

intracisternal as well as intraventricular penicillin. Case 4 had 40,000 units of penicillin intrathecally for eight days and intramuscular penicillin, 320,000 units daily, for 17 days. After an immediate good response there was a recurrence of meningitis at the end of the third week, and this was controlled completely by much larger dosage. Cases 6, 7, 8, and 9 were given 40,000 units intrathecally daily and 960,000 units intramuscularly in three-hourly doses. In no case was there any evidence of meningeal reinfection after the illness was once under control, and in no case was intracisternal or intraventricular therapy required. In one case a severe convulsion occurred after the fifth intrathecal injection, but with no ultimate ill effect.

In this last group the cerebrospinal fluid became sterile on the third to fifth day, clinical improvement was apparent in two to three days, and the meningitis seemed to be well under control by the end of a week, though the temperature did not settle completely so long as intramuscular penicillin was given. Also the cell count in the cerebrospinal fluid did not return to normal while the patient was under treatment. This was presumably due to reaction to the penicillin, but in those patients whose C.S.F. has been examined several months after cessation of treatment an ultimate return to normal is indicated. The persistence of pyrexia and cellular reaction, however, made it difficult to decide when to stop treatment: we may have given an unnecessary amount of intrathecal penicillin. There seems to be no need to continue this for more than a week after the fluid is sterile, provided adequate intramuscular penicillin, 960,000 units daily, is continued for about three weeks.

2. *Sulphadiazine, Penicillin, and Streptomycin* (3 cases).—In Cases 12 and 13 a change was made from penicillin to streptomycin on the fourth and fifth day respectively, but in each case improvement in the C.S.F.—a fall in cells from 380 to 80 and a rise in sugar from 0 to 35 mg. per 100 ml. in one, and a fall in cells from 2,540 to 70 and a rise in sugar from 21 mg. to 30.5 mg. per 100 ml. in the other—had already taken place. The second patient had a convulsion after one of the intrathecal injections of penicillin. In the third (Case 14), a change to streptomycin was made on the second day of treatment. In none of these cases can it be said that penicillin had failed: it had not been given time to succeed. All recovered.

3. *Sulphadiazine and Streptomycin*.—One patient (Case 15) was treated with this combination with complete success.

Conclusion

We submit that these cases show that penicillin, combined with oral sulphadiazine, given in adequate dosage—960,000 units daily for three weeks in three-hourly doses intramuscularly, and 40,000 units daily intrathecally for about seven days after the cerebrospinal fluid is sterile—provides an effective remedy in the treatment of severe as well as of moderately severe cases of influenzal meningitis. The facts that streptomycin is not freely available at present and that the organism is known to develop resistance render streptomycin less generally useful.

We wish to express thanks to our colleagues for permission to include their cases in this survey, to the resident medical staff for their help in carrying out the treatment, and to the nursing staff for their great care of the patients. We are also indebted to Dr. Rogers for the pathological reports and to Miss E. Hickmans for the biochemical reports.

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A STUDY OF THE POST-WAR INCIDENCE OF BREAST-FEEDING

BY

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This investigation was carried out in order (1) to study the real incidence of breast-feeding in the town of Hitchin, North Hertfordshire (population 20,710); (2) to analyse the reasons for early weaning; and (3) to consider any existing correlation of age and parity, place of confinement, effect of vitamin supplements, mixed feeding, and housing.

Opinions of previous investigators have varied considerably on the trend in breast-feeding. Spence (1938) reported a definite decline; Robinson (1939) stressed the tendency towards a shortening of the duration; Hughes (1942), reviewing the incidence of breast-feeding in a small mining community, found that 31% of babies were weaned by the second week. It has recently been stated that not more than half the babies in Britain are breast-fed for longer than three months (Waller, 1947).

Material and Method

The survey was restricted to mothers living in Hitchin who were confined locally between Jan. 1, 1946, and Dec. 31, 1947, and who spent at least six antenatal months in the district. By such selection it was hoped that variations in antenatal and post-natal care, modes of management in infant-feeding, and fluctuations in the availability of extra rationed goods would be equalized.

In order to obtain a comprehensive survey it was obvious that the records of antenatal and infant welfare clinics alone would be inadequate. A detailed questionnaire was therefore prepared and mothers in the above category were interviewed individually. The questions were worded so that a "social history" of each infant could be built up. A complete picture of environmental conditions possibly affecting its intrauterine and extrauterine life until the age of 6-9 months was obtained. Out of all the visits paid, in only one instance was the required information refused.

