

School-Teachers Knowledge about Prevention of Dental Caries and Malocclusion in India

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ABSTRACT

Objective: To Study knowledge and assess factors associated with knowledge towards dental-caries and malocclusion among Indian school-teachers.

Methodology: Cross-sectional design employed using self-administered questionnaire with personal-interview method. 215 schoolteachers were selected with response rate of 95.34%.

Results: 36.59% school-teachers have medium knowledge, 26.83% have good knowledge. 30 years above and with additional educational degrees have higher knowledge. Significant association observed between knowledge with education ($p < 0.05$). However, multivariate stepwise-regression analysis showed impact of factors like education, gender and teaching experience significantly correlated to knowledge ($R^2 = 0.2296$, $p < 0.05$).

Conclusion: Schoolteachers need to be motivated to improve their awareness and knowledge about oral-health diseases, particularly younger-age groups, those with basic educational qualifications.

Keywords: Schoolteachers, Oral-health knowledge, Prevention, Dental caries, malocclusion

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INTRODUCTION

Poor oral-health can have a detrimental effect on children's performance in school and their success in later life. Children who suffer from poor oral-health are 12 times more likely to have more restricted-activity days including missing school than those who do not (1). More than 50 million hours annually are lost from school due to oral diseases (2). Through schools Health promotion messages can be reinforced throughout the most influential stages of children's lives, enabling them to develop lifelong sustainable attitudes and skills. Investments in schools are intended to yield benefits to communities, nations and individuals. Such benefits include improved social and economic development, increased productivity and enhanced quality of life. Also schools are a suitable platform for organizing preventive program services which can be made available to all children includ-

ing those who, for a variety of reasons, may not be receiving professional care.

India, an emerging economy, still faces many challenges in rendering oral-health needs. The country's population of just over one billion constitutes 32.3% who are less than 15 years-old (3). The majority of India's population resides in rural areas, of which more than 40% constitute children (4) considerable majorities have access to schools. The school years cover a period that runs from childhood to adolescence. These are influential stages in people's lives when lifelong sustainable oral-health related behaviors, as well as beliefs and attitudes, are being developed. Children are particularly receptive during this period and the earlier the habits are established, the longer lasting the impact. Moreover, the messages can be reinforced regularly throughout the school years. Children may also be equipped with personal skills that

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enable them to make healthy decisions, to adopt a healthy lifestyle and to deal with stressful situations such as violence and conflicts.

Also among common oral disease seen in children dental decay and malocclusion can be prevented if proper amount of knowledge is provided. Therefore, schools are ideal sites for the presentation of health education information as schools remain an important setting, offering an efficient and effective way to reach over 1 billion children worldwide and, through them, families and community members (5). School-teachers are known to exert considerable influence on their wards and, to an extent, on the larger community; they hold the distinct position of enabling future generations of correctly informed health care consumers and decision-makers. School-based dental education is internationally recognized and plays a potential role in increasing the knowledge of oral-health diseases among school-teachers (6-12). School-teachers will increase their knowledge through school-based dental education as it is internationally recognized and plays a potential role in increasing the knowledge about oral-health. Moreover, previous studies have shown that school-teachers have inaccurate knowledge regarding preventive methods for dental caries in the developed countries (13) and have a disappointingly poor knowledge of oral-health and disease (14). Lack of teaching aids and oral-health topics in schools may be one of the reasons for inadequate knowledge concerning oral-health among school-teachers.

Health literacy is important to gain knowledge and skills to attain and maintain good health, including oral-health, for themselves and others who depend on them. This entails the health professional to adopt a more practical approach to achieve prevention of oral diseases (15). As health professionals can identify the potentials for the development of disease and have effec-

tive measures available for preventing the initiation of disease, it is a sound and logical practice to intervene the prior to the onset of disease whenever possible rather to wait and treat the effects of the disease. Since one of the important components of the overall health care delivery system in any country is school health programs (16). School-teachers should be trained in providing oral-health education. Given the continuing important role of teachers in preventing oral-health diseases, the objectives of this study were to study knowledge and assess factors associated with knowledge towards dental-carries and malocclusion among Indian school-teachers.

