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Original Research Article

Prevalence of dental caries and oral hygiene practices among elderly people: a descriptive cross-sectional study from Nepal

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ABSTRACT

Background: Dental caries is one of the most prevalent oral diseases of public health concern affecting elder people. The main reasons for caries arise in elderly people are increase in sugar consumption, poor oral hygiene, microbial plaque, periodontal disease, dietary habits, low socioeconomic status and infrequent dental visits. The oral hygiene is essential to general health and quality of life.
Methods: A descriptive cross-sectional study was conducted among 246 elder people. Systematic random sampling was used for data collection. The data collection was done between 15 April to 07 May 2017.
Results: The overall prevalence of dental caries in study population was 88.57%. The mean DMFT of all study participants was 17.13 (SD=10.48; participants were allocated a DMFT of 32). Majority of elder people (56.33%) had experience of pain and discomfort in their teeth within 12 months. The gender, marital status, diet, socio-economic status, medication, method of cleaning, frequency of cleaning, dental visit and tobacco chewing were factors that determines dental caries. Regular dental checkup (11%) was very poor. Majority of respondents preferred tea with sugar, biscuits/cake, chocolate and soft drinks (64%).
Conclusions: The study showed that the prevalence of dental caries among elderly people in Rajdevi Rural Municipality, Rautahat District, Nepal was high. The awareness should be provided to local residents regarding the importance of good brushing habits and regular dental visits. Oral health policies are needed revised and implemented focusing on the special needs of this population to improve their quality of life.

Keywords: Dental caries, Elderly, Oral hygiene, Nepal

INTRODUCTION

Dental caries is defined as progressive, irreversible microbial disease of multi-factorial nature affecting the calcified tissue of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic portion of the tooth. Dental caries is the universal disease affecting all geographic regions, races, both sexes and all age groups. Dental caries is now largely a disease affecting the deprived section of society. Dental caries is a disease that may never be eradicated because of complex interplay of social, behavioral, cultural, dietary and biological risk factors that are associated with its initiation and progression. Dental caries is one of the most prevalent oral diseases of public health concern affecting elder people.[1]

At present the prevention and treatment of oral disease i.e. dental caries is virtually unavailable to population outside the Kathmandu Valley.[2] Dental caries forms through a complex interaction over time between acid producing bacteria and fermentable carbohydrate, and many host factors including teeth and saliva.[3] Risk factors for oral diseases are unhealthy diet, tobacco use, harmful alcohol use and poor oral hygiene. These are also risk factors for the four leading chronic diseases – cardiovascular diseases, cancer, chronic respiratory diseases and diabetes – and oral

diseases are often linked to chronic disease. Dental infections result in osteomyelitis, cavernous sinus thrombosis, infection of the floor of the mouth and neck space and even death in both children and adults.[4] The reasons for caries arise in elder people are increase in sugar consumption, poor oral hygiene, microbial plaque, periodontal disease, sex - gender (male), dietary habits, xerostomia, low socioeconomic status and infrequent dental visits.[5] Oral hygiene is the practice of keeping the mouth clean and healthy by brushing and flossing to prevent tooth decay and gum disease.

The purpose of oral hygiene is to prevent the build-up of plaque, the sticky film of bacteria and food that forms on the teeth.[4] Oral hygiene consists of proper brushing and flossing daily. Oral hygiene promotes the brush the teeth at least twice a day or after every meal and snack, and floss daily. The primary focus of brushing and flossing is to remove and prevent the formation of plaque. The oral hygiene is more effective to prevent tooth decay and other oral problems such as gum diseases, and periodontitis.[5] The aim of this study was to assess the prevalence of dental caries and oral hygiene practices among elderly people of Rajdevi Rural Municipality, Rautahat District, Nepal.

