DOI: https://doi.org/10.53350/pjmhs20221612238

ORIGINAL ARTICLE

Knowledge about Negative Effects of Bottle Feeding on Babies' Dental Tissues Amongst Mothers

FATIMA AMER[1], DARAIN ZAHRA RIZVI[2], MUHAMMAD SHAIRAZ SADIQ[3], RAID M ALDHAFEERI[4], ZIDAN M ALANAZI[5], TAHANI H ALENZI[6], AIMAN MALIK[7]

[1,2]Demonstrator, Institute of Dentistry, CMH Lahore Medical College, NUMS
[3]Associate Professor & Head of Department of Oral Medicine, Institute of Dentistry CMH, Lahore & Medical College, National University of Medical Sciences, Rawalpindi, Pakistan
[4]Resident Maxillofacial Surgery Hafralbatin Central Hospital, KSA
[5]Specialist Maxillofacial Surgery, Hafaralbatin Central Hospital, KSA
[6]Clinical Assistant Maxillofacial Surgery Hafaralbatin Central Hospital, KSA
[7]Clinical Demonstrator, Oral Medicine & Diagnosis Department, Institute of Dentistry, CMH Lahore Medical College, NUMS
Correspondence to: Fatima Amer, Email: fatimakhan2466@gmail.com, Cell: +923364741350

ABSTRACT

Background: Bottle feeding affects the hard tissues of babies in a negative manner. Overall health of infants is also affected by regular bottle feeding. It also results in development of certain harmful habits and increasing use of pacifiers when bottle feeding exceeds 0-6 months. Many detrimental changes occur in the dental tissues of infants due to bottle feeding. Infant feeding practices are an important factor influencing malocclusion in deciduous dentition, which can have long-lasting negative outcomes on oral health-related quality of life.

Objective: To assess the awareness in mothers regarding bottle feeding and its adverse dental effects in babies and to find out the general feeding pattern among mothers.

Study Design: Descriptive cross sectional study.

Study Duration: Study was conducted on feeding mothers in Lahore during a period from November 2020 to February 2021.

Methodology: In this study 350 mothers participated. The inclusion criteria consisted of women having at least 1 baby less than 2 years of age. Questionnaire was printed in English and Urdu and filled by mothers. Prior to the actual data collection process at non-sampled Kebeles, the questionnaire was pre-tested on 5% of the sample size, and adjustments were made as necessary. The short questionnaire was collected on same day. Data was analyzed using SPSS version 23 (IBM SPSS Statistics, version 23, USA). Chi square test was used to compare frequencies amongst groups. A p value of <0.05 was set as the level for statistical significance.

Results: The results showed that age distribution of mothers included in this study were between 20 to 50 years with 20 to 29 being highest 186 (53.3%). Two hundred and eleven (60.3%) were housewife and one hundred and thirty-nine (39.8%) were working women. Feeding pattern showed that 41% women were breastfeeding their child, 9% were bottle feeding and 50% were using both methods of feeding.

Practical implication: In order to identify issues and find solutions to prevent illness and stunted growth, it is important to regularly monitor breastfeeding patterns and feeding practises in mothers. That's why current study was planned to assess the awareness in mothers regarding bottle feeding and its adverse dental effects in babies and to find out the general feeding pattern among mothers.

Conclusion: It is concluded that bottle feeding is more common among women, which is having deleterious effects on both dental and skeletal tissues of babies. Knowledge among mothers related to dental problems as an implication of bottle feeding is generally quite lacking. There needs to be more educational efforts made in order to prevent the dental problems in infants.

Keywords: Infant feeding, Breast feeding, bottle feeding, dental, altered occlusion, deciduous dentition, feeding pattern, nutritional demand, tooth decay, discoloration

INTRODUCTION

Infant feeding is the foremost concern of a mother. Early nutrition is critical for the development, growth, and health of the child during infancy and early childhood. The mother starts to worry about the feeding pattern that she should follow after birth in order to fulfil the child's nutritional demand at a very early stage. Feeding patterns can include breast feeding, bottle feeding or combination of both. There are many factors associated with specific feeding patterns opted by the mothers.[1,2]

Feeding patterns are dependent on preference and availability of mothers, socioeconomic status, education, surrounding environment and specific medical conditions of the mothers. Mothers who can't breastfeed or who choose not to, infant formula is an alternative choice.[3]

Breastfeeding support a healthy development of the immune and nutritional system of the child and offer benefits to their oral health.[4,5]

Even now, there is no consensus into whether bottle feeding is more cariogenic than nursing. While other studies have reported the existence of such an association, certain writers have not discovered a link between breastfeeding and dental caries. While some writers have claimed that bottle feeding is a risk factor for dental caries, other authors have not discovered such a link. Further research is required to understand whether this link exists given the discrepancy between these findings.[6,15,16]

