ORIGINAL RESEARCH

Factors influencing Oral Health and Utilization of Oral Health Care in an Indian Fishing Community, Mangaluru City, India

[1]Sumeet Bhatt, [2]Guru R Rajesh, [3]Ashwini Rao, [4]Ramya Shenoy, [5]Mithun BH Pai, [6]Vijayendra Nayak

ABSTRACT

Aim: The aim of this study was to assess factors influencing the oral health and utilization patterns of oral health services by fishermen community in Mangaluru city, Karnataka, India.

Materials and methods: A house-to-house survey was conducted among 840 individuals in fishermen population. Oral health status was evaluated by employing the World Health Organization basic oral health survey form. A self-administered questionnaire was used to assess patterns of utilization of dental services and their sociodemographic details.

Results: Mean decayed, missing, and filled teeth (DMFT) of the population was 3.78 ± 6.02 and prevalence of caries and periodontal conditions was 55 and 99% respectively. About 55% participants had never visited a dentist. Age, gender, and education of the respondents showed significant associations with DMFT status. Periodontal health showed significant association with age, gender, education, and income of the respondents. Visit to the dentist was associated with age, gender, education, and dental caries. The major barrier recognized in seeking dental care was the perception of not having any dental problem.

Conclusion: The dental care utilization was poor, and majority of the dental visits were for tooth extraction. Lack of perceived oral health care need was the main barrier to the utilization of dental services.

Clinical significance: The fishing population had high dental caries and poor periodontal health due to low utilization of dental care.

Keywords: Barriers to utilization, Dental care utilization, Fishing community, Oral health status.

[1]Department of Public Health Dentistry, Himachal Institute of Dental Sciences, Paonta Sahib, Himachal Pradesh, India

[2-6]Department of Public Health Dentistry, Manipal College of Dental Sciences, Manipal University, Mangaluru, Karnataka, India

Corresponding Author: Sumeet Bhatt, Department of Public Health Dentistry, Himachal Institute of Dental Sciences, Paonta Sahib, Himachal Pradesh, India, Phone: +919816138636, e-mail: bhatt.sumeet@gmail.com

INTRODUCTION

Orodental diseases are major public health problems in developing countries like India. At present, in India, there are close to 300 dental colleges. Despite the increasing workforce each year, even the most basic oral health care is unavailable to the vast majority of population, especially the poor segments in rural and urban areas. Inappropriate utilization of dental services is a major problem, especially in underdeveloped and developing countries, even though the deleterious effects of oral diseases are well known.[1]

Health care utilization is the actual attendance by the members of the public at health care facilities to receive care. Utilization is measured as the number of visits per year or the number of people with at least one visit during the previous year, and utilization studies serve as an important tool for oral health policy decision-making.[2]

The utilization of health services is a complex phenomenon. It depends on multiple factors, such as sociodemographic, socioeconomic, sociocultural and sociopsychological variables.[3] The determinants of oral health care can be classified as predisposing (sociodemographic factors like age, sex, occupation, and social network), enabling (transportation, income, and information), and need (perceived health or professionally assessed illness) factors.[4]

According to the US Department of Labor, fishers and related fishing workers catch and trap various types of marine life. Some fishers work in deep water on large fishing boats that are equipped for long stays at sea.[5] In a previous study reported from an Indian coastal area, the prevalence of caries was found to be very high among the elderly.[6] Adverse habits damaging the oral health, such as tobacco and alcohol consumption have also been reported to be high in the fishermen population.[7] This highlights the need to investigate the oral health status of such isolated communities to plan appropriate health programs. Earlier investigators have addressed the need to bring oral health care closer to communities that are underserved.[8]

It would seem logical that the disadvantaged people have poorer oral health because they have fewer opportunities for care and various sociodemographic factors that have been known to affect the oral health. Sadly, what

is termed the "inverse care law" is all too prevalent in dentistry, i.e., deprived communities that suffer the most and so have the most need receive the least resources.[8] Studies have shown repeatedly that the people who are poor and with limited education, minorities, and older people who live in difficult circumstances continue to have poor access to oral care.[9,10] The present epidemiological study was conducted with the objective to assess the oral health status, patterns of utilization of oral health services, and potential barriers in seeking dental care in a fishing population in Bengre area of Mangaluru city.

