

AWARENESS OF CHILD ORAL HEALTH AMONG PARENTS AND CAREGIVERS ATTENDING PEDIATRICS OPD AT BPKIHS, DHARAN

Sneha Shrestha^{1*}, Bandana Koirala², Gauri Shankar Shah³, Abhishek Kumar⁴, Dharanidhar Baral⁵

Affiliation

1. Assistant Professor, Department of Pedodontics and Preventive Dentistry, B. P. Koirala Institute of Health Sciences, Nepal
2. Professor and Head of the Department, Department of Pedodontics and Preventive Dentistry, B. P. Koirala Institute of Health Sciences, Nepal
3. Professor, Department of Pediatrics and Adolescent Medicine, B. P. Koirala Institute of Health Sciences, Nepal
4. Head, Department of Dentistry, Awadh Narayan Memorial Hospital, Biratnagar, Nepal
5. Assistant Professor, School of Public Health and Community Medicine, B. P. Koirala Institute of Health Sciences, Nepal

ARTICLE INFO

Received : 25 December, 2021

Accepted : 18 April, 2022

Published : 22 June, 2022

© Authors retain copyright and grant the journal right of first publication with the work simultaneously licensed under Creative Commons Attribution License CC - BY 4.0 that allows others to share the work with an acknowledgment of the work's authorship and initial publication in this journal.



ORA 302

DOI: <https://doi.org/10.3126/bjhs.v7i1.45827>

* Corresponding Author

Dr Sneha Shrestha

Assistant Professor

Department of Pedodontics and Preventive Dentistry

B.P. Koirala Institute of Health Sciences, Nepal

Email: snehastha3@gmail.com

ORCID: <https://orcid.org/0000-0002-3539-3575>

Citation

Awareness of Child Oral Health among Parents and Caregivers Attending Pediatrics OPD at BPKIHS, Dharan, Sneha Shrestha, Bandana Koirala, Gauri Shankar Shah, Abhishek Kumar, Dharanidhar Baral. BJHS 2022;7(1)17. 1740-1745.

ABSTRACT

Introduction

Parents and caregivers are the key sources responsible for their children's good health. They are the basic needs-provider and role models as well for their children to learn good oral habits early on. Thus, their awareness about the factors affecting child oral health is an essential component for the well-being of the child.

Objectives

To assess awareness of child oral health among parents and caregivers attending Pediatrics OPD at BPKIHS, Dharan.

Methodology

A cross-sectional questionnaire-based study was conducted among conveniently selected 400 parents and caregivers of six months-to-14-year-old children attending Pediatrics OPD, BPKIHS, Dharan. A single interviewer administered pre-tested standardized questionnaires to the participants. The questionnaires consisted of five domains: socio-demographic profile of the participants; child's oral hygiene practices; child's feeding and dietary habits; awareness of child's first dental visit and presence of family dental problems; and child's dental service utilization. Data were entered in MS excel 2007 and statistically analyzed using SPSS version 11.5. Data analysis included descriptive statistics.

Result

Majority (90%) of the parents and caregivers were literate and 44.3% belonged to the lower-class socioeconomic status. 83.3% of the participants reported that their children took a sugary diet and 77.6% of them brushed once daily before breakfast. 91% of the respondents reported the age of the child's first dental visit to be any age when there was a dental problem. The awareness of the presence of oral health problems in their child was seen in 29.5%, where as 18% had made previous dental visits.

Conclusion

Despite the fact that most parents and caregivers reported factors affecting their children's oral health, there was evidence of a lack of awareness and, as a result, low utilization of dental services for their children.

KEYWORDS

Awareness, caregivers, children, oral health, parents



INTRODUCTION

The oral health of children is integral to their general health.^{1,2} Parents and caregivers are the primary sources responsible for their children's good oral and overall health.^{3,5} Apart from their education level and socioeconomic situation, the parents' and caregivers' awareness, attitudes, and practices regarding oral health influence the child's oral health.⁶⁻¹³ Dental caries is the most frequent oral ailment majority of the children have.¹⁴ In fact, mothers are known to be the first to infect their children with cariogenic bacteria¹⁵ and therefore, high levels of it in the mothers increase the likelihood of developing dental caries in their children by 11 times.¹⁶ The consequences of early childhood caries follow high risk for caries development throughout the lifetime, frequent emergency landings and hospitalizations apart from the regular school missings, increased time and cost of treatment, and overall slumped oral health-related quality of life.¹⁷ Amongst the various factors associated with caries development in children, feeding and dietary habits especially with regard to sugar consumption^{18,19}, oral hygiene practices²⁰, and utilization of dental services²¹ are of prime concern.