The empirical literature's findings addressing the association between feeding behaviour and occlusal issues are far from universal. According to several research, breastfeeding protects against malocclusion: Labbok and Hendershot have claimed that longer periods of breastfeeding are related to a decrease in the percentage of kids with malocclusion.[18] Breastfeeding has been demonstrated to have a positive impact on dental occlusion because it greatly increases the likelihood of anterior open bites in non-breastfed children. Other research, however, has found no connection between any dental arch or occlusal features and the length of breastfeeding during the first year of life.[19]

Bottle feeding fulfills the nutritional demand for optimal growth and is considered a healthy alternative of breast milk but it adverse dental effects in babies. It has negative effects on dental tissues, it is associated with dental caries and malocclusion in deciduous dentition Increased risk of oral diseases, tooth decay, alteration of bite, open bite, posterior cross bite, over jet and tooth loss are also linked with formula milk consumption. The purpose of this research is to identify barriers to exclusive breastfeeding and reason of very common practice of bottle feeding. We looked into the cultural and spiritual factors that may have an effect on these customs, as well as the advantages of nursing for the mother and child. Thus, we can save lives and improve health standards by stopping bottle feed and promoting optimal breastfeeding practices through campaigns and other health-promotion options specifically

towards parents by understanding the perspective of mothers and healthcare professionals, particularly public health experts and healthcare administrators. In our hospital no research was performed in this regard. As a result objective of this study is to assess the awareness in mothers regarding bottle feeding and its adverse dental effects in babies and to find out the general feeding pattern among mothers.

MATERIAL & METHODS

Study Setting: This study was done in Department of Dentistry CMH Lahore Medical College, NUMS.
Study Design: Descriptive cross-sectional study.
Duration: Six months from November 2020 to February 2021.
Sample Size: Total 350 mothers participated in the survey.
Sample Technique: Convenient sampling method was applied.
Methodology: A questionnaire was made after literature review and informal discussions with the specialists in the concerned field. This survey was done in Lahore from November 2020 to February 2021 with prior consent of participants. The inclusion criteria included mothers having at least 1 baby under 2 years of age. A questionnaire on infant and young child feeding habits (IYCF) was used to gauge mothers' awareness of certain indications. In order to evaluate the moms' knowledge of baby and small child nutrition (breastfeeding, infant formula feeding). Questionnaire was printed in English and Urdu and filled by participating women. The short questionnaire was collected on the same day.
Data Collection Tools: Questionnaire was simple and the participant could fill the form in the language she was more comfortable with. 350 mothers participated in the survey. Prior to the actual data collection process at non-sampled Kebeles, the questionnaire was pre-tested on 5% of the sample size, and adjustments were made as necessary. Using a pre-tested questionnaire, in-person interviews were done to gather information on socio-demographic factors, obstetric features, and habits of mothers. Data were gathered by eight local health extension workers outside of their kebeles in order to avoid bias, and two nurses, including the lead investigators, acted as supervisors. For one day, supervisors and interviewers received training on the study's goal, data gathering techniques, and interviewing style.
Data Analysis: Data was analyzed using SPSS version 23 (IBM SPSS Statistics, version 23, USA). Chi square test was used to compare frequencies amongst groups. A p value of <0.05 was set as the level for statistical significance.

RESULTS

The results showed that age distribution of mothers including in this study were between 20 to 50 years with 20 to 29 being highest 186 (53.3%) followed by 30 to 39 years 154(44%) and lowest were 40 to 50 years 10 (2.8%). 121 mothers had two babies while 96 women had three babies. Detail is given in Table-1.

As far as profession is concerned, 211 (60.3%) were housewives and 139 (39.7%) were working women. Feeding pattern showed that 4% women were breastfeeding their child while 9% were bottle feeding and 50% had both. Results also revealed that women mainly preferred bottle feeding due to professional limitations and to meet nutritional demands of child. 312 (89%) had dental tissue impact including mainly tooth decay and teeth crowding followed by discoloration, toothache and tooth loss. Detail of these findings is given in Fig 1 through 3.

