INFANT FEEDING 1977

by

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SUMMARY

In 1974 the Department of Health and Social Security alerted the medical profession and the general public to the problems associated with the prevailing high levels of artificial feeding. As a result a campaign to promote breast feeding was initiated.

This thesis reviews the history of infant feeding and the implications of the change from breast to bottle feeding. A survey of infant feeding practice was undertaken in a health district during 1977. The results showed that although sixty percent of the mothers attempted to breast feed less than half were successful.

The mothers were subsequently interviewed and it was found that their choice of feeding method was either decided before, or very early in pregnancy, and that they did not necessarily seek professional advice. Those that did were most often advised by a health visitor or midwife at a clinic, antenatal class, or with pamphlets. Mothers from the manual social groups showed the greatest need for advice and were the least likely to find the classes or written material appealing. Failure of lactation was thought to be due to an insufficient milk supply and occurred during the first six weeks of the infant's life.

Health visitors and midwives in district were asked for their views on the relative merits of breast and artificial feeding and the problems of establishing lactation. There was a consensus of opinion in favour of encouraging breast feeding, but a divergence on how to promote successful lactation. The concept of frequent demand feeding was not always accepted and complementary feeding was also advocated. Additionally there were differing views on the energy and fluid intake required by lactating mothers all of which resulted in some mothers receiving confusing or inappropriate advice.
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CHAPTER ONE

THE HISTORY OF INFANT FEEDING

"Our 20th century methods, be it understood, are not of 20th century make. They are covered with the finger marks of old time gossips and dented with the prejudices of half a dozen centuries".

DAVID FORSYTH 1911

PRIMITIVE MAN TO THE MIDDLE AGES

The process of lactation evolved some 200 million years ago with the mammalian species. Man belongs to the Mammalia Eutheria an order whose offspring are almost entirely dependent on their mothers milk for survival in the early part of life (Mepham, 1976). Some idea of the infant feeding habits of early man can be gained from the study of primitive tribes. Primitive people relied solely on maternal breast feeding; the period of lactation varying from four months amongst the Hottentots to fifteen years in some Eskimo tribes. The average would appear to be three to four years. The taboo on colostrum is thought to have begun amongst these savage tribes, and mothers allowed several days to pass before beginning to suckle the new born infant (Floss, 1935).

The earliest written reference to infant feeding comes in the Papyrus Ebers (C. 1550 B.C), a medical encyclopaedia from Egypt, which gives the following prescription for encouraging lactation. "To get a supply of milk in a woman's breast for suckling a child, warm the bones of a sword fish in oil and rub her back with it" (Bryan, 1930). It seems that failure, or unwillingness, to breast feed is a dilemma that has been with us for many centuries. If the infant was to survive when maternal suckling was not available alternatives had to be found, and the first substitute for
mothers milk was the use of a wet nurse. This practice was clearly well organised 1000 years before Christ (Exodus, 2, 7.) but was not without its problems. The choice and deportment of a wet nurse was a subject dealt with in full by Soranus of Ephesus who lived in the second century A.D. He wrote a treatise on gynaecology and obstetrics which remained the major work of reference on infant feeding until the middle ages. (Wickes, I, 1953). Soranus recommended with holding the breast during the colostrum period for as long as 20 days. Weaning should commence at six months with the addition of breadcrumbs, diluted wine, soup, and eggs to the infants diet (Soranus, C. A.D. 98-136).

The length of time that an infant was suckled in these early centuries is difficult to ascertain. In Israel the average duration was probably three years (2. Maccabees, 7, 27.). In Europe Paulus Bagellardus writing in Padua during 1472 said that: "It is customary to suckle for two to three years" (Forsyth, 1911). However a shorter length of time for breast feeding is given in the Roesslin’s Rosegarten the first printed book on obstetrics written in 1549. Roesslin commented: "Although it is advised to suckle for two years, it is common they suckle but one" (Wickes, I, 1953). Specific reference to infant feeding practice in Britain did not come until the middle of the 16th century when, in 1545, Thomas Phaire wrote the Boke of Chyldren. This was the first English book to be written on paediatrics. Phaire stated that mothers should nurse their own children and recommended parsnip roots and fennel roots in chicken broth eaten with fresh butter to increase the mothers milk. His book once again emphasised the importance of the choice of a wet nurse. There was widespread belief at the time that the temperament and morals as well as nourishment was conveyed to the child through the milk it suckled (Phaire, 1545).

**THE 17th AND 18TH CENTURIES**

In the 17th century the choice of feeding method still lay between the mother and the wet nurse. Weaning did not normally begin until the child had all its milk teeth when pap, bread boiled in water, or
broth was the first food to be introduced (Pechey, 1697).

The use of wet nurses and the practice of baby farming, where the children of the rich were sent into the country to be suckled, led to a high infant mortality rate. Women would often abandon their own children in order to take a good position as a wet nurse only to give scant attention to their new charge. One example was the Countess of Lincoln who had 18 children of her own all of whom were reared by wet nurses. Only one son from the 18 survived and when his wife breast fed their first child the old countess was stricken with remorse. In 1661 she wrote the Countess of Lincoln's Nursery, which ends with the following exaltation: "Be not so unnatural as to thrust away your own children, be not so hardy as to venture a tender babe for a less tender breast, be not accessory to that disorder of causing a poorer woman to banish her own infant for the entertaining of a richer woman's child, as it were, putting her to un-love her own, to love yours" (Wickes, II, 1953).

Wet nursing reached its zenith during the 18th century, and the abandoned infants of these nurses had to rely on hand feeding alone. Only one in three survived the diet of paps, panadas, gruel, and unboiled cow's milk (Cadogan, 1748). Even this figure is an optimistic view of the situation when compared to the mortality rate of 99.6% found amongst infants at The Dublin Foundling Hospital 1775-1796, but not all these deaths were attributable to hand feeding. However, the heading "Death from Want of Breast Milk" in the Registrar General's Reports at the time was intended for mortality figures in the foundling hospitals (Forsyth, 1911).

Foundlings were not the only infants at risk during this period. Almost half the children born in Great Britain died before the age of 12, a state of affairs described by one of the doctors of the time as "A sin of our own making" (Buchan, p. 27, 1812). William Buchan's domestic medicine was first published in 1769. In it he attributes much of the infant mortality to the current feeding practices and the use of poor wet nurses. He wrote "Every mother
who can, ought to suckle her own young. Of the wet nurses who abandoned their own children not one in twenty lives". The practice of squeezing out colostrum is again recommended in Domestic Medicine but midwives who give syrups, oils, or drugs in the interval are admonished. Instead the new born infant should be given a little thin water pap to which may be added an equal quantity of new milk. Buchan also advised that children need no other food but milk for three to four months, when "we recommend good light bread" (Buchan, pp 19-41, 1812).

By the close of the 18th century there were four recognised methods of infant feeding:

- Breast feeding by the mother.
- Breast feeding by a wet nurse.
- The use of animal milks often by direct sucking.
- Feeding the infant with pap and panada (Wickes, III, 1953).

THE 19th CENTURY

A SCIENTIFIC APPROACH TO INFANT FEEDING

At the turn of the 18th century Michael Underwood wrote a Treatise on Diseases of Children. This proved to be a turning point in infant feeding practice. "With Underwood paediatrics in England had crossed the Rubicon" and the modern study of disease in children had begun (Still, 1931).

The fourth edition of Underwood's Treatise included a detailed chemical analysis of breast milk compared with the milk of other animals. Underwood noted that breast feeding by the mother was becoming more fashionable among ladies of rank, so the evils of wet nursing were on the decline. He was the first writer to consider why it was that animals had so little trouble feeding their young compared with man. He is also first to mention the use of a nipple shield for tender or retracted nipples (Underwood, 1799).

The 19th Century proved to be a period of increasing interest in
paediatrics and enlightenment on the subject of infant feeding. Thomas Bull, in his book "Hints to Mothers" (1849), finally discarded the myth that colostrum should not be given to the newborn but was amongst the first to suggest that breast fed babies should be fed four hourly (Wickes, III, 1953).

Raw milk instead of pap became the recognised food for hand feeding infants. It was diluted with water and sweetened, and in 1853 some attempts were made at fixing the size of the feeds to 3-4 ozs (Forsyth, 1911). The biggest difficulty encountered in attempts to hand feed had been the lack of a suitable feeding vessel. Cow horns with sewn parchment or leather teats were in use from the middle ages to the 18th century (Wickes, IV, 1953). Sour milk would collect between the stitches and any child reared on one of these "is in danger of falling into watery gripes" (Armstrong, 1767). To overcome this problem glass bottles evolved in the 19th century, but the problem of the teat remained until the introduction of a rubber teat in 1856 (Drummond, 1957).

The amount of artificial feeding, particularly amongst the poor, that had begun to rise in the 18th century continued. There was increasing employment of women in the factories, and the hard conditions of life probably made it difficult for many mothers to nourish their children (Drummond, 1957). Instead they turned to bottle feeding but there was no clear guidance as to the contents of the bottle nor indeed how to clean it. Mrs Beeton in 1861 advised her readers to wash a feeding bottle in warm water, but added that there was no need to remove the teat which was secured by fine twine, "It should last a fortnight" (Beeton, 1861).

Raw milk was notorious for its adulteration and lack of cleanliness particularly in the large towns (Lancet, 1856). However there was prejudice against boiled cow’s milk as it was thought to be less well digested than raw owing to the formation of tough curds in the infants’ stomach (Forsyth, 1911). Mixtures of flour, water, sugar, and a little milk were also commonly used as a substitute for breast milk. Not surprisingly diarrhoea was a major killer of infants who were partially or wholly artificially fed (Smith, p. 85, 1979).
The medical profession at that time was beginning to question the cause of infantile diarrhoea.

In the four years, 1866 to 69, no fewer than five of the leading children's hospitals in London were founded in quick succession, and paediatrics became a separate specialism. There was also increasing interest in the work of Pasteur and Koch who drew attention to micro-organisms in milk. In a series of lectures given at Great Ormond Street Hospital in 1887, W.B. Cheadle made the following comment. "Owing to many different causes a very large number of children cannot be suckled by their mothers, or transferred to wet nurses, and must be brought up by hand. The proper food given should contain proteid (sic) 3.5%, fat 3%, carbohydrate 4%, salt 0.2% and water 85%", and this can be provided by boiled cow's milk."

Cheadle was one of the first doctors to advocate boiling milk to protect against infection, despite current opinion to the contrary. "Nurses will fight against it, and mothers object, perhaps, for there is a common prejudice against it" (Cheadle, 1889).

Prejudice, however, did fade, by the end of the 19th century improved methods for hand rearing infants had resulted in the almost complete demise of the wet nurse.

THE 20th CENTURY

BREAST FEEDING versus ARTIFICIAL FEEDING

At the beginning of the 20th century breast feeding was still by far the safest method of rearing infants. A survey conducted in Liverpool in 1889 showed the death rate amongst breast fed babies under one year as 20 per 1,000 compared with 300 per 1,000 among those who were artificially fed (Smith, p. 101, 1979).
However, in 1904 a Government Report on the physical deterioration of the nation established that breast feeding was rapidly declining (Drummond, p. 404, 1957). This decline was in part due to the increasing levels of employment for women. The Factory Act of 1891 forbade the resumption of work within one month of confinement, but it was up to the employer to report breaches of this act. Many new mothers and their employers connived to evade the Act and women commonly returned to work within 10 days of confinement (Smith, p. 95, 1979).

Infants were increasingly fed on the new forms of preserved milk which became available at the end of the 19th century. Condensed milk, first patented in 1835, was introduced as suitable for artificial feeding towards the end of the 19th century. Dried milk came into general use in 1902. Two years later there were simultaneous reports from New York and Leicester on the beneficial results of feeding dried milk to the children of the poorer classes (Ebrahim, 1978).

The increasing availability of dried milk coincided with the beginnings of the infant welfare movement. The initial clinics for mothers and babies were run by voluntary societies. Statutory powers were given to local authorities to establish clinics in 1909 and these were extended by the Maternity and Child Welfare Act of 1918 (Wickes, IV, 1953). Dried milk powder was made available in the clinics at about half the price of that in the shops (Ebrahim, 1978). Sales of dried milk rose as the number of clinics increased and artificial feeding had received its first tacit support from the state.

Precise figures relating to feeding methods at the turn of the 20th Century are sparse. Breast feeding levels were highest amongst the better off and rural families, and lowest amongst the urban families where the mother went out to work (Reid, 1892). In Liverpool a survey put breast feeding at 50% for infants 0–3 months (Jones, 1894). Studies through eight cities in the United States of America (USA) during 1922 showed that 87% of mothers started to breast feed and 71% would continue for 3 months (Woodbury, 1922).
Chicago in the years 1924-29 had an incidence of 49% totally breast fed at 9 months (Grulee, 1934); and health visitors in Bristol in the years 1929-30 recorded 78% still breast feeding at 3 months (Ross, 1951).

Medical opinion in the first quarter of the 20th Century was still strongly in favour of breast feeding, for although infant mortality had been falling slowly since the year 1900, the rates of morbidity and mortality amongst the artificially fed were still considerably higher than those who were breast fed (Woodbury, 1922; Grulee, 1934). In an effort to encourage working mothers to breast feed the National Health Insurance Scheme, which started in 1911, provided for financial assistance given to the mother at childbirth for one month postpartum (Douglas, 1948).

One of the most ardent campaigners for breast feeding in the early 20th century was Truby King. His mothercraft movement started in New Zealand in 1907 and spread rapidly to England and the USA. Truby King was undoubtedly responsible for a great re-awakening interest in breast feeding with his campaigns amongst the urban poor, but his work was marred by gross over emphasis of the dangers of over feeding and a strict enforcement of the feeding times, an influence that has lingered to this day (Wickes, V, 1953).

At the same time efforts were continuing to produce a form of powdered milk which would resemble human milk in its chemical composition. In 1919 a formula was promoted under the proprietary name, Scientific Milk Adaption (S.M.A. in short). This was the forerunner of many humanised milks. By 1931 most of the leading manufacturers of milk powders had begun to add vitamins to their products (Ebrahim, 1978). The infant food manufacturers provided information as well as milk powder. Glaxo produced their first Ostermilk Book in 1928, and it's third edition contains some sound advice on the maintenance of lactation but suggests rigid three or four hourly feed schedules.
Instructions for the care of a bottle are an improvement on Mrs Beeton’s, but are by no means foolproof. “Bottles should be washed out (not boiled), first in cold and then in hot water immediately after the feed” (Glaxo, 1938).

In years to come the infant food industry was to achieve a dominant place in the moulding of infant feeding practices and to assume leadership in the supply of information to the public and to the health professions (Editor Lancet, 1976).

THE MODERN DECLINE OF BREAST FEEDING

In 1938 the British Medical Journal published a plea to arrest the modern decline in breast feeding and asked for accurate information on the subject (Spence, 1938). Spence estimated that between 20% to 30% of urban babies were now being artificially fed from birth and breast feeding levels were also declining in the USA, Scandinavia, and Russia. In reply to Spence, figures from Liverpool were supplied for years 1918 to 1937; they did not show any significant decline in breast feeding but did show a shortening in the period of lactation (Robinson M, 1939). Three years later a decline in breast feeding of about 14% was found in the Borough of Ilford between 1930 and 1938. The place of breast milk was taken by dried milk powder and there was an increase in supplementary feeding (Gordon, 1942).

Both Robinson and Gordon commented on the higher incidence of bottle feeding amongst poorer mothers.

The second world war intervened in the discussion, and brought with it legislation to provide National Dried Milk free or at a special price to all mothers and infants (Ministry of Food, 1946).
Confirmation of the decline in breast feeding came in 1946 with a government enquiry into pregnancy and childbirth covering the whole of Great Britain (Douglas, 1948). The results of the enquiry show that although between 80 and 95% of mothers started breast feeding their infants, this figure had fallen to 43% by eight weeks. Variations within the country were put down to the quality of antenatal supervision available, but no recommendations on infant feeding were made.

Paediatricians in the 1950's have been described as having a laissez faire attitude to infant feeding (Editorial, Archives of Disease in Childhood, 1973). However the number of mothers attempting to breast feed remained fairly high and figures between 70 and 92% were recorded in different parts of the country (Campbell, W., 1954; Hytten, 1954; Morris, D., 1957; Riley, 1959; and Drillien, 1959). This was probably a direct result of hospital pressure and contrary to the real wishes of mothers (Newson, 1965; Eastham, 1976). Eastham noted that when the policy of the Princess Mary Hospital in Newcastle was modified to avoid undue pressure in 1956 breast feeding levels at birth dropped to 30%. The number of mothers reported as breast feeding at three months in this period ranged from 23.8% in Lancashire (Stocks, 1953) to 55% in Woolwich (Morris, D., 1957).

At the end of this decade John and Elizabeth Newson undertook a detailed study of 700 mothers in Nottingham. This was a period of relative affluence and the inconveniences of bottle feeding had by then so diminished as to be almost non-existent. Breast feeding was generally considered by the Nottingham mothers to be more inconvenient and messy than bottle feeding; 83% commenced breast feeding but only 29% continued for 3 months (Newson, 1965).

The popularity of artificial feeding continued to grow and became an established way of life for 80% of the nation's babies (Davies, P., 1971). Percentage figures that had been applicable to breast feeding at birth in the 50's became applicable to bottle feeding at birth by end of the 60's.
In Glasgow 69% were bottle fed from birth (Arneil, 1967), in Worcestershire 72% (Shukla, 1972), and in an Oxfordshire study 1972-3, 73% of mothers were discharged bottle feeding (Sloper, 1975).

This complete abandonment of breast feeding by so many mothers must reflect the growing acquiescence to artificial feeding amongst health professionals at the time. It also began to highlight some of the problems associated with high solute loads in artificial feeding which are of particular danger to the very young aged 0-2 months (Graham, G., 1953; Edelmann 1969; Cockburn, 1973; Snodgrass, 1973; Stimmler, 1973; Davies, D.P., 1973).

There were reports of inaccuracy in the preparation of artificial feeds by both mothers (Taitz, 1972; Oates, 1973), and nursing staff (Wilkinson, 1973), as well as growing evidence to suggest that artificially fed infants were being given solids at a very early age (Arneil, 1967; Taitz, 1971).

In June 1973 a working party was set up under the chairmanship of Professor T.E. Oppe, with the task of reviewing the present day practice in infant feeding (DHSS, 1974).

The working party's main recommendations were,

1. All mothers be encouraged to breast feed their babies for a minimum of two weeks and preferably for the first 4 to 6 months of life.

2. Artificial milk feeds should contain a concentration of phosphate, sodium and protein which is lower than that of cow's milk and nearer to that of breast milk. The composition of National Dried Milk should be modified accordingly.
3. The present confusion in the reconstitution of artificial milks feed should be overcome.

4. The early introduction of cereals or other solid foods to the diet of babies before about 4 of 5 months should be strongly discouraged.

5. Breast feeding should be encouraged by education of children, parents, and in the training of all professional personnel.

The report received widespread publication in medical journals and the popular press. Wherever positive steps to encourage breast feeding were taken by hospitals or health care teams breast feeding levels rose, at least in the initial weeks of life (Sloper, 1975; Malvern, 1975; Jepson, 1976; Coles, 1976).

The general climate of opinion and the publicity given to the high solute levels of the national dried milk was also effective in raising breast feeding levels (Smart, 1976; Miles, 1976). It was to be 16 months however, before a government warning was issued listing the high solute milks which were dangerous to a baby under the age of 6 months (H.C. (76) 16). The demand for national dried milk then declined and it was finally discontinued in 1977.

The Oppe report was followed by a national survey of infant feeding practice in 1975 (Martin, 1978). At the time that the study described in this thesis was in progress Martin found that 51% of mothers attempted to breast feed and in common with past studies there was a gradual decline in incidence of breast feeding from mothers in social class I (77%) to IV (39%) (Gordon, 1942; Douglas, 1948; Newson, 1965). Over half the mothers who started breast feeding stopped by 6 weeks and only one quarter were breast feeding at all at 4 months. The findings of the Oppe report in 1974 have since been reinforced by an increased understanding of the immunological value of breast feeding (Ed. British Medical Journal, 1976; Buisseret, 1978), and its importance in promoting maternal infant bonding (Lynch, 1977).
The history of infant feeding shows a persistent pattern. The period of maternal suckling has become steadily shorter over the centuries, and more recently, less frequent. The early alternatives to breast feeding were either too perilous or too expensive to be generally adopted, until the advent of the humanised milks in the 20th century appeared to provide a satisfactory alternative.

Recent advances in medicine have proved that this is not so, and it is generally agreed that breast milk is the best food for the young baby. Teaching mothers how to breast feed again is not so quickly achieved and it has always been the most disadvantaged babies who have been given the least appropriate food.

BREAST MILK AND PROPRIETARY MILK IN INFANT FEEDING

The evidence supporting the statement "the best food for babies is human breast milk" (DHSS, 1974) lies in four general areas. Maternal breast feeding provides for optimum growth and nutrition, defence against infection, avoidance of allergic disease, and the enhancement of maternal infant bonding.

OPTIMUM GROWTH AND NUTRITION

The neonatal period represents one of the most critical and vulnerable stages in life. The new born infant is in a state of rapid development and maturation during the first four to six months, a period when there is a high demand for specific essential nutrients (Hambraeus, 1977a). At the same time the infant mechanisms for control of energy intake remain immature at least for the first 42 days (Iaitz, 1978) and the osmotic concentrating ability of the kidneys is limited in the first weeks of life (Edelmann, 1969). The development of gastric function does not end at birth but continues to develop over the first 3 months of life when it almost reaches adult levels and it is fully mature at 24 months. The defence mechanisms which control the
growth of intestinal flora are not fully developed during the neonatal period and this favours the entry of microorganism and alimentary allergens (Royer, 1978).

Breast feeding constitutes a wholly reliable means of ensuring infant survival, for man has succeeded in evolving through millions of years without substitutes for human milk (Mata, 1978). Bottle feeding only became an established practice in the last few decades and, although the short term effects of bottle feeding in industrialised countries are usually good, little is known of the long term effects or the optimal way of feeding the human infant other than through breast feeding (Hambraeus, 1977a).

The main alternatives to human milk in the Western world are formulae based on cow's milk. The major differences in the gross composition of cow's and human milk have been known since the middle of the 19th century (West, 1884) and attempts have been made to adjust for these differences. However, recent research has shown that human milk contains over 100 constituents which are present in different proportions and in different chemical forms than those found in the milk of other species (Jelliffe, p.28, 1978). Detailed examination of these constituents shows that there are profound differences in human breast milk and proprietary infant milks. The most important differences will be discussed in detail.

COLOSTRUM

Colostrum is the initial milk to be secreted in the first few days after parturition. It is a yellow viscous fluid varying in quantity from 10 to 40 ml per day, this is followed by a transitional milk in larger quantities when the mothers oestrogen levels fall (MacKeith, 1977). Despite the small quantity colostrum is finely adapted to meet the needs of the new infant over the first few days of life. The infant's ability to digest protein is similar to that of the older individuals, but they are less able to absorb fats due to differences in bile salt composition.
<table>
<thead>
<tr>
<th>Type of Milk</th>
<th>Protein g/100ml</th>
<th>Year</th>
<th>Source</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Human</td>
<td>1.3</td>
<td>1952</td>
<td>Morrison</td>
<td>Mean taken from well nourished USA and European women.</td>
</tr>
<tr>
<td>(2) Human</td>
<td>1.2</td>
<td>1953</td>
<td>Macy as in USA National Research Council</td>
<td>average taken from mothers of differing race, country and socio-economic status.</td>
</tr>
<tr>
<td>(3) Human</td>
<td>1.1</td>
<td>1961</td>
<td>Kon and Cowie</td>
<td>Mean of values from milk of 216 mothers living in the same geographical area in USA and of adequate dietary intake.</td>
</tr>
<tr>
<td>(4) Human</td>
<td>1.1</td>
<td>1977</td>
<td>D.H.S.S.</td>
<td>96 UK mothers at 4-6 weeks lactation.</td>
</tr>
<tr>
<td>(5) Human</td>
<td>0.9</td>
<td>1977a</td>
<td>Hambraeus</td>
<td>Well nourished and mal nourished Swedish mothers.</td>
</tr>
<tr>
<td>(6) S.M.A.</td>
<td>1.5</td>
<td>1974</td>
<td>D.H.S.S.</td>
<td></td>
</tr>
<tr>
<td>(7) Cow's</td>
<td>3.3</td>
<td>1974</td>
<td>D.H.S.S.</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. The protein content of mature human milk as reported by various sources, compared with cow's milk and humanised milk.
Alpha amylase activity is low at birth and rises only slowly with age, a factor that inhibits carbohydrate digestion. Lactase activity is high at birth and remains high throughout infancy (Fomon, pp. 95-108, 1974). The composition of colostrum alters daily and there are progressive increases in fat and lactose with a reduction in protein and mineral content (Murphy, 1979). The protein in colostrum is rich in antibodies especially secretory IgA and lactoferrin (Jelliffe, p.30, 1978) and it has a high cellular content of polymorphs, macrophages and lymphocytes with total counts ranging from $0.5 \times 10^6$ to $10 \times 10^6$/ml (Lawton, 1977). The cellular content is much higher in colostrum than in mature milks (Pittard, 1979). The function of colostrum is primarily anti-infective but its biochemical make-up may have a laxative even proteolytic effect to help clear out the meconium (Jelliffe, p.30, 1978). If the infant is to obtain an optimum amount of colostrum it must be able to feed on demand, a method not always practised in the United Kingdom hospitals (Gulley, 1979). The artificially fed infant will receive little lactoferrin as it occurs in very low amounts in cows milk (Hambraeus 1978). The protective factors are not provided by milk formulae (Lawton, 1977), nor is there any gradual daily alteration in the proportions of nutrients in an artificial feed.

**COMPOSITION OF MATURE HUMAN MILK**

Research has shown that the composition of mature human milk varies quantitatively within an individual feed and at different times of the day (Barrie, 1975; Hall, 1975), but the chemical form of the constituents however remains unaltered.

**MILK PROTEIN**

The protein content of mature human milk is variously reported to be between 0.9 and 1.3g/100 ml (see Table 1). The early figures are based on analyses of total nitrogen multiplied by the conversion factor 6.25 or 6.38 and are 20/25% higher than those produced in 1976 by Hambraeus et al whose method used direct measurement of the amino acid content.
Further work in Brussels and Tokyo supports the figure of 0.9g/100 ml as being the true protein content of human milk (Jelliffe, p.69, 1978). The non-protein nitrogen constitutes about 13% of the total nitrogen in colostrum, and about 25% in mature milk and is mainly derived from urea (Hambraeus, 1977a). Any comparison of human milk and alternative sources of milk for infant feeding should be viewed in light of this error.

Casein constitutes only about 20% of the total protein nitrogen in human milk, the remainder is derived from whey proteins, the three dominant components being lactalbumin, lactoferrin and secretory IgA. In cow's milk casein represents the bulk of the total nitrogen with whey proteins accounting for only 20%, the dominant protein here being lactoglobulin. As well as difference in quantity there are physicochemical differences between bovine and human casein which lead to different curd formation (Mellander, 1972). Cow's milk curd is tough and rubbery while human milk curd is soft and flocculent. Modern infant formulae however produce less dense curds (Jelliffe, p.64, 1978). The gastric emptying time is nonetheless faster in the artificially fed infant than the breast fed infant (Fomon, p.367, 1974).

The precise amino acid composition of human milk is subject to discrepancy (DHSS, 1980b) but has two main characteristics. The cystine content of human milk is 24 mg/100ml nearly twice that of cow's milk and the methionine/cystine ratio is uniquely low. The relative absence of the enzyme cystothianase in the neonate and premature infant makes it likely that cystine is in fact an essential amino acid (Sturman, 1970). Formula food producers seem unaware of the importance of the correct levels of cystine, they group cystine and methionine together as the sulphur amino acids and show that there is little significant difference between total levels in the cow's milk and human milk, this is true but irrelevant. In contrast levels of phenylalanine and tyrosine are lower in human milk (Hambraeus, 1977b).

The main components of the proteins in human milk, cow's milk and
Figure 1  Main components of the protein of human milk, cow's milk and humanised breast milk substitutes.  
(Hambraeus, 1977b)
humanised breast milks are summarised in Figure 1. It can be seen that there are profound differences. Proprietary milk can never be humanised beyond a given limit as long as it is based on cow's milk or any other non-human milk protein. This is a fact that was realised by the DHSS in 1974. Their recommendation for protein levels in artificial feeds was that they should approximate with a composition of breast milk as nearly as possible, but suggested a figure of 2.0 grams protein /100 ml (DHSS, 1974) a figure that is more than double that found in human milk. This level has again been modified to 1.5g/100ml (DHSS, 1980b), but if this protein is unmodified cow's milk then levels of both cystine and tryptophan will be lower than those provided by human milk. The immunological significance of the whey proteins is discussed on page 31.

LIPIDS

Lipids in human milk are important not only as sources of energy and as nutrients but also in relation to the development of the nervous system of the infant (Belavady, 1978). The fat content of mature human milk changes from low at the beginning of nursing to high at the end and in order to obtain an accurate figure an average must be taken. This can only be done by complete manual expression of the breast contents and, even then, the assumption has to be made that the infant would have consumed all the milk available. In a recent review (Jensen, 1978) reported total lipid figures ranging from 2.1% to 3.8%. A mean of 3.3% total lipid has been given for a group of Indian women of low socioeconomic class (Belavady, 1978a) and DHSS give a figure of 4.2% (DHSS, 1977). There are also variations in the reported levels for individual fatty acids within the total lipid content (Gyorgy, 1971; Crawford, 1976; Belavady, 1978a). Whether these differences are due to inaccurate sampling, differing methods of analysis, or result from the basic variability in the product itself is difficult to assess.

Despite problems of accurate analysis human milk can be shown to have an individual lipid profile that differs widely from that
of cow's milk. About 98% of the lipid is triglyceride in which most of the secondary ester is palmitic acid. Although 167 fatty acids have been positively or tentatively identified, the major fatty acids are palmitic, stearic, oleic and linoleic (Jensen, 1978).

The human infant digests and absorbs human milk fat (95-98%) more efficiently than it does cow's milk fat (80%) or mixtures of vegetable and animal fats; even when these mixtures have been formulated specifically to resemble human milk fat in fatty acid composition (Southgate, 1969). The reason for this is thought to be twofold. Palmitic acid which is a major constituent of many dietary fats is not always found in the same position within the triglyceride molecule. In human milk about 85% of the palmitic acid is esterified in position 2, in cow's milk only 40% is so positioned, the remainder being in position 1 or 3. During the process of digestion the pancreatic lipase hydrolyses the primary ester linkages of the triglycerides, this produces polar and readily absorbable 2-monopalmitin from human milk fat but less polar and less readily absorbable palmitic acid from cow's milk fat (Moore, 1978).

The second possible reason for easy digestion is the presence of lipase in human milk making large proportions of free fatty acids available (Jelliffe, p. 33, 1978). This hypothesis is disputed by Jensen who maintains that the low pH of the intestine 3.1 - 5.6 would inactivate this enzyme. The activity of pharyngeal lipase which will remain active at pH 3.5 and the fact that human milk contains a bile salt activated lipase that is not affected by low pH (Hernell, 1977) is put forward as an alternative reason (Jensen, 1978).

The cholesterol levels in human milk are higher than in cow's milk whilst adapted formulae based on vegetable oils are lower still. Reiser (1972) suggests that critical levels of cholesterol may be needed in the early weeks of life to ensure the development of appropriate enzyme systems. Cholesterol may also facilitate the
the myelisation of the central nervous system (Hambraeus, 1977a). There is certainly a very high lipid content (60%) in the brain of the neonate (Jelliffe, p. 33, 1978). The use of non fat cow's milk with subsequent addition of a suitable fat such as soy oil, oleo oil and coconut oil, as used in SMA, give the manufacturer the possibility of composing a formula which has a fatty acid composition that resembles human breast milk more closely. However, in this process buttermilk fat is replaced by vegetable oils to provide better fat absorption, and most of the cholesterol is removed. Animal studies suggest that ingestion of cholesterol during infancy may induce enzymes that can subsequently better metabolise cholesterol and thereby result in lower serum cholesterol levels later in life (Reiser, 1972).

An ongoing study in the Boston area of the USA seems to show that 30 year old adults who were exclusively breast fed for at least two months have significantly lower serum cholesterol levels than those who had been breast fed for less than two months. This finding is now being tested in a larger group of subjects from four other longitudinal studies (American Academy of Pediatrics, 1978). The initial results show tentative confirmation of this link (Marmot, 1980).

Until there is increased certainty on the exact nature and function of human milk lipids it will be difficult for the formulation of any proprietary mixture to be based on fact instead of guess work. It is known, however, that the triglycerides in the adipose tissue of babies are profoundly influenced by the fat content of the infant's diet. Dutch babies fed on formulae containing maize oil had 33 to 37% of subcutaneous fat containing linoleic acid compared with British babies fed on unchanged cow's milk who only had 3% linoleic acid. The ultimate effects on health and nutrition of such variations are unknown (Widdowson, 1975).

The antimicrobial and viral properties of milk lipids are discussed on page 33.
CARBOHYDRATES

Almost all the carbohydrate in human milk is present in the form of lactose and this provides 37% of the energy value in milk (Fomon, p.187, 1974). Lactose is a nutrient that is only found in the mammalian milks and man at 7% has the highest level (Hambraeus, 1977b). This ensures a readily available source of galactose, a constituent of galacto-lipid needed for the development of the central nervous system of the rapidly growing human brain (Jelliffe, p.140, 1978).

