Effect of Complementary Feeding on Nutritional Status of Children of Less Than Two Years

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Abstract

Breastfeeding fulfils the dietary requirement of a child until 6 months. After that infant get developmentally ready for additional food to meet nutritional needs. Complementary feeding impart important effects on health of a child, improves health, IQ, weight, and height. The aim of this study was to determine the effects of complementary feeding on the nutritional status of children less than 2 years. A cross sectional study conducted at the Pediatric ward of Ayoub teaching hospital (ATH)Abbottabad, KP. A total of 139 children were enrolled in this study. Nonprobability convenient sampling technique was used. Obtained data was analyzed using SPSS. The mean and standard deviation were used to characterize quantitative variable. The ages of 139 enrolled children were ranged from 4-24 months with mean age of 12.6±5.60 months. Out of 139 children, 117 (84.2%) were taking complementary feeding. The analysis showed a significant association between feeding and weight of the children with respect to age. The results depicted that, children taking complementary feeding were of normal weight with respect to age and those without complementary feeding were of low weight with respect to their age (P=0.03). It was observed that complementary feeding practices have highest frequency (57.6%) of starting complementary feeding between 0 to 6 months of age. Mixed types of food were used in greater percentages (43.6%), per day frequency was 3 times (35.9%) and amount of food was 1 cup in in majority (47.86%). The result showed that children taking complementary feeding were healthier than those without complementary feeding. Most of the mothers were not following the standard protocols for about age of 4 to 24 months of complementary feeding, Frequency, quantity, and quality of food given in complementary feeding were not according to the WHO guidelines. There is dire need to educate the mothers about breast and complimentary feeding as per WHO guidelines to save the children from malnutrition.

***Keywords*:** Complementary feeding, Children, Feeding practices, Breast feeding.

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Introduction

Complementary feeding is the feeding process which starts when breast milk is no longer sufficient to meet the nutritional requirements of an infant to full fill this gap other foods and liquids along with breast milk are being fed to the baby (Rath, 2012). Exclusive breast feeding for infant's starts from birth until six months (180 days). According to WHO the complementary foods should be introduced from the beginning of seventh month and continued until the age of 2 years along with breast feeding (Gunja and Brown, 2009). Complementary food must be Timely, i.e. food to all infants should be started from six months onwards. It should have an appropriate nutritional value to meet a child's growth needs. Moreover, it should be appropriate it must have variety, of appropriate texture and enough (Reissig et al., 2009). Globally around 10 million children under the age of 5 years die each year of which more than half of the deaths occur because of malnutrition. The presence of adequate health system can nearly reduce 2/3 of the deaths (Clauson et al., 2008). Exclusive breastfeeding is recommended during the first six months. The transition period from breastfeeding to the family food is most vulnerable to develop malnutrition ((Sawka et al., 2007).

According to a study conducted, 85% of UK mothers administer solid diet by 4 months. While 34% Italian mothers started complementary feeding before 4 months (Zucconi et al., 2013; Mets et al., 20011). In contrast 16% German mothers started complementary feeding before 3 months (Bedi et al., 2014). According to a study conducted in Lahore Pakistan in 2015, it was observed that 31% mother introduced complementary feeding at 4 months 32% at 6 months, and 24% after 4 months (Seifert et al., 2011). It is important to know that the period from birth to two years of age is the critical time for the development of optimal growth. Insufficient quantities and improper quality of complementary foods poor child-feeding practices and high rates of infections have a detrimental impact on health and growth in these important years (Carrillo and Benitez, 2000). It is estimated that almost 1.3 million lives are being lost annually because of inadequate exclusive breastfeeding with an additional 600,000 are being loss by lack of continuation of breastfeeding with proper complementary feeding.

Stunting delayed motor and mental development, neurological and mental tiredness, recurrent diarrhea, & lack of macro and micronutrients are all complications induced by inappropriate complementary feeding techniques. Malnutrition during first year of the life causes many short-term severe problems including retorted growth and increased child morbidity and mortality. Low weight or height are the

indicators of delayed growth in infancy. It is estimated that malnutrition, directly or indirectly lead to almost 60% of the mortality of the children aged below 5 years (Visram et al., 2016). In 2001, the frequency of underweight children in the world was 10%. In 2001, globally 10% children were suffering from underweight. In 2011 this frequency increased to 13%. Today, the worldwide underweight rate risen to 16%. Furthermore, 52 million kids' under-5 age or five are experiencing from mild to severe wasting (i.e. low height for age). In this regard South Africa ranks first where approximately one in six children have moderate or severe wasting. According to recent estimates, by following exclusive breast feeding for 6 months and good supplemental feeding methods, it is feasible to save 20% of under-5 age fatalities in underdeveloped nations (Manrique et al., 2018).

