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Knowledge, attitude and practice of oral health and endodontic procedures among paramedical, engineering and nursing professionals

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***Abstract*---**Introduction: The purpose of this study was to determine the level of oral health knowledge, attitude, and practise among engineering, paramedical, and nursing staffs, as well as the factors that influence them. Materials and methods: A cross-sectional questionnaire-based study was conducted using voluntarily filled questionnaires which was circulated among 342 study participants.The recorded data were analyzed using the SPSS version 26. The descriptive statistics included computation of percentages, means and standard deviation. The statistical tests applied for the analysis were, Chi-square test and One Way ANOVA. The Confidence Level and the Level of Significance were set at 95% and 5%, respectively. Results: The response rate was 95.4%. More than half (69.1%) of the professionals and other staff members participating in the study were females. While comparing the scores of the three groups among education levels attitude section and practice section was found to be statistically significant (p=0.05). The difference in scores in the practice domain when compared with gender was found

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to be statistically significant (p=0.004). Conclusion: It is concluded that paramedical personnel, engineering, and nursing professionals had significantly less understanding of oral health and endodontic operations. However, all of the groups practised appropriate dental hygiene.

***Keywords*---**Knowledge, awareness, Oral Health, education, gender.

Introduction

In the field of dentistry, the perspective of good health means absence of caries or periodontal disease; a patient's mental and social well-being should be considered as well. In the discipline of dentistry, good health is defined as the absence of caries and other periodontal diseases, and a patient's mental and social well-being.[1]

Dental professionals and oral health educators are primarily concerned with instilling positive oral health knowledge and behaviour in children. There has been a developing idea of health in society. Education, instruction, and motivation are all effective ways to promote oral health. Medical, dental, and paramedical students play a critical role in oral health promotion and care.[2] Dentists and other health providers understand that a patient's dental health is inextricably linked to his or her overall health. Many oral disorders are intertwined with systemic diseases. Total health care, at its best, necessitates the collaboration of medical and dental specialists.[3]

Conservative endodontic treatment,a branch of dentistry is based on the notion of preventing root canal infection from irritating the periapical tissues. The root canal therapy may not always result in favourable healing outcomes.Endodontic specialisation has advanced significantly in the previous 20 years, with developments in apex locators and ultrasonic units with specifically fitted tips, as well as the use of microscopes.[4] Since then, root canal therapy (RCT) has saved millions of teeth as a tertiary preventive approach. When the pulp becomes irreversibly inflamed or infected, RCT is recommended. A deep cavity, trauma to the tooth, or significant restorative therapy are the most common causes of inflammation or infection. Pain, temperature sensitivity, colour changes, and swelling or tenderness in the gums are all indicators of pulpal injury. When the pulp becomes inflamed or infected, RCT or extraction is required to remove the inflamed or infected tissue and repair the area. The science of endodontics has evolved into a fairly predictable and successful field, as seen by the high prognosis commonly given.[5]

The success rate of endodontic therapy has risen to 90 percent or higher, with clinics, universities, controlled studies, and endodontists all contributing to this high percentage of success. But this rate does not reflect the treatment success in private practices.[6] Hence,the purpose of this study was to determine the level of oral health knowledge, attitude, and practise among engineering, paramedical, and nursing staffs, as well as the factors that influence them.

Materials and Methods

A cross-sectional questionnaire-based study was conducted using voluntarily filled questionnaires which was circulated among the study participants to assess the knowledge, attitude and practice of oral health and endodontic procedures among Engineering professionals, Paramedical staffs and Nursing professionals of KIIT Deemed to be University, Bhubaneswar, Odisha from February-March 2022.Ethical clearance has been obtained from the Institutional Review Board before the starting of the survey study.

The sample size was calculated using the formula n = z2pq/d2, where n is the sample size, p the prevalence of disease, q those free from disease, d the allowable error and z a point on the normal deviation. Upon calculating, the n required was found to be 312 and in order to cover for the non-respondents a total of 342 subjects were examined during the study. Bhubaneswar city is divided into three zones namely North, South-west and South-east zone.Each zone has one prestigious dental colleges namely Kalinga Institue Of Dental Sciences (KIDS), Hi-Tech Dental College and Institute of Dental Sciences. KIDS was selected randomly through lottery system .Participants who gave their informed consent were included in the study.Participants who did not give consent and incomplete questionnaires were excluded from the study. Multistage random sampling technique was followed (Figure 1).

