



Reasons for Introducing Solid Foods to Infants Younger than Six Months of Age

Authors

Sijal Fadhil Farhood Makki¹, Hadeel Fadhil Farhood²

¹M.B.Ch.B., F.I.C.M.S., M.Sc. Community Medicine

Department of Community Medicine Babylon Medical College-Babylon University

Email: sijalaljoborae@yahoo.com

²M.B.Ch.B. F.I.C.M.S., Assistant Professor in Community Medicine

Department of Community Medicine Babylon Medical College-Babylon University

Email: hadeelfadhil75@yahoo.com

Abstract

Background: *The introduction of solid foods to infants younger than (six months) of age differs from one country to another and from one society to another. In fact cultural issues in Babylon Province influence early introduction of solid foods because the older generations, who are now grandparents; grew up at a time when it was a norm to give solid foods as early as 40 days of age on the belief that the infant will get used to eating better.*

Aim of the Study: *This study was conducted to determine the maternal and infantile socio-demographic and medical characteristics that influence the decision to introduce solid foods to young infants before six months of age in Hillah city Babylon Iraq.*

Patients and method: *A cross sectional study was conducted in Al-Hilla city, Babylon Governorate, Iraq. It was carried on infants younger than six months attending primary health care centers for vaccination, during the period from 1st of March 2014 to 31st October 2014.*

The sample included 200 infants younger than 6 months who had history of early introduction of solid foods.

Results: *The study found out that a number of maternal and infantile demographic and medical characteristics interact and impact the decision to introduce solid foods earlier than 6 months of age. Most mothers were low income (64%) married (79%) urban (66.5%) housewives (73%) younger than 18 years old (39.5%). (50.5%) of these mothers live in extended families with varying degrees of educations. (20%) were illiterate.*

Two thirds of infants were artificially fed, male (75%) preterm babies (59%) with low birth weight (70.5%). Self-reported decisions and advice from an older person accounted for (64%) of reasons for early introduction of solid foods. Some factors had a relatively weak effect for example the presence of infantile colic and maternal age with the type of food introduced, while maternal education had a significant impact on the choice of solid food introduced. Our study concludes that a number of maternal and infantile demographic and medical characteristics interact and impact the decision to introduce solid foods earlier than 6 months of age. Most mothers were low income married urban housewives younger than 18 years old. Half of these mothers live in extended families. There was an uneven distribution among educated and illiterate mothers.

Key Word: *solid food, infant, weaning food.*

Background

The decision to introduce solid foods is a huge milestone that lays the foundation for healthy eating habits in the future. The practice of introducing complementary foods (solid foods and liquids other than breast milk or infant formula) during the first year of life has varied over time and across cultures.

The American Academy of Pediatrics (AAP) recognizes breastfeeding and human milk as the “normative standards for infant feeding.” Given the documented health benefits, the Academy recommends exclusive breastfeeding for 6 months, followed by continued breastfeeding for at least 12 months as complementary foods are introduced.^[1]

Weaning is the term usually used to describe the process of cessation of breastfeeding after a period of successful breastfeeding. This usually involves addition of food to infant's diet and/or replacement of breast milk in infant's diet with another type of milk (formula or whole milk). Maternal physiology, infant nutritional needs, infant development, especially the development of biting and chewing, and cultural issues all play a role in the timing of weaning.^[2] Cultural issues in Babylon Province influence early introduction of solid foods earlier than six months of age because the older generations, who are now grandparents; grew up at a time when it was a norm to give solid foods as early as 40 days of age on the belief that the infant will get used to eating better.

The AAP and WHO, UNICEF, Australian National Health and Medical Research Council recommend that all babies be exclusively

breastfed (no cereal, juice or any other foods) for the first 6 months of life (not the first 4-6 months) and currently recommend that complementary foods be introduced around six months of age. Most babies will become developmentally and physiologically ready to eat solid foods between 6 and 8 months of age.^[3,4]

The prevalence of breastfeeding differs from one country to another and from one society to another; this of course is due to cultural and religious beliefs^[5].

Delayed breastfeeding initiation, supplementary feeding of breast milk substitutes, colostrum deprivation, early introduction of complementary feeding, and incorrect weaning from breast milk are commonly found practices in communities around the world^[6-10]

As there is insufficient evidence and information on the introduction of solid foods into the infant diet before 6 months in Babylon, Iraq, the current study was carried out in an objective to determine the local reasons related to demographic and medical factors for early introduction of solid foods before the age of six months.