Table-1: Number of Mothers (N=350)

S. No	Number of babies	N	%
1	2	121	34.57
2	3	96	27.42
3	1	79	22.57
4	4	37	10.57
5	5	11	3.14
6	6	2	0.57
7	7	2	0.57
8	8	2	0.57

Table-2: Age distribution of babies

S. No	Number of babies	N	%
1	Up to 1 year	160	45.8
2	Up to 2 years	137	39.3
3	Up to 3 years	42	12.0
4	Up to 4 years	11	3.0
Total		350	100

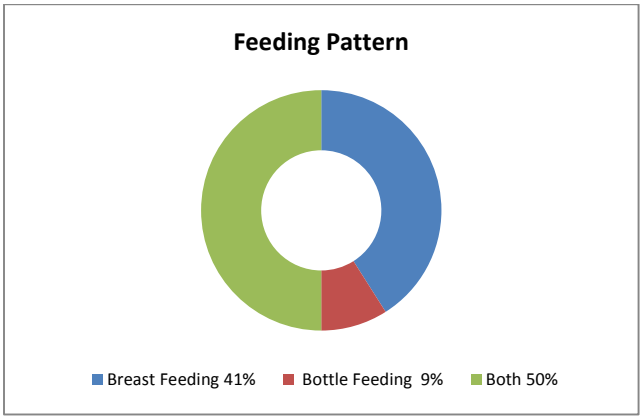

Fig. 1: Feeding pattern

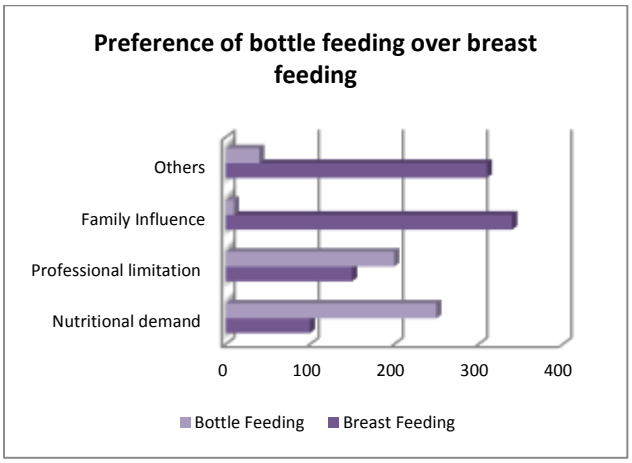

Fig. 2: Preference of bottle feeding over breast feeding

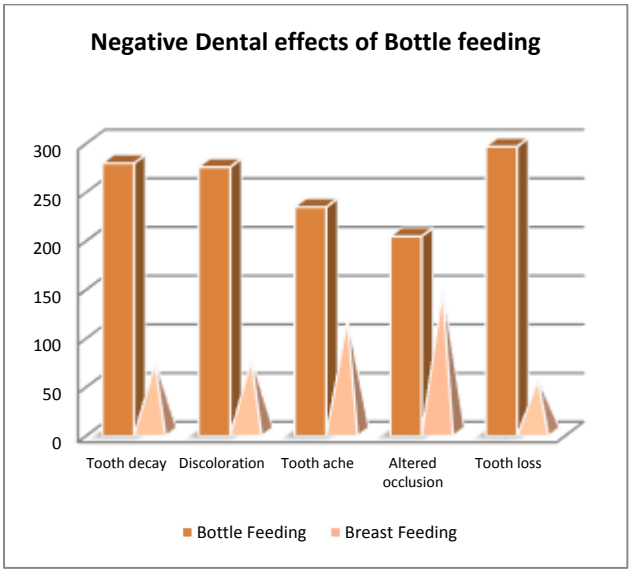

Fig. 3: Negative dental effects of bottle feeding

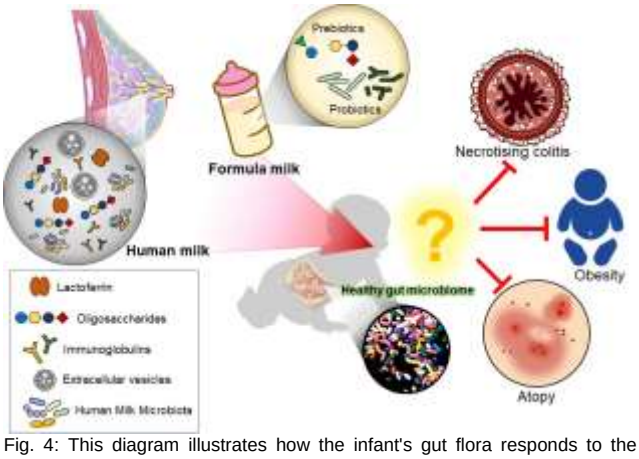

Fig. 4: This diagram illustrates how the infant's gut flora responds to the various feeding methods.

Figure 4 illustrates how the infant's gut flora responds to the various feeding methods. Lactoferrin, immunoglobulins, extracellular vesicles, oligosaccharides, and the human milk microbiota are all naturally present in human milk and help to modulate an infant's healthy gut. Formula milk, in an effort to emulate the nutritional value of human milk, typically has extra vitamins added.