In developing countries like Nepal, most dental visits are made only when severe pain and disability ensue.²²⁻²⁴ Disparities between oral and general health priorities amidst the commoners have been the pre-eminent problem faced by the dental professionals in establishing a standard oral care regime especially for the children. Considering that most of the oral problems are largely preventable, focusing on preventive methods for child oral health takes the utmost priority.²⁵ Thus, raising awareness on child oral health among the parents and caregivers and making dental care accessible to them through various government, community, and local approaches is the need of the hour. Integrated oral and primary care approaches reinforcing dental referrals for children in early ages, preferably by their first birthday is highly recommended.^{26,27} Therefore, the study was conducted among the parents and caregivers attending pediatrics OPD to assess their awareness of child oral health and motivate and reinforce them accordingly for regular utilization of dental services to improve child's oral health.

METHODOLOGY

This cross-sectional questionnaire-based study was conducted from 2012-2013 after obtaining Institutional Review Committee clearance and informed consent from the participants. Based on the convenient sampling, 400 parents and caregivers of the children aged six months to 14 years attending Pediatrics OPD, BPKIHS, Dharan were selected.²⁸ Only children aged six months and above were included as six months being the recommended time for the first dental visit of child.^{26,27} Parents and caregivers of the non-ambulatory children and those unwilling to take part in the study were excluded. A personal interview of the participants was carried out using pre-tested standardized questionnaire by a single interviewer. The questionnaire consisted of five domains: Domain 1 included a socio-demographic profile of the parents and caregivers

(education and socioeconomic status); Domain 2 included five questions on child's oral hygiene practices; Domain 3 included ten questions on child's feeding and dietary habits; Domain 4 included four questions on awareness of the child's first dental visit and presence of family dental problems and Domain 5 included three questions on child's dental service utilization. Data were entered in MS excel 2007 and statistically analyzed using SPSS version 11.5. Data analysis included descriptive statistics.

RESULTS

In this study, about 90% of the participants were literate and 44.3% belonged to the lower-class socioeconomic strata (Table 1). Table 2 shows the response to oral hygiene habits of the participants' children. Out of the 400 participants, 281 (70.3%) reported that their children cleaned their mouth while 119 (29.8%) did not. Among those who cleaned their mouth, more than half (62.3%) reported regular cleaning whilst the two-thirds (77.6%) cleaned only once before breakfast. Most of them (96%) used brush and toothpaste for cleaning and 90.3% used fluoridated toothpaste.

Table 3 shows the responses of participants on the feeding habits of their children. In this study, the majority (80%) of the participants reported to have breastfed their child, while 19% of them had both breast- and bottle-feeding practices. Breastfeeding was seen most commonly for a duration of one-to-two years (34.3%) and bottle-feeding for a duration of 0.5 to one year (32.5%). More than half of the parents and caregivers (67.5%) reported of bottle-feeding sweetened milk to their children and in 49.4% of the children, bottle-feeding even during the night-time was observed. Out of the 400 participants, 298 (74.5%) reported that their children were weaned at less than six months of age, while 102 (25.5%) children were weaned at six or more months of age.