Lactose is the principal osmotically active compound in milk and as such regulates the total water content of milk. A general reciprocal relationship between lactose and salt concentration is maintained and this keeps the total osmotic power of milk close to that of blood plasma (Nichols, 1978). Human milk has a higher lactose content than cow's milk and, therefore, formulae usually have carbohydrate added. Although this is generally lactose there are some formulae which contain sucrose, glucose or fructose. Other complex carbohydrates have been identified in human milk, notably the bifidus factor which is either a single nitrogen containing carbohydrate (Jelliffe, p.86, 1978) or a group of related compounds (Hambraeus, 1977a) which promotes the growth of lactobacillus bifidus. This is lost if milk is boiled and is, therefore, not present in infant formulae. The value of lactobacillus is discussed on page 31.

VITAMINS

All the known vitamins are present in both colostrum and mature human milk. The total amounts of the individual vitamins increase as lactation becomes established but are subject to fluctuations which depend on maternal diet. Vitamins seem to be unique in this respect in that they are the only constituents of breast milk which are found in lower concentrations in the milk of poorly nourished mothers (Belavady, 1978b).
If the mother's vitamin status is good then her breast milk will supply sufficient vitamins for the infant's requirements (DHSS, 1980a; Jelliffe, p.41, 1978). Evidence of vitamin deficiency or excess in the United Kingdom is very uncommon and the most recent recommendations for the vitamin content of infant formulae are based on the levels found in mature breast milk (DHSS, 1980b).

The amounts of vitamins A, E, and C are higher in human milk than in cow's milk but as all formulae are fortified with vitamins A and C they will offer similar quantities. Vitamins of B complex, with the exception of nicotinic acid, are found in larger amounts in cow's milk than human milk. Extra intake of water soluble vitamins is not however likely to be an advantage. Workers in the USA showed that supplementation of the mother's diet with thiamine and riboflavin increased the urinary excretion of these vitamins rather than the levels in mature breast milk (Nail, 1980). Similarly folate supplementation did not increase milk folate levels in twenty-five healthy lactating mothers (Tamura, 1980).

Controversy exists on the requirements for several of the vitamins and the adequacy of breast milk to provide them. Vitamin K is found in lower concentration in human milk than formulae and Vitamin K deficiency is said to be more common amongst breast fed infants (Sutherland, 1967; Keenan, 1971). However, these two studies are both based on neoates of questionable nutritional backgrounds. Low levels of vitamin K in breast milk may well be compensated for by the production of the vitamin in gut flora (Hambraeus, 1977a) and it is routine paediatric practice to give a single dose of vitamin K immediately after birth (DHSS, 1980b; American Academy of Pediatrics, 1980) thereafter the amount in human milk appears to be adequate.

The need for vitamin D is difficult to assess. The amount of vitamin D in breast milk is usually quoted at 0.01 ug/100ml (Macey, 1961). This amount provides the infant with much less than the recommended amount of 7.5 ug per day (DHSS, 1979). Breast fed babies however rarely develop rickets and researchers in Cambridge suggest that this is because much of the vitamin D is present in the form of a water soluble conjugate with sulphate. Previous assays have disregarded the aqueous phase of milk and measured vitamin D in the lipid fraction only (Lakdawala, 1977).
Similar work in Japan and France supports this theory and the vitamin D content of human milk is now reported to be 0.81 ug/100 ml (DHSS, 1977). This level assumes that the biological activity of vitamin D sulphate is the same as that of fat soluble vitamin D, but a recent study with rats suggests that this may not be the case (Leerbeck, 1980). Cases of rickets in wholly breast fed infants have been reported either in association with low maternal vitamin D intakes and minimal exposure to sunshine (Fomon, 1978) or in association with maternal fad diets (Edidin, 1980). The Welfare Food Scheme makes children’s vitamin drops available free or at a reduced cost for infants and the recommended dose provides 7 ug of vitamin D. However recent recommendations cautiously suggest that individual infants of known sound nutritional status, i.e., those breast fed from a well-nourished mother, do not need supplementation (DHSS, 1980a). The one section of the community that does give cause for concern are the breast fed infants of Asian women who seem predisposed to deficiency of vitamin D (Brooke, 1980; DHSS, 1980c). Too great an intake can be harmful (DHSS, 1980b) and as there are many proprietary vitamin D supplements available their use should be restricted to those infants in need—that are rarely the breast fed.

There are suggestions that the sudden infant death syndrome (SIDS) may be related to infant feeding method. An analysis of all possible factors relating to SIDS indicates a higher percentage of bottle feeding amongst the victims (Protestos, 1973; Carpenter, 1974) this is possibly due to the high solute load in formulae (Emery, 1974). Other reports suggest that the association may be coincidental to major risk factors such as the mother’s age and the infant’s birth order (Biering, 1978; Mason, 1980). In a recent study a more specific connection between SIDS and biotin has been suggested. It is known that stress induced sudden death occurs in young chickens who have a diet that is marginally deficient in biotin. This combination of events may also occur in human infants. The biotin levels in the livers of infants who died from SIDS was significantly lower than those who died from explicable causes. This result could be related to differences between the biotin available to the breast fed and bottle fed as biotin is lost during the manufacture of infant formulae (Johnson, 1980).
If infants are to receive adequate but not excessive amounts of vitamins they are best breast fed by a mother of sound nutritional status.

MINERAL SALTS AND WATER BALANCE

The concentration of sodium, potassium and chloride ions in the milk of different species is an inverse function of the molar concentration of lactose (Nichols, 1978). It follows therefore that human milk which has the highest lactose levels has also the lowest solute load, for example, the ash content of human milk is 0.2%, of cow's milk 0.7% and rat's milk 2.0% (Hambraeus, 1977a). These low levels reflect the relative immaturity of the neonates kidney. During the first few days of extrauterine life marked limitations of most renal functions can be observed. Glomerular filtration rate is low initially and does not fully mature for 9 to 12 months. The response to salt or water loading is qualitatively normal but quantitatively less than an adults. Infants are unable to respond to the stress of a high solute load or ill health (Edelmann, 1969). There are significant differences in the urine sodium concentrating ability of the infant between the 3rd, 6th day, the 6th day, one month and one year (Polack, 1965).

The concentration of minerals in infant formulae is varied but tends to be consistently higher than that of human milk. A detailed study of the mineral concentrations in infant milk formulae was done in the United Kingdom in 1973. The results were related to urine osmolarity and showed that with an average insensible water loss (200 ml per day) and normal powers of urine concentration the infant can remain in water balance on any milk. However, if insensible water loss is increased or volume of feed is much reduced, renal concentrating ability may be exceeded and dehydration will occur (Shaw, 1973). Also in 1973 the plasma osmolarity of 60 healthy infants aged 0 to 3 months was measured. The results showed that none of the breast fed infants had levels in the hyperosmolar range but that 11% of bottle fed infants and 40% of those fed with a bottle and solids had raised plasma osmolarity. Apparently healthy infants may be on the verge of a hyperosmolar crisis from only the mild degree of water loss accompanying any of the common infections of infancy (Davies, D.P., 1973).
The high solute concentration of artificial feeds is exacerbated by the over strength mixing that was found to be relatively common place amongst mothers and nurses (Taitz, 1972; Stern, 1972). The high incidence of hypernatraemia associated with infantile gastroenteritis, high solute feeds from over concentrated dried milks, and the early introduction of mixed feeding was noted by the DHSS in 1974. Hypernatraemic dehydration is known to be associated with a serious risk of permanent brain damage (Macaulay, 1967). However, a change in the manufacture of milk powders to reduce their solute load combined with a campaign to prevent over mixing, has resulted in a decrease in the number of artificially fed infants reported with hypernatraemia (Davies, D.P., 1977a; Whaley, 1977; Sunderland, 1979). High solute load and overmixing of formulae are not problems with which the breast fed baby has to contend.

The levels of calcium and phosphorus in human milk are relatively low but provide amounts sufficient for skeletal growth (Fomon, p.274, 1974). Infants fed on formulae, particularly those based on unadapted cow's milk, will receive higher levels of both phosphorus and calcium. Despite these high intakes, however, nutritionally dependent neonatal tetany associated with hypocalcaemia occurs almost exclusively in the formula fed infant, the critical period being 1 to 2 weeks after birth (Oppe, 1968). The exact mechanisms of hypocalcaemia are incompletely understood, but the high phosphorus intake and altered calcium/phosphorus ratios of formula feeds appear to be important factors (Barltrop, 1975). If mothers, who are unwilling to breast feed for a prolonged period, could be encouraged to do so at least for the first two weeks of the infant's life, neonatal hypocalcaemia would be virtually eliminated (Addy, 1976).

The iron content of all mammalian milk is low and is insufficient to maintain the concentration of haemoglobin found in the young at birth during the period of time it takes to double their birth weight (Widdowson, 1976). Artificially keeping up the level of haemoglobin in the human infant, whether by supplement or formula, is probably unnecessary. Indeed, it has recently been suggested that the low levels of iron in human milk are in fact an advantage because the lactoferrin and transferrin present lose their bacteriostatic properties when saturated with iron (Bullen, J., 1972).
The hypothesis on the role of lactoferrin as an anti-infective agent has yet, however, to be proved in-vivo (Brock, 1980).

The iron content of human milk is more readily available than iron from other sources; according to McMillan, 50% of the iron in human milk is absorbed as opposed to 34% from cows milk, thus the fully breast fed infant can maintain adequate iron supplies. The difference in absorption rate is thought to be due to the lower protein and phosphorus content, and higher Vitamin C and lactose levels in human milk (McMillan, 1976). Although the humanised formulae usually also have these advantages, they contain little active lactoferrin, as the small quantities found in bovine milk are denatured on heating. Lactoferrin, an iron binding whey protein, has been put forward as the major controlling factor in iron absorption. Human milk, particularly colostrum, is unusually rich in lactoferrin containing 7 mg/ml initially and thereafter falling off to 1 mg/ml in mature milk (Brock, 1980).

Recent work in Finland also supports breast feeding as an efficient method of preventing iron deficiency in early infancy. Figures for iron absorption show levels of 70% from breast milk, approximately 30% from cow's milk and only 10% from the supplementary iron in infant formulae (Saarinen, 1979a). On the other hand, Fomon has estimated that an infant may need 0.55 mg of iron per day in the first year of life, and even at an absorption rate of 70% human milk is unlikely to be able to provide this. He therefore recommends that breast fed babies and those fed on unmodified cow's milk need an iron supplement of 7 mg per day (Fomon, 1979). There have also been reports of lower haemoglobin levels amongst fully breast fed infants although the sample size is small (Woodruff, 1977). It seems likely that iron supplementation will continue to be used for breast fed infants until the precise role of lactoferrin is established and infantile iron requirement adequately assessed. Whilst the infant being given iron supplementation or fed on a humanised formula is likely to be offered a surfeit of iron; iron deficiency anaemia is still most likely to occur amongst infants who, up to the age of six months, are fed on pasteurised cow's milk. Pasteurised cow's milk, besides giving a relatively low and unavailable iron intake, also causes gastro-intestinal blood loss, therefore raising the iron requirement (American Academy of Pediatrics, 1978).
ENERGY INTAKE

The regulation of energy intake by the infant who is breast fed relies on both the length of time the breast is offered and the time the infant will continue to suck. Milk at the beginning of the feed is watery and acts as a thirst-quencher; milk towards the end of a feed contains 4 to 5 times as much lipid and 1.5 times as much protein. These changes in content are similar for both breasts and an infant who is feeding slowly from the first breast will suck vigorously again when offered the second.

It is suggested that these changes in composition and texture are associated with the development of appetite control (Hall, 1975). An infant who is given a set amount of time at each breast may never take sufficient hind milk to satisfy its energy intake and this can lead to the false conclusion of insufficient milk supply when the baby continues to appear hungry. The infant who is bottle fed has both the disadvantage of an unchanging texture and flavour throughout the feed and total reliance on the feeder's judgement as to the quantity required. Subtle persuasions ensure that a bottle fed infant will be cajoled into finishing every drop and thereby have a greater tendency to be over-fed than the breast fed infant whose mother cannot see how much is left (Fomon, p.22, 1974). It is only the infant who is allowed unrestricted breast feeding that can regulate its own intake. Small for dates and large for dates babies grow back to the median most rapidly when allowed to breast feed (Ounsted, 1975).

The result of the poor regulation of energy intake is infantile obesity and this has become increasingly common in the United Kingdom (DHSS, p.4.1, 1974), and in Canada and the USA (America Academy of Pediatrics, 1978). Studies at the beginning of the decade seemed to show an association between obesity and bottle feeding (Mellander, 1959; Hutchinson-Smith, 1970; Fomon, 1971; Shukla, 1972; Neumann, 1976). Later studies dispute this hypothesis, (Ritchie, 1975; Svegar, 1975; de Swiet, 1977; Evans, 1978), and infantile obesity proved only to be associated with bottle feeding when over strength mixing and the early introduction of solids added to the infant's solute and energy loading (Taitz, 1978).
The relationship between infantile obesity and obesity in childhood and later life is also under discussion. Some studies suggest that fat babies do stay fat (Lloyd, 1961; Asher, 1966; Eid, 1970) and a retrospective study in the USA indicates that the degree of obesity was an important factor. Babies whose weights reach the 90th centile at some time during the first six months of life are 2.6 times more likely to become obese as adults and this result was independent of such factors as parental weight or social class (Charney, 1976). Other workers who have done follow up studies on obese infants doubt the hypothesis of an early introduction to obesity (Mellbin, 1973; Garn, 1976; Poskitt, 1977) and animal studies show obesity to be a mixture of genetic endowment and early nutrition (Garrow, 1976).

In summary, although bottle feeding per se has not been proved to increase infantile obesity, it can and frequently does allow for an excessive energy intake. Breast feeding is self-regulatory and it is very uncommon to find an obese infant who is solely breast fed (Jeliffe p.244, 1978). Whatever the cause, obesity in infancy is to be avoided, as it leads to a higher risk of respiratory infection (Tracey, 1971; Watkins, 1979) and may have long term implications for the onset of diabetes mellitus (Baum, 1975) and coronary heart disease (Brook, 1978).

In conclusion, human milk can be shown to be unique and its composition is directly related to the rate of growth of the human young (Naismith, 1975). The alternative formulae available differ most particularly in total protein content and mineral salt levels tend to be higher. Formulae are also less well digested and absorbed. In the short term, bottle feeding can lead to hypernatraemia, hypocalcaemia, and accelerated growth. In the long term, the effects of the changed biochemical make-up of a bottle fed infant have yet to be assessed. As the precise chemical nature of human milk is still incompletely understood it is impossible to manufacture an identical alternative.
Breast feeding has long been known to give infants resistance to infection (Grulee, 1934). Since this study rising standards of sanitation and hygiene, with an accompanying drop in infant mortality and morbidity, have coincided with the steady improvement of artificial milk and the increase in bottle feeding. This co-incidence has tended to obscure the protective value of breast milk and to over-value the safety of bottle feeding. The anti-infective role of human milk was again made apparent, however, in 1961 when it was used to thwart an otherwise uncontrollable epidemic of E.Coli enterocolitis (Head, 1977) and recently there have been many efforts to explain the nature of the protective mechanisms involved.

One of the most important mechanisms is the transfer of specific antibody and in particular the immunoglobulin IgA (BMJ, 1976). Secretory IgA is present in highest concentration in colostrum at levels up to 50 mg/ml and these then fall to a base level of 1 mg/ml in mature milk (Hanson, 1975). Secretory IgA is more resistant to acid conditions and proteolytic enzymes than is serum IgA, and therefore it remains active throughout its passage through the gut, and exerts a localised protective influence on the intestinal mucosa (Tomasi, 1965; Goldman, 1973). It is also thought to be active in some parts of the respiratory tract where it is deposited when the infant inhales milk feed and regurgitates it through its nose (Downham, 1976). The reports of secretory IgA antibodies found in human milk have been extensively reviewed (Head, 1977; Pittard, 1979; Welsh, 1979). They attribute anti-bacterial antibodies to E. Coli, E. Coli enterotoxin, C. Tetani, V. cholerae, C. diphtheria, B. pneumoniae, salmonella, and shigella and anti-viral factors to a variety of polio, coxsakie and echo types as well as rotavirus, influenza, and respiratory syncytial virus. Recent studies have focused on the anti-E. Coli IgA, because E. Coli is universally present and commonly involved in infantile diarrhoea (Stoliar, 1976); the onset of which frequently coincides with the cessation of breast feeding particularly in underdeveloped countries (Mata, 1971).
The transfer of passive immunity from mother to infant appears to be a homing process. Beta cells in the intestinal Peyers patches after being sensitised by gut antigens, migrate to the breast glands, there they synthesise secretory IgA with a specificity for the antigen previously encountered in the gut (Hanson, 1978). The immunity conferred by breast feeding may be active as well as passive. Measurements of nasal mucosa suggest that the IgA producing lymphocytes of the neonate are switched on by some factor (probably cellular) in maternal colostrum, which thus provides rapid and effective secretory immunity actively as well as passively (Roberts, 1977).

The major antibody constituent of cow's milk is IgG which is in any case destroyed by pasteurisation and is not present in any currently marketed infant formula (Pittard, 1979).

Human milk also contains a specific growth factor for lactobacillus bifidus. The growth factor is a nitrogen containing polysaccharide which encourages the organisms to colonise the intestine (Kabara, 1980). Growth of lactobacillus is further increased by the high lactose, low protein, low phosphate content of human milk, together with its poor buffering capacity. This produces a low pH which antagonises the growth of enterobacteria including many common enteric pathogens (Gyorgy, 1971). The predominance of lactobacillary flora in breast fed babies takes some days to be established. It is suggested by Bullen that the high antibody and lactoferrin levels in colostrum play an important role in the initial protection of the infant. As the concentration of lactoferrin declines and the lactobacillary flora are established the protective role against gram-negative organisms is taken over by the poorly buffered acid environment that prevails in the breast fed infant's gut (Bullen, C., 1971). The gut flora of the bottle fed infant is very different having greater colonisation of gram-negative bacteria (Jelliffe p.87, 1978) and a higher incidence of infection by these agents (Bullen, C., 1977).

A further anti-microbial factor in breast milk is lysosyme which is found in 3,000 times greater concentration in human milk than cow's milk and in a more stable form.
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<th>Components</th>
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<tbody>
<tr>
<td><strong>Protein Macromolecules</strong></td>
<td></td>
</tr>
<tr>
<td>Immunoglobulins</td>
<td>IgA for the gut</td>
</tr>
<tr>
<td>Complement: C3, C4</td>
<td>C3 Fragments has opsonic chemotactic and anaphylatoxic activity</td>
</tr>
<tr>
<td>Lysozyme</td>
<td>Lysis of bacterial wall</td>
</tr>
<tr>
<td>Lactoperoxidase</td>
<td>Oxidation of streptococci</td>
</tr>
<tr>
<td>Lactoferrin</td>
<td>Antimicrobial by chelating iron</td>
</tr>
<tr>
<td><strong>Humoral Factors</strong></td>
<td></td>
</tr>
<tr>
<td>Leukocytes</td>
<td>Phagocytosis</td>
</tr>
<tr>
<td></td>
<td>Cell-mediated immunity</td>
</tr>
<tr>
<td></td>
<td>Production IgA, C4, Cs</td>
</tr>
<tr>
<td></td>
<td>Lysozyme and lactoferrin</td>
</tr>
<tr>
<td>Polysaccharide Growth Factor of L. bifidus</td>
<td>Production of low pH which leads to interference with organisms</td>
</tr>
<tr>
<td><strong>Lipid Factors</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perturbation of bacteria and virus membranes</td>
</tr>
<tr>
<td>Fatty acids and monoglycerides</td>
<td></td>
</tr>
</tbody>
</table>
Lysosyme, a specific milk protein, has been shown to act in vitro in concert with IgA to lyse E. Coli (Welsh, 1979).

The cellular content of human milk also makes important contributions to its anti-infective properties. Colostrum contains a variety of leucocytes in concentrations of 0.5 to 10 million cells per ml. Mature milk contains about 2% of the colostrum cell concentration but increasing volume compensates for this (Lawton, 1977). Macrophages comprise 90% of the cells, they are actively phagocytotic and have the ability to produce lysosyme, lactoferrin and complement. Leucocytes comprise 10% of the cells. Some are T cells and these may be able to transfer delayed hypersensitivity from mother to infant; others are B cells which synthesise IgA (Schlesinger, 1977; American Academy of Pediatrics, 1978). The cellular content of any milk, including human, is destroyed by heating at 62.5°C for 30 minutes (Welsh, 1979).

Besides containing anti-bacterial components, human milk has also non-specific antiviral effects. The free unsaturated fatty acids and monoglycerides present in the lipid faction reduce the infectivity of flaviviruses and alphaviruses (Welsh, 1978). There is a strong relationship between lipase activity in milk and antiviral activity; bovine milk and milk formulae, which are high in triglyceride, low in monoglyceride, and contain little lipase, lack a lipid mediated antiviral activity (Kabara, 1980).

The wide range of factors active against bacteria and viruses in breast milk are summarised in Table 2. The majority of these factors are either absent from cow's milk and synthetic milks or present in much smaller quantities. Although it is still difficult to assign precise clinical evidence to each factor individually, the sum of the factors is responsible for the difference in the morbidity and mortality of the breast fed and the non breast fed infant. These differences persist to this day. In the UK in 1972 gastro-enteritis was responsible for 1 in 40 deaths during the first year of life. Gastro-enteritis is much more common in bottle fed babies, who are also 50% to 100% more likely to suffer from respiratory infections and are over four times as likely to die from these infections.
Otitis Media is also more common amongst the bottle fed and the breast fed are protected against such divergent infections as neonatal septicaemia, meningitis and thrush (Addy, 1976). Moreover, morbidity studies in America indicate that the protective influence of breast feeding seems to extend beyond the period of feeding and into the first year of life. Protection increases with duration of breast feeding and appears to be more striking for serious illness, even though this was incurred after breast feeding had finished. The protective factor operates independently of socio-economic status, family size, day care exposure, and birth weight (Cunningham, 1979).
Childhood allergy is common in developed countries; asthma is found in 10% of children and eczema in perhaps 1% (Soothill, 1975). At least some of the asthma, eczema, and associated intestinal disease is due to cow’s milk intolerance a condition that is greatly under-diagnosed by paediatricians (Buusseret, 1978) and in its milder form goes unrecognised (BMJ, 1975). Pediatricians in America put the incidence of cow’s milk intolerance variously between 0.3% to 1% (Goldman, 1977) and 7.5% (Gerrard, 1974) of new born infants annually affected, giving a possible total of 250,000 infants. The mechanism behind the allergic response is possibly based on the transient IgA deficiency of the new born exacerbated by the lack of IgA in bottle feeds. Amongst the breast fed this deficiency is made good by the IgA content of human milk, particularly colostrum. The lack of a brisk IgA response allows antigens to be absorbed through the intestinal mucosa. The resultant over-stimulation of a normally responsive IgE system can lead to atopic disease. Also, once the reaginic system has been primed during this deficiency period, subsequent access of only small amounts of antigen will continue the process (Taylor, 1973).

Cow’s milk seems to be of particular importance in precipitating allergic illness as early exposure encourages sensitisation to other allergens beside bovine milk protein (Lancet, 1977). Sensitisation may also require the presence of E.Coli endotoxin; human milk greatly restricts the growth of these organisms and IgA prevents the attachment of E.Coli to the mucosal cells. The bottle fed infant is deprived of both these defence mechanisms.
Reaginic allergy is known to be familial, and when a group of susceptible infants were put on an allergen avoiding regime entailing exclusive breast feeding, a striking reduction in the incidence of eczema resulted (Matthew, 1977). Paediatricians in Finland have also found that prolonged breast feeding is prophylactic for atopic disease in infants at hereditary risk and the longer the breast feeding continued the fewer atopic symptoms were subsequently registered (Saarinen, 1979b). Not all reports agree that avoidance of bovine protein will protect against atopic eczema (Halpern, 1973; Eastham, 1978). However, the general practice of the occasional supplementation of bottle feeds to the breast fed, its short duration, and the fact that breast milk itself can contain sufficient antigens to cause a reaction in the very sensitive infant, all need to be considered when assessing any discussion on infant feeding and atopic disease. The role of breast feeding in the prevention of atopic disease is not merely a negative one in that it avoids the subjection of the infant to foreign antigen; it is positive as it provides local protection to prevent antigenic absorption. One of the most important functions of breast feeding is to ensure the smooth transition from immunological dependence to independence (Gerrard, 1974).

MATERNAL INFANT BONDING

The initial contacts that take place in the first few days after birth are extremely important to the future relationship between mother and child (Kennell, 1975). A group of mothers who had routine hospital contact with their babies briefly at birth and then only at subsequent four-hourly feeding times was compared with mothers who were given their babies for one hour at birth and an extra five hours a day for the next three days. The latter group showed differences both in enhanced quality and quantity of mothering that were still discernible after two years (Ringler, 1975). Failure to form a normal attachment accounts for the high incidence of battered babies amongst infants who suffered separation in the neonatal period or during the first year of life (Lynch, 1975).
The physical contact afforded during breast feeding and the presence of the baby close to the mother, that is a prerequisite for demand feeding, help to promote this attachment (Valman, 1980a). Furthermore, the success of breast feeding has been shown to be enhanced if the infant is allowed to suckle within the first four hours after birth (Martin, 1978). This is no new idea. The fact that breast feeding "makes mothers become more sympathetic to their offspring" was noted many centuries ago (Soranus, AD 98). The battered baby syndrome, however, is a feature of the last two decades and is the extreme manifestation of a lack of bonding the intermediate stages of which almost certainly go unrecorded (BMJ, 1977). During the same period there has been a trend away from home deliveries, which are now a relatively rare occurrence, to hospitalisation for the birth. The present practice in many maternity units gives little chance for mothers to form this initial early attachment to their babies and reduces their chances of successful breast feeding, thus further curtailing maternal-infant contact. Mothers have little time alone with their newborn infant and even where the need for demand feeding is acknowledged, it tends to fall into a 4-hourly routine (personal communication). A mother should be encouraged to feed when she and her baby choose and a breast fed baby needs feeding more frequently than one who is bottle fed (Richards, 1975). This does not allow for a set pattern of feeding times.

If we are to continue to commit almost all our pregnant women to be delivered in a maternity unit, then their routines must be geared to the requirements of mother and baby and not the institution.

The use of bottle feeding and artificial formulae was promoted and became widespread practice in an era when knowledge of the nutritional content of human milk was scanty and its immunological significance almost unknown. Paediatric nutrition has now advanced to a point where it is difficult to deny that human breast milk is the best food for human infants and many well-informed parents have returned to the practice of breast feeding. Despite these changes in knowledge, Britain still remains a largely bottle fed nation. Breast feeding is not promoted whole-heartedly by the health professionals and is thought to be difficult to achieve successfully. Why should this be so?
The study described in this thesis was designed to ascertain the extent of breast feeding in a health district and set the results against the background of information available to the mothers and the attitudes of their advisors.
The county of Buckinghamshire lies to the north-west of the London conurbation and is some 80 Km long and a maximum of 50 Km wide and it is predominantly a rural and agricultural county. Health Service facilities in Buckinghamshire are the responsibility of the Buckinghamshire Area Health Authority (AHA) which is itself a part of the Oxford Regional Health Authority. The organisational responsibility for the day to day coordination and management of Health Services is delegated to two Health Districts, one of which, Aylesbury District (total population 200,000), was the subject of the 1977 survey on infant feeding practice.

THE AYLESBURY AND MILTON KEYNES HEALTH DISTRICT

Economically and geographically the district can be divided into two parts:

(1) North Buckinghamshire.

Including the Milton Keynes development area which, at the time of the survey, had the fastest growth of population and urban development in the country. The original predominantly agricultural economy with small towns and villages has continued relatively undisturbed in the very north of the county. In 1975 the new city of Milton Keynes had a population of some 80,000 with a final target figure of 250,000 by the mid 1990s; most of the additional population coming from other parts of South East England. This rapid development is imposing a considerable burden on both Local Authority and Health Service resources. In 1977 the city of Milton Keynes was only half finished and large tracts of undeveloped land lay between the individual housing estates.
Transport, pedestrian, and shopping facilities were also underdeveloped and many of the child health clinics were situated in new health centres. Turnover amongst the population was high and this included both patients and staff.

(ii) Central Buckinghamshire

Aylesbury Vale. This is a mainly agricultural district in the low lying clay valley between the Chiltern Scarp to the south and Milton Keynes urban area to the north. Aylesbury is the only major urban centre and provides employment in light industry, the service industries, and public administration. Aylesbury was a London overspill area but this function has been increasingly taken over by Milton Keynes, although moderate population growth was continuing in 1977 and projection for the 1990s is for a population of around 140,000.

The two parts of the district have separate senior nursing officers who are responsible for the health visitors and community midwives in their districts. The General Practitioners (GP) from all parts of the district are registered with the Family Practitioner Committee in Aylesbury.

The district is served by a variety of maternity units either within Buckinghamshire or adjacent to it. The Royal Buckinghamshire Hospital in Aylesbury Vale is the largest maternity unit and takes primigravidae and any multigravidae who may have possible complications.

The Barratt Maternity Home, part of Northampton General Hospital, provided the same service for mothers-to-be in the northern part of the district. Deliveries in both of these hospitals are performed by the resident obstetricians and midwifery staff. There are also three GP Maternity Units in Bletchley, Newport Pagnell, and Stoke Mandeville when mothers are delivered by the domiciliary midwives and the GP. A smaller number of mothers might also be delivered at the Princess Mary's Royal Air Force Hospital, Halton or if they lived in the western part of the district at the John Radcliffe Hospital, Oxford. Delivery at home is actively discouraged.
The maternity services work on a shared-care basis. Antenatal care is initiated by the GP who will see an expectant mother routinely, approximately once a month, and the domiciliary midwife is frequently in attendance at these consultations. The GP will refer the mother to one of the maternity units serving the district; if it is a GP unit the mother will attend the booking clinic at approximately 4 to 6 months and then two further clinics at 32 and 36 weeks gestation. Mothers being delivered at hospital maternity units will also attend a booking clinic early on in pregnancy and then be cared for routinely either by the hospital obstetrician or their GP.

The length of time that a mother stays in the maternity unit postpartum is, to a great extent, left to her own choice. Forty-eight hours is normally the minimum, but primiparous mothers are encouraged to stay for 7 to 10 days and multiparous mothers 5 to 10 days. After the birth a mother normally remains under the care of a midwife for the first ten days of the baby’s life; this will either be the hospital midwife or the domiciliary midwife if the mother is in a GP unit or is transferred home. Responsibility for the infant’s welfare after the first 10 days of life is taken over by the health visitor who visits mothers at home initially and then encourages them to attend Well Baby Clinics.

Health visitors and midwives also run antenatal classes for primigravidae either locally at health centres or from the maternity units.
METHOD

The official policy of the AHA is to encourage mothers to breastfeed and not to introduce solids until after the age of four months. The survey was designed to find out whether mothers were breast or bottle feeding their babies during that first four months. The health visitors in the district were already in fairly regular contact with new mothers and recorded the feeding methods of the infant in their case notes. This information would have been time-consuming to gather retrospectively and not necessarily complete. During 1977, therefore, the health visitors in Aylesbury Health District were supplied with forms to record the feeding method of all babies assigned to their care; records were kept for the first four months of the infants' life (see Appendix 1). "Not breast fed at all" was defined as the mother having made no attempt whatsoever to breastfeed her infant. "Breast feeding" was defined as a mother feeding one or more feeds a day from the breast. On completion, the forms were sent with all other monthly returns to the relevant Nursing Officer in the two parts of the district. The information received was analysed by the Statistical Package for Social Services computer programme (Nie, 1975).

The AHA was concerned that there should be no breach of privacy during the survey, forms were therefore made in duplicate and only the copy retained by the health visitor contained the mother's name and address.

At the start of the year separate meetings were held with the health visitors involved in both parts of the district to explain the purpose of the survey and the method of filling in the record forms. Health visitors in Aylesbury Vale were extremely cooperative but there were one or two health visitors in Milton Keynes who felt that the paperwork involved was an unnecessary extra burden. During the year each of the maternity units was visited to ascertain their policy on infant feeding and routines used.
Fig. 2  Proportion of babies still breast fed up to the age of 4 months.
- Number of mothers breast feeding initially $X^2 = 58.38$, 2 df,
  $P < 0.0001$

% still breast feeding

- Aylesbury Vale
- Total Survey
- Milton Keynes
- National Survey 1975, n = 1544*

(* Martin, 1975)
There were 3369 live births in the Health District surveyed during 1977 and records of feeding method were received for 2461 infants; thus the sample obtained represents 73% of these births. Within the district 45% of the infants were born to mothers residing in Aylesbury Vale and 54% to mothers residing in Milton Keynes.

RESULTS

THE FEEDING METHOD CHOSEN BY ALL MOTHERS

The incidence of breast feeding in the district, defined as the proportion of babies who were put to the breast at all, was 60%. This is higher than the national average of 51% that was recorded in the 1975 census (Martin, 1978). However, as there were large regional variations in this census, the figure is best compared with that for London and the South East of England where Martin found that 62% breast fed initially. The number of mothers who continued to breast feed for four months was 27%. This is 1% lower than the Regional figure for London and the South East of 28% and it appears that the level of breast feeding when comparing these two surveys remained stable between 1975 and 1977 (see Fig. 2).