Patients and Method

A cross sectional study was conducted in Al-Hilla city, Babylon Governorate, Iraq. It was carried on infants younger than six months attending primary health care centers for vaccination, during the period from 1st of March 2014 to 31st October, 2014. 10 of infants' mothers out of the 210 sample size did not meet the inclusion criteria and thus were excluded because of incomplete or uncertain data).

The sample which included 200 infants, was convenient (any mother presenting at time of data collection to vaccinate her baby at the 4 primary health care centers at different districts in Hilla, Babylon governorate and met the inclusion criteria. Those included were babies age younger than 6 months who had history of early introduction of solid foods. Their mothers agreed to participate in the study by verbal consent.

Mothers or caregivers who were uncertain about the data needed to complete the questionnaire were excluded from the study. All participants were informed of the purpose of the study. They were also informed that their participation in this study is voluntary and they have the right to withdraw at any time. A self-structured Arabic language questionnaire sheet compiled by authors included:

Gender and age of baby, age of mother, income, employment and educational level of mother, history of living in an extended family, residence, type of delivery, birth weight, spacing between births, birth order, previous medical history and infantile colic. Questions related to feeding practices include: type of feeding during the first 6 month of life (breast feeding, bottle feeding and mixed feeding, food items that was initiated, the cause of initiation of early feeding before 6 months and history of initiation of solid food.

Data Analysis

After the recorded information was checked for missing values and data entry errors, statistical analysis was performed using Statistical Package for Social Science software (SPSS, version 17)

and Microsoft office Excel 2010. Variables were described using frequency distribution and percentage for the patients according to their characteristics and standard deviation (SD) for continuous variables. The Chi square test was used for the assessment of association between the variables studied. One way ANOVA test was also used. The p-value of less than 0.05 was significant statistically.

Results

Table 1: Table showing both the mean maternal age of mothers included in the study and the mean birth weight.

Variables	Mean±SD
Maternal age	27.43±10.07
Baby birth weight	2374.75±906.05

The mean maternal age was 27.43 years of age and the mean birth weight was 2374.75 grammes (low birth weight).

Table 2: Table of maternal demographic factors including maternal age, education, employment, residence, living in extended families, marital status and socioeconomic status.

Maternal demographic factors	Number	Percentage (%)
Maternal age		
<18	79	39.5
18-35	62	31.0
>35	59	29.5
Maternal education		
Illiterate	40	20.0
Primary	53	26.5
Secondary	74	37.0
Higher education	33	16.5
Maternal employment		

Employed	54	27.0
Housewife	146	73.0
Maternal residence		
Rural	67	33.5
Urban	133	66.5
Living in extended family		
Yes	101	50.5
No	99	49.5
Marital status		
Married	158	79.0
Divorced,widow	42	21.0
Socioeconomic status		
High income	24	12.0
Intermediate	48	24.0
Low	128	64

Over two thirds of mothers who introduced solid foods were younger than 18 years of age. There was an uneven distribution among educated and illiterate mothers. Most mothers were low income married urban housewives. Half of these mothers live in extended families.

Table 3: Table of infantile characteristics including maturity at birth, birth weight, baby gender, medical illness, infantile colic and type of milk prior to introduction of solid foods.

Infantile Characteristic variables	Number	Percentage (%)
Maturity at birth		
Post mature	30	15.0
Premature	118	59.0
Term	52	26.0
Birth weight		
Normal	34	17.0
Low birth weight	141	70.5
Large for gestational age	25	12.5
Baby gender		
Male	150	75.0
Female	50	25.0

Medical illness		
Present	64	32.0
Absent	136	68.0
Infantile colic		
Present	134	67.0
Absent	66	33.0
Type of feeding prior to giving solid foods		
Breast feeding	22	11.0
Bottle feeding	134	67.0
Mixed feeding	44	22.0

Two thirds of infants were male preterm babies with low birth weight. The majority were artificially fed formula milk. Although they were healthy most had history of infantile colic.

Table 4 : Table showing the main reasons for early introduction of solid foods earlier than 6 months of age.

Causes	Number	Percentage (%)
Medical advise	16	8.0
Advice from peers	8	4.0
Advice from older person	58	29.9
Mass media	10	5.0
Self-decision	70	35.0
Availability of baby food for those under 6 months	38	19.0

Self-decision and advice from an older person accounted for 64% of reasons for early introduction of solid foods.

