Effects of Nutritional Status and Supplementation on Resumption of Menstruation Amongst Parturient Nigerian Women

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Abstract

Context: *Breastfeeding patterns, ethnic variation and nutrition have been shown to influence the return of menstruation after childbirth, but the role played by nutritional status requires further elucidation, particularly in a place like Nigeria where undernutrition is common.*

Objectives: *To determine the effects of nutrition and breastfeeding pattern on the duration of lactational amenorrhoea in Nigerian women.*

Subjects and Methods: *Marginally malnourished mothers (162) were randomised into two groups [A & B] for comparison with a third group [C] of well-nourished mothers. Mothers in Group A (83 subjects) received supplements in the form of specially formulated biscuits while those in Group B (79 women) & Group C (85 women) received none. The subjects were visited 3 times a week to ensure compliance with the supplements and to collect information on breastfeeding pattern and duration of lactational amenorrhoea.*

Results: *There were no significant differences in the duration of postpartum amenorrhoea in the three groups of mothers, being 270, 220 and 234 days for Groups A, B and C respectively. Wide individual variations were observed in the duration of amenorrhoea in each group of mothers despite the fact that they generally had similar patterns of breastfeeding. The energy expenditure patterns in the supplemented and unsupplemented mothers were similar.*

Conclusion: *Nutritional status and supplementation do not seem to influence the duration of lactational amenorrhoea in this group of Nigerian women. Subtle physiological differences between individual women may account for the wide individual variations observed in the time of resumption of menstruation after childbirth in the subjects.*

Key Words: Breastfeeding, Lactational Amenorrhoea, Nutritional Status, Menstruation. [Trop J Obstet Gynaecol, 2002, 19: 39-43].

Introduction.

There is a general agreement that the duration of postpartum amenorrhoea is strongly influenced by the pattern of infant feeding[1]. Most investigators agree that the duration of breastfeeding is an important determinant of the length of amenorrhoea, but there is less consensus about the role played by nutrition, ethnicity, measures of suckling, introduction of other feeds and breastfeeding during the night.[2,3,4,5,6,7]. Other researchers [5,6,8,9] demonstrated that poor nutritional status has a significant effect on the duration of postpartum amenorrhoea.

Two possible mechanisms explaining the relationship between maternal nutritional status and length of postpartum amenorrhoea have been suggested.[10] The first possible mechanism is that women with poor nutritional status may experience greater inhibition of the ovulatory hormones from the same amount of suckling as do women with good nutritional status and thus experience longer amenorrhoea. The second possible mechanism is that children of mothers with poor maternal nutritional status suckle more to get an adequate amount of breast milk. [11,12]. The increased suckling increases inhibition of the ovulatory hormones, and lengthens amenorrhoea. This probably occurred because the children with lower weight gain consume more breast milk, suckle and provide greater inhibition to their mothers' ovulatory hormones. Whether or not the infants of malnourished mothers suckle more for equal weight gain could not be explained from the data.[10]

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Results from studies on the effect of food supplementation to undernourished women on the duration of lactational amenorrhea are conflicting. A reduction in the duration of lactational amenorrhea and inter pregnancy interval (1 to 2 months maximum) was demonstrated when the diets of undernourished women was supplemented [13]. It has however been demonstrated that the effect varies, depending on whether the supplementation contained both protein and energy or energy alone and also the amount of supplement [14]. A reduction of six months was demonstrated in the inter pregnancy interval when a group of Mexican women received diet supplementation during both pregnancy and lactation [14]. In those two studies [13,14], it is difficult to evaluate whether the effect was solely as a result of improved maternal nutrition since the infants were also receiving some of the supplements.

Our own objectives were to compare the duration of lactational amenorrhoea between marginally malnourished and well-nourished women, to determine breast feeding patterns of well-nourished and marginally malnourished women and to find out the effects of maternal nutritional supplementation on the length of lactational amenorrhoea.

Subjects and Methods

The body mass index of 20 for women has been reported as the lower cut off point for people with chronic undernutrition in the developed countries and 18.5 was found to be a reasonable lower limit for developing countries [15]. In view of this findings women with a BMI(Body mass index) of 18.5-21 i.e. the malnourished and marginally malnourished mothers were recruited for the study, and another group of well nourished mothers with a BMI of 25 and above.

