Infant Feeding Practices with Oral Health Implications among Suburban Mothers of Tanzania

Hawa Shariff Mbawalla* and Shadia Majid

Department of Orthodontics, Paedodontics & Community Dentistry, School of Dentistry, Muhimbili University of Health and Allied Sciences, School of Dentistry, P.O. Box 65014, Dar es Salaam, Tanzania

Abstract: *Background*: Behaviours around infants feeding influence both nutritive value and the detrimental effects of the infant feeding.

Aim: The study aimed to determine infant feeding practices with implication to child's oral health and examine the related socio-demographic factors.

Materials and Methods: A cross-sectional study among mothers of the infants who were attending RCH clinics in suburban areas of northwest Tanzania. Cluster sampling technique was used to obtain the participants and a structured questionnaire was used to interview the mothers. Frequency distributions and cross-tabulations were used for analysis and reported as proportions and identified differences between the comparative socio-demographic categories.

Results: Study involved 213 mother-infant pairs; infants' mean age was 7.22 ± 3.48 months and 53.1% were female babies. Almost all (94.6 %) the infants were breastfed and 75.3% of infants under six months of age were exclusively breastfeeding. In infants age older than six months, 32.6% of mothers reported to have initiated complementary food before the baby turned six months and that sugar sweetened foods were mostly used (68.1%) complementary foods. Higher proportion of mothers who had secondary school education or beyond (43.4%) reported to have initiated complementary food before the recommended age than their counterparts. Mothers who were employed reported to mostly (74.5%) use sugar sweetened complementary foods as compared to unemployed mothers.

Conclusion: Infants of this community were mostly breastfed and initiated complementary feeding earlier than recommended time. Employed mothers and those with secondary education or above tended to have unfavorably infant feeding practices than their comparative groups.

Keywords: Breastfeeding, complementary foods, early childhood caries.

1. INTRODUCTION

Infant feeding practices implies to type of food given and the mode of feeding a child within the first twelve months of life. The practices are usually an outcome of the community lifestyle, culture in child rearing, economy and level of socialization of that particular population. Breastfeeding is unequalled way of providing ideal food for healthy growth and development of infants and is the earliest and the most common mode of infant feeding [1]. However, there are some who have other forms of infant feeding such as bottle and mixed feeding [2]. Improving infant feeding practices is therefore critical to improved nutrition, health and development of children [3].

Practices in infants feeding be it breastfeeding, bottle-feeding or the complementary foods are the ones that have a lot to do with both nutritive value of the infant feeding and the detrimental effects of the feeding [4–7]. These behaviours include: prompt initiation of breastfeeding, exclusive breastfeeding for the first six months of the baby's life, initiation of complementary foods, types of complementary foods provided to the infants and other non-nutritive behaviours such as using breastfeed for calming down the child, to induce sleep in child or breastfeeding the child at will [5,8].

Poor breastfeeding and complementary feeding practices in infants are widespread. It is estimated that only about a third (34.8%) of infants are exclusively breastfed for the first 6 months of life the majority receiving some other food or fluid in the early months [9]. Complementary foods are usually introduced too early or late and are resulting in nutritionally insufficiency and unsafe.

Regarding feeding American Academy of Pediatric Dentistry (AAPD) recommends that mothers should avoid high frequency of consumption of complementary foods with added sugar such as milk or juice in a baby's bottle. They should avoid putting a baby to sleep with bottle filled with sugary complementary foods. Furthermore, mothers are encouraged to use cup and spoon instead of bottle and that they should avoid breastfeeding at will so as to prevent them from childhood common oral diseases namely Early Childhood Caries (ECC) [10]. Children with ECC have been reported mostly to have toothache and this being the most common cause of emergency dental

*Address correspondence to this author at the Department of Orthodontics, Paedodontics & Community Dentistry, School of Dentistry, Dar es Salaam, Tanzania; Tel: 255 22 215 11 35; Fax: 255 22 215 04 56;
E-mail: hmbawala@muhas.ac.tz, Hawa.Homera@gmail.com

E-ISSN: 1929-4247/17

consultation both in developed and developing countries [11]. Deep cavities due to ECC disturbs children sleeps, causes difficulties in eating, inhibit children involving in plays and hence hinder their growth and development [12]. It is therefore a public health problem due to its effect on children's oral and general health, development and wellbeing.