DISCUSSION

In the study conducted, it was ascertained that out of the 350 females who were included, 42% of the women preferred breastfeeding, 9% preferred bottle feeding and 49% were partial to using both methods. This shows that most women mainly use breastfeeding and supplement that by bottle feeding at times. There was a link between the formal education of a mother and breastfeeding.[4] Women from high income backgrounds usually switch to bottle feeding due to their demanding professional lives. Working women often tend to prefer formula milk over breastfeeding due to their jobs.

Breastfeeding is often discontinued earlier on in women living in developed countries and also among mothers who come from high income households as compared to those who have lesser resources.[5]

In one study that was conducted, almost half of the women chose breastfeeding as the major feeding option for their infants. Most of these women were educated, experienced, and financially stable.[6]

As per a study conducted in Qatar, most women who were unable to practice exclusive breastfeeding listed ease of bottle-feeding, lack of breast milk production and work-related commitments as the main reasons for their choice of feeding practice.[7] In developed countries, there has been a rise in the trend of bottle-feeding babies whereas in rural areas with less privileged women, breastfeeding is still the preferred feeding option.

In another study, it was proved that the main reasons for women choosing bottle-feeding were lack of feeding support from family, ease in availability of formula milk, and lack of privacy in breastfeeding.[8]Many mothers are of the view that formula milk must be supplemented alongside breastfeeding in order to meet the baby's nutritional demands.[9]

There are many adverse effects that result from bottle feeding. Various studies show that there is an association between using formula milk and malocclusions such as overjet and crossbite.[10] Exclusive breastfeeding is less commonly associated with occlusion related problems. Bottle feeding, on the other hand, mostly results in increased instances of caries and crowding in milk teeth of babies. Among the many detrimental effects of bottle feeding, tooth decay, early tooth loss and crowding are the main concerns in infants. Primary dentition is badly affected by bottle feeding leading to altered occlusion, toothache, and discoloration of teeth. Moreover, nursing bottle caries is very common among infants who often sleep with feeding bottles in their mouth, which results in carious primary maxillary incisors.[11]

In one study, a group of women were surveyed; out of these, 53% of the mothers had little to no knowledge about the adverse effects of nocturnal bottle feeding.[12] Furthermore, there was a general lack of comprehensive understanding among first time mothers regarding healthy feeding practices and the prevalence of baby bottle caries due to use of formula milk. There is no proper regulatory force that legislates the sale and popularity of formula milk. Bottle feeding has an overall harmful effect on the health of young children, resulting in lower levels of immunity and poor growth patterns.

Another study documented the major oral health problems in early childhood. Most children have carious milk teeth anteriorly due to night feeding and sugar components of milk.[13] Riaz et al. (2022) also reported similar results on barriers and facilitators to exclusive breastfeeding and adverse effects of bottle feed on soft tissues of babies which are comparable with findings of our study. Streptococcus mutants was the predominant lesion flora present in the mouths of children suffering from bottle caries.[14] This caries, in turn, results in infection, tooth decay and tooth ache in infants, which indirectly has a poor effect on the general health of children.

CONCLUSION

The conclusion drawn from the above results shows that bottle feeding is the more popular choice among mothers. Most women are unaware and uneducated regarding the many adverse effects of bottle feeding. There should be campaigns and programs designed to educate and inform new mothers about the various harmful effect of bottle feeding and the usage of formula milk. Promoting breast feeding and introducing hygiene measures can reduce the overall burden of dental caries and other dental problems commonly associated with bottle feeding.

