CLINICAL AND CHEMICAL STUDIES IN HUMAN LACTATION

IX. BREAST-FEEDING IN HOSPITAL

BY

F. E. HYTTEN, Ph.D., M.B., B.S.

Midwifery Department, University of Aberdeen

Although most studies in this country show that the proportion of women leaving hospital fully breast-feeding is between 80 and 90%, it is generally recognized that such statistics give almost no indication of the number of women who will be breast-feeding after, say, two or three months, since there is a rapid decline in the incidence of breast-feeding soon after leaving hospital. Nevertheless, hospital records provide information which is useful in elucidating many of the medical causes of difficulty in breast-feeding. Later on the picture becomes much more complex owing to the intervention of "social" influences.

Breast-feeding in hospital is relatively easy. The baby's nutritional demands are small during the first week or two, particularly in a well-heated hospital, and the mother, resting, with no domestic responsibilities, and with the reassuring presence of the medical and nursing staff, has ample time to devote to it and to cope with minor difficulties.

The proportion of women who leave hospital "fully breast-feeding" depends to a considerable extent on the zeal with which breast-feeding is insisted upon by the medical and nursing staff. Read (1949), for example, reported 98% of 480 women leaving hospital on the twelfth day to be "entirely breast-feeding," but 15% were classified as "breast-feeding—poor" and 26% as "breast-feeding—fair"; furthermore, 46% of the babies had not regained their birth weight.

Hospital returns covering the whole of England and Wales showed that 84.9% of about 350,000 infants were wholly breast-fed when they left hospital (Ministry of Health, 1951). Dummer (1949) reported an incidence of 83.8% from a Hertfordshire hospital during 1946 and 1947, and similar figures are reported by Ross and Herdan (1951) from hospitals in Bristol. Blaikley *et al.* (1953), devoting more than usual attention to the encouragement of breast-feeding during a study of two groups of primiparae, attained an overall incidence at discharge of 87.6%.

There have been few studies in which the hospital population has been defined in relation to the community as a whole, and few which have examined the relationship of breast-feeding to such factors as maternal age and parity. Ström (1948) and Waller (1950) noted that in groups of primiparae and multiparae ability to breast-feed declined with increasing age, but showed that at a given age multiparae produced more milk than the primiparae. Miller (1952) found that primiparae over the age of 35 and multiparae over the age of 40 had a greater incidence of artificial feeding on discharge than those who were younger, but there was no obvious difference between primiparae and multiparae. There was no difference in the breast-feeding performances of tall and short women. Miller also examined the effect of the woman's health in pregnancy and her type of delivery in relation to breast-feeding; pre-eclampsia, forceps delivery, and caesarean section all reduced its incidence.

There seems to be little detailed information about the reasons for breast-feeding failure or difficulty in the puerperium. Waller (1946) listed some reasons for failure in a small series of women questioned at an infant welfare clinic, and Blaikley *et al.* (1953) listed those found in their group of primiparae.

Method

During the years 1951–3, 6,456 married women, who were resident in the city of Aberdeen, and who booked for confinement in the Aberdeen Maternity Hospital, were delivered of single infants which survived the lying-in period. In this study their breast-feeding while in hospital is examined. Twenty-one women who were discharged before the end of the first week of the puerperium have been excluded. The great majority were discharged ten to twelve days after delivery, but in the occasional instance of a woman remaining in hospital for more than two weeks, only her feeding performance up to the end of the second week was taken into account.

In Aberdeen about 90% of primigravidae book for confinement in the Aberdeen Maternity Hospital, and about 75% of women in their second and third pregnancies. For those having a fourth or later pregnancy only about half book for confinement in hospital. For first pregnancies, therefore, the hospital population is reasonably representative of the total Aberdeen population, but there is more selection with higher parities (Baird and Thomson, 1954).

From the nursing and medical case notes, the feeding performance at the time of discharge was divided into four main categories: (1) fully breast-feeding without any difficulty; (2) fully breast-feeding but only after some initial difficulty; (3) partly breast-feeding; and (4) fully artificial feeding.

