAIDS) and the accuracy of the administration by nurses.

a.iii the accuracy of prescription regarding the information/instruction for corticosteroids and the accuracy of their administration by nurses.

a.iv the comparisons between wards concerning the accuracy of prescription regarding instruction for drugs and their administration by nurses.
Chapter Five

5.4 A. Results from the observation study

a.i Figure 6: The accuracy of prescription regarding information/instruction for antibiotics and the accuracy of their administration by nurses (n=31)

As can be seen from Figure 6, this practice is a shared responsibility between doctors, pharmacists and nurses. Additional information concerning special recommendations regarding food should be written on the prescription chart by doctors. In the case of the thirty-one antibiotics (100%), no special information was provided.

Instructions, or "other directions" should be written on the prescribing form by pharmacists. Of the thirty-one antibiotics, twenty-four (75%) did not have accompanying instructions, seven (25%) had additional instructions.
The accurate administration of these drugs, is the responsibility of nurses. From the thirty-one drugs given, six (20%) were correctly administered and twenty-five (80%) were administered inaccurately.

a.ii Figure 7: The accuracy of prescription regarding the information/instruction for non-steroidal anti-inflammatory drugs and the accuracy of their administration by nurses (n=11).

During the period of observation, eleven NSAIDS were administered. No additional information regarding special recommendations concerning food was written on the prescribing form by doctors (100%).
Correct instructions were provided by pharmacists for two drugs (18%), 9 drugs (72%) had no special instructions.

In terms of administration, of the eleven drugs prescribed, nine were given correctly (82%) and two were given incorrectly (18%).

a.iii Figure 8: The accuracy of prescription regarding information/instruction for corticosteroids and the accuracy of their administration by nurses (n=18).

During the period of observation eighteen corticosteroids were administered.

No additional information regarding special recommendations concerning food was written on the prescribing form by the doctors (100%).
No instructions or "special directions" were provided by pharmacists (100%). Of the eighteen corticosteroids, fifteen (85%) were administered accurately by nurses and three, (15%) were not administered accurately.

**Figure 9: Comparisons between wards, concerning the accuracy of prescription regarding the instructions for drugs and their administration by nurses drugs.**

The findings from the observation data are provided in Figure 9. It can be seen on surgical wards, where twenty-three drugs were administered, incorrect instruction
regarding additional “special directions” from pharmacists applied to twenty prescriptions (85%). Correct instruction applied to three drugs (15%).

Of the twenty-three drugs, fifteen (65%) were administered inaccurately by nurses and eight (35%) were administered accurately.

Nineteen drugs were administered in medical wards. Three (15%) had instructions from pharmacists and sixteen (85%) did not. Nurses administered nine drugs (47%) accurately and ten drugs (51%) inaccurately.

On oncology wards, eighteen drugs were administered. Incorrect instructions from pharmacists were recorded for eleven (51%) drugs and seven (49%) had correct instructions.

The nurses administered eleven drugs accurately (70%) and administered seven drugs (28%) inaccurately.

5.5 **Total drugs administered**

The total number of drugs administered with special recommendations regarding food was 60.

<table>
<thead>
<tr>
<th>Class</th>
<th>Accurately Administered</th>
<th>Inaccurately Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics n=31</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>NSAIDS n=11</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Corticosteroids n=18</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total**: 30 (50%) 30 (50%)

There is a 50/50 chance of taking these drugs accurately.
5.6 PURPOSE 2

To establish what knowledge different Grades of nurses have regarding the timing of drug administration and its relation to food intake.

5.7 B. Results from the pilot study

These results were described in Chapter Four (p 89).

5.8 C. Results from the main study

The following discussion describes the analyses of section 4.2 (Appendix E). This section contained six open questions, requiring the respondents to complete the following sentences:

- It is important that drug, and meal times should coincide because ..........
- If a patient needs a drug which has special recommendations for food and no meal is available I would ..........
- Some oral drugs should be given before meals because ..........
- Three common examples of these drugs which should be given before meals are ..........
- Some oral drugs should be given with meals because ...
- Three common examples of these drugs which should be given with meals are..........

Results were analysed using the following definitions:
An accurate response was sub-divided into "accurate knowledge" and "accurate awareness". "Accurate knowledge", indicated that the respondent had stated the accurate response according to Martindale's Pharmacopoea (1982). "Accurate awareness", indicated that the respondent had given a partially accurate response. An inaccurate response indicated that the respondent sentence completion was wrong. No responses indicated that the respondent had not attempted to complete the sentence at all. The following tables are prefaced by the correct responses (Martindale 1982).

C.i Table 1: Nurses' knowledge, Question 4.2.1

"It is important that drugs and mealtimes should coincide because ....." For the purposes of this study, the accurate response should state that: "some drugs need to be taken with food"

In Table 1, it can be seen that responses were variable across different Grades of nurses. It should be acknowledged, however, that this question was open and very general in nature and the researcher was using a value judgement in assessing the answers. There were, however, some responses which did not mention food at all. For example, a Grade C nurse’s response to “it is important that drugs and mealtimes should coincide,” gave the following answer:

“because of the inflammatory action of (sic) the gut caused by some drugs, also for absorption and breakdown of the drugs by interaction.”

A Grade D medical nurse’s response:

“because it is convenient.”

This response also accounted for the one inaccurate response in the table.

An example of an accurate aware response in the Grade Es was:

“it helps with absorption.”

Nurses “accurate aware” responses from the most senior Grade Gs included the following example:

“it effects the efficiency of the drug taken.”

Although in retrospect question 4.2.1 could have been more sharply focused it is of some concern that 3% of Grade Es and 11% of Grade Ds gave no response at all to this question. The researcher must assume that these nurses were unsure of the answer but, as qualified nurses, knowledge at this level must be expected.

There is a pattern which emerges from these findings:
Figure 10: Pattern emerging across grades for nurses' knowledge regarding drugs and mealtimes

Given that the analyses of the data is subjective, the finding does however support an assumption which can be made that nurses gain knowledge with seniority. It should also be noted that although the more junior grades of nurses scored less well on this question, the senior Grades, G and F were scored as 91% and 100% respectively.

C.ii Table 2: Nurses’ knowledge, Question 4.2.2

“If a patient needs an oral drug which has special recommendations for food and no meal is available, I would …….” For the purposes of this study, the accurate response should state that:

“give the patient a glass of milk with biscuits or toast.”

(Martindale 1989)
In Table 2, it can be seen that these findings might give some cause for concern.

The following patterns emerged:

Figure 11: Pattern emerging, across grades, for nurses’ accurate knowledge of meal substitution
In almost all cases the nurses' knowledge was recorded as “accurate awareness”. No mention was made of biscuits or toast although milk, or a glass of milk was stipulated. Some nurses even stressed the importance of a full glass of milk rather than a few sips.

A Grade C nurse in the accurate awareness column responded with:

“I would provide a glass of milk as protection.”

A Grade D medical suggested:

“I would give the patient a glass of milk to take the medication with.”
A Grade E oncology nurse wrote:

"I would ensure that the patient takes at least a full glass of milk with the drug."

A surgical Grade E nurse wrote:

"I would give a milk drink."

Similar responses were given by Grade F and G nurses. One Grade F surgical nurse reported:

"I would speak to the housekeeper."

Where responses were recorded as being accurate knowledge, both milk and some form of food was mentioned.

For example a Grade C nurse in a mixed ward suggested:

"I would give a glass of milk and a biscuit."

Within the Grade D responses accurate knowledge was recorded for:

"I would provide milk and biscuits from the patient's locker."

A Grade E medical nurse suggested:

"I would give a drink of milk and a slice of bread if one was available."

Differing levels of effort were described when obtaining food. For example a Grade D orthopaedic nurse reported that:
"I would provide the patient with any food from the ward fridge or phone the kitchen for food or, if no food was available at all, I would give them milk and biscuits."

An Grade E oncology nurse suggested:

"I would give a glass of milk and biscuits or toast, whichever the patient prefers."

A Grade D surgical nurse reported:

"I would obtain a snack or a sandwich in order to give the drug with food."

A Grade D oncology nurse wrote:

"I would go known to the kitchen or make toast on the ward."

Other issues which were mentioned within the responses for question 4.2.2 included withholding the drug until the next mealt ime, asking the doctor to change the time of administration, and the availability of food for patients on the ward between the official mealtimes.

C.iii Table 3: Nurses’ knowledge, Question 4.2.3

"Some oral drugs should be given before meals because ..." For the purpose of this study, the accurate response should state that:

"food interferes with gastric emptying and enteric coated drugs may be released before reaching the small intestine"

(Martindale 1989)
### Ward Categories Responses according to Grade of Nurses

<table>
<thead>
<tr>
<th>Ward Categories</th>
<th>Responses according to Grade of Nurses</th>
<th>G = 12</th>
<th>F = 7</th>
<th>E = 42</th>
<th>D = 43</th>
<th>C = 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AK</td>
<td>AA</td>
<td>I</td>
<td>N</td>
<td>AK</td>
<td>AA</td>
</tr>
<tr>
<td>SURGERY</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>ORTHOPAEDIC</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MEDICAL</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>ONCOLOGY</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>MIXED</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERCENT</td>
<td>83</td>
<td>8.5</td>
<td>8.5</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AK</th>
<th>Accurate knowledge</th>
<th>G</th>
<th>Ward Sister</th>
<th>RGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Accurate awareness</td>
<td>F</td>
<td>Senior Staff Nurse</td>
<td>RGN</td>
</tr>
<tr>
<td>I</td>
<td>Inaccurate</td>
<td>E</td>
<td>Staff Nurse</td>
<td>RGN</td>
</tr>
<tr>
<td>N</td>
<td>No response</td>
<td>D</td>
<td>Staff Nurse</td>
<td>RGN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>Enrolled Nurse</td>
<td>EN</td>
</tr>
</tbody>
</table>

In Table 3 none of the nurses responses analysed could be recorded as accurate knowledge. There were, however, large scores in the accurate awareness columns. The patterns which emerged were as follows:

**Figure 13: Pattern emerging across grades, for nurses accurate knowledge regarding the administration of drugs before food.**
Figure 14: Pattern emerging across grades for nurses’ accurate awareness regarding the administration of drugs before food

Most of the nurses who responded to this question were able to give a partial version of Martindale’s definition.

For example, a Grade G orthopaedic nurse commented:

"they are more effective on an empty stomach."

A Grade E surgical nurse wrote:

"they are absorbed better on an empty stomach."

A Grade D oncology nurse suggested:

"they act best and are easily reabsorbed into the blood stream. Also, some drug strengths are altered and their absorption slowed down or their required effect reduced."
Each of the three Grade C nurses from mixed wards used the words:

"absorbed more effectively."

The inaccurate response from the Grade G nurse was:

"to avoid gastritis."

The prevention of gastritis is to take certain drugs with meals, not before.

Similarly, the inaccurate response from the Grade E nurse was:

"manufacturer’s recommendation."

Overall, the responses to this question, although not inaccurate, were nevertheless very superficial. There was no mention at all of "gastric emptying" nor of "enteric coated drugs may be released before reaching the small intestine"

C.iv Table 4: Nurses' knowledge, Question 4.2.4

“Three common examples of these drugs which should be given before meals are...” For the purposes of this study the range of accurate responses can be found in Appendix J.
Table 4 contains responses to question 4.2.4 in the questionnaire. The nurses were asked to name three drugs which should be given before meals.

The findings produced the following patterns:

Figure 15: Pattern emerging across grades, for nurses' accurate knowledge regarding 3 drugs taken before meals.
Some of the findings were due to the fact that the nurses did not or could not name three common examples of drugs which should be given before meals.

For example, a Grade G surgical nurse wrote:

"oral hypoglycaemics and colofac."

A Grade F nurse in a mixed ward suggested:

"flucloxicillen and salazopyrin."

This factor was most marked within E and D Grade nurses.

Across the Grade E nurses, although twenty were able to name three drugs, thirteen were not and nine gave no response at all. Similarly, although eight grade D nurses
could provide three drugs, twenty-nine could not and six did not respond. The list of accurate responses contained both class and individual drug names.

Table 5: Nurse’s knowledge  Question 4.2.5

"Some oral drugs should be given with meals because ...." For the purpose of this study, the accurate response should state that:

"the considerable risk of gastric irritation and/or ulceration can be reduced." (Martindale 1989)

<table>
<thead>
<tr>
<th>Ward Categories</th>
<th>Responses according to Grade of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G = 12</td>
</tr>
<tr>
<td></td>
<td>AK</td>
</tr>
<tr>
<td>SURGERY</td>
<td>1</td>
</tr>
<tr>
<td>ORTHOPAEDIC</td>
<td>2</td>
</tr>
<tr>
<td>MEDICAL</td>
<td>1</td>
</tr>
<tr>
<td>ONCOLOGY</td>
<td>2</td>
</tr>
<tr>
<td>MIXED</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6</td>
</tr>
<tr>
<td>PERCENT</td>
<td>50</td>
</tr>
</tbody>
</table>

AK  Accurate knowledge    G  Ward Sister  RGN
AA  Accurate awareness     F  Senior Staff nurse RGN
I   Inaccurate             E  Staff nurse  RGN
N   No response            D  Staff nurse  RGN
C   Enrolled nurse         EN

As can be seen from Table 5, the nurses knowledge was significantly greater for drugs which needed to be taken with meals than it was for drugs which needed to be taken before meals (Table 3). The pattern emerged as follows:
Figure 17: Pattern emerging across grades for nurses' accurate knowledge regarding the administration of drugs with meals

Figure 18: Pattern emerging across grades for nurses' accurate awareness regarding the administration of drugs with meals

Other drugs were included incorrectly in these responses. For example, chlorpropramide and glibenclamide (oral hypoglycaemics), propranolol and
atenolol, (antihypertensive drugs), should each be taken before meals not with meals. Some antibiotics such as metronidazole should be given before meals.

C.vi Table 6: Nurses’ knowledge, Question 4.2.6

"Three common examples of these drugs which should be given with meals are...." 

For the purposes of this study the range of accurate responses can be found in Appendix K.

<table>
<thead>
<tr>
<th>Ward Categories</th>
<th>Responses according to Grade of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G = 12</td>
</tr>
<tr>
<td></td>
<td>AK</td>
</tr>
<tr>
<td>SURGERY</td>
<td>1</td>
</tr>
<tr>
<td>ORTHOPAEDIC</td>
<td>1</td>
</tr>
<tr>
<td>MEDICAL</td>
<td>1</td>
</tr>
<tr>
<td>ONCOLOGY</td>
<td>1</td>
</tr>
<tr>
<td>MIXED</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
</tr>
<tr>
<td>PERCENT</td>
<td>42</td>
</tr>
</tbody>
</table>

AK: Accurate knowledge
AA: Accurate awareness
I: Inaccurate
N: No response
G: Ward Sister
F: Senior Staff nurse
E: Staff nurse
C: Enrolled nurse

In Table 6, which relates to question 4.2.6 in the questionnaire, nurses were asked to name three drugs which should be given with meals. The patterns which emerged were as follows:
Figure 19: Pattern emerging across grades, for nurses' accurate knowledge regarding 3 drugs taken with meals

![Figure 19: Pattern emerging across grades, for nurses' accurate knowledge regarding 3 drugs taken with meals](image)

Figure 20: Pattern emerging across grades, for nurses' accurate awareness regarding 3 drugs taken with meals

![Figure 20: Pattern emerging across grades, for nurses' accurate awareness regarding 3 drugs taken with meals](image)

Some of these findings were again due to the fact that the nurses did not or could not name three common example of drugs which should be given with meals.
For example a Grade G nurse wrote:

"indomethazine ".

An Grade E surgical nurse wrote:

"flucloxicillen ".

5.9  PURPOSE 3

To describe patterns of nursing practice relating to drug administration using dynamic concept analysis.

DCA was described in Chapter Four and is a method of analysing phenomenon by conceptual models.

5.10  D.  Results from the conceptual model development

One hundred and seven models were created with a computer programme which allowed individual responses regarding five concepts of practice to be fed into a pre-determined information structure. For each Grade of nurse who completed a questionnaire, a concept model was produced and then subjected to further analysis. The following discussion describes the process of application of dynamic concept analysis to the study data and results derived from the analysis.