MATERIALS AND METHODS

The study was conducted in Bengre area of Mangaluru city in August 2012 and was completed in 2 months. Bengre is an isolated area on the seacoast of Mangaluru city and comprises mainly fishing population. There is no dental insurance for the residents in this area. For this study, cluster sampling method was used. The information about the residents of Bengre was obtained from the electoral voter's list of the area. The number of individuals aged 18 to 59 years was found to be 2,340. Individuals aged 60 years or above were not included in the study as this comprises the geriatric population and can be the subject of a separate research. Sample size for the study was calculated based on expected prevalence of oral diseases and was estimated to be 840.

Before the commencement of the study, ethical clearance was obtained from the Institutional Ethics Committee of Manipal College of Dental Sciences, Mangaluru, Karnataka, India. Data collection was done through a house-to-house survey. Prior to the examination, the nature of the study was explained to every individual in his/her language and informed consent was taken from each study participant.

Inclusion criteria comprised of all the available individuals within the age range of 18 to 59 years who were involved in fishing or related business. Most of the adult men in this area are involved in deep sea fishing, whereas women engage in onshore fishing and fish-selling. If the subjects were not available on some particular day of the examination, they were examined on a subsequent visit till the desired sample size was achieved. Individuals not willing to take part in the study were excluded. During the course of the study, 11 individuals declined participation citing reasons, such as lack of time and ill health.

After obtaining consent, particulars regarding demographic data, education, financial status, oral hygiene habits, personal habits, past dental history, and dental utilization were collected using the interview method. The oral health status was assessed using the World Health Organization (WHO) basic oral health survey form 1997.[11] The oral examination of the subjects was carried out in their houses using artificial light. Examination was carried out by single examiner beginning from the maxillary right quadrant and proceeding in a clockwise direction to the mandibular right quadrant. The periodontal health was assessed using the community periodontal index (CPI) which includes three components of periodontal status, namely, gingival bleeding, calculus, and periodontal pockets. This was carried out using CPI probe, and periodontal health was scored using codes 0 (healthy), 1 (bleeding on probing), 2 (calculus), 3 (pocket 4–5 mm), 4 (pocket 6 mm or more), or X (excluded sextant when less than two teeth are present). The dental caries status was assessed in terms of number of decayed, missing, and filled teeth (DMFT) obtained through the dentition status component of the WHO basic oral health survey form 1997.

The educational qualification was dichotomized as below primary education and above. Primary education is the most basic level of education. Primary education in India is mandatory and comprises 5 years of schooling. The financial status was assessed using monthly family income and was divided as below Rs. 10,000 and above. The questionnaire related to utilization included questions on the frequency of utilization and main reason for visiting or not visiting a dentist. The questionnaire was translated into the local language (Tulu) of the area.

Statistical Package for Social Sciences version 11.5 (SPSS Inc., Chicago, Illinois, USA) statistical software was used to analyze the data. The level of significance for the present study was fixed at $p < 0.05$. Comparison of the questionnaire findings with the oral health status was done using chi-square test and independent t-test.

RESULTS

The study was done on 840 participants with a median age of 38.5 years. For the purpose of analysis, age was divided into two groups of 18 to 38 and 39 to 59 years consisting of 420 individuals each. There were 469 (55.8%) men with a mean age of 38.48 ± 12.01 years and 371 (44.2%) women with a mean age of 38.65 ± 12.06 years (Table 1). Majority of the study subjects were Hindus (94%), followed by Christians (3.5%) and Muslims (2.5%).

There were only eight (1%) individuals with healthy periodontium. The most commonly observed periodontal condition among the study participants was the presence of calculus (48%). There were about 40% individuals with bleeding as the highest score. The presence of pockets up to 5 mm was noted in 110 (13.1%) individuals (Table 2).

Table 2 shows the caries status of the population. There were 464 (55.2%) subjects with dental caries. The mean DMFT of the population was 3.78 ± 6.02. Mean decayed teeth (DT) was 1.58 ± 2.09, mean missing teeth (MT) was 2.11 ± 5.84, and mean filled teeth (FT) was 0.22 ± 0.94.