Groups 2, 3, and 4 were divided, according to the reasons why breast-feeding was not easily accomplished or failed, into the following cause groups:

Breast.—Where there were engorged and painful breasts requiring special nursing care and treatment, or mastitis. The transitory "heavy" breast, which caused only mild discomfort when the milk came in, was ignored.

Sore Nipples.—Where the nipples were persistently sore or were at any stage oedematous, abraded, or cracked.

Poor Nipples.—Where the nipples, because of an anatomical defect such as flatness or inversion, caused feeding difficulty.

Poor Lactation.—Where there was clear evidence of insufficient milk from test weighing and expression of any residual milk.

Ill Baby.—Where the infant was segregated in a special nursery for more than the first four days, or where there was a specific defect such as mongolism or cleft palate. (It is the practice in Aberdeen for all premature babies, unless they are over 5 lb. (2.3 kg.) and obviously strong, to be admitted to a special nursery, where they are fed by bottle on the mother's expressed milk. Many mothers of premature babies do not, therefore, feed the baby at the breast in hospital, but remove the milk artificially, and may be discharged without the baby, to continue expressing milk at home. If they provided enough milk in this way they have been classified as fully breast-feeding on discharge, but in the category "difficult" due to an "ill baby"; if not sufficient, partly breast-feeding. In some, particularly if the baby is likely to remain in hospital for a long period, and prospects for successful breast-feeding are poor, the expression of milk may be stopped in hospital; these were then classified as artificial feeding.)

Poor Feeder.—Where the baby did not at any stage fix readily to the nipple, not because of any specific defect but usually because of lethargy or unwillingness. Babies who were initially keen feeders but who subsequently lost interest because of poor nipples, for example, were not included.

Maternal Disease.—Where breast-feeding was precluded by maternal disease, usually pulmonary tuberculosis or severe cardiac disease.

Maternal Opposition.—Where breast-feeding was difficult because the mother was uncooperative, or was stopped because she refused to breast-feed.

If more than one of these reasons applied to one individual, as was common, the difficulty or failure was ascribed to the one which appeared to be predominant. "Ill baby" was given priority over all other causes except refusal to breast-feed and maternal disease.

It might be expected that the age and parity of the mother, and her general physique and health, would show an association with her breast-feeding performance in hospital, and these aspects have been examined. The indices used in the assessment of physique and health—height and "physical grade"—were discussed in a previous publication (Hyttén, 1954c).

The effect of the woman's social class was also examined, because it is known that in good social circumstances there is a concentration of women of good health, physique, and intelligence, and in poor circumstances a concentration of women of poor health, physique, and intelligence. It has been shown (Baird and Illsley, 1953) that social class greatly influences the incidence of breast-feeding after leaving hospital. The woman's occupation before marriage, although known only for primiparae, was used as the basis for social classification, because it was shown by Baird and Illsley to correlate better with breast-feeding than the occupation of either her husband or father.

The effect of operative delivery and pre-eclamptic toxæmia on the incidence of breast-feeding in hospital was examined in primiparae. Deliveries were classified as spontaneous, forceps, and caesarean section, and pre-eclampsia as "mild" and "moderate and severe" according to Nelson (1954).

It is important that breast-feeding statistics should be viewed against the background of the "official" attitude of the hospital staff to breast-feeding, and the routine management of infant feeding in hospital. This has been previously described (Hyttén, 1954b). Briefly, it is assumed that all women will attempt breast-feeding unless there are definite medical contraindications or unless the woman has insisted on bottle-feeding; most patients believe that "they make you breast-feed in hospital." If lactation is obviously poor and the woman is nevertheless anxious to persevere with breast-feeding, she may be discharged partly bottle-feeding, but there is an increasing tendency in these circumstances to send her home with the baby established on the bottle. There is no systematic antenatal treatment of breasts and nipples such as that advocated by Waller (1946), but all women are taught in hospital to express excess milk after feeding, with the object of encouraging lactation and to prevent overfilling with milk, and this is normally continued until the end of the first week.

Results

Of the 6,456 women, 5,458 (84.5%) left hospital fully breast-feeding—4,595 (71.1%) without any difficulty and 863 (13.4%) after some initial difficulty—172 (2.7%) left hospital partly breast-feeding, and 826 (12.8%) were discharged with the baby artificially fed.

