

Assessment of Oral Health Knowledge, Attitude, Utilization and Barriers toward Professional Dental Care among Adults in Central Rural India

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Abstract

Background: While the burden of oral diseases is more on socio-economically disadvantaged groups in India, a paucity of data exists on modifiable risk factors influencing oral health among rural populations in India. This study 1) assessed oral knowledge levels, attitudes, barriers toward seeking professional dental care and utilization of dental care through empirical and anecdotal data; and 2) determined overall caries experience.

Methodology: The cross-sectional study took place in Ramgarh in District Chhindwara, Madhya Pradesh. Participant answered survey questions in a face-to-face interview and underwent an intra-oral examination.

Results: Participants with ≥ 8 years of formal education had significantly higher oral health knowledge ($M=4.0$ $SD=2.5$) than participants having <8 years or no education ($F=17.24$; $p<0.001$). Participants between 18-34 years of age had significantly higher knowledge ($M=3.5$, $SD=2.4$) than 35-44 year olds and ≥ 45 years of age ($F=3.92$; $p=0.01$). Only 17% of the sample received care from a dentist, and 31% believed going to the dentist was necessary even in the absence of dental pain. The barriers preventing participants from seeking professional care were: fear of loss of vision following tooth extraction, absence of pain, and use of home remedies. Overall caries experience increased significantly by increasing age ($F=16.8$; $p<0.001$), and decreased with higher educational levels ($F=2.72$; $p=0.046$).

Conclusions: Rural people have low oral health knowledge and their behaviors of seeking dental care are impaired by prevailing myths. Both younger adults and older adults should be made aware of dental disease prevention and maintaining optimal oral hygiene behaviors throughout their lives. Offering essential dental services within the existing health infrastructure, which involve auxiliary dental professionals and rural health workers, may meet some of the unmet dental needs.

Key Words: Oral health knowledge, Self-care, Barriers, Dental visits, Caries experience, Attitude, Professional dental care

Introduction

Oral diseases are major worldwide public health problems affecting a vast majority of adults. While dental problems remain rampant both in urban and rural regions of a nation, the burden of oral diseases is more on the disadvantaged and the socially marginalized groups [1].

The incidence and prevalence of global dental diseases can be attributed to socio-behavioral and environmental factors [1]. Urbanization and economic development, which have enabled easy access to soft drinks and processed foods and also created a shift in dietary habits with increased consumption of refined foods, have contributed to an increase in the incidence of dental diseases in developing nations such as India [2,3]. Many social determinants of health, such as poor living conditions, low education level, prevalent myths and beliefs are related to oral health. In addition, modifiable risk behaviors (i.e., oral hygiene practices, tobacco use and dental attendance), may also affect oral health outcomes among rural populations in developing nations.

Reduction of risks to disease is only possible if services are focused on primary health care and prevention [1]. Changing behaviors form the core of oral preventive and health education programs that have been used extensively in the past few decades. One of the most important aspects for developing community-based oral health education and promotion programs is generating data and determining existing knowledge, behaviors, attitudes and factors for

seeking professional dental care [4]. Within the framework for the WHO STEP wise approach (i.e., where acquisition of data begins with self-reported information followed by clinical data and biochemical analysis), the risk-factor approach model guides data collection on socio-environmental determinants, modifiable risk factors, hygiene habits and use of oral health services affecting oral health [5].

Even though 70% of the 1.2 billion population of India resides in villages, data on oral health remain scarce in rural communities [6]. A paucity of data exists on modifiable risk factors that influence oral health status among rural populations in India. Studies assessing such variables are limited to either adolescents or urban populations and they are usually concentrated in more developed regions of India [7,8]. The rural health mission, which was initiated in 2005 aimed to improve health status of rural populations, does not include dental care or services; oral health is not considered as important as other general health issues that plague rural communities [9].

Most of the oral health studies employ WHO pathfinder methodology that aims to include youths or adults subgroups, (i.e., 12 year olds or 35 to 44 year-old-age group) and that is more likely to have different oral disease levels. This is the first among the studies that includes comprehensive assessment of modifiable risk factors determining oral health status across the lifespan among the adult population in the rural region of central India. The two objectives of this study were:

1. To assess oral knowledge levels, attitudes, barriers versus facilitators toward seeking professional dental care and utilization of dental care through empirical and anecdotal data.
2. To determine the oral health status of the participants.
3. This study will help to understand the socio-cultural and environmental contexts in which beliefs and attitudes are shaped and how they affect oral health outcomes in a lesser known population. This research will also assist in assessing some of the barriers and facilitators that prevent rural people from seeking dental care.

