

## Growth Performance of a Neonate Exclusively Fed on Buffalo Milk: A Case Study

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**Abstract:** A full term baby born through C-section with a birth-weight of 7.7lbs, which were within the standard range of 5.5-7.7 lbs. The baby was kept on the Nestle's Lactogen-1 with the advice of a classified Pediatrician when the mother was failed to breast-feed the baby. Due to complications in the weight-gain with the Nestle's Lactogen-1, it was abandoned at the age of fourth month and fresh boiled buffalo milk was introduced. The protein requirements were adjusted according to the recommended level of 2.46 g/kg body weight by adding boiled water. The protein contents of the buffalo milk were assumed to be 4-gram/100 ml of fresh milk. The amount of water lost during the boiling of the fresh milk was adjusted to the original volume of the milk. The milk was fed at *ad libitum* to the baby; however, the volume consumed over the reported period was not recorded. At the end of sixth month banana was introduced to the baby and at the start of ninth month family food was gradually introduced. The body weight was regularly recorded weekly and on monthly basis with the pediatric scale. In this case study it was noticed that when the infant was on the Nestle's Lactogen-1, the weight-gain was severely less during first four months. However, the weight-gain with buffalo milk was steady up to 24 months. This study shows that the buffalo milk is as good as other milk sources provided that its protein content is adjusted properly.

**Key words:** Buffalo milk, breast-milk, protein, artificial milk

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### Introduction

For normal growth and development of a neonate breast-milk is prerequisite and its importance has been widely documented in the published literature. There are several reasons when the innocent baby has to be exposed to various kinds of formulas or milk feeding. These might be the maternal death, surgery and disease condition or just for fashion. Whatever the reason may be for the discontinuation of breast-milk to baby(ies), one has to take into consideration while feeding baby(ies) on milk other than breast milk that growth is not affected. Again this relate to the parents awareness as well, if the parents are literate then there are chances of selecting a suitable formula with the help of a nutritionist or medical practitioner otherwise it would be disastrous for the growing baby. There are different speculations regarding different types of milk in-terms of preference for the type of milk when the breast-milk is given up. In this country, the cow's milk is mostly preferred when the babies are fed other than breast-milk. However, the milk has to be evaluated in terms of protein and can be adjusted according to the recommended level of protein no matter whatever the source of milk is provided to a neonate. An increased level of protein in the milk is associated with increased morbidity and mortality in the neonate shortly after birth. The symptoms may be diarrhea, acidosis, hypertonic dehydration, fever and elevated blood urea and ammonia (Committee on Nutrition, 1976). Breast-milk is a perfect food for babies it contains all the nutrients that a baby needs (WHO/UNICEF, 1989). The artificial or

animal milks do not contain the correct amounts of nutrients. There is continuous effort of studying the difference between the breast-milk and the animal milk and accordingly the manufacturer modify the formula milk but none of the formula milk can be a substitute (IBFAN, 1990). This paper examines the efficacy of buffalo milk in a case study in which the baby soon after birth was on the Nestle's Lactogen-1.

### Materials and Methods

This study was not a designed one rather it happened by chance and was conducted on a single baby. In this study the subject was a neonate born in the Combined Military Hospital (CMH), Peshawar. The baby was full term and born through C-section. The birth-weight of the baby was 7.7lbs, which was within the standard range of 5.5-7.7 lbs. (American Academy of Pediatrics, Committee on Nutrition, 1977; Widdowson, 1968). In other studies it has been reported that to have highest chances of survival, an infant should be born in the 7.04-7.48 lbs. birth weight (Goldstein and Peckham, 1975). However, the birth weight outside these ranges may be associated with the complication. After birth the baby was kept on the Nestle's Lactogen-1 for four months with the advice of a classified pediatrician when the mother was failed to breast-feed the baby. Due to complications in the weight-gain the Lactogen-1 was abandoned and fresh boiled buffalo milk was introduced. The protein requirements were adjusted according to the recommended level of 2.46 g/kg body weight/day (FAO/WHO/UOU Expert Consultation, 1985)