The causes of failure in all those who did not leave hospital fully breast-feeding—that is, those partly breast-feeding and those fully bottle-feeding—are shown in Table I. Poor lac-

tation is the most important single cause, accounting for 39.4% of all failures, in both primiparae and multiparae.

In the detailed results which follow, analyses were made of the primary causes of all breast-feeding difficulties. For the purposes of aetiological classification no distinction was made between the "artificial feeding," "partly breast-feeding," and "breast-feeding difficulty" groups, because for most causes the decision whether the individual mother struggles on to establish breast-feeding or resorts to artificial feeding often depends on such subsidiary reasons as shortage of nursing time or on the mother's personality and her reaction to the difficulty, and not necessarily on its severity. Whether or not difficulty with breast-feeding led to the adoption of artificial feeding also depended to some extent on the nature of the difficulty.

Only about one-fifth of primiparae having "breast" or "sore nipples" as a major difficulty abandoned breast-feeding before discharge. In the case of "poor nipples" and "poor feeder" about half of all cases abandoned breast-feeding; the proportion was less in the younger and more in the older age groups. Poor lactation nearly always led to artificial feeding, especially in the older age groups. Maternal disease always, and maternal opposition almost always, resulted in artificial feeding. "Ill baby" is something of a special category, since this cause took precedence over most others. Thus, if a woman whose baby was in the special nursery produced very little milk the difficulty was nevertheless classified as "ill baby," since there was no means of knowing what effect a vigorous baby might have had in stimulating lactation. Moreover, a mother separated from her baby is not exposed to nipple trauma, and anatomically poor nipples, which might have prevented a baby fixing, are not put to the test. In this series, about half the babies in the "ill baby" group were wholly fed on their own mother's milk at the time the mother left hospital.

Since there were often several causes of breast-feeding difficulty in an individual case, the actual incidence of, say, sore nipples was higher than the incidence of difficulty whose major cause was sore nipples. When referred to below, the overall incidence of a condition, irrespective of whether it was the major cause of difficulty, is called the total incidence.

FIG. 1.—Relationship of parity to the feeding performance in hospital.

TABLE I.—Causes of Failure to Leave Hospital Fully Breast-feeding

Cause of Failure	Primiparae (2,461)			Multiparae (3,995)			All Parities (6,456)		
	No. of Failures	% of Total Cases	% of Failures	No. of Failures	% of Failures	% of Total Cases	No. of Failures	% of Total Cases	% of Failures
Breast	7	0.3	1.8	7	0.2	1.2	14	0.2	1.4
Sore nipples	24	1.0	6.2	36	0.9	6.0	60	0.9	6.0
Poor	62	2.5	15.6	43	1.1	7.1	105	1.6	10.5
Poor lactation	152	6.3	38.4	241	6.1	40.0	393	6.1	39.4
Ill baby	84	3.4	21.1	81	2.0	13.5	165	2.6	16.6
Poor feeder	29	1.1	7.3	27	0.7	4.5	56	0.9	5.6
Maternal disease	17	0.7	4.3	41	1.0	6.8	58	0.9	5.8
Maternal opposition	21	0.8	5.3	126	3.1	20.9	147	2.3	14.7
Total	396	16.1	100.0	602	15.1	100.0	998	15.5	100.0

Parity

The proportion of failures and difficulties decreased up to and including the third pregnancy, followed by an increase in women of higher parities (Fig. 1).

There was a significantly lower ($P<0.01$) incidence of breast engorgement in multiparae compared with primiparae, both as a total incidence and as the major complication of breast-feeding. Cracked and sore nipples were significantly less frequent ($P<0.01$) among women with a third or later baby compared with the rest; there was no difference between primiparae and women with second babies. The incidence of poor nipples, both total and as a major source of feeding difficulty, was much greater in primiparae than in multiparae, the difference being highly significant.

Other differences due to parity are described under the various headings below.