There were, however, significant differences in the popularity of breast feeding in different localities within the health district. The level of breast feeding in Aylesbury Vale was higher than in Milton Keynes (See Fig. 2). The highest level of breast feeding was found in rural areas and lowest in the newer parts of Milton Keynes (see Fig. 3). A detailed breakdown of breast feeding levels as defined by local health centre attachment is show in Table 3. The precise address of the mothers was not known but health centre attachment gives a clear indication of area residence. The largest number of mothers starting to breast feed in any locality was 85%, the lowest 32%. The results from Eagleston Health Centre, central Milton Keynes, refer to the first four months of 1977 only. This was the busiest of the new urban health centres and, in fact, none of the mothers recorded breast feeding their babies past the age of seven weeks.
Fig. 3 The number of mothers still breast feeding expressed as a % of the total of mothers in each area

<table>
<thead>
<tr>
<th>Area</th>
<th>% still breast feeding</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>M K South &amp; Central Urban</td>
<td>506</td>
<td></td>
</tr>
<tr>
<td>Stony Stratford Stantonbury Wolverton</td>
<td>543</td>
<td></td>
</tr>
<tr>
<td>Newport Pagnell Olney</td>
<td>197</td>
<td></td>
</tr>
<tr>
<td>Aylesbury Urban</td>
<td>498</td>
<td></td>
</tr>
<tr>
<td>Aylesbury Rural</td>
<td>625</td>
<td></td>
</tr>
</tbody>
</table>

KEY
- % who started to breast feed
  \( \chi^2 = 90.08, 4 \text{ df}, P < 0.0001 \)
- Breast feeding at 2 weeks
- " " " " 6 weeks
- Still breast feeding at 4 months
  \( \chi^2 = 64.65, 4 \text{ df}, P < 0.0001 \)
Table 3  To show the number of mothers still breast feeding expressed as % of the total for each area

<table>
<thead>
<tr>
<th>Number</th>
<th>Health Centre</th>
<th>Birth</th>
<th>2 weeks</th>
<th>6 weeks</th>
<th>4 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>127</td>
<td>Water Eaton</td>
<td>32</td>
<td>25</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>379</td>
<td>Valley Drive</td>
<td>51</td>
<td>41</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>78*</td>
<td>Eglistone</td>
<td>33</td>
<td>32</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>186</td>
<td>Wolverton</td>
<td>47</td>
<td>37</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>210</td>
<td>Stantonbury</td>
<td>53</td>
<td>48</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>147</td>
<td>Stony Stratford</td>
<td>72</td>
<td>53</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>142</td>
<td>Newport Pagnell</td>
<td>64</td>
<td>56</td>
<td>39</td>
<td>31</td>
</tr>
<tr>
<td>55</td>
<td>Olney</td>
<td>80</td>
<td>73</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>124</td>
<td>Walton Grove</td>
<td>61</td>
<td>50</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>54</td>
<td>Bedgrove</td>
<td>72</td>
<td>48</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>74</td>
<td>Meadowcroft</td>
<td>61</td>
<td>43</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>76</td>
<td>Oakfield</td>
<td>63</td>
<td>55</td>
<td>46</td>
<td>32</td>
</tr>
<tr>
<td>90</td>
<td>Elmhurst</td>
<td>71</td>
<td>54</td>
<td>37</td>
<td>24</td>
</tr>
<tr>
<td>80</td>
<td>Green End</td>
<td>68</td>
<td>51</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>151</td>
<td>Wing</td>
<td>73</td>
<td>61</td>
<td>46</td>
<td>38</td>
</tr>
<tr>
<td>33</td>
<td>Whitchurch</td>
<td>85</td>
<td>73</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>44</td>
<td>Waddesdon</td>
<td>55</td>
<td>55</td>
<td>43</td>
<td>32</td>
</tr>
<tr>
<td>71</td>
<td>Haddenham</td>
<td>75</td>
<td>66</td>
<td>51</td>
<td>49</td>
</tr>
<tr>
<td>45</td>
<td>Brill</td>
<td>71</td>
<td>64</td>
<td>56</td>
<td>51</td>
</tr>
<tr>
<td>85</td>
<td>Wendover</td>
<td>76</td>
<td>67</td>
<td>55</td>
<td>42</td>
</tr>
<tr>
<td>124</td>
<td>Buckingham</td>
<td>64</td>
<td>42</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>72</td>
<td>Winslow</td>
<td>61</td>
<td>51</td>
<td>31</td>
<td>25</td>
</tr>
</tbody>
</table>

* January to April 1977 only

** $x^2 = 175.26$, df $28$, $P < 0.0001$

*** $x^2 = 161.99$, df $28$, $P < 0.0001$
TABLE 4  Comparison of feeding method used by mothers according to first and subsequent births.

A  All mothers  

<table>
<thead>
<tr>
<th></th>
<th>% still breast feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>%</td>
</tr>
</tbody>
</table>

Total survey

Primiparae  
1056  66  54  35  29

Multiparae  
1405  55  45  31  26

Areas with low levels of breast feeding; less than 40% starting to breast feed

Primiparae  
121  38  35  14  12

Multiparae  
180  32  27  18  12

Areas with high levels of breast feeding; 70% or more starting to breast feed

Primiparae  
127  75  55  43  28

Multiparae  
164  70  52  30  23

\[
* \chi^2 = 38.26, \ 3 \text{ df}, \ P < 0.0001
\]

\[
** \chi^2 = 9.17, \ 3 \text{ df}; \ P < 0.05
\]

B  Mothers who breast fed initially.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total survey</td>
<td>Primiparae</td>
<td>Multiparae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,464</td>
<td>697</td>
<td>767</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>80</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td></td>
<td>82</td>
<td>53</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>44</td>
<td>47</td>
<td></td>
</tr>
</tbody>
</table>
The rate at which mothers changed from breast to bottle feeding was similar for both parts of the district. Of those mothers who started to breast feed, 18% gave up in the first two weeks and a further 37% stopped between two and six weeks. After six weeks the rate of change had slowed down and at four months 45% of those who had started were still breast feeding (see table 4).

MOTHERS OF FIRST BABIES

When the results were classified according to parity they show that 43% of the sample were first babies, 39% had one sibling, and the remainder 2 or more siblings.

Primigravidae have the benefit of antenatal classes and more instruction from the maternity unit staffs; the feeding method that they used was therefore analysed separately. Unfortunately multiparous mothers are not offered the chance to attend antenatal classes and it is often assumed that they do not need instruction on infant feeding in their maternity unit.

Both the number of primiparous mothers starting to breast feed and the number who continued to breast feed for four months was higher than the results recorded for multiparous mothers. This result was highly significant at birth ($p < 0.0001$) but less so at 4 months ($p < 0.05$). A comparison of primiparous and multiparous mothers taken from the localities where breast feeding levels are low with localities where they were high showed that the primiparous mothers are more likely to breast feed wherever they reside (Table 4). The primiparae in areas where breast feeding levels were very low were the mothers who were most likely to stop breast feeding by six weeks.
Table 5  The feeding routines a Buckinghamshire mother may encounter when having her baby (1977)

<table>
<thead>
<tr>
<th>Place of birth</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>Babies fed 4 hourly if normal weight</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>No</td>
<td>✓</td>
<td>✓</td>
<td>No</td>
</tr>
<tr>
<td>Mother can demand feed if she wishes</td>
<td>✓</td>
<td>✓</td>
<td>5 days</td>
<td>✓</td>
<td>✓</td>
<td>No</td>
<td>✓</td>
</tr>
<tr>
<td>Dextrose feeds given after birth</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>occ.</td>
<td>✓</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Time mother will feed at night</td>
<td>*</td>
<td>*</td>
<td>After 4 days</td>
<td>*</td>
<td>After 3 days</td>
<td>After 6 days</td>
<td>After birth</td>
</tr>
<tr>
<td>Complementary feeds given: routinely</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>as required</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>rarely</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Brand of formula used</td>
<td>Cow &amp; Gate</td>
<td>Cow &amp; Gate</td>
<td>Cow &amp; Gate</td>
<td>SMA or Cow &amp; Gate</td>
<td>Cow &amp; Gate</td>
<td>SMA</td>
<td>Cow &amp; Gate</td>
</tr>
<tr>
<td>Policy of advice for primigravidae: Ask mother’s intentions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Advise to breast feed</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Persuade to breast feed</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Parentcraft classes run by the unit</td>
<td>✓</td>
<td>No</td>
<td>No</td>
<td>✓</td>
<td>No</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* Variable, dependent on mother’s health and wishes.

NOTE  This table represents the normal routine for mothers who do not hold any strong views of their own. All the maternity units were flexible in approach on the above points except where the answer 'no' is given.

✓ The key to the place of birth is given in Figure 4.
Mothers in the Aylesbury Vale and Milton Keynes Health District have their babies in a variety of maternity units, many of which have different infant feeding practices. (see Table 5). The situation is complicated by the large number of mothers who are delivered at the Royal Buckinghamshire Hospital or the Barratt Maternity Home and then transferred to a smaller unit within 48 hours. These mothers have little continuity of advice or feeding routines.

The breast feeding levels, however, show the same general pattern as this total sample when examined by place of birth, see Fig. 4. The detailed results for each hospital are shown in Appendix V; 50% of the babies recorded were born in the Royal Buckinghamshire Hospital or the Barratt Maternity Home and a further 14% in the Bletchly Maternity Unit. These three had a very similar percentage of breast feeding mothers, and were the largest busiest units. The three smaller maternity units delivered 22% of the babies and all of these had higher breast feeding levels than the larger units. There was, however, one large maternity included in the study where breast feeding levels were high, namely the John Radcliffe Hospital in Oxford. Of the 5% of babies born there, 77% were breast fed initially and 43% for four months.

The number of mothers still breast feeding expressed at a percentage of those who started in each unit is shown in Table 6. Mothers delivered at a GP unit were less likely to stop breast feeding in 2 weeks than those delivered at a maternity hospital.

A small number (n= 23) of mothers were delivered at home. This was a group of atypical mothers as they has resisted AHA policy and only one was a primigravida. Their breast feeding levels were very high as 78% of these babies were breast feed initially and 61% continued for four months.
Fig. 4 The number of mothers still breast feeding expressed as percentage of total of mothers recorded for each place of birth.

At birth $X^2 = 43.75$, df 9, $P<0.0001$

KEY TO PLACE OF BIRTH

1. Barratt Maternity Home, Northampton
2. Bletchly Maternity Unit
3. Princess Mary's RAF Hospital, Halton
4. Royal Buckinghamshire Hospital
5. Westbury Maternity Home
6. Stoke Mandeville GP Unit
7. John Radcliffe Hospital, Oxford
8. Born at home
TABLE 6. To show the number of mothers still breast feeding according to place of birth expressed as a % of those who started in each unit

<table>
<thead>
<tr>
<th>Place of birth</th>
<th>N</th>
<th>% of all mothers who commenced breast feeding</th>
<th>Number still breast feeding expressed as % of those who started</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Barratt Maternity Home</td>
<td>493</td>
<td>58</td>
<td>80 40</td>
</tr>
<tr>
<td>2. Bletchley Maternity Unit (GP)</td>
<td>346</td>
<td>52</td>
<td>86 40</td>
</tr>
<tr>
<td>3. Princess Mary's RAF Hospital</td>
<td>62</td>
<td>65</td>
<td>75 50</td>
</tr>
<tr>
<td>4. Royal Buckinghamshire Hospital</td>
<td>811</td>
<td>57</td>
<td>78 42</td>
</tr>
<tr>
<td>5. Westbury Maternity Home (GP)</td>
<td>227</td>
<td>59</td>
<td>88 50</td>
</tr>
<tr>
<td>6. Stoke Mandeville GP Unit</td>
<td>253</td>
<td>70</td>
<td>85 54</td>
</tr>
<tr>
<td>7. John Radcliffe Hospital</td>
<td>116</td>
<td>77</td>
<td>82 56</td>
</tr>
<tr>
<td>8. Born at home</td>
<td>23</td>
<td>78</td>
<td>74 61</td>
</tr>
</tbody>
</table>
TABLE 7 To show the influence of weight at birth on the incidence and duration of lactation

<table>
<thead>
<tr>
<th>Weight at birth in gms</th>
<th>N</th>
<th>% breast fed initially</th>
<th>% of those who started to breast feed and still doing so at 4 mths</th>
</tr>
</thead>
<tbody>
<tr>
<td>910-2000</td>
<td>34</td>
<td>35</td>
<td>8</td>
</tr>
<tr>
<td>2001-2500</td>
<td>115</td>
<td>46</td>
<td>21</td>
</tr>
<tr>
<td>2501-3000</td>
<td>459</td>
<td>54</td>
<td>39</td>
</tr>
<tr>
<td>3001-3250</td>
<td>464</td>
<td>60</td>
<td>45</td>
</tr>
<tr>
<td>3251-3500</td>
<td>546</td>
<td>66</td>
<td>46</td>
</tr>
<tr>
<td>3501-3750</td>
<td>423</td>
<td>63</td>
<td>52</td>
</tr>
<tr>
<td>3751-4000</td>
<td>215</td>
<td>67</td>
<td>54</td>
</tr>
<tr>
<td>4001-4500</td>
<td>142</td>
<td>59</td>
<td>46</td>
</tr>
<tr>
<td>4501-5610</td>
<td>31</td>
<td>52</td>
<td>56</td>
</tr>
</tbody>
</table>

* \( x^2 = 43.05 \), df 8, \( P < 0.0001 \)

** \( x^2 = 24.55 \), df 8, \( P < 0.005 \)
WEIGHT AT BIRTH

The birth weight of the infants recorded ranged from 910g to 5,610g with the largest number (22%) weighing between 3,251 and 3,500g. As would be expected fewer of the smallest babies were breast fed initially but an unexpected result was the decline in initial breast feeding amongst babies with a birth weight above 4,000g, however, weight also appeared to have a significant affect on the success of lactation. The number of babies still being breast fed at 4 months expressed as a percentage of those who breast fed initially, rose steadily with an increase in birth weight (See Table 7).

DAY OF BIRTH

There was a difference in the number of births according to the day of the week with the least number occurring on Sundays and the most on Fridays (See Table 8). Babies born on Friday were less likely to be breast fed initially than babies born on any other day (p < 0.04) and also less likely to be breast fed for four months (p < 0.004). Sunday was the quietest day for deliveries but did no appear to affect the feeding method. These results are summarised on Table 9.
### TABLE 8
To show the number of births according to day of the week on which they were born

<table>
<thead>
<tr>
<th>Day</th>
<th>N</th>
<th>% of total births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>296</td>
<td>12.1</td>
</tr>
<tr>
<td>Monday</td>
<td>362</td>
<td>14.7</td>
</tr>
<tr>
<td>Tuesday</td>
<td>359</td>
<td>14.6</td>
</tr>
<tr>
<td>Wednesday</td>
<td>356</td>
<td>14.5</td>
</tr>
<tr>
<td>Thursday</td>
<td>362</td>
<td>14.7</td>
</tr>
<tr>
<td>Friday</td>
<td>377</td>
<td>15.4</td>
</tr>
<tr>
<td>Saturday</td>
<td>344</td>
<td>14.0</td>
</tr>
</tbody>
</table>

### TABLE 9
To show feeding method of babies according to day of birth expressed as % of total

<table>
<thead>
<tr>
<th>Day</th>
<th>% breast fed initially</th>
<th>% still breast fed at four months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday</td>
<td>54.6</td>
<td>20.7</td>
</tr>
<tr>
<td>All other days</td>
<td>60.3</td>
<td>28.0</td>
</tr>
</tbody>
</table>

* $X^2 = 4.67$, df 1, $P<0.04$

** $X^2 = 8.40$, df 1, $P<0.004$
DISCUSSION

The Sample

The sample size was aimed at collecting data for all babies born in the Aylesbury Vale district during 1977, thus giving a complete account of feeding method used by the mothers. However, the feeding method of only 73% of births was recorded due to a combination of factors:

Some health visitors did not include babies born in maternity units in adjacent areas, e.g. Bedford and Banbury, or born to mothers whose residence was in an overlap area near the boundary of the county. These infants are, however, included in the total of live births for the district.

Infants born in the district but who moved away in the first four months of life are not included.

One health visitor in urban Milton Keynes "did not agree with the statistics" and refused to take part in the survey.

The figures for Eaglestone, Milton Keynes, represent births in the first four months of 1977 only. A policy decision was then made to discontinue assisting with the survey due to shortage of staff.

There were occasional missing records during the year due to staff changes.
The overall feeding pattern for the first four months of 1977 compared to the total year was, however, almost identical. Therefore, the shortfall does not appear to have caused any bias in the results, and 73% is a sufficiently high figure to ensure a large enough cell size in all statistical cross tabulations.

The Choice of Feeding Method

In 1977 60% of mothers in Buckinghamshire chose to try to breastfeed their babies. This figure is considerably higher than the low levels that were recorded in the 1960s and reflects the upsurge of interest in breast feeding which followed the Oppe Report (DHSS, 1974). The figure is very similar to the one of 62% for London and the South East given in the National Survey two years earlier (Martin, 1978) and indicates that the rise in breast feeding levels is not necessarily continuing. An independent survey conducted in 1978 confirms this trend (Wyeth, 1978) as does the 12 month Isle of Wight Study where 60% of mothers were breast feeding their week old babies (Hide, 1980). Earlier a local survey undertaken in Bletchley, Milton Keynes showed 51% of mothers breast feeding initially in 1971 and 56% in 1975 (Miles, 1976). This compares with a figure of 50% of the same area in 1977 and although the level of population changes in Bletchley make direct comparison difficult, it seems that breast feeding levels may have reached a plateau.

The most striking finding in choice of feeding method, however, is the large variation that lies within the figure of 60%. There is a significant difference between urban and rural areas (see Fig. 3); rural areas in both parts of the district giving higher levels for both incidence and duration of breast feeding. This finding has been noted before both in the United Kingdom (Robinson, 1939) and in Europe (Voorhoeve, 1975; Vahlquist, 1975). A variety of reasons has been put forward for the contrast in urban and rural feeding patterns.
Obviously the Industrial Revolution in the second half of the 19th century with its rapid urbanisation and widespread employment in urban industry had an initial effect (Jelliffe, p. 183, 1978), but the downward trend in breast feeding in recent times cannot be due to a need to return to work. The majority of women give up breast feeding before their baby is three months old (Vahlquist, 1975) and this is within the period of maternity leave. Less than 1% of Buckinghamshire mothers had returned to work, see Appendix VII.

The answer is more likely to lie in the alteration of social structure which has taken place over recent decades. There has been a change from the rural extended family life to urban nuclear family life. Many young couples live in social isolation without close contact with the older generation and thus lack advice from female relatives when the first baby arrives. The mother, who has never seen a baby breast fed, has more difficulty in learning to breast feed herself (Tylden, 1976). The existence of the extended family is still evident in rural Buckinghamshire.

The influence of social class is known to be an important factor in choice of feeding method but the lack of family support can be demonstrated as an important factor within the same social groups. Of the 124 mothers of Walton Grove, an industrial estate in Aylesbury and an established urban area, 60% chose to breast feed initially and 26% continued for four months. Of the 127 of mothers of Water Eton, Milton Keynes, an industrial estate housing new London overspill residents, 32% started to breast feed and 9% continued for four months. The health visitors in the new part of the district have commented on the fact that they have to play the role of "grandma" to the new mothers (personal communication), a difficult task when the number of new babies assigned to an individual health visitor during the year was as high as 97.
The Influence of Parity

Although the mothers of first babies were more likely to attempt to breast feed, 66% compared with 55% of subsequent births, a result which mirrors other studies (Martin, 1978; Coles, 1978); the difference in breast feeding levels narrowed to only 3% by four months. Analysis of the duration of breast feeding, including only those who started, shows that primiparous mothers gave up more quickly in the first two weeks of the infant's life (See Chapter 3); thereafter, the decline in breast feeding levels in the two groups was similar. The method of feeding chosen for the first child and the length of time for which breast feeding continued has a major effect on the feeding of subsequent children. The 1975 National Survey showed that 96% of mothers who had breast fed at least one other child for longer than two months intended to breast feed subsequent children, and that this group were most likely to be successful (Martin, 1978).

As breast feeding levels were increasing generally in the mid 1970s it would be expected that by 1977 multiparous mothers would also begin to reflect the trend. The present study shows a small increase in the number of multiparous mothers starting to breast feed, 55% compared with the regional figure of 52% given in the National Survey of 1975 (Martin, 1978). The duration of breast feeding is, however, far greater 47% of those who started continued for four months as opposed to 26% in 1975 (see Table 3). Confirmation that multiparous mothers had indeed followed the trend was given in the 1980 National Survey (Martin, 1982).

Efforts to encourage successful breast feeding, therefore, can be concentrated on primiparae and if these mothers succeed at least for some measure of time they will successfully breast feed subsequent children.
The influence of the place of birth

The number used to notate each place of birth within results is given in parentheses.

When viewing the results according to the place of birth, it should be remembered that the maternity units did not take a random cross section of mothers, so factors such as social class and parity must also be taken into consideration. In particular the Princess Mary Hospital, Halton (3) pre-dominantly delivers either officers' wives or local mothers from Social Classes I and II, all of whom would be expected to be in favour of breast feeding. This is reflected in the high levels 65% of mothers who start breast feeding, although there is a fairly steep fall off after the first two weeks.

The two GP units, Westbury Maternity Home in the north (5) and Stoke Mandeville GP Maternity Unit in the south (6) have a majority of multiparous patients which would be expected to depress breast feeding levels. However, they also serve established local districts who offer continuity of care in the prenatal and postnatal stages. Their results are higher than would be expected. The Bletchley Maternity Unit (2) although run along similar lines to the other two smaller maternity units, has the lowest levels of breast feeding in the district, but it also takes the majority of mothers residing in new urban Milton Keynes. The Royal Buckinghamshire Hospital (4) and Barrat Maternity Home (1) both have special baby care units. All the at risk births, and most of the primigravidae, are delivered in these two hospitals. A high proportion of new mothers from these two maternity units would be expected to increase breast feeding levels but it does not, and a further factor to be taken into consideration is that of moving mothers 24 to 48 hours after delivery to one of the smaller units. The maternity unit with the highest levels of breast feeding, the John Radcliffe (7), was the only hospital in the survey with a co-ordinated policy of promoting breast feeding involving both medical and nursing personnel.
A hospital's policy and obstetric practice has obviously an influence on breast feeding levels which at times can override the expected feeding pattern of the mothers it serves. The choice of feeding method is invariably made long before the mother reaches the delivery room (see page 87) but at least the early success of lactation will be profoundly affected by the maternity unit.

Successful lactation depends on a multiplicity of factors, some instinctive or reflex, and some learned. These have been extensively investigated and reviewed in recent years (Cowie, 1971; Jelliffe, 1978; Nichols, 1978; and Voogt, 1978). To summarise their findings, lactation comprises two separate physiological mechanisms, namely, milk secretion, which is controlled by prolactin released from the anterior pituitary in response to the suckling stimulus, and the milk neuroendocrine reflex in which oxytocin is released from the posterior pituitary in response to the sucking causes contraction of the alveoli of the breast and an ejection of milk via the mammary ducts and the nipple.

Prolactin release is a quantitative phenomenon in that the prolactin secretion and hence the milk produced is related directly to the amount of suckling stimulus (Jelliffe, p.19, 1978). Timing of the stimulus is also important. A newborn baby has three instinctive reflexes; (a) rooting, where it seeks the nipple; (b) suckling, where it exerts a milking action, and (c) swallowing. The suckling reflex which activates prolactin release is strongest during the first half hour after birth (Stanway, p.84, 1978) but maybe interfered with by the stimulus of a larger free-flowing teat from a feeding bottle (Gunther, 1955). The mother also has a sensitive period of approximately 12 hours after birth when, if given even as little as three-quarters of an hour close contact with her new baby and the encouragement to suckle, she will form a strong emotional bond and be more likely to breast feed successfully (Barnes, 1953; Sousa, 1974; Sosa, 1976). The importance of early suckling has been demonstrated in the United Kingdom; 28% of mothers who commenced breast feeding during the first 12 hours stopped breast feeding within the first two weeks compared with 45% of mothers who had waited 24 hours before beginning to breast feed (Martin, 1978).
The continuance of successful lactation requires repeated stimulation of the prolactin reflex; this can occur if the baby is fed on demand (Illingworth, 1952; Salarija, 1978; Cruse, 1978). Any restriction placed on the infant's need to suckle, i.e. rigid feeding schedules, timing of feeds or supplementary feeding will reduce the strength of the infant's suckling reflex and, therefore, the success of breast feeding (Culley, 1979) as will sedation due to the excessive use of obstetric medication to the mother (Kron, 1966; Tylden, 1976). Inadequate suckling stimulus will ultimately result in reduced secretion of milk (Aono, 1977).

While the prolactin reflex controls milk production in the alveolae of the mammary gland, milk ejection or release requires the stimulus of oxytocin; this reflex is referred to as the draft or let-down reflex. Fore milk, the milk found in the lumen of the alveolae prior to the let-down reflex, contains mainly water, protein, lactose, and electrolytes. Additional physical force is required to secrete the lipid into the lumen. This is supplied by contraction of the alveolae in response to the oxytocin. During nursing there is also increased secretion of casein as well as the release of lipid and this accounts for the higher fat and protein content of hind milk (Nichols, 1978). If anything interferes with the let-down reflex the infant will obtain only the small quantity of fore milk and the mother's breasts are likely to become engorged. The let-down reflex differs from other breast feeding reflexes in that it is psychosomatic. Oxytocin release occurs not only in response to suckling but also to factors such as the baby crying or even the thought of breast feeding, it may be inhibited by both physical and psychological stress particularly in early lactation (McNeilly, 1978). This is because maternal stress is associated with adrenalin release which reduces the blood flow to the mammary tissue and thus lessens the amount of circulating oxytocin which will reach the alveolae (Nichols, 1978). Failure of the let-down reflex tends to set up a vicious circle. The already anxious mother is made more so by her failure, by the baby's crying, and by the discomfort of her own engorged breasts. She approaches subsequent feeds with even greater apprehension, and with mammary engorgement which interferes with nipple protractility and the baby's ability to suckle, this can result in sore nipples. Failure of the let-down reflex is usually interpreted by the mother as being due to insufficient milk (Jelliffe, p.23, 1978).
Table 10 the optimum conditions for the promotion of successful lactation.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Reflex involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Early mother infant contact preferably before the infant is clothed.</td>
<td>Enhancement of bonding</td>
</tr>
<tr>
<td>2. Encouragement to suckle within the first half hour and not later than 18 hours after delivery.</td>
<td>Suckling reflex.</td>
</tr>
<tr>
<td>3. Experienced assistants to help new mothers offer the breast and remove the infant at the end of feeding time.</td>
<td>Let down reflex.</td>
</tr>
<tr>
<td>4. Minimum of obstetric sedation so that the infant can respond.</td>
<td>Suckling reflex.</td>
</tr>
<tr>
<td>5. Frequent, unrestricted demand feeding.</td>
<td>Prolactin reflex.</td>
</tr>
<tr>
<td>6. Adequate duration of each feeding period, ensuring adequate energy intake.</td>
<td>Maximum prolactin production.</td>
</tr>
<tr>
<td>7. Removal of alternative stimuli i.e. Dextrose/water or complementary feeds.</td>
<td>Prolactin reflex.</td>
</tr>
<tr>
<td>(i) Unexplained removal of the infant after delivery.</td>
<td></td>
</tr>
<tr>
<td>(ii) Variations in the quantity and colour of milk or the number of feeds demanded.</td>
<td></td>
</tr>
<tr>
<td>(iii) Engorgement.</td>
<td></td>
</tr>
<tr>
<td>(v) Sore nipples.</td>
<td></td>
</tr>
</tbody>
</table>
Recent studies report that, in addition to the suckling induced release of oxytocin, women have precisely timed spontaneous release occurring at 30/60 minute intervals in early lactation, then decreasing in frequency. These spontaneous ejections are felt only when the breast is full and may indicate a readiness to suckle. This finding indicates that rigid 3 or 4 hourly feeding regimes are unphysiological and impose a threat to the initial success of lactation (McNeill, 1978).

If a maternity unit is to promote successful lactation, it needs to adopt the policies listed in Table 10. In practice Buckinghamshire mothers would come across some, all, or even none of these factors. There was no co-ordinating policy between maternity units despite the fact that a mother often had her baby delivered in one, and completed the lying-in period in another and there were likely to be changes in policy at the same unit depending on the staff on duty. Almost all the health service personnel were in favour of breast feeding and there was never any lack of concern for the well-being of the mother or baby. However, there were many differences in opinion as to how lactation should be established and these views were very strongly held. The regimes these mothers met and their effect upon the feeding methods that they used are discussed in detail.
The Barrat Maternity Home delivered 20% of the mothers in the survey, this is a teaching unit responsible for training midwives. Milton Keynes mothers who were delivered there would only be seen on average two times during the antenatal period and would not normally go to the parent-craft classes because of the distance involved. The Barrat Home had a detailed regime for infant feeding which was designed to encourage breast feeding whenever possible and feasible (see Appendix VI). Mothers were given the baby to hold immediately after the birth but would only put it to the breast if they so requested. The first feed was 5% dextrose solution given from a bottle 2 to 4 hours after the birth. Therefore the first breast feed would be at the next feeding time a further 4 hours later, or even the next day if the baby had been born late in the evening. Feeding times were fairly rigidly set, either three or four hourly, with a specified amount of time for suckling at each breast at each feed.

If adhered to this means that the baby would be allowed 20 minutes suckling in the first 24 hours, rising to a maximum of 100 minutes in 24 hours by the fifth day. In contrast to this inhibiting schedule, a mother who wished to demand feed would certainly have been allowed to do so and complementary feeding was only allowed on the instructions of the duty midwife. Qualified help was almost always available and it was frequently stressed that each baby is an individual. Of those mothers who started breast feeding 20% had stopped with in two weeks and only 40% continued for 4 months, a result that would be expected as both early imitation and increased frequency of breast feeding has shown to extend the nursing period (Salariya, 1978) and both were lacking at the Barratt Maternity Home.

The Royal Buckinghamshire Hospital (Royal Bucks) delivered 33% of the babies in the survey, this is reserved for primigravidae and at-risk births. Mothers are only seen once prior to admittance and the average length of stay is two days, all normal births being transferred back to a GP unit. The policy of the unit is for the mother to hold and suckle the baby immediately after birth but this will only happen if time is available and the midwife is in agreement.
One of the two paediatricians favoured two consecutive dextrose feeds to be given prior to breast feeding but this was also a variable feast. Feeding routine was on demand, mothers having free access to SMA to complement their babies if they wished. Bottles of SMA were in evidence at the end of the cots and night feeds were usually given by the nursing staff unless the mother wished to be woken. The senior obstetric midwife was very much in favour of persuading mothers to breast feed and well aware of the advantages of demand feeding. However, she freely admitted that postnatal work at the Royal Bucks was most unrewarding as the mothers stayed for such a short time and she knew they would be going into a different regime when they moved on. Of the mothers who started to breast feed, 22% had given up within two weeks and 42% continued for 4 months.

The two GP units in the Milton Keynes district were controlled by the same Nursing Officer Midwifery, but their regimes and results proved to be very different. The largest of the two is Bletchley Maternity Unit (BMU) with 20 beds which serves mothers from central and southern Milton Keynes, 62% of whom were multiparous. The mothers delivered at the BMU were, therefore, the least likely to breast feed and at 52% breast feeding initially this was the lowest figure recorded for place of birth. The enquiry about feeding method made at the booking clinic was restricted to a question of intent and no comment was made about the answer. Primigravidae are delivered by one of the four resident midwives; during the year 1977 one of these posts was vacant for three months. Multigravidae were delivered, wherever possible, by a domiciliary midwife, out of the eleven domiciliary posts one was continually vacant during 1977. Those mothers who elected to breast feed would suckle the baby in the labour room or at the next regular feeding time, this feed would be followed by a dextrose complement. Feeding times followed a 4 hourly regime with timed feeds; complementary feeds were discouraged and made-up milk was not freely available to mothers. Mothers who wished to demand feed, however, were encouraged and given empty side wards if they needed privacy. There was a tendency, however, for those demand feeding to drop back into a 4 hourly routine.
The nursing staff felt that helping mothers to suckle was one of their prime tasks but, in practice, the time available to do this was immensely variable as mothers in labour took precedence over mothers needing help at feeding times particularly when there was only one midwife on duty. This variation was reflected in the range of personal communication received from mothers delivered at the BMU; "You don't get no help in there" or "I had no help at the Royal Bucks' but when I got to the BMU they were marvellous". The staff view was that mothers transferred in from either the Barratt or the Royal Bucks had received little help with feeding and it was often too late to get it established by the time they arrived at the BMU. Of those mothers who had started to breast feed, 14% had given up at 2 weeks and 40% continued for 4 months.

