EFFECTIVENESS OF NATALAC AS A GALACTOGOGUE

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ABSTRACT

An investigation was undertaken to determine the effectiveness of malunggay or Moringa oleifera leaves (encapsulated into Natalac, each capsule containing 250 mg. of malunggay leaves) as a galactogogue among normal parturients. A total of 116 normal term pregnant Filipino women were included in the study. These mothers do not intend to feed milk formula, nor give their babies solid foods before 4 months of age, and their babies were of normal gestational age and weighed between 2500 and 5000 grams at birth. Immediately after delivery, the patients were given capsules which were coded at source: 58 Natalac and 58 placebo. Prolactin determinations were done within 6 hours, 48 hours after, and 4 months after delivery. Infant suckling was immediately started after the first extraction for prolactin. The baby's weights were recorded at birth, at 1 week, at 2 weeks, at 1 month, and at 4 months of age. Data obtained were subjected to statistical test: t-test for difference between means.

Significantly higher prolactin levels were obtained after 48 hours and 4 months from first extraction among the treatment (Natalac) group at a p level of <0.01 accompanied by significant weight gains among the babies at a p level of <0.01.

Keywords: Galactogogue, Moringa oleifera, Breastfeeding

INTRODUCTION

Mother's milk is the best food for its newborn. The campaign for breastfeeding is being pursued by the Department of Health, the World Health Organization (W.H.O.), the United Nationas International Children's Educational Fund (U.N.I.C.E.F.), and all organizations involved with the improvement of the health of the mother and the infant.[1]

Breastfeeding is much more beneficial to the newborn than bottle feeding. Mothers are convinced about the advantages of breastfeeding but most often they complain about the inadequacy of milk supply from their breasts.[2]

Malunggay **(Moringa oleifera)** leaves in chicken and shellfish soups have been used by generations of Filipino mothers to enhance breast milk production. The mechanism of action has not been explained but it was effective as a galactogogue (an agent that induces or enhances the secretion of milk). Malunggay leaves have been encapsulated in the form of Natalac and one capsule is equivalent to 250 mg. of malunggay leaves.

A study of the initiation and maintenance of milk production depends on several processes:

1. **Mammogenesis** or development of the mammary glands - ductal growth and lactoalveolar growth through estrogen, progesterone, growth hormone, prolactin, and glucocorticoids.[3, 4, 5]

2. **Lactogenesis** or initiation of milk secretion - this depends on a fully developed mammary gland and the withdrawal of estrogen and progesterone on delivery of the baby and placenta.[6, 7]

3. **Galactokinetic hormones** - oxytocin is the most powerful galactokinetic hormone causing contraction of the myoepithelial cells squeezing out the milk in the lumina of the alveoli into the ducts. The stimulus for oxytocin release is the suckling of the infant. Oxytocin release is essential for milk removal. Frequent suckling and adequate milk injection therefore promotes the production of milk. The reflex release of oxytocin is experienced as **"milk let-down."**[8, 9, 10]

Oxytocin released during suckling affects the uterus by causing it to contract expelling the lochia favoring involution. Oxytocin release can be inhibited by stressful situations.

4. **Galactopoiesis** - maintenance of established milk secretion. Prolactin is the single most important

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galactopoietic hormone. Hans Selye was the first to realize that suckling provides the stimulus that supports lactation. Each suckling episode is associated with a rapid rise in plasma prolactin. Prolactin levels peak in 20 to 40 minutes and return near the baseline in about 3 to 4 hours.[4, 11, 12]

Frequent nursing is required to maintain the elevated prolactin on which continued milk secretion depends. A delay of 1 to 2 days in the initiation of nursing results in diminished responsiveness of the pituitary. Nicotine decreases the amount of prolactin released in response to the suckling stimulus.[13, 14]

Drugs that stimulate prolactin release are reserpine, metoclopramide, sulpiride, and thyrotropin releasing hormone (TRH).[3]

OBJECTIVES

An investigation was undertaken to determine the effectiveness of malunggay (Natalac) as a galactogogue among normal patients.

MATERIALS AND METHODS

A total of 116 normal term pregnant Filipino patients from Barangay del Remedio in San Pablo City were included in the study which lasted from November 1994 till September 1995. Selection criteria for the study were as follows: (1) mothers did not plan to feed milk formula, (2) solid foods would not be introduced before 4 months of age, (3) infants were healthy, were of normal gestational age (38 to 42 weeks gestation), and weighed 2500 to 5000 grams at birth; and (4) mothers did not have any chronic illness and were not taking any medication on a regular basis. Informed consent was obtained from all mothers.