Age

There was a marked and highly significant correlation between the age of the mother and the success of her breast-feeding in hospital, shown by a decline in the incidence of breast-feeding without difficulty and a steady increase in the incidence of artificial feeding, with increasing age (Fig. 2). This was true in all parities, although the gradient was considerably steeper in primiparae than in multiparae, especially after the age of 30 in primiparae. In general, multiparae were more successful than primiparae, age for age.

Poor lactation was the largest single cause of breast-feeding difficulty, and accounted for most of the age gradient of breast-feeding failure (Tables II and III). In primiparae the incidence of poor lactation rose from 4% under the age of 20 (13% of all difficulties) to 37.5% over the age of 34 (57% of all difficulties); in multiparae the rise was more gradual, from 3.6% to 16.4%. The relationship between the incidence of poor lactation and maternal age was highly significant. The other causes show relatively minor variations with age, but there is a highly significant increase with age of the incidence of maternal opposition, and a doubtfully significant ($P<0.02$) increase in the incidence of maternal disease. The incidence of "ill baby" was higher in the under-20 age group than in subsequent age groups, except in primiparae over the age of 34, in whom it rose to its highest level; these trends correspond to variations in the prematurity rate with age in Aberdeen primiparae (un-

published data). The total incidence of sore nipples is not related to maternal age, but their incidence as a major source of breast-feeding difficulty falls with increasing age, because of the overwhelming effect of poor lactation in the older age groups.

Height

There was a small but significant relationship ($P<0.01$) between the mother's height and her breast-feeding performance in hospital, for both primiparae and multiparae at all ages. The increased difficulty associated with small stature was due almost entirely to an increased incidence of "ill baby."

Physical Grade

There was a highly significant ($P<0.01$) association between the physical grade of the mother—that is, her estimated state of general physique and health—and her breast-feeding performance in hospital. Fig. 3 shows that in primiparae

FIG. 3.—Relationship of the "physical grade" to the feeding performance in hospital, shown separately for primiparae and multiparae. (A=very good; B=good; C=fair; D=poor; E=very poor.) The key is as for Fig. 1.

FIG. 2.—Relationship of maternal age to the feeding performance in hospital, shown separately for each parity. The key is as for Fig. 1.

TABLE II.—*Causes of all Breast-feeding Difficulty (whether the outcome was artificial feeding or not) in Primiparae at Different Ages*

Age:	15-19		20-24		25-29		30-34		35+		All Ages	
Total Cases:	272		1,313		616		196		64		2,461	
Cause of Difficulty	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases
Breast	4	1.5	19	1.5	11	1.8	4	2.0	1	1.6	39	1.6
Sore nipples .. .	14	5.1	102	7.8	34	5.5	5	2.5	1	1.6	156	6.3
Poor	13	4.8	52	4.0	31	5.0	7	3.6	2	3.1	105	4.3
Poor lactation ..	11	4.0	91	6.9	49	8.0	32	16.4	24	37.5	207	8.4
Ill baby	25	9.2	81	6.2	45	7.3	11	5.6	9	14.0	171	6.9
Poor feeder .. .	12	4.4	40	3.1	19	3.1	10	5.1	4	6.3	85	3.4
Maternal disease ..	2	0.7	5	0.4	7	1.1	2	1.0	1	1.6	17	0.7
" opposition ..	3	1.1	15	1.1	8	1.3	9	4.6	0	—	35	1.4
Total	84	30.8	405	31.0	204	33.1	80	40.8	42	65.7	815	33.0

TABLE III.—*Causes of all Breast-feeding Difficulty in Multiparae at Different Ages*

Age:	15-19		20-24		25-29		30-34		35+		All Ages	
Total Cases:	56		1,019		1,434		963		523		3,995	
Cause of Difficulty	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	Total	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases
Breast	1	1.7	22	2.2	17	1.2	12	1.2	1	0.2	53	1.4
Sore nipples .. .	2	3.6	53	5.2	84	5.9	52	5.4	13	2.5	204	5.0
Poor	0	—	26	2.5	17	1.2	15	1.5	9	1.7	67	1.7
Poor lactation ..	2	3.6	33	3.3	93	6.5	95	9.8	86	16.4	309	7.7
Ill baby	5	9.0	41	4.0	61	4.3	26	2.7	26	4.9	159	4.0
Poor feeder .. .	0	—	18	1.8	17	1.2	17	1.8	12	2.3	64	1.6
Maternal disease ..	0	—	9	0.9	13	0.9	11	1.1	7	1.3	40	1.0
" opposition ..	1	1.7	24	2.3	39	2.7	37	3.8	35	6.7	136	3.4
Total	11	19.6	226	22.2	341	23.9	265	27.3	189	36.0	1,032	25.8

