



RESEARCH ARTICLE

STUDY OF RELATIONSHIP BETWEEN MATERNAL KNOWLEDGE ABOUT
COMPLEMENTARY FEEDING AND THE NUTRITIONAL STATUS OF PRESCHOOL CHILDREN
AT BENGHAZI

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ABSTRACT

Early childhood is a period of rapid growth and an important phase for developing eating habits because the dietary behaviors acquired during the early years of life can extend to adulthood, healthy eating behaviors in childhood are very important. It helps prevent malnutrition, growth retardation, and acute child nutrition problems. Several studies have revealed that the mothers' level of education has a positive impact on her knowledge and how she deals with child health care issues. The aim of this paper is studying the relationship between the maternal nutritional knowledge about the baby feeding and study the correlation between ages of food introducing and body mass index. The current study is a cross sectional study carried out from January to May 2019 on mothers and their children in Benghazi, the participant in the study are 200 mothers with their children. The results of present study shown that, 46% of the mothers whose participate in this survey were aged between 25-34. The sex distribution of the children nearly half (52%) of the population were boys, while (46%) were girls in this study 57% of the mother have knowledge about the recommended age of complementary feeding. The main source of nutrition information was their families 56%. The nutritional status for children in this study were 45% of them were overweight and 17.5% were underweight There was a significant relationship between the overweight and age of initiated complementary feeding, and between mother's source of information and the age of complementary feeding. Growth patterns were therefore affected much by timing of introduction of complementary feeding In this study level of education, level of economic and age of mothers were the factors that influenced the timing of introduction of complementary food.

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INTRODUCTION

Nutrition is a basic human need as well as prerequisite to a healthy life. An appropriate diet is essential from the very early stages of life for proper growth, development and to remain active(1). Nutritional status which is the balance between intake of nutrients and its expenditure in the processes of growth, reproduction and health maintenance, is a critical determinant of growth and development of children.(2)

Early childhood is a period of rapid growth and an important phase for developing eating habits because the dietary behaviors acquired during the early years of life can extend to adulthood. (3-4) Child care is mostly the responsibility of mothers. Therefore, the mother's knowledge about child care influences the nature and quality of care that is given to the child. (5)

Several studies have revealed that the mothers' level of education has a positive impact on her knowledge and how she deals with child health care issues. (6-7) Children are future of society and mothers are guardian of that future, Knowledge of mothers has an important role in the maintenance of nutritional status of the children. Hence to ensure sound foundation and secure future of any society health and nutrition of their children needs protection.(8) Healthy eating behaviors in childhood are very important. It helps prevent malnutrition, growth retardation, and acute child nutrition problems, in addition to preventing chronic, long-term health problems such as cardiovascular diseases, type 2 diabetes, cancer, obesity, and osteoporosis. (9) As a national public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. (10) After 6 months exclusive breast feeding and complimentary

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feeding should be initiated to supplement nutritional requirement. Mother's knowledge on exclusive breast feeding is not sufficient enough on mothers to demonstrate practically. Complementary foods should provide approximately 25-50% of total daily requirements and 75-100% for phosphorus, zinc and iron.(11) World Health Organization (WHO) defines complementary feeding as "a process starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk" (12)

In Australia, in 2010 at least 35 % of infants aged 4 months, and 92 % of infants aged 6 months had consumed soft/ semi-solid food (15) with exclusive breastfeeding rates in Queensland (where in this study was conducted) even lower, only 9.5 % at five months of age; 90.5 % had consumed some form of complementary feeding.(16) Similarly a recent West Australian study found the median infant age for introduction of complementary feeding was four months; with 93 % of the cohort having received complementary feedings by six months of age.(17) Mother can be especially prepared Complementary foods for the infant or can be the same foods available for family members, modified in order to meet the eating skills and needs of the infant. In the first case, they are called transitional foods.(18)It is very essential know the mother of initiate complementary feeding timely. Early introduction of complementary feeds is associated with increased morbidity due to diarrheal diseases and development of malnutrition. On the other hand, too long delay in introducing appropriate complementary foods may lead to nutritional deficiencies of iron, zinc, calcium and sometimes vitamin A and riboflavin. Mother should be follow standard protocols on complementary feeding (complementary feeding) in order to address these problems. (19)

In the United Kingdom, 75% of infants had been given complementary foods by 6 months, while in the United States of America, 20% of infants were receiving only breast or formula milk at 6 months of age.In developing countries early or inappropriate complementary feeding displace breast milk and may lead to malnutrition and poor growth, resulting in stunting or wasting in childhood. In developed countries, early introduction of complementary feeding has been linked to gastrointestinal problems.In several parts of the developing world, complementary feeding continues as a challenge to good nutrition in children of 6–23 months,if complementary foods are not introduced at this age or if they are given inappropriately, an infant's growth may falter. In many countries, the period of complementary feeding from 6–23 months is the time of peak incidence of growth faltering, micronutrient deficiencies and infectious illnesses.(20-24)

