

STUDY OF THE COMPOSITION OF BREAST MILK AND THE EFFECT OF LEPTADEN ON THE QUALITY OF BREAST MILK

By

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In this connection it is interesting to note that quality wise, United States has the poorest quality of breast milk. The

The composition of breast milk has been known to vary from individual to individual and from one country to another.

composition is slightly better in Scandinavia followed by other places in this order - Britain, Japan, India and South East Asia. This accounts for the rapid adoption of artificial feeds in America and Scandinavia. The present study was conducted by the authors at N. Wadia Maternity Hospital, Bombay, India, during the year

Family Planning. The aim of the study was: 1. To qualitatively analyze breast milk obtained from a representative section of normal lactating mothers in Bombay, the majority of whom belonged to the lower socioeconomic status. and

1975-76, under the auspices of its Post Graduate Institute for Study and Research in Gynecology and Obstetrics and

- 2. To study the effect of an Indian herbal drug LEPTADEN on the quality of breast milk.
- Earlier work done on LEPTADEN has shown its (1) lactogenic, (2) galactokinetic (3) galactopoietic properties in human as well as animal lactation. However, no work had been done on the effect of LEPTADEN on the quality and constituents

socio-economic group settled in Bombay City, a city which has more than 8 million population. **SELECTION OF PATIENTS:**

Only healthy primi-gravida with normal deliveries were considered for this study. They had normal birth weight. Those

of breast milk. This study was conducted as a double blind trial. The cases admitted included a cross section of lower

cases who did not fully cooperate were dropped from the study.

Eight cases of abnormal deliveries were also included as they had no lactation problems. Of these, there were 5 cases of forceps delivery, 2 breach extractions and 1 case of induced labour.

Three breast milk samples were obtained from each mother. Samples I and II were collected in the hospital itself as the primigravidae usually stayed in the ward for 6 days. Sample III was collected during the first post-natal visit on the 17th day. The mothers were informed about this project in order to get their cooperation in attending the post-natal O.P D. on the 17th day.

The study consisted of 100 cases, of whom 50 cases were given placebos and 50 were given LEPTADEN. The capsules containing the drug and the capsules containing the placebo were identical in size, shape and colour. The true identity of the capsules was revealed only after the whole study was over and the data of 100 cases computed. Then the X capsules were found of contain LEPTADEN while Y capsules contained placebo. The analysis of the data was statistically evaluated.

Table

AGE GROUP DISTRIBUTION Y Group X Group Total Age group (Control Group) (LEPTADEN Group) 28 25 53 53% 16-20 Years 17 39 22 39% 21-25 Years 7% 4 26-30 Years 31 Years 1% Total 50 50 100 100% The majority of cases ranged between 16-25 years (92%). There was one case of 31 years which was the highest age

METHOD OF BREAST FEEDING Colostrum was not expressed out during pregnancy or in the post-natal period. The new born baby was put to the

breast about 4-6 hours after delivery and was fed colostrum 3 hourly during the day time. After the initiation of lactation

Maternal diet consisted of her usual diet with no special additions or instructions.

2. LEPTADEN in animal lactation:

PHARMACOLOGY

LEPTADEN: AN INDIAN HERBAL DRUG

in this series.

The mothers were investigated routinely for blood and urine at the time of admission. In this study haemoglobin ranged between 64 to 90% with a mean of 77% in both groups. Only cases with normal findings in the blood and urine were included in the study.

the baby was breast fed with an interval of 3 to 4 hours between 2 feeds.

Patel (1947) first drew the attention of the medical profession to the potentialities of this drug in the management of habitual abortion, infertility and allied conditions. Trivedi (1956) first studied its effect as a galactagogue. Since then the following studies have been published on LEPTADEN:

1. LEPTADEN in human lactation: Trivedi (1956); Malati Gokhale (1965); Maiati Deshpande and Manju Ashar (1962);

Kusum Gupta (1966); Habla Akhtar and Sitaratna (1972).