Factors effecting the complementary feeding include information about complementary feeding, attitude, believes, values and socio-economic status. A study conducted in Dhaka Bangladesh showed that mother's education, and limited family buying capacity were the major determinant factor for complementary feeding. A study conducted in South Africa showed that major determinant factor for poor feeding practices was poverty and lack of knowledge about complementary feeding (Bleich and Vercammen, 2018). Insufficient quantity and improper quality of complementary foods, and poor child-feeding practices have a detrimental impact on health and growth in 1st two years of life of a baby. Complementary feeding has wide range of effects on physical and mental health of a child. Setting in which we carried out study mothers are uneducated and poor and had lack of knowledge about complementary feeding. So, we carried out study to determine the pattern and frequency of complementary feeding. In current study less than two years' children were enrolled because, it is vital to understand that the interval between birth and two years of age is critical for the development of healthy growth. Inadequate volumes and poor quality of supplementary meals, poor child-feeding habits, and high infection rates all have a negative influence on the health and growth during these critical years. This study will help to initiate the systematic efforts to reduce burden of malnutrition and its ill effects.

Methods

Study design

This is a cross sectional study carried out at Pediatric ward of Ayoub teaching hospital Abbottabad, KP, and Pakistan. A total of 139 children were enrolled and study was conducted. Ethical approval was

taken from the institutional Ethical committee of Hazara University Mansehra before data collection patients or guardians was briefed and informed consent was taken.

Inclusion and Exclusion criteria

The children under the age of 2 years of either gender admitted at pediatric ward of ATH suffering from acute health problem were included, while the children with serious illness or not willing to participate in study were excluded.

Data collection and analysis

A stranded questionnaire was used as a tool for data collection. A structured questionnaire was developed including variables of interest. The questionnaire was pre-tested twice before adopting a final version. Non-probability convent sampling technique was used. Weight of the baby was measured in kilograms by using weight balance present in ward. Height of the baby was measured in inches using measuring tap while lying them on bed.

Ethical approval

An informed verbal consent was obtained from all those who participated in the study. Procedure and purpose of the study was explained before asking the questions. Data was only accessible to those who conducted the study.

Data analysis

Data was analysed using SPSS version 16. Age and other quantitative variables were specified in terms of mean and standard deviation. Frequencies and percentages were used to characterise categorical variables. Statistical association between categorical variables was determined by applying chi-square test. P-value of 0.05 or less was considered as statistically significant.

Results

A total of 139 childern were included of which 86 were male and 53 were females. The weight ranged from 3kg to 21kg with the mean weight 8.02±2.64 kg. The height ranged from 12.5 to 36 inches with the mean range of 27.1±4.3 inches. Out of 139 children 117 were taking complementary feeding. The age of children ranged from 4-month to 24 months with the mean age of 12.6±5.60 months as shown in figure 1.

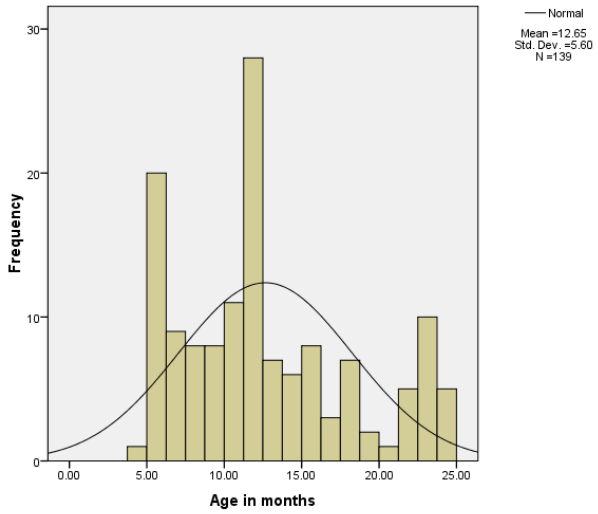

Figure 1: Age wise distribution of children

Ages of children ranged from 4 months to 24 months with mean age of 12.6±5.60 months (Fig 1)