Table 1: Socio-demographic characteristics of the study population (N=400)

Variables	n(%)
Education	
Illiterate	42 (10.5)
Primary School Certificate	42 (10.5)
Middle School Certificate	80 (20)
High School Certificate	141 (35.25)
Intermediate or Post high School Diploma	66 (16.5)
Graduate / PG / Profession or Honours	29 (7.25)
Socioeconomic Status	
Upper	18 (4.5)
Upper middle	101 (25.25)
Lower middle	104 (26)
Upper lower	171 (42.75)
Lower	6 (1.5)

Table 2: Responses on oral hygiene habits of children (N=281)

Characteristics	Category	n (%)
Regularity of oral cleanliness	Regularly	175 (62.3)
	Irregularly	106 (37.7)
Cleaning aids used for cleaning mouth	Brush and toothpaste	270 (96.0)
	Others (fingers, cloth and water, water, cotton)	11 (4.0)
Toothpaste	Fluoridated	242 (90.3)
	Non fluoridated	26 (9.7)
Timing of cleaning mouth	Before breakfast	218 (77.6)
	After breakfast and after dinner	8 (2.8)
	Before breakfast and after dinner	24 (8.5)
	After every meal	20 (7.1)
	Other	11 (4.0)

Table 3: Responses on feeding habits of children

Characteristics	Category	n (%)
Type of feeding (N=400)	Breastfeeding	320 (80.0)
	Only Bottle feeding	4 (1.0)
	Both	76 (19.0)
Duration of breastfeeding (age of child in years) (N=396)	< 0.5	14 (3.5)
	0.5 – 1	71 (18.0)
	1 – 2	136 (34.3)
	2 – 3	118 (29.8)
	3 – 4	36 (9.1)
Duration of bottle feeding (Age of child in years) (N=83)	< 0.5	11 (13.3)
	0.5 – 1	27 (32.5)
	1 – 2	25 (30.1)
	≥ 2	20 (24.1)
Type of milk when bottle-fed (N=83)	Unsweetened	27 (32.5)
	Sweetened	56 (67.5)
Bedtime bottle-feeding (N=83)	No	42 (50.6)
	Yes	41 (49.4)

Table 4 shows responses of the participants on child's dietary habits related to sweet intake. The habit of sweet intake was seen in 83.3% of the children, with 58.9% occurring between meals and at least twice a day for the 123. Out of the 400 children, 128 (32%) had regular medicated syrup intake.

Table 5 presents responses of the participants' awareness of the child's first dental visit and the presence of dental decay in their family. The major (91%) response to the age of the first dental visit of a child was "Any age whenever problem arises" while only 2.8% replied as soon as the tooth erupted or by the first year of age. More than a quarter (29.5%) of the parents or caregivers were aware of their children having some oral health problems. 34% of the participants reported that the child's siblings also had dental caries and less than half (39.5%) self-reported the presence of decay in their mouth.

82% of the respondents had never had a previous dental visit. Among those who had made a dental visit (18%), more than half (67.6%) responded having had their last visit more than 6 months back of which dental pain (32.4%) was found to be the most common reason. (Table 6)

Table 4: Responses on dietary habits (sweet intake) of children

Characteristics	Category	n (%)
Sweet intake (N=400)	No	67 (16.7)
	Yes	333 (83.3)
Timing of sweet intake (N=333)	During meal	94 (28.2)
	Before meal	196 (58.9)
	After meal/Anytime	43 (12.9)
Frequency of sweet intake/ day (N=333)	Once	106 (31.8)
	Twice	123 (37.0)
	Thrice	62 (18.6)
	Four or more	42 (12.6)

Table 5: Awareness of the first dental visit and their dental problem

Characteristics	Category	n (%)
Age of 1 st dental visit (years) (N=400)	As soon as 1 st tooth erupts/ first year of age	11 (2.8)
	2 – 5	12 (3.0)
	6 – 12	13 (3.2)
	Any age whenever problem arises	364 (91.0)
Awareness on child oral health problem (N=400)	No	282 (70.5)
	Yes	118 (29.5)
Guardian's decay (N=400)	No	242 (60.5)
	Yes	158 (39.5)
Sibling's decay (N=250)	Yes	85 (34.0)
	No	165 (66.0)

Table 6: Responses on dental service utilization

Characteristics	Category	n (%)
Previous dental visit (N=400)	No	329 (82.0)
	Yes	71 (18.0)
Last visit (months) (N= 71)	≥ 6	48 (67.6)
	< 6	23 (32.4)
Reason for dental visit (N=71)	Dental pain	23 (32.4)
	Loose teeth	16 (22.5)
	Decayed tooth	22 (31.0)
	Others / Swelling (gums / face / neck) / Esthetics	10 (14.1)