Materials and Method

Setting

The study took place in the small rural community of Ramgarh, located east of District Chhindwara in the central state of Madhya Pradesh in India. The population of this village is about 800 adults. Individuals are engaged in agricultural-related activities, are self-employed as small business owners or employed for wages in the local schools. The sample size for the study was 202 participants, which was fairly representative of the target population. More females (56%) than males (44%) were included in our sample. Younger participants of age group 18 to 34 years comprised a larger proportion (49%) of the sample followed by 25.8% of the 45-year-old, and higher age group and 21.8% of the 35 to 44 years age group. While 43.6% of the participants had more than eight years of formal education, about 39% had less than eight years of education and 11.4% had no education at all (*Table 1*). The Institutional Review Board at a large Texas university approved the survey questions and study procedures.

Research design and procedure

The study was a cross-sectional study design conducted from July to December 2014. Individuals older than 18 years residing in the village were eligible to be included in the study. Pregnant women, children and other individuals who had chronic health conditions were excluded from this study. The interview protocol was read to the community members. Only after having their permission through a written consent form were they allowed to participate in the study.

The community gatekeeper (e.g., village priest) and primary author approached individuals door-to-door to recruit individuals into the study. The participants were ensured anonymity and were told the information collected would be used for statistical purposes only. Once enrolled, each participant answered the survey questions in a face-to-face interview and underwent an intra-oral examination. The primary author administered the questionnaire to those who were eligible and agreed to participate. The interview took place in the participants' front yards or on the porches. Due to low literacy levels, the close-ended questions were read to the participants and the research personnel recorded the responses. Participants willing to participate underwent intra-oral examinations that were performed by a single trained dentist.

Measures

The survey questionnaire measured knowledge levels with respect to oral health, in addition to questions that

collected information on: 1) Demographics, 2) Participants' management of certain oral health conditions, 3) Attitude toward professional dental care, 4) Utilization of dental care, and 5) Prevalence of caries and barriers toward seeking professional oral health care. "Age" was noted down as age at last birthday. While age or birth year was not known by a majority of participants, age in those cases was estimated based on major life events such as their wedding year or the birth years of their children.

Description of the survey

Many knowledge level questions, self-practice questions and barrier questions were adapted from previous questionnaires and used in this study [10-12]. The knowledge related questions were adapted from the structured questionnaire that had 33 items formulated to assess knowledge, attitudes and behavior of young school children regarding their oral health, and dental treatment in North Jordan [10]. Questions related to attitude toward dental health, management of oral conditions, and utilization of dental services were adapted from the original structured questionnaire that originally created in English and later translated into Lithuanian language to assess oral health behavior and attitudes of adults in Lithuania [12].

The barrier-related questions adapted from the original questionnaire, available both in English and Hindi were based on attitude, socio-economic factors and cultural factors such as traditional beliefs, misconceptions, preferences and taboos [11].

While questions were adapted from previous structured questionnaires, validity and reliability of the questionnaire used for this study were evaluated using several tests.

The questionnaire prior to data collection was translated into Hindi and evaluated for cultural relevance. Content validity of the questionnaire was checked by a public health professional that was not associated with our study but was familiar with the socioeconomic and cultural contexts of rural populations in central India. A few unknown or unfamiliar terminologies were eliminated or rephrased.

The knowledge level scale included nine items that tested participants' awareness on various aspects related to oral health. Each question had four answer choices; each correct response was assigned a value of 1 and an incorrect response was given a value of 0. The sum of the knowledge score was calculated by adding the number of correct responses for a participant; the total score could vary from 0 to 9. The Cronbach's alpha for the knowledge level questions was found to be 0.74 indicating good reliability.

Five questions pertained to attitudes and utilization of dental care services. Participants were asked 1) whether or not they believed going to the dentist was necessary in absence of dental pain, 2) did they ever visit a dentist, (if yes, when and where did they go), and 3) what treatment did they seek. Questions on management of oral health conditions included what participants did in an event of dental pain or gum bleeding.

Twelve reasons were listed as barriers toward professional dental care. Participants were asked if they disagreed or agreed to a set of factors that prevented the sample participants from seeking early or regular dental care.

Clinical examination

The decayed, missing and filled teeth index (DMFT),

commonly used to determine the overall experience of dental caries can range from 0 to 32, 0 indicating no caries and 32 suggesting that all teeth are affected by caries. The WHO oral assessment form (1997) was used to record the results of intra-oral examinations.

To ensure intra-examiner reproducibility and reliability when applied to recording dental caries at tooth level, a total of 25 participants were re-examined. A perfect agreement was found with a value of kappa statistics to be 1.