Table 5: Table showing both maternal education & age and the type of food that was initiated.

Variables	Type of food that was initiated		Total
	Baby food	Adult food	
Maternal education			
Illiterate	14(7.0%)	26(13.0%)	40(20.0%)
Primary	2(1.0%)	51(25.5%)	53(26.5%)
Secondary	38(19.0%)	36(18.0%)	74(37.0%)
Higher education	23(11.5%)	10(5.0%)	33(16.5%)
Chi-Square=45.927		P value=0.0001	
Maternal age			
<18	24(12.0%)	55(27.5%)	79(39.5%)
18-35	28(14.0%)	34(17.0%)	62(31%)
>35	25(12.5%)	34(17.0%)	59(29.5%)
Chi-Square=3.736		P value=0.154	
Presence of infantile colic			
Present	55(27.5)	79(39.5%)	134(67%)
Absent	22(11.0%)	44(22.0%)	66(33%)
Chi-Square=1.111		P value=0.292	

Maternal education had a significant impact on the choice of solid food introduced prior to 6 months of age.

Table 6: Table of causes of initiation of early feeding before six months by maternal age.

Causes of initiation of early feeding before six months	Number	Mean±SD	F	P value
medical advice	16	32.25±9.970	1.6570.147	
advice from peers	8	28.00±11.759		
advice from older person	58	27.10±9.718		
mass media	10	20.80±2.530		
self-decision	70	27.27±10.009		
availability of baby food for those under 6 months	38	27.79±11.080		
Total	200			

Table 7: Causes of initiation of early feeding before six months by birth weight.

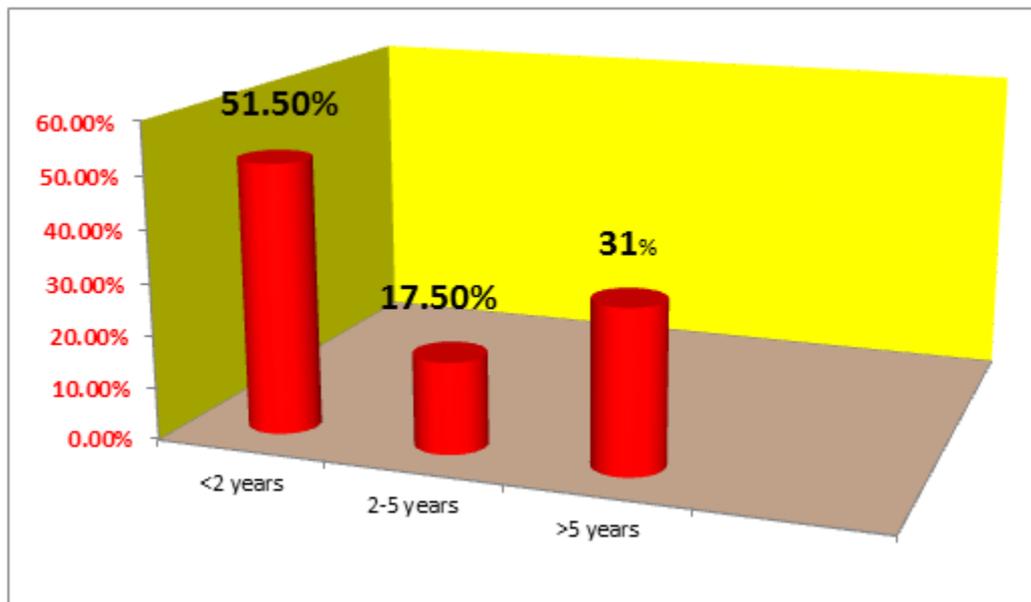
Causes of initiation of early feeding before six months	Number	Mean±SD	F	P-value
medical advice	16	2350.00±774.597	2.504	0.032
advice from peers	8	2400.00±534.522		
advice from older person	58	2171.55±620.138		
mass media	10	2000.00±760.000		
self-decision	70	2658.57±1099.538		
availability of baby food for those under 6 months	38	2265.79±1001.627		
Total	200			

Unlike table 7 this table shows a significant relation between birth weight and causes of early introduction of solid foods.