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Table 1: Various types of milk composition per 100 ml of milk

|                     | Milk Type     |             |                 |                   |
|---------------------|---------------|-------------|-----------------|-------------------|
|                     | Human's Milk* | Cow's Milk* | Buffalo's Milk* | Lactogen-1 Milk** |
| Moisture (gms)      | 88            | 88          | 81              | 90.4              |
| Protein (gms)       | 1.1           | 3.2         | 4.3             | 1.7               |
| Fat (gms)           | 3.4           | 4.1         | 8.8             | 3.4               |
| Carbohydrates (gms) | 7.4           | 4.4         | 5.0             | 7.41              |
| Energy (kcal)       | 65            | 67          | 117             | 67                |
| Minerals (gms)      | 0.1           | 0.8         | 0.8             | 0.4               |
| Calcium (mgs)       | 28            | 120         | 219             | 73                |
| Phosphorus (mgs)    | 11            | 90          | 198             | 53                |
| Iron (mgs)          | 0.5           | 0.2         | 0.2             | 0.8               |
| Vitamin A (IU)      | 137           | 174         | 160             | 230               |
| Thiamin (mgs)       | 0.02          | 0.05        | 0.04            | 0.05              |
| Riboflavin (mgs)    | 0.02          | 0.19        | 0.10            | 0.1               |
| Niacin (mgs)        | -             | 0.1         | 0.1             | 0.67              |
| Vitamin C (mgs)     | 3             | 2           | 1               | 7                 |

\*Goplan *et al.* (1981). Nutritive value of Indian Foods. National Institute of Nutrition, Hyderabad-7 (A.P.), Indian Council of Medical Research. P.O. Box No. 4508. Assari Nagar, New Delhi-16. \*\*Nestle Milkpack Limited 308 Upper Mall, Lahore 54000

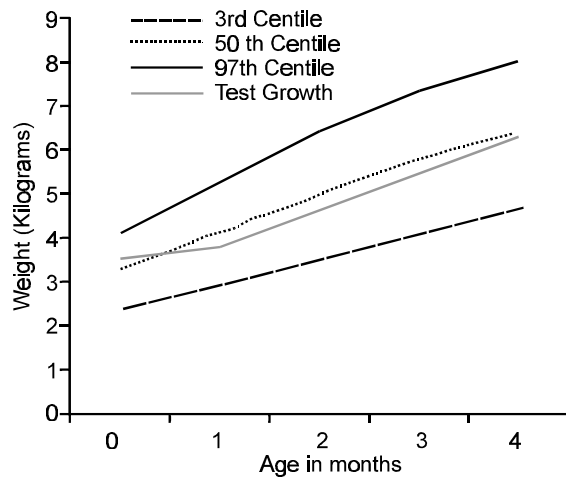


Fig. 1: Growth of a baby on Nestle's Lactogen-1 in comparison to the reference growth curve

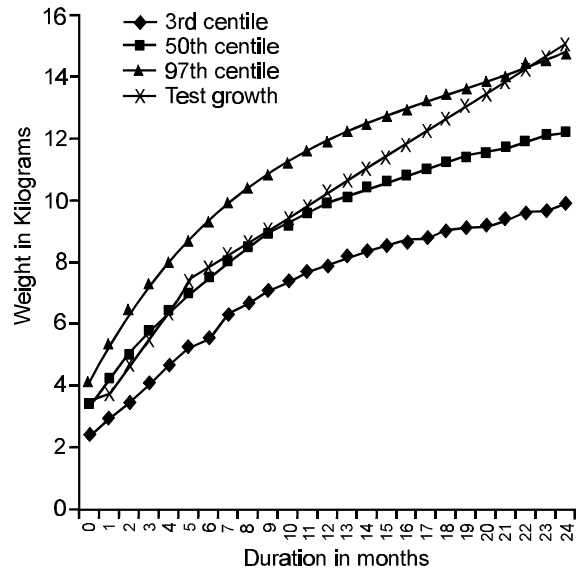


Fig. 2: Pattern of Weight-gain with Nestle Lactogen 1 (0 to 4 Months) and buffalo Milk (5-24 Months) in comparison to the reference growth curve

by adding boiled water. The protein contents of the buffalo milk were assumed to be 4.0 gram/100 ml of fresh milk as reported by Goplan *et al.* (1981). The amount of water lost during the boiling of the fresh milk was adjusted to the original volume of the milk. The milk was fed *ad libitum* to the baby, however, the volume consumed over the period reported was not recorded. At the end of sixth month banana was introduced to the baby and at the start of ninth month family food was gradually introduced. The body weight was regularly recorded weekly and on monthly basis with the pediatric scale.