Table 1: Distribution of subjects according to sociodemographic variables

Sociodemographic variable	N (840)	%
Age (years)		
18–38	420	50
39–59	420	50
Gender		
Men	469	55.8
Women	371	44.2
Education		
Up to primary school	464	55.2
More than primary school	376	44.8
Income (Rupees)		
Up to 10,000	373	44.4
More than 10,000	467	55.6

Table 2: Oral health status of the subjects

Periodontal status	
Code 0 (Healthy)	8 (1%)
Code 1 (Bleeding)	285 (33.9%)
Code 2 (Calculus)	403 (48%)
Code 3 (Pocket 4–5 mm)	110 (13.1%)
Code 4 (Pocket 6 mm or more)	8 (1%)
Code X (Excluded sextant: Less than two teeth present)	26 (3.1%)
Dental caries status	
Mean DMFT	3.78 ± 6.02
Mean DT	1.58 ± 2.09
Mean MT	2.11 ± 5.84
Mean FT	0.22 ± 0.94

Table 3: Association between sociodemographic factors and oral health status (n = 814)[#]

| | Community periodontal index scores | | | | | |
Sociodemographic variable	Healthy	Bleeding	Calculus	Pockets > 4 mm	Pockets > 6 mm	Mean DMFT
Age (years)						
18–38	6	198*	200	15	0	2.24 ± 2.61
39-59	2	87	203	95*	8*	5.31 ± 7.82* (p = 0.000)
Gender						
Men	2	135*	254*	62	5	3.21 ± 5.32
Women	6	150	149	48	3	4.48 ± 6.75* (p = 0.002)
Education						
Up to primary	1	102	236*	94*	6	5.00 ± 7.44*
More than primary	7*	183*	167	16	2	2.27 ± 2.96 (p = 0.000)
Income (Rupees)						
Up to 10,000	2	113	182	59*	2	4.12 ± 6.52
More than 10,000	6	172	221	51	6	3.50 ± 5.59 (p = 0.142)

*p = 0.000; [#]Data missing because some individuals had excluded sextants

Age, gender, education, and financial status were significantly associated with the periodontal status in this population. Individuals in older age group, men, lower education group, and those with lower incomes exhibited more periodontal problems (Table 3).

The variables significantly associated with the dental caries experience in this population were age, gender, and educational status. Older age group, women, and those with lower education exhibited significantly higher dental caries experience (Table 3).

Out of the 840 participants, 377 (44.9%) had visited the dentist at least once in their lifetime. Majority (55.1%) subjects reported that they had never visited a dentist. Among the visitors, majority of the participants reported having visited the dentist once in more than 4 years. The main reason of dental visit was reported as tooth extraction, followed by cleaning of teeth and filling. The main reason for not visiting a dentist was cited as "Don't have a dental problem" (Table 4).

The dental caries was found to be significantly higher among the nonvisitors compared with those who visited the dentist, whereas there was no statistically significant

Table 4: Utilization patterns of oral health services of the study population

Frequency of dental visit (n = 840)	
More than once a year	2 (0.2%)
Once a year	25 (2.9%)
Once in 2–3 years	34 (4%)
Once in more than 4 years	316 (37.6%)
Never	463 (55.1%)
Main reason for dental visit (n = 377)	
Routine checkup	4 (1%)
Cleaning	65 (17.2%)
Extraction	261 (69.2%)
Filling	38 (10%)
Replacement	5 (1.3%)
Others	4 (1%)
Reason for never visiting the dentist (n = 463)	
Don't have dental problem	404 (87.2%)
Afraid of dental treatment	13 (2.8%)
Treatment too expensive	23 (4.9%)
Dental problems not priority	19 (4.1%)
Lack of mobility/functional limitation	2 (0.4%)
Traveling to dentist is too difficult	2 (0.4%)

Table 5: Dental caries status of the study population in relation to dental visiting patterns

			Total subjects = 840		
Caries (n = 464)	Present	Mean DMFT	Mean DT	Mean MT	Mean FT
Visitors (n = 377)	202	6.05 ± 7.63*	1.37 ± 1.86	4.19 ± 7.76*	0.49 ± 1.36*
Nonvisitors (n = 463)	262	1.93 ± 3.32	1.75 ± 2.24*	0.41 ± 2.54	0
p-value	0.383	0.000	0.01	0.000	0.000