The results of the questionnaire, taken in conjunction with the relevant records in the clinics and the reports of the health visitors, provide the basis of this study.

Results

Omitting infant deaths, removals from the district, and mothers who were confined elsewhere, the total available for investigation was 546. The number successfully interviewed was 545. Of these, 58.7% were in regular attendance at the infant welfare centre. This figure is regarded as satisfactory, since over 30% of mothers with children born in 1946-7 are living in an area of the town almost two miles from the centre, and their regular attendance would be a matter of great inconvenience to them.

Deliveries.—These were carried out in the County Council Maternity Home (161), two private nursing-homes (230), the

maternity unit of a local hospital (50), and "on district" (104). Midwives delivered 383 cases, while 162 were doctors' cases. The overall average period "confined to bed" was 11.1 days.

Age and Parity.—Almost one-quarter of the primiparae were aged 30 or over (Table I). Although the number of primiparae is high—44%—the tendency towards postponement of the first birth is seen. The average time which elapsed between marriage and the birth of the first child to the primiparous group was 3.4 years. Less than 27% have more than two children.

TABLE I.—Age and Parity

Age	Para									Total
	1	2	3	4	5	6	7	8	8+	
18—	26	2	1							29
22—	87	25	6	1		1				120
26—	72	38	12	7	2	1				132
30—	38	48	18	11	6	3	1			125
34—	14	31	15	8	5	3	4	1		81
38—	5	11	14	8	6	4	2	2	1	53
42+		2			1		1		1	5
Total	242	157	66	35	20	12	8	3	2	545

Duration of Breast-feeding.—In Table II "weaned" is defined as "having reached the stage at which the infant receives wholly, for the first time, feeds other than breast milk." These results are compared with those of previous investigations

TABLE II.—Duration of Breast-feeding (545 Cases)

Time	Complete Breast-feeding	Partial Breast-feeding	Weaned
At birth	84.8%	5.5%	9.7%
Up to 2 weeks ..	78.3%	2.4%	19.3%
1 month	69.5%	4.5%	26.0%
2 months	57.5%	6.5%	36.0%
3	50.3%	2.7%	47.0%
4	40.7%	5.3%	54.0%
5	30.25%	9.0%	60.75%
6	13.2%	18.4%	68.4%

TABLE III.—Duration of Breast-feeding. Comparison with Previous Investigations

Time	Spence (from Findlay, Edinburgh), 1938 (3,000 Cases)	Spence (from Brewis, Newcastle) 1938 (1,326 Cases)	Robinson, Liverpool, 1937 (439 Cases)	Hughes, Newbiggin, 1942 (112 Cases)	Present Survey 1948 (545 Cases)
10–14 days	87%	—	—	—	—
2 weeks ..	—	—	86%	67%	78.3%
1 month ..	—	—	—	55%	69.5%
3 months ..	—	58%	48%	32%	50.3%
3–6 ..	55%	—	—	—	—
6 ..	—	34.7%	29%	19%	13.2%

(Table III). Since the factor of "duration" is of greater consequence than "initial incidence" the results were further broken down to ascertain the trend of primiparous women (Table IV).

TABLE IV.—Duration of Breast-feeding: Primiparae (242 Cases)

Time	Complete Breast-feeding	Partial Breast-feeding	Weaned
Up to 2 weeks ..	75%	9%	16%
1 month	66%	11.5%	22.5%
3 months	50%	4.2%	45.8%
6	12.8%	18.2%	69%

Complementary Feeding.—Table V shows the average period for which mothers have been able to extend breast-feeding by the use of complementary feeds. Cases in which full breast-feeding was later resumed have been excluded.

TABLE V.—Showing the Duration of Breast-feeding along with Complementary Feeds

Complemented at	Average Extension of Breast-feeding	Complemented at	Average Extension of Breast-feeding
1 week	3.5 weeks	8 weeks	6.9 weeks
2 weeks	5.3 "	12 "	10.0 "
3 "	7.3 "	16 "	9.1 "
4 "	6.0 "	18 "	9.8 "
5 "	7.3 "	20 "	11.9 "
6 "	6.6 "	22 "	10 "

Place of Confinement Related to Weaning.—The results are shown in Table VI.