DISCUSSION

Dental caries is the most common oral disease for people of all ages.²⁹ Despite studies showing a global decline in dental caries, its prevalence in Nepalese children has risen



dramatically in the last 20 years.³⁰⁻³² This multifactorial disease begins with the eruption of a tooth in a child's mouth when cariogenic bacteria are transmitted primarily from mothers (vertical) and through horizontal channels (from siblings or in child care centers) particularly during certain infectivity periods.³³ Because caries is a preventable disease and parents and caregivers are the primary sources of oral health care for children, their understanding of factors impacting their children's oral health is closely linked to their child's oral health throughout childhood and into adulthood. The findings of the study showed most of the parents and caregivers reported the presence of factors affecting child oral health implying a lack of awareness and, as a result, poor usage of dental services for their children. This study also attempted to increase awareness of the child oral health among the parents and caregivers attending Pediatrics OPD with a discussion on the importance of child oral health and their first dental visit for each.

According to studies, caries occurrence is lower in children whose parents or caregivers are educated and have a solid financial situation.¹⁰⁻¹³ Because 90% of the participants in this study were literate, acquiring oral hygiene routines was rather simple. However, over half of the participants (44.3%) were from lower socioeconomic backgrounds, which may make it difficult for them and their children to access dental care on a regular basis. Children practicing good oral hygiene habits such as brushing twice a day using fluoridated toothpaste decrease their caries risk.²⁰ This study showed that more than half (62.3%) of the children cleaned their mouths regularly using a brush and toothpaste (96.1%), with fluoridated toothpaste (90.3%). However, two-third of the children cleaned their mouths only once before breakfast (77.6%) which might be a risk factor for their caries development. Other mouth cleaning aids (4%) like fingers, water only, cloth and water, and cotton were also being used (especially for the infants) which suggests certain level of awareness among the parents and caregivers.

Exclusive breastfeeding is advised until six months of age.³⁴ However, frequent and long-term breastfeeding and bottle-feeding (particularly night-time) beyond a child's first year of age cause higher early childhood caries.³⁵ This study showed children being breastfed even for four or more years of age (5.3%) and bottle-feeding continued beyond two years of age (24.1%). Use of sweetened milk (67.5%) and bedtime bottle feeding (49.4%) were also observed. Majority of the parents and guardians reported their child took a sugary diet (83.3%) with 58.9% taking between meals with four or more sugar exposures in a day (12.6%). Also, 32% of the parents and caregivers reported their children taking medicated syrups frequently. An increased caries risk is observed in children having increased frequency of refined sugar exposures, including medicated syrups, between-meal and at bedtime snacks.³⁶⁻³⁸ The American Heart Association also recommends that sugar in foods and drinks should be avoided in children under two years of age.³⁹ The findings of this study indicate the presence of high number of feeding

and dietary risk factors that are responsible for developing caries in children.

In this study, there was a lack of awareness on the age of child's first dental visit among the parents and caregivers, where the majority reported the age of first dental visit to be only when the problem arose (91%). Almost a quarter (29.5%) of the participants were aware that their children had an oral health problem; 39.5% reported decay in their own teeth and their child's sibling's teeth (34%). Surprisingly, the majority of the children (82%) had never had a dental visit, which was greater than prior studies conducted in Nepal by Giri M et al⁴⁰, Bastola B et al²³, and lower than Prasai et al²⁴. Among the 18% children who had made dental visits previously, more than half (67.6%) of the children had their last visit more than six months back. The major reasons for their previous dental visits were dental pain (32.4%), loose teeth (22.5%), decayed teeth (31%), and other reasons (swellings and esthetics) (14.1%). Despite being aware of the presence of oral health issues in the family, the usage of dental services was insufficient, as was the practice of regular three-to-six-monthly dental check-ups. They visited the dentist only when there was a clear problem. This gap in oral health care among children's parents and caregivers may be due to their lack of awareness of the importance of children's oral health and perceived needs apart from dental fear and anxiety, inaccessibility to dental care and cost of dental treatments.² According to studies, even parents and caregivers with good oral health knowledge and attitudes are unable to use it in everyday practice.⁶