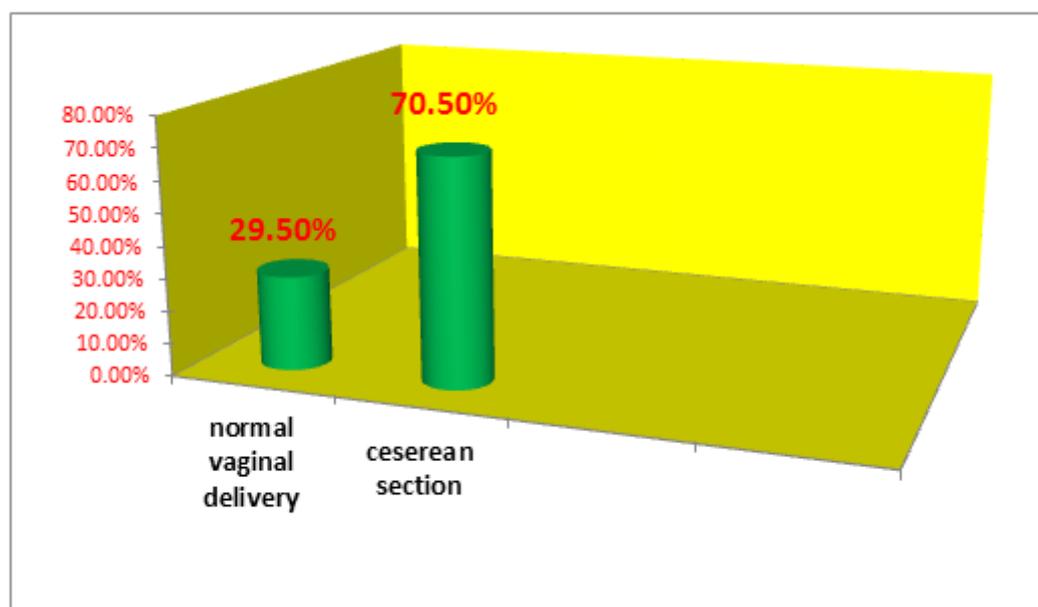
Table 8: Table showing maternal age, type of delivery and duration of pregnancy by Type of feeding prior to giving solid foods.

Variable	Type of feeding prior to giving solid foods			Total
	Breast feeding	Bottle feeding	Mixed feeding	
Maternal age(years)				
<18	18(9%)	43(21.5%)	18(9.0%)	79(39.5%)
18-35	4(2.0%)	45(22.5%)	13(6.5%)	62(31.0%)
>35	0(0%)	46(23.0%)	13(6.5%)	59(29.5%)
Chi-Square=20.893 P value=0.0001				
Type of delivery				
Normal vaginal delivery	13(6.5%)	31(15.5%)	15(7.5%)	59(29.5%)
Caesarian section	9(4.5%)	103(51.5%)	29(14.5%)	141(70.5%)
Chi-Square=12.319 P value=0.002				
Duration of pregnancy				
Post mature	10(5.0%)	12(6.0%)	8(4.0%)	30(15.0%)
Premature	10(5.0%)	86(43%)	22(11.0%)	118(59.0%)
Term	2(1.0%)	36(18.0%)	14(7.0%)	52(26.0%)
Chi-Square=22.092 P value=0.0001				

This table shows a significant association between maternal age, type of delivery and duration of pregnancy with the type of feeding prior to giving solid foods. For all the above mentioned variables the P value was less than 0.05.

Figure 1: Histogram of spacing between births of mothers included in the study.

Half of the mothers included in the study gave history of close spacing between births.

Figure 2: Histogram of type of delivery of mothers included in the study.

Nearly three quarters of respondents gave history of Caesarean Section delivery

Discussion

Introducing solid foods too early can lead to health risks, due to its potential effects on life-long health. Giving solid foods too early may also suggest mothers are cutting short breast-feeding. Timing of the first introduction of solid foods in

infancy is an important aspect of pediatrics^[12]. In an international study the most commonly cited reasons for early introduction of solid food were as follows: "My baby seemed hungry," "My baby was old enough," "I wanted to feed my baby something in addition to breast milk or formula,"

"My baby wanted the food I ate," "A doctor or other health care professional said my baby should begin eating solid food," and "It would help my baby sleep longer at night." Four of these reasons varied by milk feeding type^[13].

Children who aren't breast-fed are at higher risk for obesity, diabetes, eczema, respiratory and ear infections, and tend to require more doctor visits, hospitalizations and prescriptions. Child feeding practices are successful when the food provided meets the nutritional requirements of the infants, protects the airway, and does not exceed the functional capacity of the gastrointestinal tract and the kidneys^[14].