A total 162 consenting mother infant pairs in the malnourished group were randomly divided into two 2 groups. One study group of 83 mothers received dietary supplements and served as experimental subjects (Group A). The supplement took the form of a biscuit developed and produced in Australia based on a formulation recommended by the Commonwealth Scientific and Industrial Research Organisation. The nutrient composition and the percentage of recommended dietary intake provided by the biscuit is represented in Table 1. The second group of 79 undernourished mothers did not receive any dietary supplements and served as controls (Group B). A third group of 85 mothers with a BMI of 25 and above served as well nourished mothers (Group C). The consenting subjects were admitted at 3-7 days postpartum. All the subjects in the study intended to breastfeed their infants and did breastfeed.

Table 1

Composition of the Australian High Protein Biscuit (per 100 grams Weight)*

Energy	450kcal	***Protein***	20g
Carbohydrate	50g	***Fat***	20g
Iron	25g	***Calcium***	1125mg
Vitamin A	1000µg	***Iodine***	125µg
Vitamin B1	2.75mg	***Folate***	1.25mg
Vitamin B2	4mg	***Niacin***	27.5mg
Vitamin C	62.5mg		

* Arnotts Biscuit Ltd, Homebush, Australia[17].

On admission, information on personal data, medical history, socio-economic situation and nutritional status were recorded. In addition, mothers were educated on how to fill the infant feeding charts. The breastfeeding episodes were monitored using charts developed by the World Health Organisation (WHO) Special Programme for Research and Training in Human Reproduction.

Ethical Approval: Ethical consent was obtained from the Ogun State University Ethical Committee prior to the commencement of the study.

Follow-up Procedure: All the subjects were visited at least 3 times a week. During each visit, the subjects were interviewed and record charts were examined in order to assess compliance with the dietary supplement, ensure proper completion of the infant feeding record chart and check details of infant health. The activity pattern of the supplemented and non-supplemented mothers was evaluated during the first 3 months of admission. Evaluation was based on the method described by James and Schofield [16]. The activities of the lactating mothers throughout the day and the time spent on each activity were recorded. The activity pattern was computed using the following procedure:

- Calculation of total energy allowance for the different activities.
- Estimation of the basal metabolic rate (BMR) for the body weight using the predictive equation for an adult woman (8.7W(Kg) +829) where W is the weight of the woman.
- Estimation of BMR per hour by dividing value calculated in 2 above by 24.
- Calculation of the energy cost of each activity per hour by multiplying the integrated energy index for that activity by the BMR expressed in Kcal
- Multiplication of this total energy cost for each activity by the hours spent on each activity.
- Summing up the different activity expenditures to give the total daily energy, allowing all the residual day time to have an integrated energy index of 1.4.

This calculation is illustrated in Table 2.

Table 2

Calculation of Total Energy Cost

Activity	*Time Spent (hours)*	*Integrated Energy Index (IEI)*	*Total Energy Cost (Kcal)**
In bed	8	1	424
Occupational	7	3	1113
Household Chores	5	2.7	715.5
Other Discretional Activity	1	3.3	174.9
Residual Time	3	1.4	222.6

*Total Energy Cost = *Basal Metabolic Rate* x *IEI* x *Time*

Statistical analysis was done by using the version 6 module of the Epi-Info programme developed by the WHO and the Center for Disease Control (CDC), Atlanta, USA.

Results

During the follow up period the activity pattern of the supplemented and the unsupplemented mothers was the same (Table 3). This shows that the supplemented mothers were not expending more energy than the non-supplemented mothers.

There was a progressive decline in the percentage of infants who received breast milk with age in the two groups of marginally malnourished mothers (Table 4). By 12 months postpartum only 21% of the supplemented mothers and 11% of the non-supplemented ones were still breastfeeding their infants.

Table 3

Activity Patterns of the Supplemented and Non-Supplemented Mothers Postpartum.