In Nigeria, only 21% of breastfed children receive the minimum acceptable complementary feeding diet 25 However, in Ethiopia, only 4.2% of breastfed children of 6–23 months of age have a minimum acceptable diet 26The challenges during complementary feeding are context specific, but many are common across settings. They are often characterized by poor feeding practices and poor dietary quality of homemade complementary foods.27-29 Low maternal education also mediates poor child nutrition status. This is because primary care given to children by their mothers and/or caregivers is

influenced by their knowledge and understanding of nutrition (i.e. basic knowledge of nutrients and healthy foods) and child health care30Inappropriate feeding practices are a major cause of the onset of malnutrition in young children.31Malnutrition is estimated to cause about half of the world's 12 million annual deaths in children less than 5 years.32 Child nutrition outcomes, stunting and wasting in particular, are recognized as key indicators for tracking the nutrition and health status of children in a population33about 35 % of preschoolers are stunted, while 29 % are underweight in Sub-Saharan Africa In addition, the Fifth Global Nutritional Report (FGNR) estimates that in East Africa 44 % of children under-five were stunted while 31 % were underweight in 2005.34

According to MICS (Multiple Indicator Cluster Survey) report, the prevalence of malnutrition in fewer than five children is as follows: 42% children are stunted, 16.4% are severely stunted, 9.6% children are wasted and 1.6% is severely wasted, 31.9% children are underweight and 8.8% are severely underweight. In Barisal, Underweight prevalence 35.2%, stunting prevalence 41.4%, and wasting prevalence 11.7%. 35In Ghana, the latest Multiple Indicator Cluster Survey showed that about 11% of children under five years of age were underweight, 19% were stunted and 5% were wasted (Ghana Demographic and Health Survey, 2014)36.Malnutrition leads to early physical growth failure, delayed motor, cognitive and behavioral development, diminished immunity and increased mortality and morbidity37Poor physical growth, an indicator of poor nutritional status, is high in sub-Saharan countries, where approximately 21.9% of children are underweight and 40.1% are stunted.38The most vulnerable group of children are those under 5 years of age.39Malnutrition literally means "bad nutrition" and technically includes both over- and under-nutrition40.Obesity is becoming more prevalent in children of all ages, Children are no exception. An estimated 20% of school-aged, children in the European Union and 31.8% of American children and adolescents were overweight or obese in 2010. 41

overweight children are more likely70% to become obese adults42 According to the World Health Organization (WHO) data covering 144 countries, the worldwide prevalence of overweight and obesity in preschool children aged 0 to 5 years old increased from 4.2% in 1990 to 6.7% in 2010 and is projected to reach 9.1% (about 60 million) by 2020.43

A recent review found strong evidence of overweight tracking from childhood into adulthood, so if the number of overweight children is increasing, then so will the number of overweight adults also, earlycomplementary feeding may be one risk factor for, childhoodobesity.44

For these reasons, interventions to prevent obesity should begin early in life, starting in preschool or even at birth45.

No studies on complementary fed in Libya has been carried out, thus the result of this research can be used as a baseline for further researches. This research aims to study the level of cultural awareness among mothers in Benghazi city and how it reflects positively or negatively on the children and compares this level with the health statues of their children. This paper also aims to know the maternal nutritional knowledge about the baby feeding as well as to study the correlation between age of

food introducing and body mass index. This research tries to study the correlation between socioeconomically status and nutrition states of children.

MATERIALS AND METHODS

Study Sample

Across sectional study carried out from January to May 2019 on mothers and their children in Benghazi, the second largest city in Libya. The participants in this study, was any child under the age of five year who was healthy or sick, and did not specify specific characteristics for the mothers who would be participate.. The sample of 200 mother and 200 children (96female and 104 male) and the age of mothers ranged from (16 years–and above) and the children was (1 – 5years)this sample was collected from Benghazi Medical Center and Benghazi children Hospital. In this study we include any case want to participate without exception, except children who more than 5 year.

Questionnaire

In this study the questionnaire has been used based on 17 items divided into two basic sections. All questionnaires were carried out by direct interviewwith the subjects. Information such as personal information, demographic and socioeconomic characteristics, food habit and patterns, anthropometric (weight and height and mid upper arm circumference) and others items to assess the knowledge and study correlations of food habit andlife style patterns to their health statues were collected.

Measures and biochemical tests

Weight and height were measured after completion of the questionnaires and hand by two students. Height was measured to the nearest 0.1 cm using standard calibrated scale attached to the balance against a wall. Weight was measured to the nearest 0.2 kg using weighing machine. All measurements were collected with barefoot and with light clothes. BMI was computed by dividing weight (kg) over square of height in meter, and classified according to categories of World Health Organization. The MUAC was measured by using tape measure (it is the circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow –olecranon process and the acromion. Although the importance of calculation of head circumferenceand chest circumference, they were not been measured in this study since most of children didn’t respond to us. The data of investigations were collected from Benghazi Medical Center, Benghazichildren Hospital.