*Statistically significant

Table 6: Association between dental visiting patterns and sociodemographic variables

Sociodemographic variable (n = 377)	Visited dentist	p-value
Age (years)		
18–38 (n = 420)	148 (39.2%)	0.000
39–59 (n = 420)	229* (60.7%)	
Gender		
Men (n = 469)	178 (47.2%)	0.000
Women (n = 371)	199* (52.8%)	
Education		0.000
Up to primary (n = 464)	234*(62.1%)	
More than primary (n = 376)	143 (37.9%)	
Income (Rupees)		
Up to 10,000 (n = 373)	162 (43%)	0.450
More than 10,000 (n = 467)	215 (57%)	

*Statistically significant

association found between periodontal conditions and dental visiting patterns (Table 3). Among the nonvisitors who had dental caries (n = 262), there were 225 (85.8%) respondents who stated that they did not have any dental problem (Table 5).

The dental visits were significantly higher in the older age group and in women. It was also observed that those with education below primary level visited the dentist more than those with higher education (Table 6).

DISCUSSION

This study was an attempt to assess the factors affecting the oral health status, patterns of oral health services utilization, and barriers in seeking oral care in a fishing community in Bengre area of Mangaluru city. There is a paucity of data on the oral health status and utilization patterns of such underserved and neglected communities in developing countries like India. There are no previous studies in the literature which have evaluated simultaneously all these factors among fishing population.

A total of 99% of the study subjects in this study had one or the other periodontal diseases. This is similar to previous studies where the prevalence of periodontal disease was found to be very high in adults.[12,13]

About 55% of the individuals in this population had one or more DT. This prevalence was found to be lower than that reported in a rural Indian fishing community[14] and among rural Indian adults.[15] However, this might be due, in part, to a correspondingly higher number of MT because of caries. The restorative treatment was virtually nonexistent. This shows a preference toward the extraction of DT rather than their restoration. This preference may be because of people's attitude regarding dental problems wherein the loss of teeth is considered an unavoidable occurrence.

Age, gender, education, and financial status were found to be significant predictors of the periodontal status. Bleeding was observed most commonly in the lower age group, while pockets greater than 4 mm were observed mostly in the older age group. More women exhibited bleeding as their highest score compared with men, whereas the calculus was predominantly higher among men. These findings are in agreement with a study done by Kumar et al[16] on mine laborers and by Wang et al[17] in a Chinese population. More individuals with education above primary level had healthy periodontium, and lower calculus and pocket scores, than those with less education. The individuals with higher income had fewer pockets. All these findings suggest that the sociodemographic factors play a significant role in the periodontal health of the community.

The results of this study show that age, gender, and educational level were significant determinants of the dental caries experience, which was significantly higher in the older age group, women, and individuals with lower education. The sociodemographic factors have previously been established as risk factors for dental caries.[18]

Like in another Indian study,[19] only 45% of the participants had ever visited a dentist. The participants who had visited the dentist before were asked about the frequency of their dental visit. There were only two participants who reported visiting the dentist regularly (at least twice a year). The International Labor Organization mandates that oral health assessment should be a part of medical examination of seafarers and that it should be conducted at least once in 2 years.[20] This population, however, is part of an unregulated fishing industry and there is no provision for any sort of medical or dental examination. Among those who had visited the dentist, about 84% had made their last visit more than 4 years back. These findings are similar to the previously reported studies where the percentage of subjects visiting the dentists regularly was found to be less.[21,22] Time since the last dental visit could reflect personal motivation and independent decision

making. People delay visiting a dentist until they have an acute dental problem, which forces them to make frequent visits thereafter.[22]

This fishing population had a primary health center located within the community with the provision of oral health services. The dental treatment was being provided at a low cost ranging from Rs. 20 to 50 for basic treatments like scaling, restoration, and extraction to about Rs. 150 for root canal treatment. Despite the easy access and low cost of dental care in the primary health center, the utilization of dental services was low and infrequent.