The conceptual models were first sorted according to Grade. This process produced the following results:
Figure 21: Concept models according to Grade

<table>
<thead>
<tr>
<th>Grade</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>12</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
</tr>
<tr>
<td>E</td>
<td>42</td>
</tr>
<tr>
<td>D</td>
<td>43</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
</tr>
</tbody>
</table>

Conceptual models in patterns

It was then possible to consider each individual model in terms of attributes and relationships. Each of the 107 models was then sorted according to attributes. This process produced four initial patterns of attributes.

Conceptual Models in groups

Following the initial identification of four patterns, the 107 models were resorted to ensure that the patterns were absolutely identical, that is, the direction of the arrows was the same. This secondary analysis resulted in seven patterns, now referred to as groups.
d.i  **Group 1, (n=8)**

Conceptual models in Group 1 indicated that the respondents’ attributes were as follows:

1n  rather skilful
2n  rather knowledgeable
3a  very experienced
4n  well prepared
5n  rather powerful

**Figure 22: The model for Group 1 attributes, nurses who were closest to demonstrating optimum practice**

Group 1 indicated that the relationship between the attributes were as follows:

Type 2  one way relationships between
experience and skill
experience and knowledge
knowledge and skill
knowledge and preparation
Skill and preparation

Type 3  no relationships
Type 4  no relationships
Type 5  no relationships

Figure 23: Identical models, Group 1

<table>
<thead>
<tr>
<th>GRADE</th>
<th>INDIVIDUAL RESPONDENTS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>16, 18, 89</td>
<td>37.5%</td>
</tr>
<tr>
<td>F</td>
<td>15</td>
<td>12.5%</td>
</tr>
<tr>
<td>E</td>
<td>88, 94, 97</td>
<td>37.5%</td>
</tr>
<tr>
<td>D</td>
<td>41</td>
<td>12.5%</td>
</tr>
<tr>
<td>C</td>
<td>None</td>
<td>0%</td>
</tr>
</tbody>
</table>

The evidence presented through this model indicates that these nurses have demonstrated a concern for the importance of skilled behaviour. They see their skill developing from experience and knowledge but do not see themselves as being particularly powerful.

Their preparation regarding drug interactions with food was good and they remain knowledgeable on the topic.
d.ii Group 2, (n=14)

Concept models in Group 2 indicated that the respondents attributes were as follows:-

1n  rather skilful
2n  rather knowledgeable
3a  very experienced
4b  poorly prepared
5n  rather powerful

Figure 24: The model for Group 2 attributes, nurses who were also demonstrating practice close to optimum

Group 2 indicated that the relationships between attributes were as follows:-

Type 2 one way relationship between
experience and skill
experience and knowledge
knowledge and skill
Type 3 no relationships
Type 4 no relationships
Type 5 no relationships
The model identified for Group 2 indicates that these nurses have demonstrated a concern for skilled behaviour. This skilled behaviour relates to having experience and knowledge. From the models, they consider that their preparation in terms of drug interactions with food was poor and do not see themselves as being powerful.

d.iii  Group 3, (n = 26)

Concept models in Group 3 indicated that the respondents attributes were as follows:

1n   rather skilful
2b   not very knowledgeable
3a   very experienced
4b   poorly prepared
5b   powerless
Figure 26: The model for Group 3 attributes, nurses who were also demonstrating practice close to optimum

Group 3 indicated that the relationships between attributes were as follows:-

Type 2  
one way relationship
experience and skill

Type 3  
two way relationship
knowledge and preparation

Figure 27: Identical models, Group 3

<table>
<thead>
<tr>
<th>GRADE</th>
<th>INDIVIDUAL RESPONDENTS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>8, 12</td>
<td>7.5%</td>
</tr>
<tr>
<td>F</td>
<td>2, 5</td>
<td>7.5%</td>
</tr>
<tr>
<td>E</td>
<td>38, 52, 82, 84, 91, 92, 101</td>
<td>27%</td>
</tr>
<tr>
<td>D</td>
<td>12, 23, 25, 29, 31, 35, 57, 64, 89, 93, 95, 98</td>
<td>46.5%</td>
</tr>
<tr>
<td>C</td>
<td>36, 37, 38</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

The model for Group 3 indicates that skilled behaviour for these nurses is dependent only on experience. They do however, see a relationship between preparation and knowledge even though their own level of knowledge is not very good and they consider themselves to have been poorly prepared. These nurses also consider themselves to be powerless.
d.iv Group 4, ("Broken" Group 2) \( n = 13 \)

Figure 28: An example of a Group 4 model showing variations within the group 2 attributes

These thirteen models demonstrated variations within the relationships of the Group 2 attributes.

d.v Group 5, Single relationship \( n = 13 \)

Figure 29: The model for Group 5 which links only two concepts of practice

These thirteen models all demonstrated single, one way relationships between skill and knowledge.
The model for Group 5 indicates that knowledge is seen as being of prime importance in relation to skilled behaviour. Interestingly this is the only model where "very skilful" $sk(a)$ was seen to emerge.

d.vi Group 6, "Mavericks" ($n = 18$)

Figure 30: An example of a Group 6 model where no common representation of practice could be identified

These eighteen models all demonstrated relationships between attributes for which no common picture could be constructed.

d.vii Group 7, Broken Group 1 ($n = 15$)

Figure 31: The model for Group 7, nurses who were also closest to demonstrating optimum practice
These fifteen models all demonstrated variations within the relationships of Group 1 attributes.

An assumption has been made that the conceptual model in Group 1 (p. 131) demonstrates the most skilful behaviour. This is because this model is the closest match to all the attributes being recorded as a’s, that is:

- very skilful
- very experienced
- very knowledgeable
- very well prepared
- very powerful

Figure 32: The Model for optimum practice

In this model, knowledge, preparation and power would all contribute to skilled behaviour. Knowledge would be linked to experience, preparation and skill. Preparation has a direct relationship with skill and knowledge. No-one demonstrated this model in the analysis.
Following this assumption about Group 1; Group 2 and Group 3 models may demonstrate attributes which can be also associated with skilful behaviour.

Groups 4, 5 and 6 cannot necessarily be fitted into this continuum but Group 7 demonstrates sixteen broken Group 1 models. These may prove to be closely associated with the findings from Group 1.
5.11 Results from the descriptive study

e.i Once the one hundred and seven conceptual models had been organised into seven groups, a complete summary was produced.

Figure 33: Summary of Conceptual Models

<table>
<thead>
<tr>
<th>GROUP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orth G 18</td>
<td>One F 9</td>
<td>Surg D 25</td>
<td>Surg D 99</td>
<td>Med D 42</td>
<td>Orth E 100</td>
<td>Orth D 61</td>
<td></td>
</tr>
<tr>
<td>Neur F 15</td>
<td>One E 71</td>
<td>Surg D 57</td>
<td>Orth F 4</td>
<td>Med D 79</td>
<td>Med E 24</td>
<td>Orth D 66</td>
<td></td>
</tr>
<tr>
<td>One E 94</td>
<td>One E 72</td>
<td>Surg D 98</td>
<td>Orth E 67</td>
<td>One E 43</td>
<td>Med E 50</td>
<td>Orth D 101</td>
<td></td>
</tr>
<tr>
<td>One E 75</td>
<td>Orth G 12</td>
<td>Med D 70</td>
<td>M&amp;S D 30</td>
<td>Med D 62</td>
<td>Med E 56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One E 75</td>
<td>Orth E 102</td>
<td>One E 53</td>
<td>M&amp;S D 30</td>
<td>Med D 62</td>
<td>Med E 65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One E 77</td>
<td>Orth D 86</td>
<td>Neur E 48</td>
<td>M&amp;S D 81</td>
<td>Med D 47</td>
<td>Med E 83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One E 103</td>
<td>Med E 38</td>
<td>Neur D 49</td>
<td>Neur E 85</td>
<td>One G 14</td>
<td>Med D 51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One D 39</td>
<td>Med E 91</td>
<td>Neur D 60</td>
<td>Neur E 87</td>
<td>One D 32</td>
<td>Med D 51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man G 11</td>
<td>Med D 64</td>
<td>M&amp;S G 7</td>
<td>Med D 96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One G 8</td>
<td>M&amp;S G 10</td>
<td>Neur E 106</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One D 1</td>
<td>M&amp;S F 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One D 93</td>
<td>Gyn D 33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M&amp;S E 92</td>
<td>Priv E 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M&amp;S D 29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M&amp;S D 31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M&amp;S D 35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M&amp;S C 28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M&amp;S C 36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M&amp;S C 37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Priv D 95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neur D 23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n=8  n=14  n = 26  n = 13  n=13  n = 18  n = 15
Patterns of nursing practice across grades

The purpose of the analysis at this stage was to examine the summary to see if patterns of professional practice could be identified across Grades from G to C. The following results emerged:

Figure 34: Patterns of professional practice by Grade:

<table>
<thead>
<tr>
<th>Grade</th>
<th>DCA Group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>G (n=12)</td>
<td></td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>F (n=7)</td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>E (n=42)</td>
<td></td>
<td>3</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>9</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>D (n=43)</td>
<td></td>
<td>1</td>
<td>3</td>
<td>12</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>C (n=3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>8</td>
<td>14</td>
<td>26</td>
<td>13</td>
<td>13</td>
<td>18</td>
<td>15</td>
</tr>
</tbody>
</table>

Eight respondents from the total sample were identified as being Group 1. These 8 nurses were from Grades G to D. The pattern for professional practice indicates that within the study, these nurses are the most skilful. Since Group 7 represented a "broken" Group 1 model, adding their total of fifteen would indicate that twenty-three nurses were in this category.
Fourteen respondents of the total sample were identified as being in Group 2. Twenty-six were placed in Group 3. Group 4 (Broken Group 2) contained thirteen respondents and in Group 7 (Broken Group 1) there were fifteen respondents. Group 6 contained eighteen respondents and Group 5 had thirteen.

e.iii Patterns of nursing practice across specialities

The summary was then used to identify patterns of nursing practice across the specialities of surgery, orthopaedics, medicine and oncology. The results appear below:
Figure 35: Patterns of professional practice across speciality:

<table>
<thead>
<tr>
<th>Speciality</th>
<th>DCA Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Surgical Speciality</td>
<td></td>
</tr>
<tr>
<td>n=33</td>
<td></td>
</tr>
<tr>
<td>G n=3</td>
<td>2</td>
</tr>
<tr>
<td>F n=3</td>
<td>0</td>
</tr>
<tr>
<td>E n=13</td>
<td>2</td>
</tr>
<tr>
<td>D n=14</td>
<td>1</td>
</tr>
<tr>
<td>C n=0</td>
<td></td>
</tr>
<tr>
<td>Orthopaedic</td>
<td></td>
</tr>
<tr>
<td>Speciality n=12</td>
<td></td>
</tr>
<tr>
<td>G n=2</td>
<td>1</td>
</tr>
<tr>
<td>F n=1</td>
<td></td>
</tr>
<tr>
<td>E n=3</td>
<td>0</td>
</tr>
<tr>
<td>D n=6</td>
<td>0</td>
</tr>
<tr>
<td>C n=0</td>
<td></td>
</tr>
<tr>
<td>Medical Speciality</td>
<td></td>
</tr>
<tr>
<td>n=27</td>
<td></td>
</tr>
<tr>
<td>G n=1</td>
<td>1</td>
</tr>
<tr>
<td>F n=1</td>
<td></td>
</tr>
<tr>
<td>E n=13</td>
<td>0</td>
</tr>
<tr>
<td>D n=12</td>
<td>0</td>
</tr>
<tr>
<td>C n=0</td>
<td></td>
</tr>
<tr>
<td>Oncology Speciality</td>
<td></td>
</tr>
<tr>
<td>n=18</td>
<td></td>
</tr>
<tr>
<td>G n=2</td>
<td>0</td>
</tr>
<tr>
<td>F n=1</td>
<td></td>
</tr>
<tr>
<td>E n=10</td>
<td>1</td>
</tr>
<tr>
<td>D n=5</td>
<td>0</td>
</tr>
<tr>
<td>C n=0</td>
<td></td>
</tr>
<tr>
<td>Mixed Speciality</td>
<td></td>
</tr>
<tr>
<td>n=17</td>
<td></td>
</tr>
<tr>
<td>G n=4</td>
<td></td>
</tr>
<tr>
<td>F n=1</td>
<td></td>
</tr>
<tr>
<td>E n=3</td>
<td></td>
</tr>
<tr>
<td>D n=6</td>
<td>0</td>
</tr>
<tr>
<td>C n=3</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8</td>
</tr>
</tbody>
</table>
Comparisons between specialities

Figure 36: Comparisons between specialities for DCA groups 1 and 7, 2 and 3

<table>
<thead>
<tr>
<th></th>
<th>Surgical nurses n=33</th>
<th>Orthopaedic nurses n=12</th>
<th>Medical nurses n=27</th>
<th>Oncology nurses n=18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Group 7</strong></td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>= 10</td>
<td>= 4</td>
<td>= 7</td>
<td>= 2</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td><strong>Group 3</strong></td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19 (57%)</td>
<td>9 (69%)</td>
<td>15 (48%)</td>
<td>12 (75%)</td>
</tr>
</tbody>
</table>

These results show that in terms of skilled practice, Group 1 and 7

10 surgical nurses were closest to the model for optimum practice

4 orthopaedic nurses were closest to the model for optimum practice

7 medical nurses were closest to the model for optimum practice

2 oncological nurses were closest to the model for optimum practice

The following nurses were also demonstrating practice close to optimum, Groups 2 and 3

9 surgical nurses

5 orthopaedic nurses

8 medical nurses

10 oncology nurses

The overall findings from these results will now be discussed in Chapter Six.
6.1 Discussion of the Findings

The purpose of this chapter is to discuss the findings, from Purpose 1, 2 and 3. This discussion will then be followed by an exploration of verifying data derived from interviews undertaken with some of the nurses in the original representative sample. DCA is a reflective activity and Kontiainen (1991) suggests that conceptual models derived from the analysis should be explored in the context to which they belong. Following this exploration, the author will summarise the study so far in terms of Mitchell’s four principles of triangulation (1986). The scene will then be set for Chapter Seven in which the educational implications of the study will be addressed.

6.2 Purpose 1

To investigate current practices regarding the prescription and administration of drugs which have special recommendations regarding food

The results for each class of drug and the areas of specialism involved will now be discussed.

During the study ten drug rounds were observed. Although only lunchtime and suppertime drug rounds were observed within the sample, these were also the rounds in which most drugs with special recommendations for food were administered. The results might have
been very different if the morning and night-time drug rounds had been included. At
night, drugs would not be given with a meal and this would favour the correct
administration of drugs which should be given on an empty stomach for example,
antibiotics. It would, however, put at risk the correct administration of drugs needing to be
taken with food for example, NSAIDS and corticosteroids. The timing of the morning
drug round varies from ward to ward. Some rounds coincide with breakfasts being served
whereas other rounds may start up to one hour after breakfast. This arrangement will again
favour the correct administration of some drugs and disadvantage the administration of
others.

Drugs have specific recommendations for administration with regard to food intake for one
of two reasons:

1. The drugs must be given at certain times in relation to food in order that the
   bioavailability of the drug is at its maximum. The maximum level will then ensure
   that the drug remains at the correct concentration in the blood (Welling and Tse
   1982).

2. The drug must be given with food in order to minimise the risk of gastric-intestinal
damage leading to ulceration and haemorrhage (Ivey 1990).

The therapeutic implications of incorrectly administering NSAIDS and corticosteroids
would be that they are likely to cause damage to the gastrointestinal tract. This causes
additional problems for the patient in terms of increased time spent in hospital and an
overall delay in the recovery period. They may also suffer additional pain, discomfort and in some cases, life-threatening emergencies if gastric ulcers bleed.

If antibiotics are incorrectly administered in relation to food intake, the implications are that the drug will not be at the correct level in the blood and its therapeutic level will be diminished (Welling and Tse 1982). This lowering of the drug level may again lengthen the time a patient must remain in hospital and cause prolonged effects of distressing symptoms such as urinary or chest infections. These adverse situations are therefore both costly for patients and for hospitals. In this study antibiotics, NSAIDS and corticosteroids were all given incorrectly at times and were also given incorrectly on different wards.

The results and analysis derived from the observation study highlight several areas of concern. Although only sixty drugs from a total of two hundred and six had special recommendations regarding food, there were important discrepancies in the information/instructions provided by doctors and pharmacists and the administration of these drugs by nurses. Prompt action is required to resolve this problem and to prevent the serious consequences of diminished therapeutic effects or increased risk of adverse reactions. The findings are supported by other relevant research (Carr, Dickerson and Goodinson 1990).

