

## A PRELIMINARY REPORT OF THE STUDY OF BREAST FEEDING IN MINNEAPOLIS \*

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MINNEAPOLIS

Most of the members of this organization have heard me in season and out of season, talking about breast feeding, and the study we have been making of it at the University of Minnesota. Although the statistics will not be ready until September, enough data have come so that we have records which indicate what we have learned and accomplished. I have had so many inquiries in regard to our technic, that I am taking this opportunity to explain the essential parts to those who are interested.

The investigation of breast feeding in Minneapolis was planned to study the wider applicability of certain principles of breast feeding which we have been using at the University of Minnesota and in private work. We wished to see whether these principles are applicable to a wider field, and to all strata of society. We wished to make a statistical study to observe the effect, if any, on infant mortality. Dr. Rood Taylor made a study of the records of our New-born Clinic at the University recently and he found that in one thousand consecutive cases in which the mother and the baby left the hospital together each child was at the breast. This disposes of the importance of the bogey, agalactia. The idea that the mothers often have no milk for their new-born babies was not given much consideration in this study. The technic of the maintenance and reestablishment of breast feeding is that which I described in my chairman's address in New York in 1917<sup>1</sup> and I shall mention simply the essentials here.

The demand which is made on the breast is by far the most important factor in the maintenance of the breast milk supply. Repeated, regular and complete evacuation of the breasts by a vigorous baby, is, of course, the natural and best method. When this natural stimulus is not obtained or when the demand on the breast is insufficient for any reason, the supply of breast milk dwindles gradually until the breast does not support the baby. In these cases artificial aid is

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\* Read before the American Pediatric Society, June, 1920.

1. Establishment, Maintenance and Reinstitution of Breast Feeding, J. A. M. A. **64**:417 (Aug. 11) 1917.

necessary. In an interesting paper published in 1913, Zlocisti showed that this can be accomplished by putting the father at the breast, and stimulating the lactation systematically. This, however, is open to many esthetic and social objections. We have found that in most cases, using the principle of stimulation but by milking the breast, we are able to accomplish a similar or even better result. A cross section of the breast shows that the milk sinuses are largely just back of or in the area under the colored areola. The gland proper is farther back. We apply the same principles that the milkmaid applies. She does not stroke the cow's udder. She grasps the teats only. We do not massage or stroke the breasts over the glandular tissue as this often causes injury. We grasp the breast just back of the colored areola, press the forefinger and thumb together, thus closing off the sinuses. Then, using a milking motion, push forward then outward, thus emptying the ducts and sinuses to the nipple itself. This should be done gently and should not be painful. No trauma should be done the nipple and the gland tissue of the breast itself is not injured.

Let us consider the premature baby first. Many a premature baby has been deprived of its mother's breast milk unnecessarily. The milk of the mother of the premature baby dries up, not because of the baby being born prematurely, but because the premature baby cannot make the proper demand on the breast. We make the practice of milking the mothers breasts as described above, and giving the milk to the premature baby, usually by means of a tube. In our experience these mothers of premature babies furnish milk just as well as mothers of full time babies, and in case after case we have found that these mothers who are milking their breasts, and not laying the baby on the breast on account of the weakness of the baby, have just as good a milk supply, and often are able to furnish milk for their own babies and for another baby besides. When we have intelligent mothers who cooperate well we do not at all feel that the breast feeding of the premature baby is difficult.

It may take a little more time but the mothers are almost always sympathetic and willing to aid in this work and do not complain of the extra time involved. Most of our premature babies are fed with a tube for a month or two before they are laid at the breast at all. It is certainly much less trouble than wet nursing.

It is not only in cases of prematurity that this method is of value for keeping the breast milk up. When a baby is weak from any cause, or ill, so as not to be with the mother, or even when the mother is required to be away for a period, as in one case for two weeks, this method will keep the supply up.