Ethical statements

This study was granted approval by the local Ethics Committee of the Benghazi province. Informed written consent was obtained through a consent form that was given to the participants along with the questionnaire.

Statistical analysis

The data collected from questionnaire was loaded on Excel. Data set was exported to (SPSS Inc. Chicago, USA v. 18) and analysed to describe food intake, health characteristics, anthropometric, and life style patterns. The BMI was calculated and classified according to World Health

Organization.Chi-square test (t test) was done the significance level: $P \leq 0.05$ was considered to be statistically significant.

RESULTS

The results of present study shown that,46% of the mothers whose participate in this survey were aged between 25-34, 35%were aged above 35,and 18% were aged between16-24 years old.and 51% of them their educational level were university level,33% high school level education, 11%middle level education , and 5%primary level education.Regarding the economical levels of the participants, 85% were has medium level, 11%low, and4% were with high economical leveltable (1). The sex distribution of the children is shown in table (2). Nearly half (52%) of the population were boys, while (46%) were girls. A total of 200 children under five of age were covered in the study. 24% of them were aged 5 years old,21%were aged 3 years, 19% were aged 2years, 18%were aged 4years old and 18% of them were aged 1years old.

Table 1 Socio-demographic characteristics of mothers

Variables	NO.	%
Mother’s age		
16-24	36	18%
25-34	93	46%
35and more	70	36%
Educational level		
Primary educational level	10	5%
Middle educational level	23	12%
High school level	65	32%
University level	102	51%
Socio-economical level		
High	9	4%
Medium	169	85%
Low	22	11%

Table 2 Distribution of children by sex and age

Child’s age	Boys	Girls	Total
1years	11	14	25
2years	17	23	40
3years	26	20	46
4years	21	16	37
5years	29	23	52
Total	104	96	200

Mothers were asked about the appropriate age for starting weaning their children .the ages at which weaning should be started more than half of the mothers (57%) mentioned the period within which weaning should be introduced after the age of six months and (43%) before the age of six months as shown in figure(1) The 86 children who were weaned before 6 months of age 78 of them were overweight, 6 were with normal body weight and just 2 were underweight as shown in figure 2

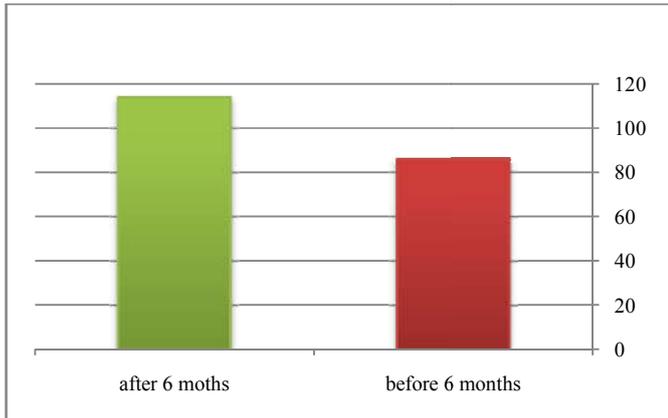


Figure 1 Distribution of mothers by age of complementary feeding introducing

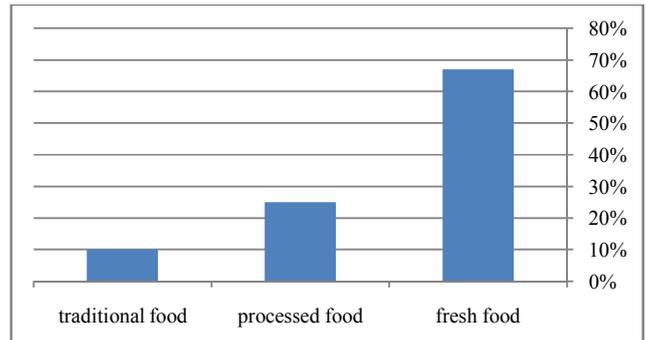


Figure 4 Distribution of first type of complementary feeding

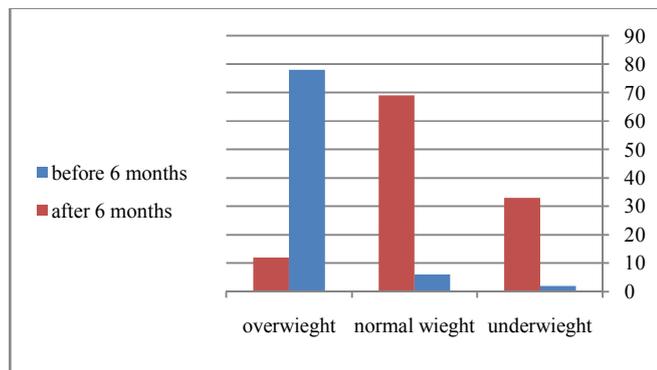


Figure 2 Distribution of children's BMI by age of complementary feeding introducing