	Mean Energy Expenditure(Kcal)		
Months Postpartum:	0	2	3
Supplemented	2138	2193	2183
Non-Supplemented	2137	2158	2218
Difference (*t*-test)	NS	NS	NS

NS: Not statistically significant

Table 4

Proportion of Infants Being Breastfed Month by Month Postpartum

	Infants Being Breastfed (%)	
Months Postpartum	**Supplemented**	**Non-Supplemented**
1	98	98
2	86	88
3	83	74
4	74	69
5	61	61
6	55	52
7	45	37
8	39	31
9	30	24
10	24	19
11	22	16
12	21	11

The body mass index of the three groups of mothers is as shown in Table 5. There was a significant difference in the body mass index of the well-nourished mothers as compared to that of the undernourished mothers at recruitment. There were wide individual variations in the duration of lactational amenorrhoea in each of the three groups of mothers. The supplemented group (Group A) recorded the highest mean duration of lactational amenorrhoea. The mean number of breastfeeding episodes in 24 hours, the mean number of night time breastfeeding episodes, the duration of full (or exclusive) breastfeeding and the duration of predominant breastfeeding were similar in all 3 groups.

Discussion

The total number of breastfeeding episodes per 24 hours in supplemented, control and well nourished mothers were not significantly different in the three groups, but the of duration of lactational amenorrhoea had wide individual variations in all the three groups of mothers. The mean duration of lactational amenorrhoea in the supplemented group was the highest. Varied duration of lactational amenorrhoea found may be accounted for by the fact that there may be a physiological variable yet to be discovered which is different from one mother to the other that may be responsible for the differences seen in the duration of lactational amenorrhoea [11]

The overall prevalence of breastfeeding was high. The percentage of infants being breast fed in the first month was 98% in both the supplemented and non-supplemented groups. By the second month this had fallen to 86% and 88% for Groups A and B respectively. After the sixth month, over half of the mothers in the two groups of undernourished mothers were no longer breastfeeding and by the end of one year less than a fifth of the mothers were still breastfeeding. This prevalence is similar to the findings of an earlier WHO collaborative study on breasfeeding [17]. In Nigeria they found that about 100% of all the four groups of mothers studied were breastfeeding at the time of the interview. By the third month 96% of group A (economically advantaged) were breastfeeding and 100% of all the other groups were breastfeeding. By the sixth month, only 32% of group A, but 91% of group B (urban middle income), 97% of group C (urban-poor) and 100% of group R (rural) were still breastfeeding. At the end of twelve months, no member of group A, 22% of group B and 97% of group R were still breastfeeding.

This finding shows that maternal supplement intake and marginal nutritional status may not be an important factor variable explaining the length of postpartum amenorrhoea in Nigerian women. The influence of nutritional status of women during lactation on the duration of lactational infertility is usually the same if well nourished women nurse their infants at frequencies common in populations with extended periods of lactational amenorrhoea. This finding is in agreement with some previous observations [5, 18]. In the view of these authors, the single most important factor controlling the duration of lactational infertility is the suckling stimulus of the babies. The duration of lactational amenorrhoea observed in this study is also similar to the findings of the WHO collaborative study [17] in Nigerian mothers.

Table 5

Nutritional Status, Breastfeeding Patterns and Duration of Lactational Amenorrhoea in the Three Groups of Breastfeeding Mothers.

Parameter	Group A	Group B	Group C	*p*
Body Mass Index *(Mean ± SD)*	20.3±1.9	20.5±1.5	25.2±2.6	< .05
Duration of Amenorrhoea Mean (95% CI)	270 days (203-338)	220 days (175-264)	234 days (215-255)	NS
Breastfeeding Episodes per 24 hours *(Mean ± SD)*	8.6 ± 1.0	8.0 ± 1.7	8.4 ± 1.8	NS
Breastfeeding Episodes per Night *(Mean ± SD)*	2.4 ± 0.5	2.2 ± 0.4	2.5 ± 0.3	NS
Duration of Exclusive Breastfeeding in Months *(Mean ± SD)*	1.0 ± 0.5	1.0 ± 0.3	1.0 ± 0.3	NS
Duration of Predominant Breastfeeding in Months *(Mean ± SD)*	5.1 ± 0.7	5.0 ± 0.9	5.2 ± 0.3	NS

NS: No statistically significant difference

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