TABLE VI.—Percentages Weaned at 14 Days and 3 Months Referred to Place of Confinement

Place of Delivery	Weaned by 14 Days	Weaned by 3 Months
County Council Maternity Home	16.2%	53.4%
Private nursing-homes	18.2%	42.2%
District	23.1%	50%

Housing.—Details of housing accommodation for the first six post-natal months were carefully noted, and cases were allocated to one of the six categories shown in Table VIII. The special position of primiparae was ascertained.

TABLE VII.—Showing (i) Housing Distribution; (ii) Percentage Weaned by 8 Weeks; (iii) Percentage of Primiparae Weaned by 8 Weeks

Group	Sharing	Detached	Semi-det.	Flat	Rooms	In-laws
(i) Overall	8.1%	7.2%	48.5%	9.1%	11.7%	15.4%
(ii) Weaned by 8 weeks ..	25.0%	26.6%	33.4%	31.2%	39.6%	40.0%
(iii) Weaned by 8 weeks (primiparae) ..	63%	20.0%	29.0%	27.0%	59.0%	65.0%

Vitamin Supplements.—It might be of some interest to note the percentages using the Ministry of Food vitamin supplements A and D and the concentrate of orange juice available for expectant mothers: (1) 27.3% did not use the supplements at any time; (2) 11.8% took the supplements in both antenatal and post-natal periods; and (3) 60.9% took them in the antenatal period only. For either period the minimum time allowed in the calculations was one month and the maximum six months. In group 1, 25.1% breast-fed for three months or more; in group 2 the figure was 12.3%; and in group 3, 62.6%. No real relationship is suggested in these findings.

Reasons for Weaning.—The reasons for weaning by the end of the third month were: maternal illness, general, 9%; maternal illness, local, 15%; illness of infant, 5%; economic, 4%; psychological, 10%; physiological, 51%; miscellaneous, 6%. Among the above causes breast abscess accounted for 4%, mastitis or engorgement without abscess formation 6%, malformation of nipples or breasts 5%, and infant malformations such as cleft-palate and hare-lip 1.1%.

Occupational Groups.—Apart from illegitimate children, in all but two cases the occupation of the husband was accurately elicited. Table VIII covers the occupational groups of 97% of the husbands of the women interviewed.

TABLE VIII.—Showing Occupational Distribution of Weaning Times

Occupation	Percentage Weaning Occurring at			
	0–4 Wks	5–12 Wks	13–24 Wks	After 24 Wks
Professional	33	15	22	30
Civil servants	24	22	26	28
Skilled workers	22	21	18	39
Services	35	25	15	25
Semi-skilled workers..	31	27	19	23
Storekeepers	28	17	30	25
Vehicle drivers	22	22	32	24
Factory workers	31	15	15	39
Labourers	30	22	22	26

Discussion

From a study of previous investigations it is clear that there is a distinct trend towards early weaning (Spence, 1938; Robinson, 1939; Hughes, 1942). The likelihood that this mode will become permanent is given weight by the fact that the gross initial incidence of breast-feeding has not fallen to any appreciable extent. Of the 242 primiparae in this series 16% had weaned by the end of the first month, and of these nearly one-half had either not attempted to feed the infant or had failed to establish successful feeding

in the first week. In the analysis of the reasons for weaning at or before 3 months 6% were classified as being unwilling to breast-feed.

Genuine physical incapacity of mother or infant amounted to only 6.1%. Spence (1938) considers that not less than 5% of failures in lactation are due to this cause.

The term "physiological insufficiency" covers a multitude of unsatisfactory causes. In this group the commonest explanation was "My milk just dried up." Where there was any reason to suspect undue worry, shock, or housing conditions which were too bad for a nursing mother to cope with there has been a follow-up, and the reason re-allocated. But a large percentage of failures remain unexplained. In a study of failing lactation Robinson (1943) found that in 40% of women who ceased breast-feeding before the end of the seventh month no adequate reason could either be given or be found on examination. There would seem to be no specific fault, and in the majority of cases the mother insisted that she wished to persist in breast-feeding. In many instances it is not unlikely that the reason was an unadmitted revolt against the conditions in which she was placed—tiredness, small accumulating worries, living under poor or even bad conditions, restriction of freedom, and, possibly, marital anxieties. In such cases home help, the health visitor's continuing interest, and, perhaps most important of all, the attitude of the husband would give the nursing mother that peace of mind and bodily rest so essential throughout lactation. It is not unknown for the husband to forbid breast-feeding. One such individual gave as his reason, "Breast-feeding is a disgusting example to our 12-year-old daughter."