The Westbury Maternity Unit is a 14 bed GP unit serving mothers from Newport Pagnall, Wolverton and Olney, an area where breast feeding levels were generally higher than in central Milton Keynes. Although 70% of the mothers delivered at the Westbury were multiparous 59% of these elected to breast feed initially. The booking clinics were run by both the local GPs and midwives as well as the resident staff, and this gave a greater continuity of advice to mothers in the antenatal and postnatal stages. For those mothers who elected to breast feed, suckling would commence in the labour ward if the mother requested it, or at the first feed. Again 4 hourly, timed feeds were the norm, complementary feeds were rarely anything but water or occasionally dextrose and mothers were woken routinely to feed at night. Efforts were also made to ensure continuity of regime for mothers who because of a sudden emergency were delivered at the Barratt but transferred back to the Westbury. Of those who started to breast feed, 12% stopped at 2 weeks, following this a less rapid decline in breast feeding levels occurred, so that at 4 months 50% of the mothers were still breast feeding.

The equivalent GP unit in the south of the district was the 16 bed Maternity Unit at Stoke Mandeville General Hospital. This unit took 60% multiparous mothers from an area where the breast feeding levels in general were higher than that of the total survey.
Two of the GPs involved in delivering mothers were actively in favour of encouraging breast feeding and one particularly keen on demand feeding. The sister in charge, however, did not believe that any persuasion should be used to influence the mother's choice of feeding method and at the booking clinic they were merely asked how they intended to feed. Some 70% of the mothers breast fed initially and were routinely asked if they would like to suckle within the first half hour after delivery "between a wash and a cup of tea". The first two breast feeds were always followed with a dextrose feed and all feeding times were on a strict 4 hourly routine. A mother could choose to complement after a breast feed if she wished as the sister in charge had strong views in favour of complementing "if its hungry, feed it".

SMA was always used for milk feeds even if the baby arrived from Royal Bucks on Cow & Gate. This was the only unit to despatch mothers with a gift pack which, incongruously, was Osterfeed. There were no staff shortages during 1977, the unit overall being rather under utilised. Of the mothers who started to breast feed, 15% had stopped by two weeks and, as with the Westbury, there was a slower rate of declining so that 54% were breast feeding at 4 months.

A small number of mothers (62) 2.5% of the total survey were delivered at the Princess Mary's R.A.F. Hospital, Halton, which is a unit used by a high proportion of social classes I and II 45% of whom were primiparous. Although 64% of the mothers delivered at the unit breast fed initially there was a rapid decline in breast feeding levels with 25% of these stopping in two weeks. The routine at the Princess Mary's Hospital was particularly rigid; mothers would only suckle immediately after the birth at their own request but within two hours a dextrose feed would be given to the infant. All babies were fed at night by bottle for the first five days and a complementary feed was given routinely to all breast fed babies after each feed until they left the unit. After this inauspicious beginning, the rate at which mothers stopped breast feeding slowed down and by four months 50% of the mothers were still breast feeding.
The 5% of mothers who were delivered at the John Radcliffe Hospital, Oxford, showed the greatest deviation from the mean in both incidence and duration of breast feeding. The John Radcliffe Hospital initiated a policy of breast feeding in both the hospital and the community in 1974 (Sloper, 1977) and introduced demand feeding as a routine in the maternity unit in 1975 (Cruse, 1978). The process of encouraging breast feeding begins at the antenatal stage. Mothers are seen at least three times whether they are to be delivered in the GP unit or in the consultant unit. Enquiries are made as to how they intend to feed the baby and all new mothers or prospective bottle feeders have a separate interview with a specialist lactation sister. All mothers regardless of feeding intention are given a pamphlet (see Appendix IX) encouraging breast feeding which has no alternative method mentioned. There is also a variety of books and pamphlets available at the booking clinic, promoting breast feeding including the publications of the National Childbirth Trust and La Leche League. These are, however, more likely to appeal to the mothers from social classes I, II and IIIa.m.

Mothers are actively encouraged to suckle immediately after delivery and dextrose or complementary feeds are rarely given. Mothers feed the babies on demand throughout the full 24 hours with the occasional exception of the first night feed. Of the mothers delivered at the John Radcliffe, 77% started to breast feed and of those who started, 18% stopped within the first two weeks and 56% continued for four months. The policy has an obvious impact on the incidence and duration of breast feeding, although not upon the initial sharp decline in breast feeding levels during the first few weeks after birth as has been noted in the past (Sloper, 1975). A follow up study in 1979 on 90 mothers delivered at the John Radcliffe Hospital showed an even higher success rate initially with 87% starting to breast feed but, again, 17% of those who started stopped within two weeks. It is likely that there is still a core of mothers whose real inclination is not to breast feed but who feel obliged to do so in hospital (Newson, p.63, 1965; Eastham, 1976; Burne, 1979; Personal Communication).
A small number of mothers (23) had their babies delivered at home and all but one was multiparous. These mothers were atypical in that they had resisted pressure for a hospital delivery, and in the home environment would have full control over feeding regimes. They had the highest incidence of breast feeding with 78% commencing and were also the most successful group in that 61% of those who started to breast feed continued for four months.

There is obviously little co-ordination of policy on infant feeding amongst the maternity units available to Buckinghamshire mothers and this is particularly unfortunate as there is a shuttle service run between them. The influence of the hospital appears to have the greatest impact on the establishment of breast feeding, and mothers delivered at the GP units where there was a greater continuity of care and advice were more successful breast feeders than those at the larger units (See Table 6 p. 52). The existence of a strict regime (Unit 3) increased early failure and strong promotional policies (Unit 7) increased both the incidence and duration of breast feeding. Early suckling has been shown to have the greatest effect on the long term success of breast feeding (de Chateau, 1978; Salaraya, 1978) and only two hospitals in the survey initiated this (6, 7) and these had the highest percentage of mothers breast feeding for four months - 54% and 56% respectively. The other units relied on the mother making the suggestion and I doubt if many mothers would have either the knowledge or the presence of mind to do this within the first half hour after delivery.

Friday’s Child

The variation in the number of births according to the day of the week is well known and is probably associated with elected intervention (Marcfarlane, 1978). Why the feeding method of children born on the busiest day of the week should be different is less clear.
The fact that the more significant result was in the duration of breast feeding for these babies suggests that time to help with early postpartum suckling was not so readily available on a busy Friday as other days in the week. It does not follow that Sunday's child will be advantaged as it is also well known that there are fewer staff available on Sundays. It is perhaps stating the obvious to say that the more mothers who start breast feeding the larger will be the number continuing at least for several months, thus adding to the pool of women who can by example, promote breast feeding, or breast feed subsequent babies, and who will also breed breast feeders. The policy of encouragement to breast feed is only effective with 60% of mothers in Buckinghamshire and even this success rate is uneven in application, with mothers in new urban areas faring the worst. A sustained policy, as practised by the John Radcliffe, Oxford, will increase both the incidence and duration of breast feeding.

A desire to breast feed, however, is not enough; even the John Radcliffe was not able to prevent early failure of lactation in 18% of its mothers directly under the influence of the hospital and the hospital environment itself may be at fault. The policy in Buckinghamshire is for all mothers to have their babies in hospital and this is to become the norm for the whole of the United Kingdom (Social Services Committee, 1980). A report on perinatal and neonatal mortality states that in the interests of safety all births should take place in hospital. The reasons for this are outside the scope of this thesis, but if hospitals are to be the birthplace for all our babies they must be geared to the fact that the majority of women need a normal physiological labour, and not a mechanised event accompanied by unnecessary obstetric interference or medication. The American tendency to warp the experience of childbirth, distorting it into a pathological one, rather than a physiological one with the attendant routines that inhibit successful lactation, has been well documented (Haire, 1973). It would be a great disadvantage to breast feeding levels if birth in Britain were to follow the same pattern. There have been objections to the report by the maternity welfare groups who are concerned that unwanted technical procedures will be imposed on a majority of women for the sake of the small minority at risk. These were dismissed recently by the Chairman of the Social Services Committee as "coming from a lot of fuddy duddy middle class mothers" (Gillie, 1980).
CHAPTER 3
A SURVEY OF MOTHERS IN BUCKINGHAMSHIRE

The Area Health Authority, in accordance with Government guidelines, has a policy of promoting breast feeding but it is the infant's parents, particularly the mother, who will make the decision on the feeding method to be used. Half of Buckinghamshire mothers followed the DHSS minimum recommendation to breast feed for two weeks and 27% breast fed for the preferred time of four months (DHSS, 1974).

The survey of feeding methods described in Chapter 2, although giving an accurate picture of infant feeding patterns in Buckinghamshire, gave only limited information on the factors affecting the mother's choice of feeding method. To gain more detailed information a 10% sample of mothers was interviewed personally and a questionnaire was used to find out where the mothers were currently gaining information on infant feeding and how and when they required advice.

METHOD

The sample:—241 mothers were interviewed from May 1977 to April 1978 during 33 visits to child health clinics throughout the district. They were asked to complete a questionnaire the details of which are given in Appendix II.

All the mothers had given birth to an infant in 1977 that was at the time of the interview between four and eight months old; at this age the questions would not either have affected the outcome of the main survey or provided answers relying on a memory of events too far back in the past.

Information was gained on the feeding method of their 1977 baby, social class of the family, parental age, the feeding method of siblings, and of the mothers themselves.
The sample of mothers surveyed in the main survey reported in Chapter 2 and the present survey is similar with respect to area of residence and place of birth. The number of primiparous mothers is however higher, 56% of the total compared to 44% in the main survey, as primiparous mothers are more likely to be attending a child health clinic than multiparous mothers. The 241 mothers did however include a small number who did not attend child health clinics and were questioned by health visitors. These were difficult to collect as the attendance at child health clinics at least initially is very high in Buckinghamshire and is estimated to be around 95% of mothers with young infants.

The social class of the mothers is defined by father's occupation in accordance with the Registrar General's classification (OPCS, 1970). The question on mother's occupation proved to be inconclusive as so many fell into social class III

**SOURCES OF INFORMATION**

The books and pamphlets given to the mothers at the antenatal and postnatal stages were collected and examined. The health visitors were asked for details of the organisation and content of the antenatal classes offered to the mothers. A number of them booking clinics sessions were attended as an observer as well as one of the antenatal classes devoted to the subject of infant feeding.
TABLE 11 The feeding method given by mothers accorded to first or subsequent birth and area of residence

<table>
<thead>
<tr>
<th>All 1977 births</th>
<th>N</th>
<th>Birth</th>
<th>2 wks</th>
<th>4 wks</th>
<th>2 mths</th>
<th>4 mths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st child</td>
<td>135</td>
<td>*82</td>
<td>61</td>
<td>47</td>
<td>38</td>
<td>30</td>
</tr>
<tr>
<td>2nd or subsequent child</td>
<td>106</td>
<td>*62</td>
<td>57</td>
<td>44</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>Siblings born before 1977</td>
<td>148</td>
<td>61</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Aylesbury Vale births**

| 1st child | 68 | 88 | 73 | 62 | 49 | 41 |
| 2nd or subsequent child | 38 | 66 | 63 | 58 | 55 | 34 |

**Milton Keynes births**

| 1st child | 67 | 76 | 48 | 33 | 27 | 19 |
| 2nd or subsequent child | 68 | 60 | 53 | 34 | 26 | 22 |

* $X^2 = 11.13$, df 1, $P<0.001$
RESULTS

The feeding method chosen by mothers showed the same distribution as the survey in Chapter 2 but gave a level of initial breast feeding that is apparently higher than that reported by the Health Visitors, see Table 11. According to the mothers 73% attempted to breast feed as opposed to 60% recorded by the health visitors as breast feeding initially. Discrepancy between the two surveys narrows over a period of time so that by four months the breast feeding levels were almost identical in each.

The results from the mothers' survey included the feeding method used for their previous children and this is compared with the 1977 births in Table 11.

Second or subsequent children born in 1977 have a very similar feeding pattern to their earlier siblings establishing once again the importance of the mother’s initial experience. Of the multiparous mothers surveyed 69% attempted to breast feed their first child born before 1977, this compares with 82% of the 1977 primiparous mothers.

Fewer multiparous mothers attempted to breast feed than primiparous and this difference was significant ($P < 0.001$). However as the most rapid decline in breast feeding occurs amongst the primiparae during the first two weeks of the baby’s life this difference soon diminishes. Of those mothers who attempted to breast feed 37% of Milton Keynes primiparae had given up within two weeks. This compares with 15% of Aylesbury Vale primiparae, 12% of Milton Keynes multiparae and 3% of Aylesbury Vale multiparae ($x^2 = 7.76$, $df = 2$, $P < 0.025$) thus confirming the trend noted in Chapter 2.
Table 12: Method of feeding used for first children (1977 births + earlier first children) according to how the mother was fed

<table>
<thead>
<tr>
<th></th>
<th>Totally Bottle fed</th>
<th>Breast fed 4 months</th>
<th>Breast fed initially changed to bottle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottle fed mothers</td>
<td>34%</td>
<td>19%</td>
<td>72% of those who started</td>
</tr>
<tr>
<td>Breast fed mothers</td>
<td>13%</td>
<td>39%</td>
<td>56%</td>
</tr>
</tbody>
</table>

N = 198 (excludes "don't knows")

Pattern of feeding according to how mother was fed

\[ \chi^2 = 54.30, \text{2 df, } P < 0.001 \]

---

Table 13: Feeding method chosen by mothers expressed according to social class

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>IIIm</th>
<th>IIIln</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Started</td>
<td>86</td>
<td>81</td>
<td>65</td>
<td>72</td>
<td>67</td>
<td>64</td>
</tr>
<tr>
<td>Breast</td>
<td>48</td>
<td>41</td>
<td>15</td>
<td>26</td>
<td>26</td>
<td>9</td>
</tr>
</tbody>
</table>

N = 21 42 20 117 27 11

I + II compared to III + IV + V

\[ \chi^2 = 9.45, \text{3 df, } P < 0.023 \]
FACTORS AFFECTING THE CHOICE OF FEEDING METHOD

The mothers were asked how they were fed as a baby, a question that caused surprise but was answered in an almost identical manner in both parts of the district. The answers showed that 57% said that they were breast fed, 27% were bottle fed and 14% did not know. The age of the mother made little difference to these answers with the exception of the teenage mothers and in this small group (N=16) 38% had been bottle fed.

The way a mother was fed herself had a significant influence on both how she chose to feed her first child and its subsequent feeding pattern. A bottle fed mother was much more likely to bottle feed her child than a breast fed mother, and those bottle fed mothers who attempted to breast feed were less likely to continue for four months than mothers who had been breast fed themselves (see Table 12).

The choice of feeding method was also related to the social class of the family classified by father's occupation, both in the numbers who started to breast feed and the length of time they continued. The results were only significant when social classes I and II are compared with the remainder (P<0.023) (See Table 13).

Those mothers who had made an attempt to breast feed were asked if they had enjoyed doing so. The great majority of the mothers 123 (81%) said 'Yes', 18 (12%) 'Partly' and 11 (7%) replied 'No'. The enjoyment of breast feeding was related to the length of time a mother continued as 48% of those who gave the answer 'Yes' breast fed for four months compared to 11% who gave the answer 'Partly' and none of the mothers who gave the answer 'No'. (P<0.005). The mothers who attempted breast feeding despite lack of enjoyment were all from social classes I-IIInm. None of the mothers in classes IV and V had been prepared to do so.
Figure 5 The length of stay in maternity unit according to area and whether first or subsequent birth

First births as % of total

Aylesbury Vale

Milton Keynes

Length of stay in days

Subsequent births as % of total

Aylesbury Vale

Milton Keynes

Length of stay in days
The length of time a mother stayed in her maternity unit varied from 1-14 days. As would be expected primiparae stayed in a maternity unit longer than multiparae, but there was a difference between the two districts; Aylesbury Vale primiparae staying in longer than their Milton Keynes counterparts (see Figure 5). The length of stay had no apparent relationship with the feeding method used. Some 38 (16%) of the mothers had been delivered in one unit and transferred to another. They commented that this had had a disruptive influence on establishing a feeding pattern and 23% of these who tried to breast feed gave up in two weeks which compares with 18% giving up in two weeks amongst mothers who remained in the same maternity unit.

A longer lying-in period did not appear to be an advantage when establishing lactation as 89% of the mothers who gave up trying to breast feed within one week did so while still in their maternity unit (n = 27).

THE REASONS GIVEN FOR CHANGING FROM BREASTFEEDING TO BOTTLE FEEDING

Of the mothers who commenced breast feeding 108 (61%) changed to bottle feeding within four months. Over 20 different reasons were given for this change and these are summarised in Appendix VII. Those most frequently occurring were:

- The baby did not seem satisfied 33%
- Breast feeding never became established 19%
- Medical reasons, including engorgement and cracked nipples 15%

The other reasons given centred around needing to feed more frequently than was expected, tiredness, use of supplements, and lack of advice. Only two of the mothers said the baby was not gaining sufficient weight.
There were 36 multiparous mothers who changed feeding method from breast to bottle within four months, 55% of those who started. One gave the reason that breast feeding never became established, 16 (45%) felt that the baby was not satisfied and 9 (25%) gave medical reasons for the change. In contrast the 69 primiparous mothers who stopped breast feeding within four months (62% of those who started) had more difficulties initially with 19% saying that breast feeding never became established. The baby not being satisfied was given as a reason by 20 (29%) and medical reasons by 7 (10%).

The critical period for a baby to appear unsatisfied with breast feeding was between three and eight weeks of age. This reason was given by 36 (75%) of mothers who had stopped breast feeding before the baby was two months old. Medical problems were most likely to have caused a mother to change to bottle feeding during the baby’s first week of life.

Of these mothers who changed feeding method 40 were asked further details on how they effected the change from breast to bottle feeding. The majority (65%) did ask for advice at this time although there was a tendency to act first and ask second. The advice mothers received was nearly as variable as the reasons they gave for changing feeding method (see Appendix VIII).

Health visitors were asked by 15 (43%) of the mothers, while 4 (11%) asked a midwife and a further 4 were given the advice from their maternity unit. Surprisingly 17 (40%) of the mothers did not attempt to phase out breast feeding but changed directly to the bottle, 14 took up to two weeks and the remaining 8 three weeks to a month to effect the changes.
Table 14  The age of babies when first given solids according to feeding method

<table>
<thead>
<tr>
<th>Age of baby</th>
<th>Bottle fed</th>
<th>Breast fed 4 weeks or less</th>
<th>Breast fed 4 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 4 weeks</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4-8 weeks</td>
<td>19</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>9-12 weeks</td>
<td>19</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>13-17 weeks</td>
<td>28</td>
<td>56</td>
<td>46</td>
</tr>
<tr>
<td>4 months or more</td>
<td>22</td>
<td>18</td>
<td>39</td>
</tr>
</tbody>
</table>

The totals do not add up to 100% as there were a few mothers who could not remember accurately enough to be included.

* $x^2 = 21.93$, df 6, $P<0.002$
The milk chosen was most often the one used in the maternity unit or suggested by the health visitor and only three brands were mentioned namely Ostermilk, Cow and Gate Premium and SMA Gold Cap.

The mothers were asked what the fathers' opinion of the change had been and very few could answer without some thought and occasionally the comment 'What's it got to do with him?'. Some 27 fathers were said to have agreed to the change or did not mind while 2 suggested the idea and 1 disagreed but was overruled.

**INTRODUCTION OF SOLIDS**

Although it is the policy of the Oxford Area Health Authority not to recommend the introduction of solids before 4 months of age many of the mothers do give some solids to their baby at an earlier stage. The longer the baby was breast fed the less likely it was to be given solids before 4 months (See table 14).

**SOURCES OF ADVICE ON INFANT FEEDING**

The mothers were asked where they had obtained information or advice on infant feeding at the antenatal stage. The majority had received advice from several sources, although 30% of the mothers said they had received none. The answers given are summarised in Figure 6, half the mothers included their own beliefs as a source of advice but the last column represents only those who relied solely on their own beliefs. It can be seen that despite the efforts of the health care teams 17% of primigravidae said that they had not received any information on infant feeding prior to the birth of their baby. Nevertheless the primigravidae are much more in need of information than multigravidae and 68% of the replies came from mothers of first babies.

Nursing Personnel were the most frequently quoted professional sources of advice with health visitors being the most popular. Doctors accounted for only 11% of the replies.
The figure 6 presents the source of advice on infant feeding given by mothers according to whether it was the first or subsequent birth. The diagram shows the percentage of mothers who received advice from various sources. The percentages are indicated by dots, with different categories such as school, books, media, friends, relatives, and health professionals. The specific percentages for each category are not legible in the image.
Table 15 The % of mothers who used advice from Health Service staff or other sources

<table>
<thead>
<tr>
<th>Source of Advice</th>
<th>% of total sample</th>
</tr>
</thead>
</table>
| 1. Advice received from one or more of:  
  Doctor, Midwife, Health Visitor,  
  Maternity Unit Nursing Staff | 56 |
| 2. Mothers who asked relations or friends only | 6 |
| 3. Mothers who consulted books or pamphlets only | 5 |
| 4. Mothers who used 2 + 3 only | 3 |
| 5. Mothers who did not record receiving advice from any source | 30 |

Table 16 The % of mothers who received advice from each source according to social class

<table>
<thead>
<tr>
<th>Social class of mother</th>
<th>Mothers gaining advice from each source as % of total in each social class</th>
<th>% of replies given compared to Group I</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All medical staff</td>
<td>Relations</td>
</tr>
<tr>
<td>I</td>
<td>43</td>
<td>14</td>
</tr>
<tr>
<td>II</td>
<td>55</td>
<td>10</td>
</tr>
<tr>
<td>III</td>
<td>60</td>
<td>15</td>
</tr>
<tr>
<td>III⁻</td>
<td>55</td>
<td>21</td>
</tr>
<tr>
<td>IV</td>
<td>52</td>
<td>7</td>
</tr>
<tr>
<td>V</td>
<td>55</td>
<td>27</td>
</tr>
</tbody>
</table>
When adjustment is made for the multiple answers given by the many mothers it can be seen that less than two-thirds gained advice from health service personnel, the remainder of mothers either asked elsewhere or did not ask at all (see Table 15). The social class of the mother had an influence on both the amount of advice sought and the source of that advice. The numbers involved did not allow for detailed statistical analysis but do show that while the popularity of health service personnel was unaffected by socio-economic status; books and pamphlets were most often used by mothers in Group I and II and never by mothers in Group V who prefer to rely on relations and friends (see Table 16). When the number of replies is adjusted for group size the results indicate that mothers in Groups I and II seek the most information and those in Groups IV and V the least.

The content of advice given by health service professionals was varied; all encouraged breast feeding but the emphasis ranged from a straightforward question of intent to active encouragement. There was always concern that those who would not, or could not, breast feed should not feel guilty and that the final choice should be the mother's. Details will be discussed in chapters 4 and 5.

Books and pamphlets were the second most popular source of information and were readily available at the antenatal stage. The Health Visitors' Association's 'New Baby' or the British Medical Association's 'You and Your Baby' were given to all mothers. These publications give a wide range of advice with approximately equal coverage of breast and bottle feeding. Both also contained coloured advertisements with contented looking babies promoting proprietary infant milks. The Health Education Council booklet 'Now You're a Family' was also available at some clinics, as was Cow & Gate's publication 'A hundred and one questions answered on you and your baby'. Both of these were almost identical in size and colour scheme and could readily be confused giving the impression that Cow & Gate's publication was an official document.
The maternity units, with the exception of the John Radcliffe Hospital, use 'The Baby Book', Newborn Publications. This also has a section on infant feeding sandwiched between advertisements for bottles and artificial milk. The only non-commercial publication available was the Buckinghamshire Area Health Authority's 'What so special about breast feeding?' This was newly published and not yet widely distributed in 1977.

The advice from the media referred to the Sunday morning television programmes such as 'Having a Baby' on BBC 1, but these programmes were not viewed by any of the mothers in social class IV or V.

Antenatal Classes All primigravidae are encouraged to attend antenatal classes and it is estimated by the health visitors that over 90% do so. The average length of the antenatal classes was 13 hours with 2 hours spent on infant feeding. The classes are run in 6 or 8 week cycles continuously unless there are too few mothers to attend in which case alternatives in the area are offered to the mothers (see Chapter 5). The attendance at antenatal classes is subject to the mother's working status, health and delivery date amongst other variables, and does not automatically mean she has attended the specific class giving instruction on breast feeding.

Of those mothers who received advice from a health visitor or midwife 28% specified that it was in the context of an antenatal class. This is a small group (n = 41) but the breast feeding level of these mothers was very high with 87% commencing to breast feed and 50% continuing for four months. Many other mothers however commented that they were too preoccupied with the forthcoming birth at the antenatal stage to be able to concentrate on the details of infant feeding; and it was not until after the baby arrived that they realised what sort of information they required. The results of the questions on timing of advice confirmed this.
Table 17  The answers mothers gave to the questions on how they preferred to receive advice on infant feeding according to social class

<table>
<thead>
<tr>
<th>Method of advice</th>
<th>% of mothers giving answer &quot;Yes&quot; in each social class</th>
<th>% of total mothers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personally by Health Service staff</td>
<td>71 83 85 72 67 82</td>
<td>75</td>
</tr>
<tr>
<td>In booklets you can take home</td>
<td>48 41 35 25 22 9</td>
<td>29</td>
</tr>
<tr>
<td>During antenatal classes</td>
<td>29 33 45 29 22 18</td>
<td>30</td>
</tr>
<tr>
<td>No. of mothers in each class</td>
<td>21 42 20 117 27 11</td>
<td></td>
</tr>
</tbody>
</table>

Table 18  The time mothers of first babies made a final decision on feeding method according to social class

<table>
<thead>
<tr>
<th>% in each social class</th>
<th>I</th>
<th>II</th>
<th>IIIm</th>
<th>IIIm</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st trimester or earlier</td>
<td>83</td>
<td>86</td>
<td>90</td>
<td>74</td>
<td>67</td>
<td>50</td>
</tr>
<tr>
<td>2nd trimester</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>3rd trimester</td>
<td>8</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>After the birth</td>
<td>8</td>
<td>7</td>
<td>0</td>
<td>15</td>
<td>11</td>
<td>0</td>
</tr>
</tbody>
</table>

\[ x^2 = 54.52, \text{ df } 25, \text{ P}<0.001 \]
Mothers had varied views and the results include some multiple answers where they would like some information early on in pregnancy and then again immediately after the birth. Out of the 311 answers given to the question 'When do you require advice?' the spread was as follows: 1st trimester 15%; 2nd trimester 20%; 3rd trimester 24%; postpartum or during the initial weeks of the baby's life 41%.

THE METHOD OF GIVING ADVICE.

Advice given on a personal basis by health service staff was the most popular method of giving information accounting for 56% of the answers. Antenatal classes and books or pamphlets ranked equally with 22% each and again many mothers gave multiple answers stating that they liked to receive information personally and also have written advice to refer to afterwards. The social class of the mother was related to the use of antenatal classes and written material as methods of gaining information, but not to advice given personally. Antenatal classes were less popular with mothers in social classes IV and V, and written material showed a steady decline in popularity in social classes I through to V (see Table 17).

TIMING OF THE DECISION ON INFANT FEEDING

The majority (77%) of mothers made the decision on how they were going to attempt to feed their baby in the first trimester of pregnancy or even earlier, 12% made the decision during the period of antenatal care and 8% waited until after the birth. Mothers in social class V were the least likely to have made their minds up earlier on. (See Table 18).
DISCUSSION

The way an infant is fed during the first four months of its life depends on two factors, first the initial intentions of the parents, secondly the success with which these intentions are met.

There has been a largely successful campaign to convince mothers that the best method to feed a baby is with breast milk and this is reflected by the increasing number of primiparae attempting this. Initial intention however is not enough as the failure rate is high, so that at two weeks only 4% more primiparae were breast feeding than multiparae in Buckinghamshire. At this rate of progress it will take a long time for breast feeding levels to rise. Once a mother has made an unsuccessful attempt to breast feed she is unlikely to try again (see Chapter 2). If breast feeding is to be promoted further it is important to know who are the mothers who do not try to breast feed and what are the reasons for the failure of those who do.

Factors which affect feeding method: (i) Social Class

Social class of the mother is one of the major factors operating on choice of infant feeding and its success. The post-neonatal infant mortality rate is said to be the most socially sensitive of health indicators (Morris, J., 1979) and although it is now much lower in absolute terms the proportional difference between social classes I to V is about the same as it was when the National Health Service was instituted. The 1976 figures for post-neonatal mortality in England and Wales show a uniform increase between social classes I (2.8/1000 live births) and IV (5.4/1000 live births) followed by a rise as much again to social class V (8.6/1000 live births). Few infant and child deaths can be attributed directly to nutritional factors but they should not be disregarded, particularly in the youngest age groups (Oppe, 1980). Respiratory infections are one of the major causes of post-neonatal death and they are also associated with bottle feeding (Grulee, 1935; Watkina, 1979). It can be no coincidence that babies in social class V have the highest incidence of both these factors. Moreover, mothers in this socioeconomic group are known neither to claim nor to receive the full benefits of the Health Service (Morris, J., 1979) despite being the most in need of them.
The Buckinghamshire mothers in group V although small in number (11) had the lowest initial incidence of breast feeding and the highest failure rate. Other manual groups also had low levels of breast feeding compared to the mothers in groups I and II. These findings are in line with other studies this century (Gordon, 1942; Douglas, 1948; Newson, 1965; Davie, 1972; Sloper, 1975; Martin, 1978; Hart, 1980).

Few reasons for these differences in feeding pattern have been put forward and until the National Survey in 1975 there had been no systematic attempts to measure attitudes to breast and bottle feeding (Martin, p.48, 1978).

One suggestion is that the working class mother feels the need for a degree of privacy which because of her circumstances she is unable to obtain (Newson, p.175, 1965). It has subsequently been found that embarrassment about breast feeding in front of other people is a manifestation of a distaste for breast feeding and this in its turn is an attitude that is closely associated with the choice of feeding method (Martin, p.55, 1978).

Mothers in social classes I and II had less distaste for breast feeding than other mothers who planned to breast feed. This distaste and the attitudes to the sexuality of the breast are deep rooted feelings and unlikely to be changed during the period of a pregnancy (Bacon, 1976).

The views of the mother’s close relatives (husband and own mother) were also correlated with the attitudes and distaste for breast feeding and rated above medical opinion as an influence on feeding method (Martin, 1978). Working class women have their babies under predominantly middle class supervision, and to appear to comply with the wishes of the health professionals whilst in their cars is traditionally a quick way out of a situation with which they have little sympathy (Newson, p.175, 1965). When medical staff withdraw they will suit themselves and their close associates as to how they feed the baby. The almost total change to bottle feeding with two months that occurs in urban Milton Keynes, where mothers are predominantly working class and medical supervision is thinly spread, is likely to be a reflection of this long standing attitude of distaste for breast feeding.
The Buckinghamshire Survey showed a large majority of mothers (81%) enjoyed breast feeding and their answers were unaffected by social class. As these were mothers who had already elected to try to breast feed, this result neither proves nor disproves the theory of distaste, although those who disliked or only partially enjoyed breast feeding gave up more quickly. There was one notable difference amongst mothers of differing social class. Mothers in social class I-III were prepared to try to breast feed, despite lack of enjoyment, but mothers in social class IV and V were not.

It is not tenable to blame the groups in question simply on the basis of socio-economic position as the appropriateness of the antenatal care and means of communication for these mothers also need examination. Research in the Scottish Health Education Unit (SHEU) indicates that women in social classes IIIm, IV and in particular V are not satisfied with the communication given and information received from health professionals during the antenatal period; but they will utilise a service when they see its direct value for them such as the family planning services (Docherty, 1979).

Buckinghamshire mothers have many potential sources of information on infant feeding and the extent to which they were used altered with social class. Just over half the mothers sought advice from health professionals and this source was unaffected by social class. However the mothers in group V were distinctive in that none of them referred to books, or pamphlets, or the media, preferring to rely on relations or friends to a far greater extent than other mothers; a habit that will only maintain the status quo of feeding pattern. The remaining mothers in the manual groups represent nationally and in Buckinghamshire approximately 61% of the population. Of the Buckinghamshire mothers interviewed only 22% said they had used written material despite its being free and widely available. It is only the middle class mothers from group I and II with their high breast feeding levels that made any extensive use of books or the media. Edinburgh working class mothers have also been shown to use more lay advice and less books than their middle class counterparts (Kirk, 1980). John and Elizabeth Newson summed up the situation as follows: "Middle class mothers are firmly committed to breast feeding as a matter of principle, whether or not they find the experience enjoyable."
It may be that this attitude is partly the result of reading baby books, a highly middle class activity, but it might equally well be argued that the books themselves simply reflect the established middle class attitudes of their middle class authors" (Newson, p.174, 1965). The Buckinghamshire mothers in social class V, in consulting their friends and relations to support their ideas, are acting in precisely the same manner with a different outcome.

Written material is none the less the second most popular source of information overall and ranked equally with antenatal classes when mothers were asked how they would most like to receive advice.

Personal communication may be the most popular and the best method for giving information but it is the most expensive. It is also subject to the availability of health service personnel and their varying attitudes. These facts, combined with the knowledge that the working class mothers form 67% of the population but have the lowest levels of breast feeding and are the poorest utilisers of the antenatal and postnatal services, make it important to have printed educational material that will appeal to this large group.