When asked about the main reason for their dental visit, about 70% of the participants mentioned that they had visited the dentist for the removal of painful teeth. This was followed by cleaning of teeth (17%) and filling (10%). These results are in line with the findings from previous studies where tooth extraction was the most common reason for dental visit.[1,22,23] The data from studies done on adults in the United States suggest that the main reason for oral care was routine dental examination,[24] signifying the difference in attitudes of people toward dental treatment in developed and developing countries, although this could also be because of differences in availability of health insurance.

When asked about the reasons for never visiting the dentist, about 87% of the nonvisitors stated that they "don't have any dental problem." This seems contradictory in the light of the oral health status of this population. This perception might be related to the fact that only symptomatic dental conditions are considered problematic. Similar results were seen in studies done by Al-Shammari et al[21] in Kuwaiti adults and by Devaraj and Eswar[22] in India. About 5% of the participants stated that they could not make a visit to the dentist because "dental treatment was too expensive." Cost of the treatment has a recognized influence on the utilization of oral health services.[25] About 3% individuals never visited the dentist because they were afraid of the dental treatment. Various studies have shown that high levels of dental anxiety are associated with reduced or irregular dental care utilization or seeking care only in case of emergency.[26,27]

The mean DMFT score of the participants who visited the dentist was significantly higher than those who had never visited the dentist. The observation might seem to suggest that the dental caries status of nonvisitors was better than the visitors. However, on analyzing individual components of DMFT, it was found that the mean DT of nonvisitors was significantly higher, revealing a high disease burden. This is in agreement with a study conducted in Australia which reported that mean DT is higher among those with lesser dental visits.[28] Mean MT component was significantly higher among the visitors.

In this population, the dental visits were influenced by age group, gender, and educational status. More individuals in the older age group had visited the dentist compared with the younger age group. This may be because of accumulated dental needs in this group as the age advances. Women were more likely to visit the dentist as compared with men in this population. This may be attributed to the fact that men in this population are most of the times out in the sea for fishing, thus getting little time to make dental visits. Interestingly, individuals in the lower education group were more likely to make dental visit in this population. The oral health status of lower education group was poorer in comparison to those with higher education, as evidenced by higher levels of calculus, pockets, and more caries experience. This could have led them to make more frequent dental visits, which were mainly intended for tooth extraction.

A limitation of the present study is the cross-sectional design which does not give any information regarding the causal relationships between different variables. Longitudinal studies on a varied sample can give insights in this area. Since the age distribution of the population was not known, the sample was selected according to age, which might lead to bias in the interpretation of results. Furthermore, since the study was conducted in Mangaluru city only, more research is required to generalize the findings.

India has a vast coastline and fishermen are part of a major industry in coastal states. Due to geographical isolation and different sociodemographic characteristics, fishing populations sometimes face a high disease burden and low access to dental care. The situation is similar for other underserved communities, such as slum-dwellers, rural populations, migrants, etc. Hence, there is a critical need for affordable, rural oral health centers to make dental care accessible to disadvantages strata of the population.

CONCLUSION

The oral health status in this population was poor and the proportion of unmet dental needs was high. Utilization of dental health services was found to be low, resulting in greater disease burden. In the light of this study, low perceived dental need was the most important barrier in seeking dental care. The associated social determinants should be taken into consideration to improve the access to oral care and prevent dental diseases.

REFERENCES

1. Kadaluru UG, Kempraj VM, Muddaiah P. Utilization of oral health care services among adults attending community outreach programs. Indian J Dent Res 2012 Nov-Dec;23(6): 841-842.

2. Manski RJ, Moeller JF, Maas WR. Dental services. An analysis of utilization over 20 years. J Am Dent Assoc 2001 May;132(5):655-664.

3. Slack GL. Planning for manpower requirements in dental public health. Dental public health: An introduction to community dental health. 2nd ed. Bristol: John Wright & Sons Ltd; 1981 p. 173.

4. Pizzaro V, Ferrer M. The utilization of dental care services according to health insurance coverage in Catalonia Spain. Community Dent Oral Epidemiol 2009 Feb;37(1):78-84.

5. Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2014-15 Edition, Fishers and Related Fishing Workers [cited 2015 Aug 22]. Available from: http://www.bls.gov/ooh/farming-fishing-and-forestry/fishers-and-related-fishing-workers.htm.

6. Thomas S, Raja RV, Kutty R, Strayer MS. Patterns of caries experience among an elderly population in south India. Int Dent J 1994 Dec;44(6):617-622.