Mother's Nutritional Knowledge

To test their nutritional knowledge and practice, mothers were asked a set of few questions on child nutrition. These questions include: age of weaning, type of first complementary feeding were introduced for their baby, their source of nutritional information, the effect of food in child's growth and developments, the importance of dairy products on their child's health and wellbeing. Figure 3 shows sources of nutrition information as stated by mothers. The main source of nutrition information was their families. Mothers provided information on what types of complementary food they were introduced to their children. Most common type of weaning foods was fresh natural foods which was mentioned by 67% of the mothers, followed by processed foods were mentioned by 23% , and the lower percent 10% were for traditional foods as shown in figure(4)

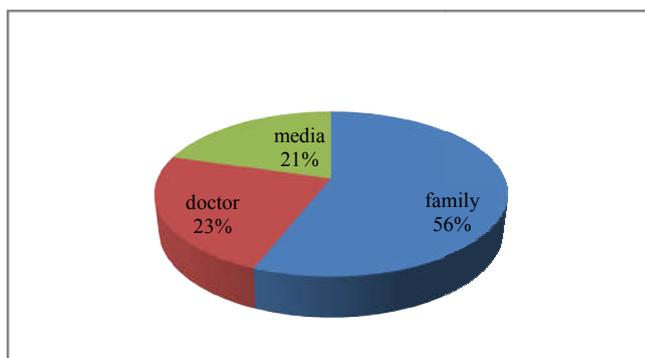


Figure 3 Frequency of maternal source of nutritional information

Mother's awareness of the importance of healthy food for children

As table 3 shown, the majority of mothers 74% were focused on dairy product in the complementary feeding of their children, while 26% did not. 48% of the mothers were aware by the effect of complementary feeding on their children growth and development, while 52% of them were not aware about that.

Table 3 Mother's awareness

Mother's awareness	No.	%
Focus on dairy products in complementary feeding		
Yes	147	74%
No.	53	26%
Food you introduce to your baby will affect his growth at advanced age?		
Yes	97	84%
No	103	52%

Nutritional status of study children

Height for age (stunting)

Height for age measures chronic malnutrition. 87% of study children were with normal body height, just 13% were suffer from mild stunting, this 13% represent: 10 girls, 16 boys

Weight for height (BMI)

Weight for height measures current nutritional condition of an individual. 45% of them were overweight, 37.5% were has normal body weight, and 17.5% were underweight as shown in figure 5.

Table 4 Distribution of children by height and age and age

	Boys No.(%)	Girls No.(%)
Stunting		
Normal height	90(84%)	84(89%)
Mild stunting	16(15%)	10(11%)

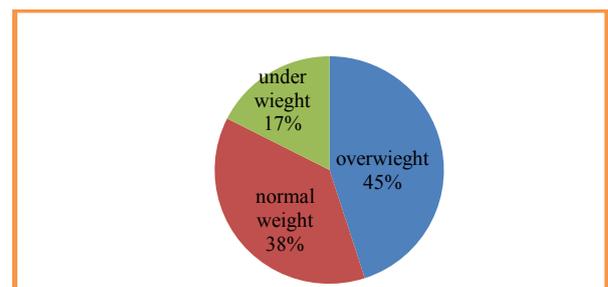


Figure 5 distribution of child's BMI

Maternal nutritional knowledge and practice and child nutritional status

Chi-square test shows significant relationship between overweight and the age of weaning (p=0.04). Since 86 children who were weaned before 6 months of age 78 of them were overweight. Mother's source of information and the age of weaning shown significant relationship (P= 0.000), since the majority of mothers whose weaned their children at 6 months of age taken their information from their family, doctor, respectively. There was no significant relationship between the weight for height and type of first introduced complementary feeding (fresh, processed, or traditional foods) P=0.084. There was significant relationship between the maternal educational level and the maternal knowledge about the age of introducing the solid foods, the P value was=0.029. There was significant relationship between mother's educational level and the awareness of the positive effect of good nutritional choices and the child's growth and development. There was no significant relationship between children's BMI and causes of giving dietary supplement for children (P=0.927). There was significant relationship between children's BMI and socio-economical level of their families P=0.000. There was no significant relationship between children's BMI and children's sex P=0.805

Table 5 Relationship between overweight and age of introducing complementary feeding

variables	Age of introducing complementary feeding		Chi-square test
	Before 6 months No.(%)	After 6 months No.(%)	
Overweight	86(96%)	4(4%)	P=0.04
Source of maternal information			P=0.000
Family	30(27%)	81(73%)	
Doctor	11(22%)	39(78%)	
Media	13(33%)	27(68%)	
Did you know at any age complementary feeding should be introduced			=0.029
yes	44(25%)	135(75%)	
no	9(43%)	12(57%)	