In an attempt to improve the high perinatal mortality rate in Scotland the SHEU decided that print is the only feasible medium they could use in an attempt to reach all pregnant women. They also decided that the material needed designing specifically for groups IIIa, IV and V. After extensive pilot studies they have produced "The Book of The Child". This book is based on the criteria that the text should contain short sentences and paragraphs, few words of three or more syllables, and should not be perceived to be patronising. Anyone with a reading age of 12½ ought to be able to understand the script. The book is designed in the style of reading material used by women in the target group and was therefore modelled on popular women's magazines. The information in the book is presented at three levels each self-explanatory:—

1. Visual using colour pictures to convey the point to be made.

2. Brief, large captions or headings which summarise the information that is to be relayed.

3. More detailed text aimed at the few who will take the trouble to read the book in total (SHEU, 1979).

It was also felt to be important that the book did not appear to emanate from a government department (Docherty, 1979).
Examination of the written material the Buckinghamshire mothers are given makes it unlikely that any of it would encourage breast feeding or even be used by the mothers in groups III, IV and V. The book produced by the Area health Authority to promote breast feeding contained sound advice but was in black and white, small print and totally devoid of illustrations of any kind. The Health Visitors' Association and British Medical Association publications, that were handed out to all pregnant women, were basically a vehicle for advertisement and their pictorial content was provided by the manufacturers of baby products. Bottle feeding is the only visual impression they give and in the Health Visitors' Association book the heading for the section on infant feeding is negatively phrased. The title of the section on infant feeding reads "IS BREAST BEST?" The text then continues:

"Look at it from the mother's viewpoint first. What's good for the baby is not necessarily always good for her."

Such a negative approach is hardly likely to encourage mothers, and provides evidence that a health visitor's attitude is generally orientated towards mother first and baby second with an apparent conflict between the two. This will be discussed in chapter 5. Buckinghamshire is not alone in issuing such booklets (Bolton-Maggs, 1979).

The differences in the levels of successful lactation, that exist between the various socio-economic groups, are not going to be influenced by written material unless it is designed for the ones that don't breast feed rather than the ones that do.
Factors which affect feeding method (2) mothers previous experiences.

The mothers' questionnaire again showed the importance of a mother's experience with her first child the final outcome of which will dictate how she feeds her subsequent children. Mothers have also been shown to be affected by how they were fed as children, this cannot be as result of memory, and therefore shows the influence of her own mother's advice or behaviour with younger siblings. This relationship has been reported to have only a weak association with how a mother planned to feed her baby (Martin, 78). The way a mother was fed appears to have a significant influence on the outcome of attempts to breast feed, however, a point not considered in the National Survey 1975 (Martin, p.48, 1978). Significantly more successful lactators in Oxford were themselves breast fed (Sloper 1975) and similarly in Buckinghamshire few bottle fed mothers were successful in breast feeding any of their first children, only 19% doing so for 4 months. This is a much higher failure rate than that of mothers who were breast fed themselves. The fact that a mother was bottle fed herself therefore means that she is more likely to choose to bottle feed and if she does attempt to breast feed will find it difficult to succeed. The question of how a mother was fed was not routinely asked anywhere in the district but could help to identify mothers most in need of advice to sustain lactation.

The factors associated with the mothers who elected to bottle feed are also associated with those who experienced difficulty in maintaining lactation. They are low socio-economic status particularly group V; multiparous mothers who bottle fed their first child, or were unsuccessful with their attempts to breast feed; mothers who were themselves bottle fed; and those who reside in urban Milton Keynes regardless of parity. These factors are interrelated to some extent but could provide a simple, readily obtainable, indication of those mothers in need of advice.
The mothers in social class V are the most in need of this advice and, although, they seem more entrenched in the views of their peer groups than other mothers they are also more undecided about infant feeding in the antenatal stage. Only 54% reached the end of the first trimester with set intentions on infant feeding. This at least gives the opportunity to influence them positively towards breast feeding.

The reasons mothers gave for failure of lactation

The most frequently reported reason for changing from breast to bottle feeding both in Buckinghamshire and elsewhere is associated with the failure of lactation whether it is described as "Baby did not seem satisfied", "My milk dried up", or "I didn't have enough milk". (Hytten, 1954; Sacks, 1976; Davies, D.P. 1976; Sloper, 1977; Martin, 1978; Kirk, 1980). In many cases lactation never becomes established and attempts to breast feed are stopped within the first two weeks postpartum. It can be argued that too little milk is the standard reply given by those mothers who lack motivation to continue. However, there is an increased desire within the population to breast feed as the rising numbers attempting to do so show. This is not matched by a decrease in the numbers failing initially as was so aptly shown in two subsequent Oxford surveys (Sloper, 1975; Sloper, 1977). Failure to establish lactation while still in the maternity unit was given as a reason for changing to bottle feeding by 20 Buckinghamshire mothers (19%), only one was multiparous. These new mothers are failing while still in the care of the midwives and nursing staff. The regimes they meet which are likely to suppress lactation have already been discussed. The advice they are given also often shows a lack of understanding of the basic principle of breast feeding physiology, which is that the namely stimulus of milk demanded by the baby creates a response of milk production by the mother (Davies, 1976).
It has been shown that there is no difference in the capacity for response in poor lactators and good lactators, the difference lies in the amount of stimulus given to the nipples and therefore prolactin levels (Aono, 1977).

Midwives, nurses and health visitors frequently suggest complementary feeds as the answer to a worried mother and an unsatisfied baby. Many doctors are also known to find breast feeding an insoluble enigma and "are among the first to put the baby on the bottle the moment the going gets rough" (Applebaum, 1970). Of the mothers who gave medical reasons for failure of lactation 10 out of 17 had also changed to bottle feeding within the first two weeks of the infant's life. The problems of engorgement and sore nipples are manifestations of poor lactation practices and emanate from a lack of frequent suckling or the failure of the let-down reflex (Stanway, 1979). The high incidence of early failure of lactation is unlikely to improve unless health service personnel gain better understanding of its causes and are prepared to initiate a change in maternity unit regimes as a result of that understanding.

Whilst early failure of lactation was confined mainly to primiparous mothers secondary failure was not associated with mother's parity. Most (75%) of the mothers who changed to bottle feeding because they felt the baby was unsatisfied with breast milk did so when the baby was between 3 and 8 weeks of age indicating another critical period when they need encouragement and advice. The advice of the health visitor is crucial at this stage but there were many occasions when this advice was conflicting as will be discussed in Chapter 5. Complementary feeding was much more likely to be suggested as the solution than demand feeding.

Frequent demand feeding may be essential to establish lactation but it will not always correct a milk supply that fails after a few weeks. This is often as a result of another problem frequently encountered, that of tiredness of the mother (Illingworth, 1952; Bacon, 1976; Eastham, 1976; Martin, 1978). This is a particular problem in isolated or unsupported families and was mentioned by many of the Buckinghamshire mothers.
One effective remedy for failing lactation was to encourage the mothers to eat more and to eat more frequently (Whichelow, 1979). Their extra energy requirement for lactation is 2.5 megajoules per day (DHSS, 1979). This solution was mentioned by the health visitors in Buckinghamshire, but is most effective when used in conjunction with more frequent feeding. (See Chapter 5).

Currently there is some controversy on the adequacy of breast milk as a sole source of food for the young infant after the age of three months (Davies, D. P., 1979; Waterlow, 1979; Frantz, 1978; Jelliffe, 1979; Rowland, 1981) despite the DHSS recommendations to the contrary (DHSS p.11 1974, and 1980a). This is unfortunate and there is concern that the problem of the few who fail to thrive on breast milk will detract from the advantage of breast feeding to the many (Frantz, 1978; Levi, 1979). In Buckinghamshire the argument on the long term adequacy of breast milk is almost academic; the problem is to persuade mothers to breast feed at least until 3 months as so very few do so after that age in any case.

Recent research has done little to clarify the position. Breast milk output of mothers during the first three months postpartum in widely different parts of the world, Cambridge and the Gambia (Whitehead, 1980) and Sweden (Lonnerdal, 1976), has been shown to be remarkably similar despite the differences in nutritional status and feeding regime of the mothers. After three months the output of breast milk falls below the level required to satisfy the DHSS estimated energy needs of an infant (DHSS, 1979). This is not always shown to be the case; as a further study in America has found that exclusive breast feeding will allow satisfactory growth in infants for between seven and twelve months (Ahn, 1980). A similar contradiction can be found when efforts to increase lactation are compared. Long term dietary supplementation of lactating mothers in the Gambia, normally on low energy intakes, have been unsuccessful (Prentice, 1980). But well fed Australian mothers were able to raise the quantity of milk produced by increasing the number of feeds to between fourteen and twenty a day (Rattigan, 1979), which is the norm for the Gambian women (Whitehead, 1980). It now seems increasingly likely that the recommended allowances for infants are too high (Whitehead, 1981).
At the present time there is still a lack of objective, scientific proof as to the optimum growth rate for a human infant and the precise inter-relationship between the baby's requirements, his mother's nutritional status, and the duration and frequency of suckling.

Comparisons between different countries need also to account for the varying levels of infection in the environment. Some of the conflicting advice on lactation and the priority given to the value of breast feeding must stem from this lack of convincing argument.

The Introduction of Solids

A secondary benefit of breast feeding is the associated improvement of other infant practices. The DHSS discourage the use of any solid foods before the age of four months as a baby who is on solid food will run the risk of a high solute load, gluten enteropathy, or possibly obesity (DHSS, 1974). Many mothers, however, do introduce solids early, often to their baby's bottle feed, in the belief that it will help the baby to sleep (Wilkinson, 1978; Martin, 1978; Kirk, 1980), and this is done as early as six weeks postpartum or even less. Breast fed babies not only cannot be given solids in this way, but are introduced to solids from the spoon much later than bottle fed babies.

Buckinghamshire mothers were no exception, see Table 4; 9% of those bottle feeding had already given their babies some solid food before the age of four weeks, and only 22% waited for four months. The mothers who breast fed initially, but changed to bottle feeding during the first four weeks postpartum, were most likely to be giving their babies solids during the third month. Mothers who were fully breast feeding waited significantly longer, with 39% not introducing any solid food until four months or longer. There were no social class differences in this result.

A mother will introduce solids to her infant if she feels that it is crying due to hunger which is not satisfied by milk alone (Jones, 1978; Wilkinson, 1978; Martin, 1978). Why should bottle fed babies exhibit this hunger so much earlier than breast fed babies?
The National Survey suggested that mothers will give a complement of artificial milk to an apparently hungry breast fed baby if the mother is unsure of the quantity of milk she is producing, but the bottle feeding mother knows exactly how much milk she is giving and is, therefore, more likely to solve the problem of apparent hunger by solid food (Martin p. 105, 1978). An alternative view is that infants fed the new humanised milks are less satisfied than those fed on unmodified milk (Wilkinson, 1980), and breast milk is more satisfying than either type of infant formula if given in sufficient quantity. There were certainly many occasions in Buckinghamshire when a health visitor mentioned the fact that S.M.A., the most highly modified artificial milk, did not seem to satisfy and they recommended change to Cow & Gate Premium instead. It is difficult to explain the difference in the apparent satisfaction given by these two brands, as the energy value of both products is identical. It could be that S.M.A. is more readily digested, and therefore has a lower satiety value, and that the four hourly regimes imposed are no more satisfactory to the bottle fed baby given an easily digested milk (Valman, 1980b), than they are to the breast fed baby.

The Timing of the Decision on Infant Feeding

To increase the incidence of breast feeding, health education needs to be aimed at reaching primigravidae while they are still undecided about how to feed the expected infant. Buckinghamshire primigravidae in general made this decision early, 77% doing so before pregnancy or during the first trimester. This result is difficult to compare with other studies, as the time scales used are different in each case, but an early rather than a late decision seems to be the norm. The National Survey showed only 30% of mothers deciding before pregnancy, but did not specify the time of the decision during the antenatal period (Martin, p. 29, 1978). Approximately half the mothers in a Newcastle survey had decided before pregnancy and 86% by the first six months (Eastham, 1976).
A survey showed that 62% of Blackburn mothers decided before pregnancy, and a further 30% during early pregnancy (Nursing Mirror, 1976); and 60% of Bristol mothers who were questioned decided before pregnancy, the ones choosing to breast feed making the decision earlier than those choosing to bottle feed (Sacks, 1976).

Routine antenatal care does not begin until the second trimester, therefore a majority of mothers will have already decided how they intend to feed the new arrival before they come into contact with any of the primary health care team, who might influence them positively towards breast feeding. There has, none the less, been an influence in favour of breast feeding in Buckinghamshire as elsewhere. Nutrition education in schools has been suggested as an ideal time and place, as it could be passed on to prospective fathers as well as mothers (DHSS 1974, 1980). This venue, although under discussion in Buckinghamshire, had not made any impression on mothers in 1977. Only two (1.7%) mothers mentioned their schools as a source of information on infant feeding. The media accelerated fashion to breast feed has, undoubtedly, had a greater impact than many realise and mothers are probably open to alternative ideas on feeding as their pregnancy progresses, despite saying that they decide early.

The Buckinghamshire mothers who were most indecisive were the manual groups, particularly Group V, and as these were also the most likely not to choose to breast feed, this uncertainty obviously gave an opportunity for positive persuasion during the period of antenatal care. An opportunity that proved to be used in an uncoordinated fashion. Nearly half (44%) of all mothers did not recall receiving information from any of the health professionals during the antenatal period. This number included 17% of the primigravidae who should be the prime target. Supplying mothers with information on infant feeding tends to be everybody's business and nobody's responsibility in Buckinghamshire and elsewhere (Bolton-Maggs 1979; Kirk, 1980).
One of the earliest occasions on which mothers can be given nutrition education is at the maternity unit booking clinic, which almost all mothers will attend and as such, it has been suggested as the most effective stage at which to promote breast feeding (Kirk, 1980). In reality this is not so as the booking clinic is an occasion when mothers are besieged by questions often from several different unknown people. They undergo an extensive examination and are given detailed instructions all of which are orientated towards the events of pregnancy and birth. The Community Dietitian in Aylesbury had attempted to give mothers some nutrition education at the booking clinic of the Royal Buckinghamshire Hospital, but withdrew because she found that the mothers were too bewildered and anxious at the end of the session to assimilate any further information (King, personal communication, 1977). It has already been noted in Chapter 2 that advice on infant feeding from other personnel varied from a question of intent, which was received without comment, to an interview with a lactation sister. Also the persuasion to breast feed used at the Barratt Maternity Home was not given by the maternity unit, but a Northamptonshire domiciliary midwife at a follow-up home visit. Therefore Buckinghamshire mothers to be delivered at this unit would not be covered by such an arrangement.

Booking clinics do, however, provide an occasion when mothers who want to bottle feed, who are undecided, or exhibit the factors making them most likely to find breast feeding difficult, can be identified for follow-up and appropriate printed information. Once identified midwives and health visitors could concentrate their efforts on these mothers.

The second occasion is during routine antenatal care, given either at a GP practice, or a hospital clinic, usually by a doctor and a midwife. Only 10% of mothers recalled receiving information from a doctor and 24% from the midwife prior to the birth. The health visitor also has a potential input at this stage, as many attempt to pay a domiciliary visit on all pregnant women in their group practice.
If they are successful, this gives the advantage of continuity of care as the health visitor is the most likely person to give advice to mothers during the early months of the baby's life. Health visitors in Buckinghamshire proved to be the most popular source of information on infant feeding but they had difficulties in contacting mothers during the antenatal period. This is because there was no set routine in the district for informing a health visitor of who was pregnant. They find the information out either by attending antenatal clinics themselves, which very few do, searching the booking list regularly for new names or, as most often happened, keeping in close liaison with the midwife in the practice. None the less, many health visitors frankly admitted that some expectant mothers 'slip through the net' and are not known until discharge from the maternity unit. This was particularly likely to happen with mothers booked into the consultant units of the John Radcliffe Hospital or the Barratt Maternity Home, or with unmarried mothers.

The other difficulty health visitors experienced was the purely mechanical problem of catching the primigravidae at home, as so many work until late on in the pregnancy. Both these problems have been noted in London (Hart, 1980). According to the Buckinghamshire mothers, 33% of them had in fact been advised by a health visitor on infant feeding prior to the birth.

Finally, the method and venue most frequently relied upon by health professionals as the occasion when mothers would be given information on infant feeding was at the antenatal classes. The mothers' views differed as only 44 (18%) mentioned them spontaneously as a source of information, and only 30% chose antenatal classes when asked directly how they preferred advice to be given. In any case, for the vast majority of mothers these classes take place at the end of pregnancy when the decision on infant feeding has already been taken.
The mothers who remain undecided until late in pregnancy are unfortunately the very ones who have poorest record of attendance at antenatal class (Martin, p. 39, 1978) and were the ones in Buckinghamshire, who showed the least enthusiasm for antenatal classes as a source of information. When they do reach mothers antenatal classes have an association with very high success rate in breast feeding, a result that is apparently irrespective of social class. Although the numbers in the mothers survey are small antenatal classes are obviously providing practical details that are helpful to the already convinced breast feeder.

The mothers survey showed that there is no ideal time nor setting for nutrition education that would suit all mothers. Nutrition education to promote breast feeding needs to be a continuous process, starting at school, giving usable and unbiased information on the choice of feeding method prior to the birth, and practical details to help maintain successful lactation afterwards. The co-ordination of nutrition education first recommended by the DHSS in 1974, was manifestly lacking in Buckinghamshire in 1977 (DHSS 1974, 1980). It is not surprising that 17% of primigravidae learn nothing when one of their main advisers, the health visitors, cannot even guarantee to know of their existence.
The Midwives Act of 1902 gave midwives independent practitioner status which was necessary because much of what they did was unsupervised. There has subsequently been a move towards more hospital confinements, accelerated by the Peel Report (1970), and it is envisaged that in future all babies will be born in hospital. This is a trend that was almost complete in Buckinghamshire in 1977, for 99.1% of babies were born in a hospital or a maternity unit.

As a result, midwives have seen obstetricians tending to undertake practices traditionally assigned to them, namely, antenatal care, delivery, and postnatal care. Originally, the obstetrician was only involved if the mother presented with any complications, but recently as the care of pregnant women has adopted the principles of preventative medicine, more and more normal women have been included. The general result is that morale amongst midwives is at a low ebb and recruitment is falling. The second Report of the Social Services Committee on perinatal and neonatal mortality expressed concern on the current status of the midwifery profession in the following manner: "Midwives are involved with the mother at the antenatal stage and during labour. They have an important role in providing much of the emotional support and teaching postpartum to mothers, and a particularly vital part of their job is to encourage and supervise breast feeding. We consider it would be seriously detrimental to obstetric practice if the status of midwives were to be diminished any further" (Social Services Committee, pp. 71-77, 1980). Despite this apparent demise in their status midwives have the opportunity and job specification to influence mothers positively towards breast feeding and to assist in the early establishment of lactation. They were the second most popular source of information on infant feeding and in the present study mothers were more likely to ask a midwife for advice than a doctor.
In Buckinghamshire there are two types of midwifery post. The first is the domiciliary midwife who is attached to a group general practice, but is supervised by a Nursing Officer Midwifery of whom there are two, one based in Aylesbury Vale District and one in Milton Keynes. A domiciliary midwife will attend GP antenatal clinics and will be primarily be concerned with the care of the multigravidae. The domiciliary midwife will come into the GP unit and supervise the labour of a mother who she has been attending antenatally, the GP normally arriving at the second stage of labour. Should the mother be confined when the domiciliary midwife is off-duty, or busy elsewhere, her role is taken over by the the maternity unit midwife. If the mother is unexpectedly admitted to a consultant unit the domiciliary midwife is very unlikely to attend the birth. The domiciliary midwife takes over responsibility for mother and baby after discharge from the maternity unit, and for the first 10 to 28 days of the infant's life. This includes all mothers in her GP attachment, regardless of place of birth and antenatal involvement, therefore much of her time will be spent in postnatal care.

The second type of post is the residential hospital midwife, working from the consultant or GP unit. A hospital midwife may only see the mothers once in the ante-natal stage, at a booking clinic, and will attend labour under the supervision of an obstetrician in a consultant unit or with sole responsibility in a GP unit unless the doctor arrives before the birth. These midwives then care for the mothers until discharge. The routine care of babies is given to nursery nurses thus splitting the mother-infant diad into two separate areas of responsibility.
The only mothers who will be cared for by the same midwife antenatally, intrapartum and postpartum are the multigravidae delivered in a GP unit at a propitious time. As most mothers are likely to meet more than one midwife during the period of pregnancy and birth, and four is quite normal, it is important that the midwives should agree on policy and the practical details of infant feeding. The views of the midwives advising Buckinghamshire mothers were therefore sought.

METHOD

The Sample

The 74 Maternity Unit and Domiciliary Midwives employed by the Aylesbury Vale and Milton Keynes Health District were contacted at the end of 1977 and asked to complete a questionnaire, the details of which are given in Appendix III. A stamped, addressed envelope was provided for their replies. Prior to distribution in Buckinghamshire, the questionnaire had been sent to a separate group of midwives and this pilot survey ensured both the clarity and relevance of questions. The questionnaires were distributed to the domiciliary midwives personally at one of their regular monthly meetings. Questionnaires for the maternity unit midwives were delivered to the relevant Senior Nursing Officers for distribution. Ten midwives from each of the two units outside the district, but serving Buckinghamshire mothers, were also included; namely midwives from the Barratt Maternity Home, Northampton and the John Radcliffe Hospital, Oxford. Both of these were large units, training pupil midwives, and it would have distorted the sample to have included all of their midwives.
Seventy-five replies were received, twenty-eight (37%) from community midwives, forty-three (57%) from hospital midwives, and one from a nursery nurse. Three midwives answering the questionnaire did not specify in which section they worked. There were sixteen domiciliary midwives in the Aylesbury Vale half of the district and fifteen of these replied to the questionnaire. In Milton Keynes there were only eleven domiciliary midwives and nine replied. This apparent discrepancy in workload is due to the differing organisation in the two halves of the District. There is a relatively low birthrate in rural Aylesbury Vale and there the post is one of community nurse/midwife, therefore some of the midwife's work will be district nursing. In Aylesbury town and throughout Milton Keynes, community nursing and midwifery are separate posts. A comparison of the two urban areas, however, does show that in 1977 there were 86 births per domiciliary midwife in Aylesbury Vale compared to 100 births per domiciliary midwife in Milton Keynes.

The number of hospital midwives was dependent on the number of beds in each unit. The Bletchley Maternity Unit had an unfilled midwifery post throughout 1977.
Midwives' reply to the question: "When do you think pregnant women are most receptive to advice on infant feeding?"

Total number of replies

<table>
<thead>
<tr>
<th></th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booking Clinic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine antenatal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>antenatal class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antenatal care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home visit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity Unit Clinic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 weeks +</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-partum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
RESULTS

Time and Place Used to Advise on Infant Feeding

Almost all (96%) of the midwives replying to the questionnaire discuss infant feeding with women during the antenatal period; the three who did not were all hospital based midwives. These discussions were invariably said to take place early on in the pregnancy, 14% during the first trimester, 44% at a booking clinic, and 18% both at a booking clinic and the 32 week follow up clinic. Although the majority of midwives discuss infant feeding with mothers at a booking clinic, this is not a venue that they would necessarily choose. The midwives were asked when they thought mothers were most receptive to advice. Their replies are summarised in Figure 7. Antenatal classes and home visits were thought to be the best places to give advice, the latter despite the fact that only two gave a home visit as an occasion that they themselves had used. There was no difference in the replies from midwives according to their post or district with one exception. Half (50%) of Milton Keynes midwives felt mothers would be receptive to advice at a booking clinic, compared to 21% from Aylesbury Vale and one (10%) from Oxford ($\chi^2 = 11.55$, df2, $P < 0.005$).

Advice given by Midwives on Infant Feeding, Antenatally

The emphasis midwives place on choice of feeding method is shown in Table 19. Few (9%) agreed that mothers should be strongly advised to breast feed, one only doing so if there was a history of atopic disease, dirty home surroundings or violence. Two of these midwives were at the John Radcliffe Hospital and the remaining five in Aylesbury Vale. Forty-two (55%) would encourage mothers to breast feed, and several stated that they varied their advice according to the mothers' circumstances. Fifteen (20%), rather incongruously, answered both the option that mothers should be encouraged to breast feed and be given information on breast and bottle feeding without bias.
### Table 19
The advice mothers should be given on feeding method during the antenatal period

<table>
<thead>
<tr>
<th>Advice</th>
<th>Midwives who answered yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Strongly advised to breast feed.</td>
<td>9</td>
</tr>
<tr>
<td>2. Encouraged to breast feed.</td>
<td>55</td>
</tr>
<tr>
<td>3. Told about breast and bottle feeding without bias.</td>
<td>11</td>
</tr>
<tr>
<td>4. Asked their intentions without comment.</td>
<td>0</td>
</tr>
<tr>
<td>Option 2 &amp; 3 answered.</td>
<td>20</td>
</tr>
<tr>
<td>Other multiple answers including 4.</td>
<td>5</td>
</tr>
<tr>
<td>Total No</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 20
Midwives' view of the information acquired by mothers in the antenatal stage

Midwives who said yes expressed as of those replying in each area.

<table>
<thead>
<tr>
<th>Area</th>
<th>AV</th>
<th>MK</th>
<th>Oxford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do mothers arrive at their maternity unit with sufficient information on:-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. How to breast feed a baby?</td>
<td>60%</td>
<td>42%</td>
<td>50%</td>
</tr>
<tr>
<td>b. How to bottle feed a baby?</td>
<td>54%</td>
<td>43%</td>
<td>40%</td>
</tr>
</tbody>
</table>
Advice on breast care aimed at preventing sore or cracked nipples is given to all mothers by 70% of midwives irrespective of intended feeding method, but they differed on the timing, 39% recommending that breast care should commence in the first trimester, 36% in the second, and 23% in the third. When asked whether they thought that mothers arrived at their maternity units with sufficient information on infant feeding, less than half the midwives replied 'Yes'. A detailed breakdown of this result is shown in Table 20. The Milton Keynes mothers were felt to be less well informed on breast feeding than their Oxford or Aylesbury counterparts. The information mothers lacked was said to be on the practical aspects of infant feeding, i.e. how to fix a baby to the breast, how much feed to give, and the problems of engorgement or diminished milk supply. Nine (12%) of the midwives stated that mothers arrived at their maternity units with no idea of how to feed a baby. This lack of experience was felt, by others, to be inevitable.

Postnatal Advice on Infant Feeding given by Midwives

The policy of putting new born babies to the breast in the labour ward, if at all possible, was advocated by sixty-three (84%) of the midwives replying to the questionnaire. An even higher percentage, 89%, were against the suppression of the lactation with drugs for bottle feeding mothers.

Questioned on the advice that they would give to mothers on some of the problems encountered in breast feeding the midwives gave many multiple replies. They frequently associated demand feeding and feeding more frequently when giving advice to a mother with a diminished milk supply as it is likely that the former will result in the latter. The most popular remedy for failure of lactation was to drink more fluids and three midwives suggested a combination of rest and a bottle of stout.
Table 21

Midwives answer to the question "What advise would you give to a mother with a diminished supply of breast milk".

<table>
<thead>
<tr>
<th>Suggested Advise</th>
<th>% Of Midwives Who Said Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drink more</td>
<td>77%</td>
</tr>
<tr>
<td>Breast feed more frequently</td>
<td>56%</td>
</tr>
<tr>
<td>Feed on demand</td>
<td>42%</td>
</tr>
<tr>
<td>Give complementary feeds</td>
<td>30%</td>
</tr>
<tr>
<td>Use Lactagol tablets</td>
<td>24%</td>
</tr>
<tr>
<td>Eat more</td>
<td>12%</td>
</tr>
<tr>
<td>Stop breast feeding</td>
<td>1%</td>
</tr>
</tbody>
</table>

Figure 8

Advice for mothers with a diminished milk supply expressed as a % of midwives in each area who would give the specified advice.

\[ x^2 = 6.88, df1, P < 0.01 \]

\[ x^2 = 3.94, df1, P < 0.05 \]
The replies from hospital and community midwives were similar, with one exception, 71% of community midwives favoured breast feeding more frequently as opposed to 49% of hospital midwives. The replies to these questions are summarised in Table 21 and Figure 8. The Aylesbury Vale and Milton Keynes midwives took similar views, but the views of the Oxfordshire midwives were sometimes significantly different; 90% favouring increasing the number of feeds, only 40% increasing fluids, and none the use of drugs. The stronger the emphasis a midwife placed on breast feeding, the more likely she was to recommend breast feeding more frequently to a mother with the problem of a diminished milk supply ($x^2 = 9.72$, dF3, $P < 0.025$).

The midwives' advice on the treatment of the reverse problem, that of engorgement, brought a majority of multiple answers the complexity of which defied comparison. The use of analgesics for pain relief was the most popular remedy which was given by 51 (68%) of the midwives. This was invariably in conjunction with several other measures. Half (52%) would advise hot baths or bathing the breasts, 34% reducing fluid intake, 33% emptying the breasts after a feed, 30% using a supportive bra, and 16% increasing the number of feeds. The same variety of opinion was apparent wherever a midwife worked, although a community midwife was more likely to recommend bathing ($p < 0.06$) or increasing the number of feeds ($p < 0.07$).

One of the most difficult problems that mothers encounter when establishing lactation is the occurrence of a cracked nipple. The question on advice for mothers with cracked nipples was therefore left open. However, it produced a very uniform response as 90% of the midwives suggested the use of medication, particularly a spray and 75% recommended resting the affected breast in conjunction with the medication. Twenty five (32%) of the midwives would recommend expressing breastmilk during the period of rest to keep up the milk supply and 25% the use of a nipple shield. Nine (12%) pointed out that prevention by care during the antenatal period is better than cure.
Table 22

The midwives answer to the question on working conditions for teaching mothers how to breast feed.

<table>
<thead>
<tr>
<th></th>
<th>No Problems</th>
<th>Lack of Time</th>
<th>Lack of Liaising</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aylesbury Vale</td>
<td>19%</td>
<td>59%</td>
<td>6%</td>
</tr>
<tr>
<td>Milton Keynes</td>
<td>3%</td>
<td>81%</td>
<td>12%</td>
</tr>
<tr>
<td>Oxford</td>
<td>-</td>
<td>90%</td>
<td>90%</td>
</tr>
</tbody>
</table>

\[ x^2 = 5.93 \quad \quad x^2 = 5.82 \quad \quad x^2 = 7.59 \]
\[ p < 0.05 \quad \quad p < 0.05 \quad \quad p < 0.02 \]

Table 23

The midwives answer to the question "Whose role is it to advise mothers on infant feeding"?

<table>
<thead>
<tr>
<th></th>
<th>Number of midwives replying yes as a % of the total.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwife only</td>
<td>43%</td>
</tr>
<tr>
<td>Team to include Health Visitor</td>
<td>39%</td>
</tr>
<tr>
<td>Team to include Mother who has breast fed</td>
<td>35%</td>
</tr>
<tr>
<td>Team to include School</td>
<td>15%</td>
</tr>
<tr>
<td>Team to include Doctor</td>
<td>12%</td>
</tr>
<tr>
<td>Team to include Dietitian</td>
<td>8%</td>
</tr>
</tbody>
</table>
Most (84%) midwives agreed that all mothers should be given information on these three problems, a view shared by many mothers, as their unexpected occurrence had been an alarming and discouraging experience.

The relative merits or disadvantages of giving breast fed babies complementary feeds of artificial milk is an issue that is unresolved, and the maternity units in Buckinghamshire have opposing views (see Chapter 2). The midwives were asked when they would advise the use of complementary feeds, and their answers reflect these different policies. Four of the six midwives who said complementary feeds should be given to all breast fed babies were those working at The Princess Mary's RAF Hospital. Forty-eight (64%) recommend the use of complementary feeds to the babies of mothers with diminished milk supply, but this answer was less likely to be given by an Oxfordshire midwife. Thirty-eight (51%) would complement small babies and two (3%) would never recommend complementary feeding.

The Midwives' Attitude to Their Role in Encouraging Breast Feeding

There is a statutory requirement that all mothers and babies should remain under the care of the midwife for ten days postpartum, and in general the midwives agreed with this Statute although six (8%) said that it was too short, and one that it was too long. The question of enjoyment of their role and the conditions for teaching breast feeding showed that only seven (9%) of the midwives are happy with the current situation. Fifty-five (73%) had too little time, and ten (13%) needed more liaison with other staff, while a further 8% lacked either a constructive policy or facilities. There was some significant differences in the answers given by midwives from each district (see Table 22). Aylesbury Vale midwives appeared to have both more time and fewer problems than their Milton Keynes or Oxfordshire counterparts.
Table 24. To show the average number of hours midwives spend per week advising mothers on infant feeding according to area or maternity unit compared with breast feeding levels.

<table>
<thead>
<tr>
<th>No</th>
<th>Hospital Midwives</th>
<th>Average no of hours per week</th>
<th>*Breast feeding %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Barratt Maternity Home</td>
<td>8.4</td>
<td>58</td>
</tr>
<tr>
<td>5</td>
<td>Bletchley Maternity Unit</td>
<td>7.0</td>
<td>52</td>
</tr>
<tr>
<td>5</td>
<td>Westbury Maternity Home</td>
<td>13.8</td>
<td>59</td>
</tr>
<tr>
<td>8</td>
<td>Royal Bucks Hospital</td>
<td>9.1</td>
<td>57</td>
</tr>
<tr>
<td>3</td>
<td>Stoke Mandeville GP Unit</td>
<td>12.0</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>Princess Mary's Hospital</td>
<td>15.0</td>
<td>60</td>
</tr>
<tr>
<td>8</td>
<td>John Radcliffe Hospital</td>
<td>16.2</td>
<td>77</td>
</tr>
</tbody>
</table>

**Community Midwives**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Milton Keynes</td>
<td>8.0</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Aylesbury Urban</td>
<td>11.3</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Aylesbury Rural (PT)</td>
<td>5.0</td>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>

*1 = Mothers breast feeding initially as % of all mothers.  
2 = Mothers who stopped breast feeding during first two weeks as % of those who breast fed initially.  
3 = Primiparous mothers who stopped breast feeding in two weeks as % of those breast fed initially.*
The question on whose role it should be to teach the subject of infant feeding showed that 99% of midwives themselves were committed to this as part of their job, while 57% gave a multiple answer indicating that they would favour a team approach to teaching infant feeding. Who the alternative adviser should be is shown in Table 23. Health visitors were the most likely alternative chosen, and doctors followed by dietitians, the least likely.