When the trouble is with the breast or the nipple itself, this

method may be used to advantage. In one case a mother had failed to nurse two children because of a badly inverted nipple on one side. With the third lactation she was shown how to express the milk and encouraged in carrying out this procedure over a long period. At the end of nine months, she was nursing the baby at one breast fully and on the other she had expressed the milk at every feeding; five times in every twenty-four hours during the whole nine months period. When she appeared for the weaning of the baby, at the end of nine months she was getting more milk from the breast on which she could not lay the baby, and from which she had expressed the milk regularly, thus furnishing the stimulation artificially, than she was getting from the breast on which the baby was being laid. In cases in which the nipple is sore or where there is a fissure, this method can be used to let the nipple have the proper rest, and at the same time the breast milk is not lost for want of stimulation. Expression can be used without any injury to the nipple itself. It would be a mistake to leave the impression that we depend wholly on expression in this study of breast feeding. Every other method of encouraging and instructing the mothers in breast feeding is applied also. Expression is reserved largely for the more difficult cases. However, I wish to stress the demand made on the breast and the expression as the important means, rather than the very common giving of enormous quantities of fluid. We know enough now about the physiology of the breast, if we could apply it, to get at least 90 or 95 per cent. of the babies nursed at the breast.

In organizing the bureau for carrying on this study, we began with the medical men. We wrote to every physician in the city announcing the formation of the bureau, we invited them to meet at the University, and explained the purpose; we sent representatives to talk with them and explain all details. We made it quite plain that no physician in active practice would be employed in connection with the work. I was fortunate in that I was confining my private work to consultation and referred work. Each physician was asked for criticisms. A card index of the physicians was maintained on which any special desire of the physicians was recorded. In most cases the physicians wished that we go directly into the cases, but report to them afterward. Some wished, however, to have us report to them before going in. Some wished all our statements and directions to come through them personally. We respected all these wishes. After we had been in operation some time, we sent a representative to all the physicians again to ask whether we were embarrassing them in any way, and asked for suggestions to prevent such embarrassment. The Minneapolis Health Department cooperated in every way possible; not

only passively but actively. The Infant Welfare Society took up the work of getting information for us from the families with whom they were working. Prominent citizens and the daily papers participated and aided in many ways.

The Breast Feeding Investigation Bureau of the Department of Pediatrics of the University of Minnesota was the name under which the work was carried on. The graduate school of the University appropriated \$1,000 for the study. The war chest appropriated \$3,000. From private individuals and other sources, about \$1,500 more was paid, thus making the total amount between five and six thousand dollars for the year's study.

The mother of practically every baby born in Minneapolis during the year was followed for nine months. The birth reports were sent in from the health department every day, and the first information concerning the breast feeding was obtained by telephone or personal call. If things were going well literature was sent each month. If the return cards were not sent back, the case was followed up by telephone or personal call. If there was any trouble with the breast feeding, the bureau was thus informed and the doctor was consulted, a nurse sent out to instruct the mother when necessary, even daily. The literature was as follows:

1. Is your baby being breast fed?.....
  2. If not, when and why did you stop?.....
  3. How many other children have you had?.....
  4. Give years of births: 1..... 2..... 3..... 4.....
  5. How many are living?.....
  6. If you have lost any, at what ages and from what cause?.....
  7. How long was each child at the breast only? (If but a few days or short time, state as nearly as possible the number of days.)  
1..... 2..... 3..... 4.....
  8. When was the breast stopped in each case?  
(1).....mos. (2).....mos. (3).....mos. (4).....mos.
  9. Give reason for stopping breast feeding in each case if before the ninth month.  
1..... 2..... 3..... 4.....
  10. If bottle was given with the breast, when was it begun and was it in addition to each breast feeding or in place of certain breast feedings.  
1..... 2..... 3..... 4.....
- I can be reached by Phone No.....

#### POST CARD

DEAR MADAM:

Summer will soon be here. It is especially important now for your baby to be kept upon the breast. There is much more danger for the bottle-fed baby when the weather is hot.

We wish to make sure again that you have no difficulty with the breast feeding which can be prevented.

We are, therefore, taking the liberty of sending you another card, asking you to answer the following questions and return it to us.

Thank you.

For THE BREAST FEEDING INVESTIGATION BUREAU.

- (1) Is your baby still breast-fed?.....
- (2) How often do you feed it?.....
- (3) Does it receive the breast only?.....
- (4) Are you having any difficulty nursing the baby?.....
- (5) If so, what?.....
- (6) If not breast-fed, when and why did you stop? (State how long the baby was breast-fed.) .....