Early Childhood Caries (ECC) being a form dental caries is known to be caused by multifactorial interplay between the acidogenic bacteria, dental biofilm and human caries related factors such as saliva composition, fluoride exposure, and diet composition and frequency of consumption [13]. Diet composition and frequency of consumption/exposure of the sugary diet in young children is determined by infant feeding practices in terms of breastfeeding, complementary foods and associated practices such breastfeeding at will.

Experience has shown that infants make a substantial proportion of dental patients who attend dental clinics in Tanzania and the usual complaint being toothache as a result of dental caries. The usual finding during the visit is improper feeding practices. So this study aimed to determine infant feeding practices with general and oral health implications among mothers who were attending child health clinics in suburban areas of northwest lake zone of region of Tanzania.

2. MATERIALS AND METHODS

This was a cross sectional study that was conducted on northwest region of Tanzania. The people in this community are mostly homogenous in culture and have limited access to paediatric dental care services. The study involved mothers as the key players in the child's general health, oral health and upbringing of the children. These mothers and their infants were attending public child health clinics for routine growth and development monitoring and childhood immunization program.

Through cluster sampling technique where child health clinic was sampling unit, four clinics were selected and all the women attending the selected clinics on the days of interviews were invited to participate in the study. Only mothers who had their own children with them and their children being aged 12 months or below on the day of interview were invited. Setting Z standard value of 1.96 at 95% confidence interval, prevalence of mothers who breastfeed their infant being 80% and marginal error at 5% a sample of 246 mothers was sought to be sufficient.

The study got ethical approval from Muhimbili University of Health and Allied Science Research Ethical Review committee; invited mothers were informed of the study and requested to sign informed consent form for their approval to participate. Permission to work in the child health clinical was granted by the responsible authorities.

Data collection was though interviews using structured Kiswahili questionnaire that was developed for this purpose. The questionnaire inquired on infant feeding modes, breastfeeding/bottle-feeding practices in relation to ECC, age of initiation of complementary foods, types of complementary food used and the basic social demographic characteristics of the participants.

The infant feeding modes was assessed as the main mode of feeding the child and scored as breastfeeding only, bottle feeding only, both breastfeeding and bottle feeding, bottle feeding with complementary foods, breastfeeding with complementary foods and complementary foods only. Breastfeeding/bottle-feeding practices in relation to ECC were assessed as whether or not the mother was leaving her nipple in the child's mouth during bed time, ways of assisting the child who is about to sleep, acceptable norms of handling crying and sleepless baby and calming down the crying baby and these were scored as cuddling the baby, breastfeed/bottle feed the baby or carry the baby on the back. Age at which other foods beyond breastfeed or bottle feed was initiated was inquired as "At what age did you start giving your child complementary food?"; type of food used for feeding the child was scored as cooked banana, potatoes, sugared porridge/tea/milk or sugarless porridge/tea/milk without sugar and frequency of feeding the stated for in a day which was scored as once, twice or thrice on more. The socio-demographic characteristics assessed were the age in months and sex of the child as girl or boy; mother age in years, mother's education level as no formal education, primary education, secondary education or college/ university education and mother's employment status that was scored as employed, self-employed, peasant or a housewife.

During data analysis most variables were transformed. The infant feeding modes was grouped as breastfeed only, breastfeeding with complementary

foods and mixed feeding. Breastfeeding/bottle-feeding practices in relation to ECC were grouped as whether or not using breastfeeding for assisting the child who is about to sleep and calming down the crying baby. Age at which other foods beyond breastfeed or bottle feed was initiated was categorized as before or after six months; type of food used for feeding the child was grouped as sugar sweetened not sugar sweetened and the frequency of feeding was grouped less than thrice and thrice or more per day. Age of the child was grouped as younger than six months or six months and beyond. Mother's education level was categorized as primary education or below and secondary education and beyond. Mother's employment status was categorized as having activities around the household and having activities away from home.