Table 6 Comparison between child's BMI and other variables

variables	BMI categories			Chi-square test
	Normal	Underweight	Overweight	
Before 6 months	6(8%)	33(94%)	78(86%)	P=0.340
After 6 months	69(92)	2(6%)	12(14%)	
	Type of first COMPLEMENTARY FEEDING introduced			P=0.084
Fresh food	52(50%)	18(50%)	5(26%)	
Processed food	26(25%)	9(25%)	0(0%)	
Traditional food	26(25%)	9(25%)	14(74%)	
	Cause of giving dietary supplements			P=0.927
Vitamin D deficiency	56(38%)	2(29%)	17(37%)	
anemia	25(17%)	1(14%)	9(20%)	
No reason	66(45%)	4(57%)	20(43%)	
	Socio-economical level			P=0.0001
Low	3(14%)	17(77%)	2(9%)	
medium	69(41%)	17(10%)	83(49%)	
high	3(33%)	1(11%)	5(56%)	
	Child's sex			P=0.805
boys	37(49%)	17(49%)	49(54%)	
girls	38(51%)	18(51%)	41(46%)	

Significance level <0.05

Table 7 Distribution of mother's source of information by the educational level

variables	Mother's educational levels				Chi-square test
	Primary level	Middle level	High school level	University level	
Source of information about the age of first introducing complementary feeding					P=0.068
Family	10(100%)	13(57%)	36(58%)	50(49%)	
Doctor	0(0%)	5(22%)	12(19%)	31(30%)	
Media	0(0%)	5(22%)	14(23%)	21(20%)	

Significance level: P<0.05

DISCUSSION

In this study, we investigated the effect of maternal knowledge on the nutritional status of children. In our study, nearly two-thirds of mother were in 25-34y while the lower were on 16-24years. These result similar to study in Benghazi and Saudi Arabia most of mother in middle age. The study found that most of the mother received university education, while lower percentage received primary education. The majority families were 'medium economical level, minor for high and low economical level. According to our study, most of mother's sources information's to starting complementary food were from family, similarly to study has been done in Australia informed that, most of information sources for mothers from their family. Also, similar to another study in Saudi Arabia.(46-49) In contrast, to a study has been done in Adelaideshowed that the sources of information's were Recent research demonstrates that expectant mothers highly value information provided by the doctors. Half of the mothers had started complementary feeding at sixth month of the child's age, as recommended, Similar to result in india6It was higher than the findings from United Arab Emirates (<17%). This, High rates of initiation of complementary feeds at the recommended time of six months in our study could be related to high female literacy rates. Also different studies showed that almost of themothers started complementary feeding before the recommended age of 6 months and delayed introduction of complementary feeding beyond the recommended was found that the

introduction of complementary foods before 6 months of age was associated with overweight or obese, but delaying this introduction after 6 months showed no relationship with overweight or obesity. These results are similar to study done in Sweden. (50-52).

Another study in Melbourne says both early (4 months) and late (≥ 7 months) introduction of SF increased the odds of BMI > 97.7 th percentile. One possibility is that an early introduction to solids is associated with an increased intake of calories and protein is predictive of greater weight gain and percent body fat in childhood. Stunting and wasting are a predictor of risk as it reflects the overall level of development characterized by poverty, low socioeconomic status, and the prevalence of chronic diseases. In our country, these conditions are not very large, so the results did not show cases of wasting or stunting compared to a study in Egypt. The results were children (stunted) (20.3%), wasting (23.8%), and the rate is not serious. Two studies in Libya 1979 and 2000, showed lower percentage of stunting and wasting, most important factor associated with lower prevalence of wasting and stunting is availability of higher energy food, female literacy and socioeconomic improvement. (53-56)

The prevalence of illiteracy among mothers declined from 59% in 1979 to 17.8% in 2000, these changes may help to explain the improvements in nutritional status. There was a relationship between maternal education level with knowledge at any time to introduce the food for a baby. Similar to result study in Georgia. Also, a study in Ghana shown that mother's nutritional knowledge is positively associated with the nutritional status of their children; compared with American study found a significant inverse association between maternal education and the prevalence of unhealthful feeding practices. It may be that information about the transition to complementary foods is less accessible to lower-education mothers, such as in written materials, whether in pamphlets from a doctor, books, or Web materials. (57-60) It has also been found to be inversely associated with socioeconomic status. In contrast to the study in Sri Lanka showed Parental educational status was when the educational level of the parents was compared with the nutritional status of the child, no significant relationship. There is also a relationship between socioeconomic status and BMI and most of the studies agree on this result, but the strongest relationship was with obesity. Study in USA says obesity correlated with socioeconomic status. In contrast, study in India says socioeconomic variables were unrelated to children's nutritional status. We found relationship between mother's educational level and the awareness of the positive effect of good nutritional choices and the child's growth and development. In the same context, Ethiopian study found mothers with high education level provide their children food rich with iron and vitamin A. (61-63) Another study in Pakistan showed level of mother education decreases the likelihood of stunting by approximately 35 percent compared to those mother having no educational status. There was a relationship between the time in which food is provided to children and where the source of this information is that most mothers provide food to children according to the information given to them. This is in line with a study conducted in Britain that