Immediately after delivery, patients were given capsules, the content of which the researchers do not know. The capsules have been coded at source: 58 Natalac (NATC-T) and 58 Placebo (NATC-F). The administration of these capsules were repeated after every 12 hours for four months.

Prolactin determination was done by extraction of 4 ml. whole blood from the antecubital vein of the postpartum women at three stages:

1. within 6 hours of delivery before infants suckling and capsule intake
2. 48 hours after delivery - 30 minutes after infant suckling
3. 4 months after delivery - 30 minutes after infant suckling

The blood was allowed to stand to effect separation of the serum. About 1 ml. of serum was extracted thereafter and subjected to prolactin determination using the ELISA (Enzyme linked immunosorbent assay) technique.

Infant suckling was started within 6 to 12 hours after delivery for a duration of 10 to 15 minutes to each breast, every 2-1/2 to 3 hours for a total of 8 to 10 times a day. The timing of the appearance of breast engorgement and milk let-down were recorded.

The infants' weights were recorded at birth, at 2 weeks, at 1 month, and at 4 months of age.

Data obtained from this double-blind study were subjected to statistical tests: t-test for difference between means.

RESULTS

Table 1 shows the age, parity, type of capsule taken, and levels of serum prolactin, each of the three extractions done during the study. While Table 2 lists the infants' weights recorded at different periods in the study.

The desired sample size was 100. To allow for attrition, we recruited 120 subjects. The number of mothers who remained in the study at 4 months were 116. Four subjects dropped out; one for infant mortality, three for transfer of residence.

The average age was 27.53 years with a standard deviation of 6.4663 for the Natalac or treatment group and 26.58 years with a standard deviation of 5.6547 for the placebo group. Ten per cent (10%) and 17% were primiparas while 90% and 83% were multiparas in the treatment and placebo groups, respectively. (Table 3)

Breast engorgement occurred 24 hours after delivery in the majority of patients from both groups: 98.3% for both the treatment and placebo groups (Table 4). Milk let-down for these patients occurred after 48 hours (Table 5).

Table 7 shows the mean levels of serum prolactin at first, second and third extractions between the two groups. Prolactin levels were higher in the treatment group and are significant at a p level of <0.01 for the second (t value = 4.789) and third (t value = 13.27) extractions. There were also significant increases of prolactin values during the latter two extractions in the treatment group as compared to the placebo group at a p level of <0.01. t values obtained were 5.824 and 5.372 for differenced between the baseline or first extraction with the second and third extractions, respectively.

A record of the infants' weights at birth, at 1 week, at 2 weeks, at 1 month, and at 4 months are shown on Table 2. Table 6, on the other hand, contained statistical data on the infants' weights which revealed significantly higher weight gains among the babies from the treatment group at a p level of <0.01. t values were 3,165 at 1 month of infant age and 5,362 at 4 months of age.

Table I. Maternal Age, Parity, and Serum Prolactin Levels.