Statistical Package for Social Sciences (SPSS) version 20 was used for data entry and analysis where frequency tables were generated for all the studied variables and cross tabulations were performed to test for bivariate associations using chi-square test where P-value ≤0.05 was chosen as a level of statistical significance difference between groups.

3. RESULTS

This study involved 213 mother-infant pairs attending Reproductive and Child Health (RCH) clinics in Bukoba Tanzania. The infants had mean age of 7.22 ± 3.48 months, most of the infants were aged older than six months (58.2%) and were female babies (53.1%). The mothers were mostly younger than 25 years old (52.6%), had primary school education or below (59.6%) and were employed (78.9%), (Table **1**).

Almost all (94.4%) of the children were breastfed, whether exclusively breastfed, breastfed and bottle-fed or breastfed with complementary foods. However, mixed feeding was the reported by majority of the participants (59.2%) as the mode of feeding their infants (Table **2**). The participants were concurrently breastfed, bottle-fed and at the same gave the infants other foods beyond breast-meal. A third of the participants (31.5%) reported to only breastfeed their children and less than 10% of the mothers used other feeding patterns like bottle feeding and or both bottle feeding and giving complementary food. A large proportion of participants (75.3%) with infants aged

Table 1: Participants' Profile

Variable	Categories	% (n)
Age of the children	Below six months	33.8 (72)
	Six months or beyond	66.2 (141)
Sex of the children	Male	46.9 (100)
	Female	53.1 (113)
Age of the mother in years	Younger or than 25	52.6 (112)
	25 or older	47.4 (101)
Mothers' education levels	Primary school or below	59.6 (127)
	Secondary school or beyond	40.4 (86)
Mother's occupation	Peasant/housewife	29.6 (63)
	Employed	70.4 (150)

Table 2: Frequency Distribution of Participants by Infant Feeding Pattern

Variable	Categories	%	n
Feeding style all infants (0-12 months)	Breastfeeding only	31.9	68
	Breastfeeding and bottle-feeding	3.3	7
	Breastfeeding and bottle-feeding with complementary foods	59.2	126
	Complementary foods only	5.6	12
Feeding for six months aged babies	Exclusive breastfeeding	75.3	67
	Mixed feeding	24.7	22

Table 3: Frequency Distribution of Infants Feeding Practices Detrimental to Oral Health

Variable	Categories	%(n)
Infant feeding practice detrimental to oral health	Use breast to induce sleep	63.7 (136)
	Do not use breast to induce sleep	36.3 (77)
	Use breast to calm the child	70.0 (149)
	Do not use breast to calm the child	30.0 (64)
Frequency of giving sugary fluids/food	Three/less than three times/day	33.7(33)
	More than three times/day	66.3(65)

less than six months, reported to only breastfeed their babies (Table **2**).

Concerning breastfeeding practices associated with ECC, majority of the participants reported to breastfeed (70%) at will, use breast to induce sleep (63.4%) and that 65% of the nursing mothers reported to give their infants sugary complementary food more than three times/day (Table **3**).

Regarding the age of initiating complementary foods and type of foods used for complementary children, it was found that 32.6% of mothers initiated complementary food before the baby turned six months and that sugar sweetened foods were the most (68.1%) commonly used complementary foods (Table **4**).

Age of the mother and level of education showed statistical significant difference with the age of initiation of complementary food. Substantial proportion of mothers aged younger than 25 years (41.9%) initiated complementary food when their infants were younger than six months of age compared to their counterpart. Higher proportion of mothers who had secondary school education or beyond (43.4%) reported to have initiated complementary food before the recommended age compared to the mothers with primary education (26.1%). There was as well statistical significant difference between the groups on type of food used for complementary foods with the mother's occupation, whereby a higher percentage (74.5%) of employed mothers reported to use sugar sweetened complementary foods compared to their comparative group. The rest of feeding practices assessed did not show any statistical significant difference between the compared groups (Table **5**).