and multiparae at all ages, those who were assessed antenatally as being of poor or very poor health and physique (about 5% of primiparae and 11% of multiparae) had a worse performance than the other grades. A detailed analysis of the causes of difficulty (Table IV) shows that those women of poor and very poor physique differed from the rest mostly because of an increased incidence of "ill baby," an association which was highly significant for both primiparae and multiparae. There was a slightly higher incidence of poor lactation among those of poor and very poor physique and a small continuous rise in the incidence of maternal disease and maternal opposition with falling levels of physique, but these were not statistically significant.

FIG. 4.—Relationship, in primiparae, of the mother's occupation before marriage to her feeding performance in hospital. (1=professional and technical workers; 2=clerical workers; 3=shop assistants; 4=skilled manual workers; 5=semi-skilled and unskilled manual workers and workers in the fish industry.) The key is as for Fig. 1.

composition of the various social classes lead to underestimation of the importance of good social circumstances, women in the lower social groups having the advantages of youth which probably outweigh the disadvantages of inferior health and physique. The independent relationships of age, physique, and social class could not be adequately examined with the numbers available.

Social Class

The upper social groups have a breast-feeding rate only slightly greater than the lower groups (Fig. 4). It may be that differences in the age

Such fall in breast-feeding performance as did occur with decreasing social status seemed to be determined almost entirely by an increasing incidence of "ill baby" (Table V).

Type of Delivery

Compared with those who had a spontaneous delivery, primiparae delivered by forceps had a slightly higher incidence of artificial feeding and those delivered by caesarean section had about twice the incidence of artificial feeding on leaving hospital. The relationship was highly significant and occurred at all ages.

The increase in artificial feeding with operative delivery was due mostly to an increased incidence of poor lactation, the difference being highly significant, and to a less extent to "ill baby." Some of the decline in the incidence of breast-feeding with age is associated with the rising incidence of operative delivery which occurs with increasing maternal age; the decline is, however, still very marked among women who delivered spontaneously.

Pre-eclamptic Toxaemia

Compared with primiparae who had no pre-eclampsia during pregnancy, those who had mild pre-eclampsia showed no difference in the incidence of bottle-feeding on discharge from hospital, but those who had moderate and severe pre-eclampsia had a very much poorer performance. The difference, due largely to an increased incidence of "ill baby," was highly significant. The incidence of poor lactation was also higher in those women who had moderate and severe pre-eclampsia, but not significantly so.

Discussion

Poor lactation, or insufficient milk, was responsible for about 40% of bottle-feeding at the time of leaving hospital. The causes "ill baby," "maternal opposition," and "poor nipples," accounted for 16.6%, 14.7%, and 10.5% of failures respectively; the other causes—"sore nipples," "breast," "poor feeder," and "maternal disease"—were numerically much less important, and together contributed less than 20% of the failures.

That the incidence of poor lactation was closely related to age was not unexpected. It has been shown previously (Hytten, 1954a, 1954c) that the amount of milk produced during the early puerperium, although little affected by the upbringing and general health and physique of the woman, declines with increasing maternal age, probably as a result of disuse atrophy of the breast. About 6% of all primiparae in this series failed to breast-feed in hospital because of poor lactation, but even in the age group 15-19, where disuse atrophy cannot be influential, 3% failed. The reasons may be genetic. It is not possible to classify women in any clear-cut manner according to their ability to produce breast milk. Of two women capable of producing just enough milk for the baby's immediate needs, one has a normal pregnancy, labour, and puerperium, and leaves hospital breast-feeding; the other is delivered by caesarean section following difficult labour, and this may be sufficient to tip the balance, so that she leaves hospital artificially feeding. The effects of such complications assume considerable importance among older women, who are prone both to a high incidence of difficult labour and to a diminished ability to produce sufficient milk.

