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Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

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Maternal Education and Complementary Feeding

Perveen Liaqat, Mazhar Abbas Rizvi, Abdul Qayyum, Hajra Ahmed and Nadia Ishtiaq
Department of Home and Health Sciences, Allama Iqbal Open University, Islamabad, Pakistan

Abstract: This study indicates the possible association between maternal education and the complementary feeding practices among representative sample of Pakistani mothers and their infants. The research team claims this sample as representative one, as the population of Islamabad is a heterogeneous group of people settled in Federal capital. Mothers of five hundred infants, age ranging from 6-12 month, visiting for immunization and various minor ailments were selected through convenience sampling technique from the Outpatient department of Paediatrics at Federal Government Services Hospital, Islamabad,. The data was collected by the researchers with the help of a pre-tested questionnaire, Tabulated and analyzed to find out possible association between mother's education and the prevalent complementary feeding practices. A positive relationship was found between the nutritional status of infants and educational status of mothers ($P<0.001$). The study revealed that the majority of Pakistani infants falling in various degrees of malnutrition belonged to the uneducated mothers. Similar relationship was observed between the educational status of respondents and the introduction of complementary foods at an appropriate age (six months) of infants ($P<0.001$ It was noted that a high percentage of respondents (34.8%) who introduced complementary foods to their infants at six months age belonged to educated class. Similarly educated Pakistani mothers were more aware of the appropriate frequency of complementary feeding in every age group The study concludes that mother's education play a vital role in increasing receptivity to nutritional requirements of their infants and improved complementary feeding practices.

Key words: Maternal education, complementary feeding practices, nutritional status

Introduction

Growth of all Infants from the age of six months on words depends largely upon the provision of additional building materials supplied through complementary foods in order to help them grow into healthy and active adults. They need to be fed on a diet that provides all the nutrients and energy required for normal growth; vitamins and minerals to alleviate their hidden hunger and keep them strong. It is well-recognized fact that about half of Pakistani children under five mortality is directly or indirectly related to malnutrition. Infant feeding practices play a crucial role in determining a child's rate of growth and development. A point of great concern among nutritionists and health professionals is that improper feeding practices have not only continued to jeopardize the nutritional status of Pakistani Children but also the well being of millions of children all over the world. Introduction of timely, adequate and balanced complementary food is perhaps one of the most important single and direct remedial measures to combat infants' malnutrition. The education of the mothers is also considered to have a great impact on infants' nutritional status. The more a mother is knowledgeable the more she shall be able to help her child to grow nutritionally healthy as a young adult (Smith and Haddad, 2000). It is generally, assumed that the maternal education has a direct association with improving the nutritional status of infants as it enlightens her about the healthy eating practices. On the basis of this assumption, it is hard to accept that all the educated mothers have children without any nutritional problem, as it has been observed that the educated mothers also have malnourished children but these problems are of different nature I-e over nutrition, which is translated into over weight and obesity. Education initiative and nutrition intervention both have the capacity to foster development, raise consciousness and empower mothers to take diet related conscious decisions for themselves and for their children. Investing on mother education and appropriate nutrition intervention to ensure adequate and appropriate food converging it to balanced dietary intake is surely the most direct way through which a country can promote its health and social welfare reforms, and can lay the foundation for a mentally and physically healthy society.

Complementary feeding has been defined as the provision of nutrient containing foods or liquids other than breast milk that includes both solid foods and infant formula (Foote and Marriott, 2003). This refers to the period during which an infant becomes accustomed to complementary foods or infant formula in addition to the routine breast milk. The amount, type and consistency of food depend on the age of the child. This is also called "intermediately period". In developing countries, it covers a period between four months to two years, when the incidence of malnutrition and deficiency disease is at its