MATERIALS AND METHODS

Study area

This study was conducted in Dharwad city, Northern region of Karnataka state, India, which is one of educational centers.

Study population and sampling procedure

Dharwad city has 108 primary schools with 652 teachers. All primary schools of Dharwad were divided into four zones (East, West, North and South). A sample of in service teachers was randomly selected by a two stage simple random sampling procedure (zones, then schools) and all teachers in the study in which, an individual teacher was a unit of analysis. A randomly selected two zones that had 53 primary schools formed the basis from which schools were selected. A total of 215 teachers were identified in selected schools and finally all schoolteachers were included in the study. Knowledge questionnaire was distributed to all teachers and the response rate was 95.34 % (n=205).

The knowledge questionnaire contained 16 items and for each item provided four alternatives, in which one alternative is correct and remaining alternatives are incorrect. Responses on each item of knowledge were thus

scored as either correct (= 1) or incorrect (= 0). To make the study more purposeful, the questionnaire was divided into two dimensions. In dimension-I, the eight items related to knowledge towards prevention of tooth decay were decreased sweet intake, rinsing habit after every meal, use of fluoridated toothpaste, fluoridation of water, knowledge about pit and fissure sealants, frequent tooth brushing, dental floss and regular dental visit. However, next eight items related knowledge towards prevention of malocclusion, which included care of milk tooth, knowledge about space maintainer, thumb sucking, tongue thrusting, mouth breathing, nail biting, heredity and regular dental visit in dimension-II.

On the basis of the pilot study data, the consistency and reliability was calculated. The index of homogeneity (i.e. cronbach alpha) was performed for the questions on knowledge towards prevention of oral health diseases. The alpha value was found to be 0.7105. The item test correlation, the percentage of correct answers and relation between true score and error of each of the questions on knowledge ranging from 0.1164 to 0.4294. The split-half reliability of the questionnaire was estimated as 0.8817. The age, sex, educational qualifications (B.Ed- Bachelor of education: Basic educational degree and M.Ed-Master of education: Additional educational degree), teaching experiences and types of institutional funding (schools managed by public funds only, schools funded by public funds but managed by private management, and schools managed by private funding only) were also related to assess their influence on knowledge towards prevention of oral-health diseases.

Data Analysis

The data on each item of knowledge was entered into statistical software STATA 9.2 version. For convenience of statistical analysis, in order to develop a continuous variable which could be utilized in regression analysis,

a total score was estimated by adding the knowledge responses to the all 16 items. Similarly same procedure was applied for two dimensions of knowledge towards prevention of tooth decay and malocclusion. Later, total knowledge score was classified into good, medium and poor groups on the basis of quartiles of the scores (i.e. fQ_1 = poor knowledge, between Q_1 and Q_3 = medium knowledge and 3Q_3 = good knowledge). The minimum knowledge score was 0 and maximum was 16. Then, chi-square test for association was used between factors and groups of knowledge followed by independent t-test was performed to determine the significance difference between two sample means and one way ANOVA was used to find out the difference between more than two sample means, followed by Newman-Keuls multiple post hoc tests procedure for pair wise comparison. A step-wise multiple linear regression procedure was also performed to see the impact of independent factors on knowledge towards prevention and its dimensions. Consequently, a relative contribution

of each independent factor was calculated by taking beta coefficient and Karl Pearson's correlation coefficient on total knowledge and its dimensions. A statistical significance set at 5% level of significance ($p < 0.05$).

RESULTS

Study Population

In the selected schools 215 school-teachers were identified, out of which 205 (approximately equally distributed among three types of institutional funding schools) teachers participated with the response rate of 95.34 %. Of total population, 82.93% were females and 17.07% were males with the mean age (40.18 ± 9.67) and mean teaching experience (in years) was 6.94 ± 3.36 . 54.15% teachers were having basic with additional degree followed by 45.85% teachers with basic educational (B.Ed) degree.