An integrated approach involving primary healthcare practitioners (pediatricians, gynecologists, pediatric dentists, nurses), staff and teachers in child care facilities and schools, and health policy personnel is required to improve child's oral health. All expectant moms should receive oral hygiene counseling and engage in a dental home program, according to the guidelines, so that their infants' oral health can be examined before their first birthday. Furthermore, primary health care providers can provide modest dental treatments (such as fluoride varnish application) for those who require it, and government authorities should continue to promote initiatives that improve children's oral health.³ Although this hospital-based study does not reflect a representative population sample, it can be used as a pilot study. More large-scale (community-based) research are needed to assess parental and caregiver awareness of children's oral health, as well as to identify and eliminate barriers to their dental appointments.

CONCLUSION

A substantial number of participants reported factors affecting child oral health, yet there was a lack of awareness about child oral health among parents and caregivers, as well as insufficient use of dental services.

RECOMMENDATIONS

Already in the discussion

LIMITATIONS OF THE STUDY

Further studies in larger scale (community-based) should be conducted to assess parental and caregivers' awareness on child oral health and barriers for their dental visits to be elicited and eliminated.

ACKNOWLEDGEMENTS

The authors would like to thank all the participants,

Department of Pediatrics and adolescent medicine, BPKIHS and all those involved in this study.