mothers follow the doctor's advice for fear of losing weight or anemia. This is what was in our study also most mothers were most fear of anemia and they do not know that malnutrition has other disease. (64-66)

CONCLUSION

In the present study, most of mother had introduced complementary feeding at the standard recommended period most of them obtain information for initiation complementary feeding from their family, this study found child who received feeding earlier before the recommended period of six months, were more likely over weight compared to their peers, who did not receive early complementation. In this study level of education, level of economic and age of mother were the factors that influenced the timing of introduction of complementary feeding. Growth patterns were therefore affected much by timing of introduction of complementary feeding. Accordingly, it is recommended that regular check-up for mothers at maternal and child centers to alleviate risk of weight disturbance. Furthermore, health education sessions should be held for mothers regarding relationship between type of complementary food introduced to their children and obesity. Maternal health service outlets should be used to transmit child feeding information and hence, training should be given for all health workers to focus on minimum dietary diversity and minimum meal frequency as well.

References

1. James P, Chunming C, McMichael J. Diet Nutrition and the Prevention of Chronic Diseases: report of a WHO study group. World Health Organ Tech Rep Ser. 1990;797:
2. Book Review: Feeding and Nutrition of Infants and Young Children. Nutrition and Health. 2001;15(1):72-72.
3. de Andrade Previato H, Behrens J. Taste-related factors and food neophobia: Are they associated with nutritional status and teenagers' food choices?. Nutrition. 2017;42:23-29.
4. Harris G. Development of taste and food preferences in children. Curr Opin Clin Nutr Metab Care. 2008;11(3):315-9
5. Kamau-Thuita F, Omwega A, Muita J. Child care practices and nutritional status of children aged 0-2 years in Thika, Kenya. East African Medical Journal. 2002;79(10).
6. Birenbaum E, Fuchs C, Reichman B. Demographic factors influencing the initiation of breast-feeding in an Israeli urban population. Pediatrics 1989;83:519-
7. Nokso-Koivisto J, Pitkäranta A, Blomqvist S, Kilpi T, Hovi T. respiratory coronavirus infections in children younger than two years of age. The Pediatric Infectious Disease Journal. 2000;19(2):164-166.
8. Mishra R, Biswa R, Kumar R, Halden, Chattrjee T. Assess the knowledge and magnitude of protein energy malnutrition and its associated factors. Indian J Public Health. 1999; 43
9. Position of the American Dietetic Association: Nutrition Guidance for Healthy Children Ages 2 to 11 Years. Journal of the American Dietetic Association. 2008;108(6):1038-1047