POST CARD

- (1) Is your baby still breast-fed?.....
- (2) How often do you feed it?.....
- (3) Does it receive the breast only?.....
- (4) Are you having any difficulty nursing the baby?.....
- (5) If so, what?.....
- (6) If not breast-fed, when and why did you stop? (State how long the baby was breast-fed.) .....

Have you or the baby had influenza?.....  
Have you a telephone?.....

A report was obtained concerning each child every month.

Such work is usually done in clinics and hospitals, but we reached everybody, rich and poor. We were told, and we also feared, that we would have great difficulty in the private families where the physicians were in charge. This, however, we found not to be true. In almost every case the physician was sympathetic and aided us. When our agents found that there was difficulty with breast feeding we often asked the physician to give us his support, which he almost always did. Many of our workers have reported that they had even less trouble with those who were educated and had means to pay for services of their own physicians and nurses.

Jan. 1, 1920, this work was turned over to the Infant Welfare Society of Minneapolis, thus making it permanent. The final report cannot be given out until nine months after January 1, as babies born in December, 1919, will not be nine months old until September, 1920. The Infant Welfare Society is giving us reports to complete our records.

I would, however, call your attention to the beginning of the report where the total results of the investigation for January, February, March, April and May are listed. The results by months run from 96 per cent. at the end of the second month to 72 per cent. at the end of the ninth month.

TABLE 1.—TOTAL RESULT OF INVESTIGATION OF BREAST FEEDING OF THE  
JANUARY, FEBRUARY, MARCH, APRIL AND MAY BABIES  
BORN IN MINNEAPOLIS DURING 1919

	Breast Fed		Percentage on Arti- ficial Food
	Number	Per Cent.	
Of the 2,022 babies still under observation at the end of the ninth month.....	1,472	72+	27+
Of the 2,113 babies still under observation at the end of the eighth month.....	1,631	77+	22+
Of the 2,240 babies still under observation at the end of the seventh month.....	1,810	80+	19+
Of the 2,355 babies still under observation at the end of the sixth month.....	1,992	84+	15+
Of the 2,412 babies still under observation at the end of the fifth month.....	2,090	86+	13+
Of the 2,505 babies still under observation at the end of the fourth month.....	2,250	89+	10+
Of the 2,674 babies still under observation at the end of the third month.....	2,492	93+	6+
Of the 2,847 babies still under observation at the end of the second month.....	2,761	96+	3+

TABLE 2.—JANUARY, 1919, CASES

Six hundred and thirty-six babies were born in Minneapolis during January, 1919. Of these, at the end of each month listed, the data are shown.

	Jan. 31, 1919	Feb. 28, 1919	March 31, 1919	April 30, 1919	May 31, 1919	June 30, 1919	July 31, 1919	Aug. 31, 1919	Sept. 30, 1919
Breast fed.....	516	486	427	590	345	301	224	146	88
Breast fed complemental*.....	33	41	67	66	75	94	138	198	242
Total breast fed.....	549	527	494	656	420	395	362	344	330
Artificially fed.....	...	8	24	39	56	80	70	75	85
Total under observation†.....	549	535	518	495	476	455	432	419	415
Artificially fed from birth.....	13	13	13	13	13	13	13	13	13
Baby died.....	18	21	25	27	28	29	29	31	31
Mother died.....	3	3	3	3	3	3	3	3	3
Refused to give information.....	0	3	3	5	5	6	7	7	7
Moved out of town.....	2	6	13	23	31	40	46	48	49
Cannot be traced.....	11	15	21	30	40	50	66	75	78
Out of town cases.....	40	40	40	40	40	40	40	40	40
	636	636	636	636	636	636	636	636	636

#### RESULT

	Breast Fed		Percentage on Arti- ficial Food
	Number	Per Cent.	
Of the 415 January babies still under observation Sept. 30, 1919 .....	330	79+	20+
Of the 419 January babies still under observation Aug. 31, 1919 .....	344	82+	17+
Of the 432 January babies still under observation July 31, 1919 .....	362	83+	16+
Of the 455 January babies still under observation June 30, 1919 .....	395	86+	13+
Of the 476 January babies still under observation May 31, 1919 .....	420	88+	10+
Of the 495 January babies still under observation April 30, 1919 .....	456	92+	7+
Of the 518 January babies still under observation March 31, 1919 .....	494	95+	4+
Of the 535 January babies still under observation Feb. 28, 1919 .....	527	98+	1+

\* By "complemental" is meant breast fed with an addition of some artificial mixture after the breast feeding.