CONFLICT OF INTEREST

None

FINANCIAL DISCLOSURE

None

REFERENCES

1. Oral Health Information System/Oral Health Surveillance: WHO. [cited 2022 Apr 05] Available from: http://www.who.int/oral_health/action/information/surveillance/en/index.
2. US Department of Health and Human Services, Public Health Service, Office of the Surgeon General. Oral health in America: A report of the Surgeon General. Rockville, MD: National Institutes of Health, National Institute of Dental and Craniofacial Research; 2000, p. 33-59. [cited 2022 Apr 05]
3. Virdi M. S. Oral Health Care - Prosthodontics, Periodontology, Biology, Research and Systemic Conditions. London: IntechOpen; 2012 [cited 2022 Apr 05]. 384 p. Available from: <https://www.intechopen.com/books/2116>. DOI: 10.5772/2520
4. Cafferata, Gail Lee, and Judith D. Kasper. "Family Structure and Children's Use of Ambulatory Physician Services." *Medical Care*, vol. 23, no. 4, Lippincott Williams & Wilkins, 1985, pp. 350-60. [cited 2022 Apr 05]. Available from: <http://www.jstor.org/stable/3764824>.
5. Hickson, G.B., & Clayton, E.W. (2002). Parents and their children's doctors. In: *Handbook of parenting*, vol. 5, Bornstein, M.H., pp. 439-62. Mahwah, N.J., Lawrence Erlbaum [cited 2022 Apr 05]
6. S Kamolmatyakul & S Saiong. Oral health knowledge, attitude and practices of parents attending Prince of Songkla University dental hospital, *International Journal of Health Promotion and Education*. 2007;45:4, 111-113. DOI: <https://doi.org/10.1080/14635240.2007.10708115>
7. de Castilho AR, Mialhe FL, Barbosa TS, Puppim-Rontani RM. Influence of family environment on children's oral health: a systematic review. *J Pediatr (Rio J)*. 2013; 89:116-23. DOI: <https://doi.org/10.1016/j.jped.2013.03.014>
8. Amen MM, Clarke VP. The influence of mothers' health beliefs on use of preventive child health care services and mothers' perception of children's health status. *Issues Compr Pediatr Nurs*. 2001 Jul-Sep;24(3):153-63. DOI: <https://doi.org/10.1080/014608601316942522>
9. Okada M, Kawamura M, Kaihara Y, Matsuzaki Y, Kuwahara S, Ishidori H, Miura K. Influence of parents' oral health behaviour on oral health status of their school children: an exploratory study employing a causal modelling technique. *Int J Paediatr Dent*. 2002 Mar;12(2):101-8. DOI: <https://doi.org/10.1046/j.1365-263x.2002.00338.x>
10. Cianetti S, Lombardo G, Lupatelli E, Rossi G, Abraha I, Pagano S, Paglia L. Dental caries, parents educational level, family income and dental service attendance among children in Italy. *Eur J Paediatr Dent*. 2017 Mar;18(1):15-18. DOI: 10.23804/ejpd.2017.18.01.03
11. Saldūnaitė K, Bendoraitienė EA, Slabšinskienė E, Vasiliauskiene I, Andruškevičienė V, Zūbienė J. The role of parental education and socioeconomic status in dental caries prevention among Lithuanian children. *Medicina (Kaunas)*. 2014;50(3):156-61. DOI: 10.1016/j.medici.2014.07.003
12. Davey TM, Cameron CM, Ng SK, McClure RJ. The relationship between maternal education and child health outcomes in urban Australian children in the first 12 months of life. *Matern Child Health J*. 2015; 19:2501-11. DOI: <https://doi.org/10.1007/s10995-015-1771-5>
13. David J, Wang NJ, Astrøm AN, Kuriakose S. Dental caries and associated factors in 12-year-old schoolchildren in Thiruvananthapuram, Kerala, India. *Int J Paediatr Dent*. 2005 Nov;15(6):420-8. DOI: <https://doi.org/10.1111/j.1365-263x.2005.00665.x>
14. World Health Organization. Oral Health Fact Sheet. Geneva, Switzerland: WHO; 2012. [cited 2022 Apr 05]
15. Caufield PW. Dental caries--a transmissible and infectious disease revisited: a position paper. *Pediatr Dent*. 1997 Nov-Dec;19(8):491-8. PMID: 9442545
16. Alaluusua S, Renkonen OV. Streptococcus mutans establishment and dental caries experience in children from 2 to 4 years old. *Scand J Dent Res*. 1983 Dec;91(6):453-7. DOI: 10.1111/j.1600-0722.1983.tb00845.x
17. American Academy of Pediatric Dentistry. Policy on early childhood caries (ECC): Consequences and preventive strategies. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2021:81-4. [cited 2022 Apr 05] Available from: https://www.aapd.org/globalassets/media/policies_guidelines/p_eccconsequences.pdf
18. Moynihan PJ, Kelly SA. Effect on caries of restricting sugars intake: systematic review to inform WHO guidelines. *J Dent Res*. 2014 Jan;93(1):8-18. DOI: 10.1177/0022034513508954
19. Tinanoff N, Kanellis MJ, Vargas CM. Current understanding of the epidemiology mechanisms, and prevention of dental caries in preschool children. *Pediatr Dent*. 2002 Nov-Dec;24(6):543-51. PMID: 12528947
20. Boustedt K, Dahlgren J, Twetman S, Roswall J. Tooth brushing habits and prevalence of early childhood caries: a prospective cohort study. *Eur Arch Paediatr Dent*. 2020 Feb;21(1):155-159. DOI: 10.1007/s40368-019-00463-3
21. Gao X, Ding M, Xu M, Wu H, Zhang C, Wang X, Feng X, Tai B, Hu D, Lin H, Wang B, Zheng S, Liu X, Rong W, Wang W, Wang C, Si Y. Utilization of dental services and associated factors among preschool children in China. *BMC Oral Health*. 2020 Jan 8;20(1):9. DOI: 10.1186/s12903-019-0996-x
22. Dikshit P, Limbu S, Gupta S, Pradhan R. Evaluation of Knowledge, Attitude and Practices of Parents toward their Children Oral Health Compared with their Dental Caries status. *Birat J. Health Sci*. 2018;3(2):447-52. DOI: <https://doi.org/10.3126/bjhs.v3i2.20943>
23. Bastola BS, Koirala B, Dali M, Shrestha S, Baral D. Dental Caries Experience in 6-13 Years Old School Children of Dharan Sub-Metropolitan City, Nepal: A Cross-Sectional Study. *JNAPD [Internet]*. 2021 Dec. 31;2(1):12-8. DOI: <https://doi.org/10.3126/jnapd.v2i1.41559>