METHODS

A quantitative, descriptive cross-sectional study was conducted among 246 elderly people in Rajdevi Rural Municipality, Rautahat district, Nepal using systematic random sampling. The descriptive cross sectional study collects data at particular point of time. The sample size was calculated using the formula below.

$$n = \frac{z^2 p(1-p)}{d^2 + \frac{z^2 p(1-p)}{N}}$$

$$n = \frac{1.96^2 \times 0.464(1-0.464)}{0.05^2 + \frac{1.96^2 \times 0.464(1-0.464)}{714}} = 223$$

Taking 10% of the sample size as non-response rate, the final sample size will be

$$n = 233 + 10\%\ of\ 233 = 246$$

Where, p=46.4%, d=sampling error that can be tolerated, z=constant which is 1.96 at 95% confidence interval (CI).[3]

People above 60 years who was mentally disturbed, was uncooperative and was not be able to give verbal consent were excluded from the study.

Structured questionnaires were used for data collection. The questionnaires were developed as guided by the WHO oral health survey fifth edition, 2013. The DMFT score was used for assessing dental caries status which is guided by WHO oral health survey fifth edition, 2013.[6]

Table 1: Caries status and DMFT score.

Caries status	DMFT score
Caries free	0
Very low	<5
Low	5-8.9
Moderate	9-13.9
High	>13.9

Dental checkup and face to face interview was taken after informed consent to collect the data. The study was conducted after approval from the Institutional Review Committee (IRC) of Manmohan Memorial Institute of Health Sciences. All the ethical norms were considered prior to the data collection.

The written/oral informed consent of participant was taken before interview. No pressure or inducement of any kind was applied to encourage an individual to a subject of research. Confidentiality and anonymity of all the respondents was maintained. Data coding, entry and analysis was done by using statistical package for social sciences (SPSS) 20.0. Univariate and bivariate analysis were carried out.

RESULTS

The prevalence of dental caries in study population was 88.57%. Of all participants 28 (11.4%) had caries free teeth and 217 (88.6%) had carious teeth. The mean DMFT of all study participants was 17.13 (SD = 10.48; participants were allocated a DMFT of 32). Of all participants, 50 (23%) had a DMFT of 32, which meant that they did not have a single healthy tooth. The table 1 shows that most of the participants (49%) had high DMFT score (>13.9) that means they had severe dental caries. Only 11.4% participants had caries free teeth.

Table 2: DMFT score.

Caries status	DMFT score	Number	Percent
Caries free	0	28	11.4
Very low	<5	25	10.2
Low	5-8.9	37	15.1
Moderate	9-13.9	35	14.3
High	>13.9	120	49.0

Table 3 shows that majority of respondents (61.2%) belongs to age group 60-70 years. During study period, most of male were found (70.6%) to collect information. Majority of them were Hindu (83.3%) and Madheshi (56.3%). Nearly three quarter of elder people were illiterate (75.1%). The majority of respondents had agriculture (49.4%) followed by housewife (24.1%), daily wages (13.9%), service (6.5%) and business (6.1%). Nearly three quarter of respondents are non-vegetarian (75.5%).

Table 4 represents the cross tabulation of independent variables and dependent variables. Though there was no significant association between sex and dental caries but male were likely to suffer more from dental caries than female (OR=1.283, CI=0.520-3.166). There was statistically significant association between marital status and dental caries (p=0.001) and the respondents whose married were likely to suffer more from dental caries than female (OR=13.972, CI=1.862-104.860).

There was no significant association between religion and dental caries (p=0.866). There was no significant association between occupational status and dental caries (p=0.463). At the same way, there was no significant association between dietary habit and dental caries (p=0.296) but respondents were vegetarian likely to suffer more from dental caries than that of non-vegetarian (OR=1.573, CI=0.670-3.693).

Table 5 shows that 56.33% of respondents had experience of pain and discomfort in their teeth within 12 months.

Table 6 shows that the majority of respondents preferred tea with sugar (99.2%) followed by biscuits/cake (67.3%), chocolate and soft drinks (64%) and fruits (57%). Majority of respondents eat or drinks all types of food items several times a week (41.4%) followed by every day (34.8%) and several times a day (23.8%).

The majority of respondents had habit of chewing tobacco (82.4%), only 30.2% had habit of drinking alcohol and nearly half of the respondents had habit of smoking (44.9%).