6.3 Antibiotics (n=31)

The reasons for the findings, six antibiotics administered accurately and twenty-five administered inaccurately (Figure 6, p:107), could relate to the timing of the drug round.
Patients who have their drugs administered at the start of the round are more likely to have them administered accurately, that is, thirty minutes before a meal, than those receiving antibiotics in the middle or at the end of the drug round when the meals may already have been served. From the observation study, it is unlikely that individual patients who have eaten will have their antibiotics withheld and administered at the later correct time, that is, two hours after a meal. This finding is similar to the work carried out by Petrick and Kleinmann (1975). These drugs will either be taken with food so that the nurse can check that the patient has taken them or the dose will be omitted altogether. In either case the timing in relation to food will not be accurate. It is of concern that the therapeutic effect of the antibiotics given after food will be lowered and as a result, the patient's recovery from surgery or a medical condition could be delayed. This result applied to 80% of the antibiotics given. The teaching of pharmacology with regards to antibiotics is very superficial in the pre-registration curriculums which may be a factor involved in this result. The finding may also require post-registration courses to have their pharmacology input updated.

For antibiotics, none of the thirty-one drugs prescribed had additional information written on the drug chart by doctors. Pharmacists had provided instructions for twenty-four. Although the accuracy of prescription regarding the information and instruction given by doctors and pharmacists is not the major focus of this study, the results described do give cause for concern. This additional information should be available to nurses and it is not satisfactory that in so many cases it was omitted.
6.4 NSAIDS (n=11)

In terms of administration, of the eleven NSAIDS, nine were given accurately and two were given inaccurately (Figure 7). This finding could again be related to the timing of the drug rounds observed. Since the lunchtime and suppertime rounds coincides with the availability of food it is more likely that patients will have these NSAIDS administered accurately. In terms of additional information required by doctors, none was provided. Pharmacists wrote instructions for two of the eleven drugs (Figure 7, p.108).

This result can be linked to the teaching of pharmacology in the pre-registration curriculums. The side effects of NSAIDS such as gastric irritation and haemorrhage are always stressed and nurses must develop an understanding of these risks and therefore the importance of these drugs being taken with food (Ivey 1990).

6.5 Corticosteroids (n=18)

Fifteen drugs were administered accurately and three were administered inaccurately. The reasons for these findings could be similar to those for NSAIDS. No additional information or instruction was provided by doctors or pharmacists for these eighteen corticosteroids (Figure 8, p:109).

The reason for this finding in relation to administration, could again relate to the teaching of pharmacology in the pre-registration curriculums where particular emphasis is placed on the side effects of corticosteroids (Martindale 1989).
These findings raise concerns in relation to the pharmacology literature. Welling (1977b) makes reference to the huge investment in time and money on which the development of these drugs depend. The investment will be wasted if drugs which should be taken before meals are inhibited by the presence of food in the stomach. Equally those drugs which should be taken with food, corticosteroids and NSAIDS in particular, may well be doing considerable damage to the patients' gastrointestinal mucosa if not administered accurately.

Other factors which were explored in the pharmacology literature and might have influenced the nurses' reaction for example, positioning the patient (Lewis and Said 1961, cited in Bates and Gibaldi 1970) were not observed by the researcher as playing any part in the nurses' behaviour. Cold water and milk were the only liquids seen to be offered and issues such as the temperature, viscosity, volume and composition did not appear to be considered (Bates and Gibaldi 1970).

While the drug round was in progress, none of the nurses expressed any views about how the food might have been cooked (Pantuck 1976, Conney et al 1976, Kappas 1978). Research using charcoal-broiled beef has shown that some drugs such as theophylline and antipyrine are better absorbed with beef cooked in this way.

6.6 Comparisons between Wards (Figure 9 p:110)

Surgical (n=23)

In the surgical wards where four lunch-time drug rounds were observed, fifteen drugs were administered inaccurately and eight were administered accurately. This result reflects busy
wards which often experience an extremely fast throughput of patients. Although drug administration was not unsafe, 65% of drugs where special requirements are needed, were not being given at the correct time. Surgical patients may not be familiar with their prescribed drugs and must rely on the actions of the nurses to ensure that they take them correctly. Because of the hectic pace, pharmacology updates may be infrequent if indeed they happen at all. This may account for only 35% of drugs which had special recommendations for food being given accurately. Pharmacists provided accurate instruction for twenty drugs prescribed on surgical wards.

Medical (n=19)

In medical wards, where three lunch-time drug rounds were observed, nurses administered ten drugs inaccurately and nine drugs accurately. Here the percentage of drugs given accurately was higher than for surgical wards, that is, 49%. It is acknowledged that the number of drugs under consideration is slightly less in medical wards than surgical wards (n=23) and (n=19) respectively, but a trend can still be identified.

This small increase in accurate administration by nurses may be due to a slower pace where there is more time for the drugs to be given according to the special requirements for food. Some patients may also be more familiar with their prescribed drugs, especially if they have chronic illnesses such as arthritis or asthma. It is also likely that there is more time for pharmacy staff to update nurses although recording this activity did not form part of the observation study.
Oncological \((n=18)\)

Observations of one lunch-time drug round and two supper-time drug rounds took place. Eleven drugs were administered accurately and seven drugs were administered inaccurately. This result showed that 70\% of the drugs which had special recommendations for food were administered accurately. This finding could relate not only to the timing of the drug rounds observed but also to the fact that patients with long-standing oncological problems often know a lot about the drugs which they are taking. Many of these drugs are very toxic to the body, for example NSAIDS, corticosteroids and cytotoxic compounds. Patient education is viewed by most nurses in this speciality to be extremely important and during weeks and months of treatment patients learn about the special requirements relating to drug and food intake.

Qualified nurses, who have often undertaken additional specialised courses understand these effects and should take considerable care over their administration. Because of this greater knowledge, it is surprising that seven drugs which had special recommendations for food were given inaccurately.

It would seem therefore that from a comparison of the observation data across medical, surgical and oncology wards, drugs which have special recommendations regarding food are administered more accurately in oncological areas than in medical and surgical areas. This finding raises concerns regarding the Codes of Conduct produced by the United Kingdom Central Council for Nurses, Midwives and Health Visitors. Standards for the Administration of Medicines \((UKCC\ 1992)\) states quite clearly that drug administration
requires thought and the exercise of professional judgement to ensure that oral medications are given at the scheduled time. Similarly the Code of Professional Conduct (UKCC 1992) states that registered nurses must be personally accountable for their practice and must always act in such a manner as to safeguard and promote the patients’ well-being. The findings from this section of the research should be explored further in relation to the nurses’ comparative understanding of and adherence to their own Codes of Professional Practice, since the findings indicate that many qualified nurses are guilty of misconduct (Adams 1996).

Although no comparative studies have been undertaken previously regarding different speciality areas, these findings are in general similar to those presented by Johnson and Giles (1993). They refer specifically to the problems of efficient time management, and the morning and evening drug rounds when no meal is available.

Other reasons for this finding may relate to the educational preparation of the nurses concerned and also to their subsequent post basic educational opportunities (Fitzpatrick et al 1994). This issue will be addressed following the discussion on the findings from the second purpose of the study.

More generally, the literature regarding the observation of nurses performance using rating scales (Wilson 1975, Bondy 1983, Fitzpatrick et al 1994, While 1994) has demonstrated that this methodology needs more development. Establishing acceptable levels of inter-rater reliability for a range of behaviours is urgently needed (Tomalin et al 1993). More
work should be undertaken on both percent agreement and intra-class correlation coefficient. (Polit and Hungler 1991). To date, most of the studies available have been carried out in the United States.

6.7 Special concerns arising from Purpose 1

Although general concerns arising from the results and analysis will be summarised at the end of this Chapter, the author wishes to highlight one which relates specifically to Purpose 1.

Additional Instructions and Information

It became apparent in the observation study that additional instructions and information regarding drugs which have special recommendations for food were often omitted from the drug prescribing/recording form.

In the case of doctors instructions, these were never provided for the antibiotics, NSAIDS or corticosteroids, administered during the study. A future research project might investigate the reasons for this phenomenon and the direct effect the omission has on drug administration.

Additional information from pharmacists was provided more frequently and again the reasons for this situation might form the basis of future research.
6.8 Purpose 2

To establish what knowledge different grades of nurses have regarding the timing of drug administration and its relation to food intake

The results shown in Chapter Five demonstrate that overall, the knowledge of different Grades of nurses is variable. It must be acknowledged that the number of respondents from each nursing Grade were derived from a representative sample and that totals therefore differ. From this respect, it is only possible to discuss trends and then make recommendations for further work which might involve a more rigorous approach to sampling.

The questionnaire for the study contained a block of open-ended statements and the nurses were required to make written responses to them (Appendix E, 4.2).

It was judged that the responses to these six statements would enable the researcher to quantify various levels of knowledge. The two levels identified for the study were firstly “accurate knowledge”, indicating that the response matched that given in Martindale (1989). The second level of knowledge was “accurate awareness”, indicating that the level of knowledge expressed was only partially in line with Martindale’s definition. The questions themselves required responses concerning the reasons why food and drugs needed to be taken separately or together. The respondents were also asked to state how they would substitute a meal for a patient if none was available. They were then asked to name three drugs which needed to be taken which needed to be taken with meals. If the nurses wrote nothing in the space available this was recorded as a “no response”.

156
The results and analysis from each open-ended statement will now be discussed.

6.9 **“It is important that oral drugs and mealtimes should coincide because...”**

The first question, Table 1, Question 4.2.1 (p:113), although rather vague, did demonstrate that knowledge increases with seniority. As would have been expected Grade G and F scored almost 100% each for this question whereas the Grades E and D scored between 69% and 61% respectively for accurate knowledge and 28% and 26% for knowledge which demonstrated awareness. The most junior, the Grade C enrolled nurses, scored 33% for accurate knowledge and 67% for accurate awareness. One criticism of the study is that it was not possible to include a larger number of Grade C nurses in the representative sample. Formerly, enrolled nurses had a statutory training programme of two years rather than the three years undertaken by Registered Nurses. It would have been interesting to have undertaken a comparative study concerning the differences relating to the teaching of pharmacology within these two programmes.

6.10 **“If a patient needs an oral drug which has special recommendations for food and no meal is available I would...”**

The results from Table 2, Question 4.2.2 (p:116) showed a different pattern. Here the scores for accurate knowledge were low for all Grades, the most junior Grade C nurses scoring the highest percentage, that is 67%. The most senior Grade G nurses scored only 50%. This result, where many nurses made no mention of milk, biscuits or toast is surprising, given that emphasis is placed on the risk of gastric irritation and haemorrhage.
especially in relation to NSAIDS and corticosteroids. Where milk, biscuits and or toast was mentioned, considerable effort might be needed to provide patients with these items (Johnson and Giles 1993). In general, ward kitchens no longer exist in their previous form. They used to be stocked with items such as bread, butter, milk, sugar, etc. A substitute meal could always be provided with little difficulty. The disappearance of these facilities may be extremely important in preventing nurses from providing patients with suitable alternatives when no meal is available. From their comments many nurses were implying that considerable effort would be required to produce a glass of milk and several biscuits. Other issues mentioned in the responses referred to withholding the drug until the next mealtime and asking the doctor to change the time of administration. The first of these comments could effect the patient’s therapeutic level if the drug were, for example, an antibiotic. Missing a whole dose could effect recovery from pneumonia or the healing time of traumatic wounds caused by a road traffic accident. Asking a doctor to change the timing of drug administration might ensure that the drug was more accurately administered.

6.11 “Some oral drugs should be given before meals because...

Results from Table 3, Question 4.2.3 (p.120), indicate that none of the respondents could demonstrate accurate knowledge concerning this question. Their level of understanding as derived from their responses was at the level of awareness. These nurses were unable to make the physiological and pharmacological links between food and its effect on gastric emptying.
None of the respondents referred to enteric-coated drugs being released before reaching the small intestine. This factor is again very important in terms of certain drug compounds being affected by gastric acid. During the period of this research, the author became aware that nurses sometimes crush enteric-coated drugs before asking the patient to swallow them. It may make the drugs easier to take but renders them virtually inactive as a result. Their required therapeutic effect may be greatly diminished (De Souich *et al* 1990). Six nurses made no response to this question. One was a Grade G and five were Grade E nurses. These were senior staff and it is of great concern that they left this question blank.

6.12 “Three common examples of these drugs which should be given before meals are...”

The results from Table 4, Question 4.2.4 (p:123) demonstrate that qualified nurses could not name three drugs. Accurate knowledge was shown by 58% and 57% of Grade G and F nurses respectively. Of the Grade D nurses, only 19% were able to provide three examples. Since the three classes of drug used for the study are the most commonly administered medicines, this finding must be addressed promptly.

Across the Grade E nurses, although twenty nurses, 48%, were able to name three drugs, nineteen, 52% were unable to respond in this way. Similarly, although eight, 19% Grade D nurses could provide three drug names, twenty-nine, 67%, could not, and six, 14%, did not respond at all.
6.13 “Some oral drugs should be given with meals because...”

In Table 5, Question 4.2.5 (p:125), it can be seen that the nurses had greater knowledge concerning drugs which needed to be taken with meals than they had for drugs which needed to be taken before, Table 3.

Nevertheless, the Grade G nurses only scored 50% for accurate knowledge whereas the scores for Grade F and E nurses were higher, 86% and 74% respectively.

This finding relates to the dangers of taking NSAIDS and corticosteroids on an empty stomach. A fact about which most of these nurses had accurate knowledge.

The non-response results from Question 4.2.5 were higher than from Question 4.2.3, 46% and 20.5% respectively. The implication of this is hard to explain since the nurses knowledge was more specific regarding drugs to be given with meals than it was for drugs to be given before.

6.14 “Three common examples of these drugs which should be given with meals are...”

Results from Table 6, Question 4.2.6 (p:127) indicate that although these responses demonstrate approximately 50% accurate knowledge across all Grades (apart from the Grade F nurses who scored 71%), it was still disappointing that relatively few nurses could
name three common drugs which should be given with meals. The Grade D nurses were of concern since less than 50%, nineteen out of forty-three were able to complete this question.

The non-response results were higher for Question 4.2.6 than for Question 4.2.4, 50% and 35% respectively. This is rather surprising since the nurses appeared more knowledgeable about the reasons for drugs being taken with meals than the reasons for them being taken before meals.

The discussion of these results has shown that qualified nurses across a range of Grades are in general, able to demonstrate knowledge regarding the timing of drug administration and its relation to food intake. The level of this knowledge does, however, vary from being accurate (Martindale 1989) to demonstrating only awareness. Knowledge at the level of awareness may delay or prolong a patient’s recovery time and suggests that the level of knowledge must be improved to ensure that the drugs which are being administered are able to produce the therapeutic affect intended.

No response

There were the 59 occasions out of 642 where nurses gave no response at all (9%). It would have been interesting to have followed up the reasons for the non responses and this might form part of a future research project. In the meantime, the researcher could only surmise that, the nurses did not know the answers to these questions. Failing to record a response could also have masked an inaccurate response.
There was one 'no response' in Question 4.2.1 recorded by a Grade E nurse. Eight 'no responses' were recorded for Question 4.2.3 given by one Grade G, five Grade E nurses and two Grade D nurses. In Question 4.2.4, seventeen 'no responses' were recorded ranging across all Grades. Seventeen 'no responses' were also recorded in Question 4.2.5 by differing Grades of nurse. For Question 4.2.6 sixteen 'no responses' were identified.

Those with the highest scores, related to Question 4.2.4, regarding three drugs which should be taken before meals; Question 4.2.5 regarding the reasons for certain drugs being given with food; and Question 4.2.6 when nurses were asked to name three drugs which should be taken with meals.

In terms of speciality areas, for these three questions there were eighteen 'no responses' from surgical nurses, thirteen 'no responses' from medical nurses and eight 'no responses' from those nurses in oncology wards. Generalisations cannot be made from this data but for the clinical areas which were involved in this study pharmacology updating and ongoing education must be considered as a matter of urgency.

**Inaccurate responses**

What is also of considerable concern are the eight inaccurate responses which were recorded. Although this number represents only 1% of the total responses possible for Question 4.2 as a whole (107 x 6 = 642) the reason for these errors should be followed up as soon as possible.
One inaccurate response was recorded in Question 4.2.1. In response to the statement "It is important that drugs and mealtimes should coincide", the respondent, a Grade D medical nurse wrote:

"because it is convenient".