4. DISCUSSION

This was a cross-sectional study that is reporting on feeding practices of infants who were attending RCH-clinics in suburban areas of northwest Tanzania. There were about equal proportions of infant boys and girls and more than half of the infants were aged six months or older. The fact that more than two thirds of the mothers were married and had a primary school education or below reflect a typical suburban nature of the participants who were intended for the study. Interestingly, very few of these mothers were peasants/housewife so had activities around home, which could be explained due to increased awareness and number of women who engage themselves in different activities that boost their family income regardless of the education status. Similar findings have been reported in the study that was done in northern Tanzania suburban town Moshi municipal which is also a non-metropolitan area as the current study area where most of the mothers were married,

Table 4: Frequency Distribution of Participants by Complementary Food Practices in Children Older than 5 Months of Age

Variable	Categories	%(n)
Age initiated complementary food	Before six months	32.6 (46)
	After six months	67.4(95)
Type of food used for complementary food	Sugary	68.1(96)
	Non sugary	31.9(45)
Frequency of giving sugary fluids/food	Three/less than three times/day	33.7(33)
	More than three times/day	66.3(65)

Table 5: Distribution of the Infant Feeding Practices by Mother's Socio-Demographic Factors

		Age of the mother		*Mother's education*		*Mother's occupation*	
Feeding and oral hygiene practices	**Categories**	**Younger than 25**	**25 years or older**	**Primary school or below**	**Secondary school or beyond**	**Employed**	**Peasant /housewife**
Feeding for six months aged babies	Exclusive breastfeeding	70.0 (35)	82.1 (32)	75.0 (36)	75.6 (31)	77.8 (49)	69.2 (18)
	Mixed feeding	30.0 (15)	17.9 (7)	25.0 (12)	24.4 (10)	22.2 (14)	30.8 (8)
Age of initiating complementary food	Below six months%(n)	41.9 (31)	22.4 (15)	26.1 (23)	43.4(23)	32.7 (32)	32.6 (14)
	After six months%(n)	58.1 (43)	77.6 (52)*	73.9 (65)	56.6 (30)*	67.3 (29)	67.4 (29)
Type of food used for complementary food	Sugary	68.9 (51)	67.2 (45)	63.6 (56)	75.5 (40)	74.5 (73)	53.5 (23)
	Non sugary	31.1 (23)	32.8 (22)	36.4 (32)	24.5 (13)	25.5 (25)	46.5 (20)*

*p≤ 0.05.
**P≤0.001.

had at least primary school education and most had activities away from home, (79.9%), (63.2%) and (79.9%) [14].

Breastfeeding the infants are the healthy and socially acceptable infant feeding practice, and this study found that almost all infants were being breastfed. This observation is to be expected in most African communities and has to be encouraged with some health education on better breastfeeding practices. These include initiation of breastfeeding on the first hour of child's life, EBF during the first six months of life, avoiding breastfeeding at will and using breast to induce sleep after the infants have their first teeth. Contrasting findings have been reported in Australia where 99% of the mothers did not breastfeed at all [2].

Mixed feeding, that is a combining of both breastfeeding, bottle-feeding while at the same given other food was the most common mode of infants feeding reported. This may be due to the fact that this study was overrepresented by children aged six months and above where mixed feeding is expected mode of child feeding. Furthermore, the mixed feeding in the current study could be explained by the nature of the mothers that were involved in the study. Most of the mothers reported to have been employed and hence have daily activities away from home. This may necessitate provision of combination of breastfeeding, bottle-feeding and complementary foods.

The study finding that exclusive breastfeeding being the most common mode of feeding infants aged less than six months was an encouraging observation, since exclusive breastfeeding during the first six months of life is recommended by WHO [15]. However, this finding have to be interpreted with cautions since this was a health facility based study and the asked practices are routinely taught to mothers as part of health education during RCH-clinic visit. So mothers might have been reporting the information that they know but not what they really practice. The finding is in contrast to several studies from Tanzania and other African countries where exclusive breastfeeding is report by a third or less of the studied participants [16–19].

The early initiation of complementary foods in the infants reported in mothers of infants aged six to twelve months poses a risk for infant malnutrition, gastrointestinal conditions and excessive crying early in life in these infants [20]. The early initiation of complementary food might be explained by a notion among mothers that breast milk only during the first six months of infant's life is insufficient for their children's health [19]. The finding are supported by other studies done in Africa where infants as young as two months tended to have already started having complimentary foods [18,19,21].