24. Prasai DL., Shakya A, Shrestha M, Shrestha A. Dental caries prevalence, oral health knowledge and practice among indigenous Chepang school children of Nepal. *BMC Oral Health*. 2013;13:20. DOI:<https://doi.org/10.1186/1472-6831-13-20>
25. Northridge ME, Kumar A, Kaur R. Disparities in Access to Oral Health Care. *Annu Rev Public Health*. 2020 Apr 2; 41:513-535. DOI: 10.1146/annurev-publhealth-040119-094318
26. American Academy of Pediatrics, Policy Statement, Section on Pediatric Dentistry. Oral Health Risk Assessment Timing and Establishment of the Dental Home. *Pediatrics*. 2003; Vol III: 1113-16. DOI:<https://doi.org/10.1542/peds.111.5.1113>
27. American Academy of Pediatric Dentistry. Policy on the dental home. *The Reference Manual of Pediatric Dentistry*. Chicago, Ill.: American Academy of Pediatric Dentistry; 2021:43-4. [cited 2022 Apr 05]
28. Venugopal T, Kulkarni VS, Nerurker RA, Damle SG, Patnekar PN. Epidemiological study of dental caries. *Indian J Pediatr*. 1998 Nov-Dec;65(6):883-9. DOI: <https://doi.org/10.1007/BF02831355>
29. GBD 2016 Diseases and Injury Incidence and Prevalence Collaborators (2017). Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 390, 1211–1259. DOI: 10.1016/S0140-6736(17)32154-2
30. Alsuraim BS, Han DH. Effect of globalization on global dental caries trend. *Medicine (Baltimore)*. 2020 Aug 28;99(35):e21767. DOI: 10.1097/MD.00000000000021767.
31. Karki S, Laitala ML, Humagain M, Seppänen M, Pääkkilä J, Anttonen V. Oral health status associated with sociodemographic factors of Nepalese schoolchildren: a population-based study. *IDJ*. 2018;68(5): 348-358. DOI: <https://doi.org/10.1111/idj.12393>
32. Khanal S, Shah P, Ghimire P. Burden of Dental Caries in the Nepalese Children: A Literature Review. *J Nepal Assoc Pediatr Dent*. 2021;2(2):90-6.
33. Tanzer JM, Livingston J, Thompson AM. The microbiology of primary dental caries in humans. *J Dent Educ*. 2001 Oct;65(10):1028-37. PMID: 11699974
34. Salone LR, Vann WF Jr, Dee DL. Breastfeeding: an overview of oral and general health benefits. *J Am Dent Assoc*. 2013 Feb;144(2):143-51. DOI: 10.14219/jada.archive.2013.0093
35. Peres KG, Chaffee BW, Feldens CA, Flores-Mir C, Moynihan P, Rugg-Gunn A. Breastfeeding and Oral Health: Evidence and Methodological Challenges. *J Dent Res*. 2018 Mar;97(3):251-258. DOI: 10.1177/0022034517738925
36. Touger-Decker R, van Loveren C. Sugars and dental caries. *Am J Clin Nutr*. 2003 Oct;78(4):881S-892S. DOI: 10.1093/ajcn/78.4.881S
37. Babu KL, Doddamani GM, Naik LR, Jagadeesh KN. Pediatric liquid medicaments - Are they cariogenic? An in vitro study. *J Int Soc Prev Community Dent*. 2014 May;4(2):108-12. DOI: 10.4103/2231-0762.137637
38. Dye BA, Shenkin JD, Ogden CL, Marshall TA, Levy SM, Kanellis MJ. The relationship between healthful eating practices and dental caries in children aged 2-5 years in the United States, 1988-1994. *J Am Dent Assoc*. 2004 Jan;135(1):55-66. DOI: 10.14219/ jada.archive.2004.0021
39. Voss MB, Kaar JL, Welsh JA, et al. Added sugars and cardiovascular disease risk in children: American Heart Association. *Circulation* 2017;135(19): e1017-e1034. DOI: <https://doi.org/10.1161/ cir.0000000000000439>
40. Giri M, Pandit SK, Oli HP, Giri S. Prevalence and Associated Factors of Dental Caries among Basic School Children in Kathmandu Metropolitan City, Nepal: A Cross-sectional Study. *MedS. J. Med. Sci*. 2021;1(1):89-94. DOI: <https://doi.org/10.3126/mjmms.v1i1.42955>