10. Sasie S. Infant and Young Child Feeding Practice and Associated Factors among Mothers/Caretakers of Children Aged 0-23 Months in Asella Town, South East Ethiopia. *Journal of Family Medicine*. 2017;4(5)..
11. Karim A, Admassu K, Schellenberg J, Alemu H, Getachew N, Ameha A *et al*. Effect of Ethiopia's Health Extension Program on Maternal and Newborn Health Care Practices in 101 Rural Districts: A Dose-Response Study. *PLoS ONE*. 2013;8(6):e65160.
12. World Health Organization. Guiding Principles for Complementary Feeding of the Breastfed Child. Geneva: WHO Press; 2001. Available from.
13. Murtaugh M. Book Review: Complementary Feeding of Young Children in Developing Countries: A Review of Current Scientific Knowledge. *Journal of Human Lactation*. 1999;15(4):355-356..
14. Horton S. United Nations ACC/SCN Fourth Report on the World Nutrition Situation UN ACC/SCN in collaboration with IFPRI, Geneva, 2000, 132pp., available in paperback at accscn@who.org, free to developing countries, US\$ 15 to developed countries. Also available free on the Web at. *Agricultural Economics*. 2001;26(1):85-
15. Australia's health 2012. Canberra: The Institute; 2012
16. 16-Barriers in Compliance to IYCF (Infant and Young Children Feeding) Guidelines about Exclusive Breast Feeding (At KIMS, Karad, Maharashtra). *International Journal of Science and Research (IJSR)*. 2016;5(4):1636-1639.
17. Scott J, Binns C, Graham K, Oddy W. Predictors of the early introduction of solid foods in infants: results of a cohort study. *BMC Pediatrics*. 2009;9(1).
18. Michaelsen K. Complementary Feeding of Young Children in Developing Countries: a Review of Current Scientific Knowledge. *The American Journal of Clinical Nutrition*. 2000;71(2):605-606.
19. Menon D. Training of Health Professionals in Breast Feeding, Complementary Feeding (IyCF)- Infant young Child Feeding. *International Journal of Scientific Research*. 2012;3(4):310-311.
20. Payne S, Quigley M. Breastfeeding and infant hospitalisation: analysis of the UK 2010 Infant Feeding Survey. *Maternal & Child Nutrition*. 2016;13(1):e12263.
21. Grummer-Strawn L, Scanlon K, Fein S. Infant Feeding and Feeding Transitions During the First Year of Life. *Pediatrics*. 2008;122(Supplement 2):S36-S42.
22. Martorell R, Kettel Khan L, Hughes M, Grummer-Strawn L. Obesity in women from developing countries. *European Journal of Clinical Nutrition*. 2000;54(3):247-252.
23. Murtaugh M. Book Review: Complementary Feeding of Young Children in Developing Countries: A Review of Current Scientific Knowledge. *Journal of Human Lactation*. 1999;15(4):355-356.
24. Dewey KG, Adu-Afarwah S. Systematic review of the efficacy and effectiveness of complementary feeding interventions in developing countries. *Maternal and Child Nutrition* 2008; 4(s1):24-85.
25. Rabina D. United Nations Documents2011268United Nations Documents. New York, NY: United Nations Last visited March 2011. Gratis URL: www.un.org/en/documents/index.shtml. Reference Reviews. 2011;25(6):26-26..
26. Lakew Y, Tabar L, Haile D. Socio-medical determinants of timely breastfeeding initiation in Ethiopia: Evidence from the 2011 nation wide Demographic and Health Survey. *International Breastfeeding Journal*. 2015;10(1).
27. Krebs N, Hambidge K, Mazariegos M, Westcott J, Goco N, Wright L *et al*. Complementary feeding: a Global Network cluster randomized controlled trial. *BMC Pediatrics*. 2011;11(1)..
28. Nielsen A, Michaelsen K, Holm L. Parental concerns about complementary feeding: differences according to interviews with mothers with children of 7 and 13 months of age. *European Journal of Clinical Nutrition*. 2013;67(11):1157-1162.
29. Jones G, Steketee R, Black R, Bhutta Z, Morris S. How many child deaths can we prevent this year?. *The Lancet*. 2003;362(9377):65-71.
30. Halder S, Kejriwal S. Nutritional awareness of mothers in relation to nutritional status of the preschool children. *Early Child Development and Care*. 2015;186(9):1366-1377.
31. Sachs M. Infant and young child feeding: Challenges to implementing a global strategy. *Maternal & Child Nutrition*. 2010;7(1):107-107.
32. Van de Poel E. Socioeconomic inequality in malnutrition in developing countries. *Bulletin of the World Health Organization*. 2008;86(4):282-291.
33. Deonis M. Methodology for estimating regional and global trends of child malnutrition. *International Journal of Epidemiology*. 2004;33(6):1260-1270.
34. Leenstra T, Petersen LT, Kariuki SK, Oloo AJ, Kager PA, terKuile FO. Prevalence and severity of malnutrition and age at menarche; cross-sectional studies in adolescent schoolgirls in western Kenya. *Eur J Clin Nutr* 2005; 59(1):41-48
35. Haider R, Saha K. Breastfeeding and infant growth outcomes in the context of intensive peer counselling support in two communities in Bangladesh. *International Breastfeeding Journal*. 2016;11(1).
36. Aheto J. Predictive model and determinants of under-five child mortality: evidence from the 2014 Ghana demographic and health survey. *BMC Public Health*. 2019;19(1).
37. Black R, Victora C, Walker S, Bhutta Z, Christian P, de Onis M *et al*. Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*. 2013;382(9890):427-451.
38. Black R, Allen L, Bhutta Z, Caulfield L, de Onis M, Ezzati M *et al*. Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet*. 2008;371(9608):243-260.
39. de Onis M. Methodology for estimating regional and global trends of child malnutrition. *International Journal of Epidemiology*. 2004;33(6):1260-1270.
40. Dijkhuizen P. Processed Complementary Foods in the World Food Programme. *Food and Nutrition Bulletin*. 2000;21(1):62-64.