7. Chandroth SV, Venugopal HK, Puthenveetil S, Jayaram A, Mathews J, Suresh N, Al Kheraif AA, Ramakrishnaiah R, Divakar DD, Asawa K, et al. Prevalence of oral mucosal lesions among fishermen of Kutch coast, Gujarat, India. Int Marit Health 2014;65(4):192-198.

8. Hart JT. The inverse care law. Lancet 1971 Feb;297(7696):405-412.

9. Ghorbani Z, Ahmady AE, Ghasemi E, Zwi AB. Socioeconomic inequalities in oral health among adults in Tehran, Iran. Community Dent Health 2015 Mar;32(1):26-31.

10. Huang DL, Park M. Socioeconomic and racial/ethnic oral health disparities among US older adults: oral health quality of life and dentition. J Public Health Dent 2015 Spring;75(2):85-92.

11. Oral health surveys – basic methods. 4th ed. Geneva: World Health Organization; 1997 p. 26-29.

12. Bansal M, Mittal N, Singh TB. Assessment of the prevalence of periodontal diseases and treatment needs: a hospital-based study. J Indian Soc Periodontol 2015 Mar-Apr;19(2):211-215.

13. Shaikh H, Shankar S, Vinay S. Assessment of periodontal status and treatment needs among beedi factory workers Harapanahalli town, Davangere district, Karnataka. JIADS 2011;2(2):13-17.

14. Bhat M. Oral health status and treatment needs of a rural Indian fishing community. West Indian Med J 2008 Sep;57(4):414-417.

15. Maru AM, Narendran S. Epidemiology of dental caries among adults in a rural area in India. J Contemp Dent Pract 2012;13(3):382-388.

16. Kumar S, Dagli RJ, Chandrakant D, Prabu D, Suhas K. Periodontal status of green marble mine labourers in Kesariyaji, Rajasthan, India. Oral Health Prev Dent 2008;6(3):217-221.

17. Wang HY, Petersen PE, Bian JY, Zhang BX. The second national survey of oral health status of children and adults in China. Int Dent J 2002 Aug;52(4):283-290.

18. Krustrup U, Petersen PE. Dental caries prevalence among adults in Denmark – the impact of socio-demographic factors and use of oral health services. Community Dent Health 2007 Dec;24(4):225-232.

19. Malvania EA, Ajithkrishnan CG. Prevalence and socio-demographic correlates of dental anxiety among a group of adult patients attending a dental institution in Vadodara city, Gujarat, India. Indian J Dent Res 2011 Jan-Feb;22(1):179-180.

20. Guidelines on the medical examination of seafarers. Geneva: International Labor Organization and International Maritime Organization; 2013.

21. Al-Shammari KF, Al-Ansari JM, Al-Khabbaz AK, Honkala S. Barriers to seeking preventive dental care by Kuwaiti adults. Med Princ Pract 2007;16(6):413-419.

22. Devaraj C, Eswar P. Reasons for use and non-use of dental services among people visiting a dental college hospital in India: a descriptive cross-sectional study. Eur J Dent 2012 Oct;6(4):422-427.

23. Ekanayake L, Mendis R. Self reported use of dental services among employed adults in Sri Lanka. Int Dent J 2002 Jun;52(3):151-155.

24. Wall TP, Vujicic M, Nasseh K. Recent trends in the utilization of dental care in the United States. J Dent Educ 2012 Aug;76(8):1020-1027.

25. Gambhir RS, Brar P, Singh G, Sofat A, Kakar H. Utilization of dental care: an Indian outlook. J Nat Sci Biol Med 2013 Jul;4(2):292-297.

26. Appukuttan D, Subramanian S, Tadepalli A, Damodaran LK. Dental anxiety among adults: an epidemiological study in South India. N Am J Med Sci 2015 Jan;7(1):13-18.

27. Armfield JM. Predicting dental avoidance among dentally fearful Australian adults. Eur J Oral Sci 2013 Jun;121(3 Pt 2):240-246.

28. Brennan DS, Spencer AJ, Roberts-Thomson KF. Dental self-care and visiting behaviour in relation to social inequality in caries experience. Community Dent Health 2011 Sep;28(3):216-221.