† Sixty-seven mothers of January babies were taught expression of milk from the breasts in order to stimulate the breasts and thereby increase the milk supply.

‡ Jan. 31, 1919, we had 549 of the babies born in January under observation. Sept. 30, 1919, we had 415 of these babies still under observation, 134 of the 549 babies under observation on Jan. 31, 1919, having been dropped for the following reasons: baby died, 13 cases; refused to give information, 7 cases; moved out of town, 47 cases; cannot be traced, 67 cases.

TABLE 3.—FEBRUARY, 1919, CASES

Six hundred and twenty-one babies were born in Minneapolis during February, 1919. Of these, at the end of each month listed, the data are presented.

	Feb. 18, 1919	March 31, 1919	April 30, 1919	May 31, 1919	June 30, 1919	July 31, 1919	Aug. 31, 1919	Sept. 30, 1919	Oct. 31, 1919
Breast fed.....	520	493	418	362	326	260	188	116	77
Breast fed complemental.....	31	46	61	63	78	126	168	215	224
Total breast fed*.....	551	539	479	425	404	386	356	331	301
Artificially fed.....	...	4	21	38	44	57	77	88	91
Total under observation†.....	551	543	500	463	448	443	433	419	392
Artificially fed from birth.....	11	11	11	11	11	11	11	11	11
Baby died.....	20	23	23	24	25	26	28	28	28
Mother died.....	1	1	3	3	3	3	3	3	3
Refused to give information.....	0	0	1	1	1	2	2	2	2
Moved out of town.....	0	3	19	39	39	40	41	45	54
Cannot be traced.....	4	6	30	46	60	62	69	79	97
Out of town cases.....	34	34	24	34	34	34	34	34	34
	621	621	621	621	621	621	621	621	621

RESULT

	Breast Fed		Percentage on Arti- ficial Food
	Number	Per Cent.	
Of the 392 February babies still under observation Oct. 31, 1919 .....	301	77+	22+
Of the 419 February babies still under observation Sept. 30, 1919 .....	331	78+	21+
Of the 433 February babies still under observation Aug. 31, 1919 .....	356	82+	17+
Of the 443 February babies still under observation July 31, 1919 .....	386	87+	12+
Of the 448 February babies still under observation June 30, 1919 .....	404	90+	9+
Of the 463 February babies still under observation May 31, 1919 .....	425	91+	7+
Of the 500 February babies still under observation April 30, 1919.....	479	95+	4+
Of the 543 February babies still under observation March 31, 1919 .....	539	99+	1/4+

\* Fifty-four mothers of February babies were taught expression of milk from the breasts in order to stimulate the breasts and thereby increase the milk supply.

† Feb. 28, 1919, 551 of the babies born in February were under observation. Oct. 31, 1919, 392 of these babies were still under observation, 159 of the 551 babies under observation Feb. 28, 1919, having been dropped for the following reasons: baby died, 8 cases; mother died, 2 cases; refused to give information, 2 cases; moved out of town, 54 cases; cannot be traced, 93 cases.

The cold figures are lifeless but, of course, necessary. I have often thought of it in comparison with our judgment of certain therapeutic procedures. The statistics of the effect of diphtheria antitoxin are of interest and, of course, are also necessary, but each of us has seen the brilliant effect of the administration of the serum in the individual cases which appeals to us more. I remember the enthusiasm of my father, who practiced medicine during the time of the introduction of antitoxin. In like manner our workers became enthused over the fine results in the individual cases. We find that many of them

who could not well afford it were willing to do this work for less pay because of the remarkable results that they saw before them. One of the members of this society once heard me discussing this subject. He evinced some interest and some mental reserve. Later he came out to see us and I sent him out into the field with a nurse, keeping away myself. He saw two cases and ceased to be skeptical about maintenance of breast feeding and was wholly convinced and enthusiastic.