Data analysis

The data were entered into SPSS (v. 22). First, descriptive statistics were calculated for demographics and all study variables. Secondly, analysis of variance (ANOVA) was used to compare knowledge and overall caries experience by age, gender, and educational levels. Some of the missing data in the study were due either to failure to reach participants in two attempts or response failure because of limited understanding of questions. Missing data in those cases were omitted and analyses were carried out with what remained.

Results

Table 1 shows the distribution of the participants by gender, age, and educational levels (discussed under Materials and Methods). Table 2 shows the comparison of oral health knowledge by gender, age, and educational levels. The mean knowledge of participants was 3.0 with the standard deviation of ± 2.3. The knowledge levels for males and females were nearly the same, (M=3.1, SD=2.4; M=3.0, SD=2.2, respectively) and the difference in the knowledge by gender was not statistically significant. Participants who had

more than eight years of formal education had significantly higher knowledge (M=4.0, SD=2.5) than participants having eight years or less of formal education or no education at all (F=17.24; p<0.001). Similarly, younger participants between the age group 18 to 34 years had higher knowledge (M=3.5; SD=2.4) than older age cohorts between 35 and 44 years and 45 year olds and higher, and this difference in the knowledge was statistically significant (F=3.92; p=0.01).

Table 3 shows the attitude of participants toward professional dental care. On being asked whether or not going to the dentist was necessary in absence of dental pain, half of the participants said it was not necessary while 31% said it was necessary. Only 17% of the sample participants had dental visits out of which nearly 39% went to the dentist in the last year. Dental visits for rest of the participants (61%) were between two to five years. A majority (60%) sought professional treatment in private dental offices followed by 23% in government hospitals. Other individuals from whom participants sought dental care were unqualified dental care providers (i.e., “quacks”). Approximately 25% of the sample went to the dentist solely for tooth removal. In addition, approximately 24% sought multiple treatments that included examination, and/or prescription medications for pain relief or tooth removal. Only 10% went to the dentist for teeth cleaning.

Participants in this rural community managed their gum bleeding and dental pain through various ways (Table 4). In an event of gum bleeding, 36.1% of the participants used home remedies, 15.3% of the participants did nothing, and 22.8% said they sought professional help and 13% reported

Table 1. Demographics.

Variable	N%	
Gender		
Male	89	44.1
Female	113	55.9
Total	202	100
Age		
18-34 years	99	49
35-44 years	44	21.8
45 years and Higher	52	25.8
Missing	7	3.5
Total	202	100
Average	35.5 ± 15.1 years	
Educational level		
No formal education	23	11.4
8 years or less	79	39.1
More than 8 years	88	43.6
Missing	12	5.9
Total	202	100

Table 2. Comparison of mean knowledge scores by gender, age and educational levels.

Variable	Mean	SD	F statistics	p
Gender			.11	.746
Male	3.1	2.4		
Female	3.0	2.2		
Educational levels			17.24	< .05*
More than 8 years	4.0	2.5		
8 or less than 8 years	2.4	1.7		
No formal education	1.0	1.5		
Age (years)			3.92	.010*
18-34	3.5	2.4		
35-44	2.7	2.3		
45 and Higher	2.5	2.1		

Note. *Significant at the p<0.05 level

Table 3. Attitude toward professional dental care and utilization of dental care and services.

Variable	N	%
Going to the dentist is necessary even if you have no dental pain?	N = 202	
Yes	63	31.2
No	100	49.5
Missing	39	19.3
Did you visit a dentist?	N = 202	
Yes	35	17.3
No	148	72.3
Missing	21	10.4
Where did you receive dental treatment?	N = 35	
Private dental office	21	60
Hospital	8	22.9
Others	6	17.1
When was the last dental visit?	N = 35	
Past one year	12	38.7
1-2 years ago	4	12.9
3-5 years ago	9	29
More than 5 years ago	6	19.4
Treatment sought during your last dental visit	N = 35	
Check my teeth	6	20.7
Tooth removal	7	24.1
Cleaning	3	10.3
Pain relief	3	10.3
Prescription	3	10.3
Multiple treatment sought	7	24.1

having no gum bleeding. In cases of dental pain, nearly 33% used home remedies. About 17% did nothing and nearly 27.2% reported going to a health care professional or a dentist for prescription medications or pain relief. No dental pain was reported by 9.4% of the participants.