The author interpreted this response as inaccurate because it did not include any reference to drugs or food whatsoever. Convenient for whom, might be the next question to ask. One inaccurate response was recorded for Question 4.2.2 which referred to the action required if no meal was available. A Grade E oncology nurse suggested that she would:

"wait until a meal was available".

Two inaccurate responses were recorded for Question 4.2.3 regarding the reason for some oral drugs being given before meals. A Grade G surgical nurse wrote:

"to avoid gastritis"

and a Grade E surgical nurse wrote:

"manufacturer's recommendation".

The response from the Grade G nurse was of particular concern since not only was the person the most senior nurse on the ward but the answer given was the exact opposite of what was required. In other words, gastritis is avoided by taking drugs with food and not before (Ivey 1990).
Two inaccurate responses were recorded for Question 4.2.5. These responses related to the reasons for some drugs being given with meals. The two respondents were both Grade E surgical nurses working in surgical wards. They both referred to drugs which are not to be given with meals for example chlorpropamide and propanolol. There was one inaccurate response for Question 4.2.6 which related to three drugs which should be given with meals. A Grade D medical nurse wrote:

"glibenclamide".

This drug is an oral hypoglycaemic and should be given before meals.

It was not part of the study design to follow-up the non-responses or the inaccurate responses but consideration needs to be given to methods by which knowledge related to the timing of drugs and food can be enhanced and maintained.

6.15 Specific concerns arising from Purpose 2

The variability of nurses knowledge

When the percentage scores were considered, the level of knowledge which nurses demonstrated was variable across all Grades. The responses for some questions showed that senior Grade G and F nurses had only obtained a 50% score for accurate knowledge, for example, Question 4.2.2, 4.2.4 and 4.2.6.
In contrast, some of the more junior Grades E and D, scored higher percentages, for example, Question 4.2.5. It was not possible to assume from these results that senior nurses always had higher levels of knowledge than their junior colleagues although this would probably be the expected result. Experience, in terms of time spent in senior positions may not always equate with increasing knowledge. Indeed, it is a dangerous assumption to make, given the nature of these results. Similar findings were shown in a study by Wilson (1975) where she sought to establish the nurses' knowledge regarding biological science from a questionnaire survey.

Substituting meals

This issue of meal substitution excluded to a large extent any mention of biscuits or toast. Almost all of the 107 nurses mentioned milk in their responses but the effect of this liquid may only serve as a medium in which the drug is dissolved. The protective nature of solid food in the stomach has not been fully researched even though it is recommended that food should be eaten before NSAIDS and corticosteroids are taken (Martindale 1989). The issue regarding test meals and their varying composition was mentioned in Chapter One. However stringently oral drugs are administered during pre-clinical trials, the same test meals, including the exact amount of calories and composition in terms of fat, protein and carbohydrate is never likely to be provided for patients taking the drugs subsequently. This fact was also referred to by Ali (1982) who suggested that drug manufacturers themselves do not specify the amount or type of food to be taken. Brandt et al (1995) found that high protein meals caused a 35% increase in splanchnic blood flow. The increased blood flow resulted in the correct concentration of drug being reached more quickly. This research-based evidence, although not necessarily conclusive, is very rarely discussed with pre- or
post-registration students. Very few large scale studies have been undertaken concerning qualified nurses' knowledge regarding drugs which have special requirements for food. This study has therefore created new evidence which should be replicated and developed.

6.16 Purpose 3

To describe patterns of nursing practice relating to drug administration using dynamic concept analysis

The next section will be used to not only describe the findings from Purpose Three but to begin the process of triangulating the data obtained from the study as a whole.

Triangulation was explored in Chapter Three when, after a consideration of the literature which either supported the notion or rejected it, the author decided that methodological triangulation was the right approach (Mitchell 1986). It was anticipated that this powerful integration of data would provide very robust and authentic results.

The importance however, of the underlying paradigm was not forgotten and a qualitative approach has been dominant throughout the study (Powers 1987). This approach, it is hoped, will guide the author in establishing how best to present the discussion as it arises from the triangulation process. The process itself fits into Mitchell's description of "across method triangulation" where dissimilar but complementary methods are used to try to achieve convergent validity. The combination of dissimilar methods provides opportunities
for counterbalancing the weaknesses of one method with the strengths of another. It also allows for the combination of both qualitative and quantitative methods of data collection within the same study (Cowman 1993).

Hammersley and Atkinson (1983) however, suggest that triangulation is not a simple combination of different kinds of data but the attempt to relate them so as to counteract the threats to validity identified in each.

"One should not, therefore, adopt a naively 'optimistic' view that the aggregation of data from different sources will unproblematically add up to produce a more complex picture". (Hammersley and Atkinson 1983:199)

It may be that the difference between types of data can be as illuminating as their similarities. The eventual outcome of triangulation is to add range and depth to the findings rather than accuracy and objective truth (Fielding and Fielding 1986).

Several authors have commented on the technical problems associated with the analysis and interpretation of triangulated data (Fielding and Fielding 1986, Haase and Myers 1988). There is very little literature to help the novice researcher and this lack of guidance was a daunting prospect as the study developed. Mitchell’s four principles are offered as a way of minimising these problems and their application to the study are described later.

The qualitative methods which have been used involve activities within dynamic concept analysis. This method is reflective in nature especially when the key concepts are being chosen and the relationships between them are being explored. Interviews with twenty-
three nurses from the representative sample were also qualitative in nature. The conversations enabled the researcher to produce verifying or confounding data for a range of issues concerning drugs administration and reflective practice. This personal information was very important in terms of content and context validity and a discussion on the views which emerged appears later in the Chapter.

The quantitative data was derived from the observation study and the survey questionnaire. These methods enabled the researcher to see what was happening in practice and to quantify levels of knowledge concerning drug interaction with food. Other quantitative date relating to the key concepts of skill, knowledge, experience, preparation and power were also obtained from the questionnaire.

Convergent validity is the main aim of across method triangulation, that is, each set of data confirms another and therefore gives robustness to the results. It is the view of the author that convergent validity cannot be claimed for every issue addressed in the study as the following discussion will demonstrate. Some of the results however can be cross validated and these relate in particular to the need for more educational support and development.

From the results in Chapter Five, seven groups were identified and described. Each group comprised nurses from all the Grades involved in the study apart from Grade C (Enrolled Nurses).

It is important to emphasis once again, that in applying DCA, an information structure is the basis for building conceptual models. The models described in Chapter Five were built
from concepts and relationships which the author considered to be central to professional nursing practice. The concepts were all fairly broad and not all of them were able to demonstrate interconnections, particularly "power". When the initial analysis took place, the concept of power was almost always unconnected with any other concept. Only twelve respondents recorded themselves as being very powerful. This issue will be referred to in more detail when the interviews are discussed.

There are no other published studies which have used DCA to explore current nursing practice regarding drugs which have special recommendations regarding food. There is therefore no absolute comparison in the literature from which the author can draw inferences. Studies concerned with other professional activities have however been published (Kontiainen and Hobrough 1991. Kontiainen and Manninen 1991). The methodology used for maximising validity and reliability in these studies has been followed by the author during the development of this research. The five key concepts have drawn on existing literature discussions with both clinical and educational experts and the author's own experience and expertise. This evidence has informed the process of DCA but the findings are new for this element of practice and as such have increased the boundaries of knowledge in this area.

6.17 Patterns of nursing practice for Surgical Nurses (n=33)

Dynamic concept analysis

The patterns of nursing practice within the surgical speciality show that only ten (33%) nurses were demonstrating the most skilled behaviour, (Group 1 and Group 7), (Figure 36, p:144). Of these ten, three were the most senior nurses, that is Grade G. This is a finding
which the researcher would have expected, that the most senior nurses were providing the most skilled care in relation to drug administration. There were however, junior Grades E and D in Group 1 and 7 demonstrating skilled behaviour.

One Grade E nurse was in Group 2 (3%) and eight were in Group 3 (24%); two were Grade F, three were Grade E and three were Grade D. A pattern of nursing practice cannot therefore be identified across these Grades. It is evident, however, that nineteen of the thirty-three nurses (57%) were included in Group 1, 7, 2 and 3.

Observation data

The observation data showed that of the drugs which had special recommendation for food, only 35% were correctly administered by surgical nurses (Figure 9, p:110). From the methodology used, it is not possible to demonstrate which Grades of nurse gave the 35% accurately and this is a weakness in the study.

Levels of knowledge

The analysis of the level of knowledge (Appendix E) possessed by different specialities showed that two of the three Grade G nurses had accurate knowledge for Question 4.2.1 concerning drugs and mealtimes coinciding. One Grade G nurse had accurate knowledge for Question 4.2.2 which related to substituting a meal for milk and biscuits. No Grade G nurse had accurate knowledge for Question 4.2.3 regarding why some oral drugs needed to be given before meals and only one Grade G nurses could name three common examples of
drugs which should be given before meals. For Question 4.2.5 regarding the reason that some oral drugs should be given with meals, one Grade G nurse had accurate knowledge. For the last question, 4.2.6 concerning three common drugs to be given with meals again, only one Grade G nurse gave an "accurate knowledge" response.

The findings for a more junior Grade D, showed that seven out of fourteen nurses had accurate knowledge for Question 4.2.1. Four Grade D nurses had accurate knowledge for Question 4.2.2 and no Grade D nurse had accurate knowledge for Question 4.2.3. Two of the fourteen nurses had accurate knowledge for Question 4.2.4 and thirteen provided an accurate response for Question 4.2.5. For Question 4.2.6 six Grade D nurses had accurate knowledge. These findings demonstrate that there is a need for the level of nurses' knowledge to be raised across all Grades.

**Interviews**

The purpose of the interview was to add more depth to the findings obtained from dynamic concept analysis (Appendix F). The nurses' comments from the conversation were recorded on the interview schedule by the researcher.

**Surgical nurses**

Of the thirty-three surgical nurses involved in the study, five appeared in Group 1 and five in Group 7 (Figure 36). Only ten surgical nurses were therefore demonstrating a high level of skilled behaviour according to dynamic concept analysis. This finding is in general consistent with that of the observation study where surgical nurses were observed to administer only 35% drugs correctly in relation to specific instructions regarding food.
Interview Data, Group 1

From the representative sample of interviews undertaken with surgical nurses, none were from Group 1. This is unfortunate since exploring the validity of the analysis was not possible for this clinical group. One surgical nurse was included in Group 2 and eight in Group 3. Of these nine surgical nurses, three were interviewed, one from Group 2, one from Group 3 and one from Group 4.

Interview data, Group 2

An interview to verify the finding of the DCA was undertaken with a Grade E surgical nurse from Group 2.

It was evident from the interview data that the nurse was able to verify a considerable amount of information from discussion relating to her completed questionnaire. She agreed with the model and particularly reinforced the importance of knowledge kn(n) and experience ex(a) as the major contributors to a skilled performance sk(n). In her view, she had been poorly prepared regarding drug interaction with food pr(b) and was extremely concerned at this omission. She also agreed that she was a fairly powerful person po(n).

"This questionnaire has really shown me that I need to do some more reading. Is someone reviewing the way student nurses are taught about these drugs?"

The questions which related to learning from experience produced some important findings. This Grade E staff nurse expressed strong support for this process and although she described ways in which she was attempting to learn from each practical activity for example, writing down problems she observed or was told and then dealing with them as
promptly as possible, there were considerable constraints in terms of time and resources in solving these problems.

"Everything seems to be so rushed, it's difficult to find the time to think."

In order to upgrade the model for Group 2 to the model for Group 1, the attribute relating to preparation needs to move from pr(b), poorly prepared, to pr(n), well prepared. The nurse was able to suggest ways in which staff development would help her to be better prepared for this clinical activity. She felt that more pharmacological updates could be provided. These activities could include both discussion on the ward regarding various patients' drugs and written updates supplied by pharmacy on a regular basis. This additional information would then be available to her to pass on to patients and other staff, particularly students. She viewed the written information as being a major source of staff development since the pace of work and the turnover of patients meant that there was little time for lengthy discussions to take place.

"It would be really useful to have regular teaching sessions on the ward, it would make us discuss our problems more."

The nurse also mentioned the importance of longer courses and her current involvement in the BSc (Hons) Health Studies course from which she was deriving enormous benefit.

"This would be a good example to use for a critical incident exercise. I have to do these on my degree course."

Interview data, Group 3

An interview to verify the findings of the DCA was undertaken with an Grade F Staff Nurse.
This nurse agreed with the important link identified in her model with experience \( \text{ex}(a) \) and skill \( \text{sk}(n) \). She felt that the more you did something the better the quality of that activity. There was however for this person, a clear relationship between the poor preparation \( \text{pr}(b) \) which she had received relating to drug interactions with food and her current low level of knowledge \( \text{kn}(b) \).

"The topic was hardly mentioned in my training."

She reinforced a concern that her current understanding of these specific drug reactions did not make her practice unsafe but she needed to ensure that the timing of their administration was more precise, thus maximising their therapeutic effect.

*I shall certainly be more careful in future."

In terms of learning from experience, this did sometimes happen. More often however, the drug round became rather a routine activity with so many interruptions that it became quite hard to think about what was happening.

"Everyone seems in such a hurry to get the drug round to of the way but it could be such a good learning exercise."

Looking at the changes which would be necessary in order that the Group 3 model should become a Group 1 model, preparation \( \text{pr}(b) \), would have to become \( \text{pr}(n) \) and knowledge \( \text{kn}(b) \) would have to become \( \text{kn}(n) \).

Both of these changes were reflected in the Grade F staff nurses' responses to Section 4 of the interview schedule. She welcomed the idea of specific up-date sessions from pharmacy staff and suggested that all clinical personnel could benefit. She did not however consider that any changes were necessary to the procedure for drug administration.

"It would be useful to be taught with other members of the team. We could then learn from each other."
6.18 Patterns of nursing practice for orthopaedic nurses (n=12)

Dynamic concept analysis

The patterns of nursing practice within the orthopaedic speciality showed that only four nurses (30%) were demonstrating the most skilled behaviour, (Group 1 and 7) (Figure 36). Of these four, one was a senior Grade G and three were junior Grade Ds. Two Grade Ds were in Group 2 (15%), and three nurses across a range of Grades were in Group 3 (23%). It is not possible therefore to identify a pattern of practice which indicates that more senior nurses are providing the most skilled care. It is evident however, that nine of the twelve nurses (69%) were included in Group 1, 7, 2 and 3.

Observation data

No data for orthopaedic nurses is available from the observation study.

Levels of knowledge

The analysis of levels of knowledge (Appendix E) showed that the two Grade G nurses had accurate knowledge for Question 4.2.1 but demonstrated only awareness for Question 4.2.2 and Question 4.2.3. They also had only awareness of the responses to Question 4.2.4 and 4.2.5. One Grade G nurse gave an accurate response to Question 4.2.6.

From the findings relating to the six junior Grade D orthopaedic nurses, five had accurate knowledge for Question 4.2.1 and one had accurate knowledge for Question 4.2.2. No Grade D nurses had accurate knowledge for Question 4.2.3 or for Question 4.2.4. Four nurses had
accurate knowledge for Question 4.2.5 and three for Question 4.2.6. These findings suggest that more education needs to be undertaken in orthopaedic areas.

Interviews

Thirteen orthopaedic nurses took part in the study and of these, one was from Group 1. The nurses' comments from the conversation were recorded on the interview schedule.

Interview data, Group 1

A Grade G nurse was interviewed from Group 1. Once the model had been explained she felt that it did relate to her behaviour and attitudes. Skill sk(n) she felt was firmly based on knowledge kn(n) and experience ex(a). She also indicated agreement with the influence of experience ex(a) on power po(a). This relationship was slightly different to the others in Group 1, as was this senior nurse's exclusion of preparation pr(b).

The attribute of power was seen very positively by this nurse. She felt that her role as ward manager gave her power to take decisions and to be involved in decision-making generally. She viewed good leadership as essential and was constantly motivating her staff. This motivation was also a powerful influence when she wanted support for making changes. Additional power had been obtained through undertaking a BSc in Health Studies. Even though she wished to improve her knowledge and understanding of drug reactions with food, she felt confident in being able to find this information for herself.

"I do think motivation is so important in getting things right. I shall organise some sessions with the pharmacy staff as soon as possible. Continuing education is vital for up to date care."