We wish now to supplement this study with one of rural conditions in the state.

Through the members of our staff who are sent out on our rural clinics, we get reports from certain districts in which rickets is very

TABLE 4.—MARCH, 1919, CASES

Seven hundred and ninety-nine babies born in Minneapolis during March, 1919. Of these, at the end of each month listed, the data are presented.

	March 31, 1919	April 30, 1919	May 31, 1919	June 30, 1919	July 31, 1919	Aug. 31, 1919	Sept. 30, 1919	Oct. 31, 1919	Nov. 30, 1919
Breast fed.....	615	541	470	429	377	339	234	130	62
Breast fed complemental.....	30	52	78	74	88	115	181	261	273
Total breast fed*.....	645	593	548	503	465	454	415	391	335
Artificially fed.....	...	41	58	74	87	96	102	119	132
Total under observation†.....	645	634	606	577	552	550	517	510	467
Artificially fed from birth.....	25	25	25	25	25	25	25	25	25
Baby died.....	20	29	30	32	32	32	35	35	35
Mother died.....	5	5	5	5	5	5	5	5	5
Refused to give information.....	1	1	1	1	1	1	1	1	1
Moved out of town.....	15	16	25	39	49	50	62	67	90
Cannot be traced.....	25	26	44	57	72	73	91	93	113
Out of town cases.....	63	63	63	63	63	63	63	63	63
	799	799	799	799	799	799	799	799	799

## RESULT

	Breast Fed		Percentage on Arti- ficial Food
	Number	Per Cent.	
Of the 467 March babies still under observation November 30, 1919 .....	335	71+	28+
Of the 510 March babies still under observation Oct. 31, 1919 .....	391	76+	23+
Of the 517 March babies still under observation Sept. 30, 1919 .....	415	80+	19+
Of the 550 March babies still under observation Aug. 31, 1919 .....	454	82+	17+
Of the 552 March babies still under observation July 31, 1919 .....	465	84+	15+
Of the 577 March babies still under observation June 30, 1919 .....	503	87+	12+
Of the 606 March babies still under observation May 31, 1919 .....	548	90+	9+
Of the 643 March babies still under observation April 30, 1919 .....	593	93+	6+

\* Eighty-three mothers of March babies were given special attention and taught expression of milk from the breasts in order to stimulate the breasts and thereby increase the milk supply.

† March 31, 1919, 645 of the babies born in March were under observation. Nov. 30, 1919, 467 of these babies still were under observation, 178 of the 645 babies under observation March 31, 1919, having been dropped for the following reasons: baby died, 15 cases; moved out of town, 75 cases; cannot be traced, 88 cases.



common. In these neighborhoods infants are weaned for insufficient reasons. Fortunately, most of the children in the territory covered by our rural clinics, are breast fed. The study of breast feeding in smaller towns and rural districts should be very interesting, and should be made through the physicians as in Minneapolis. The conditions in certain other cities of large and smaller size and the same size over the country should be determined. Minneapolis has a low infant mortality for a city of its size. However, for the first year of the application of this work, the mortality dropped definitely. This may be entirely coincident, but I do not believe that it is.

TABLE 5.—APRIL, 1919, CASES

Seven hundred and nineteen babies born in Minneapolis during April, 1919. Of these, at the end of each month listed, the data are given.

	April 30, 1919	May 31, 1919	June 30, 1919	July 31, 1919	Aug. 31, 1919	Sept. 30, 1919	Oct. 31, 1919	Nov. 30, 1919	Dec. 31, 1919
Breast fed.....	599	573	486	436	386	312	185	93	35
Breast fed complemental.....	17	27	56	70	93	134	225	221	224
Total breast fed*.....	616	600	542	506	479	446	410	314	259
Artificially fed.....	...	8	22	30	47	60	74	89	128
Total under observation†.....	616	608	564	536	526	506	484	403	387
Artificially fed from birth.....	7	7	7	7	7	7	7	7	7
Baby died.....	19	25	25	26	27	27	28	28	29
Mother died.....	1	1	2	2	2	2	2	2	2
Refused to give information.....	0	0	0	0	0	0	0	0	0
Moved out of town.....	8	9	35	48	53	62	67	70	71
Cannot be traced.....	15	16	33	47	51	62	77	155	169
Out of town cases.....	53	53	53	53	53	53	53	53	53
	719	719	719	719	719	719	719	719	719