Table 5 shows the comparisons of mean decayed, missing, and filled teeth index (DMFT) scores by gender, age, and educational levels. While males had a slightly higher mean score, the difference in the mean DMFT scores was not statistically significant between the gender groups. Table 5 shows an increase in the mean DMFT scores with increasing age. Participants 55 years and older showed the highest mean score and standard deviation ($M=10.7, SD=9.8$). This difference in the mean DMFT scores across age groups was statistically significant ($F=16.8; p<0.001$). While with increasing educational levels, there was a decrease in the mean DMFT scores, and the decrease was statistically significant ($F=2.72; p=0.046$). Lastly, the top reasons preventing the participants for seeking professional care included absence of pain, fear of loss of vision following tooth extraction, and use of home remedies.

Discussion

Using the WHO risk-factor approach model, this study collected information on the specified proximal and distal oral health risk factors determining oral health outcomes among rural adult population in central India. Questions assessing knowledge levels were based on decay, gum disease, use of tobacco, dental visits and brushing. On an average,

participants answered 33% of the questions correctly with approximately 40% to 50% of the participants giving correct responses to questions pertaining to brushing, gum disease, and effects of tobacco use. While 29% of the participants gave a correct response to the question on an element they believed prevents decay, the majority of the participants have never heard of fluorides. Participants with more than eight years of education and younger participants had statistically significant higher oral health knowledge than the less literate and older adults, respectively. These statistics indicate not only younger adults have more years of formal education, but they were more informed about the topic of oral health. In addition, the lower knowledge among older adults reflected their traditional beliefs and myths with respect to maintaining oral hygiene [13]. Most of the knowledge that relates to oral health is received through television and through casual conversations with other community members or health care professionals [14]. While television has emerged as one of the most influential media that affects peoples' opinions and introduces new ways of life, national or statewide health plans do not address the topic of oral health in villages [15]. Furthermore, even though small local studies have shown the impact of training community health workers, such as Anganwadi workers, on positive outcomes in the oral health of children, rural health workers have not been trained in creating awareness or improving knowledge on the topic of oral health in villages [16,17].

The participants had several ways of managing their oral conditions. Gum bleeding management included several self-care techniques such as massaging salt on the gums, using warm saline rinses, avoiding the use of toothbrushes and using herbal-based or tobacco containing toothpowders. Use of "nas," which is a locally available tobacco containing toothpowder, is prevalent because participants believe it alleviates oro-dental pain while getting addicted to the product. Use of tobacco containing toothpowders is culturally acceptable and largely practiced by females [18-20]. Going to the dentist for gum bleeding problems was not common. About 10% of the participants reported having no gum bleeding at all. On examinations, more than two-thirds of the sample had gingivitis.

In event of dental pain, some participants used pain relief medications, toothpowders containing tobacco or herbal additives and they avoided foods they believed aggravated pain and swelling. Anecdotal information suggested that eating "Bhaareyi cheez" can either cause or increase pain and swelling ("Bhaareyi" is a word in colloquial Hindi that applies to food items that aggravate pain and swelling; red lentils, eggplant, and cauliflower are believed to be some of the food items in this category). Taking medicines for pain relief was a common practice. Relatively more individuals preferred seeking professional help in cases of dental pain rather than in gum bleeding. Some of the self-care strategies, such as use of tobacco containing toothpowders in an event of an oral condition, have implications on tailoring oral health education programs toward dissuading people from using such approaches.

While 31.2% of the participants felt the need of regular dental visits, this attitude was not translated to utilization of

Table 4. Management of oral conditions: Gum bleeding and dental pain.

Gum bleeding management	N	%
Use home remedies	73	36.1
Do nothing	31	15.3
Go to the dentist	46	22.8
Others	5	2.5
No gum bleeding	26	12.9
Missing	21	10.4
Dental pain management		
Use home remedies	67	33.2
Do nothing	35	17.3
Go to the dentist	55	27.2
Others	6	3
No dental pain	19	9.4
Missing	20	9.9

Table 5. Comparison of mean DMFT scores by gender, age and educational levels.

Variable		N	Mean	SD	F	p	Significance
Gender	Male	89	4.6	6.6	1.73	.189	NS
	Female	113	3.5	4.8			
	Total	202	4.0	5.7			
Age	18-34 years	99	2.3	2.3	23.5	< .05	S*
	35-44 years	44	2.9	2.9			
	45-54 years	25	5.2	6.8			
	55 years & above	27	10.7	9.8			
	Total	195	4.0	5.6			
	No formal education	23	5.2	7.1			
Education- al levels	8 years or less	79	5.0	7.2	2.72	.046	S*
	More than 8 years	88	2.7	3.1			
	Total	190	4.0	5.7			

Note. *Significant at the $p < 0.05$ level

dental services, with only 17% seeking help in the past few years. The majority of the sample (i.e., approximately 64% out of the few dental care seekers) went to the dentist in an event of dental pain where they either got the tooth removed or were prescribed medication for pain relief. Utilization of dental care services was based on emergency needs and was curative rather than preventive or restorative in nature. Treatment, if sought, is usually in private dental clinics or government owned hospitals that are 35 kilometers away from this rural region. In addition, they seek advice and treatment from unqualified dental care providers or traditional healers. Most of the dental payments are out-of-pocket payments and this kind of payment demonstrates a need for affordable and accessible dental care in villages [11].