highest (Ilyas, 1983). Previously 4-6 months was considered to be an appropriate age to start complementary feeding because at this age, iron- stores from birth were thought to be exhausted and caloric requirements were no longer considered to be met by breast milk alone in developing countries (Ilyas, 1983). On the contrary, this reference is two decades old and there is enough evidence to support the introduction of complementary feeding after the age of six months to reduce morbidity and mortality among infants especially in economically-developing countries. During the last two decades, the scientific evidences collected have indicated that early introduction of complementary food has an adverse effect on the health of the infant in economically developing countries. This is due to the exposure of the home- made complementary foods to the microbial contamination, which is prepared under unhygienic conditions and non-affordability of commercially available complementary foods. In addition to these two comparative research studies from Honduras on exclusive breast-feeding for about four months with the same pattern of feeding for about six months did not show an adverse effect of the latter on growth and morbidity of the infants (Cohen *et al.*, 1994) and (Dewey *et al.*, 1999). The study of Fleisher *et al.*, 2000) concluded that the majority of healthy full term infants fed on adequate volume of breast milk from nutritionally healthy mothers who were capable of supplying all the required nutrients to the infants until six months of age. These studies directed to the recommendation that the infants should exclusively be breast fed until the age of 6 months and the introduction of complementary foods before the age of six months is considered to be an early feeding. The rate of infectious disease transmission increases with the introduction of an early complementary feeding. It has also been confirmed that exclusive breast-feeding for six months protects the infant against gastrointestinal infection, even in settings where unhygienic ally prepared complementary foods are used, and confers an advantage in prolonging the duration of lactation amenorrhoea in mothers who breast feed frequently (WHO, 2001). In the light of these recommendations, the appropriate age for complementary feeding is considered as six months. Mothers who delay in introducing complementary feeding from the age of seven months onwards till twelve months of age are considered to be late Complementary feeding and one year of age is described as very late.

A survey conducted by (Guldan *et al.*, 1993) on 185 infants (4-21 months of age) belonging to the rural Bangladesh found that education of mothers had a significant effect on child care and feeding behaviours. In a similar study Bhat interviewed 123 infant's mothers, and found that 23% infants were accepted as well nourished while remaining 77% infants were found to be in various grades of malnutrition. Mothers, whose infants were well nourished, had a higher level of breast-feeding knowledge than those whose infants were moderately to severely malnourished. The only mothers who had an excellent score for infant's complementary feeding awareness were three mothers, whose infants had an excellent nutritional status. Little difference in infants' nutritional status existed among mothers who scored fair and those who scored poor, but among mothers of well-nourished infants, those who scored well were more likely to be having infants of good nutritional status than those who did not score well (Bhat *et al.*, 1992).

Appropriate complementary feeding is very important both during and after breast-feeding. In developing countries breast-feeding is common, but complementary foods are frequently introduced at an early stage before the age of six months. Dewey *et al.*, 1998 conducted study in Honduras to evaluate the effects of the introduction of complementary foods before six months of age on iron status of breast-fed infants. This study randomly assigned 164 infants, who had been exclusively breast fed for four-months to continue being exclusively breast fed until six months of age, while the other group of infants was exposed to complementary foods (fortified with iron) in addition to breast milk from four to six months. The analysis showed that none of the infant with a birth weight over 3000g experienced an iron deficiency (low ferritin level) before the sixth month. However, a higher risk of anaemia and iron deficiency was associated with birth weights lower than 2500g , It was therefore concluded that the risk of iron deficiency is lowest in infants with birth weights over 3000g who are exclusively breast-fed for the first six months of life.

A major study on the determinants of malnutrition in five Indian states found that achieving timely introduction of solid foods at appropriate age might be the most cost effective means of reducing early childhood malnutrition in India today. (BAIF, 1997). Not only the appropriate timings, but appropriate quantity and quality in a hygienic environment, along with increased maternal interaction time also have a desired positive effect on the growth of young children. (Philips *et al.*, 2001)

The aim of the present study was to look into the association between the educational status of Pakistani mothers and prevalent complementary feeding practices. The prevailing infant feeding practices of Pakistani mothers were assessed and association between maternal education and complementary feeding practices was also studied.