PATIENT	AGE	PARITY	CAPSULES TAKEN	FIRST EXTRACTION	SECOND EXTRACTION	THIRD EXTRACTION
1. E.C.	30	G3P3	NATC-T	8412 mIU/l	7818 mIU/l	1431 mIU/l
2. M.A.	20	G1P1	NATC-T	5827 mIU/l	7350 mIU/l	1797 mIU/l
3. B.C.	25	G1P1	NATC-F	3009 mIU/l	3308 mIU/l	575 mIU/l
4. J.J.	22	G1P1	NATC-F	7669 mIU/l	4265 mIU/l	360 mIU/l
5. N.V.	22	G2P2	NATC-T	5426 mIU/l	3589 mIU/l	1767 mIU/l
6. B.A.	38	G8P6	NATC-T	3083 mIU/l	8332 mIU/l	1172 mIU/l
7. B.P.	27	G3P3	NATC-T	5481 mIU/l	3360 mIU/l	1387 mIU/l
8. R.J.	24	G2P2	NATC-F	8520 mIU/l	5954 mIU/l	305 mIU/l
9. J.A.	28	G2P2	NATC-F	2354 mIU/l	685 mIU/l	779 mIU/l
10. E.B.	19	G1P1	NATC-T	3569 mIU/l	6549 mIU/l	dropped out
11. M.S.	22	G1P1	NATC-F	4771 mIU/l	6948 mIU/l	376 mIU/l
12. J.B.	28	G2P2	NATC-T	4283 mIU/l	6777 mIU/l	2019 mIU/l
13. R.P.	36	G8P7	NATC-F	7636 mIU/l	2349 mIU/l	513 mIU/l
14. R.A.	28	G2P2	NATC-F	7604 mIU/l	5698 mIU/l	116 mIU/l
15. R.E.	19	G1P1	NATC-T	2070 mIU/l	3292 mIU/l	3160 mIU/l
16. T.R.	37	G4P3	NATC-T	4205 mIU/l	4302 mIU/l	2396 mIU/l
17. E.B.	32	G5P5	NATC-T	2987 mIU/l	5689 mIU/l	2639 mIU/l
18. L.M.	41	G5P5	NATC-T	3459 mIU/l	5007 mIU/l	1737 mIU/l
19. H.Y.	28	G1P1	NATC-F	5348 mIU/l	1546 mIU/l	448 mIU/l
20. C.S.	43	G6P6	NATC-F	>8800 mIU/l	2751 mIU/l	316 mIU/l
21. L.G.	33	G6P6	NATC-F	5016 mIU/l	4161 mIU/l	502 mIU/l
22. R.R.	25	G1P1	NATC-F	4420 mIU/l	1138 mIU/l	251 mIU/l
23. F.D.	29	G4P4	NATC-F	4804 mIU/l	7472 mIU/l	707 mIU/l
24. M.A.	18	G1P1	NATC-T	6451 mIU/l	5870 mIU/l	2095 mIU/l
25. E.T.	27	G3P3	NATC-T	5063 mIU/l	6923 mIU/l	1621 mIU/l
26. M.B.	20	G1P1	NATC-F	5221 mIU/l	3609 mIU/l	622 mIU/l
27. M.P.	21	G2P2	NATC-F	6621 mIU/l	5572 mIU/l	770 mIU/l
28. R.R.	34	G6P6	NATC-T	>8800 mIU/l	3811 mIU/l	2568 mIU/l
29. S.D.	23	G2P2	NATC-T	6263 mIU/l	7758 mIU/l	3232 mIU/l
30. A.D.	26	G2P2	NATC-F	>8800 mIU/l	7513 mIU/l	128 mIU/l
31. R.P.	24	G3P2	NATC-F	3423 mIU/l	1973 mIU/l	235 mIU/l
32. M.N.	31	G4P3	NATC-F	4620 mIU/l	1673 mIU/l	451 mIU/l
33. E.V.	28	G2P2	NATC-T	8256 mIU/l	7952 mIU/l	2970 mIU/l
34. R.L.	25	G3P3	NATC-F	4667 mIU/l	4869 mIU/l	735 mIU/l
35. R.M.	32	G2P2	NATC-T	2632 mIU/l	7203 mIU/l	2835 mIU/l
36. L.C.	35	G4P4	NATC-F	1061 mIU/l	1686 mIU/l	300 mIU/l
37. M.O.	38	G3P3	NATC-T	4007 mIU/l	3958 mIU/l	1371 mIU/l
38. S.B.	30	G1P1	NATC-T	5020 mIU/l	1503 mIU/l	1975 mIU/l
39. R.D.	32	G5P5	NATC-F	2753 mIU/l	1032 mIU/l	500 mIU/l
40. C.V.	24	G1P1	NATC-F	6112 mIU/l	5955 mIU/l	690 mIU/l
41. C.N.	28	G3P3	NATC-F	3350 mIU/l	1884 mIU/l	402 mIU/l
42. C.C.	25	G2P2	NATC-F	3988 mIU/l	2526 mIU/l	861 mIU/l
43. C.M.	21	G1P1	NATC-F	4113 mIU/l	3472 mIU/l	265 mIU/l
44. M.C.	23	G3P3	NATC-F	841 mIU/l	1022 mIU/l	752 mIU/l
45. R.B.	25	G2P2	NATC-T	3469 mIU/l	4908 mIU/l	2391 mIU/l
46. N.M.	26	G2P2	NATC-F	6540 mIU/l	2448 mIU/l	851 mIU/l
47. E.M.	28	G3P2	NATC-F	5791 mIU/l	436 mIU/l	750 mIU/l
48. G.D.	19	G2P2	NATC-F	5504 mIU/l	480 mIU/l	555 mIU/l
49. D.P.	24	G3P3	NATC-T	1396 mIU/l	1512 mIU/l	1206 mIU/l
50. M.L.	21	G2P2	NATC-F	158 mIU/l	2421 mIU/l	177 mIU/l
51. R.C.	30	G3P3	NATC-F	4442 mIU/l	1461 mIU/l	268 mIU/l
52. M.M.	21	G1P1	NATC-F	4522 mIU/l	268 mIU/l	48 mIU/l
53. N.R.	25	G2P2	NATC-F	5667 mIU/l	3665 mIU/l	690 mIU/l
54. R.N.	33	G4P4	NATC-F	6179 mIU/l	748 mIU/l	113 mIU/l
55. J.C.	27	G2P2	NATC-F	3868 mIU/l	860 mIU/l	886 mIU/l
56. C.H.	25	G2P2	NATC-F	7925 mIU/l	5896 mIU/l	DROPPED OUT
57. E.A.	18	G2P2	NATC-T	4087 mIU/l	4139 mIU/l	3245 mIU/l
58. E.T.	23	G2P2	NATC-F	3308 mIU/l	3851 mIU/l	324 mIU/l
59. C.P.	37	G4P4	NATC-T	1272 mIU/l	3605 mIU/l	2001 mIU/l