Table 7 shows that majority of respondents clean their mouth always (84.1%). All respondents clean their mouth before taking the meal. Majority of respondents used wooden toothpick for cleaning their teeth and only 11.2% of respondents used toothbrush for cleaning their teeth. Almost 90% of respondents clean their teeth once a day. Almost all respondents used fluoridated toothpaste (11.2%) of total used toothbrush for cleaning their teeth. Majority of respondents did not receive any dental services (89.0%) and only 11% of respondents received any dental services. The reason behind for receiving dental care was pain or discomfort in moth and teeth, consultation and consultation.

Table 3: Socio-demographic information.

Variables	Number	Percent
Age (years)		
60-70	150	61.2
71-80	54	22.0
81-90	38	15.5
91-100	3	1.2
Sex		
Male	173	70.6
Female	72	29.4
Marital status		
Married	170	69.4
Widow	75	30.6
Religion		
Hindu	204	83.3
Muslim	41	16.7
Ethnicity		
Brahmin	12	4.9
Janjati	7	2.9
Dalit	47	19.2
Madheshi	138	56.3
Muslim	41	16.7
Educational status		
Illiterate	184	75.1
Literate	61	24.9
Occupational status		
Agriculture	121	49.4
Housewife	59	24.1
Service	16	6.5
Business	15	6.1
Daily wages	34	13.9
Dietary habit		
Vegetarian	59	24.1
Non-vegetarian	185	75.5

Table 4: Dental caries according to socio-demographic characteristics.

Variables	Caries absent (%)	Caries present (%)	OR	95% CI	P value
Sex					
Male	21 (75)	152 (70)	1.283	0.520- 3.166	0.588
Female	7 (25)	65 (30)	1		
Marital status					
Married	27 (96.4)	170 (69.4)	13.972	1.862-104.860	0.001*
Widow	1 (3.6)	75 (30.6)	1		
Religion					
Hindu	23 (82.1)	181 (83.4)	0.914	0.326-2.566	0.866
Muslim	5 (17.9)	36 (16.6)	1		
Educational status					

Variables	Caries absent (%)	Caries present (%)	OR	95% CI	P value
Illiterate	11 (39.3)	173 (79.7)	1.653	0.072-0.376	<0.001*
Literate	17 (60.7)	44 (20.3)	1	-	
Occupational status					
Agriculture	12 (42.9)	109 (50.2)	0.743	0.336-1.645	0.463
Non-agriculture	16 (57.1)	108 (49.8)	1	-	
Dietary habit					
Vegetarian	9 (32.1)	50 (23.1)	1.573	0.670-3.693	0.296
Non-vegetarian	19 (67.9)	166 (76.9)	1	-	

(*) Means the variable is statistically significant at 95% of confidence

Table 5: Dental pain.

Dental pain	Number	Percent
Yes	138	56.3
No	107	43.7

Table 6: Health behavior.

Number	Percent	
Food consumption		
Fresh fruits		
Yes	140	57.1
No	105	42.9
Biscuits/cake		
Yes	165	67.3
No	80	32.7
Chocolate		
Yes	158	64.5
No	89	35.5
Cocacola or other drinks		
Yes	157	64.3
No	87	35.7
Tea with sugar		
Yes	242	99.2
No	2	0.8
Frequency of food consumption		
Several times a day	58	23.8
Once a day	85	34.8
Several times a week	101	41.4
Drinking alcohol		
Yes	74	30.2
No	171	69.8
Smoking		
Yes	110	44.9
No	135	55.1
Chewing tobacco		
Yes	202	82.4
No	43	17.6

Table 7: Oral hygiene habit.

Variables	Number	Percent
Mouth rinsing		
Always	206	84.1
Sometimes	17	6.9
Never	22	9.0
Teeth cleansing time		
Before meal	223	100
Materials used for cleaning teeth		
Toothbrush	25	11.2
Wooden toothpick	190	85.2
Charcoal	6	2.7
Finger	2	0.9
Frequency of cleaning teeth		
Once a day	199	89.2
Twice a day	10	4.5
Sometimes	14	6.3
Use of toothpaste to clean teeth		
Yes	25	11.2
No	198	88.8
Dental visit		
Less than 6 months	3	1.2
6-12 months	11	4.5
1-2 years	5	2.0
More than 5 years	8	3.3
Never received dental care	218	89.0
Reason for dental visit		
Consultation / advice	1	3.6
Pain or trouble with teeth, gum or mouth	17	60.7
Treatment / follow up	10	35.7