Next in importance to "poor lactation" as a cause of artificial feeding on discharge from hospital is "ill baby," which is mainly a matter of prematurity. The association of prematurity with maternal health and physique has been previously demonstrated (Baird, 1952), and it would appear that the decrease in the incidence of breast-feeding in hospital associated with diminishing social status is due mainly to this effect. There is no evidence that the slight social class differences of breast-feeding rates *at the time of discharge from hospital* are associated with different attitudes to breast-feeding.

"Maternal opposition," revealed as general non-cooperation, or more often as a firm refusal to breast-feed, ranks

third in importance as a cause of all artificial feeding in hospital, and second in multiparae alone. It is more common in older than in younger women; nevertheless, experience shows that the young woman who is apparently willing to breast-feed in hospital turns more often than the older woman to artificial feeding soon after she goes home. It may be that the younger woman prefers to conform to the mode in hospital, rather than risk conflict with authority, whereas the older woman may take a more independent line.

The total incidence of poor nipples was 3.5%, but the failure rate from this cause was only 1.6%, although it has been claimed by Waller (1946) that poor nipples are the major source of trouble in the initiation of breast-feeding. In a series of 200 primigravidae he found 56 (28%) in which the nipples were described as poor, and Blaikley *et al.* considered 22% of nipples to be in need of antenatal treatment. Waller's shields were used, and almost all the nipples showed a marked improvement, but there was no control series. In Aberdeen during 1951-3 14% of primigravidae were considered to have poor nipples when first seen at the antenatal clinic, but, of these, only 16% experienced difficulty with breast-feeding due to poor nipples. Of the 86% of primiparae who were considered to have adequate nipples when seen at the antenatal clinic, 3.5% had breast-feeding difficulty because of poor nipples. Antenatal examination of nipples therefore had some predictive value, but the majority (84%) of those whose nipples were considered by the obstetrician to be poor had, in fact, no difficulty in breast-feeding from this cause even though they had no treatment of the nipples during pregnancy.

This suggests that the traditional criteria of what constitutes a poor nipple are unsatisfactory, or that forecasting of the effects of poor nipples is unreliable owing to spontaneous improvement during the course of pregnancy. The

TABLE IV.—*Causes of all Breast-feeding Difficulty by Physical Grade in Primiparae and Multiparae.*
(A=very good; B=good; C=fair; D=poor; E=very poor)

Physical Grade:	Primiparae						Multiparae					
	A+B		C		D+E		A+B		C		D+E	
	1,618		675		129		1,835		1,508		440	
Total Cases*:	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases
Breast	28	1.7	10	1.5	1	0.6	34	1.8	13	0.9	5	1.1
Sore nipples	106	6.7	36	5.3	10	7.8	105	5.7	72	4.8	20	4.6
Poor	60	3.7	33	4.9	11	8.5	40	2.2	21	1.4	5	1.1
Poor lactation	137	8.5	53	7.9	15	11.6	130	7.1	110	7.3	43	9.8
Ill baby	88	5.4	70	10.4	11	8.5	55	3.0	62	4.1	40	9.1
Poor feeder	61	3.7	21	3.1	2	1.6	24	1.3	30	2.0	5	1.1
Maternal disease	5	0.3	7	1.0	4	3.1	9	0.5	19	1.3	9	2.1
" opposition	22	1.4	6	0.9	5	3.9	51	2.8	54	3.6	19	4.3
Total	507	31.4	236	35.0	59	45.6	448	24.4	381	25.4	146	33.2

* 39 primiparae and 212 multiparae were not graded.