60.	C.M.	31	G3P2	NATC-T	4750 mIU/l	5557 mIU/l	1987 mIU/l
61.	E.S.	30	G2P2	NATC-T	8317 mIU/l	7642 mIU/l	3701 mIU/l
62.	N.C.	35	G4P3	NATC-T	8283 mIU/l	7629 mIU/l	2558 mIU/l
63.	E.L.	32	G1P1	NATC-T	3169 mIU/l	2175 mIU/l	1875 mIU/l
64.	E.R.	24	G2P2	NATC-F	4511 mIU/l	1651 mIU/l	460 mIU/l
65.	I.G.	28	G1P1	NATC-T	5073 mIU/l	6030 mIU/l	2100 mIU/l
66.	S.C.	22	G1P1	NATC-T	4443 mIU/l	6022 mIU/l	2692 mIU/l
67.	M.T.	25	G1P1	NATC-T	7664 mIU/l	>8000 mIU/l	3112 mIU/l
68.	L.C.	28	G3P3	NATC-T	3896 mIU/l	3339 mIU/l	4732 mIU/l
69.	A.A.	34	G4P4	NATC-F	1405 mIU/l	2036 mIU/L	302 mIU/l
70.	J.C.	22	G3P3	NATC-F	7881 mIU/l	3051 mIU/l	145 mIU/l
71.	V.A.	19	G2P2	NATC-F	1333 mIU/l	1383 mIU/l	288 mIU/L
72.	E.S.	15	G1P1	NATC-F	4608 mIU/l	DROPPED OUT	
73.	M.V.	29	G2P2	NATC-F	2438 mIU/l	2000 mIU/l	724 mIU/l
74.	M.F.	24	G2P2	NATC-T	2945 mIU/l	1637 mIU/l	1243 mIU/L
75.	M.D.	28	G3P3	NATC-T	6041 mIU/l	5710 mIU/l	4301 mIU/l
76.	I.G.	25	G2P2	NATC-T	7541 mIU/l	3053 mIU/l	1189 mIU/l
77.	E.R.	20	G2P2	NATC-T	2948 mIU/l	3305 mIU/L	2141 mIU/l
78.	V.M.	32	G6P5	NATC-F	609 mIU/l	897 mIU/l	490 mIU/l
79.	G.E.	39	G5P4	NATC-T	285 mIU/l	DROPPED OUT	
80.	A.S.	34	G2P2	NATC-T	7160 mIU/l	7009 mIU/l	1895 mIU/l
81.	E.J.	21	G3P3	NATC-F	6266 mIU/l	2453 mIU/l	400 mIU/l
82.	J.E.	26	G2P2	NATC-T	4735 mIU/l	2399 mIU/l	3171 mIU/l
83.	S.A.	44	G4P4	NATC-F	2383 mIU/l	2166 mIU/l	363 mIU/l
84.	A.E.	21	G1P1	NATC-T	1420 mIU/l	2876 mIU/l	2455 mIU/l
85.	W.R.	36	G2P2	NATC-T	3809 mIU/l	4690 mIU/l	1329 mIU/l
86.	J.Y.	28	G3P3	NATC-F	4245 mIU/l	3978 mIU/l	322 mIU/l
87.	A.A.	24	G2P2	NATC-T	2919 mIU/l	2241 mIU/l	1307 mIU/l
88.	J.G.	21	G3P3	NATC-F	6449 mIU/l	5191 mIU/l	486 mIU/l
89.	S.C.	37	G7P7	NATC-T	2261 mIU/l	5898 mIU/l	3366 mIU/l
90.	A.A.	19	G2P2	NATC-T	1548 mIU/l	4326 mIU/l	1884 mIU/l