Moulvi (1963); Vaishnav and Buch (1965); Anjaria and Gupta (1967); Kaikini, Hukeri and

Pargaonkar (1968); Kaikini, Pargonkar and Kadu (1969); Murthy (1969); Prasad (1970);

Azmi (1970); Kulkarni (1970); Chauhan, Nair, Mittal and Rangan (1971); Nisal, Sapre and

- Khare (1975); Harkawat and Singhvi (1977); Mujumdar (1977); Agarwal, Deshmankar, Verma and Saxena (1960); Ahmad et al (1974);
- Each capsule of LEPTADEN contained (equivalent to one commercially available tablet): Jeevanti (Leptadenia Reticulata): 150 mg. Kamboji (Breynia Patens): 150 mg.

to these drugs.

was taken, within a few hours of the initiation of lactation.

mothers, laboratory and social workers, who cooperated in this study.

COMPOSITION OF LEPTADEN

reproduction and to activate neuroglandular system. And 'stanya' that is, galactagogue properties are also attributed Sharma (1976) using sensitive radioimmunoassay methods studied the possible mechanism of action of LEPTADEN. These studies indicated that LEPTADEN has an inhibitory effect on the ability of the guinea piguterine tissue to biosynthesize Prostaglandin F2alpha.

In the Ayurvedic Pharmacopoeia, Jivanti and Kamboji are considered as 'garbhashaya shodhan', 'garbha sthapan'

and `shothaghna' which mean: properties to help nidation of the zygote, to promote normal environmental factors for

BREAST MILK SAMPLE FOR ANALYSIS From the mothers selected for the study, only one sample of breast milk was taken by hand expression. It was not a

pooled collection of 24 hours. It was not possible to do so for practical difficulties for all concerned-the administration,

The dose given in this study was 2 capsules thrice daily for 16 days. First dose was given after sample 1 of initial milk

However, as far as possiable, the timings and conditions, such as cooperation of mother, the infant, interval of breast feed, method of hand expression etc. were uniformly followed for each case. This procedure was as per general guidelines suggest by ICMR (Indian Council of Medical Research) for research workers on human lactation in India

(ICMR Report, 1963).

Quantity of Milk expressed:

RESULTS

DOSAGE:

METHOD OF EXPRESSION: Milk was expressed by hand after proper guidance and help. Milk was expressed from both breasts in quantities sufficient for analysis.

Sample I (Initial milk): was taken within a few hours of initiation of lactation but not exceeding twelve hours and before

X and Y Capsules were given. Then they were given 2 capsules three times a day for 16 days. Sample II (Transitional milk): The breast milk was taken on the 6th day after delivery.

(1) Proteins were estimated by Esbasch Tube method.

(6) Ash was estimated by the usual laboratory methods.

weight of solids namely non-fat, fat and ash components.

The breast milk samples were analysed and the contents in grams percent were determined for the following constituents by the methods mentioned below.

Analysis of breast-milk samples Techniques used and methods adopted

10 to 15 cc. were collected in a bowl and later transferred to a test tube.

Sample III (Mature milk): This sample was collected on the 17th post-natal day.

Calcium estimations were done by the Titration Method (5) Phosphorous was estimated by the Gomorri Method.

The mean percentage of change from sample I to III was adopted for both the groups. To evaluate statistically the effect of LEPTADEN on the quality of breast milk students' 't' test was used.

STATISTICAL STUDY OF MEAN-CHANGE

STATISTICAL EVALUATION

(2) Lactose was estimated by Folin-wu method using standard concentrations of lactose for comparison.

(3) Fat was estimated after eliminating the protein from the breast milk and then analyzing this protein-free sample.

Water estimation was by the ordinary laboratory method of evaporation. It was also verified by the deduction of total

Data from sample I containing initial milk. sample II transitional milk and sample III mature milk were analyzed to study

the variations from sample I to sample I II and also to evaluate the effect of LEPTADEN on the quality of breast milk.