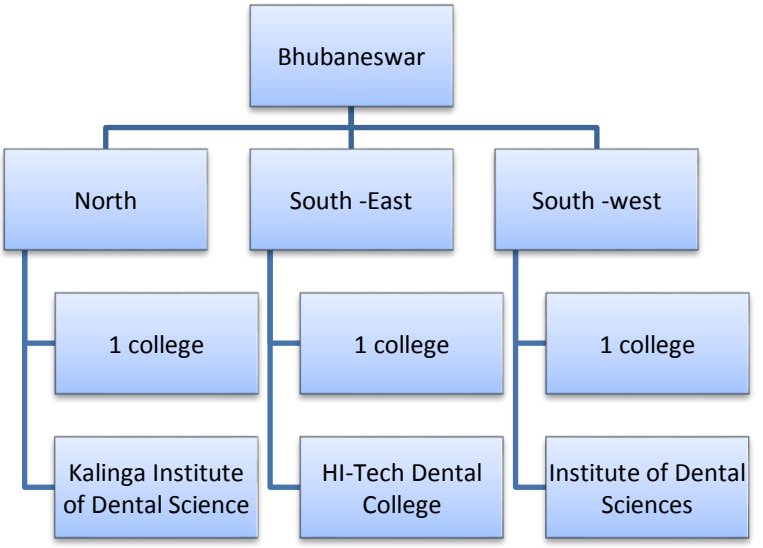

Figure 1-Sampling Technique

A Self-administered questionnaire consisting of a total of 24 multiple-choice questions was distributed randomly to all the professionals and other staff

members. The study's questionnaire was divided into four sections. The first section dealt with demographic information (gender, age, type of professionals). The second section consisted of nine questions based on oral health and endodontic operations knowledge. The third section included ten attitude-based questions to measure the patient's attitude toward the dental profession (frequent visits to the dentist, recent visit and treatment requested, patients' attitude toward root canal therapy and other endodontic procedures). The fourth section included five questions about oral hygiene practices (type of brush, use of other oral hygiene aids, brushing duration and interval).

The questions were written in English and then back translated into Odia, a native language that was easier to read and understand by paramedical and nursing staffs other than professors. A pilot study was conducted to check the feasibility and validation of the questionnaire.The validity of the questionnaire was checked by a panel of five subject experts and modifications were made accordingly before the start of the study. Training and calibration of the investigator and the assistant were done in the Department of Oral Medicine, Kalinga Institute of Dental Sciences. The Cronbach's α value was calculated to 0.98 which denoted excellent reliability.

The first 15 questions including the sociodemographic data, assessed the level of knowledge of professors of engineering and nursing, as well as paramedical and other staffs, on oral health and endodontic procedures. Each individual's Knowledge Score was computed by allocating a score of 1 to each correct answer. The scores of questions 1 through 9 were added together to get the 'knowledge score' for each individual. The total knowledge scores of all people were divided by the number of participants to get the mean knowledge score for each individual. The mean attitude score was also calculated in the similar way as we calculated for knowledge.The last 5 questions assessed the oral hygiene practice of the participants. The "total score" was determined by adding all of the correct answers to questions 1 through 24 together.

The recorded data were compiled and entered into a spreadsheet computer program (Microsoft Excel 2010) and analyzed using the SPSS version 26. The descriptive statistics included computation of percentages, means and standard deviation. The statistical tests applied for the analysis were, Chi-square test and One Way ANOVA. For all the statistical tests, the Confidence Level and the Level of Significance were set at 95% and 5%, respectively.

Results

The sociodemographic characteristics of the study participants are described in Table 1. Out of the total 370 participants, 342 responded. The response rate was 95.4%. More than half (69.1%) of the professionals and other staff members participating in the study were females. Most of the participants were from the (21-40) age group, followed by (41-60), then followed by (> 60) age group. Most of the participants were Engineering Professionals, followed by Nursing professors and staffs, followed by Paramedical staffs. The p-Value of age for the participants was found to be highly significant i.e., <0.000.