91.	N.M.	25	G2P2	NATC-T	5346 mIU/l	8649 mIU/l	2198 mIU/l
92.	R.S.	20	G2P2	NATC-T	4880 mIU/l	2588 mIU/l	1494 mIU/l
93.	A.B.	21	G3P3	NATC-F	>8800 mIU/l	4844 mIU/l	504 mIU/l
94.	R.V.	27	G2P2	NATC-F	5087 mIU/l	4479 mIU/l	650 mIU/l
95.	B.T.	26	G2P2	NATC-F	6883 mIU/l	4595 mIU/l	352 mIU/l
96.	M.C.	28	G3P3	NATC-T	5504 mIU/l	6878 mIU/l	3098 mIU/l
97.	B.G.	32	G2P2	NATC-T	7743 mIU/l	>8800 mIU/l	3550 mIU/l
98.	H.R.	40	G6P6	NATC-T	4552 mIU/l	6893 mIU/l	2899 mIU/l
99.	A.M.	38	G4P4	NATC-T	5229 mIU/l	7888 mIU/l	4208 mIU/l
100.	P.B.	15	G1P1	NATC-T	7542 mIU/l	>8800 mIU/l	2817 mIU/l
101.	E.M.	21	G3P3	NATC-F	5540 mIU/l	3892 mIU/l	752 mIU/l
102.	B.L.	22	G2P2	NATC-F	6575 mIU/l	4884 mIU/l	801 mIU/l
103.	M.N.	27	G4P4	NATC-T	8800 mIU/l	8132 mIU/l	1939 mIU/l
104.	C.G.	25	G2P2	NATC-T	3292 mIU/l	5492 mIU/l	3048 mIU/l
105.	A.F.	28	G3P3	NATC-T	2610 mIU/l	5001 mIU/l	2948 mIU/l
106.	R.H.	23	G2P2	NATC-T	6091 mIU/l	4336 mIU/l	2443 mIU/l
107.	V.M.	23	G2P2	NATC-T	4126 mIU/l	6176 mIU/l	3788 mIU/l
108.	E.S.	27	G3P3	NATC-T	6594 mIU/l	4856 mIU/l	4216 mIU/l
109.	M.T.	22	G2P2	NATC-T	8000 mIU/l	6998 mIU/l	3223 mIU/l
110.	J.T.	20	G2P2	NATC-T	3021 mIU/l	2789 mIU/l	3126 mIU/l
111.	A.A.	26	G2P2	NATC-F	>8800 mIU/l	5234 mIU/l	476 mIU/l
112.	C.C.	28	G3P3	NATC-F	3778 mIU/l	4116 mIU/l	493 mIU/l
113.	J.S.	30	G3P2	NATC-F	2493 mIU/l	1851 mIU/l	119 mIU/l
114.	L.A.	25	G1P1	NATC-F	6134 mIU/l	5259 mIU/l	155 mIU/l
115.	M.L.	24	G2P2	NATC-T	>8800 mIU/l	7758 mIU/l	3878 mIU/l
116.	B.L.	36	G4P4	NATC-F	8769 mIU/l	6004 mIU/l	802 mIU/l
117.	R.D.	27	G3P3	NATC-T	5660 mIU/l	4610 mIU/l	3050 mIU/l
118.	P.S.	28	G2P2	NATC-F	7665 mIU/l	6042 mIU/l	498 mIU/l
119.	I.T.	23	G2P2	NATC-F	7945 mIU/l	5255 mIU/l	628 mIU/l
120.	G.G.	24	G3P3	NATC-F	6854 mIU/l	4089 mIU/l	820 mIU/l