Oral-health Knowledge

According to bivariate analysis, 36.59% (n=75) teachers have medium knowledge and 26.83% teachers have good knowledge towards prevention of den-

tal decay and malocclusion. Also good knowledge was seen among younger age group as followed by older age group. The association between knowledge and age groups is found to be statistically not significant ($p=0.4222$). But, the female teachers have higher knowledge towards prevention of oral-health diseases ($p=0.1151$). Teachers with additional degree have significant higher good knowledge towards prevention of oral-health diseases as compared to teachers with basic educational degree ($p=0.0000$). The significant good knowledge towards prevention of oral-health diseases was observed between senior teachers and counter parts ($p=0.0114$) (Figure 1).

The knowledge towards prevention of oral-health diseases was measured from responses of 16 items in the questionnaire, in which 8 each items related to knowledge towards prevention of tooth decay and malocclusion respectively. A homogeneity index value (i.e. 0.7105) conformed the reliability of the scale. A mean knowledge score towards prevention of tooth decay and malocclusion as compared to younger age with lesser teaching experience. Male and female teachers did not vary significantly with respect to overall knowledge, but mean knowledge scores towards prevention of malocclusion of female school-teachers was significantly greater than that of male teachers. However, schoolteachers with additional educational degree had significant higher knowledge towards tooth decay and malocclusion as compared to teachers with basic educational degree ($p < 0.05$). Though mean overall scores of knowledge was seen higher among schoolteachers working in private funded schools (Table 1).

The general consideration of the school-teachers is that the tooth decay could be prevented by avoidance of

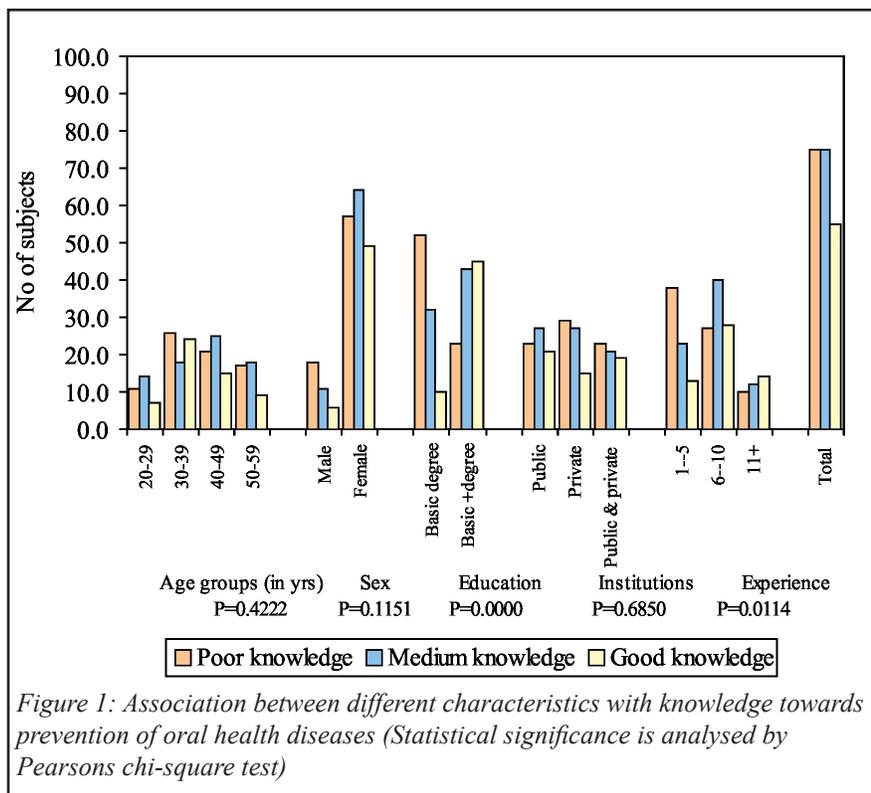


Table 1: Comparison of knowledge and its component scores between the Subpopulations