176
In terms of her responses to Section 4 on staff development, she was anxious to involve as many people as possible to look again at how drugs were administered. Changes, she felt could be discussed, based on updates particularly from the pharmacy staff. If good, creative ideas emerged like, for example, the use of blister packs (for packaging individual drugs), she would use her power in order to implement and evaluate them. She remarked that these two activities were very much the essence of degree level nursing. It would be a considerable challenge for the nurses to be part of changing such a ritualistic procedure as the drug round.

"I think I'm fairly powerful because of my knowledge. Relevant knowledge helps me to make changes. I can challenge my colleagues about lots of issues."

Interview data, Group 2

A Grade D orthopaedic nurse in Group 2 agreed to be interviewed. She was not very forthcoming about her views on the model but did not appear to disagree with its interpretation. She was more communicative about her views on power and could not envisage from her junior status, how she would ever be able to implement change.

"No-one seems very interested in what I think or asks me my opinion. I just get on with the work."

In terms of learning from experience, her views on this were rather vague and she could only think of few occasions when active learning had taken place. She viewed the drug round as a mechanistic task, plagued by interruptions. Occasionally she would notice that drugs and food had not coincided but felt there was little she could do to improve this situation.

"I've never really thought much about the drug round - it's such a task-centred job. I think it would be better if drugs were given by named nurses."
In terms of staff development she mentioned seeing the pharmacist more often and having update lectures on the ward. She felt that the chances of everyone being able to attend were rather remote since there had been staff shortages for some time.

"There's not much time to stop for teaching sessions, even with students but it shouldn't be like that."

Some of her suggestions, if implemented, would enable her to move from model 2 to model 1. This development could be achieved by improving her preparation, pr(b) to pr(n).

Interview data, Group 3

An interview to verify Group 3 findings was undertaken with a Grade D orthopaedic nurse. Once the model was explained in more detail, the nurse did not appear to disagree with its interpretation apart from the concept of power. She had recorded a four in her questionnaire po(b) but following discussion, she asked the researcher to record it as a six pr(n). Her reasons for this was that although she was only a Grade D staff nurse and therefore not particularly powerful in her own right, she did feel able to make a contribution to the overall decision making process regarding nursing care. She also added that her reasons for feeling powerful were that she was experienced and had recently completed an English National Board Course in Orthopaedic Nursing. She did acknowledge, however, that there was not very much pharmacology included in the curriculum.

"I think I can make changes, or at least help to make changes. I shall ask if we can have more pharmacy sessions."
As has been said before, in order to upgrade a Group 3 model to a Group 1 model, preparation needed to be $pr(n)$ and knowledge needs to be $kn(n)$. This nurse currently has $pr(b)$ and $kn(b)$ in her model. This was surprising considering that she had recently completed a long ENB course.

In terms of staff development to improve the situation, some ideas suggested by other interviewees were mentioned by this nurse.

She suggested that additional pharmacology sessions should be offered to ward staff, particularly for students. Patients ought not to be excluded and it was felt that extra teaching for them would be vital if other methods of drug administration were to be implemented.

"It would be done better if all drugs were given by individual nurses not just one nurse going round with the trolley."

In terms of learning from experience, similar difficulties were mentioned concerning the routine nature of the task, the interruptions which occurred and the lack of time for any useful discussion as the drug round was happening.

6.19 Patterns of nursing practice for medical nurses (n=27)

Dynamic concept analysis

Of the twenty-seven medical nurses involved in the study, seven were located in Group 1 and 7 (22%) (Figure 36, p:144). Only one Grade F nurse appeared in Group 1, four Grade Es and two Grade Ds were in Group 7. The most senior Grade G was located in Group 2. Again it is not possible to identify a pattern from these findings according to
seniority but it is possible to state that only 48% of the medical nurses were included in Group 1, 7, 2 and 3.

**Observation data**

The data from the observation study showed that only 49% of the drugs which had special recommendations for food were given accurately (Figure 9, p:110).

**Levels of knowledge**

The analysis of the levels of knowledge (Appendix E) showed that the one Grade G nurse involved in the study had accurate knowledge for Question 4.2. but gave a response indicating only awareness for Question 4.2.2 and 4.2.3. The responses for Question 4.2.4, 4.2.5 and 4.2.6 were all accurate.

From the twelve Grade D medical nurses, eight gave accurate responses to Question 4.2.1 and seven to Question 4.2.2. No Grade D nurse gave an accurate response to Question 4.2.3 and only one gave an accurate response to Question 4.2.4. For Question 4.2.5, seven nurses gave an accurate response and four similar responses were provided for Question 4.2.6. These results indicate that the level of knowledge for all nurses working in medical areas needs to be improved.
Interviews

Interview data, Group 1

It is unfortunate that the only medical nurse in Group 1 was not in the representative sample for interviews.

Interview data, Group 2

A Grade G medical nurse from Group 2 was interviewed. Comments from the conversation were written on the interview schedule by the researcher. For a senior nurse, she was not particularly vocal in discussing the findings from her questionnaire although she did not disagree with them. It seemed somewhat surprising to the researcher that a Grade G nurse should record and agree a finding of "powerlessness" po(b). No request was made to change the result and in discussion it was discovered that power was almost impossible to obtain on the ward where she worked. Power was held exclusively by the medical staff who appeared not to welcome much discussion on aspects of nursing practice.

"Change around here is just not possible. It's also difficult to be included in discussions about patients' care."

As for the drug round being a learning experience, this did sometimes happen when new drugs were prescribed or when patients had adverse or unexpected reactions. The nurse emphasised that drug administration was safe but the procedure did not develop into topics for clinical discussion amongst nurses.

"We don't have as much time as we used to for ward teaching. The afternoon handover was when this used to happen but there's not enough staff now."
Staff development was seen as a good way to bring about change provided staff could attend. This attendance was happening more and more in the nurses off duty since release during working hours had become virtually impossible. This senior Grade G nurse had completed two ENB Clinical Courses and was completing a third one relating to people with diabetes.

It was suggested that the pharmacy staff could provide more verbal information at varying levels of complexity for ward personnel. Written information would also be beneficial.

"Perhaps we would learn better if more information was written down. We could then use this for ourselves and for teaching student nurses."

Interview data, Group 3

A Grade D medical nurse from Group 3 was interviewed. She appeared interested in the methodology used but rather disappointed in some of the results. After some discussion, however, she was able to agree the findings and did not request any changes.

She acknowledged her need for more knowledge regarding drug interactions with food and conceded that there was a strong relationship between her lack of knowledge and lack of preparation. The lower rating for power was again largely due to the nature of the ward where change of any kind was hard to implement.

“There didn’t seem to be a lot of teaching about drugs in my training but I did find drugs interesting.”

Learning from experience provoked a lengthy debate between the researcher and the nurse. Although there were few examples which the nurse could quote instantly, she was keen to reflect on how she could use the drug round more effectively in the future. Drugs were of special interest to her and although she knew her knowledge was lacking in relation to drug
reactions and food, in other topic areas she felt confident to teach others. Having exchanged some examples of creative practice, the nurse appeared motivated to use some of these ideas within the ward teaching programmes and saw staff development as a means to improve skilled practice.

"I would like to spend more time teaching student nurses. Thank you for giving me some new ideas. There are lots of different drugs here that I can learn and teach about."

6.20 Patterns of nursing practice for oncology nurses (n=18)

Dynamic concept analysis

Of the sixteen nurses involved in the study, two were located in the group 1 and 7 (12%) (Figure 36). Both nurses were Grade E. The most senior Grade G nurse was in Group 3. Seven of the sixteen nurses were in Group 2, (43%) and three were in Group 3 (18%). Again no pattern of practice could be drawn from these findings concerning seniority but 75% of the nurses were in Group 1, 7, 2 or 3 and were demonstrating skilled practice.

Observation data

These findings showed that 70% of the drugs which had special recommendations regarding food were given accurately (Figure 9, p:110).

Levels of knowledge

The findings from this data showed that two Grade G nurses had accurate responses for Question 4.2.1, 4.2.4 and 4.2.5. For Question 4.2.2 and 4.2.6 only one nurse gave an accurate response. Neither Grade G nurses gave an accurate response to Question 4.2.3.
Of the five Grade D oncology nurses, four gave accurate responses to Question 4.2.1. None gave accurate responses to Question 4.2.2 or 4.2.3. Four gave accurate responses to Question 4.2.4 and two gave accurate responses to Question 4.2.5. For Question 4.2.6, three out of six provided answers which were accurate.

Interviews

Of the eighteen nurses who participated in the study, one appears in Group 1 and one in Group 7. The nurses' comments from the conversation were recorded on the interview schedule by the researcher.

Interview data, Group 1

A Grade E oncology nurse from Group 1 agreed to participate in the interviews. Following discussion about dynamic concept analysis and its use in analysing her questionnaire, the nurse was able to agree that being rather skilful sk(n) was based on knowledge kn(n) and lengthy experience ex(a). She also agreed that her preparation pr(n) had been influenced by learning knowledge and practising skills. Although in terms of power, she was recorded as being rather powerful po(n) she nevertheless saw herself as part of the decision-making team in the ward and felt fully involved in those aspects of care which directly affected her patients.

"We have regular meetings on the ward. Everyone contributes and everyone's opinion is valued. We all have a lot of knowledge about oncology and know our patients very well."

She stressed the team work and good leadership amongst doctors, nurses and pharmacists which when combined together they were a strong force for implementing and monitoring
change. Research findings were often debated and there was a serious approach to making reflective practice a reality.

"Changes are certainly possible on this ward. Practice is constantly being reviewed and we learn such a lot from patients and their relatives."

"Research findings are often the basis of ward discussions. These are then explored in day to day practice so we can keep up to date."

This was evident when Section Three, Learning Practical Knowledge was discussed. The nurse described in considerable detail the methods used to learn from practice when administering drugs. Great care was taken to teach patients and families when and how to take their medication so that the therapeutic effects would be maximised at all times.

"Our patients and families come back to us over a long period and we get to know them well. Their drugs are often toxic and must be given at the right time, especially antibiotics and cytotoxics."

"We always impress on student nurses the importance of drug therapy. This part of care is often used in reporting critical incidents. We also make sure that up to date written information is available."

Drugs are of course an extremely important part of oncology and the nurse certainly demonstrated a thoughtful approach to their administration. She was also able to describe different methods for administration and to argue and justify their advantages. Her most preferred system was that the patient’s named nurse should be responsible for ensuring that drugs were taken at the right time, with or without food and that the patient should have their own supply of drugs in a locked cabinet in their locker rather than being kept in one large trolley. The details for this idea were written on her questionnaire and during the interview she was able to update the researcher on further developments.

"Since I completed your questionnaire, we have been evaluating the named nurse idea. It seems to be working very well and the number of nurses on each shift has not been reduced. We thought this might happen last month and were very worried."
“We’ve also been looking at research to do with patient self-administration. So many people here know their drugs and could keep them in secure boxes in their lockers. The whole team, but particularly the pharmacists have become very interested in this idea.”

6.21 Supplementary data from individual concepts

Although DCA is a process for analysing the relationships between concepts, it is also possible to add data generated by considering individual concepts separately. The following discussion is offered as supplementary information which can be added to the process of triangulation. These comments are derived from responses made by nurses on the questionnaire before they were entered into the DCA computer programme.

Patterns from individual concepts

It was judged that skill might be quantified by asking the respondents to state in precise hours and minutes, how they would interpret “before meals” and “after meals” (Question 4.3). It could be argued that this response only related to what the nurses said they would do, rather than what they were seen to do. The limitations of this approach are acknowledged but other forms of data in the study supported the view that in general, drugs which have special recommendations regarding food are not being given at the right time. This statement can be verified by noting that when all the models are analysed across the five individual concepts thirty nurses scored (a) very skilful, seventy nurses scored (n) rather skilful, and seven scored (b) not very skilful. The fact that seven qualified nurses emerged as being “not very skilful” should be noted with alarm.
Knowledge

The concept of knowledge was quantified by asking the respondents to self-rate themselves on a Likert scale (Question 5.6). They were asked what their current understanding was in relation to drug interactions with food. Most of the responses indicated that the nurses were rather knowledgeable or, not very knowledgeable.

Only four nurses rated themselves as being very knowledgeable (a) thirty-six rated themselves as being rather knowledgeable (n) and thirty-six nurses indicated that they were not very knowledgeable (b).

These comments support the findings from Purpose Two where the nurses’ knowledge was found to be variable and in many cases superficial. It is of great concern that thirty-six qualified nurses rated themselves as having a poor understanding of the interactions between drugs and food.

Experience

The concept of experience was quantified from data relating to the length of time a nurse had been employed in their current post (Question 1.4). The largest number, fifty-seven respondents, had been in post longer than two years (a). Thirty-two had been in post for between six and twenty-four months (n) and eighteen had been in post for less than six months (b). A few of the nurses in the last category were those who had qualified with Diplomas in Higher Education in Nursing Studies. It does appear that although these
diploma level nurses were the least experienced, they demonstrated very good scores for skill and knowledge.

**Preparation**

Preparation as a concept was quantified for each respondent from data derived from Question 5.2. It asked the nurses to respond on a Likert scale to an issue regarding the teaching of drug interactions with food during their training. The analysis of findings showed that six nurses thought that the training for this specific topic had prepared them very well (a), twenty-nine thought they had been well prepared (n) and seventy-two nurses indicated that they had been poorly prepared (b).

These findings raise issues of concern regarding curriculum development in both the pre- and post-registration.

**Power**

The concept of power was quantified by asking nurses to self-rate themselves in Question 5.11. This question related to the power they had to change the method of drug administration according to their Grade. Twelve nurses rated themselves as being very powerful (a), fifty-five nurses rated themselves as being rather powerful (n) and forty nurses responded by rating themselves as being powerless (b).
The concept of power has been raised earlier as a cause for concern. These figures serve to confirm this position.

6.22 Conclusions from triangulation

From an exploration and discussion of varying sets of results it is proposed that a tentative matrix of a convergent validity can be constructed, Figure 37.
Figure 37 Triangulation of methods. A tentative matrix of convergent validity

<table>
<thead>
<tr>
<th>Purpose 1</th>
<th>Question: What are the current practices?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method. Observation study</td>
<td></td>
</tr>
<tr>
<td>Overall results</td>
<td></td>
</tr>
<tr>
<td>Doctors don’t write additional information</td>
<td></td>
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<tr>
<td>Pharmacists sometimes write instructions</td>
<td></td>
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<tr>
<td>Nurses administered 50% of drugs accurately (n = 60)</td>
<td></td>
</tr>
<tr>
<td>Surgical nurses administered 35% accurately</td>
<td></td>
</tr>
<tr>
<td>Orthopaedic nurses - no data available</td>
<td></td>
</tr>
<tr>
<td>Medical nurses administered 49% accurately</td>
<td></td>
</tr>
<tr>
<td>Oncological nurses administered 70% accurately</td>
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<tr>
<th>Purpose 2</th>
<th>Question: What knowledge do different grades of nurses have?</th>
</tr>
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<tbody>
<tr>
<td>Method. Questionnaire</td>
<td></td>
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<tr>
<td>Overall results - Variable across grades</td>
<td></td>
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<tr>
<td>√</td>
<td>√</td>
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<tr>
<th>Purpose 3</th>
<th>Question: What patterns of nursing practice can be described and identified?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method DCA</td>
<td></td>
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<tr>
<td>Overall results</td>
<td></td>
</tr>
<tr>
<td>No nurses demonstrated optimum practice (n = 107)</td>
<td>√</td>
</tr>
<tr>
<td>51% were closest to optimum practice group 1, 7, 2, 3 (n = 55)</td>
<td>√ 50%</td>
</tr>
<tr>
<td>Oncology nurses 75% closest to optimum practice</td>
<td>√ 70%</td>
</tr>
<tr>
<td>Orthopaedic nurses 69% closest to optimum practice</td>
<td>-</td>
</tr>
<tr>
<td>Surgical nurses 57% closest to optimum practice</td>
<td>x 35%</td>
</tr>
<tr>
<td>Medical nurses 48% closest to optimum practice</td>
<td>√ 49%</td>
</tr>
<tr>
<td>49% not identified in this category. Group 4, 5, 6 (n = 52)</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Results</th>
<th>Results</th>
<th>Results</th>
<th>Reflective Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs. study</td>
<td>Main study questionnaire</td>
<td>DCA self-rating</td>
<td>Interviews</td>
</tr>
</tbody>
</table>

- Results from individual methods
- Results for a tentative matrix

√ result tentatively confirmed
x result tentatively disputed
- not able to confirm or dispute
The purpose of the diagram is to suggest how the results from different methodologies can be supported or disputed by others. For example, the results from Purpose One, the observation study, showed that nurses administered only 50% of the drugs which have special recommendations for food accurately. This finding is confirmed by the results from the DCA analysis which indicated that only 51% of nurses were in the groups whose conceptual models were closest to optimum practice.