Table II. Records of Infants Weights (Kg).

PATIENT	BIRTH WEIGHT	ONE WEEK	TWO WEEKS	ONE MONTH	FOUR MONTHS
1. E.C.	2.89	2.89	3.32	4.54	5.75
2. M.A.	2.27	2.38	3.18	4.54	8.8
3. B.C.	3.18	3.18	3.18	4.09	5.0
4. J.J.	3.6	3.6	3.6	4.54	5.45
5. N.V.	2.27	2.5	2.7	3.6	8.3
6. B.A.	2.5	2.5	2.7	3.5	5.8
7. B.P.	3.5	3.5	3.9	4.5	7.4
8. R.J.	2.8	2.8	2.9	3.3	5.0
9. J.A.	2.5	2.5	2.7	3.0	4.8
10. E.B.	4.0	4.0	4.0	4.2	EXPIRED
11. M.S.	3.0	3.0	3.0	3.5	4.5
12. J.B.	3.18	3.18	3.43	4.54	10.0
13. R.P.	4.0	4.0	4.0	4.8	6.2
14. R.A.	3.0	3.5	3.5	4.0	5.2
15. R.E.	2.7	2.7	2.95	4.09	9.0
16. T.R.	3.18	3.29	4.09	4.54	8.0
17. E.B.	2.6	2.6	2.7	4.0	5.8
18. L.M.	3.6	3.8	4.09	5.9	10.5
19. H.Y.	3.2	3.2	3.2	3.6	4.8
20. C.S.	3.1	3.1	3.1	4.2	4.9
21. L.G.	3.0	3.0	3.2	4.2	5.1
22. R.R.	3.2	3.2	3.2	3.8	5.0
23. F.D.	2.8	2.8	2.9	3.3	4.8
24 M.A.	2.7	2.78	3.18	4.54	10.0
25. E.T.	2.92	2.92	3.35	4.54	9.0
26. M.B.	2.7	2.7	3.18	3.75	4.9
27. M.P.	2.5	2.5	2.6	2.9	4.2
28. R.R.	2.7	2.7	2.92	3.6	5.8
29. S.D.	3.18	3.23	3.6	4.54	10.0
30. A.D.	2.7	2.7	2.8	3.1	5.0
31. R.P.	3.2	3.1	3.5	3.8	6
32. M.N.	2.7	2.8	2.85	3.2	5.1
33. E.V.	3.4	3.3	3.7	4.6	8.0
34. R.L.	2.8	2.8	2.9	3.3	5.0
35. P.M.	2.9	2.8	3.4	4.6	8.0
36. L.C.	3.0	3.2	3.5	4.0	5.2
37. M.O.	3.18	3.18	3.32	4.0	6.9
38. S.B.	3.22	3.1	3.3	3.8	6.8
39. R.D.	3.6	3.6	3.8	4,56	7.0
40. C.V.	3.1	3.2	3.4	4.5	5.6
41. C.N.	3.32	3.2	3.4	4.1	6.0
42. C.C.	3.4	3.4	3.5	4.0	6.2
43. C.M.	2.8	2.8	2.8	3.2	5.0
44. M.C.	3.0	3.0	3.2	3.8	5.0
45. R.B.	3.18	3.18	3.32	4.0	6.8
46. N.M.	2.6	2.6	2.7	3.1	5.0
47. E.M.	3.5	3.5	3.5	4.0	6.2
48. G.D.	3.6	3.6	3.89	4.2	6.8
49. D.P.	3.4	3.4	3.6	4.4	7.4
50. M.L.	2.7	2.7	2.9	3.3	5.0
51. R.C.	3.0	3.0	3.1	3.7	5.7
52. M.M.	3.0	3.0	3.2	3.6	5.6
53. N.R.	2.6	2.6	2.7	3.2	5.0
54. R.N.	3.32	3.32	3.32	4.1	6.1
55. J.C.	3.4	3.4	3.5	4.0	6.5
56. C.H.	3.1	3.1	3.2	STOPPED	
57. E.A.	2.5	2.51	2.8	3.2	5.5
58. E.T.	3.4	3.3	3.7	4.0	6.6
59. P.C.	2.9	2.8	3.1	3.7	6.0
60. C.M.	3.0	3.1	3.18	3.8	6.3