TABLE V.—*Causes of all Breast-feeding Difficulty by Previous Occupation in Primiparae*
(1=professional and technical workers; 2=clerical workers; 3=shop assistants;
4=skilled manual workers; 5=semi-skilled and unskilled manual workers
and workers in the fish industry)

Occupation Before Marriage:	1		2		3		4		5	
Total Cases*:	142		635		475		553		638	
Cause of Difficulty	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases	No.	% of Total Cases
Breast	5	3.5	4	0.6	7	1.5	7	1.3	9	1.4
Sore nipples	9	6.4	43	6.8	32	6.7	38	6.8	32	5.0
Poor	4	2.8	29	4.6	14	3.0	30	5.4	26	4.1
Poor lactation	11	7.7	50	7.9	45	9.5	48	8.7	49	7.7
Ill baby	4	2.8	32	5.0	36	7.6	39	7.0	59	9.2
Poor feeder	3	2.1	22	3.5	16	3.4	18	3.3	26	4.1
Maternal disease	1	0.7	3	0.5	4	0.8	4	0.7	5	0.8
" opposition	1	0.7	13	2.0	3	0.6	7	1.3	9	1.4
Total	38	26.7	196	30.9	157	33.1	191	34.5	215	33.7

* There was no information about 18.

lower incidence of poor nipples in multiparae suggests that repeated maternities may develop nipples to a greater extent than a single pregnancy. Observations of normal nipple development during pregnancy are needed before effects of treatment designed to improve them can be reliably assessed.

A somewhat bigger problem than the poor nipple, although a lesser cause of bottle-feeding, since it is usually transitory, is that of the sore and cracked nipple. Waller (1946) believes that damaged nipples are associated with breast engorgement and with anatomically poor nipples, the good nipple being drawn right into the infant's mouth and being protected there "from the force of suction, which falls instead almost entirely on the skin of the areola."* In this series the total incidence of sore nipples was 7.6% in primiparae and 6.7% in multiparae. The incidence was no higher in poor nipples than in the rest, and there was no relationship with breast engorgement. More detailed observations of the natural history of cracked nipples are required to establish the facts. Gunther (1945) found that parity did not influence the incidence of nipple damage, but it may be that most of the multiparae in her series were women with second babies. In this series the incidence of sore nipples did not decline until the third or later baby.

It is widely held that breast engorgement is a major cause of failure to breast-feed. Waller (1946) found that about 35% of primiparae suffered from severe or moderate breast engorgement during the early puerperium, and that such overdistension was the commonest cause of failure of the milk supply. On the other hand, Miller (1952) found that only 5% of women in his large series had engorgement requiring treatment and that these contributed few breast-feeding failures. In Aberdeen the total incidence of breast engorgement was 2.4% (2.6% of primiparae and 2.2% of multiparae), but failure due to this cause occurred in only 0.2%.

Waller's method of avoiding overdistension by prolonged antenatal expression of the breasts and manipulation of the nipples has been applied to a series of primigravidae by Blaikley *et al.* (1953). At the time of discharge from hospital the incidence of breast-feeding in this treated group did not differ significantly from that of a group of controls nor from that of primiparae in the Aberdeen Maternity Hospital. It is true that Blaikley's treated cases showed a better breast-feeding performance after eight weeks, but it seems unlikely that such a remote effect can be due to the relief of overdistension in the puerperium. It will be demonstrated in a later publication that the maintenance of breast-feeding beyond the lying-in period depends to a large extent on such things as the intelligence and education of the mother and her realization of the value of breast-feeding. Waller's regime may owe its success to its educational effects more than to any direct effect on breast function. The underlying pathology of breast engorgement has never been described, but clinical observation suggests that it is unlikely to be due only to a simple overfilling with milk. At least two types seem to occur: first, the simple distension with milk occurring on the third or fourth day, which occurs when a big supply "comes in"—this is seldom painful and is readily relieved; and, second, the relatively uncommon, hard, painful engorgement corresponding to Waller's description of "engorgement with obstruction." Although this is commonly ascribed to "too much milk," it seems, in fact, to be almost entirely due to vascular congestion and oedema, since the acute swelling can be completely reduced by massage and warm applications, often with the production of less than an ounce (28 ml.) of milk from both breasts. More fundamental work on the causes of engorged breasts is needed.

*Waller presumably means "sucking"—that is, the mechanical action of the baby's jaw on the nipple or areola, rather than the negative intraoral pressure. The latter must act on all surfaces within the mouth, and is in any case not very great. Gunther (1945) reported negative pressures up to 200 mm. Hg, but it has been shown (Hyttén, 1951) that when a source of mechanical error in the recording apparatus is remedied, readings exceeding —50 mm. Hg are not obtained.