RESULT

	Breast Fed		Percentage on Arti- ficial Food
	Number	Per Cent.	
Of the 387 April babies still under observation Dec. 31, 1919 .....	259	66+	33+
Of the 408 April babies still under observation Nov. 30, 1919 .....	314	77+	22+
Of the 484 April babies still under observation Oct. 31, 1919 .....	410	84+	15+
Of the 506 April babies still under observation Sept. 30, 1919 .....	446	88+	11+
Of the 526 April babies still under observation Aug. 31, 1919 .....	479	91+	8+
Of the 536 April babies still under observation July 31, 1919 .....	506	94+	5+
Of the 564 April babies still under observation June 30, 1919 .....	542	96+	3+
Of the 608 April babies still under observation May 31, 1919 .....	600	98+	1+

\* Sixty mothers of April babies were taught expression of milk from the breast in order to stimulate the breasts and thereby increase the milk supply.

† April 30, 1919, we had 616 of the babies born in April under observation. Dec. 31, 1919, we had 387 of these babies still under observation, 229 of the 616 babies under observation April 30, 1919, having been dropped for the following reasons: baby died, 10 cases; mother died, 2 cases; moved out of town, 63 cases; cannot be traced, 154 cases.

TABLE 6.—MAY, 1919, CASES

Six hundred and fifty-seven babies born in Minneapolis during May, 1919.  
Of these, at the end of each month listed, the data are shown.

	May 31, 1919	June 30, 1919	July 31, 1919	Aug. 31, 1919	Sept. 30, 1919	Oct. 31, 1919	Nov. 30, 1919	Dec. 31, 1919	Jan. 31, 1920
Breast fed.....	506	446	363	301	266	221	164	87	66
Breast fed complemental.....	32	56	66	59	56	90	103	164	181
Total breast fed*.....	538	502	429	360	322	311	267	251	247
Artificially fed.....	...	16	54	74	88	90	107	111	114
Total under observation†.....	538	518	483	434	410	401	374	362	361
Artificially fed from birth.....	11	11	11	11	11	11	11	11	11
Baby died.....	17	22	22	24	24	25	26	26	26
Mother died.....	2	2	2	2	2	2	2	2	2
Refused to give information.....	0	0	0	0	0	0	0	0	0
Moved out of town.....	7	9	19	32	53	56	56	59	59
Cannot be traced.....	30	43	68	102	105	110	136	145	146
Out of town cases.....	52	52	52	52	52	52	52	52	52
	657	657	657	657	657	657	657	657	657

## RESULT

	Breast Fed		Percentage on Arti- ficial Food
	Number	Per Cent.	
Of the 361 May babies still under observation Jan. 31, 1920.....	247	68+	31+
Of the 362 May babies still under observation Dec. 31, 1919.....	251	69+	30+
Of the 374 May babies still under observation Nov. 30, 1919.....	267	71+	28+
Of the 401 May babies still under observation Oct. 31, 1919.....	311	77+	22+
Of the 410 May babies still under observation Sept. 30, 1919.....	322	78+	21+
Of the 434 May babies still under observation Aug. 31, 1919.....	360	82+	17+
Of the 483 May babies still under observation July 31, 1919.....	429	88+	11+
Of the 518 May babies still under observation June 30, 1919.....	502	96+	3+

\* Forty-five mothers of May babies were taught expression of milk from the breasts in order to stimulate the breasts and thereby increase the milk supply.

† May 31, 1919, 538 of the babies born in May were under observation. Jan. 31, 1920, 361 of these babies still were under observation, 177 of the 538 babies under observation May 31, 1919, having been dropped for the following reasons: baby died, 9 cases; mother died, 52 cases; cannot be traced, 116 cases.