61. E.S.	3.1	3.0	3.2	4.0	6.5
62. N.C.	3.3	3.32	3.6	4.3	7.0
63. E.L.	2.6	2.7	2.9	3.4	5.5
64. E.R.	2.8	2.9	3.1	3.7	6.0
65. I.G.	2.98	3.0	3.2	4.0	6.5
66. S.C.	3.02	3.02	3.2	3.8	6.4
67. M.T.	2.52	2.53	2.8	3.1	5.3
68. L.C.	3.18	3.2	3.23	3.7	6.6
69. A.A.	2.5	2.5	2.8	3.3	5.0
70. J.C.	3.0	3.0	3.2	3.5	5.4
71. V.A.	3.06	3.12	3.18	3.8	5.5
72. E.S.	2.7	2.7	2.8	STOPPED	
73. M.V.	3.1	3.0	3.3	3.8	5.7
74. M.F.	2.8	2.8	2.9	3.5	5.9
75. M.D.	3.0	3.0	3.3	4.0	6.5
76. I.G.	2.6	2.6	2.8	3.2	5.4
77. E.R.	2.27	2.27	2.4	2.9	4.8
78. V.M.	3.32	3.3	3.5	4.0	6.5
79. G.E.	2.75	STOPPED			
80. A.S.	2.84	2.7	3.0	3.3	5.7
81. E.J.	3.6	3.6	3.8	4.0	6.5
82. J.E.	2.86	2.86	3.32	3.8	5.8
83. S.A.	2.86	2.86	3.26	3.4	3.69
84. E.A.	3.1	3.0	3.4	4.0	6.4
85. W.R.	3.77	3.7	4.2	4.7	7.4
86. J.Y.	3.0	3.0	3.2	3.5	5.5
87. A.A.	3.4	3.6	3.77	4.5	8.7
88. J.G.	3.23	3.2	3.38	3.69	6.0
89. S.C.	2.81	2.81	2.9	3.6	5.8
90. A.A.	2.7	2.7	2.84	3.6	5.6
91. N.M.	2.9	2.8	3.1	3.8	6.3
92. R.S.	3.3	3.2	3.6	4.3	7.0
93. A.B.	3.4	3.3	3.6	4.0	6.7
94. R.V.	2.7	2.6	2.9	3.4	5.0
95. B.T.	2.7	2.7	2.76	3.2	5.0
96. M.C.	3.4	3.3	3.6	4.6	7.9
97. B.G.	2.95	3.0	3.32	3.58	6.4
98. H.R.	3.18	3.18	3.32	3.7	6.5
99. A.M.	3.1	3.1	3.6	4.2	6.9
100. P.B.	2.7	2.7	3.18	3.4	5.7
101. E.M.	2.7	2.7	3.1	3.2	5.0
102. B.L.	3.2	3.1	3.5	3.8	6.2
103. M.N.	3.4	3.35	3.4	4.2	7.0
104. C.G.	3.1	3.1	3.6	4.0	6.5
105. A.F.	3.3	3.2	3.6	4.1	6.8
106. R.H.	2.7	2.86	3.1	3.5	5.5
107. V.M.	3.23	3.23	3.4	3.6	6.6
108. E.S.	3.32	3.4	3.66	3.75	6.9
109. M.T.	2.95	3.0	3.32	3.6	6.2
110. J.T.	3.1	3.0	3.2	4.0	6.5
111. A.A.	2.78	2.78	2.95	3.18	5.0
112. C.C.	2.7	2.69	2.77	3.2	5.1
113. J.S.	3.35	3.3	3.6	4.0	6.4
114. L.A.	3.23	3.29	3.4	3.46	6.0
115. M.L.	3.18	3.18	3.32	3.6	6.4
116. B.L.	2.7	2.6	2.8	3.2	5.2
117. R.D.	2.7	2.8	2.95	3.1	5.8
118. P.S.	3.4	3.3	3.5	4.0	6.3
119. I.T.	3.1	3.1	3.3	3.8	5.7
120. G.G.	3.0	2.9	3.1	3.5	5.6