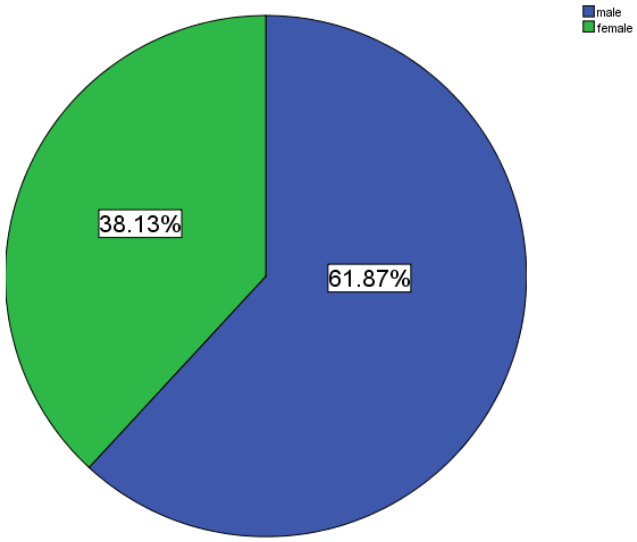

Figure 2: Gender wise distribution of Children

The sample consisted of both male and female children. Male children were 86(61.9%) and female children were 53(38.1%). Ratio of male to female was 1.62 (Fig 2).

Complementary feeding status

A total of 117 children (84.2%) were taking complementary feeding, while children not taking complementary feeding were 22(15.8%).

Reasons for not initiating complementary feeding

When we asked about the reason of not initiating complementary feeding, 12(54.5) said that their babies start vomiting, 7(31.8%) said that their babies get diseased by starting complementary feeding, and 3(13.6%) were not knowing the reason.

Age of starting complementary feeding

When asked about age of starting complementary feeding, 67(57.3%) started CF below the age of 6 months, 42(35.9%) started between the range of 6 to 12 months, 8(6.9%) started above the age of 12 months.

Type of food given in Complementary Feeding

About food given in Complementary feeding, 27(23.1%) were taking homemade food, 39(33.4%) were taking readymade food, while 51(43.6%) were taking mixed food.

Per day frequency of Feeding

When asked from mothers, about how often they feed their children, 47(40.1%) replied that they were giving complementary feeding less than 3 time a day, 70(59.9%) were giving 3 times or more a day.

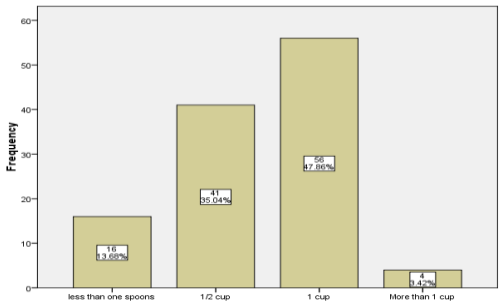

Figure 3: Amount of food per feed

When asked from mothers of children included in study, about how much do you feed your child at one time, 16(13.7%) were feeding 2 to 3 spoons at one time, 41(35%) were feeding ½ cup, 56(47.9%) were feeding 1 cup, 4(3.5%) were feeding more than 1 cup. One cup is equal to 2 spoons. (Fig 3).

Feeding Style

About the type of complementary feeding 97(82.9%) were actively feeding their children while 20(17%) were passively feeding their children as shown in above table. Active feeding means that child eat sepearately and not with his/her other brothers and sisters. While passive feeding means that child take food along with his/her brothers and sisters.

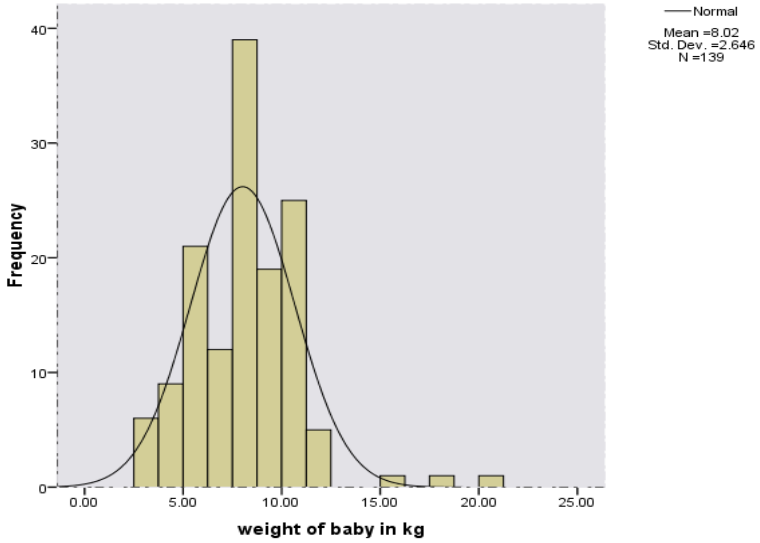

Figure 4: Weight of baby (in Kg)