Time Spent Advising Mothers On Infant Feeding

The number of hours per week the midwives spent on infant feeding was very variable and not always directly comparable. An average taken from the replies given by the midwives is shown in Table 24. This is compared with the number of mothers breast feeding initially and at 2 weeks postpartum. Two of the midwives worked full time on advising mothers how to feed their infants and both of these were employed at the John Radcliffe Hospital, Oxford, thus making the average number of hours per week for this hospital very high.

Midwives' Training

The midwives answering the questionnaire have been trained over a wide period between 1945 and 1978; the majority (85%) having taken a post registration course. They were almost all satisfied that their training had equipped them both to understand the merits of breast feeding (90%) and how to breast feed (88%). The average amount of time studying the subject of breast feeding per midwife was 17.2 hours, compared to 11.2 hours on the proprietary infant milks and 9.3 hours on general nutrition.

The decade in which a midwife trained made no difference to these replies, showing that the emphasis on training had not changed since the 1950's. The midwives' attitude to infant feeding was also unaffected by the decade in which she had trained.
DISCUSSION

The results of the midwives questionnaire showed that the majority of Buckinghamshire midwives are involved in giving advice to mothers on infant feeding antenatally, and they see this as one of their roles, either exclusively or in conjunction with other health professionals. All mothers will have seen at least one midwife during their pregnancy, but less than half of the mothers recall receiving their advice. It is difficult to believe that the midwives will select just a few of their clients to advise, and ignore the rest so there must be a lack of communication on the midwives' part or failure of memory on the mothers'. One reason for this failure could well be the venue that is used as 66% of midwives discuss infant feeding at a booking or other antenatal clinic, but only 29% felt that mothers were receptive to advice on these occasions. Findings in a recent survey of mothers' experiences during pregnancy would support this feeling; only 25% of mothers stated that they learnt anything from their antenatal checkups (Graham, 1980).

As discussed in Chapter 3, clinics as they are currently organised are not an ideal place in which to teach or persuade anyone. The problem centres round the mothers' expectations of maternity care and its reality. They hope for a personal approach but often find the clinic staff impersonal and brusque in manner. The organisation of the clinic visit tends to be broken up with different members of staff performing different tasks. Staff tend to be orientated towards the task rather than the mother and also there is a lack of privacy. All of these factors work against both the asking of questions by the mothers and the giving of a full and comprehensive answers by the staff.
In another large survey on antenatal care 46% of the mothers were less than enthusiastic about the way or the extent to which things had been explained to them. One of the main findings of this study was that working class women; particularly those in social class V, had the greatest desire for more information and explanation (Institute of Social Studies in Medical Care 1978). The recent BBC survey also showed that only 48% of women felt that their questions had been answered satisfactorily (Boyd, 1982). Many of the midwives obviously realise that they are not working in an ideal setting and it was noticeable that none of the Oxfordshire midwives, where breast feeding levels were high, would choose to use a booking clinic whereas half of the Milton Keynes midwives, where breast feeding levels are lower, do feel that a booking clinic is a suitable venue.

Antenatal classes or home visits were occasions the midwives would prefer to use when giving advice on infant feeding; the latter option coincides with the mothers' views as they also preferred to receive information on a one to one basis. The difficulty with home visits is that they are time consuming and were, therefore, not widely used for this purpose in Buckinghamshire.

There is no simple solution to the midwives' dilemma on this issue.

There has been a general recommendation that antenatal clinics should be given a more congenial and supportive atmosphere, and that a major portion of the antenatal care of the low risk mothers should be transferred back to the GP to relieve overcrowding (Social Services Committee, p. 91, 1980). For the individual mother the policy should be one of positive discrimination in favour of the disadvantaged (Ennals, 1978). The information on who makes least use of the antenatal services and gains least from them is available. Mothers from social classes I and II are able both to demand, and extract, all the information they require. Middle class mothers make use of the antenatal classes. It is the mothers in social classes IV and V that will gain the most from the home visits and therefore they should be given priority, and it is their infants who are most at risk from poor infant feeding practices.
Communication between GPs, midwives, and the hospitals is necessary to identify these mothers, but this seems equally difficult to achieve (Institute of Social Studies in Medical Care, p.53, 1978).

Failure of recall is the second possible reason why so few mothers said they had received advice on infant feeding antenatally from their midwife and a message that is not understood or remembered will not be complied with. The general problem of communication in medicine has been investigated by the Trustees of the Nuffield Provincial Hospitals Trust and their findings can be applied to the Buckinghamshire mothers. Patients remember best what they are told first and what they consider to be most important (Ley, 1976). The subject of infant feeding was never the first, and was often the last topic to be brought up at an antenatal check up, thus it would appear less important to the mother than her current well being and the impending birth. The importance a mother will attach to the way she is going to feed her infant will also depend on how the topic is presented to her. The midwives were asked what advice they thought mothers should be given antenatally on infant feeding, and their answers were somewhat ambivalent. Very few would strongly advise mothers to breast feed; their training mitigates against persuasion in case it should cause feeling of guilt if a mother fails (Law, 1972). The majority view was that mothers should be encouraged to breast feed and the 20% that varied their opinion would choose which mother they thought would be unlikely to be successful at breast feeding and not press the point to them. I was emphatically told by several midwives that to try and persuade a multigravid mother to breast feed if she had bottlefed her previous children, was a waste of time.

The subject of breast feeding was therefore rarely put across as one of great importance. The one exception is that of the antenatal class that was devoted to infant feeding. Here, breast feeding was invariably discussed first, sometimes as a topic on its own, but more usually with the same session being devoted to both breast and bottle feeding.
Table 25. To show a range of recommendations for antenatal breast care.

<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>Recommendation</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>Applebaum</td>
<td>Plain water massage and manual expression.</td>
<td>Last 6-8 weeks</td>
</tr>
<tr>
<td>1970</td>
<td>Gunther, p. 7</td>
<td>Wallers shields for inverted nipples.</td>
<td>From 20 weeks</td>
</tr>
<tr>
<td>1972</td>
<td>Law, p. 344</td>
<td>Maternity units vary so much that it is unwise to do more than outline the main points.</td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>National Childbirth Trust</td>
<td>Minimum of soap, supportive bra, massage.</td>
<td>From early pregnancy</td>
</tr>
<tr>
<td>1975</td>
<td>La Leche League</td>
<td>Minimum of soap, massage and expression, shields if needed, exposure to air.</td>
<td>Last several weeks</td>
</tr>
<tr>
<td>1977</td>
<td>McKeith, p. 127</td>
<td>Shields if needed</td>
<td>Before 6 months</td>
</tr>
<tr>
<td>1978</td>
<td>Stanway, p. 76</td>
<td>Wash with water only. Routine advice given has done much to put women off breast feeding.</td>
<td>Last few weeks</td>
</tr>
<tr>
<td>1979</td>
<td>Illingworth, p. 10</td>
<td>Doubts the value of shields and expression.</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>Hutchinson, p. 97</td>
<td>Suspects that over strenuous breast care is unnecessary and may be psychologically undesirable.</td>
<td></td>
</tr>
</tbody>
</table>
The visual teaching aid for these classes, used throughout the district, was the one provided by Messrs Cow & Gate Limited; further evidence of the counter propaganda that abounds in this area of health education. The effectiveness of such counter propaganda can be reduced by the use of two sided communication, which will not only present the case for breast feeding, but deal with the case against it whilst, at the same time, ensuring that "the ayes have it" (Ley, 1976). These ideas on communication problems and their solutions are relatively new and were not obviously in use in Buckinghamshire during 1977.

Besides making a decision on how they are going to feed their infant antenatally, mothers may also need information on care of the breasts if lactation is to become established with the minimum of problems. This care has been traditionally aimed at the diagnosis and prevention of inverted nipples, although the use of both manipulation and Waller's nipples shields are now thought to be of doubtful value (Stanway, p.76, 1978; Illingworth, p.10, 1979). Manipulative exercises can however be beneficial because they expose the nipples to the air which helps to condition them and has the psychological effect of getting the mother used to handling her breasts (Neifert, 1980). Advice of more proven importance is that concerned with keeping the nipples clean by the use of warm water only in the last few weeks of pregnancy. The use of soap removes the anti-bacterial fluid that is secreted and hence makes it more likely that the nipples will become sore on sucking (Stanway, p.78, 1978). Most Buckinghamshire midwives (70%) were in favour of all mothers being advised on breast care, regardless of intended feeding method, but they were far from unanimous about when this should commence; with 40% suggesting the first trimester, 40% the second and 20% the third. This divergence of opinion reflects the varying views to be found amongst lactation specialists (see Table 25) and is a prime example of the conflicting advice about which so many mothers complain.

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Table 26. To show the advice on antenatal breast care given in pamphlets distributed to Buckinghamshire mothers during 1977.

<table>
<thead>
<tr>
<th>Source</th>
<th>Recommendation</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>You and Your Baby BMA p68</td>
<td>Massage and supportive bra.</td>
<td>From 1st check up.</td>
</tr>
<tr>
<td>New Baby HVA p. 19</td>
<td>Supportive bra only, no massage.</td>
<td>Check bra size 2-3 times.</td>
</tr>
<tr>
<td>Baby Book, all maternity units except JRH p.26</td>
<td>Supportive bra, massage and expression.</td>
<td>Last 4-6 weeks.</td>
</tr>
<tr>
<td>Health Department Buckinghamshire CC</td>
<td>Wash with soap and water, massage to express colostrum.</td>
<td>Last 3 months</td>
</tr>
</tbody>
</table>
Table 26 shows the advice given to mothers in Buckinghamshire. There is obviously a need to clarify not only the timing of advice on breast care but also the validity of advice being given. The only non-controversial items are the use of a supportive bra and the need to avoid any kind of spirits on the nipples.

The net effect of these problems in communication is that the majority of mothers arrive at their maternity unit without sufficient information on infant feeding. The midwives felt that the mothers in Milton Keynes were particularly poorly informed, and that it is the practical aspects of infant feeding that need more emphasis. The advice given postnatally therefore becomes of pressing importance.

Postnatal Advice Given by Midwives

There is now general agreement that early postpartum suckling is important in the initiation of breast feeding (DHSS, p. 9, 1980a). This is not a new idea. Midwives have been aware for many years that if a baby were put to the breast immediately on delivery subsequent lactation was much more likely to be successful (Illingworth p. 20, 1979). In Buckinghamshire the policy of putting new born babies to the breast in the labour ward was advocated by 84% of the midwives but it has already been noted that this view is not always routinely put into practice. The initiative is often left with the mother, and it is also subject to the availability of time and the level of sedation used during labour.

Lactation which does not begin early is frequently difficult to establish and this is interpreted as an insufficiency of milk. Midwives were asked what advice they would advocate in this situation. The most popular reply, given by 77% of the midwives, was for the mother to drink more fluids. This result occurred despite the fact that it has long been known that there is no scientific basis for this remedy (Gunther p. 76, 1970; Illingworth p. 12, 1979), and that the intake of excessive fluids can decrease milk supply due to the association between the let down reflex and the antidiuretic hormones (Illingworth, 1953).
Not all the midwives were ill-informed on this point, those at the John Radcliffe Hospital were significantly less likely to suggest increasing the fluid intake and the National Childbirth Trust (NCT) leaflets which were available at the John Radcliffe, were also careful to point out this error (NCT, 1975).

The next most popular remedy for a deficient milk supply was to increase the number of feeds either by breast feeding more frequently or feeding on demand. This is advice that has repeatedly been shown to be effective and is recommended by the DHSS (DHSS, 1974, 1980a). The ultimate success of lactation is related to the milk yield established by the end of the first week postpartum (Hytten, 1954; Howie, 1980). The increased frequency of feeds given on demand reduces the time taken for the milk to come in (Salaryia, 1978) and ensures an adequate milk supply by the end of the first week. It also has the added advantage of lessening the likelihood of both engorgement and sore nipples (Gunther, p. 73, 1970; Illingworth, p. 17, 1979; Stanway, p. 95, 1978; DHSS, p. 9, 1980). Frequent feeding is nevertheless only recommended by approximately half the midwives in Buckinghamshire, hospital midwives being less likely to suggest it than community midwives. To do so would involve changing hospital routines although this has been proved to increase ward efficiency (Cruse, 1978). Midwives are not the only health professionals to be slow in recognising the need for unrestricted demand feeding. Dietitians have recently been exhorted to suggest that a three hour feeding schedule is ideal (Journal of Human Nutrition, 1980). There is no ideal schedule to suit all babies as they have individual requirements and these are likely to vary from day to day.

A further remedy for a diminished milk supply, recommended by 30% of the Buckinghamshire midwives, is to give the infant complementary feeds, although this advice was sometimes given with the rider "if all else fails". Whether the complement be glucose, or dextrose and water, or an artificial milk any unnecessary fluids given in the early days of lactation will undermine the confidence of the mother (Martin, 1978) and effectively reduce her milk supply (Newton, N., 1950; Gunther, p. 76, 1970; Illingworth, p. 23, 1979; Stanway, 1979).
It is in the early days of lactation that midwives are advising mothers and, as giving complementary feeds to breast fed babies is one of the most common errors encountered, the midwives were asked directly about their use later in the questionnaire. On this occasion 64% said that they would recommend complementary feeding to mothers with a diminished supply of milk. There is always the problem of insufficient weight gain that is likely to prompt the use of complementary feeding but only two mothers gave this as the reason why they had had to give up breast feeding.

Complementary feeding is invariably suggested too early, increasing the frequency and lengthening the feeding time together with manual expression after each feed can usually be relied upon to increase weight gain without any complementary feeds (Illingworth, p. 22, 1979). Three of the midwives did suggest emptying the breasts after feed. In many instances, however, complementary feeds are given as a routine without the specific advice of the midwife. The general policy in some of the maternity units was for the nursery nurses to give all night feeds and not to wake the mothers. Even at John Radcliffe Hospital this was routinely done in the first twenty-four hours postpartum and at the Royal Buckinghamshire Hospital artificial milk feeds were freely available to mothers at any time. This readily availability of artificial food must be one of the main reasons for insufficiency of breast milk (Illingworth, p. 19, 1979).

The use of lactagol tablets to stimulate prolactin levels is another possible remedy for a diminished milk supply and these were recommended by 24% of the midwives. However they are thought to be of doubtful value as once the basal level of prolactin has been reached there is no further effect on feed volume (Howie, 1980). The midwives from the John Radcliffe Hospital seemed well informed on this point.
One midwife from Milton Keynes gave the reply that her advice for a diminished milk supply would be firstly to drink more, secondly to complement, and thirdly to take lactogol tablets. If these three remedies failed then breast feeding should stop. This reply was not the norm and in any case the answers need to take into account the individuality of each baby and the mother’s circumstances. However it is clear that mothers are not always getting the most appropriate advice to sustain lactation. The midwives who were most likely to give sound advice were those who were also most strongly motivated towards breast feeding themselves.

Engorgement is a further manifestation of poor lactation management and it is much less common amongst mothers whose babies are allowed unrestricted suckling than those with rigid feeding schedules (Illingworth, 1952; DHSS, 1980a). It causes pain, insomnia, and worry and if unrelieved will lead to a diminished milk supply (Gunther, p. 76, 1970; Stanway, p. 142, 1979). Many (60%) of the mothers in the National Survey experienced engorgement and those who were relieved by expressing their milk or increasing the frequency of feeds were much more likely to continue to breast feed than those who were advised to bathe, use a tighter bra or take pain killers (Martin, p. 93, 1978). From their replies the Buckinghamshire midwives were inconclusive about the most effective remedy and only a few suggested methods of relief that would enhance the possibility of continued lactation. Hospital midwives were again the ones least likely to suggest increasing the frequency of feeds.

Sore or cracked nipples are another problem that occurs during the first week postpartum and can often cause mothers to stop breast feeding (Martin, p. 93, 1978). Their cause is another contentious issue and rigid feeding regimes where the baby is only allowed to suckle for two or three minutes at the initial feeds are designed to prevent the occurrence of sore nipples. However these regimes are felt by many to be the cause of sore nipples as such brief suckling interferes with the let down reflex (La Leche League, 1975; Illingsworth, 1979; Stanway, p. 27, 1978).
An alternative and frequently quoted theory is that the cause of sore nipples is positional, the nipple not being put far enough into the baby’s mouth, either because of the inexperience of the mother or the presence of engorgement (Gunther, p. 80, 1970). The soreness is usually transient but can result in the occurrence of a cracked nipple. In this instance the midwives were almost unanimous in their advice. They recommend the use of a Rotasept Spray usually in conjunction with resting the affected breast, this period of rest is recommended by many (National Childbirth Trust, 1972; Stanway, p. 149, 1978; Illingworth, p. 18, 1979) but not all lactation specialist (La Leche League, 1975). Advice to maintain milk supply by manual expression was less likely to be given during the rest period.

The midwives are obviously conscious of these problems and 84% of them agreed that all mothers should be forewarned so they do not occur unexpectedly. The midwives have a difficult task because if they are over dogmatic when giving advice they may upset the mothers but the advice that they give should be based on a sound understanding of the physiology of lactation (Howie, 1980). It is apparent from the varied and sometimes conflicting advice that some midwives are giving to mothers in Buckinghamshire that the physiology of lactation is not fully understood.

There was almost unanimous agreement that it is a midwife’s role to advise mothers on infant feeding and the majority also suggest that a team approach was needed. Alternative sources of advice were however limited either to a health visitor or a mother who had breast fed successfully herself. The other possible advisers including doctors and dietitians gained little support. The replies to the question on conditions under which midwives are teaching others how to breast feed showed that at the John Radcliffe Hospital, where there is a team approach, there are also problems with liaison amongst the health professionals. The lack of problems with liaison in Aylesbury Vale and Milton Keynes could well merely reflect the fact that in this health district midwives are tending to work independently.
Time spent on teaching infant feeding to mothers is related both to the overall workload of a midwife and the emphasis that she would put on this part of her job but a mother’s success in breast feeding should also be related to the amount of advice available to her. Direct comparison between these three interrelated factors is difficult. Some of the midwives did not answer the questions on the amount of time per week they spent teaching infant feeding, others did not specify precisely where they work, and the midwives from rural Aylesbury Vale were only working on a part-time basis, nevertheless some patterns do emerge. The highest average, 16.2 hours per week, was recorded by midwives from the John Radcliffe Hospital and although it incorporates the reply from their full-time lactation sister it does reflect the policy of the hospital to give maximum support and encouragement to mothers wishing to breast feed. This policy is obviously successful as 77% of their mothers breast fed initially in 1977 and 87% did so in 1979 (Personal communication). Nevertheless none of the midwives from the John Radcliffe Hospital said they had no problems when teaching breast feeding and 90% said that they had too little time, factors that must contribute to the success of their mothers, 18% of whom try to breast feed but stop in the first two weeks.

Milton Keynes is an area where the number of mothers breast feeding initially is lower than average for the district so the midwives there have a more difficult task than their Aylesbury Vale counterparts and they were significantly more likely to say that they had too little time. This is reflected in the lower number of hours recorded by the Milton Keynes community midwives and those working at the Barratt Maternity Home and the Bletchley Maternity Unit. The exception was the Westbury GP Maternity Unit which achieved a higher number of mothers breast feeding initially than might be expected in Milton Keynes, particularly, as so many of them were multigravidae. This unit also had the lowest percentage of primiparus mothers to stop breast feeding in the first two weeks of any of the maternity units surveyed.
The time that the Westbury midwives recorded spending on teaching infant feeding was 13.8 hours per week which compares favourably with those at the John Radcliffe Hospital, particularly as there were no full-time lactation midwives involved. The other maternity unit whose midwives spend a large number of hours advising mothers on infant feeding was the Princess Mary's Hospital, Halton but they defeated their efforts with their rigid insistence of giving complementary feeds to all breast fed babies at all feeds.

The midwives at the Bletchley Maternity Unit had the least time available to advise on infant feeding, as they were one full-time midwife short throughout the whole of 1977, and did not appear to take any active part in promoting breast feeding antenatally. The number of mothers delivered at the Bletchley Maternity Unit who breast initially was very low, but fewer on average gave up in the first two weeks postpartum so those that tried were obviously encouraged. Whether it would have been possible for the midwives to sustain lactation in a higher percentage of mothers is difficult to assess.

If time to advise mothers on infant feeding is available either before or after the birth it is effective in promoting breast feeding but it is only one of the factors. Mothers delivered at the larger maternity units seem less able to sustain lactation than those delivered at the GP units and this is independent of the time spent advising them. Continuity of care, therefore, is also important.

Almost all, the midwives believed that their training had adequately taught them how to breast feed whenever and wherever they had trained and there was no apparent relationship between the decade of training and the answers given by the midwives to the questionnaire. It would be expected that the DHSS report: 'Present-Day-Practice in Infant Feeding' might have had an impact on some of the midwives, particularly those who had trained most recently (DHSS, 1974) but none was apparent.
There has certainly been an increase in the encouragement to breast feed but many of the Buckinghamshire midwives seemed unaware of, or disagreed with, the recommendations on how successful lactation can be achieved.

Nutrition education to promote and sustain breast feeding needs to begin at midwifery schools and refresher courses for midwives rather than at antenatal clinics. All midwives are required to attend a refresher course every 5 years. The Barratt Maternity Home in 1977 was still training its pupil midwives to use a strict regime of timed feeds, but when there is not a consensus of medical opinion on the correct procedure to initiate lactation this is not surprising. A further example of confused ideas and partial acceptance of good lactation practice is given in a prominent textbook "Practical Paediatric Problems". Professor Hutchinson, in his chapter on the techniques of breast feeding, castigates maternity units for not advocating demand feeding or allowing rooming in for mothers and babies, but suggests that babies should be put to the breast twelve hours after birth and then only be given 1-3 minutes on each breast at each feed for the first few days (Hutchinson, p. 97, 1980). Old habits obviously die hard, but die they must if mothers are to be more successful in sustaining lactation.
At the end of the 19th century many different local authorities had been experimenting with a new kind of visiting service in which trained nurses went into homes to advise and help mothers care for their infants. This was the beginning of the Health Visiting Service.

The number of health visitors increased steadily and after the 1914–1918 war their prime interest was maternal and child health, and much of their work related to infant feeding. The National Health Service Act of 1946 gave health visitors responsibility for all ages, and as a result of this has reduced the amount of time health visitors can spend with young children and their mothers (Valman, 1980c). Infant feeding is, nevertheless, still a major part of their work. A recent study showed that 52% of visits made by health visitors to a household with a child less than one year of age were to discuss the diet of the infant (Clark, 1973).

Health visitors are State Registered Nurses who have taken a twelve month course in health visiting and either a midwifery course or, more recently, an obstetric course as part of their general nursing training. This latter option has enhanced recruitment into the Health Visiting Service but poses problems for the health visitor who wishes to be involved in the care of pregnant women, but lacks the experience of midwifery (Second Report, Social Services, p. 84, 1980). The role of the health visitor is complementary to that of the community midwife. They aim to make contact with women during pregnancy and play a key role in the organisation and teaching at antenatal classes.
Health visitors have a statutory duty to visit each mother and child within ten days of the birth and they take over responsibility for the infant after the midwife has withdrawn. A majority of the health visitor's work with infants is done at the child health clinic where they form part of the primary health care team. Child health clinics provide a service where mothers can bring their infants and young children regularly to have them weighed and to seek advice from the health visitor without the need for any advance booking. The GP will also be in attendance at regular intervals to provide consultation and immunisation services. Some child health clinics also sell vitamin preparations, proprietary infant milks, and occasionally are centres for gifts of second-hand clothes.

The constant presence of the health visitor at these clinics ensures that they are the health professionals who have the most contact with mothers in the first few months of the infant's life, at a time when lactation is being established and again when the infant is weaned onto solid food. Health visitors also make home visits to families with particular problems.

In Buckinghamshire, child health clinics were run on a weekly basis from the Health Centres in the larger population areas. In the more rural parts, they took place either bi-weekly or monthly, in village halls or with the use of a mobile unit.

The health visitors in Buckinghamshire played a particularly important part in this study. They were all in close, regular contact with mothers and kept notes on each baby assigned to their care; many already recorded the details of the feeding practice. In 1977 they were responsible for recording the details of infant feeding reported in the main survey in Chapter Two. It was a great credit to them that 73% of the babies born in Buckinghamshire in 1977 were included. Similarly, ready access was provided to all the child health clinics in the district when the mothers' questionnaire was being completed.
The mothers in Buckinghamshire gave health visitors as the greatest professional source of advice on infant feeding antenatally; they would all have had one home visit from the health visitor and it was very rare for mothers not to make at least one visit to a child health clinic postnatally. The health visitors worked in small groups from GP units and, as with the midwives, it was likely that mothers would come into contact with more than one. Health visitors can be seen best used, and therefore most important, source of advice on infant feeding and their views were therefore sought.

METHOD

The Sample

There were 60 health visitors employed by the District Health Authority during 1977, 32 in Aylesbury Vale and 28 in Milton Keynes. The health visitors are based at GP units or health centres and the families they care for are located from the GP lists rather than on a geographical basis. However, the health visitors report to a Senior Nursing Officer Health Visiting, of which there were three in the district, one in Milton Keynes North, one in Milton Keynes South and one in Aylesbury Vale. The Nursing Officers hold a regular monthly briefing meeting and in January 1978, I attended each of these to report on the progress of the main survey, and ask the health visitors to complete a questionnaire, the details of which are given in Appendix IV. A stamped, addressed envelope was provided for their replies, which were unnamed.

Forty-two questionnaires were returned, twenty-seven from Aylesbury Vale representing 84% of possible replies, and fifteen from Milton Keynes, representing 54%. There had been a number of staff changes amongst the health visitors during 1977 and these were concentrated in Milton Keynes. Two (5%) of the health visitors replying worked in wholly urban areas, fourteen (33%) worked in wholly rural areas, all located in Aylesbury Vale, and twenty-six (62%) worked in areas that were a mixture of urban and rural.
A health visitor's involvement in infant feeding will depend on the number of births occurring amongst the families in her care and, as with midwifery services, health visitors' workload in this respect varied. The mean number of infants recorded by the health visitor in 1977 was 38, but these were unevenly distributed throughout the district. Both Aylesbury urban with 31 per health visitor and Aylesbury rural with 37 per health visitor fell below the mean, while Milton Keynes urban, with 40 per health visitor and Milton Keynes rural with 45, were above the mean. Moreover, if the known staff shortage in Milton Keynes urban is taken into account, then the average becomes 49 babies per health visitor. On an individual basis the variation in work load is even higher. One health visitor in Milton Keynes, who in her own words "deserved a putty medal" recorded 97 births in her practice during 1977, and for approximately half of the year she was the only one of three health visitors remaining in post to look after these babies and their families. The health visitors in a further practice in Milton Keynes ceased to participate in the study at the end of April, due to heavy workload and staff shortages.
RESULTS

The time and place used to advice mothers on infant feeding

All the health visitors answering the questionnaire teach mothers about infant feeding, and it was thought by some of them to be their major function. Many (88%) said that they did this at antenatal classes and 86% postnataally, at child health clinics. Very few, 16% (7) were involved with antenatal clinics. Nearly threequarters (74%) of the health visitors will visit a mother at home who is not attending for antenatal care. The majority would make only one visit which would last approximately twenty minutes. There was a variation in procedure amongst the different practices as some health visitors commented that they would only make such a home visit at the request of the midwife and others that it was the midwife who was more likely to take on this duty.

The initial contact with pregnant women is made in the first trimester by 17% (7) of the health visitors; in the second trimester by 19% (8) and in the third by 37% (24), when the antenatal class was the most likely venue. Three did not reply to this question. The health visitors were also asked when they felt that advice on infant feeding should begin. Their replies showed that 62% (26) agreed that infant feeding should be taught at school, 88% (37) during the antenatal period, and two health visitors favoured only postnatal advice.

The organisation of the antenatal classes was very variable within the district and much of the detail of this result was gained when visiting child health clinics rather than from the questionnaire. Antenatal classes are run as weekly sessions of between one and two hours for each session, part of the time being devoted to relaxation and part to health education.
Table 27 To show the total length of antenatal courses and time spent on infant feeding within those courses

<table>
<thead>
<tr>
<th>Total length of course in hours</th>
<th>N</th>
<th>No of hours devoted to infant feeding expressed as % of replies in each category</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 hrs or less</td>
<td>17</td>
<td>1-2 hrs 3-4 hrs</td>
</tr>
<tr>
<td>12-14 hrs</td>
<td>19</td>
<td>47 53</td>
</tr>
<tr>
<td>15-18 hrs</td>
<td>11</td>
<td>45 55</td>
</tr>
</tbody>
</table>

\[ x^2 = 6.59, \text{ df} 2, P < 0.04 \]

Table 28 To show the emphasis Health Visitors place on the choice of infant feeding method

<table>
<thead>
<tr>
<th>% of total replying</th>
<th>% according to belief in feeding methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1  2  3</td>
</tr>
<tr>
<td>Mothers should be actively persuaded to breast feed</td>
<td>29 36 25 0</td>
</tr>
<tr>
<td>Mothers should be encouraged but not persuaded to breast feed</td>
<td>71 64 75 100</td>
</tr>
</tbody>
</table>

\[ n = 42 22 16 2 \]

1 = Breast feeding is better for the baby than bottle feeding.

2 = Breast feeding is preferable to bottle feeding.

3 = Breast feeding and bottle feeding are equally as good.
Health education took approximately one hour and the amount of time devoted to relaxation from twenty minutes to one hour. Many classes also included an evening film 'To Janet, A Son' and fathers were invited to this session which was becoming an increasingly popular option.

Replies to the question on total number of hours for each course of antenatal classes reflect this variation as they ranged from six to eighteen hours. The amount of time devoted to the subject of infant feeding was also variable. Two hours was the most usual length of time recorded by 46% of the health visitors, while 22% spent three hours, and 22% spent four hours, thus covering the topic on more than one occasion. The remaining 10% spent one hour. There was a connection between the total length of an antenatal course and the amount of time devoted to infant feeding within that course ($p < 0.04$). The shorter courses, with 10 hours or less only contained one to two hours, however, the longest ones were not necessarily those with four hours, as 53% of the 12-14 hr courses covered the topic for four hours as well (see Table 27).

Advice given to Mothers

The emphasis that health visitors place on the choice of infant feeding method is shown in Table 28. Just over half the health visitors replying felt that breast feeding was better for the baby than bottle feeding; two did not answer this question. Despite this result, only 29% favoured active persuasion to breast feed, the remaining 71% would encourage mothers but not persuade. Those health visitors who feel breast feeding is better were more likely to favour active encouragement, but this result was not significant ($p < 0.5$). A health visitors attitude was not affected by the area in which she worked, but did differ according to the decade in which she had qualified. All four health visitors who trained in the fifties agreed that breast feeding was better than bottle feeding and the two who replied that both methods were equally good were both trained in the sixties.
Figure 9 To show advice Health Visitors suggested for mothers who had difficulty in establishing lactation

- Support & encouragement: 62%
- Relax & rest: 44%
- Mother to eat more: 36%
- Increase number of feeds: 28%
- Check motivation: 28%
- Supervise feeds: 26%
- Check fluid intake: 23%
- Give complementary feeds: 21%
- Test weigh: 21%
- Check for underlying problems: 21%
- Avoid guilt feelings: 15%

% of Health Visitors who gave each suggestion
The advice given to mothers encountering difficulties in establishing breast feeding varied tremendously and most health visitors gave multiple suggestions (see Figure 9). Three did not reply and the results are expressed as a percentage of those who did. The most frequently occurring reply, given by 62% of the health visitors, was to encourage and support the mother; four mentioned specifically that they would do this in the context of a home visit and one commented that this was the only occasion when she left her home telephone number. Supervision of the mother at feeding time would also involve a home visit and this was mentioned by 26% of the health visitors. Encouragement to relax and rest was the second most frequently occurring advice given by 44%, while 28% said they would check with the mother and her family to ascertain whether she really wanted to continue breast feeding before advising. A further 21% would aim to find out what was behind the difficulty, giving suggestions such as medical reasons, worry, demanding siblings, father not understanding, infrequent feeding, or unnecessary complementary feeding.

Checking the adequacy of the mother's diet or increasing her fluid intake were further suggestions, although two health visitors made the reverse point: they would make sure fluid levels were not too high. The baby's intake was also mentioned and 28% of the health visitors advised an increase in the number or size of the feeds being given. Test weighing the baby to check the adequacy of the mother's milk output, followed by the use of complementary feeds if it was found to be too low, were also suggested.