Table 3. Age and Parity Distribution

	Mean Age	Primipara	Multipara
Treatment group	27.53 years	6 (10%)	52 (90%)
Placebo group	26.58 years	10 (17%)	48 (83%)

Table 4. Breast Engorgement

	24 Hours	48 Hours	>48 Hours
Treatment group	57 (98.3%)	1 (1.7%)	0 (0%)
Placebo group	57 (98.3%)	1 (1.7%)	0 (0%)

Table 5. Milk Let-down

	48 Hours	72 Hours	96 Hours
Treatment group	57 (98.3%)	1 (1.7%)	0 (0%)
Placebo group	57 (98.3%)	1 (1.7%)	0 (0%)

Table 6. Statistical Analysis of Infants' Weights (kg.)

	Treatment Group		Placebo Group		
	Mean	S.D.	Mean	S.D.	t value
Birth Weight	3.001	0.3545	3.041	0.3309	-0.63
One Week	2.964	0.5207	3.041	0.3314	-0.96
Two Weeks	3.237	0.5645	3.205	0.3353	0.381
One Month	3.897	0.7184	3.563	0.7949	2.414
Four Months	6.646	1.7908	5.304	1.2036	4.817
PERCENTAGE WEIGHT GAIN:					
B.W. to 1 week	-1.3%	13.27%	0.029%	2.84%	-0.76
B.W. to 2 weeks	7.944%	15.649%	5.506%	4.3261%	1.163
B.W. to 1 month	30.31%	22.863%	17.04%	23.04%	3.165
B.W. to 4 months	123.6%	61.51%	74.41%	35.726%	5.362

Table 7. Statistical Analysis of Serum Prolactin Levels (mIU/l

	Treatment Group		Tratment Group		
	Mean	S.D.	Mean	S.D.	t value
1st Extraction	4808	2258.4	5134	2304.4	-0.78
2nd Extraction	5236	2252.4	3398	1939.5	4.789
3rd Extraction	2389	1019.7	504.1	412.64	13.27
Difference Between					
1st and 2nd	428.2	2132.4	-1735	1932.5	5.824
1st and 3rd	-2418	2178.1	-4630	2328.9	5.372

DISCUSSION

Lactagogues or galactogogues are special foods, drinks, or herbs which people believe can increase a mother's milk supply. In many parts of the Philippines, women take malunggay (Moringa oleifera) leaves in chicken or shellfish soups to help them lactate well. The mechanism of action has not been explained but it was effective as a galactogogue and has been used by generations of nursing mothers especially those with inadequate lactation.[1]

Lactogenesis, on the other hand, is initiated in the postpartum period by a fall in plasma progesterone in the presence of maintained prolactin concentrations.[15] Initiation of the process does not depend on suckling of the infant although the rate of milk secretion after the third or fourth day postpartum declines if milk removal is not practiced at regular intervals.[16] A study by de Carvalho et al in 1985, showed that frequent milk expression was associated with a significantly greater milk production than infrequent expression. He concluded that a low-cost, noninvasive method of enhancing milk production by mothers of nonnursing, prematurely delivered infants was to encourage frequent milk expression.[17] This was also the conclusion of Hopkinson et al in 1988 when he conducted a study on milk volume produced by women aged 20 to 38 years who delivered at 28 to 30 week's gestation. Optimal milk production was associated with five or more milk expressions per day and pumping durations that exceeded 100 minutes per day.[18]

This current study demonstrated the lactation-enhancing effect of malunggay (Natalac capsules) leaves as evidenced by the significantly greater increase in maternal serum prolactin levels and percentages of gains in the infants' weights among the patients belonging to the treatment or Natalac-treated group,. Majority of our patients were free from any form of anxiety or stress which may result in inadequate milk production. Nevertheless, there was one subject from each of the treatment and placebo groups who had breast engorgement and milk let-down a day later than the rest. These two mothers admitted to have had slight emotional stress secondary to family problems.

Practical advice, psychological support from close female relatives, and the help and encouragement of health workers are essential measures for successful breast feeding. This is supported by findings of recent research studies.

CONCLUSION

We have found that malunggay (Natalac) capsules do enhance lactation among breastfeeding mothers and there were no reported adverse effects from the study. In addition, public education, personal advice, and friendly support from health workers and counsellors who have special understanding and skills are most effective if they work with individual mothers, and if they help their colleagues to learn the same skills.

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