The composition of breast milk in the present study compares favorably with the values given by other authors except

in so far as its fat content is concerned. However, studies by ICMR (Indian Council of Medical Research) and others have

shown that the fat content of human breast milk in developing and under - developed countries can be as low as seen

in the present study. Fat values as low as 1% and as high as 9% have been reported in samples of human, cow and

goat milk.

The overall benefit seen in the LEPTADEN group is 11.8%. In some constituents it is quite high e.g. protein content increased by 19.6%, fat content increased by 26.2% and calcium by 26.6%. The mean percentage of change of the milk constituents in the LEPTADEN group was 11.8%. This is significant from the point of view of proper growth and development in relation

to infant nutrition.

	Tabl	e II				
GRADUA	GRADUAL DILUTION OF MILK FROM INITIAL MILK TO MATURE MILK AS SEEN BY THE SPECIFIC GRAVITY CHANGES.					
	Sample 1	Sample 2	Sample 3			
Control	1.0322	1.0319	1.0307			
Drug series	1.0363	1.0343	1.0319			

From the above table it is obvious that milk gradually gets diluted in both the groups. This dilution however is found to be more in the control group than in the LEPTADEN group when the water content is considered. In the LEPTADEN group therefore, it is found that the thickness and thereby the quality of milk is better than in the control group.

Table III						
WATER CONTENT IN Gm %						
	Sample 1	Sample 2	Sample 3			
Control	85.82	88.22	89.13			
Drug series	85.21	86.71	86.86			

	Table IV				
COMPOSITION OF NORMAL BREAST-MILK (MATURE MILK)					
Constituent	g1100 ml	S.D. t			
Protiens	1.5	0.59g			
Lactose	7.3	1.24g			
Fat	1.8	0.81g			
Calcium	0.03 (25.5mg)	5.43mg			
Phosphorous	0.01 (8.6mg)	3.76mg			
Ash	0.23 (233mg)	75.00mg			
Water (Rest)	89.13				
Total	100.00				

Table V

Pattern	Belavady and Gopalan	Karmarka reial	Rao & Ramanathan nathan	Elsdon Kleiner & Orien	Watt & MernII	Haw
Proteins (g%)	1.06	1.12	1.2	1.4	1.1	1.2
Lactose (g%)	7.51	7.08	6.9	7.6	9.5	6.9
Fat (g%)	3.42	4.47	4.1	4.0	4.0	4.6
Calcium (mg%)	3.12	_	_	_	33	30
Phosphorous (mg%)	_	_	_	_	14	13
Ash (g%)	_	_	_	0.2	_	0.21
(Restwater)						

	TA	BLE VI				
EFFECT OF	LEPTADEN O	N QUALI	TY OF BR	EAST-MII	LK.	
QUALITATIVE ANALYSIS OF BREA	ST-MILK IN BOTH G	ROUPS. ST	ATISTICALLY	EVALUATED E	BY STUDENTS	S 'T' TEST.
Constituent	Control	Group	Leptade	n Group	PV	alue
Protein g%						
Mean	1.5		2.	6		
S. D. ±	0.59	9	0.4	42		
S. E.	0.08	3	0.0	06	< 0.	001
Lactose g%						
Mean	7.3		7.	7		
S. E.	1.24		1.2	26		
N. S.	0.18		0.	18	N	.S
Fat g%						
Mean	1.8		2.	5		
S.D. t	0.8		0.7	76		
S.E	0.12	_	0.	11	< 0.	001
Calcium mg%						
Mean	25.5	0	28.	20		
S. D. t	5.43	3	5.3	30		
S. E.	0.7	7	0.7	75	< 0	.02
Phosphorous mg%						
Mean	8.6		8.	6		
S. D. t	3.76	3	3.:	21		
S.E.	0.5	3	0.45		N.S	
Ash mg%						
Mean	233	3	26	62		
S. D. t	75		4	9		
S. E.	10.6	6]	6.9	93	< 0	.05
	I				I	
	TA	BLE V				
MEAN PERCENTAGE OF CHANGROUP AND GROUP AND GRO	NGE OF THE CONST				NTROL (NOR	MAL)
	Initial milk	Tr milk	Mature milk	Mean change	% of mean	Beneficial action of