The advice health visitors suggested for mothers who had difficulty establishing lactation was either of a practical or of a supportive nature and, although the majority (68%) gave a mixture of both types of answer, 23% mentioned only measures of support or encouragement.
Table 29 To show the suggestions Health Visitors made for mothers experiencing difficulty in maintaining lactation

<table>
<thead>
<tr>
<th>Suggestions given</th>
<th>No. of Health Visitors who made each suggestion as % of total replying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest more</td>
<td>51</td>
</tr>
<tr>
<td>Eat and drink well</td>
<td>41</td>
</tr>
<tr>
<td>Give support and encouragement</td>
<td>36</td>
</tr>
<tr>
<td>Give complementary feeds</td>
<td>36</td>
</tr>
<tr>
<td>Stop breast feeding if mother wishes</td>
<td>31</td>
</tr>
<tr>
<td>Check for underlying emotional cause</td>
<td>21</td>
</tr>
<tr>
<td>Increase the number of feeds</td>
<td>18</td>
</tr>
<tr>
<td>Test weigh baby</td>
<td>13</td>
</tr>
<tr>
<td>Take Lactagol tablets</td>
<td>13</td>
</tr>
</tbody>
</table>
These results suggest that health visitors place emphasis on the supportive part of their job and do not merely see themselves as providers of information.

Advice for mothers who have problems in maintaining lactation also covered a broad spectrum of ideas with 21 different suggestions given. Three health visitors did not reply and the results are expressed as a percentage of those who did. Table 29 shows the most frequently occurring replies. Encouragement to rest was suggested by 51% of health visitors and a check to ascertain that mothers were eating and drinking sufficiently was suggested by 41%. These were the two most popular replies. Psychological help was again recommended with 36% stressing the need for support and encouragement of the mother. Twelve health visitors (31%) felt mothers should stop breast feeding if they wanted to when they were having difficulties and others suggested that there may well be emotional reasons behind the failure of lactation. The practical suggestions for those who wished to continue breast feeding in order of occurrence were: to give complementary feeds but possibly only as an interim measure; to increase the baby's milk intake by demand feeding or increasing the number of feeds; test weigh the baby to see if milk intake is sufficient and then advise accordingly; and advice to drink Guiness or stout, which was given by four health visitors who, incidentally, were not the same ones who had suggested this as a remedy for failure to establish lactation.

Other comments of interest were that mothers should ask advice from one person only and not a multitude of people; that breast feeding for one month would give the baby sufficient immunity and one answer that simply read "bottle feed".
Table 30 To show the number of hours per week Health Visitors spend on infant feeding

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>1-5 hrs</th>
<th>6-10 hrs</th>
<th>More than 10 hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Health Visitors</td>
<td>38</td>
<td>18</td>
<td>61</td>
<td>21</td>
</tr>
<tr>
<td>Aylesbury Vale Health Visitors</td>
<td>25</td>
<td>24</td>
<td>64</td>
<td>12</td>
</tr>
<tr>
<td>Milton Keynes Health Visitors</td>
<td>13</td>
<td>8</td>
<td>54</td>
<td>38</td>
</tr>
<tr>
<td>Urban Health Visitors</td>
<td>2</td>
<td>-</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Partly Urban Health Visitors</td>
<td>22</td>
<td>18</td>
<td>59</td>
<td>22</td>
</tr>
<tr>
<td>Rural Health Visitors</td>
<td>14</td>
<td>21</td>
<td>57</td>
<td>21</td>
</tr>
</tbody>
</table>
The time health visitors spend advising mothers on infant feeding

The size of the health visitor's caseload expressed by number of families ranged from 118, recorded by a part-time visitor to 832 recorded by a health visitor working in rural Aylesbury Vale, with a mean of 492. Nine health visitors did not answer this question; 67% of the replies above the mean came from Aylesbury Vale, however, as only 54% of Milton Keynes health visitors returned the questionnaire, it is likely that the busiest ones were those who did not reply. Nearly half (45%) of the health visitors in rural areas had caseloads above the mean, compared to 59% of those working in partly urban and partly rural areas. The two health visitors working wholly urban areas did not reply to this question.

The number of working hours per week that health visitors spend advising mothers on infant feeding is shown in Table 30. It can be seen that 61% spent between 6 and 10 hours per week and another 21% ten or more hours. In each time category, however, there was an almost equal number of health visitors with small and large caseloads. Overall workload therefore has no impact on the time spent on infant feeding.

There were a larger number of Milton Keynes health visitors spending more than 10 hours a week than there were in Aylesbury Vale, a result that would be expected in view of the higher number of births recorded in Milton Keynes. However, this result did not reach significance levels (p < 0.20). The amount of time health visitors spend according to the type of area was almost identical for the rural, partly urban, and urban areas, and there were no other significant relationships between working hours on infant feeding and any other variable in the questionnaire.
Table 31 To show the length of time spent on nutrition topics during a Health Visitor's training

<table>
<thead>
<tr>
<th>Topic</th>
<th>% of Health Visitors in each category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-5 hrs</td>
</tr>
<tr>
<td>General nutrition</td>
<td></td>
</tr>
<tr>
<td>N = 31</td>
<td>20</td>
</tr>
<tr>
<td>Breast feeding</td>
<td></td>
</tr>
<tr>
<td>N = 30</td>
<td>43</td>
</tr>
<tr>
<td>Proprietary infant milk</td>
<td>59</td>
</tr>
<tr>
<td>N = 29</td>
<td></td>
</tr>
</tbody>
</table>

* $X^2 = 21.71$, df 9, P < 0.01

Table 32 To show the answers Health Visitors gave to the questions on the value of their training

<table>
<thead>
<tr>
<th>% of Health Visitors who answered yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think your training equipped you to advise mothers on:--</td>
</tr>
<tr>
<td>1. the merits of breast feeding</td>
</tr>
<tr>
<td>2. how to breast feed</td>
</tr>
<tr>
<td>3. how to bottle feed</td>
</tr>
</tbody>
</table>
Health visitors' training

Thirty-six health visitors answering the questionnaire had taken a post-registration course in Health Visiting, five a post-graduate course, and only one the newer, integrated course. It was not therefore possible to compare the content of the courses.

Many of the health visitors could not remember the details of their training well enough to answer the questions on content, and the results of these questions are given as a percentage of those replying (see Table 31). General nutrition was taught for very variable lengths of time, with 32% studying the subject for six to ten hours and a further 32% for more than twenty hours; the mean length of study time was 13.4 hours and 52% of the health visitors studied nutrition for a maximum ten hours in all. Breast feeding and the subject of proprietary infant milks had similar coverage, although breast feeding was given marginally longer; 43% of the health visitors had studied the subject of breast feeding for a maximum of two hours, but the amount of time increased as the coverage of nutrition in general increased.

Table 32 shows that 77% of the health visitors felt that their training had equipped them to advise mothers on the merits of breast feeding. On the practical aspects, the results differed as 64% felt that they had been trained adequately to teach mothers how to bottle feed in comparison to only 46% on how to breast feed. Time spent on these topics, according to the year of qualification, was very similar despite a span of twenty-seven years. Nine of the health visitors said that lectures on infant feeding were available to them in their area, and all were able to attend these, but the remainder of the health visitors replied 'No' to both of these questions.
DISCUSSION

The response to the questionnaire

The response to the health visitors' questionnaire was disappointing for two reasons. Firstly, the number who replied, although 70% overall, included only 54% from Milton Keynes thus giving a biased result, and secondly, some of the questions were not answered by those replying giving a very small sample size, and this made statistical analysis difficult. In a detailed review of research into health visiting two factors were suggested which could affect the accuracy and completeness of results. These were the time and effort required by the respondent and the independence of the researcher (Clark, p. 15, 1981). The questionnaire to Buckinghamshire health visitors was by no means time consuming but it was noticeable that the questions on training, which for many would require checking, were the least well answered and the lowest number of replies came from the part of the district that was short-staffed. The survey was carried out by an independent observer and, although Nursing Officers were present at the distribution, collection was postal and anonymous. There is the possibility, however, that some health visitors felt that the anonymity of their replies was at risk and therefore did not reply, or failed to answer some of the questions that were too specific.

In particular, the size of the caseload was not given by 21% of health visitors, two of whom commented that this was confidential information. A health visitor's caseload is the number of families or individuals for whom she holds cards recording visits, or the provision of services to whom she holds herself responsible. It is built up of antenatal mothers, new births, removals into the district, the aged, and referrals from colleagues in the health Service or members of the public (Owen, p. 328, 1977). The size of the case load will dictate not only the amount of time available to give to individuals, but also the priorities of work.
A recent report of the Health Visitors' Association made the following suggestions giving three levels of priority of work that are pertinent to this study (Health Visitors' Association, 1975, 1981).

I. The recommended selection of work for Health Visitors working within severe staff shortages included—urgent home visiting, i.e. to new births, and to antenatal mothers, especially primigravidae. Work in Child Health Clinics.

II. The recommended additional work for Health Visitors working under only average pressure included—visits to all antenatal mothers.

III. The recommended additions for Health Visitors who may one day may have really small caseloads included—involvement in research projects.

The majority of Buckinghamshire health visitors obviously agreed with the first two priorities and tended to make contact with all pregnant women, a task not without difficulty. Apart from the lack of precise information on identity, as discussed on page 101 there is the problem of finding primigravidae, in particular, at home. No reply calls, irrespective of reason, have been variously reported as between 6 and 25% of all health visitors' calls (Clark, p. 40, 1981). The health visitors were asked specifically if they would make home visits to those women who didn't attend antenatal clinics and who are a high risk group. The eight (26%) who said 'No' all had caseloads above 400. The health visitor's ability to advise mothers on infant feeding antenatally is, therefore, tenuous. Without better information and time for evening visiting, they find it difficult to reach all women including those in the vulnerable group.
The amount of time per working week spent on infant feeding was another question which received a low response rate (90%). There are many studies which show the health visitor's work is concentrated on young children (Marris, 1971; Henderson, 1978; Walsworth-Bell, 1979; and Wiseman, 1979). A summary of home visits for health visitors shows that between 54% and 82% were to children under five (Clark, p. 30, 1981), and the DHSS statistics for 1977 indicate that 27% of the health visitor's clients under five were children born that year. A London survey of health visitors' work showed that 5% of the clients were expectant mothers and 31% mothers with young babies: this latter group accounting for 14% of the health visitor's total time (Marris, 1971). The specific topic of infant feeding is only mentioned in isolation in one study, that was given as a topic for discussion in 37% of home visits (Clark, p. 19, 1973). Time spent by health visitors with mothers and babies at clinics has been given as 38% of the total clinic time, but again, this was not specifically on infant feeding (Marris, 1971).

None of these studies is therefore directly comparable and none give a clear indication of the time taken and priority given to infant feeding per se. Particularly when home visits and clinic attendances count for approximately 46% of the health visitor's total time only, the remainder being spent on administration, travel and other activities (Clark p. 22, 1981). In the Buckinghamshire study, the question of time spent proved not to be exhaustive as 21% of those replying stated that they spend more than ten hours per week on this topic, i.e. more than a quarter of their working week, which is much higher than the amount of time that might be expected from the previous studies. Whilst self-recorded information is known to be less accurate than observed information (Moser, 1958), the health visitors giving replies had to make a positive addition to the questionnaire to record their answers, and therefore must have given them careful consideration.
It is possible that a generalisation of time spent to include travelling and associated paperwork may be included, giving a higher than expected figure and they were not specific. Eight health visitors merely said 'More' beside the six to ten hour category, but one gave a figure of twenty to thirty hours per week. An alternative reason for this high result could be confirmation of a predicted change in the emphasis of health visiting work, following the recent enthusiasm for breast feeding (Owen, p. 45, 1977). The time spent by health visitors on infant feeding was apparently dependent only on general area and the health visitors in Milton Keynes with its higher birthrate were marginally more likely to record over ten hours than Aylesbury Vale health visitors. The topic was obviously important, as size of caseload made no apparent difference to the replies, nor did the health visitor's views on infant feeding.

The survey confirmed that health visitors have little involvement in general antenatal care, but most teach mothers at antenatal classes, an occasion when they work in close liaison with the community midwives. The organisation of these classes is variable with no overall AHA policy on length or content. Sometimes the health visitors took half the classes and midwives the other half, while sometimes the health visitors took all of one set, alternating with the midwives. This latter arrangement giving less opportunity for a health visitor to meet all prospective mothers. The only way to know the precise content of classes would be to attend a series, but there was considerable resistance to my doing this in case an outsider had an inhibiting effect on the proceedings. At the session that I did attend, in Milton Keynes, the health visitor emphasised the need for immediate postpartum suckling, and the expression of milk after feeds to stimulate lactation, but felt that few of her mothers would be given the opportunity to use this advice. Further evidence of conflicting views in the practical management of lactation.

Total length of time given to the subject of infant feeding within antenatal classes varied. Some included breast and bottle feeding in one session, which, apart from being too much material to be covered in the time available, gives the impression that the alternatives are of equal status. Other classes aimed to have a new mother bathing and then breast feeding her baby, as this is an effective way to encourage conversation and questions that will promote breast feeding.
There is little information on the value of antenatal classes in this context. The National Survey was unable to determine directly whether or not antenatal classes influenced choice of feeding method but did ascertain that only 52% of all primigravidae had attended a class where feeding was a topic for discussion (Martin, p. 39, 1978). Buckinghamshire mothers who specified classes as a source of information on infant feeding had a very high breast feeding rate, but were few in number, see page 85. These classes do, however, tend to be relied upon by health professionals as the main occasion for teaching infant feeding antenatally, particularly when time is in short supply and home visits by health visitors cannot be guaranteed for all pregnant women. Given the variations in content and time spent on infant feeding reported by this survey, and the vague impression they give (Reid, 1980), further research is needed to ascertain the effectiveness of this form of nutrition education. A subsequent unpublished study in Oxfordshire, amongst 93 mothers attending five child health clinics, showed that 67% of the mothers attended some of the series of antenatal classes. However, only 43% attended the class where infant feeding was discussed and less than 10% felt that they were actually influenced by this class. Most mothers said that the class reinforced ideas that they already had regarding infant feeding, rather than having introduced new ideas, and most felt that breast feeding was being encouraged (Jeffries, 1980).

In providing practical information on the technique of breast feeding for those, who intend to use this method of infant feeding, antenatal classes provide a useful opportunity. But this is only part of their purpose. They should also be occasions where mothers can be convinced breast feeding is an advantage and to do this many more mothers need to be persuaded to attend. It is those who do not attend who are most likely to bottle feed (Martin p. 11, 1978).

Many Buckinghamshire health visitors had well organised systems and forms to invite primigravidae to the classes, but again, this relied on an individual effort and was not a standard practice. Written invitations also often need personal persuasion to be effective. This could be done by the midwife or health visitor at a home visit if time is available, or during routine antenatal check ups.
The invitation needs to be specific and with a system of shared care amongst GP's and hospitals close liaison is needed. Computerised recorded systems will supply the information for more rigorous follow-up, but it was difficult to know who, if anyone, in Buckinghamshire was responsible for seeing if mothers went to antenatal classes. Many mothers had the opportunity of going to either hospital based courses or community based courses, and a variety of health professionals were seen asking if they were attending. However there was no central co-ordination of their replies and, undoubtedly, some mothers went to neither.

Postnatal advice on infant feeding

The majority of the health visitor's work on infant feeding occurs postnatally and, here, central organisation functions well. Health visitors receive notification of all new births from the Area health Authority and will make at least one home visit, when they can establish contact and ascertain the need for further calls.

New mothers are encouraged to come to the local child health clinics and attendance levels, at least initially, are very high. However the changeover of adviser, at ten days postpartum, from midwife to health visitor comes at a particularly sensitive time. Lactation does not become established quickly and many breast fed babies have a period of between five and ten days when they demand very frequent feeds, up to twelve in 24 hours (Illingworth, p. 7, 1979). At some point during this period the mother will change from hospital to home environment and the end of the period coincides with the withdrawal of the midwife and the handover to the health visitor. Time taken for lactation to become fully established is variously reported at between three to four weeks (Hutchinson, p. 98, 1981), six weeks (Goldfarb, 1980), and fourteen days (McKeith p. 162, 1979). The findings of the main survey and the mothers' questionnaire indicate that the first month postpartum is the most difficult period after which the majority of those still lactating managed to continue. Whichever time scale is taken as correct, it will fall on the health visitor to reinforce the midwife's initial advice and extend it until lactation is firmly established.
The health visitor encounter many mothers who are experiencing difficulty with lactation at home. They were asked the same questions on the advice they would give as were the midwives, but the context in which they are advising is different, and the questions were therefore left open. The answers they gave reflect not only the remedies health visitors suggest, but also the reasons why mothers find lactation so difficult to establish and maintain.

The frequency with which measures of emotional support were mentioned shows that the mothers' lack of confidence in their ability to breastfeed is one of the main problems. The health visitors were not content just to suggest the need for emotional support, their words were frequently underlined on the questionnaire and given a variety of quantifying objectives to stress their concern. Even some of those who suggested test weighing a baby after feeds did so as a morale booster to show the mother she is producing milk. This lack of confidence was shown in another study of mothers at two months postpartum (Ounsted, 1980).

Although 23% of health visitors only mentioned measures of support and encouragement, the right practical advice is also needed for mothers with problems in lactation. The second most frequently occurring advice for mothers with difficulties in establishing lactation, and the primary advice for those who had trouble maintaining it, was to relax and rest more. This was particularly suggested around the third week postpartum when the combination of the relatives helping less and the mother becoming more active herself can cause a dip in the milk supply. This is often only temporary but could be one of the reasons for the feeling expressed by so many mothers in Buckinghamshire and elsewhere that they do not have enough milk. It has been suggested that it is unlikely that as many as 60% of mothers should be incapable of producing enough milk for their babies (Martin, p. 69, 1978), but it is equally unlikely that so many mothers should be imagining this problem.
Given life-styles where mothers expect to be able to keep house as usual and do not expect to give feeds as frequently as babies often need feeding, lactation is difficult to maintain. New mothers have been reported to be astonished that their two month old babies did not sleep most of the day (Ounsted, 1980).

In advising rest and relaxation along with comments such as "mothers should get their priorities right and forget the housework" health visitors are pinpointing one of the problems causing insufficiency of milk. More than twenty years ago it was pointed out that, of 106 mothers, only 2% who did not have any problems breast feeding. This small group of mothers were healthy, lived with their own mothers, had little domestic responsibility, and considerable help with the baby (Hytten, 1958).

Energy output cannot however be separated from energy intake and the next most popular remedy for poor lactation performance was for the mothers to eat more. A recent study in Cambridge has confirmed that insufficient milk supply is often the result of a mother not eating enough to cover the requirements for herself, her baby-minding chores, and her baby's milk supply (Whichelow, 1979). The late afternoon feed is often the one with the lowest milk output and it is associated with mothers having little or nothing between lunch and supper. Advice to 'top up' mothers with snacks and an overall increase in energy intake, rather than babies with bottles, is therefore sound and proved to be effective regardless of social class.

Stimulation of milk supply by increasing the number of feeds was less popular as an idea and was given by fewer health visitors (18%) for maintaining lactation than for establishing it (28%). So it is by no means universally accepted as a solution by the Buckinghamshire health visitors, particularly after the first few weeks postpartum. It could well be that, when efforts are made to maintain failing lactation, increasing suckling only works well in combination with an increased energy intake (Messenger, 1979).
The Buckinghamshire result does show an increase in popularity for frequent suckling over the National Survey, however, when only 6% of mothers were given this advice (Martin, p. 97, 1978) the main advisers in this instance also being health visitors.

The use of complementary feeding although still advocated by some health visitors particularly for problems in maintaining lactation seems to be on the wain. To quote a National Survey “it is clear that the most common advice for mothers with insufficient milk supply was to give the baby bottles” (Martin, p. 97, 1978). Most of the Buckinghamshire health visitors did not suggest this and some of the ones that did added “as a last resort”. The fact that complementary feeding so quickly undermines breast feeding is at long last enjoying good coverage in the professional journals (Stanway, 1979; Quickfall, 1979; Hill, 1981; Houston, 1981; Editor, Health Visitor, 1981). The individual suggestions were not given in isolation and one of the problems of advising the use of complementary feeding, even as an interim measure, is that when lactation continues to fail it lowers the credibility of all the other sound advice given at the same time. The number of complementary feeds needed gradually increases until the mother gives up breast feeding altogether and the problem appears to solve itself. To resort to bottle feeding when breast feeding seems to be difficult is always the easy option (Editor, Health Visitor, 1979).

The suggestion to test weigh the baby and proceed according to the results is a difficult one to understand. If done to reassure a successful but anxious mother it can be useful providing the result is at least equal to the expectation.
Test weighing when the mother is known to be in difficulties with lactation is merely likely to prove the point and increase her anxiety further which will in turn decrease her milk supply. To be useful a test weight must be compared with an expected weight of milk and there is no norm on the quantity of milk to expect a breast fed baby to be taking per feed (Ounsted, 1975).

The other main feature of the answers given by health visitors was that they should check the motivation of mothers to breast feed and see if there was any underlying emotional problem or hostility within the family that would mitigate against breast feeding. If there was any doubt on motivation they were unlikely to press the point. Many expressed verbal concern that mothers who stop breast feeding must not be made to feel guilty. In this situation there is a point of conflict between the emotional needs of the mother and the physical requirements of the infant. Health visitors are trained to care for the whole family. The 1949 Health Services Act committed health visitors to be concerned with the health of the household as a whole, and more recently the Council for Training Health Visitors identified the prevention of mental, physical, and emotional ill health or the alleviation of its consequences as one of the five main aspects of a health visitor's work (Clark, p. 18, 1973). The 31% of health visitors who said a mother should stop breast feeding if she wishes are reflecting these views.

The current difficulties that so many mothers face in trying to breast feed puts the health visitors on the horns of a dilemma. They almost all agreed that breast feeding is preferable or better for the baby than bottle feeding; but if, in promoting it, they make mothers feel guilty or inadequate they will alienate their clients who then may become non-users of the child health services.
A study in York has shown that at one month mothers in social classes IV and V were more likely than women from other social groups both to have attended clinics and feel satisfied with their health visitor, but by five months this class pattern had been reversed. This failure to return was frequently because a mother's competence over the management of her baby's weight was brought into question (Graham, 1979).

The commitment to the family as a whole and long term objectives probably make health visitors less committed to breast feeding than midwives. In Buckinghamshire few of the health visitors were in favour of actively persuading mothers to breast feed, the remainder just felt that it should be encouraged.

The way round the conflict is to remove it by making breast feeding easier to achieve in the first place. Many of the difficulties that mothers experience are relatively minor, but with the first baby it is particularly important that the problems should be overcome, and confidence upheld, since mothers who have failed once may well not try with subsequent children. Health visitors who trained in the years when breast feeding declined drastically will not have seen many mothers breast feeding successfully and their training may well have been inadequate or inaccurate (Editor, Health Visitor, 1979). In Buckinghamshire only 46% of the health visitors felt that their training had equipped them adequately to teach mothers how to breast feed. Taken collectively the health visitors made all the suggestions that are now known to promote breast feeding and solve difficulties when the mother is motivated, so the information is obviously available. On an individual basis the mothers are getting support and encouragement but not all are necessarily being given the right advice at the right time.
At the end of the study the Buckinghamshire health visitors requested a seminar so that they could gain feedback on all the information they had helped to collect. This was arranged, but it was ironical that in the event the seminar took place in makeshift surroundings and for a shortened period of time as it had clashed with a promotional lunch and film given by one of the proprietary infant milk manufacturers.
CHAPTER SIX

Conclusion

This study has monitored the infant feeding practices of mothers in a health district to see how closely they match government guidelines and how they have been influenced. The results show that while professional and maternal opinion is now largely in favour of breast feeding there is still a divergence of view on:

1. The emphasis that should be placed on breast feeding.
2. The practical techniques required to establish and maintain successful lactation.

Thus, although an increasing number of mothers are attempting to breast feed, many find it too difficult to achieve and give up before lactation can be said to have been established. There also remains a smaller number of mothers and professional advisers who feel that breast and bottle feeding are equally satisfactory.

The trend in favour of breast feeding in the United Kingdom is still continuing, but even so many mothers are giving up after a short time and only 26% continue for four months (Martin, 1982). If Britain is to become a breast feeding nation once again the majority of mothers should sustain lactation for the minimum recommended time of four months. Success is too often measured by the numbers who start to breast feed, particularly in the press (The Times, 1982), and not by the numbers who succeed. How can this aim be achieved? The results of this study suggest the following guidelines.

The initiation of breast feeding

An average of 60% of Buckinghamshire mothers started to breast feed so why did the remainder not even try? All would have seen a midwife, 89% of whom would encourage breast feeding, and most would have seen a health visitor, 95% of whom encourage breast feeding, but 40% of the mothers remained unconvinced.
All had also seen a doctor but their influence on infant feeding was apparently small, therefore, they were not included in this study. The results of the mothers questionnaire in Chapter 3 show that only about two thirds of the mothers sought the advice of health professionals on this subject. Those that did found that there was, however, an enormous variation in attitude to breast feeding and the amount of encouragement given. Only 29% of midwives and 9% of health visitors would strongly advise to breast feed. Many were not trained in an era when it was thought to be so important and they lacked the co-ordinated policy between medical and nursing personnel that proved effective in the adjacent area. The fact that the majority of health visitors and midwives felt their training had taught them adequately the merits of breast feeding and yet so few would strongly promote breast feeding indicated that the training schemes themselves need updating and refresher courses are required. The upsurge of interest in breast feeding was probably initiated by the DHSS in 1974, but the present rise in breast feeding levels is just as attributable to the general climate of opinion and current fashion as it is to medical opinion. Health professionals need to speak with even more unanimity and conviction if this increase is to be sustained when the subject loses it topical appeal, as it inevitably must.

The timing of the decision on how to feed an infant was made by parents either before pregnancy or very early on in pregnancy, therefore, advice in the antenatal period cannot be relied upon solely. Nutrition education to promote breast feeding should begin at school where it can reach all prospective parents and it should contain information on how to breast feed as well as why breast feeding is better than bottle feeding. This information can then be reinforced during antenatal care where the obvious venue for the catchment of almost all gravidae is the antenatal clinic. Experience in Buckinghamshire shows that the atmosphere at antenatal clinics, particularly the large ones, is not conducive to communication. These clinics however provide an opportunity to harness a computer based information system which could identify groups at risk, as suggested for general practice (Royal College of GP's 1980). All obstetric records include a question on intended feeding method and if this were to be extended it could itemise the factors which predispose to bottle feeding and provide a shortlist of women in need of further counselling, preferably at home visit.
Details of atopic parents or those with past bonding problems could also be indicated. Time for home visiting is in short supply and unlikely to increase. The use of information provided during antenatal care could ensure that potential bottle feeders received priority, but any such system would need careful co-ordination. The DHSS recommended each health district should have a co-ordinator to promote breast feeding and there was no such person in Buckinghamshire. It was notable that lack of information, particularly to health visitors, and shared responsibility, often frustrated the efforts that were being made to increase breast feeding levels. Many of the Buckinghamshire health visitors said that infant feeding was their major priority, if they are to be effective they need better tools and more up to date information.

Analysis of the results of this study and others shows that the women who are least likely to breast feed come from social groups IV and V, who live in new urban environments, and have left school by the age of sixteen. Those who were bottle feed themselves or failed to breast feed their first child are also unlikely to breast feed. These women are also the poorest users of the antenatal services and least likely to attend antenatal classes. These factors must not be thought of as the causes of failure to breast feed. They are merely a means of identifying a group that has yet to be reached and one that finds breast feeding most difficult to achieve. The reason why this group of mothers do not breast feed is more complex. Firstly tradition combined with a tendency to seek advice only from their peer group makes change in habits less likely and more difficult to achieve. This tradition is said to have its roots in the industrial revolution, increased urbanisation and the need for women to work. It could equally well result from the difficulty in sustaining lactation which generations of women in these groups have experienced. The reproductive performance of mothers in social classes IV and V is less successful than mothers in other groups and nutritional differences account for some of this variation (Bairds, 1980). Nutrient intakes in the first trimester, appreciably lower than those recommended, have been found to be associated with social classes IV, and V, and a maternal age under twenty (Smithells, 1977). Successful lactation is equally dependent on sound nutrition and this poor pattern of eating will make it much harder for these mothers to breast feed successfully.
When mothers are given advice to increase energy intake during lactation the improved performance is as good in the manual as the non-manual groups (Whichelow, 1979). Therefore if health education to improve nutrition were more successful the difference in breastfeeding levels found between mothers in social classes IV and V and other mothers could well decline along side the difference in perinatal mortality rates. This is an area that needs further investigation.

Secondly, lack of effective communication makes it more likely that these mothers will continue to bottle feed. Promotion in the media and books, which are playing an important part in the increase in breastfeeding, are not used by them. Their early school leaving age makes it more difficult for them to appreciate the arguments in favour of breastfeeding and virtually no one in Buckinghamshire had learnt anything about the subject at school. There is dissatisfaction with communication given by health professionals in the antenatal period, yet these mothers are the most undecided on infant feeding so there is scope to improve breastfeeding levels amongst them. Written material in particular proved to use totally inappropriate language and to be ambiguous as so much was sponsored by the formulae manufacturers. Pictorial information makes the most appeal and this was even more likely to advertise bottle feeding. Buckinghamshire is not an exception, this is a national problem (War on Want, 1982).

When comparing the results of the mothers', midwives' and health visitors' questionnaires a divergence of view occurs on the usefulness of antenatal classes and clinics for discussion infant feeding. Most (88%) of health visitors were involved with antenatal classes and from personal discussion it was obvious that they felt these classes were the most appropriate occasion on which to teach mothers about infant feeding. Very few health visitors were involved in antenatal clinics. When the midwives answered an open question on where they discussed infant feeding with mothers, 62% specified that it was at a booking clinic although few of them, less than 20%, felt that this was the best occasion to use. Instead they gave antenatal classes as the place where pregnant women were most receptive to advice. The mothers themselves differ as only 22% chose antenatal classes and the majority preferred a one to one contact.
It seems that the advisers are relying on an occasion that their clients do not want. The content of the antenatal classes also varied enormously as did the time devoted to the topic of infant feeding and the attitudes of the teachers. The effectiveness of these classes needs to be explored further and compared with home visits. The results in Chapter 3 however show that given a desire to breast feed the information provided by antenatal classes was well utilised.

In summary the number of mothers not trying to breast feed can be reduced still further if time and effort available were redirected towards potential bottle feeders and they are easily identified. The means of communicating with mothers in the manual groups needs radical revision so this is designed specifically for them and is given with stronger conviction by the health personnel involved.

The major problem however, is not in the initiation of breast feeding but in its establishment and maintenance. In Buckinghamshire, in 1977, 45% of mothers who breast fed initially were still doing so at four months and therefore can be described as successful. This result is high when compared to the 1980 average for Great Britain with 40% of those breast feeding initially doing so for four months (Martin, 1982), but still represents only 27% of all the four-month-old babies surveyed in Buckinghamshire. Analysis of the 55% of mothers who were unsuccessful in lactation shows that 28% had stopped in two weeks and 82% had stopped by six weeks. This clearly indicates that the early weeks are the critical period.

The factors that help to ensure the successful establishment of lactation were itemised in Table 10. When they are compared to regimes found in the maternity units discussed in Chapter 2 there were many discrepancies. It is obvious that the early initiation of lactation was rare and the use of alternative stimuli particularly in the first twenty-four hours frequent.
The concepts of demand feeding and feeding more frequently were beginning to be accepted but the disastrous effect that complementary feeding has on lactation was not appreciated. Between 30 and 64% of midwives were still recommending the use of complementary feeds when lactation failed, as were 21% of health visitors. Night feeds of infant formulae given by nursing staff are really another method of complementary feeding and almost all maternity units give them. All these practices add up to a lack of sufficient prolactin stimulation and result in failing lactation.

When lactation begins to fail the mothers need advice and analysis of the answers given by midwives and health visitors shows that this advice could well be sound. It could also be completely negative and had a very high chance of being conflicting. None of the health professionals set out to be confusing and all were attempting to help the mothers. The problem is that they were not aware of or not convinced of the physiological basis for lactation. The most frequently cited advice from midwives was for mothers to drink more, this is known to have contra-indications. Nevertheless, approximately half of the midwives suggested the alternative remedy of more frequent feeding or demand feeding which would help. Should a mother ask a health visitor she was most likely to be told to relax and rest more and increase her energy intake. This would also help but, as only 28% suggested increasing the number of feeds as well, the benefit may well be wasted through lack of stimulation and at the best would not reach the baby in any greater quantities than before. The basis of advice given by midwives and health visitors comes from their training and the textbooks available are often conflicting and out of date. The various suggestions for prenatal nipple care were a classic example of this.

The mothers experiencing difficulty with lactation were probably tired, worried, and had a crying baby in the background; also many live in unsupported surroundings.
The health visitors' emphasis on encouragement and support shows that mothers lack the self confidence to breast feed. If the advice they receive is either wrong or confusing they become undermined still further and there is an alternative, the tin of infant formula with a smiling baby on its side.

The amount of time spent by health visitors and midwives advising mothers on infant feeding is high. The majority of health visitors spend more than a quarter of their working week advising mothers on infant feeding, midwives give a more variable result but it appeared to be correlated to the early success of breast feeding. Despite their efforts less than half of mothers were able to sustain lactation for the recommended minimum time of four months.