The study was carried out on (200) mothers who introduced solid foods earlier than six months of age in Hilla Babylon. The mean maternal age was (27.43) years of age and the mean birth weight was (2374.75) grams (low birth weight). Over two thirds of mothers who introduced solid foods were younger than 18 years of age (39.5%). There was an uneven distribution among educated and illiterate mothers. Four fifths of the mothers had some form of school education while (20%) were illiterate. In this current study maternal education unlike maternal age and infantile colic; had a significant impact on the choice of solid foods introduced prior to 6 months of age with a P value of less than 0.05. The P values of the latter two were more than 0.05. The lowers the level of education, the more likely those mothers erroneously gave food items suitable for adults as initiation foods.

Most mothers were low income (64%), married (79%) urban housewives (66.5%). Half of these

mothers live in extended families (50.5%). Our study is in contrast to a nationally representative sample of infant feeding practices in the US which found that white mothers with more than high school education and non-white mothers regardless of their education had about the same rates of early introduction of solid foods. After controlling for other factors, the US study found no association with early introduction of solids was seen for maternal age, employment status, and income, number of children in the house hold and lack of breast feeding^[15].

Our study concludes that infants born with a low birth weight tend to be fed earlier than six months .This may be explained by frustrated efforts on behalf of mothers to help their infants gain weight. In the study three quarters of infants were male preterm babies with low birth weight (70.5%). The majority were exclusively *artificially* fed formula milk (67%) and if we add those who give mixed feeding, the percentage reaches (89%). Only (11%)of mothers in our study were breast feeding. Birth weight had a significant association with causes of initiation of solid foods. Half of the mothers included in the study gave history of close spacing between births. Nearly three quarters of respondents gave history of Caesarean Section delivery.

The very poor percentage of breast feeding in our study is not in line with international guidelines. For example the ESPGHAN Committee on nutrition considers that exclusive or full breast-feeding for around 6 months is a desirable goal. In all infants, in consideration of their nutritional needs, developmental abilities, and reported

associations between the timing of introduction of complementary feeding and later health, the introduction of complementary foods should not be before 17 weeks but should not be delayed beyond 26 weeks ^[16]. In another study (40.4%) of mothers introduced solid foods before age 4 months. Prevalence varied by milk feeding type (24.3%, 52.7%, and 50.2% for breastfed, formula-fed, and mixed-fed infants, respectively ^[17].

Although infants were healthy (68%) most had history of infantile colic (67%).

Self-decision and advice from an older person accounted for (64%) of reasons for early introduction of solid foods in Hilla. Our findings are in contrast to a study done in Nepal which found out that about 80% of women reported a positive influence of older persons on mothers because they actually preferred breastfeeding. In the same study eleven percent of the cohort said that breastfeeding was not enjoyable. At 12 weeks and 22 weeks after birth, about a quarter (24.8%) and half (52.8%) of the infants were introduced cow/buffalo milk, respectively, while only 6.3% and 13.4% of them were given infant formula. Overall, any breastfeeding rate remained high at over 98% throughout the follow up period ^[18].

Medical advice (8%) from paediatricians and practitioners, advice from peers (4%), misguided information from mass media (5%) and unfortunately availability of baby food for those under 6 months in the local market (19%), are some of the reasons cited for early introduction of solid foods in Hillah.

Conclusion

Our study concludes that a number of maternal and infantile demographic and medical characteristics interact and impact the decision to introduce solid foods earlier than 6 months of age. Most mothers were low income married urban housewives younger than 18 years old. Half of these mothers live in extended families. There was an uneven distribution among educated and illiterate mothers.

Two thirds of infants were artificially fed, male preterm babies with low birth weight. Self-reported decisions and advice from an older person accounted for 64% of reasons for early introduction of solid foods. Some factors had a relatively weak effect for example the presence of infantile colic and maternal age with the type of food introduced, while maternal education had a significant impact on the choice of solid food introduced.

Recommendations

- 1) Promotion of exclusive breast feeding up to six month of age helps optimize the timing of introduction of solid foods.
- 2) Maternal education appears to be protective against wrong introduction of solid foods both in timing and in type.
- 3) Doctors and health care providers need to be continuously educated and reminded of the potential health hazard of early introduction of solid foods both on the short and long term.
- 4) Pediatric practices should particularly emphasize the recommended timing of

introduction of solids especially for mothers who are not breast feeding.