DISCUSSION

The prevalence of dental caries in study population was found to be 88.57% which is similar to the result of Migle et al and higher than the result of Lu et al in contrast with Balasubramanian et al Luciene et al and Lilian et al.[7-11] Most of elder people of study population had carious teeth and only 11.4% had caries free teeth which is similar to the result of Luciene et al and Lilian et al in contrast with the study of Balasubramanian et al.[9-11] The mean DMFT of all study participants was 17.13 (SD=10.48; participants were allocated a DMFT of 32) and 23% had a DMFT of 32, which meant that they did not have a single healthy tooth

which is slightly lower than the result of Luciene et al and similar to the result of Lilian et al in contrast with Balasubramanian et al.[7,9,10]

The study showed that the dental caries varied by age and in contrast Balasubramanian et al found dental caries increased with the increasing age and considered the increasing prevalence of dental caries with age might not be due to aging but might be a product of the general deterioration in oral health which often accompanies growing old and less motivation as a main reasons for root caries development as age advances.[9] A wide range of factors have been implicated in caries initiation and progression but these are dominated by the social determinants of health and a low socioeconomic status, educational status, age, sex and occupational status has been reported to be a risk factor for dental caries.

Almost half of the elder people (56.33%) had experience of pain and discomfort in their teeth within 12 months which is similar to similar to the result of Lilian et al in contrast with Balasubramanian et al and Khanal et al.[9,11,12] Most of the elder people (97.14%) did not have any removal denture; it might be due to unavailability of dental services and oral health awareness in that community.

Most of the elder people clean their mouth always (84.1%) and all respondents clean their teeth before taking the meal in contrast with studies done by Wondemagegn et al.[13] Majority of respondents used wooden toothpick for cleaning their teeth and only 11.2% of respondents used toothbrush for cleaning their teeth which was similar to the result of Wondemagegn et al.[13] Almost 90% of respondents clean their teeth once a day which is similar to the result of Balasubramanian et al in contrast with the study of Luciene et al.[9,10] Almost all respondents used fluoridated toothpaste (11.2%) of total used toothbrush for cleaning their teeth. The reason behind for high use of wooden toothpick was wooden toothpick is found anywhere without any cost and the toothbrush and toothpaste is to buy. Majority of respondents did not receive any dental services (89.0%) and only 11% of respondents received any dental services and the reason behind for receiving dental care was pain or discomfort in moth and teeth, consultation and consultation in contrast to the study of Wondemagegn et al.[13] The reason behind for not receiving dental care was unavailability of dental services, oral health awareness and understating of people was the dental problem is not a major problem that must be need to care. The study showed that the dental caries varied by oral hygiene practice (frequency of cleansing, brushing tools and techniques and dental visit) and in contrast Balasubramanian et al found dental caries increased with poor oral hygiene practice.[9] Oral hygiene practices in the study population were inadequate and this group of elder people had poor access to oral health care. In all residents, a need for treatment by a dentist was detected by the clinical assessment, but only 19% had perceived that need.

Most of elder people had breakfast with tea and sugar (99.2%), biscuits/cake (67.3%), chocolate and soft drinks (64%) and fruits (57%). Majority of respondents eat or drinks all types of food items several times a week (41.4%) followed by every day (34.8%) and several times a day (23.8%) which was similar to result of Luciene et al, in contrast with study done by Wondemagegn et al, Lonim et all.[10,13,14] The study showed that the dental caries varied by eating pattern (consumption of sweet) and in contrast Balasubramanian et al found dental caries increased with high consumption of sugar containing foods such as chocolate, biscuits, coke, other products.

Most of elder people had habit of chewing tobacco (82.4%), only 30.2% had habit of drinking alcohol and nearly half of the respondents had habit of smoking (44.9%) in contrast with study done by Balasubramanian et al.[9] The prevalence of dental caries was more among tobacco chewers and the results were found to be statistically significant. This finding was in agreement with studies done by Balasubramanian et al and considered that the use of tobacco increased the prevalence of dental caries.