Materials and Methods

The Outpatient Paediatrics Department of Federal Government Services Hospital, Islamabad, which is a 225-bedded teaching hospital, and was selected to conduct the study since one of the investigators was based at the paediatrics department of the hospital and

Table 1: Demographic Variables: Age, Occupation, Residence and Educational Status of Mothers

Variables	Variable Type	Nos.	Percentage (%)
Age	Less than 20 years	20	4
	21-30	380	76
	31-40	100	20
Occupation	Housewife	460	92
	Employed	40	8
Residence	Urban	310	62
	Rural	170	34
	Kachi Abadi*	20	4
Educational Status	Educated	320	64
	Uneducated	180	36

•Community comprising of slum houses refers to Kachi Abadi

Table 2: Association of Maternal Education with the Nutritional Status of Infants

Variables	Educated Mother (%)	Un educated* Mothers (%)	Total (%)
Normal Infants	44	2	46
Malnourished infants	20	34	54
Grade 1	10.8	8	18.8
Grade 2	6	9	15
Grade 3	3.2	17	20.2
Total	84	70	154

*Uneducated: - Mothers who could not read and write. Degrees of freedom: 4. Chi-square = 51.5757180968379. μ is less than or equal to 0.001. The distribution is significant.

has easy access to study sample. It has a very busy outpatient department (OPD) with a daily average turnover of 350 patients in morning shift and about 150 patients in evening shift.

The study was conducted for a period of three months. The data was collected from five hundred mothers of infants age ranging from six months to one year. Both educated and uneducated mothers were made part of the sample. The educated mothers were defined as the literate mothers who could read and write and had the appearance of a refined subject. Educated mothers were further categorized into two l-e those who had less than ten years of schooling and those who had more than ten years of schooling. While the uneducated were identified as mothers having no schooling at all and were non-literate. For this purpose a convenience sample of five hundred mothers was drawn from the mothers accompanying the infants brought for immunization or other minor ailments in the Outpatient Paediatrics Department. The research team claims this sample as representative one, as the population of Islamabad comprises of a heterogeneous group of people settled in Federal capital. Infants of both sexes residing in rural and urban areas of Islamabad were included where as infants admitted in the ward for some serious illness was excluded from the study.

Survey instruments: A one-page questionnaire as a survey instrument was designed in the light of objectives and limitations of the study. In order to achieve the accuracy and reliability of data and to enhance the wise ness of the of the research tool the questionnaire was pre tested on ten mothers visiting the hospital before the start of the study., some questions were rephrased in the light of the pre testing results and the questionnaire was finalized and translated into Urdu language. All such mothers were excluded from the actual study. The data collected was based on information drawn from mothers, both educated and uneducated mothers visiting the Paediatrics Outpatient Department. The mothers visiting daily during the morning shift only were included in the study. The questionnaire included both open ended and close-ended questions (Appendix – 1). Consent was taken both from hospital administration and educated mothers prior to distributing questionnaires, while the willingness from each uneducated mother was taken before filling each questionnaire. The uneducated mothers were probed for the required information by the investigator to collect in depth information. Relevant options were tick marked. Demographic variables were age, sex of the infant, mother's age, occupation of parents and residential area (urban/rural) of the study sample.

The nutritional status of the infants was assessed using only weight for age measurement among anthropometrical measurements. Modified Gomez Classification was used for this purpose. In this method nutritional status is shown in terms of percentages of the median of the reference population. Normal Nutritional status is defined as above 80% of the median. First-degree malnutrition is defined as between 70-79%, second degree as 60-69% and third degree as 60% or less of the median of the reference population (Khan, 1996). The educational status of mothers was checked through information drawn from questionnaire and its association with the nutritional status and complementary feeding practices was statistically calculated.

Data analysis: Data entry and analysis was done using standard statistical methods. Frequency of variables was taken and Chi Square test was applied to find out the statistical significance of the data, independent relationship and validity of the variables. Data was later compiled, tabulated and classified.