Though breast milk is said to be non-cariogenic, use of breast to induce sleep in infants aged six months and above have reported to be associated with risk to ECC and this practice is reported by two thirds of the participants of the current study [20]. The practice might have no direct impact to the studied toothless infants especially those under six months but when retained and unlikely to be dropped after the infant has erupted the first primary teeth. Use of breastfeeding to

calm the child was common practice in the majority of the study participants. This observation is expected from mothers of the infants who are in most situation encouraged use of breast to calm the child and minimize the child's pain for health benefits as well as cultural stand point [22]. This practice if misused and be on demand can result to habit that poses the child to increased risk to ECC.

In aspect of infants' oral health implicated behaviours, sugar sweetened foods was reported as the most common used complementary food and were used at higher frequencies in a day, escalate the risk for Early Childhood Caries among the infants. Use of sugar sweetened complementary foods such porridge as supplementary food in infants and children is a common practice in Tanzania [23].

The socio-demographic characteristics that showed to be related to the studied infants feeding practices with oral health implications were age of the moth, level of education and her employment status. Younger mothers seemed to be early in initiation of complementary foods as they were eager as new mothers and may not be aware of the proper age to initiate the complementary feedings. Whereas mothers with secondary education initiated earlier the complementary foods as they were likely to be employed and the maternity leave is about three months which lenders the mother to opt to mixed feeding. And the fact that most of the employed mothers using sweetened sugary foods could be due to purchasing power these mothers have as they can earn their own living and a means of showing affection to their children as most of the time they are away from home. The findings are allied to the observation made by Mbawalla *et al.* 2010 among adolescents that socioeconomically advantaged mothers of Tanzania have been associated with higher sugar frequency among their children that than those who were not [24].

5. CONCLUSION

Infants of this community were mostly breastfed and that complementary feeding were initiated earlier than the health professionals recommended age for infants mixed feeding. Sugar sweetened complementary foods were commonly used and were given at higher frequency that may put this infants at risk to early childhood caries. Employed mothers and those with secondary education or above tended to prematurely initiate complementary feeding and mostly used sugar sweetened weaning foods.

ACKNOWLEDGEMENT

The study was funded by Tanzania Government through the Higher Education Loan Body that was facilitated by Muhimbili University of Health and Allied Sciences (MUHAS). Authors wishes to express appreciation to mothers and children of Bukoba district for their participation and Kagera region administrative authorities for their logistical support.

REFERENCES

[1] World Health Organization, UNICEF. Global strategy for infant and young child feeding. World Health Organization; 2003. [cited 2017 Jul 12]. Available from: www.who.int/nutrition/topics/global_strategy/en/

[2] Hocking BM, Campbell MJ, Storey E. Infant feeding patterns. Australian Dental Journal 1982; 27(5): 300-5. https://doi.org/10.1111/j.1834-7819.1982.tb05251.x

[3] UNICEF. WHO: Indicators for assessing infant and young child feeding practices. Part 1 Definitions. 2008 [cited 2017 Jul 12]; Available from: http://apps.who.int/iris/bitstream/10665/43895/1/9789241596664_eng.pdf

[4] Anderson JW, Johnstone BM, Remley DT. Breast-feeding and cognitive development: a meta-analysis. The American Journal of Clinical Nutrition 1999; 70(4): 525-35.

[5] Hallett KB, O'Rourke PK. Early childhood caries and infant feeding practice. Community Dental Health 2002; 19(4): 237-42.

[6] Howard CR, Howard FM, Lanphear B, Eberly S, Oakes D, Lawrence RA. Randomized clinical trial of pacifier use and bottle-feeding or cupfeeding and their effect on breastfeeding. Pediatrics 2003; 111(3): 511-8. https://doi.org/10.1542/peds.111.3.511

[7] Charchut SW, Allred EN, Needleman HL. The effects of infant feeding patterns on the occlusion of the primary dentition. Journal of Dentistry for Children 2003; 70(3): 197-203.