Since the breast-feeding rate in the Aberdeen Maternity Hospital (85%) closely resembles that reported from other quarters, these findings are probably generally applicable. No obvious line of action suggests itself for increasing the incidence of breast-feeding in hospital. Poor lactation will continue to be a dominant disability, especially in primiparae, so long as a large number of women delay their child-bearing until their late twenties and thirties. Prematurity, when it deprives the mother of her baby during the early puerperium, indirectly leads to difficulty in establishing and maintaining breast-feeding; it is related to poor maternal health and inferior social status, and is as much a social as a medical problem. The contribution of breast engorgement and of damaged or poor nipples to early breast-feeding difficulty has been exaggerated, since together they account for only about 18% of artificial feeding in hospital. More basic knowledge of breast and nipple development and pathology must precede rational treatment.

Summary

In conformity with general experience, it has been found that about 85% of Aberdeen Maternity Hospital booked patients leave hospital fully breast-feeding.

Of those who fail, 39.4% do so primarily because of inability to produce sufficient milk. Differences of capacity to produce milk may be genetic in origin, but actual milk production tends to decline with increasing maternal age and is impaired by such added physical stresses as operative delivery.

Separation of the mother and baby during the lying-in period, usually because of prematurity, accounts for 16.6% of failures in hospital, and refusal to breast-feed for a further 14.7%. Of the other causes of failures 10.5% are due to anatomically poor nipples; the remainder are due to sore and cracked nipples (6%), the baby a "poor feeder" (5.6%), serious disease of the mother (5.8%), and engorged breasts and mastitis (1.4%).

I am grateful to Professor Dugald Baird and the staffs of the Midwifery Department and the Aberdeen Maternity Hospital for invaluable help, and to Mr. W. Z. Billewicz, of the Medical Research Council's external staff in the Department of Midwifery, for statistical assistance.

REFERENCES

- Baird, D. (1952). *New Engl. J. Med.*, **246**, 561.
 — and Illsley, R. (1953). *Proc. roy. Soc. Med.*, **46**, 53.
 — and Thomson, A. M. (1954). *Gynaecologia (Basel)*, **138**, 226.
 Blaikley, J., Clarke, S., MacKeith, R., and Ogden, K. M. (1953). *J. Obstet. Gynaec. Brit. Emp.*, **60**, 657.
 Dummer, F. H. M. (1949). *British Medical Journal*, **2**, 14.
 Gunther, M. (1945). *Lancet*, **2**, 590.
 Hyttén, F. E. (1951). *Arch. Dis. Childh.*, **26**, 477.
 — (1954a). *British Medical Journal*, **1**, 912.
 — (1954b). *Ibid.*, **1**, 1410.
 — (1954c). *Ibid.*, **2**, 844.
 Miller, R. A. (1952). *Arch. Dis. Childh.*, **27**, 187.
 Ministry of Health (1951). Report for the year ended March 31, 1950. Cmd. 8342. H.M.S.O., London.
 Nelson, T. R. (1954). *J. Obstet. Gynaec. Brit. Emp.* In press.
 Read, G. D. (1949). *Lancet*, **1**, 721.
 Ross, A. I., and Herdan, G. (1951). *Ibid.*, **1**, 630.
 Ström, J. (1948). *Acta paediat. (Stockh.)*, **35**, Suppl. 1, 55.
 Waller, H. K. (1946). *Arch. Dis. Childh.*, **21**, 1.
 — (1950). *Lancet*, **1**, 53.

In a letter to *The Times* (December 9), Sir WILFRID FISH states: "Preliminary inquiries suggest that entry into the dental profession is restricted by widespread ignorance of the remarkable evolution which dentistry has undergone in recent years and of the expanding opportunities now open to those who make their career in it. These opportunities are not restricted to dental practice, whether as a general practitioner or consultant. There is now ample scope for an academic career in teaching and research. Children's dentistry, in particular, should make a special appeal to women. Moreover, there are few, if any, other careers which offer a higher immediate income or better security to the young entrant. There will be, in any case, no lack of demand for his services for a generation."