Results

Completely filled questionnaires were received from 500 mothers surveyed resulting in a response rate of 100%. Out of 500 respondents 106 mothers did not introduced any complementary food to their infants and the children were fed only on breast milk, where as 394 mothers were giving complementary foods along with the breast feeding their infants. All such infants were divided into three age groups. First age group included infants from

age 6 to 7 months, second from 8 to 9 months and third age group comprised of 10-12 months Table 5). Majority of respondents belonged to urban areas and were unemployed being housewives (Table 1).

In the group of infants having normal nutritional status (46%) infants belonged to uneducated mothers, 44% educated mothers and 2.0% infants belonged to uneducated mothers, while in malnourished group (54%), 20% belonged to educated mothers and 34% to uneducated mothers (Table 2). Numbers of educated mothers having infants suffering from grade 1, 2 and 3 degree malnutrition were 10.8, 6.0 and 3.2 percent respectively, while the percentages of uneducated mothers in the same malnourished group were 8.0, 9.0 and 17.0 (Table 2). The rate of malnutrition increased with the increase in number of uneducated mothers (Table 2). Further break-up of educational status of mothers into different levels of education in relation to nutritional status of the children showed that more the mothers were educated lesser the children were suffering from malnutrition (Table 3).

Out of 500 mothers interviewed, a large number of mothers i.e. 79 % had started complementary feeding to their infants while 21% mothers did not start complementary feeding at appropriate age (6 months). 1 % mothers who started early complementary feeding were all educated. 36% mothers started complementary feeding at appropriate age, out of which 35% mothers were educated and 1.4% mothers were uneducated. 19 % mothers started late complementary feeding out of which 14% mothers were educated and 5.% were uneducated. 22% mothers started very late complementary feeding out of which 10% were educated and 12% were uneducated mothers (Table 4).

Analysis of the data regarding complementary feeding pattern showed that among the total mothers (79%), 8 % mothers gave their infants complementary food occasionally (twice or thrice a month), 16 % weekly, 38 % once or twice daily while 39 % mothers gave their infants complementary food three to four times. Among the group of infants who were given complementary feeds weekly (16%), the percentage of educated mothers was 5, 1 and 1. in 6-7, 8-9 and 10-12 months old infants , where as 4, 3 and 2 % mothers having 6-7, 8-9 and 10-12 months old infants belonged to uneducated group respectively. 13, 6 and 1% educated mothers and 5, 4 and 8% uneducated mothers of 6-7, 8-9, 10-12 months old infants correspondingly gave their infants complementary food once or twice a day. Among the last group of mothers who gave complementary foods three to four times to their 6-7, 8-9 and 10-12 months old infants, 1, 17 and 7% were educated and 2, 1 and 10% were uneducated (Table 5).

Discussion

In this study we found a positive relationship between maternal education and infant's nutritional status ($P<0.001$). Majority of mothers were educated and their infants (46%) had a normal nutritional status, while infants of various malnourished groups (54%) were mainly from uneducated class of mothers. Since the study area was federal/urban so mostly mothers came from the educated class, in a similar study Bhat *et al.*, 1992 interviewed 123 infant's mothers and found that 23% infants belonging to educated mothers were considered to be well nourished while remaining 77% infants of uneducated mothers were found to fall in various grades of malnutrition. So a positive relationship between maternal education and infant's nutritional status in the current study is similar to that of Bhat,s study (Bhat *et al.*, 1992).

Our research study showed that educated women started complementary feeding of their infants at appropriate ages as compared to those who were uneducated ($P<0.001$). 36% mothers introduced complementary food to their infant's diet at recommended ages out of which 35% were educated and 1% was having no education. These results are comparable with three cross sectional surveys, which showed that mothers who did not breast-feed, were younger, had lower education, smoked or had partners that smoked, and lacked support after birth, were more likely to introduce solid foods before four months of age. Although the study does not reflect the latest recommendations as given by WHO, however, it represents the positive relationship between maternal education and appropriate weaning age (Kwavnick *et al.*, 1999).