Shared care is an integral part of the maternity services but it can lead to confusion if the roles of the professionals within it are ill understood (Social Services Committee, 1980) and even more confusion if the advice given on the same subject differs. This study has shown that there may be a consensus of opinion to encourage breast feeding but there is considerable difference in emphasis and in the method of its practical management. The DHSS were largely the initiators of the increase in breast feeding levels. They produced an informative document on why breast feeding was important in 1974 and an updated version in 1980. There have been two National Surveys publishing information on the levels of breast feeding in this country. The latter is encouraging although an increase in the number of mothers breast feeding for four months from 13 to 27% leaves no room for complacency. These surveys also giving information on the factors affecting the choice of feeding method and the success of lactation. In 1978 a lengthy and detailed report acknowledged the level of bottle feeding in the country and gave guidelines to manufacturers of infant formulae. It seems astonishing that despite all this information there has been no publication giving guidelines on how to breast feed.
There is an urgent need for authoritative documentation on the physiology of lactation, its early management, and later maintenance. Such a report could be used for the training and retraining of all health service personnel involved in counselling mothers and prospective parents. It should itemise the groups most in need of help and the best method of communicating that help.

Variation in the encouragement given to breast feeding and conflicting advice on its maintenance are based on a lack of hard fact. There is need for further research into the optimum frequency for breast feeding and the energy requirements for lactating mothers. If everyone could become as convinced about how to breast feed as they are about the value of breast feeding our problems would be over.

Recommendations

1. Nutrition education to increase breast feeding levels should be included in all school curricula.

2. Antenatal effort should be directed towards those least likely to breast feed.

3. There should be a review of the effectiveness of antenatal classes in promoting breast feeding.

4. Books and pamphlets distributed at antenatal clinics should be designed to appeal to the manual groups and literature promoting formulae withdrawn.

5. A government publication designed for training and retraining health service personnel is needed. It should detail the physiology of lactation and the practical steps needed to initiate and sustain lactation, including recommendations for changing maternity hospital routine where necessary. Details of the practical advice mothers require when leaving their maternity unit should be included so that they can fully establish and maintain lactation on returning home.
6. Further research into areas of uncertainty is needed namely:

The frequency of feeding for breast fed babies.
The energy requirements for lactating mothers.
The length of time that it takes for lactation to become fully established.
The reasons behind the apparent failure of milk supply at around six weeks post partum.
The psychological problems that mothers encounter.
The value of early maternal infant bonding.
The length of time that babies in the United Kingdom environment can be fed by breast milk alone.
Appendix I

NUTRITION EDUCATION PROJECT

This form is designed to collect information on the frequency and duration of breast feeding in the Aylesbury Health District.

Each Health Visitor in the District will be supplied with a duplicate set of forms every month. The forms will record the frequency and duration of breast feeding for the first four months of an infant's life. At the end of this period please return the completed forms to your Senior Nursing Officer. The top copy without the Mother's name on it will then be sent to Mrs Scobie and the bottom copy with the Mother's name on it will be retained by the Health Visitor for reference.

To fill in the form

1. Please keep a record of all new infants who come under your care each month, starting a new form for every month even though the previous form is unlikely to be full. Place of birth should specify the hospital, GP Unit or home.

2. The length of time an infant was breast fed should be recorded in the relevant column as follows:

   (a) Not breast fed at all tick column "Not at all".
   (b) Infants breast fed for 5 days only enter 5 in column "1 Week", or for 17 days enter 17 in column "3 Weeks", etc.
   (c) Infants who were breast fed for more than 6 weeks but less than 4 months, enter the number of weeks breast feeding continued in the final column.
   (d) Infants who are still being breast fed at 4 months enter a "C" for continuing in the final column.

Thank you
Patricia Scobie
Appendix II
INFANT NUTRITION PROJECT
Buckinghamshire Area Health Authority
Co-ordinator: Mrs P Scoble
Oxford Polytechnic
Headington, Oxford

This survey is being conducted to find out how mothers would prefer to have guidance on feeding their babies.

Please tick ( ) in the appropriate box.

1. Baby's mother
   1.1. Was this your first baby? Yes [ ] No [ ]
   1.2. If 'No' how many children have you had?
       [ ] 1  [ ] 2  [ ] 3  [ ] More
   1.3. How did you feed your previous children during their first 4 months?
       [ ] i with a bottle
       [ ] ii by breast feeding
       [ ] iii a mixture of both breast and bottle feeding
   Bottle fed  Breast fed  Don't know

1.4. How were you fed as a baby? [ ] [ ] [ ]

   15-19  20-25  26-30  31-35  36-40  41-45
   1.5 Your age group

1.6 Your occupation? Please state past occupation if no longer working.

2. Baby's father
   2.1. Age group Under 20  20-30  31-40  40 or over

2.2. Normal occupation

3. Baby
   3.1. Where was your baby born?

3.2. If in a maternity unit how long did you stay in days?
   [ ] 1  [ ] 2  [ ] 3  [ ] 4  [ ] 5  [ ] MORE
3.3. How was your baby fed during his/her first 4 months?

- [ ] i. bottle fed
- [ ] ii. breast fed
- [ ] iii. partly bottle and partly breast through out the 4 months.
- [ ] iv. breast fed to begin with then a change to bottle feeding after:

6 days or less 1 week 2 weeks 3 weeks 1 month 2 months 3 months

3.4. If you marked the last question number iv what was the reason for your change from breast to bottle feeding?

- [ ] Could not get breast feeding established
- [ ] In maternity unit
- [ ] On return home
- [ ] Need to return to work
- [ ] Difficulties with breast feeding outside your home
- [ ] Baby's father preferred bottle feeding
- [ ] Baby did not seem satisfied
- [ ] Breast feeding took too long
- [ ] You could not tell how much baby had taken

Any other reason ..........................................................

Did you enjoy breast feeding? Yes [ ] Partly [ ] No [ ]

3.5. When did you first give your baby solid food?

before 4 weeks 4-8 weeks 9-12 weeks 12 weeks or more
4. Choosing the way you fed your baby

4.1. Did you receive advice from any of the following when first deciding how to feed your baby?

- Doctor
- Midwife
- Health Visitor
- Nursing Staff in Hospital or Maternity Unit
- Relations
- Friends
- TV, Radio or the newspapers
- Books or pamphlets
- Advertisements
- Your School
- Your own beliefs
- Any other source

4.2. When do you feel you would prefer guidance or help on infant feeding?

- At the beginning of pregnancy
- During the middle of pregnancy
- Just before your baby is born
- Immediately after your baby is born

When baby is: 1 week [ ] 2weeks [ ] 3weeks [ ] more [ ]

4.3. How would you prefer advice or help to be given?

- Personally by Health Service Staff
- In Booklets you could take home
- At antenatal classes

4.4. When did you finally decide how to feed your baby?

While you were pregnant: before 3 months [ ] 3-6 months [ ]
7-9 months [ ] or immediately after the birth [ ]

THANK YOU FOR HELPING
Supplementary questions for mothers who changed from breast to bottle feeding before the baby was four months old

1. How long did you take to change from breast feeding to bottle feeding?
   - Immediate change over [ ]
   - Gradual change over 1 week 2 weeks 3 weeks 4 weeks

2. i. Did you ask for advice at this time? Yes [ ]  No [ ]
   ii. If Yes, who did you ask? ..................................
   iii. What advice was given? ..................................
       ..........................................................
       ..........................................................
       ..........................................................

3. i. Had you been given advice on the change over in the past? Yes [ ]  No [ ]
   ii. If Yes, by whom? ........................................

4. i. Which milk did you choose? .............................
   ii. Why did you choose that particular brand? ...........
       ..........................................................
       ..........................................................

5. When you first decided to change was it:
   - Weekday [ ]  Weekend [ ]  Holiday [ ]

6. When you changed were you:
   - At home [ ]  Away from home [ ]

7. Did baby's father suggest the change?  
   - agree to the change? [ ]
   - disagree with the change? [ ]
   - did not mind? [ ]
Appendix III

BUCKINGHAMSHIRE AREA HEALTH AUTHORITY

INFANT FEEDING PROJECT

Co-ordinator: Mrs P Scobie
Oxford Polytechnic
Headington, Oxford

This survey is being carried out to find the midwife's personal view on infant feeding practices.

Please tick the appropriate box.

1. In which section of the midwifery service do you work?
   i. Community Midwife
      Yes [ ] No [ ]
      General Practitioner attachment ...........................................
   ii. Hospital Midwife
      Yes [ ] No [ ]
      Hospital or Maternity Unit ............................................

      Are you employed full-time Yes [ ] No [ ]
      part-time Yes [ ] No [ ]

2. Do you discuss infant feeding with pregnant women?
   Yes [ ] No [ ]

   i. If you have answered yes to question 2, at what stage of their pregnancy?
      .................................................................
      .................................................................

   ii. When do you think pregnant women are most likely to be receptive to advice on infant feeding?
      At maternity unit booking clinic [ ]
      During routine antenatal care [ ]
      At antenatal classes [ ]
      During home visit by midwife [ ]
      Maternity unit clinic at 32 weeks + [ ]
      Immediately after the birth [ ]
2. iii. What advice do you think mothers should be given on
feeding method during the antenatal period?

- Strongly advised to breast feed □
- Encouraged to breast feed □
- Told about breast and bottle feeding with bias □
- Asked their intentions without comment □

3. How soon do you start advocating breast care?

- In the first trimester □
- In the second trimester □
- In the third trimester □

3. i. Do you advise breast care antenatally to mothers not
intending to breast feed?

- Yes □
- No □

4. Do you think that primigravid patients arrive at their maternity
unit with sufficient information on:- Yes No

a. How to breast feed a baby, or □ □
b. how to bottle feed a baby □ □

1. If you have answered no to either of the above questions
in 4, what information do they lack?

..............................................................
..............................................................
..............................................................
5. How soon do you think a baby should be put to the breast?
   In the labour ward if at all possible
   In the labour ward if mother requests
   At the next regular feeding time
   After a dextrose feed
   Does not matter
   Other please state ................................................

6. Do you advocate the supression of lactation using drugs for a mother who wishes to bottle feed her baby?
   Yes [ ]  No [ ]
   If you have answered yes to question 6, when do you think this should be done?
   ...........................................................................
   ...........................................................................
   ...........................................................................

7. What advice would you give a mother with a diminished supply of breast milk?
   Drink more [ ]
   Eat more [ ]
   Breast feed more frequently [ ]
   Demand feed [ ]
   Take lactagol tablets [ ]
   Give complementary feeds [ ]
   Stop breast feeding [ ]
   Other, please specify [ ]
   ...........................................................................
7. ii. What treatment do you advise for engorgement?

- Hot baths
- Empty the breasts after feeding
- Increase the number of feeds
- Analgesics
- Rest the breasts for 24 hours
- Cut down on fluids
- Use a tighter brassiere
- Other, please specify

iii. How would you deal with cracked nipples?

iv. Do you think all mothers need information on the three problems dealt with in question 7 i.-iii.?
   - Yes
   - No

8. Do you advise complementary feeds on the following occasions:

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For small babies</td>
<td></td>
</tr>
<tr>
<td>2. For breast fed babies with a diminished milk supply</td>
<td></td>
</tr>
<tr>
<td>3. For all breast fed babies</td>
<td></td>
</tr>
<tr>
<td>4. Never</td>
<td></td>
</tr>
</tbody>
</table>

9. Do you agree with the statutory requirement that a mother should remain under the care of a midwife for 10 days?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you have answered no, what are your reasons:

.....................................................
.....................................................

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10. Do you enjoy teaching breast feeding but wish:

- you had more time [ ]
- you had a constructive policy to follow [ ]
- better facilities [ ]
- more liaison with other professionals [ ]
- other, please specify: .............................................
- ...........................................................................
- ...........................................................................

10.1. Whose role is it to teach breast feeding?

- Doctor [ ]
- Midwife [ ]
- Health Visitor [ ]
- Someone who has successfully breast fed [ ]
- Schools [ ]
- Dietitian [ ]

11. How much of your working week is spent on infant feeding:

- 1 - 5 hours [ ]
- 6-10 hours [ ]
- 11-15 " [ ]
- more than 15 [ ]

12. How much time was devoted to the following subjects in your midwifery training?

<table>
<thead>
<tr>
<th></th>
<th>1 - 5</th>
<th>6-10</th>
<th>10-20</th>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant feeding in general</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proprietary infant milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast feeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Nutrition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13. Do you think your training equipped you to advise mothers on:—

Yes | No

- The merits of breast feeding [ ] [ ]
- How to breast feed [ ] [ ]
- How to bottle feed [ ] [ ]

14. When did you qualify as a midwife? ........................................

15. Was your midwifery training in the form of:—

- an eighteen-month post-registration course [ ]
- a one-year post-registration course [ ]
- a two-year course [ ]
- other ..................................................................................

THANK YOU FOR COMPLETING THIS FORM. PLEASE RETURN IT TO MRS P SCOBIE.
Appendix IV

INFANT NUTRITION PROJECT

University of Surrey Co-ordinator
Department of Home Economics Mrs P Scobie C.D.
Oxford Polytechnic

This survey is being carried out to find the Health Visitors view on infant feeding practices.

1. In what area do you work?
   a) Aylesbury Vale [ ]
   b) Milton Keynes [ ]

2. What type of area do you work in?
   a) Wholly urban [ ]
   b) Partly urban, partly rural [ ]
   c) Wholly rural [ ]

3. How large is your case-load ........................................

4. Do you teach mothers about infant feeding at:
   Yes No
   a) Antenatal classes [ ] [ ]
   b) Antenatal clinics [ ] [ ]
   c) Child Health clinics [ ] [ ]

5. i. Do you visit expectant mothers at home who do not attend
    antenatal clinics?
    Yes No [ ] [ ]

   ii. If yes, how often do you visit them during their pregnancy?
       Please tick where appropriate.

       Once Twice 3 times more than 3 times
       [ ] [ ] [ ] [ ]

   iii. On average how long do you spend with each expectant mother
        at each home visit?

       10 mins 10-20 mins 20-30 mins
       [ ] [ ] [ ]
6. i. How long is each course of antenatal classes? 
   Please state hours ...........................................

   ii. How much of this time is spent teaching infant feeding at 
   antenatal classes? ...........................................

7. At what stage of her pregnancy do you usually first see the 
   expectant mother?
   a) Within the first 3 months [ ]
   b) 4 - 6 months [ ]
   c) 7 - 9 months [ ]

8. How much of your working week is spent on infant feeding?
   1 - 5 hours [ ] 6 - 10 hours [ ]

9. Please tick the category which fits in most closely with your 
   views.
   i. a) Breast feeding is better for the baby than bottle [ ]
   b) Breast feeding is preferable to bottle feeding. [ ]
   c) Breast feeding and bottle feeding are equally as 
   good. [ ]

   ii. a) Mothers should be actively persuaded to breast 
   feed. [ ]
   b) Mothers should be encouraged but not persuaded to 
   breast feed. [ ]
   c) Mothers should not be persuaded at all to breast 
   feed. [ ]

10. Do you think advice on infant feeding should be given?
    a) at school [ ]
    b) antenatally [ ]
    c) postnataally [ ]

11. i. If a mother encounters difficulty in establishing breast 
    feeding what would your advice be:
11. If a mother encounters difficulties with maintaining breast feeding what would your advice be.

12. How much time was devoted to the following subjects in your Health Visitor training?

<table>
<thead>
<tr>
<th>Subject</th>
<th>1 - 5</th>
<th>6 - 10</th>
<th>11 - 20</th>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant feeding in general</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proprietary infant milk</td>
<td>1 - 2</td>
<td>3 - 4</td>
<td>5 - 6</td>
<td>More</td>
</tr>
<tr>
<td>Breast feeding</td>
<td>1 - 2</td>
<td>3 - 4</td>
<td>5 - 6</td>
<td>More</td>
</tr>
<tr>
<td>General Nutrition</td>
<td>1 - 5</td>
<td>6 - 10</td>
<td>11 - 20</td>
<td>More</td>
</tr>
</tbody>
</table>

13. Do you think your training equipped you to advise mothers on:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>The merits of breast feeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to breast feed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to bottle feed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. When did you qualify as a Health Visitor

15. Was your Health Visitor training in the form of:

   a) a post-registration course [ ]
   b) a an integrated/degree course [ ]
   c) a post-graduate course [ ]
   d) an extended course [ ]
   e) other [ ]

16. i. Are lecture courses on infant feeding available in your area?

   Yes [ ]   No [ ]

   ii. Are you able to attend these?

   Yes [ ]   No [ ]

THANK YOU FOR COMPLETING THIS FORM. PLEASE RETURN IT TO MRS P SCOBIE.
APPENDIX V

Table showing the detailed results of the Infant Feeding Survey according to place of birth.

<table>
<thead>
<tr>
<th>Place of birth</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>493</td>
<td>346</td>
<td>62</td>
<td>811</td>
<td>227</td>
<td>253</td>
<td>116</td>
<td>23</td>
</tr>
<tr>
<td>% of total survey</td>
<td>20.0</td>
<td>14.1</td>
<td>2.5</td>
<td>33.0</td>
<td>9.2</td>
<td>10.3</td>
<td>4.7</td>
<td>0.9</td>
</tr>
<tr>
<td>% Primigravidae</td>
<td>47.9</td>
<td>37.3</td>
<td>45.2</td>
<td>50.4</td>
<td>30.5</td>
<td>33.2</td>
<td>44.8</td>
<td>4.3</td>
</tr>
</tbody>
</table>

% still breast feeding

<table>
<thead>
<tr>
<th>Birth</th>
<th>57.8</th>
<th>51.7</th>
<th>64.5</th>
<th>56.6</th>
<th>59.0</th>
<th>70.4</th>
<th>76.7</th>
<th>78.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td>51.7</td>
<td>47.7</td>
<td>58.0</td>
<td>49.7</td>
<td>56.4</td>
<td>67.6</td>
<td>68.9</td>
<td>78.3</td>
</tr>
<tr>
<td>2 weeks</td>
<td>46</td>
<td>44.5</td>
<td>48.3</td>
<td>44.4</td>
<td>52.0</td>
<td>60.1</td>
<td>62.9</td>
<td>74.0</td>
</tr>
<tr>
<td>3 weeks</td>
<td>43</td>
<td>39.5</td>
<td>47.2</td>
<td>41.0</td>
<td>49.4</td>
<td>54.6</td>
<td>57.7</td>
<td>74.0</td>
</tr>
<tr>
<td>4 weeks</td>
<td>37.5</td>
<td>35.8</td>
<td>44.0</td>
<td>36.2</td>
<td>44.6</td>
<td>51.4</td>
<td>52.5</td>
<td>69.7</td>
</tr>
<tr>
<td>5 weeks</td>
<td>34.9</td>
<td>33.9</td>
<td>44.0</td>
<td>33.4</td>
<td>42.0</td>
<td>50.6</td>
<td>50.8</td>
<td>69.7</td>
</tr>
<tr>
<td>6 weeks</td>
<td>28.6</td>
<td>26.5</td>
<td>40.8</td>
<td>29.3</td>
<td>34.5</td>
<td>45.7</td>
<td>47.3</td>
<td>65.4</td>
</tr>
<tr>
<td>2 months</td>
<td>27.0</td>
<td>24.2</td>
<td>39.2</td>
<td>27.9</td>
<td>32.7</td>
<td>44.1</td>
<td>46.4</td>
<td>-</td>
</tr>
<tr>
<td>3 months</td>
<td>24.6</td>
<td>21.6</td>
<td>36.0</td>
<td>25.8</td>
<td>29.6</td>
<td>39.8</td>
<td>44.7</td>
<td>-</td>
</tr>
<tr>
<td>4 months</td>
<td>23.5</td>
<td>20.5</td>
<td>32.3</td>
<td>23.8</td>
<td>29.5</td>
<td>37.9</td>
<td>43.1</td>
<td>60.9</td>
</tr>
</tbody>
</table>

Key to Place of Birth

1. Barratt Maternity Home, Northampton
2. Bletchly Maternity Unit
3. Princess Mary's RAF Hospital, Halton
4. Royal Buckinghamshire Hospital, Aylesbury
5. Westbury Maternity Home
6. Stoke Mandeville GP Maternity Unit
7. John Radcliffe Hospital, Oxford
8. Born at home
APPENDIX VI

BARRATT MATERNITY HOME

REGIME FOR INFANT FEEDING

BREAST FEEDING

Encouraged whenever possible and feasible.

CONTRA INDICATIONS (Medical advice to be sought if such patients express a desire to breast feed).

(1) Active disease, e.g. TB, Malignant Disease
(2) Patients undergoing anticoagulation therapy
(3) Patients who feel disgusted at the thought of breast feeding
(4) Patients who have undergone breast surgery
(5) Diabetic patients

FIRST FEED

Dextrose 5% given 2-4 hours after birth
Baby is then put to breast at the next feeding time, or most convenient time, depending on the condition of mother and baby.

1st Day  2 MINUTES EACH SIDE 4 HOURLY x 5
2nd Day  4 MINUTES EACH SIDE 4 HOURLY x 5
3rd Day  6 MINUTES EACH SIDE 4 HOURLY x 5
4th Day  8 MINUTES EACH SIDE 4 HOURLY x 5
5th Day  10 MINUTES (MAXIMUM) EACH SIDE 4 HOURLY x 5

Baby to be TEST WEIGHED FOR ALL FEEDS THROUGHOUT 24 HOURS of the 4th Day.
TEST WEIGHING BOOK FOUND IN EACH NURSERY.
Babies of 2720g and under are fed three hourly, alternate breast and bottle, for the first 48 hours. Chart for amounts per feed found in each nursery, to be used as a guide.
Appendix VI contd.

COMPLEMENTARY FEEDS

May be offered from teaspoon and sterile feeding cup but may have a bottle and teat is unsuitable to feed from a spoon. Please enquire from midwife on duty if the complement is to be water or a Cow and Gate milk feed. The complement ordered by the midwife will depend on
(a) Mother's milk supply.
(b) Condition, weight and age of baby.
(c) Level of jaundice.

EACH BABY IS AN INDIVIDUAL

NOTES ON BREAST FEEDING

(1) Breast and nipples to be washed with soap and water, rinsed and dried with soft towel, prior to breast feeding.

Baby should be clean and dry and in warm wrapper. All swabs and napkins put into appropriate bin before feed.

(2) Mother and baby to be in the most convenient and comfortable position. A pillow from the bed may be very useful to rest baby on.

(3) Cubicle curtains to be drawn if patient so wishes.

(4) Baby to be fixed at breast and help support given when necessary.

(5) Complementary feed to be given at the discretion of midwife in charge.

(6) Baby to be made clean and comfortable, "wind" to be brought up after feed and baby returned to cot.

(7) Feed charted.
APPENDIX VI contd.

(8) Milk expressed if breasts full and uncomfortable, hot bathing encouraged prior to feeding when breasts are full. All expressed milk to be saved in sterile bottles found in ward fridge.

(9) Nipples dried, Masse Cream or Lanolin applied, breast pads put inside a well supporting brassiere.

(10) Extra milk may be given to breast feeding mothers. Milk bottles not to be left on lockers. Jugs and glasses are available.

(11) Ordinary diet, with fruit in normal quantities is encouraged.

(12) Should nipples become sore, breasts to be rested, breast milk hand expressed. Nipples may be treated with Synalar N Cream, obtained from Pharmacy on prescription, which is often rapidly effective e.g. 12 hours.

Please ensure all Synalar N Cream is washed off prior to expressing same as if breast feeding.
APPENDIX VII

THE REASONS GIVEN FOR CHANGING FROM BREAST TO BOTTLE FEEDING

REASONS SUGGESTED ON THE QUESTIONNAIRE

1. Could not get breast feeding established in maternity unit. 14
2. Could not get breast feeding established on return home. 6
3. Need to return to work. 2
4. Difficulties with breast feeding outside the home. 1
5. Baby's father preferred bottle feeding. 1
6. Baby did not seem satisfied. 36
7. Breastfeeding took too long. 3
8. Mother could not tell how much milk the baby had taken. 2

REASONS SPECIFIED BY THE MOTHERS

9. Medical reasons, including engorgement and cracked nipples. 16
10. A bounty pack was available but advice was not. 1
11. Little advice given. 3
12. Mother tired and baby needing two or three hourly feeds. 3
13. Baby would not take mother. 1
14. Need to supplement all the time. 1
15. The baby did not like mother. 2
16. Baby had teeth at three months and mother said breastfeeding hurt. 1
17. Need to use a nipple shield which did not work. 1
18. Insufficient weight gain. 2
19. Mother's milk dried up. 2
20. Mother did not like breast feeding. 4
21. Baby was a fidget and irritated mother. 1
22. Breastfeeding took too long and the mother didn't know how much was going in and the older children kept interfering. 1
23. Mother started to wean the baby. 1

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APPENDIX XIII

The advice mothers were given when deciding whether to change from breast feeding to bottle feeding

1. Change gradually over a period of days of weeks. 3
2. Stop breast feeding and start bottle feeding 9
3. Was given a talk and told to make my own mind up. 2
4. Supplement as well as breast feed. 3
5. Use a nipple shield. 1
6. Was giving the baby too many solids. 1
7. Stop for medical reasons. 2
8. Maternity unit had already given advice 2
9. Conflicting advice which confused. 2
10. Mothers changed first and asked second. 3
11. Mothers who did not ask. 1

TOTAL 40

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You will already be thinking of how you are going to feed your baby.

Such a decision is a very important one, worth careful consideration and discussion with your husband.

This pamphlet puts before you the case for breast feeding for you to consider.
Points in favour of breast feeding your baby

Breast feeding establishes a wonderfully close relationship between you and your baby.

Breast feeding is a pleasurable experience, and once established is simpler and more convenient than bottle feeding.

You are giving your baby what no one else can, the most perfectly balanced food for his growth and development. There are substances in your milk which can be found in no other milk, including special agents which will protect him from certain infections.

Preparation for Breast Feeding

If you would like to consider breast feeding your baby you should talk with the Baby feeding Sister or your Midwife, Health Visitor or Doctor. Some preparation of your breasts may help breast feeding after the baby is born.

If you are not sure how long you would breastfeed your baby, then be prepared to give it a try for a few weeks. Even a week or two after birth is of value to your baby, and if you find the experience pleasurable you may wish to continue for much longer.

What to expect if you Breastfeed

The first week is a time of learning for you and the baby. The baby goes to the breast as soon after birth as possible. This gives breast feeding a good start and helps your womb to contract.

First to Third Day

He is put to the breast—for a few minutes—whenever he wakes—increasing the time gradually, each day. You will learn how to handle him, and there will be someone to help you. The baby has to learn how to suck—he may take a little while. He sleeps for long periods and may fall asleep at the breast.

He takes a few mouthfuls of colostrum at each feed—which is concentrated in protein and very good for him. This is clear or yellow.

He passes black stools (weighed inside him at birth) and he loses several ounces in weight.
The Third to Fourth Day

Your breasts become heavy and perhaps a bit hard, but baby's sucking helps this. You may feel a bit weepy. This is quite common—but don't give up feeding at this stage.

The Fourth to Fifth Day

Your breasts become softer, and the milk begins to flow. This looks rich and creamy because it is mixed with colostrum.

The baby starts to regain weight but may take 1–2 weeks to gain his birthweight. The baby's stools turn to brown then yellow.

After one week you will be gaining your confidence in feeding him, and after 2–3 weeks you should be happily established on breast feeding. When human milk is no longer mixed with colostrum it should look thin and white or bluish white.

REMEMBER

A good milk supply depends on:

1. The baby sucking.
2. You being nicely relaxed—so that the milk you make can flow easily to the baby.
GUIDE TO BREAST FEEDING

(Subject to Advice given by the Doctor or Nurse)

Advantages of Breast Feeding. Breast feeding is one of the best ways of building up a good relationship between a mother and her child. The close contact and the knowledge that she is giving what is needed in the way of nourishment and comfort brings her happiness and satisfaction, and gives to her baby a sense of security which is so essential to him.

Breast milk is the natural food suited to the baby's digestion and provides the right materials for his rapid growth in the early months.

During Pregnancy a mother should look after her own health. She should see that her teeth and gums are in good condition and have any necessary dental treatment. If she has good health and eats nourishing food the growing baby will be strong and healthy.

She should carry on her normal activity, but avoid getting over-tired. Daily exercise out of doors is important. Her diet should contain at least a pint of milk daily, body-building foods (meat, eggs, fish and cheese) and protective foods (milk, butter, cheese, eggs, fresh vegetables, salads, fruit, fruit juices, liver and fish) which contain the vitamins and mineral salts necessary for her health and that of the growing baby. In addition, she should take the tablets or capsules containing vitamins A and D and should drink water between meals (up to one quart daily). A good diet and plenty of water to drink help to prevent constipation.
Care of the Breasts and Nipples. Care during the ante-natal period will help to ensure success in breast feeding. During pregnancy the nipples should be washed daily with soap and water, and dried thoroughly. A little vaseline or lanoline rubbed on afterwards will keep the skin supple. Do not scrub the skin, or use spirit. In the last three months, before washing, the breasts should be gently massaged towards the nipple with the finger and thumb, to remove any fluid which has collected.

Failures in breast feeding are often due to lack of care during the ante-natal period and will not occur if these simple measures are carried out. Sometimes the nipples are flat or turned in; if this is the case, advice should be obtained from the doctor or nurse.

After the Baby is Born the nipples must be kept clean, washed and dried before and after every feed, and covered with a clean piece of linen or lint to prevent contact with the clothes. A supporting brassiere should be worn and there should be no pressure from the clothes.

The baby should be given both breasts at each feed, unless otherwise directed, starting on alternate sides. During the first few days the breasts secrete only a small amount of fluid (colostrum) but this is an important food for the baby to educate his digestion, and by sucking he aids the production of milk. He should only be left at the breast a few minutes, because sucking on an empty breast will make the nipples sore.

When the milk comes in, usually between the third and fifth day, the length of time for feeding at each breast can be increased gradually to between five and ten minutes according to appetite. Longer sucking will only exhaust baby and mother and cause sore nipples. The mother should hold her baby comfortably. She usually leans slightly forwards and holds her breast so that the baby’s nose is clear and he can breathe easily. The baby should draw the nipple well in to the back of his mouth and obtain the milk by the action of his jaws at the base of the nipple. If the breasts become overloaded with milk the baby cannot draw the nipple into his mouth and will suck at it, causing soreness. Over-full breasts should be
partly emptied by expressing some of the milk by hand (after washing the hands thoroughly) before the baby is fed.

Feeding times are decided upon by the baby's appetite. The baby, rather than the clock, will determine the time for a feed. A hungry baby who wakes and cries before feed-time is due, is obviously ready for his milk and should not be made to wait for it. A sleeping baby will come to no harm if left for a while after the feed is due, but if this upsets the family routine, the baby should be roused gently and be thoroughly awake before being given the feed.

In the early weeks, until the baby has found his own rhythm of feeding and there is an ample supply of breast milk, it is reasonable to allow some variation in feeding times to suit the immediate needs of the baby. At first he may need a feed during the night. It is more sensible to feed a hungry baby during the night than to keep the family awake and anxious and there is little danger that this night feed will become a habit. The average baby will settle down to regular four hourly feeds and sleep through the night by the age of six-eight weeks.

In the early weeks, should the milk supply appear to be insufficient, the mother should try to get extra rest, and above all, should not worry. The most important thing is to put the baby regularly to both breasts at every feed time and see that the breasts are emptied. It is unwise to miss a feed and give the baby a bottle instead. The amount of breast milk increases when the breast is stimulated by the vigorous sucking of a hungry baby. If the baby continues to be hungry and fretful, advice about giving a small milk feed from a bottle after the baby has been breast fed should be sought from your doctor or health visitor.
Vitamins A, D and C are not present in breast milk in sufficient quantity for the baby's health and well-being so it is essential to give these in addition to the breast feeds from the age of one month onward. They are made up in liquid form and can be given on a spoon after the feed, the dose varying according to the preparation. It is important not to exceed the recommended dose. Vitamin preparations can be obtained from a child health clinic or from a chemist. Some preparations, contain only vitamins A and D and, if these are given, orange juice or another preparation containing vitamin C should be given daily as well from the age of one month onwards.

The health of the mother is just as important while she is breast feeding as during pregnancy. She should pay the same attention to her diet and to the care of her teeth, and she needs fresh air, exercise and rest. If she drinks her pint of milk and plenty of other liquid refreshment every day she will be able to provide breast milk for her baby and she will have the satisfaction of watching his strong and healthy growth.

Duration of Breast Feeding. If the milk supply is ample and the baby is thriving, breast feeding can be continued until the baby is seven or eight months old, with the introduction of mixed feeding from the age of about two or three months.

If a mother is healthy and her diet is adequate she will gain great satisfaction from being able to feed her baby.

HEALTH DEPARTMENT
BUCKINGHAMSHIRE COUNTY COUNCIL
July 1972.
APPENDIX XI

Statistical Method

The data from the four surveys included in the study was analysed using the Statistical Package for the Social Sciences, Version M, Revision 8 (Nie et al, 1975). This was run on a Prime 550 computer at Oxford Polytechnic, Oxford.

The results were examined initially to ascertain the distribution characteristics of the variables by using the sub-program 'Frequencies', operating under general mode as there were both nominal and ordinal variables involved. This program supplied the absolute and relative frequencies for each variable.

The relationship between the variables was then examined using the sub-program 'Crosstabs' which compiles two-way to n-way joint frequency distribution tables. The Chi-square test for statistical significance was applied to all cross-tabulations, and differences in levels of significance, where appropriate, are referred to in the tables and text. In the few instances where the data was partially incomplete, e.g. place of birth unknown, the complete case was omitted; this amounted to less than 3% of the total number of cases in all the surveys with the exception of the health visitors' survey which is discussed in Chapter 3.


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