The "danger period" in breast-feeding is primarily at the fourth or fifth week, with a second relapse about the tenth or twelfth week. The value, or otherwise, of complementary feeds at such times has been strongly voiced (Lishman, 1944; Hughes, 1942). We have found that even in the early stages many mothers are enabled to resume full breast-feeding after the use of small complementary feeds for only a week or ten days. It is true that a large number of mothers give up, and no aspect of infant feeding is fraught with greater disappointment.

The use of a single 2-p.m. test feed can be very misleading. It is here that the clinic medical officer—and, no less, the practitioner—faces a substantial obstacle. It helps considerably to have mothers for test feeds encouraged to attend the clinic slightly earlier than the normal session so that one may examine the breasts before the feed and again during the feeding. In really co-operative cases—and the fullest co-operation is an essential in early complementary feeding—the health visitor can usually arrange to carry out three consecutive test feeds, or at least a minimum of two, including the one at the clinic. Complementary feeds at the later stages—from the eighth week onwards—can be resorted to more confidently.

In a pre-war study Robinson (1939) found that of the 67 primiparae living in rooms in 100 consecutive cases approximately 70% had weaned by eight weeks. In the present survey the highest percentage of weanings occurs in those occupying rooms or in the even more indefinite menage with "in-laws." Naturally, the greatest number of primiparae are also found in those circumstances. The effect of "friends and relations" can be thoroughly disheartening to the inexperienced, and I am of the opinion that housing difficulties as they exist at present, and the close proximity of relations, together constitute a major menace to successful breast-feeding. This position may have some bearing

on the unsatisfactory district figures compared with those of nursing-homes on the question of weaning by the end of the second week.

In the Ministry of Health Report (1944) the statement is made that the Advisory Committee estimated that 95% of babies born on the district are wholly breast-fed when the midwife leaves, while only 80% of babies leave hospital fully breast-fed. For these results the "over-mechanized methods" of hospitals are blamed. In this series 83.8% of babies born in the County Council Maternity Home were wholly breast-fed at 14 days, while the corresponding district figure was 76.9%. Locally, at least, "over-mechanized methods" do not appear as an outstanding cause of failure.

This investigation shows that each of the occupational groups chosen has its own specific weaning rate. In her Liverpool series on the weaning rates in ten classes of the population in the years 1930-40, Robinson (1941) found a difference of only 8% at the end of the first month and only 3% between the classes at the fourth to seventh months. The smallest range—12%—in the present survey occurs between the fifth and twelfth weeks. In a series of this size we are not justified in drawing general conclusions from these findings.

From the collected material available it is unfortunately not possible to give accurate morbidity rates relative to breast-feeding; it was established, however, that no case of gastro-enteritis requiring treatment in hospital had occurred in babies who had been wholly breast-fed for three months or longer.

Summary

The results of an investigation into the incidence of breast-feeding in an area of North Hertfordshire in 1946-7 are analysed.

The number of babies completely breast-fed at 6 months was estimated at the low figure of 13.2%.

Although the primary incidence of breast-feeding has not appreciably altered there is evidence of a shortening of the duration. The "mode" in breast-feeding is set by the primiparae, who favour the shortened duration.

An evaluation is made of complementary feeding.

The effects of housing accommodation are tabulated and discussed.

A comparison is drawn between the early weaning rates of babies born in maternity homes and those on the district.

I have to thank Dr. J. L. Dunlop, county medical officer of Hertfordshire, for permission to undertake this investigation, and the staff of the County Health Department for their interest and assistance. Most of the interviews were carried out by the health visitors of Hitchin, and I am most deeply indebted to them for their sustained interest and the willingness with which they agreed to perform these additional tasks. The permission of the Librarian of Cambridge University Library to peruse the medical literature is also gratefully acknowledged.

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The Ministry of Health states that the universities should pay the expenses of printing, local advertisement, and distribution of the syllabuses of hospital courses for the postgraduate education of general practitioners. The costs should not fall on hospital funds.