The overall caries experience increased with age and decreased with higher educational levels. Caries is age-related and the number of teeth affected as a result of decay, is higher among older adults, thus contributing to a higher DMFT index than their younger counterparts. Similarly, younger participants had more years of formal education and had fewer teeth affected by caries as compared to older participants who had no formal education or fewer years of formal education. The overall caries experience was low in this community; however three-fourths of the participants had at least one tooth affected by caries. People do not consider caries to be a serious condition and usually manage pain or swelling arising from decay through self-care strategies to a point where the carious tooth becomes grossly decayed and tooth removal remains the only option. The number of missing teeth due to caries was higher among the older people and comprised a greater proportion of the DMFT score.

Several barriers were commonly reported that prevent a rural population from seeking timely or regular dental care: going to the dentist only in unbearable pain, using self-care approaches to treat oral conditions, and fearing loss of vision following tooth removal. These barriers were also documented by a study conducted in India [11]. In addition, anecdotal information suggested time and financial constraints, which also prevented people from seeking timely dental care. While several interpersonal and intrapersonal factors influence dental attendance, an important aspect for consideration is the dental care infrastructure and unequal distribution of a dental workforce in India. Qualified and trained dental professionals prefer working in urban areas further preventing rural residents from seeking professional help even if they had the means and motivation for dental check-ups [15,21]. Therefore, it is not uncommon for rural people to seek advice or help from unqualified dental practitioners called "quacks" and traditional healers [11].

This research study is one of the first inquiries that have explored several modifiable risk factors affecting oral health among rural people in central India. The data greatly increase the existing knowledge with respect to the oral health beliefs, dental care utilization, and barriers among rural population in central India.

Our study included more females than males because during the daytime hours of data collection, most men were out for work in the fields. While the results of the study can be generalized to other surrounding villages in the district, inferences should be drawn with caution. Low levels of literacy may have acted as impediments in comprehension

of questions while collecting information. Social desirability with respect to utilization of dental services and other questions may have incorporated some information bias to the study results. Although the research personnel tried to ask questions in private, privacy in the rural India is viewed in a different way than in some other cultures. Extended family members or neighbors are gathered together in most houses during the day. However, this privacy factor was not an issue as oral health is not considered a very private matter or a sensitive issue in India.

More studies at multiple villages with large sample sizes are recommended to corroborate the study findings. Integrating oral health education and prevention programs at local schools and in national or statewide health plans, where older adults may be approached door-to-door, may help increase oral health knowledge and reduce the risks to oral diseases. Communities at large should be educated about the negative use tobacco and tobacco-containing products, including dentifrices that are sometimes used as a self-management approach in dental pain or gingivitis. Laws, which were passed in 1992 preventing manufacturers to add tobacco to dentifrices, must be strictly enforced [18]. While prevalent myths and beliefs may interfere with participants' willingness to seek dental care, individuals should be made aware of the positive results of early and regular dental treatment. The unmet treatment needs among the participants cannot be overlooked. Traditional approaches in preventing and treating common oral diseases with limited resources may not help in meeting the needs of the population. But integrating feasible and affordable treatment plans may aid in addressing the unmet treatment needs of the rural population. The most important challenge is to offer essential oral health care and oral health education programs within the existing primary health programs in rural areas involving auxiliary dental professionals or a grassroots level of community workers.

Conclusion

The findings of the study indicate that due to low literacy levels and traditional beliefs, rural populations have low oral health knowledge. Their behaviors of seeking dental care are impaired by prevailing myths, seeking help only in pain and resorting to self-care approaches in an event of an oral condition. Not only should the younger adults and older adults be made aware of dental disease prevention and seeking professional help, but they should also be educated about maintaining optimal oral hygiene behaviors throughout their lives. In addition, offering essential dental services within the existing health infrastructure that involves auxiliary dental professionals and other rural health workers will help meet some of these unmet dental needs.

Acknowledgement

The authors are grateful to Dr. James R Lindner, Dr. Susan E Ward and Dr. E Lisako J Mckyer and for their advice and support; Dhananjay, Divya, and Shankar for their help in recruitment of participants and data collection.

This investigation was partially funded by the College of Education and Human Development, Texas A&M University, College Station, Texas.

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