41. Power C, Lake J, Cole T. Review: Measurement and long-term health risks of child and adolescent fatness. *International Journal of Obesity*. 1997;21(7):507-526.
42. Power C, Lake J, Cole T. Review. Measurement and long-term health risks of child and adolescent fatness. *International Journal of Obesity*. 1997;21(7):507-526.
43. de Onis M, Blössner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. *The American Journal of Clinical Nutrition*. 2010;92(5):1257-1264.. 44 -Singh A, Mulder C, Twisk J, Van Mechelen W, Chinapaw M. Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obesity Reviews*. 2008;9(5):474-488.
44. Whitaker R, Wright J, Pepe M, Seidel K, Dietz W. Predicting Obesity in Young Adulthood from Childhood and Parental Obesity. *New England Journal of Medicine*. 1997;337(13):869-873
45. Shawky S, Abalkhail B. Maternal factors associated with the duration of breast feeding in Jeddah, Saudi Arabia. *Paediatric and Perinatal Epidemiology*. 2003;17(1):91-96.
46. Balo N, Shembesh N, Nuri M. Maternal characteristics and infant and young child feeding in Benghazi 1996;14(7)
47. Walsh A, Kearney L, Dennis N. Factors influencing first-time mothers' introduction of complementary foods: a qualitative exploration. *BMC Public Health*. 2015;15(1)
48. Al-Shalan T. Infant feeding practices: a study of mothers attending a teaching hospital in Riyadh, Saudi Arabia. *Nigerian Dental Journal*. 2008;16(1).
49. Plutzer K, Keirse M. Effect of Motherhood on Women's Preferences for Sources of Health Information: A Prospective Cohort Study. *Journal of Community Health*. 2011;37(4):799-803.
50. Rao S. Study of complementary feeding practices among mothers of children aged six months to two years – A study from coastal south India. *Australasian Medical Journal*. 2011;4(5):252-257.
51. Mekbib E. Magnitude and Factors Associated with Appropriate Complementary Feeding among Mothers Having Children 6-23 Months-of-Age in Northern Ethiopia; A Community-Based Cross-Sectional Study. *Journal of Food and Nutrition Sciences*. 2014;2(2):36.
52. Dewey K, Cohen R, Brown K, Rivera L. Age of introduction of complementary foods and growth of term, low-birth-weight, breast-fed infants: a randomized intervention study in Honduras. *The American Journal of Clinical Nutrition*. 1999;69(4):679-686.
53. Memon S, et al. Assessment of infant feeding practices at a tertiary care hospital. *JPMA-Journal of the Pakistan Medical Association*, 2010; 60.12: 1010.-
54. Dinye R. Irrigated Agriculture and Poverty Reduction in KassenaNankana District in the Upper-East Region, Ghana. *Journal of Science and Technology (Ghana)*. 2013;33(2):59.
55. Tulldahl J, Pettersson K, Andersson S, Hulthén L. Mode of Infant Feeding and Achieved Growth in Adolescence: Early Feeding Patterns in Relation to Growth and Body Composition in Adolescence. *Obesity Research*. 1999;7(5):431-437.
56. Gaffney K, Kitsantas P, Cheema J. Clinical Practice Guidelines for Feeding Behaviors and Weight-for-Age at 12 months: A Secondary Analysis of the Infant Feeding Practices Study II. *Worldviews on Evidence-Based Nursing*. 2012;9(4):234-242.
57. Seach K, Dharmage S, Lowe A, Dixon J. Delayed introduction of solid feeding reduces child overweight and obesity at 10 years. *International Journal of Obesity*. 2010;34(10):1475-1479.
58. Wen L, Baur L, Rissel C, Xu H, Simpson J. Correlates of body mass index and overweight and obesity of children aged 2 years: Findings from the healthy beginnings trial. *Obesity*. 2014;22(7):1723-1730.
59. Huh S, Rifas-Shiman S, Taveras E, Oken E, Gillman M. Timing of Solid Food Introduction and Risk of Obesity in Preschool-Aged Children. *PEDIATRICS*. 2011;127(3):e544-e551.
60. Sun C, Foskey R, Allen K, Dharmage S, Koplin J, Ponsonby A et al. The Impact of Timing of Introduction of Solids on Infant Body Mass Index. *The Journal of Pediatrics*. 2016;179:104-110.e1.
61. Seedhom A, Mohammed E, Mahfouz E. Life Style Factors Associated with Premenstrual Syndrome among El-Minia University Students, Egypt. *ISRN Public Health*. 2013;2013:1-6.
62. Annual Report of the Society for Libyan Studies 1999-2000. *Libyan Studies*. 2000;31:151-154.
63. Fein S, Labiner-Wolfe J, Scanlon K, Grummer-Strawn L. Selected Complementary Feeding Practices and Their Association With Maternal Education. *Pediatrics*. 2008;122 (Supplement 2):S91-S97.
64. Appoh L, Krekling S. Maternal nutritional knowledge and child nutritional status in the Volta Region of Ghana. *Maternal and Child Nutrition*. 2005;1(2):100-110.
65. Gazmararian J, Adams M, Pamuk E. Associations Between Measures of Socioeconomic Status and Maternal Health Behavior. *American Journal of Preventive Medicine*. 1996;12(2):108-115