REFERENCES

1. Gaffar BO, El Tantawi M, Al-Ansari A, AlAgl AS. Association between oral health knowledge and practices of Saudi pregnant women in Dammam, Saudi Arabia. East Mediterr Health J. 2016 Sep 25;22(6):411-416. doi: 10.26719/2016.22.6.411. PMID: 27686982
2. Amores-Esparza JM, Altamirano-Mora V, Villacís-Altamirano I, Montesinos-Guevara C. Breastfeeding and bottle-feeding as risk factors for dental caries and malocclusions in children with deciduous dentition: A scoping review. J Int Oral Health 2022;14:447-53
3. Vachhani, K. K., Rao, D., Panwar, S., & Gupta, S. (2022). Association between oral health and infant milk formula feeding - A clinical guide. Journal of Advanced Medical and Dental Sciences Research, 10(4), 1-10.
4. Neves, P.A.R., Barros, A.J.D., Gatica-Domínguez, G. et al. Maternal education and equity in breastfeeding: trends and patterns in 81 low- and middle-income countries between 2000 and 2019. Int J Equity Health 20, 20 (2021). https://doi.org/10.1186/s12939-020-01357-3
5. Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, Murch S, Sankar MJ, Walker N, Rollins NC; Lancet Breastfeeding Series Group. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. Lancet. 2016 Jan 30;387(10017):475-90. doi: 10.1016/S0140-6736(15)01024-7. PMID: 26869575.
6. Grossman LK, Fitzsimmons SM, Larsen-Alexander JB, Sachs L, Harter C. The infant feeding decision in low and upper income women. Clin Pediatr (Phila). 1990 Jan;29(1):30-7. doi: 10.1177/000992289002900105. PMID: 2293950.
7. Hendaus MA, Alhammadi AH, Khan S, Osman S, Hamad A. Breastfeeding rates and barriers: a report from the State of Qatar. Int J Womens Health. 2018;10:467-475https://doi.org/10.2147/IJWH.S161003
8. Bonia, K., Twells, L., Halfyard, B. et al. A qualitative study exploring factors associated with mothers' decisions to formula-feed their infants in Newfoundland and Labrador, Canada. BMC Public Health 13, 645 (2013). https://doi.org/10.1186/1471-2458-13-645
9. Li R, Fein SB, Chen J, Grummer-Strawn LM. Why mothers stop breastfeeding: mothers' self-reported reasons for stopping during the

first year. Pediatrics. 2008 Oct;122 Suppl 2:S69-76. doi: 10.1542/peds.2008-1315i. PMID: 18829834.
10. Hermont AP, Martins CC, Zina LG, Auad SM, Paiva SM, Pordeus IA. Breastfeeding, Bottle Feeding Practices and Malocclusion in the Primary Dentition: A Systematic Review of Cohort Studies. International Journal of Environmental Research and Public Health. 2015; 12(3):3133-3151. https://doi.org/10.3390/ijerph120303133
11. Marino RV, Bomze K, Scholl TO, Anhalt H. Nursing Bottle Caries: Characteristics of Children at Risk. Clinical Pediatrics. 1989;28(3):129-131. doi:10.1177/000992288902800305
12. S Dhull K, Dutta B, M Devraj I, Samir PV. Knowledge, Attitude, and Practice of Mothers towards Infant Oral Healthcare. Int J Clin Pediatr Dent. 2018 Sep-Oct;11(5):435-439. doi: 10.5005/jp-journals-10005-1553. Epub 2018 Oct 1. PMID: 30787559; PMCID: PMC6379533.
13. Kumarihamy, S.L., Subasinghe, L.D., Jayasekara, P. et al. The prevalence of Early Childhood Caries in 1-2 years olds in a semi-urban area of Sri Lanka. BMC Res Notes 4, 336 (2011). https://doi.org/10.1186/1756-0500-4-336
14. Marchant S, Brailsford SR, Twomey AC, Roberts GJ, Beighton D. The predominant microflora of nursing caries lesions. Caries Res. 2001 Nov-Dec;35(6):397-406. doi: 10.1159/000047482. PMID: 11799279.
15. Plonka KA, Pukallus ML, Barnett AG, Holcombe TF, Walsh LJ, Seow WK. A longitudinal case-control study of caries development from birth to 36 months. Caries Res. 2013;47:117–127.
16. Majorana A, Cagetti MG, Bardellini E, Amadori F, Conti G, Strohmenger L, et al. Feeding and smoking habits as cumulative risk factors for early childhood caries in toddlers,after adjustment for several behavioral determinants:a retrospective study. BMC Pediatr. 2014;14:45.
17. Corrêa-Faria P, Martins-Júnior PA, Vieira-Andrade RG, Marques LS, Ramos-Jorge ML. Factors associated with the development of early childhood caries among Brazilian preschoolers. Braz Oral Res. 2013;27:356–362.
18. Labbok MH, Hendershot GE. Does breast-feeding protect against malocclusion? An analysis of the 1981 Child Health Supplement to the National Health Interview Survey. Am J Prev Med. 1987;3(4):227–32.
19. Romero CC, Scavone-Junior H, Garib DG, Cotrim-Ferreira FA, Ferreira RI. Breastfeeding and non-nutritive sucking patterns related to the prevalence of anterior open bite in primary dentition. J Appl Oral Sci. 2011;19(2):161–8.
20. Riaz A, Bhamani S, Ahmed S, Umrani F, Jakhro S, Qureshi AK, Ali SA. Barriers and facilitators to exclusive breastfeeding in rural Pakistan: a qualitative exploratory study. International breastfeeding journal. 2022;17(1):1-8.