On the public health level, health education programs focusing on the special needs of these populations are mandatory. An integrated approach is needed, and oral health education should include all stakeholders. Additionally, it is necessary to implement preventive, promotive and curative measures in these populations to reduce the need for future dental treatment. This study was conducted in a rural municipality of Bara and cannot be generalized.

CONCLUSION

In conclusion, results of this oral health survey showed that the prevalence of dental caries among elder people in Rajdevi Rural Municipality, Rautahat District, Nepal was high. Almost three fourth of participants had carious teeth. Almost half of the respondent's experience pain or discomfort in teeth within 12 months. Most of respondents eat sweats; nearly half of respondents eat sweet once or more times in a day. Almost three fourth of respondents had habit of chewing tobacco. All respondents clean their mouth before taking the meal. Oral health education programs at individual, and community levels should be implemented aimed primarily at improving the knowledge and awareness of the communities towards the risk factors associated with oral problems in order to decrease overall incidence and prevalence of dental caries. Health education programs concerning the importance and availability of quality oral health care to both the provider and receiver is needed to increase. In view of low levels of oral health status in elder people, it is important to integrate the preventive measures and appropriate actions such as awareness on proper brushing techniques and regular dental visits should be implemented. The routine dental checkup facilities should be available.

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REFERENCES

1. Murya CM. A textbook of Public Health Dentistry – JAYPEE, New Delhi, India. Jaypee Brothers Medical Publishers (P) Ltd. First edition. 2011.
2. Government of Nepal. Ministry of Health and Population, 2011. Available at: https://dhsprogram.com/pubs/pdf/fr257/fr257%5B13april2012%5D.pdf. Accessed on 06 August 2023.
3. FDI World Dental Federation, A Report of World Oral Health Day 2014 Toolkit. Available at: https://www.fdiworlddental.org/sites/default/files/2020-11/2015_wohd-whitepaper-oral_health_worldwide.pdf. Accessed on 06 August 2023.
4. The medical dictionary, American Dental Association; 211E. Chicago Ave, Chicago IL 600611(312) 440-2500. Available at: https://www.ada.org/en/contact-us. Accessed on 06 August 2023.
5. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in 21st century- the approach of World Health Organization (WHO) Global Oral Health Program. Comm Dentistry Oral Epidemiol. 2003;31:3-24.
6. World Health Organization. Oral health assessment survey (basic method), WHO Press. 2013. Available at: https://www.who.int/publications/i/item/9789241548649. Accessed on 06 August 2023.
7. Zemaitiene M, Grigalauskiene R, Vasiliauskiene I, Saldunaite K, Razmiene J, Slabsinskiene E. Prevalence and severity of dental caries among 18-year-old Lithuanian adolescents. Medicina. 2016;52:54-60.
8. Liu L, Zhang Y, Wu W, Cheng M, Li Y, Cheng R. Prevalence and correlates of dental caries in an elderly population in northeast China. PLoS One. 2013;8(11):e78723.
9. Kumara-Raja B, Radha G. Prevalence of root caries among elders living in residential homes of Bengaluru city, India. J Clin Exp Dent. 2016;8(3):e260-7.
10. Ribeiro Gaião L, Leitão de Almeida ME, Bezerra Filho JG, Leggat P, Heukelbach J. Poor dental status and oral hygiene practices in institutionalized older people in northeast Brazil. Int J Dent. 2009;846081.
11. Lilian Berta RIHS, Debora Dias da SILVA, Maria da Luz Rosario de SOUSA. Dental caries in an elderly population in Brazil. J Appl Oral Sci. 2009;17(1):8-12.
12. Khanal S, Acharya J. Dental caries status and oral health practice among 12-15 year old children in Jorpati, Kathmandu. Nepal Med Coll J. 2014;16(1):84-7.
13. Mulu W, Demilie T, Yimer M, Meshesha K, Abera B. Dental caries and associated factors among primary school children in Bahir Dar city: a cross-sectional study. BMC Res Notes. 2014;7:949.
14. Prasai Dixit L, 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.

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