The results from Purpose Two, that the knowledge which nurses have is variable across all grades, was seen in the main study questionnaire. It is confirmed in the results from the observation study and the DCA analysis. The information derived from the reflective interviews also supports this finding.

Purpose three, which sought to identify patterns across nursing practice using DCA, found that none of the nurses who took part in the study were demonstrating optimum practice. This finding is supported by results from the observation study and the reflective interviews.

Patterns of nursing practice across Grade could not, in general, be demonstrated from dynamic concept analysis. It was possible however to show that when areas of speciality were explored, those closest to optimum practice could be identified. (It is acknowledged that the numbers of respondents in each group was different so that no generalisation can be made from the findings to other populations).
Of the nurses working in oncological wards who took part in the study, 75% were indicating that their practice was closest to the optimum model. This finding is supported by results from the observation study and the interviews.

Of the orthopaedic nurses who took part in the study, 69% were indicating that their practice was closest to the optimum model. This finding cannot be supported by any other methodology. The reflective interviews can to some extent support the finding but are based on a subjective assessment made by the author.

The results from the DCA analysis of surgical nurses indicated that 57% were closest to optimum practice. This finding is disputed by the observation data which showed that only 35% of the drugs with special recommendations for food were being administered accurately. It was the view of the author that information derived from the reflective interviews confirmed the DCA finding.

Of the medical nurses who took part in the study only 48% were indicating that their practice was closest to the optimum model. This finding is confirmed by data from the observation study which showed that only 49% of the drugs were administered accurately.
6.23 Mitchell’s four principles

It may be appropriate to conclude the discussion of the results and analysis by referring to the four principles of triangulation postulated by Mitchell (1986).

1. **The research question(s) must be clearly focused**

The four questions asked in Chapter Four remained constant and although some of the results presented in Chapter Five are inconclusive they proved to be appropriate questions for investigation. The author suggests that each question could now be explored further using a more quantitative, experimental approach to ascertain the value of additional educational activities in relation to nursing practice.

2. **The strengths and weaknesses of each chosen method must complement each other**

The methods chosen for the study were both quantitative and qualitative. The observation study and the main study required the production of quantitative instruments so that objective data concerning nursing practice could emerge. The strength of the quantitative method, that is, producing valid and reliable findings had to be balanced with it’s weaknesses, that of excluding any reference to the social context in which the data gathering was taking place. The balance was achieved in part by the use of dynamic concept analysis (DCA).

DCA as a method can be used both quantitatively and qualitatively.
“Conceptual models can be considered as hypothetical models of actual life; reliability and validity of these analyses will be finally assessed in actual contexts.”

(Kontiainen 1991:1)

From this perspective, DCA has all of the strengths and weaknesses associated with both methods. In this study, the strengths of DCA have centred on its ability to demonstrate both individual and collective behaviour. The dynamic nature of this behaviour has also been illuminated between the concept relations and within the conceptual models.

The weaknesses of DCA relates to the conceptual models representing reality for a given moment. The respondents may hold particular views on one day and change them a week later. This weakness can, to some extent be overcome by undertaking follow-up interviews which can verify or modify the results.

A second weakness concerns the choice of key concepts. It is vital that researchers using this method think carefully about their choice and are prepared to modify the concepts if they are not absolutely central to the behaviour being illuminated. In this study several options were explored before the final choice was made, for example, judgement and reflection.

The subjective choice of concepts could also be seen as a weakness of this method. It is however suggested that:
“In analysis based on individual judgements, subjectivity in assessments of concept relations will be accepted, and it will be up to an individual to access information structures and conceptual models derived from them; although use of this approach may often happen with guidance by a specialist or an expert.”

(Kontiainen 1991:42)

DCA as a research strategy is still being developed as a conversation with Seppo Kontiainen demonstrated. This conversation took place in 1995 and was very beneficial in terms of the overall direction of the study. It also confirmed the view of the author that actual behaviour or practice cannot be understood from DCA alone but that this methodology can make a considerable contribution to the way in which behaviour is interpreted and practice is developed.

3. The methods should be selected according to their relevance to the nature of the phenomenon being studied.

The nature of the phenomenon concerned professional nursing practice. It was necessary to observe this practice and to gather other quantitative data which would allow issues which were of concern to be explored. The issues related to the administration of oral drugs which have special recommendations regarding food. Quantitative data was therefore relevant to the study.
Dynamic concept analysis can enable the nurses' practice to be both illuminated and developed. The illumination was achieved by analysing conceptual models and the development is possible through exploring ways in which practice could be changed (Kontiainen 1991).

These changes, particularly in terms of knowledge and preparation can be proposed by looking at models of optimum practice.

4. Continual evaluation of the approach should be undertaken during the study.

Each stage has been monitored to ensure that the nature of nursing practice in general and the nature of drug administration in particular, have been appropriately defined and explored. Where weaknesses have arisen, these have been documented in the relevant chapter.

6.24 The limitations of the observation study

The data derived from the observation study was not based on a precise sampling frame where randomisation would have been necessary. For this reason, statistical analysis was inappropriate for the data produced and no generalisations can be made to other populations.

- The number of nurses observed in specialist areas differed. This makes exact comparisons impossible.
Observing every aspect of the drug rounds was at times impossible. Patients often distracted the researcher with actions or questions which needed attention. These interruptions compromised the researcher's role as "non-participant" from an ethical point of view, it would have been negligent for the researcher, a qualified nurse herself, not to respond to the patient's problem particularly if they were putting themselves at risk. An example of this at-risk behaviour occurred when a confused orthopaedic patient tried to dismantle his traction equipment. All thought about his lunch-time ampicillin were abandoned in the rush to prevent a sixteen pound weight crashing to the floor.

Completing the observation checklists were for the same reasons, sometimes difficult. Concentration on the phenomenon being observed was broken by distracting events such as items of equipment being required urgently, or being required to put the checklist down to help patients stand up and walk to the toilet.

The presence of the researcher may have threatened the reliability of the data. Although the nurses were told that the researcher was observing the timing of certain drugs, several of them realised that there was a connection with food and may have responded by modifying their normal practice. Alternatively some nurses asked the researcher directly whether she was looking at mealtimes as well. Since the best policy is honesty (Mays and Pope 1995) questions were always answered truthfully. This factor may also have jeopardised the validity of the data.
6.25 The limitations of the main study

The data derived from the main study was not based on a precise sampling frame where randomisation would have been necessary. Statistical analysis was inappropriate for the data and as a result, no generalisations can be made to other populations.

- The response rate from the questionnaire survey was only 37%. (285 questionnaires distributed, 107 returned.) There was however, a considerable amount of data which was analysed from the 107 respondents.

- No follow-up was undertaken with the 63% who did not respond.

- There was no opportunity to correct any misunderstandings or to clarify ambiguities.

- There was no opportunity to probe questions of particular significance for the respondent, or for the researcher.

- Some sections of the questionnaire have not been included in the results and discussion.

In concluding Chapter Six, several areas of concern regarding the administration of oral drugs which have special recommendations for food have been identified. The educational implications of these concerns will be explored in Chapter Seven and recommendations for improving current levels of skill, knowledge, preparation and power will be made.
7.1 Educational Implications

"The need for information to establish and maintain optimum practice in nursing, midwifery and health visiting is of paramount importance in the development and maintenance of high quality care"

(Butterworth and Bishop 1995:24).

The accurate administration of drugs which have special recommendations for food has been identified as a problem within clinical practice. Safe, therapeutically effective drug administration is dependent on the nurses' knowledge of medications and careful monitoring of their effects on patients.

One of the purposes of this study was to establish what knowledge different grades of nurses have regarding the timing of drug administration. The results reported in Chapter Five demonstrate that this knowledge could be improved. The results also show that there are variations in practice across nursing specialities and across differing grades of nurse. Nurses also expressed concerns about how they had learnt applied pharmacology and the extent to which they were able to teach this topic to others. The aim of this Chapter is to consider how educational perspectives and processes can both enhance learning and maintain and develop optimum practice.

7.2 Reflective learning and nursing

"Action science advocated by Argyris et al (1985) considers reflection as the key to developing effective functioning of practitioners, as practice in general tends to be entrenched in a manner of practice that does not promote new learning"

(Kim 1993a: 1638)
According to action science, reflection of practitioner’s theories-in-use can lead to continuous learning of new theories in use, in that reflection allows the practitioner to adopt advocacy, inquiry and joint enterprise as the guiding principles of action (Argyris et al 1985). Reflection encompasses not only reflection-in-action by the practitioners self but also reflection-on-action with the recipients of practice. Habermas’ (1971) critical philosophy in which critical self and interpersonal reflections are considered the keys to shaping the world we live in, provides the foundation for reflective practice. This form of practice is an extension of Lewin’s idea of action research (1948) in which theories are developed and tested through practice. Schon (1983) asserts that the reflective practitioner is engaged in reflective conversations with the client as well as with the situation.

This argument is mirrored in an interesting paper by Sweeney (1994). The author constructs a concept analysis of personal knowledge, based on the work of Polanyi (1969). Knowledge is defined as pattern recognition which may be probabilistically rather than exactly predictive. Personal knowledge is defined as recognition of a new pattern through processing by the individual. The individual in turn, must communicate with other humans and the environment in order to discover new understanding.

In reviewing the literature on reflection, Atkins and Murphy (1993) have produced an exposition of the complexities which this concept has produced. They also quote several authors who have been very influential in proposing the use of reflection as a learning tool (Mezirow 1981, Boud et al 1985, Schon, 1987, Powell 1989, Smith and Russell 1991, Jarvis 1992, James and Clarke 1994, Driscoll 1994, Stockhausen 1994).
In comparing various authors interpretation of reflection it was possible to identify three stages which these interpretations had in common.

The first stage of the reflective process is triggered by feelings of uncertainty. The uncertainty stems from a realisation that in a given situation, the knowledge being applied is not sufficient to explain the events which are unfolding. The second stage involves a critical analysis of the given situation which is constructive and involves an examination of feelings and knowledge. Stage three involves the development of a new perspective which many would suggest is learning.

These three stages of reflection need to be supported by the following specific skills. Self-awareness, description, critical analysis, synthesis and evaluation.

More recent papers exploring the educational use of reflection have been produced by Driscoll 1994, Paul and Heaslip 1995.

**7.3 Critical analysis of reflection**

Although the literature on reflection and reflection practice is considerable there is also a growing critical debate emerging as to the usefulness and appropriateness of the concept (Newall 1992, Greenwood 1993b, Lauder 1994, Richardson 1995).

In her critique of the work of Argyris and Schon, Greenwood (1993a) reminds the reader of the enormous influence that these two authors have had on nursing and nursing education.
Argyris suggested the possibility of espoused theories/theories-in-use discrepancies whilst Schon pointed to the inadequacies of a purely applied science (technical rationality) view of professional practice and education. Greenwood examines the detail of this work where theories of action are revisited. She comments that although theories of action may tell us how to carry out a task, people are notorious for failing to practice what they preach. This accusation she lays before Argyris and Schon who, Greenwood suggests, did not carry out their own research in the manner they describe. In their wish to analyse the difference between theory-in-use and espoused theories, rather than observe what was happening in practice, they merely asked people what was happening. People are notorious at saying one thing and doing another. For example, a nurse may say she always administers oral drugs accurately according to the precise prescription and timing yet in practice, in the real world, there may be discrepancies in her actions.

Schon's notion of technical rationality, (a relic from positivism), views vigorous professional practice as instrumental problem-solving though the application of scientific theory and technique. Systematic problem-solving however, presupposes one or two alternatives; first, that the problem has already been identified or, second that the outcomes are known and agreed. Greenwood argues that from a practitioner's point of view, problems of practice do not present themselves in neat and tidy fashion. These problems are often a tangle of complex strands where systematic approaches to care may not be helpful (Fonteyn and Cooper 1994).

Schon's answer to the problem posed by the technical rationality approach to practice is reflective practice. This concept comprises two elements, reflection-in-action and
reflection-on-action. Reflection-in-action is seen as thinking about what you are doing whilst doing it. The thinking is triggered by an uncertainty or a surprise. These thoughts then allow the practitioner to reshape her thinking and therefore her actions. Reflection-on-action is a retrospective thinking and critical analysis activity which Greenwood refers to as a cognitive post-mortem. The practitioner looks back on her experiences to explore again the understandings she brought to them. She is then able to monitor and evaluate the outcome of her actions.

Schon suggests that the best place to learn these two types of reflective skill is within a specifically designed virtual world relatively free from pressures, distractions and risks of the real one.

Greenwood makes several criticisms of this idea and suggests that one of Schon's serious weaknesses relates to the difference between a virtual protected world for students and the real unprotected world of a clinical area. She is not wishing to negate the idea of protected practice (in a clinical practice classroom) but is saying that in a planned and supervised manner, the students must be introduced to the messy, complex world full of pressure, distractions and risks. It is also vital that the teachers accompany the students into the real world to prevent espoused theories that is, that which is taught in the classroom, being seen as different to theories-in-use, that is, that which is taught on the wards. A strong case is also made for reflection-before-action:

"This stems from all human action being intentional, and therefore human agents have to learn to reason from their intentions to their successful outcome in practice. Nurses need to think about what they are going to do, before they do it."

(Greenwood 1993: 1186)

The critiques by Newall (1992) and (1994) take a rather different approach.
The author is concerned that given the high profile of reflection as the proper activity for the nursing profession, very little critical examination has been made of the concept. His particular concern is with the role played by memory and suggests that recall and retrieval are crucial processes occurring within reflection-in-practice and reflection-on-practice.

Recall is of particular importance and Newall outlines the nature of this highly selective, schematised cognitively mediated process. Many issues can interfere with recall, for example, stress, noise, and it is these interferences which Newall suggests can make reflection about nursing a very fragile entity.

He does however recommend strategies for enhancing the accuracy of recall by for example the use of reflective diaries. Here, guidelines can be suggested to take both student, mentor and teacher through the reflective process. The timing of entries into the diaries is also crucial and they should be written up as soon as possible after an event has occurred. The written information will then reduce the burden of the memory by changing it from a recall to a recognition exercise.

Richardson (1995) is more concerned with the different approaches to reflection and analysis and contrasts a social approach with an approach from the natural sciences. She suggests that as a result of examining the value system of these two approaches:

"we can recognise that reflection and reflective practice requires an understanding not only of our own histories (biography), values and assumption and the factors which have influenced them, but also of the historical, political, cultural and ethical factors which influence the organisations within which we practice, together with the wider social arena, both in relation to organisational and national factors."

(Richardson 1995: 1047)
She then goes on to explore these factors in relation to the emergence of nursing theory suggesting that we must not slavishly follow a natural science approach because it is there.

The issue regarding the claim made by the supporters of reflection that it can improve nursing practice is examined by several authors (Powell 1989, Darbyshire 1993, Newall 1994, Lauder 1994).

Newell expresses concern about the vagueness of the concept when literature reviews are presented. He also suggests that very few evaluation studies have been published to demonstrate exactly what the outcomes of reflection are for patients/clients. If the claims made for reflection are indeed empirical that is, reflection changes practice, then it should be possible to identify the elements of reflection and open them up to empirical investigation. These empirical studies are not yet available and Newell therefore contends that since reflection is supported largely and only by beliefs it can be described as an art, or pseudo-science but not science.

Lauder’s paper takes us back to the epistemological notions of thinking and doing. He suggests that:

“What appears to be missing from the reflective concept is the bridge between thinking about care and actually caring.”

(Lauder 1994: 92)

Reflection should not be seen as something going on in someone’s head: the necessary actions must be part of the process otherwise the dualist split of mind and body will be perpetuated.
7.4 Using reflection as a learning process

Ensuring that nurses are thinking about what they are doing and then translating the thinking into action is a considerable challenge for clinical nurses and nurse educators (Oldenall 1995). This challenge invites further exploration of how reflection can be used as a learning process (Dale 1994, Ferguson and Jinks 1994).