Characteristics	Overall knowledge (Mean±SD)	Dental decay knowledge (Mean±SD)	Malocclusion knowledge (Mean±SD)
Age group			
20-29 years	5.00±1.19	5.88±1.66	10.88±2.28
30-39 years	5.60±1.19	5.65±1.63	11.25±2.25
40-49 years	5.54±1.22	5.43±1.69	10.97±2.30
50-59 years	5.80±1.11	5.25±1.33	11.05±1.88
F-value, p-value	2.9748, 0.0328*	1.1617, 0.3255	0.2819, 0.8384
Gender			
Male	5.23±1.29	4.80±1.73	10.03±2.41
Female	5.59±1.17	5.68±1.53	11.28±2.08
t-value, p-value	-1.1801, 0.2393	-1.6501, 0.1005	-3.0397, 0.0027*
Education			
Basic degree	5.15±1.14	4.96±1.67	10.11±2.19
Basic with additional degree	5.86±1.16	6.02±1.36	11.87±1.83
t-value, p-value	-1.9014, 0.0587	-4.3925, 0.0000*	-5.0166, 0.0000*
Types of institutional funding			
Public funding	5.46±1.27	5.75±1.65	11.21±2.38
Private funding	5.54±1.12	5.37±1.50	10.90±1.96
Private and public funded	5.60±1.21	5.48±1.62	11.08±2.22
F-value, p-value			
Teaching experience			
1-5 years	5.18±1.15	5.12±1.63	10.30±2.18
6-10 years	5.67±1.13	5.72±1.46	11.39±1.91
11+ years	5.89±1.30	5.89±1.72	11.78±2.46
F-value, p-value	5.7898, 0.0036*	4.1018, 0.0179*	8.0490, 0.0004*
Total	5.53±1.20	5.53±1.60	11.06±2.19
*Significant at 5% level of significance (P<0.05), -significant pairs at 5% level			

sugar or sweet consumption every day (91.22%), rinsing mouth with water after every meal (92.68%) and visit to dentist regularly (91.22%) frequently brushing the teeth (86.34%) would prevent decay. On the other hand school-teachers reported that malocclusion could be avoided by frequently visiting to dentist (95.12%) and 81.46% by avoiding thumb sucking and tongue thrusting (81.46%) avoidance of Mouth breathing (67.80%) and heredity (55.61%).

The five background variables were introduced (teaching experience, types of management, education, gender and age group) into the step wise regression equation. The statistical data were analyzed into two levels. The step-wise regression analysis of five background variables was performed on total knowledge as a continuous response at the beginning. Secondly, the five background variables in turn to investigate whether influencing explanation

of knowledge towards tooth decay and malocclusion independently.

Table 2 clearly shows that contribution or influence of three of the background variables within regression equation is found to be statistically significant ($p < 0.05$). These variables are education (additional educational degree have good knowledge), teaching experience (experienced teachers have higher knowledge) and sex (male teachers were less likely to have good knowledge). These are explaining 22.9588% of variance of knowledge scores towards prevention of oral-health diseases. In which, the contribution of education on knowledge is maximum (14.46%) followed by teaching experience (5.21%) and gender contributed least (3.29%).

Though, three variables such as education, teaching experience and age contributed significantly ($p < 0.05$) to explain 15% of the variance of the

knowledge scores towards prevention of tooth decay. The older and senior teachers with additional degree had a greater knowledge about prevention of tooth decay. Moreover, the contribution of three variables (education, gender and teaching experience) on knowledge towards prevention of malocclusion was found to be statistically significant ($p < 0.05$) and explains about 16% of the variance of preventive knowledge of malocclusion. The contribution of education on malocclusion knowledge is approximately 10% followed by gender (3.33%) and teaching experience (2.52%).