- 5) Information about introduction of solid foods and discussion about the correct timing (six months) should take place at well-child visits as early as two months of age.
- 6) National nutritional centers should emphasize the importance of supporting breast feeding mothers both emotionally and financially ,for example, by free hand-outs and tokens according to WHO recommendations, because of the positive association between correct solid food introduction and optimal breast feeding practices.
- 7) Because the older generations especially grandmothers in our local society were used to very early introduction of solid foods during their life time, this population group should be specifically targeted by the mass media, so that they will not have a negative influence on the timing of initiation of solid foods.

Acknowledgements

Authors were grateful to the mothers who participate and her relative who, together with the rest of our research assistants staff, have diligently assisted in recruitment efforts and data collection

References

1. American Academy of Pediatrics Section of Breastfeeding. Policy statement: Breastfeeding and the use of human milk. Pediatrics. 2012; 129:e827–41. [PubMed: 22371471].
2. Gibney MJ, Elia M, Ljungqvist O, Dowsett J. Ch. 1. 2nd ed. UK: Blackwell; 2006. Clinical Nutrition; p. 2
3. Section on Breastfeeding. Breast feeding and the use of human milk. Pediatrics 2012; 129:e827
4. World Health Organization: Complementary feeding. Available at: www.who.int/nutrition/topics/complementary_feeding/en/index.html (Accessed on April 28, 2010)
5. Li R, Zhao Z, Mokdad A, Barker L, Grummer- Strawn L. Prevalence of breast feeding in the United States: The 2001 National Immunization Survey. Pediatrics. 2003;111:1198–201.[PubMed: 12728138]
6. Kumar D, Goel NK, Mittal PC, Misra P. Influence of infant-feeding practice on nutritional status of under-five children. Indian J Paediatr. 2006;73:417–22
7. Waiswa P, Peterson S, Tomson G, Pariyo GW. Poor newborn care practices- a population based survey in eastern Uganda. BMC Pregnancy Childbirth. 2010;10:9. [PMCID: PMC2834614] [PubMed: 20178626]
8. Cruz Agudo Y, Jones AD, Berti PR, LarreaMacías S. Breastfeeding complementary feeding practices and childhood malnutrition in the Bolivien Andes. Arch Latinoam Nutr. 2010;60:7–14.[PubMed: 21090271]
9. Dibley MJ, Senarath U, Agho KE. Infant and young child feeding indicators across

- nine East and Southeast Asian countries: An analysis of National Survey Data 2000-2005. *Public Health Nutr.* 2010;13:1296–303.[PubMed: 20441662]
10. Kimani-Murage EW, Madise NJ, Fotso JC, Kyobutungi C, Mutua MK, Gitau TM, et al. Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi, Kenya. *BMC Public Health.* 2011;11:396. [PMCID: PMC3118248] [PubMed: 21615957]
11. Kramer MS, Kakuma R. Optimal duration of exclusive breastfeeding. *Cochrane Database of Systematic Reviews* 2012, Issue 8. Art. No.: CD003517. DOI: 10.1002/14651858.CD003517.pub2
12. World health organization. (2002) Infant and child nutrition :Global strategy for infant and young child feeding.
13. Clayton HB1, Li R, Perrine CG, Scanlon KS. Prevalence and reasons for introducing infants early to solid foods: variations by milk feeding type. 2013 Apr;131(4):e1108-14. doi: 10.1542/peds.2012-2265. Epub 2013 Mar 25.
14. Dewey,K.(2001).Guiding Principles for complimentary feeding of the breast fed child.2001 WHO .URL. http://www.who.int/nutrition/publications/guiding_principles_complementary_feeding_breastfed.pdf.
15. Alice A.Kuo et al.Introduction of solid foods to young infants.*Maternal Child Health J.*Nov 2011;15(8):1185-1194.
16. Complementary Feeding: A Commentary by the ESPGHAN Committee on Nutrition: Carlo Agostoni et al. *Journal of Pediatric Gastroenterology and Nutrition*46:99–110 # 2008 by European Society for Pediatric Gastroenterology, Hepatology, and Nutrition and North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition 16-2013 Apr;131(4):e1108-14.doi: 10.1542/peds.2012-2265.Epub 2013 Mar 25.
17. Rajendra Karkeel et al. Infant feeding information, attitudes and practices: a longitudinal survey in central Nepal. *International Breastfeeding Journal* 2014, 9: 14 <http://www.internationalbreastfeedingjournal.com/content/9/1/14>