Reflection has been described from various standpoints and the author will now describe different approaches by which reflection can be used in everyday circumstances, for example, when a drug round is in progress. This nursing intervention has been shown to have problems. Strategies will be described in order to remedy these educational deficiencies.

From this study it appears that qualified nurses are not always reflecting-in-practice, that is, thinking about what they are doing as the action is taking place. If this were the case, the results from the observation study would have been better. There may be an element of habitualisation in this practice (Berger and Luckman 1967, Schutz 1970). Habitualisation can be equated to non-reflective learning (Jarvis 1994). In order to prevent habitualisation occurring various processes could be used.

The first, which would link reflection-on action with the concepts of skill, knowledge and experience, relates to the use of critical incidents (Smith and Russell 1991). Critical incidents have been referred to as:

"Snapshot views of the daily work of the nurse"
The original idea for the use of critical incidents came from Flanagan in 1954. Flanagan worked as an aviation psychologist and developed a procedure for gathering information retrospectively concerning effective or ineffective behaviour in certain situations.

In nurse education, revisiting certain situations using a particular set of questions can assist nurses, to think about what happened, consider the consequences and reflect on ways in which the action could have been improved or support the actions which were taken as being wholly appropriate. It is beneficial to carry out this process as close to the incident having happened in order to minimise any loss of detail.

This activity could take place at the end of a drug round using incidents which were perhaps surprising or worrying or just routine.

Critical incidents can also be used in group sessions where a teacher or clinical facilitator works with a small number of nurses who are exploring particular events. From the group discussions, themes can emerge to be used for further reflective learning. These themes can then form the structure for informal workshops and may involve issues such as, the nurses' role in drug administration, identifying common problems, suggesting solutions and developing action plans. Applied pharmacology could also be used as a topic for a workshop. Several comprehensive texts are available for this purpose (Govoni and Hayes 1990, Joshua and King 1993, Trounce 1994). Drug metabolism could also be discussed (Gibson and Skett 1992, Downie et al 1995). Although these subjects may be taught through the formal curriculum in a classroom, they are likely to be more easily understood in the context of the relevant clinical area, for example, the use of NSAIDS in an oncology
ward. In these circumstances, misunderstandings, or simply gaps in knowledge, can be addressed so that all nurses will be encouraged to reflect-in-action as well as reflect-on-action. This study has already demonstrated that there are certain aspects of nurses' knowledge regarding drugs and food which must be improved.

Using critical incident analysis to develop reflective learning may not necessarily result in better patient care. It could be argued that this technique is theoretical, undertaken away from the immediacy of ward areas. Critical incident workshops may need to be followed by an immediate period of practice so that what has been discussed in theory, or theories which have been explored, can be immediately applied in practice. In order to test its effectiveness, the technique needs to be more rigorously researched (James and Clarke 1994, Minghella and Benson 1995).

The interviews carried out for this study may have triggered a renewed emphasis regarding reflection in and on practice. Several respondents expressed interest in reflective/creative/experimental practice and could share examples of how this activity had happened in practice.

Learning through practice and reflective processes have been expounded by Kolb (1984) within the terms of his experiential learning theory. The theory suggests that learning, change and growth are facilitated by cyclical processes. Such experiences involve direct experiences, reflection on the experience, and abstract concept formation from which behaviour may be modified to aid new experiences.
Within the education literature on reflective practice there is a dimension of learning which is personnel and embedded in the experience of the learner (Boud 1988). In order to optimise these experiences through reflective learning, the role of the teacher in practice becomes a vital aspect of the process.

In Stockhausen's work (1994) a framework for reflective learning was developed through Clinical Learning Spirals. These spirals build on reflective learning as described by Boud (1985). Following an initial experience the first stage of the reflective process is returning to the experience. Here students recollect the events that have occurred and re-examine their reactions to those events. The recollection occurs in a descriptive rather than a judgemental manner. The second stage of the process requires the students to think about their feelings following the experience. This activity allows time for the students to sort out positive feelings from negative ones and leads them into the third and most difficult stage, making sense of what happened. During this third stage, Boud et al (1985) suggest that re-evaluation occurs when students link new knowledge to what is already known and seek more complex relationships between theory and practice. This integration and validation of knowledge increases the student's own personal or tacit understanding of events and will enable them to recognise a similar situation occurring in the future.

An examination of this spiral process brings into focus the role of the teacher in the preparation of students. In Stockhausen's model, the role is described in terms of preparing the student in advance of any clinical activity. The activity will have been explained beforehand and the teacher may choose to demonstrate a skill to the student in the first instance. The skill will then be undertaken by the student under the supervision of
the teacher. Immediately after the clinical activity has taken place, the reflective learning process starts and the student revisits the experience. Once the revisiting and reflective processes have been completed, the teacher and student can plan any changes they feel will enhance practice. In order to integrate a spiral model into an existing curriculum, the necessary resources in terms of teaching time and teacher competence would have to be assured.

The debate concerning this issue is on-going and several important research projects have reported on findings which reflect the current and rather confused picture as to whether or not teachers should be credible practitioners (Crotty and Butterworth 1992, Crotty 1993, Cave 1994, Clifford 1995, de Sales Fergusen 1996).

7.5 Educational proposals made during the interviews

During this current study, respondents who agreed to be interviewed were asked their views on how education could maintain and improve professional practice.

In response to a question concerning initial pre-registration nursing courses, the respondents requested more input to applied pharmacology. Several nurses commented on the way in which the questionnaire had raised anxieties concerning their low levels of pharmacological knowledge. This lack of knowledge related particularly to the relationship between accurate drug administration and therapeutic effect.
When asked about on-going education at post-registration level, the proposals were similar. Several of the respondents who had undertaken English National Board long clinical courses, felt that although aspects of pharmacology had been included there was still a need for regular up-dating in terms of specific oral drugs. A few nurses who had not undertaken a long course, expressed a need to do so or in the meantime have more ward teaching sessions with pharmacists and medical colleagues.

It was also suggested that the ward pharmacists could (and did in some wards) make a considerable contribution to optimum reflective practice by their involvement in providing up-to-date drug bulletins and advice. Oncology nurses in particular stressed the importance of teaching patients and families as well as other health care professionals.

The response to the question concerning other methods of administering oral drugs, produced a mixed response. Some nurses, again oncology nurses in particular, were very keen to try out new methods and had already implemented changes. These changes involve appropriate patients taking their own oral medicines and taking them at the correct time particularly in relation to food. This change in practice is supported by an educational programme for patients, families and staff.

The interviewees were also asked about the best methods of implementing change. Some suggested discussion and feedback to all staff from internal or external study days. Other nurses were able to quote from MacGuire (1990) in relation to research utilisation being an aspect of change management.
The issue of power in relation to effecting changes in practice also needs to be addressed. The nurses who were interviewed expressed differing opinions regarding power ranging from being powerless to being very powerful. Developing the power to make changes in practice is both an educational and managerial responsibility. Those nurses who saw themselves as being powerful, related this attribute to knowledge in particular. This view reinforces the importance of ongoing, relevant and contemporary education.

There are considerable educational implications arising from this study and future work needs to be undertaken in terms of developing optimum practice, supporting practitioners with educational opportunities and ensuring that curriculum development and evaluation for both pre- and post-registration courses includes adequate preparatory and on-going material.

Some data from the survey questionnaire has not yet been analysed. The author intends to publish articles in the future relating in particular to the effects of specific educational programmes on skilled performance. "Does education make a difference to practice?" may well be the title of the first paper. Local NHS Trusts are certainly wanting an answer to this question since continuing education is a costly exercise and impact evaluation studies are urgently needed to ensure that positive changes in professional behaviour can be demonstrated as a result in professional behaviour can be demonstrated as a result of this investment.

The role of clinical supervisors, advanced and specialist practitioners should also be investigated to measure the contributions they are making to the development of consistent
optimum practice. Finally, the impact of Diploma level preparation on practice should be explored. The author wishes to re-interview those nurses who qualified through this programme to obtain their views about the effectiveness of their course in producing "knowledgeable doers".

Chapter Eight will consider the conclusions which can be drawn from the study and make recommendations for further work which should be undertaken.
8.1 Conclusions and Recommendations

"Quality nursing ultimately depends on nurses; nurses who are dedicated, sincere, devoted and enthusiastic, who possess the scientific knowledge and technical skills necessary to carry out their professional responsibilities efficiently and effectively."

(Feisal 1963, cited in While 1994:528)

8.2 Restatement of the problem

The administration of drugs is an important part of professional nursing practice. This study has shown that there are concerns to be addressed promptly regarding oral drugs which have special recommendations regarding food.

The purposes of the study were to observe current practice, to establish what knowledge different grades of nurse have regarding these specific drugs and to describe patterns of professional practice using dynamic concept analysis. Other issues regarding reflective learning and practice have been explored in order to establish how educational activities can help to solve some of the problems which were identified.

8.3 Current Practice

Correct oral administration requires accurate prescription by medical staff and correct interpretation of instructions by the nurse. The practice of both is dependent on their knowledge of clinical pharmacology and current legislation.
Antibiotics, NSAIDS and corticosteroids were all at some point administered inaccurately and their accompanying information/instructions were rarely provided.

The fact that nurses are not administering these drugs accurately is a cause of concern. Prompt action is required to remedy weaknesses in the system, thus ensuring that the therapeutic effects of these drugs is not diminished. Solutions to these problems have been identified in the recommendations, but as a matter of urgency, all acute wards should review the procedures for drug administration and if possible carry out a risk assessment (Packer and Hunter 1995).

These assessments or audits can reduce the risk to patients, improve the quality of care, minimise litigation and formally measure compliance with a Trust’s drugs policy. Packer and Hunter (1995) describe such an audit which was concerned with prescriptions, supply and administration of drugs. They have been able to demonstrate significant improvements in the quality of these procedures since 1993. This improvement has been achieved through a multidisciplinary approach where action planning to solve identified problems was seen as being very important. Interestingly, one aspect of the action plan has been to investigate alternative medicine trolley and supply systems. Research based drug and nutrient literature should also be used ensuring that contemporary metabolic evidence is contributing to appropriate standards of care.
The lack of additional information from doctors and instruction from pharmacists was also shown to be a weakness in the procedure. This aspect of oral drug administration was not explored specifically in this study, but should be investigated promptly by the appropriate clinical staff.

8.4 Nurses' knowledge

Results from the analysis of nurses' responses established that their knowledge was variable. Senior nurses were not consistently the most knowledgeable and in several cases, greater levels of knowledge were demonstrated by more junior nursing staff. Of these junior staff, a small percentage were students who had completed Project 2000, Diploma in Higher Education Courses, leading to registration as qualified nurses. Research is indicating that these "knowledgeable doers" are indeed gaining more knowledge and can with varying degrees of ease, apply this knowledge to practice (Hislop et al 1996).

On the whole, the knowledge displayed was superficial, demonstrating the need for pharmacological updating. This finding also suggests that this lack of knowledge is a weakness in the procedure for oral drug administration. In order to address this issue, acute wards could develop clinical guidelines (Duff et al 1996). Such guidelines are used specifically for integrating both existing and new knowledge into practice. Good practice then becomes research-based. As the literature suggests, however, this development is not necessarily straightforward (Lacey 1994, Rolfe 1994, Mulhall 1995). The pilot study by Lacey is particularly relevant to this study since she cites
considerable problems concerning the lack of power expressed by nurses. This perceived lack of power interferes with the nurses' ability to effect changes in practice. They feel unable to challenge medical colleagues and clinical managers even though they are in possession of the most up to date research findings.

Increasing the level of nurses' knowledge would also be aided if more time and resources could be allocated to continuing education. In acute wards, which are often very short staffed, open learning packages could be used. This type of educational provision would mean that nurses could learn and develop within their clinical areas with tutorial support being provided by liaison teachers, pharmacists, or medical staff.

8.5 Patterns of nursing practice derived from DCA

It was not possible to identify patterns of nursing practice in terms of seniority. Senior nurses, Grades G and F, were not always delivering the most skilled care and in some cases the more junior nurses, Grade E and D were identified as providing optimum practice. It was possible, however, to identify patterns of practice in terms of speciality.

Oncology nurses were in general, found to be delivering care which was closest to the model for optimum practice. This finding was not surprising given the specific content of post-registration courses relating to the speciality. Medical nurses were in general, the furthest from the model for optimum practice. This finding was surprising since nurses undertaking post-registration courses in medical care, receive considerable information relating to applied pharmacology.
8.6 What has been achieved

Methodological triangulation

A study has been undertaken using methodological triangulation. The benefits and difficulties of this methodology have been acknowledged and explored, adding to the body of knowledge concerned with the analysis of this type of data. A tentative matrix of convergent validity has been constructed in order to demonstrate how certain aspects of the findings can be supported or disputed.

The methods chosen were concerned with both clinical and educational perspectives, in order to identify how education can assist qualified nurses in the delivery of optimum practice for patients and clients. Education has also been shown to be necessary for the continued development of nursing practice.

Dynamic concept analysis

DCA demonstrated the process of change which was required in the five key concepts, in order for individual nurses to be delivering optimum practice. It also highlighted the need for more empirical work to be undertaken concerning the complex issues of power and autonomy. The findings from DCA were discussed with some of the respondents which provided the author with a greater understanding of the method and also a deeper understanding of the nature of reflective practice.
Achievements relating to clinical practice

The clinical findings have highlighted the need for different methods of drug administration to be introduced. The implications will be discussed in detail with the nurses and managers in the NHS Trust where the main study was undertaken.

These results have been eagerly awaited since the study began in 1992. The author is hopeful that a considerable achievement will relate to the implementation of the findings and their ongoing evaluation.

Achievements relating to educational practice

The educational findings have highlighted the need for a careful re-examination of the teaching of applied pharmacology in pre- and post-registration programmes. Teaching methods also need to be re-assessed to make sure that critical incident analysis is being used appropriately in order that students and qualified nurses can develop reflective and analytical skills. These cognitive skills then need to be embedded in practice.

Beare (1975) suggested that actual performance in the real-life situation is the most important outcome of educational experience. This study has added to the empirical literature which indicates that apparently competent registered practitioners do not always perform at an adequate level (While 1994, Adams 1996).
One way of tackling this deficit relates to the provision of continuing education programmes. These programmes can be developed through the use of training needs analysis (Sheperd 1995).

The aims of training needs analysis are, for example:

- To assess and examine qualified nurses’ perception of their learning needs relevant to their current and future development.
- To identify how nurse managers perceive the developmental needs of practitioners for whom they are responsible and the organisation in which they work.
- To provide vital information to the educational planning teams in order that an appropriate framework for continuing education can be designed, which has the ability to meet the individual’s needs.

8.7 Future Work

Future work to be undertaken should include a more detailed investigation into the reasons why nurses, doctors and pharmacy staff are not implementing oral drug administration procedures accurately.

In the early chapters of this study, an explanation of how oral drugs which have special recommendations for food ought to be administered was presented. The study's findings and subsequent discussion indicated that these recommendations were not always implemented. In other words, a gap was identified between recommended
practice and actual practice. Education was proposed as the bridge, not only for crossing the gap but eventually for closing it. Issues concerning deficits in knowledge, power and preparation were addressed but the purposes of the study did not encompass a remit for exploring the reasons behind why these deficits occurred.

Some of the reasons did however begin to emerge from the author’s interest in reflective practice and a future study should certainly be undertaken into how qualified nurses develop their understanding of this intervention why some nurses provide consistent optimum practice and others do not. It may be that the author’s early thoughts about using reflection as a key concept within DCA might be taken forward for this purpose. Adequate levels of resourcing might also be included as another key concept.

As well as future work on the reasons why healthcare professionals behave as they do, clinical improvements to oral drug administration procedures should be made and evaluated. These improvements should be discussed and agreed by all relevant staff including, where appropriate, patients, clients and their families.

The second major area of future work should include educational improvements to current curriculums. A study should be undertaken into the teaching of applied pharmacology for both pre- and post-registration courses. Current methods for teaching, tutoring and assessing should also be re-examined to ensure that reflective processes are being appropriately developed by students. Continuing education
programmes for doctors and pharmacists should be increased as well as opportunities for multidisciplinary teaching sessions.

8.8 A summary of recommendations for future work

As a result of the study, the following recommendations are made:

1. All acute wards should review the procedure for drug administration to ensure that oral drugs are being accurately administered. This review may include a risk assessment and the development of research-based clinical guidelines.

2. If current methods are not considered optimum practice, comparative pilot studies should be set up to investigate the effects of new procedures.