Weight of children included in study ranged from 3 kg to 21 kg with mean weight of 8.02±2.64 kg. (Fig 4). Height of children ranged from 12.5 inches to 36 inches with mean age of 27.1±4.3 inches (Fig5).

Weight for age of Children

For children we measured the weight, and plotted against age and found that, 67(48.2%) were normal, 68(48.9%) were of low weight and 4(2.9%) ere obese as shown in above table.

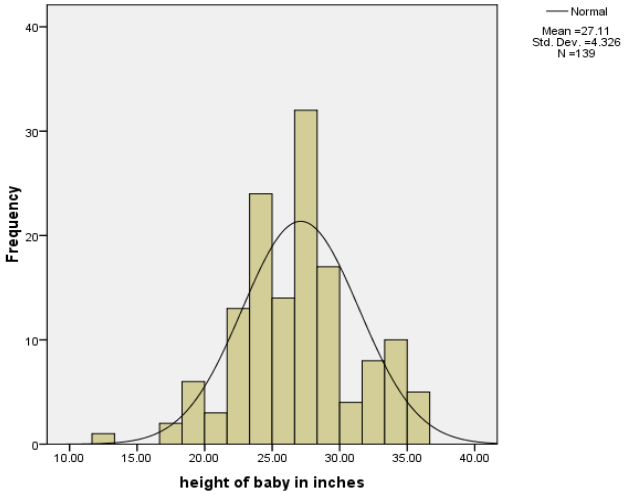

Figure 5: Height of baby (in inches)

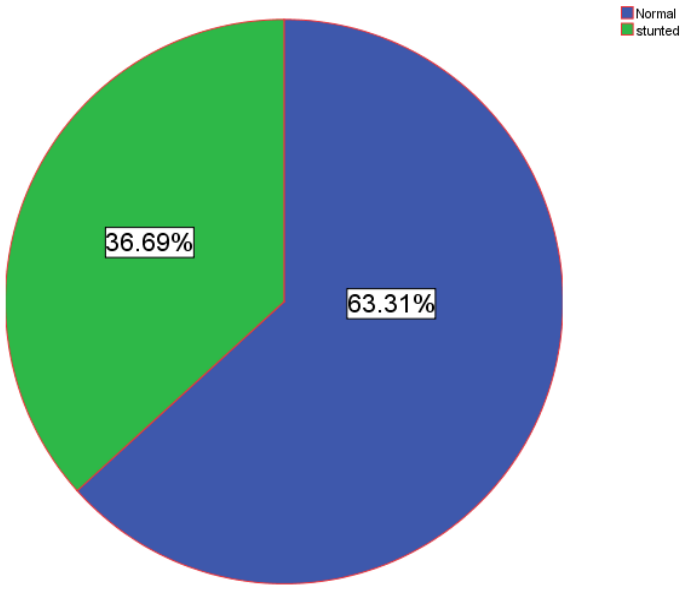

Figure 6: Height for age of Children

For 139 children we measured the height and plotted against age, we find that 88(63.3%) were of normal height, and 51(36.7%) were of stunted growth. (Fig 5)

Effect of complementary feeding on weight (in kg) and height (in inches) for age

Effect of complementary feeding on weight for age of babies is given in table 6. It shows that out of 117 child taking complementary feeding 62(52.9%) were normal, 52(44.4%) were low weight 3(2.56%) were obese. Out of 22 children who were not taking complementary feeding 5(22.7%) were normal, 16(72.7%) were low weight, 1(4.56%) was obese. We apply chi-square test to above data and found that above results were statistically significant (P=0.03).

Effect of complementary feeding on height for age of children is given in table 6. It shows that out of 117 children 74(63.2%) were normal, 43(36.75%) were stunted. Out of 22 not taking complementary feeding 12(54.5%) were normal and 10(45.45%) were stunted. We apply chi-square test to above data and found that above results were not statistically significant (P=0.97).