PROTEINS (g/100 ml) LACTOSE (g/100 ml)	LEPTADEN:	S.D. ± ——— Mean	2.58	\cap	0.50			
ACTOSE	LEPTADEN:	Mean		0.8	0.59	0.0	47.000	10.00/
			4.9	3.6	2.6	-2.3	-47.00%	19.6%
		S.D. ±	2.63	0.86	4.20			
	Normal:	Mean	6.4	6.9	7.3	+0.9	+14.1%	
(g/100 ml)		S.D. ±	1.10	0.94	1.24			
	LEPTADEN:	Mean	6.7	6.9	7.7	+1.0	+15.0%	0.9%
		S.D. ±	1.12	0.84	1.26			
	Normal:	Mean	3.0	2.2	1.8	-1.2	-40.0%	
FAT		S.D. ±	1.19	0.61	0.81			
(g/100 ml)	LEPTADEN:	Mean	2.9	2.5	2.5	-0.4	-13.8%	26.2%
		S.D. ±	1.06	0.86	0.78			
	Normal:	Mean	25.15	25.45	25.50	+0.35	+1.35	
CALCIUM		S.D. ±	5.69	5.92	5.43			
(g/100 ml)	LEPTADEN:	Mean	22.15	26.17	28.20	+6.05	+27.3	26%
	LLI IADLIN.	S.D. ±	5.51	5.50	5.30			
	Normal:	Mean	6.5	7.8	8.6	+2.1	+32.3%	
PHOSPHORUS	INOTITIOI.	S.D. ±	4.25	3.64	3.76			
(g/100 ml)		Mean	6.4	9.4	8.6	+2.2	+34.4%	2.1%
	LEPTADEN:	S.D. ±	3.88	3.28	3.21			
	Normal:	Mean	235	248	233	-2.0	-0.9%	
ASH	NOTTIGI.	S.D. ±	70	50	75			
(g/100 ml)		Mean	260	248	262	+2.0	+0.8%	1.7%
	LEPTADEN:	S.D. ±	61	50	49			
TOTAL (~0/)	N. I. a. was a sub-	Mean	14.167	_	10.868	-3.3	-23.3%	
TOTAL (g%)	Normal:	S.D. ±	14.788	_	13.099	-1.7	-11.5%	11.8%

change

-66.6%

Leptaden

if any%

from I to III

-3.0

Ш

1.5

Ш

2.4

Mean

Normal:

4.5

3. Calicum: Increase (26.0%) helps better bone growth and is prophylaxis against hypocalcemia and rickets. Slight increase (1.7%) in ash content is just enough to improve the quality of breast milk without overloading 4. Ash:

Dilution (2.27%) is less in the Leptaden Group. LEPTADEN therefore maintains the thickness (quality) of milk. 5. Water:

and premature babies in whom the weight gain is earlier than expected.

TOXIC OR SIDE EFFECTS

mother or in the infant. However, 2 cases of infants in the LEPTADEN group and 3 cases of infants in the Control group

kidneys.

developed transient diarrhoea. This was controlled with 48 hours with ordinary binding mixtures.

No toxic or adverse side effects were observed or reported in any of the 50 LEPTADEN treated cases either in the

OBSERVATIONS

Since LEPTADEN has shown significant beneficial effect on the quality of breast milk, it can be started within the first 3 days of delivery. It can be continued as 1 tablet twice or thrice a day for as long as the mother wants to breast-feed. As mentioned earlier, it is worthwhile to avail of its utility in prevention of infant diseases such as marasmus, kwashiorkar and rickets, particularly in the Third World countries. And thereby provide the benefits of the mother's milk to the new born from the point of view of the immunological protection against B.Coli and other organisms entering in the intestinal tract soon after birth. By ensuring the natural production of increasing quantities of mother's milk with the proper and timely use of this drug, the need for the use of outside milk is reduced.

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