[8] Masumo R, Bardsen A, Mashoto K, Astrom AN. Prevalence and socio-behavioral influence of early childhood caries, ECC, and feeding habits among 6–36 months old children in Uganda and Tanzania. BMC Oral Health 2012; 12(1): 24. https://doi.org/10.1186/1472-6831-12-24

[9] World Health Organization. WHO Global data Bank on infant and Young child feeding (IYCF). World Health Organization; 2014 [cited 2017 Jul 12]; Available from: http://www.who.int/nutrition/databases/infantfeeding/en/

[10] Council on Clinical Affairs- AAPD. Policy on Dietary Recommendations for Infants, Children, and Adolescents. 2012 [cited 2017 Jul 12]; 37(6): 15-6. Available from: http://www.aapd.org/media/policies_guidelines/p_dietaryrec.pdf

[11] Evans CA, Kleinman DV. The Surgeon General's report on America's oral health: opportunities for the dental profession. The Journal of the American Dental Association 2000; 131(12): 1721-8. https://doi.org/10.14219/jada.archive.2000.0118

[12] Sheiham A. Dental caries affects body weight, growth and quality of life in pre-school children. British Dental Journal. 2006; 201(10): 625. https://doi.org/10.1038/sj.bdj.4814259

[13] Selwitz RH, Ismail AI, Pitts NB. Dental caries. The Lancet. 2007; 369(9555): 51-9. https://doi.org/10.1016/S0140-6736(07)60031-2

[14] Rwakatema DS. Early childhood caries in Moshi, Tanzania. East African Medical Journal 2010; 87(7). https://www.ajol.info/index.php/eamj/article/view/75969/66452

[15] World Health Organization. The importance of infant and young child feeding and recommended practices. In: Infant and Young Child Feeding: Model Chapter for Textbooks for Medical Students and Allied Health Professionals Geneva; 2009 [cited 2017 Jul 12]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK148967/

[16] Shirima R, Greiner T, Kylberg E, Gebre-Medhin M. Exclusive breast-feeding is rarely practised in rural and urban Morogoro, Tanzania. Public Health Nutrition 2001; 4(2): 147-54. https://doi.org/10.1079/PHN200057

[17] Motee A, Ramasawmy D, Pugo-Gunsam P, Jeewon R. An assessment of the breastfeeding practices and infant feeding pattern among mothers in Mauritius. Journal of Nutrition and Metabolism 2013; 2013.

[18] Cosminsky S, Mhloyi M, Ewbank D. Child feeding practices in a rural area of Zimbabwe. Social Science & Medicine 1993; 36(7): 937-47. https://doi.org/10.1016/0277-9536(93)90085-I

[19] Umar AS, Oche MO. Breastfeeding and Weaning Practices in an Urban Slum, North Western Nigeria 2013; 3(2): 114-25.

[20] Erickson PR, Mazhari E. Investigation of the role of human breast milk in caries development. Pediatric Dentistry 1999; 21: 86-90.

[21] Safari JG, Kimambo SC, Lwelamira JE. Feeding practices and nutritional status of infants in Morogoro Municipality, Tanzania. Tanzania Journal of Health Research 2013; 15(3). https://doi.org/10.4314/thrb.v15i3.5

[22] Halpern SD, Ubel PA, Caplan AL, Marion DW, Palmer AM, Schiding JK, *et al.* Solid-organ transplantation in HIV-infected patients. N Engl J Med 2002; 347: 284-7. https://doi.org/10.1056/NEJMsb020632

[23] Mamiro PS, Kolsteren P, Roberfroid D, Tatala S, Opsomer AS, Van Camp JH. Feeding practices and factors contributing to wasting, stunting, and iron-deficiency anaemia among 3-23-month old children in Kilosa district, rural Tanzania. Journal of Health, Population and Nutrition 2005; 222-30.

[24] Mbawalla HS, Masalu JR, Åstrøm AN. Socio-demographic and behavioural correlates of oral hygiene status and oral health related quality of life, the Limpopo-Arusha school health project (LASH): A cross-sectional study. BMC Pediatrics 2010; 10(1): 87. https://doi.org/10.1186/1471-2431-10-87

Received on 17-07-2017 Accepted on 31-07-2017 Published on 09-11-2017

https://doi.org/10.6000/1929-4247.2017.06.04.5