3. These new procedures should also be examined carefully in order to establish that the necessary resources in terms of staffing and equipment are in place.

4. Doctors and pharmacists should be consulted by nurses regarding a more individualised system of drug administration.

5. The prescription charts should be redesigned so that “before food” or “with food”, could appear as options and then be ticked by the doctor/pharmacist.

6. Pharmacists in particular, should be invited to participate more closely in ward teaching programmes.

7. More research should be undertaken into the clinical effects of drugs which are not administered therapeutically.

8. More research should be undertaken regarding types of food, their definition and composition, and their effect on drug absorption.
9. Pre- and post-registration curriculums should put greater emphasis on applied pharmacology. This would assist nurses to become more knowledgeable especially regarding drugs which have special recommendation regarding food for example antibiotics, NSAIDS and corticosteroids.

10. Senior education managers should examine the notion of clinical learning spirals and with other relevant personnel, make judgements as to their usefulness in local courses/programmes of study.

11. Liaison/clinical teachers should re-examine their role in relation to reflective learning. If necessary, policy decisions as to the time they are able/required to work in a practice area must be redefined.

12. Drug rounds should be used for reflective learning even when undertaken by one qualified nurse.

13. Drug rounds should be the subject for critical incident analysis especially when student nurses are involved.

14. Further comparative research should be undertaken regarding reflective learning within specialist clinical areas.

8.9 Concluding Remarks

The study has shown that only half of the qualified nurses who took part in the study were delivering optimum practice. This finding is supported by other research to which reference has been made in earlier chapters. Numerous other factors beyond the
One factor does, however, stand out from the study as being of major importance in terms of improving the current situation, that is,

"The education of qualified practitioners must be viewed as a continuous process which results in the advancement and growth of nursing's body of knowledge. The increasing responsibility of the profession to fulfil its potential for leadership in the delivery of care makes post-registration education imperative for the future"

(Sheperd 1995:70)

Strategies must be developed in order to ensure that the advancement and growth of nursing’s body of knowledge becomes embedded in the day-to-day practice of all qualified nurses.
APPENDIX A

UNIVERSITY OF SURREY
Department of Nursing & Midwifery

APPLICATION TO ETHICS COMMITTEE FOR APPROVAL
S.W. Surrey Health Authority

Name of Applicant: Lesley Munro
Supervisor: Susan Goodinson-McLaren
Title of Project: An Educational Investigation into Current Nursing Practice Regarding Drugs which have Special Recommendations in Relation to Food

Purpose of Proposed Investigation:
Please see aims attached

Method:
Non-participant observation of 20 drug rounds. Researcher will accompany the registered nurse dispensing drugs.

Use of Resources: which units/wards involved
- involvement of patients/staff
Medical/Surgical wards

Involvement of patients:
Nil

Proposed starting date: 6 November 1993  Proposed duration: 3 months

Signed:................................. Student ................................. Supervisor
I agree to this project being carried out using my patients/staff

Signed................................. Consultant ................................. Director of
I approve this application subject to endorsement by the Committee Nursing Studies

Signed:................................. Chairman, Ethics Committee
Data collection check list

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Statement of relationships between concepts central to professional practice

C.1 SKILL

The more knowledge the more skilful
The more experience the more skilful
The more preparation the more skilful
The more power the more skilful

C.2 KNOWLEDGE

The more skilful the more knowledgeable
The more experience the more knowledgeable
The more preparation the more knowledgeable
The more power the more knowledgeable

C.3 EXPERIENCE

The more skilful the more experienced
The more knowledge the more experienced
The more preparation the more experienced
The more power the more experienced

C.4 PREPARATION

The more skilful the more prepared
The more knowledge the more prepared
The more experience the more prepared
The more power the more prepared

C.5 POWER

The more knowledge the more powerful
The more experience the more powerful
Type two relationships between concepts and attributes

1. SKILL C.1

C.2 - C.1

What kind of effect knowledge might have on skills

- very knowledgeable 2a ———> 1a very skilful
- very knowledgeable 2a ———> 1n rather skilful
- rather knowledgeable 2n ———> 1n rather skilful
- not very knowledgeable 2b ———> 1b not very skilful

C.3 - C.1

What kind of effect experience might have on skills

- very experienced 3a ———> 1a very skilful
- very experienced 3a ———> 1n rather skilful
- rather experienced 3n ———> 1n rather skilful
- not very experienced 3b ———> 1b not very skilful

C.4 - C.1

What kind of effect preparation might have on skills

- very well prepared 4a ———> 1a very skilful
- well prepared 4n ———> 1a very skilful
- poorly prepared 4b ———> 1b not very skilful

C.5 - C.1

What kind of effect power might have on skills

- very powerful 5a ———> 1a very skilful
- very powerful 5a ———> 1n rather skilful

2. KNOWLEDGE

C.1 - C.2

What kind of effect skill might have on knowledge

- very skilful 1a ———> 2a very knowledgeable
- very skilful 1a ———> 2n rather knowledgeable
- rather skilful 1b ———> 2n rather knowledgeable
- not very skilful 1b ———> 2b not very knowledgeable
C.3 - C.2
What kind of effect experience might have on knowledge

very experienced 3a → 2a very knowledgeable
very experienced 3a → 2n rather knowledgeable
not very experienced 3b → 2b not very knowledgeable

C.4 - C.2
What kind of effect preparation might have on knowledge

very well prepared 4a → 2a very knowledgeable
poorly prepared 4b → 2b not very knowledgeable

C.5 - C.2
What kind of effect power might have on knowledge

none

3. EXPERIENCE

C.1 - C.3
What kind of effect skill might have on experience

none

C.2 - C.3
What kind of effect knowledge might have on experience

none

C.4 - C.3
What kind of effect preparation might have on experience

none

C.5 - C.3
What kind of effect power might have on experience

none
4. PREPARATION

C.1 - C.4

What kind of effect preparation might have on skill

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<th>Skill Level</th>
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<td>1a very skilful</td>
</tr>
<tr>
<td>well prepared 4n</td>
<td>1n rather skilful</td>
</tr>
<tr>
<td>poorly prepared 4b</td>
<td>1b not very skilful</td>
</tr>
</tbody>
</table>

What kind of effect preparation might have on knowledge

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<th>Knowledge Level</th>
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</thead>
<tbody>
<tr>
<td>very well prepared 4a</td>
<td>2a very knowledgeable</td>
</tr>
<tr>
<td>well prepared 4n</td>
<td>2n rather knowledgeable</td>
</tr>
<tr>
<td>poorly prepared 4b</td>
<td>2b not very knowledgeable</td>
</tr>
</tbody>
</table>

What kind of effect preparation might have on experience

none

What kind of effect preparation might have on power

none

5. POWER

C.1 - C.5

What kind of effect might skill have on power

none

C.2 - C.5

What kind of effect might knowledge have on power

very knowledgeable 2a  ➔  5a very powerful

C.3 - C.5

What kind of effect might experience have on power

very experience 3a  ➔  5a very powerful

C.4 - C.5

What kind of effect might preparation have on power

none
The relationship between the administration of oral medicines and food intake

1. Employment Details

*Please tick the appropriate box*

1.1 How long have you been employed?

- Less than 1 year □
- 1 - 5 years □
- 6 - 10 years □
- 11 - 15 years □
- 16 years + □

1.2 On what type of ward do you work? (Ge, surgical, medical, oncological).................

1.3 Do you work on:

- Day duty □
- Night duty □
- Internal rotation □

1.4 How long have you been employed in your present grade?

- 1 - 3 months □
- 4 - 6 months □
- 7 - 12 months □
- 13 - 18 months □
- 19 - 24 months □
- more than 2 years □

1.5 What is your present grade?

- C □
- D □
- E □
- F □
- G □

1.6 Are you Male □ Female □

1.7 Do you work Full-time □ Part-time □ Bank □
2. Qualification details

*Please complete/tick as appropriate*

2.1 In which year did you obtain your first nursing qualification? □

2.2 What was your first nursing qualification? □

UKCC Register Part □

2.3 Did you undertake a Project 2000 Diploma Level Course?

Yes □

No □

2.4 What other nursing qualifications do you have?

SEN □ RMN □ RSCN □ RM □ RGN □

If you have obtained any ENB clinical courses, please specify:

<table>
<thead>
<tr>
<th>ENB Number</th>
<th>Speciality</th>
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</thead>
<tbody>
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</tbody>
</table>

2.5 Are you currently undertaking a course of study for nursing professional qualifications? Yes □ No □

2.6 If yes to the last question, please specify, eg Msc in Nursing, E/N Conversion Course, Higher Award Modules

..........................................................................................................

..........................................................................................................

..........................................................................................................

3. Drug rounds

Drugs may be given in the following ways. *Please tick which practice you use:*

3.1 Traditional drug rounds with one or more nurses dispensing drugs to every patient □

3.2 Patients are given drugs by their named nurse from individual drawers in the drugs trolley □
3.3 Patients are given drugs by their named nurse from locked cupboards within each patient area.

3.4 Other, please specify:

3.5 How many times per 24 hours are drug rounds undertaken on your ward?

3.6 For each drug round please state approximate start time and finishing time:

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<thead>
<tr>
<th>Start</th>
<th>Finish</th>
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</thead>
<tbody>
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</tr>
</tbody>
</table>

4. Meal times

4.1 For each meal time please state the approximate start and finishing time:

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<thead>
<tr>
<th></th>
<th>Start</th>
<th>Finish</th>
</tr>
</thead>
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<tr>
<td>Lunch</td>
<td></td>
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<tr>
<td>Supper</td>
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</tbody>
</table>

4.2 Please complete the sentence:

4.2.1 *It is important that oral drugs and mealtimes should coincide because:*

4.2.2 *If a patient needs an oral drug which has special recommendations for food and no meal is available I would:*

4.2.3 *Some oral drugs should be given before meals because:*
4.2.4 Three common examples of these drugs which should be given before meals are:

4.2.5 Some oral drugs should be given with meals because:

4.2.6 Three common examples of these drugs which should be given with meals are:

4.3 I consider that “before meals” when written on a prescription chart means:
   at least ......................... minutes before a meal, or
   at least ......................... hours after a meal

4.4 I consider that “with meals” when written on a prescription chart means:
   not more than ......................... minutes before a meal
   not more than ......................... minutes after a meal

5. Education and Training Details

On a scale of 1 - 10 (1 being poor; 10 being excellent)

Please rate the following statements:

5.1 The teaching of pharmacology during my training was:
   
5.2 The teaching related to drug interactions with food during my training was:
   
5.3 My understanding of bioavailability is:
   
5.4 Since completing my training the opportunities for updating my pharmacology knowledge have been:
   
5.5 The updating sessions which I have attended on pharmacology have been:
   
5.6 My current understanding related to drug interactions with food is:
   
5.7 The availability of drug information bulletins on my ward is:
   
5.8 The information regarding drug interactions with food which the ward pharmacist supplies is:
5.9 The possibility for patients on my ward to administer their own oral drugs is:

5.10 Patient teaching related to drug interactions and food is:

5.11 The power I have to change the method of drug administration in relation to my grade is:

6. Please put a tick in the box which best represents your opinion:

<table>
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<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>6.1 There is insufficient time to discuss drugs with patients</td>
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<tr>
<td>6.2 Meal times are too inflexible</td>
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<tr>
<td>6.3 Accurate administration of oral drugs in relation to mealtimes is sometimes difficult</td>
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<tr>
<td>6.4 There is insufficient time to discuss the drugs with learners</td>
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<tr>
<td>6.5 The timing of drug rounds is too rigid</td>
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<tr>
<td>6.6 There are often too many interruptions during the drug round</td>
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<tr>
<td>6.7 Special recommendations regarding food intake are always written up by the Doctor</td>
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<tr>
<td>6.8 I often have to ask for special recommendations to be written up</td>
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<tr>
<td>6.9 A different system of drug administration should be used</td>
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</tbody>
</table>

*If you strongly agree, or agree with 6.9, please describe briefly the change you would make:*
7. Please add any further comments that you wish to make:

Thank you for completing this questionnaire.

Mrs Lesley Munro
Director of Education
Research, Planning & Development
St Luke's Education Centre
Guildford
Tel: 01483 571122, ext 2107
1. Specific analysis from your questionnaire produced this DCA model.

In relation to my five concepts,

<table>
<thead>
<tr>
<th>Skill</th>
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<th>Disagree</th>
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<tr>
<td>Experience</td>
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</table>
1.1 Do you

<table>
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<tr>
<th>Preparation</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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</thead>
<tbody>
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</table>

1.2 Respondents comments on the model
2. Power

2.1 In the questionnaire you have indicated, Do you

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>

2.2 I ought to have more power to make changes regarding medicine rounds

2.3 The reasons why I feel powerless to make changes are:

2.4 How could you gain more power to make changes?
The reasons why I feel powerful are:

2.5

I have gained power to make changes by:

2.6
3. Learning practical knowledge

<table>
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<th></th>
<th></th>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
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<td>3.1</td>
<td>I use the outcomes of the drug round as a learning experience</td>
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<td></td>
<td>Give examples</td>
<td></td>
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</tr>
<tr>
<td>3.2</td>
<td>There is time for me to learn from practice</td>
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</tbody>
</table>
| 3.3 | Sometimes I identify problems in relation to drugs and food  
please give examples |   |   |   |   |
| 3.4 | There is time for me to develop creative/experimental practice in relation to the drug round  
please give examples |   |   |   |   |
| 3.5 | Other pressures inhibit me from learning from experience as the drug round  
please give examples |   |   |   |   |
In order to maintain/improve professional practice in relation to this task.

4.1 What would you like included in initial education courses?

4.2 What would you like included in your current on going education?

4.3 What would you like included on the ward teaching programmes/

4.4 How could the ward pharmacist assist?

4.5 Could another method of administering drugs be tried?

4.6 What would be the best method of introducing any changes?
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**APPENDIX J**

**Accurate responses for drugs given before meals**

The range of accurate responses given.

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## APPENDIX K

### Accurate responses for drugs given with meals

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Conceptual models Groups 1 - 7

Model for Group 1

Model for Group 3

Model for Group 5

Model for Group 7

Model for optimum practice
Observation checklist, inter-rater reliability, drugs given BEFORE meals

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<thead>
<tr>
<th>Before Meals</th>
<th>Nurses administration correct</th>
<th>Doctor's instructions correct</th>
<th>Pharmacist's instructions correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes ✓</td>
<td>No X</td>
<td>Yes ✓</td>
</tr>
<tr>
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<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
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<td>X</td>
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<td>X</td>
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<tr>
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<td>✓</td>
<td>X</td>
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<tr>
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<td>✓</td>
<td>X</td>
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<tr>
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<td>✓</td>
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<td>X</td>
</tr>
<tr>
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<td>✓</td>
<td>X</td>
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<td>✓</td>
<td>X</td>
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<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>ampicillin</td>
<td>✓</td>
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<td>X</td>
</tr>
<tr>
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<td>✓</td>
<td>X</td>
</tr>
<tr>
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<td>X</td>
<td>X</td>
</tr>
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<td>X</td>
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<tr>
<td>ampicillin</td>
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<td>✓</td>
<td>X</td>
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</tbody>
</table>
Observation checklist, inter-rater reliability, drugs given WITH meals

<table>
<thead>
<tr>
<th>With Meals</th>
<th>Nurses administration</th>
<th>Doctor’s instruction</th>
<th>Pharmacist’s instructions</th>
</tr>
</thead>
<tbody>
<tr>
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<td>correct</td>
</tr>
<tr>
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<tr>
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<td>X</td>
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</tr>
<tr>
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<td>✓</td>
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<td>X</td>
</tr>
<tr>
<td>ibufen</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
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<td>✓</td>
<td>✓</td>
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</tr>
<tr>
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<td>X</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
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<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ibufen</td>
<td>X</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>diclofenac</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>diclofenac</td>
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<td>X</td>
<td>X</td>
</tr>
<tr>
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<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
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<td>✓</td>
<td>X</td>
</tr>
</tbody>
</table>

Using the formula:

Number of agreements
Divided by, total number of agreements + disagreements

produced the following results:

Nurses administration (n=38)

\[
\frac{28}{38} = 0.73
\]

Indicates reasonably good reliability
(Seaman 1987)

Doctor’s and Pharmacist’s Instructions (n=38)

\[
\frac{38}{38} = 1.
\]

Indicates very good reliability
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