**Results**

The baby was not feeling comfortable with the Nestle Lactogen-1 and was associated with number of

complications. These complications were for example, flatulence recurrent vomiting abdominal distension and difficulty in stool evacuation. These symptoms were not present altogether when the baby was fed with the buffalo milk. Most of the time the symptoms were also accompanied with high body temperature. The babies lost weight during the first week of his birth, which is a normal process, and do happen in the breast-fed children. The weight with the Nestles product was less than the 50<sup>th</sup> percentile and there was fluctuation in weight gain during these four months as indicated in

the Fig. 1. During the feeding period of buffalo milk (5 - 24 months) the weight became steady and it was above the 50<sup>th</sup> percentile with buffalo milk as indicated in the Fig. 2. Another thing is that the symptoms of flatulence and difficulty in bowel evacuation also disappeared.

### Discussion

As mentioned earlier that this study was not designed intentionally but the author would like to share the observations recorded on the weight of a neonate with the fresh buffalo milk feeding with the colleagues.

The buffalo milk, which is normally hesitated to be given to infants in our society for unknown reason(s). One of the apparent reasons might be that buffalo milk contains more energy, protein, fat or total solid as compared to the cow's or other milk types. The energy contents of human milk, cow's milk, buffalo's milk and lactogen-1 are 65, 67, 117 and 67 kcal/100 ml respectively (Table 1). Apparently, the human milk, cow's milk and lactogen-1 are very similar in caloric contents but this would be very much misleading for the ignorant people. The absorption of human's milk is more whereas the absorption for other types of milk is questionable? In the buffalo's milk the apparently increased amount of calories per 100 ml of milk was adjusted and provided 90 kcal/100 ml of milk, which is still higher than the human's milk by 34 percent. It is assumed that these extra calories provided to the infant are not efficiently absorbed but can provide closer absorption index to the human's milk. The Nestle's lactogen-1 provide comparable and excellent composition to cow's milk and human's milk but it does not provide the information on the availability of the 67 percent energy to the infant. The 100 percent absorption of the energy is also questionable since the complete and nearly 100 percent absorption would be only possible from the breast-milk. Human's milk has the lowest protein content of all the milks. The protein content is only about 1.1 percent (in some of the literature it is 0.9 gram in 100 ml) in the human milk. In the other sources i.e. cow's milk, buffalo's milk and lactogen-1 the protein content is 3.2, 4.5 and 1.7 gram per 100 ml of milk respectively (Table 1). In the infant's diets when protein contents increases than certain level than it causes severe ailments. High protein intake lead to a burden on liver and kidney function, therefore the extremely low protein level in the human milk is of great nutritional and physiological importance. When there is an increased concentration of protein in the infant's diets it causes an abnormal and pathological pattern of amino acids in the blood plasma which might affect the organ functions (Bäihä, *et al.*, 1986a; Bäihä, *et al.*, 1986b). During infancy period fluctuation in the growth is not desirable since it indicates that there is something-negative happening to the infant most probably because of nutrition. In this case study, it was noticed that when the infant was on

the Nestle's Lactogen-1, the weight was less compared to the corresponding reference weight during first four months. When the baby was on buffalo milk not only the weight became steady but the symptoms were also subsided. The question of buffalo milk with the adjusted concentration has to be investigated in the neonates less than four months or soon after birth. This is worthwhile to mention in here, that the source of milk to the Nestle's collection points is predominantly also buffalo milk therefore, there would be no harm to adjust it for a baby less than four months. This study shows that the buffalo milk is as good as other milk sources provided that its protein content is adjusted properly.

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