Table 1
Effect of complementary feeding on height

Complementary feeding status			
Weight (in kg)			
	Normal	Low	Obese
Children with CF	62(52.9%)	52(44.4%)	3(2.56%)
Children without CF	5(22.7%)	16(72.7%)	1(4.56%)
Height (in inches) for age			
	Normal	Stunted	
Children with CF	74(63.2%)	43(36.75%)	
Children without CF	12(54.5%)	10(45.45%)	

Discussion

After 6 months of age, infant on breastfeeding need nutrients. Furthermore, most infants are developmentally ready for other foods at about 6 (Kreb, 2014). Period of complementary feeding (6 months to 24 months) is one of the most important times for preventing malnutrition. Growth retardation is most evident during this time (Dewey and Brown, 2003). Our results showed that (84.2%) children were taking

complementary feeding while 22(15.8%) children were not. The most common reason for not initiating Complementary feeding was vomiting when complementary feeding was given. A study conducted in Nigeria showed that 85.4% of mothers started Complementary feeding to their children while 14.6% did not started Complementary feeding to their Childs (Imdad et al., 2011). Another study conducted in Siri Lanka on 476 mothers showed that 82.5% of mothers started Complementary feeding while rest did not start Complementary feeding (Prescott et al., 2008). A similar study conducted on Bangladeshi children showed that 76.6% started CF before 8 months while 24.6% did not started Complementary feeding (O'Donovan et al., 2015). Results of other researches are almost same as that ours. Reasons stated by other research about not starting Complementary feeding are different but most common reason was lack of knowledge about standard protocols of Complementary feeding practices. And mothers did not know the importance of Complementary feeding.

The complementary foods should be introduced from the beginning of seventh month and continued until the age of 2 years along with breast feeding.[2] Our results showed that, 67(57.3%) mothers started Complementary feeding before 6 months, 42(35.9%) started between the range of 6 to 12 months, 5(4.3%) started between the range of 12 to 18 months, while 3(2.6%) started between the range of 18 to 24 months. A study conducted showed that 2.3% of mothers introduced complementary feeding to their infants as early as first month of life and 12.9% at 2 moths. Overall, 73.5% of the mothers introduced CF to their infants before the recommended age of 6 months (Underwood and Hofvander, 1982). Similar studies conducted in Siri Lanka (Dewey and Adu- Afarwuah, 2008) and Nigeria (Caulfield et al., 1999), where 69 percent and 82 percent of mothers were reported to have started complementary foods afore 6 months respectively. A study conducted in Karachi Pakistan showed that 21% of mothers started Complementary feeding at an inappropriate time (Aggarwal et al., 2008).

The reasons for poor practices of introduction of Complementary feeding stated by different researches are different. Most common reason recorded is wrong perceptions mother have about breast milk alone for recommended duration of 6 months. Mothers in these investigations claimed that breast milk did not satisfy the infant and supplemental feeding should begin (Prescott et al., 2008). Our study results are almost like other studies and reason poor practices of initiating Complementary feeding is myth of mothers about Complementary feeding that breast milk alone will not be sufficient to meet nutritional requirements of baby and

Complementary feeding should be introduced. For age of child 6 to 8 months' frequency of meal is 2 to 3 times a day (plus frequent breast feed) and amount is 2 to 3 spoons per feed and energy need is (200kcal/day). In our study about children included, 13(11.2%) were taking Complementary feeding 1 time a day, 34(29.5%) were taking 2 times a day, 42(35.9%) were taking 3 times a day, 19(16.3%) were taking 4 times a day, 9(7.7%) were taking 5 times a day. A study showed that average number of feedings per day was 5.0±2.5 times. Similar study conducted in China and Uganda showed that average number of feedings per day was 2.0±1 and 3.0±2 times per day respectively (Engebretsen et al., 2007). A study conducted in Karachi Pakistan showed the frequency of Complementary feeding 4.0±2 times a day.

Conclusions

Complementary feeding had most vital role in the early development of child health. The effect of complementary feeding on children's weight shows that those who had Complementary Feeding had normal weight for their age, whereas those who did not received it had low weight. Similarly, children who received Complementary Feeding had normal height and others did not. We concluded from above discussion that standard protocols for Complementary feeding are not followed by mothers in study area. We also concluded that children taking complementary feeding are healthier than those not taking. About age of starting complementary feeding, frequency of feeding and quantity and quality of food given in complementary feeding are not according to the WHO guidelines.

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