Rafiquzzaman (1992) reported in a survey of 188 mothers that majority of educated respondents were likely to introduce complementary foods to their infants feed at proper age than uneducated ones. Ignorance and poverty were the leading causes of improper complementary feeding practices among 4-12 month old infants of the study area.

It was also observed that educated mothers were giving complementary feeding on daily basis and with more frequency ($P<0.001$). The basic concept of mothers about complementary feeding was observed, as they assumed that once the complementary feeding has initiated, it did not matter to feed regularly on daily basis and they thought as it was absolutely fine to feed them occasionally.

Conclusion: The main conclusion of this study was that majority of mothers introducing complementary foods to their infant's diet at recommended age of six month were mainly from educated class. Similarly positive relationships were observed between educational status of mothers with nutritional status of the infants. It was also observed that mostly infants suffering for different degrees of malnutrition belonged to

Table 3: Degree of Malnutrition among Infants' with the level of Maternal Education

	Nutritional Status of the children			
Level of Education of mothers	Normal (%)	Grade 1 (%)	Grade 2and3 (%)	Total
Uneducated(Non literates)	2	8	26	36
Below ten years of schooling.	20.8	9.2	8	38
Ten years schooling and above	23.2	1.6	1.2	26
Total	46	18.8	35.2	100

Degrees of freedom: 4. Chi-square = 50.1111544364989. μ is less than or equal to 0.001. The distribution is significant.

Table 4: Relationship of Maternal education with Initiation of Complementary Feeding Practices

Complementary feeding period	Educated	Uneducated	Total
Having no complementary feeding	3.4	17.8	21.2
Having Complementary feeding	60.6	18.2	78.8
Early complementary feeding(less than 6 months)	1.2	0	1.2
Normal Complementary feeding (6 months)	34,8	1.4	35.4
Late complementary feeding (7-12 months)	14.2	5.2	19.4
Very late Complementary feeding (after 1 year)	10.4	11.6	22
Total	123.8	54.2	178

Degrees of freedom: 5. Chi-square = 48.2146759783293. p is less than or equal to 0.001. The distribution is significant.

Table 5: Relationship of Complementary Feeding frequency with Infants age (n=394)*

	Infants age			
Pattern of complementary Feeding	6-7 months	8-9 months	10-12 months	Total (%)
Occasionally	4.06%	2.03%	1.52%	7.61
weekly	8.88%	3.81%	3.05%	15.74
Daily: once or twice	17.77	10.34	9.45%	37.56
Daily: 3 or 4 times	3.55%	18.27	17.26	39.08
Total	34.26	34.45	31.28	99.99

Remaining 106 mothers did not initiate Complementary feeding even at the age of 12 months. Degrees of freedom: 6. Chi-square = 18.5602148413138. p is less than or equal to 0.01. The distribution is significant.

uneducated class. Since it is not necessary that uneducated mother has always-malnourished child and educated mother cannot have malnourished child, it may need further investigations to focus on other factors that can influence the nutritional status of the infants.

It has been reported that majority of the uneducated mothers withheld complementary food to their babies and even if they started giving, the frequency was not appropriate, merely because of lack of education. The late introduction of semisolid food has been one of the major factors contributing to the protein calorie malnutrition and high incidence of infant's mortality. Formal education plus nutrition education of the mothers is important as it increases awareness among mothers about important nutritional needs for their infants by increasing the receptivity of the mothers towards the educational message.

Recommendations for future research:

1. Other factors like weight of the child at birth, socio-economic status of parents and multi- parity that can influence the nutritional status of infants need to be further explored..
2. Quantity and quality of local complementary feeds need to be measured and assessed.
3. Similarly the feeding practices and nutritional awareness of their mothers need to be further investigated.

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