DISCUSSION

Oral disease is one of the most costly diet- and lifestyle-related diseases (17). The cost of treating dental decay alone could easily exhaust a country's total health care budget for children (18). However, the cost of neglect is also high in terms of its financial, social and personal impacts (19). Many oral-health

Table 2: Summary of stepwise regression analysis of knowledge and components of knowledge towards prevention of various oral-health diseases

Independent variables	Beta value	Coefficient	t-value	p-level	Multiple R	r-value	% of contribution
A. Knowledge towards prevention of dental decay and malocclusion							
Education	0.3578	0.0629	5.6881	0.0000*	0.4040	0.4040	14.4567
Teaching experience	0.2003	0.0626	3.1993	0.001*	0.4547	0.2602	5.2114
Sex	0.1528	0.0626	2.4416	0.0155*	0.4792	0.2154	3.2907
R ²		0.2296					
B. Knowledge towards prevention of dental decay							
Education	0.2744	0.0657	4.1786	0.0000*	0.2946	0.2946	8.0853
Teaching experience	0.1820	0.0657	2.7688	0.0062*	0.3497	0.2257	4.1074
Age	0.1635	0.0652	2.5091	0.0129*	0.3859	0.1652	2.7018
R ²		0.1489					
C. Knowledge towards prevention of malocclusion							
Education	0.2937	0.0658	0.9379	0.0000*	0.3321	0.3321	9.7543
Sex	0.1597	0.0655	0.6753	0.0156*	0.3719	0.2087	3.3318
Teaching experience	0.1349	0.0655	0.3028	0.0408*	0.3951	0.1869	2.5206
R ²		0.1561					
*Significant at 5% level of significance (p<0.05)							

problems are preventable and their early onset is reversible. However, in several countries a considerable number of children, their parents and teachers have limited knowledge of the causes and prevention of oral disease (20, 21).

According to Frazier "Given an existing body of scientific knowledge about measures for preventing oral diseases, society has a responsibility to educate its youngsters about these measures (22). School children, as educated by the teachers, are not important as far as prevention of disease among themselves in the present, but also their future role as adults and opinion leaders of next generation. Schools are the one place where most school-age children congregate six or seven hours a day, nine months a year. Hence, in the present study an effort was made to assess school teacher's knowledge and factors affecting the knowledge concerning prevention about dental decay and malocclusion by means of self administered questionnaire. Also gathering health related information by self administered questionnaires has its limitations in recognizing cause-effect relationships (23).

In the present study, school-teachers reported that dental decay can be prevented by decrease sweet intake and regular brushing which is also seen in previous study (12). If the aim is to utilize the potential of teachers, the dental profession should attempt to encourage the inclusion of the knowledge about oral-health, diseases, their methods of prevention and oral-health promotion within the curriculum of school-teachers. Teachers in this study had more knowledge that, malocclusion could be avoided by frequently visiting to dentist, avoidance of thumb sucking, tongue thrusting and especially female teachers demonstrated more positive levels of preventive knowledge about malocclusion.

Also present study showed that experienced school-teachers had more knowledge about dental decay and malocclusion, as they might have gained knowledge through years of teaching experience and also schoolteachers with additional educational degree had better preventive knowledge. In a similar study (24) **showed that** school-teachers, with their educational experience and contact with students, can actively contribute to student's health promotion, provided that they receive

enough training and support to do so.

In Indian scenario, it's been recommended in national oral-health policy (25) that, schoolteachers should be trained in giving Oral-health Education. Implementation of primary prevention package through the school health schemes in the different urban and rural areas. In addition, chapters on oral-health can be included in school textbooks of 3rd, 5th and 8th grade level. Regular oral-health promotional activities in form of health education, regular dental check-up, demonstration of brushing and rinsing technique and preventive and interceptive treatment can be undertaken at school level.

Teachers cannot assist in developing well informed students if they themselves remain misinformed, as to future oral-health education programs, accurate information on preventive measures is needed among common oral diseases as they are potentials for reaching all the children. As, results in the present study showed medium knowledge among teachers about prevention of dental decay and malocclusion, it can be improved by providing them accurate knowledge about oral-health and preventive measures

especially to younger teachers and those with normal educational degree.

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