Table1. Sociodemographic details of participants(n=342)

Variables		**Male**	**Female**	**df**	**P value**	**Persons R**
Education	engineering	52	141	2	.847	.849
		26.9%	73.1%			
	paramedical	13	41			
		24.1%	75.9%			
	nurse	27	68			
		28.4%	71.6%			
	Total	92	250			
		26.9%	73.1%			
Age	**<20 years**	0	13	3	.000***	0.000***
		0.0%	100.0%			
	21-40	68	223			
		23.4%	76.6%			
	41-60	22	14			
		61.1%	38.9%			
	>60	2	0			
		100.0%	0.0%			
	Total	**92**	**250**			
		26.9%	**73.1%**			

Test applied: Pearson-Chi-square test; p-value ≤0.05 statistically significant.

Table 2 -Knowledge attitude and practice of the study participants according to education

Education		**N**	**Mean**	**Std. Deviation**	**Std. Error**	**95% Confidence Interval for Mean**		**F**	**Sig.**
						Lower Bound	**Upper Bound**		
Knowledge	**1**	193	4.33	1.940	.140	4.05	4.60	2.339	.098
	2	54	4.89	1.690	.230	4.43	5.35		
	3	95	4.27	1.621	.166	3.94	4.60		
	Total	342	4.40	1.825	.099	4.21	4.59		
Attitude	**1**	193	12.92	3.263	.235	12.45	13.38	2.987	.05*
	2	54	12.83	3.533	.481	11.87	13.80		
	3	95	11.96	2.839	.291	11.38	12.54		
	Total	342	12.64	3.215	.174	12.30	12.98		
Practice	**1**	193	20.06	3.430	.247	19.57	20.54	2.814	.05*
	2	54	19.67	3.981	.542	18.58	20.75		
	3	95	19.02	3.300	.339	18.35	19.69		
	Total	342	19.71	3.506	.190	19.33	20.08		

Test applied: one way ANOVA; p-value ≤0.05 statistically significant

In table 2 comparisons were made among the various study groups on the basis of their educational background for the Knowledge, Attitude and Practice domain scores. In the Knowledge domain, the mean score of Paramedical staffs is 4.33+1.940, of Engineering professionals and staffs is 4.89+1.690 and of Nursing professionals and staffs is 4.27+1.621. So it was seen that majority of the participants belonged to Paramedical group i.e., paramedical staffs. The Engineering professionals and staffs group have the highest mean knowledge score (4.89+1.690).

In the Attitude Section, the mean score of Paramedical staffs is 12.92+3.263, Engineering professionals is 12.83+3.533 which was the highest and Nursing professionals and staffs is 11.96+2.839.

In the Practice Section, the mean score of Paramedical staffs is 20.06+3.430, the highest mean score was of Engineering professionals is 19.67+3.981 and the mean score of Nursing professionals and staffs was 19.02+3.300.

While comparing the scores of the three groups among questions of the Knowledge section, the difference in scores was not found to be statistically significant (p=0.098). The difference in scores in the Attitude section and Practice section was found to be statistically significant (p=0.05).

Table 3 -Knowledge attitude and practice of the study participants according to Gender

Gender		**N**	**Mean**	**Std. Deviation**	**Std. Error**	**95% Confidence Interval for Mean**		**F**	**Sig.**
						Lower Bound	**Upper Bound**		
Knowledge	1	92	4.32	1.966	.205	3.91	4.72	.275	.601
	2	250	4.43	1.774	.112	4.21	4.65		
	Total	342	4.40	1.825	.099	4.21	4.59		
Attitude	**1**	92	12.78	3.284	.342	12.10	13.46	.256	.613
	2	250	12.58	3.194	.202	12.19	12.98		
	Total	342	12.64	3.215	.174	12.30	12.98		
Practice	**1**	92	18.82	2.855	.298	18.22	19.41	8.331	.004**
	2	250	20.04	3.667	.232	19.58	20.49		
	Total	342	19.71	3.506	.190	19.33	20.08		

Test applied: one way ANOVA; p-value ≤0.05 statistically significant.

In Table 3, comparisons were made among the Gender groups for the Knowledge, Attitude and Practice domain scores. The mean domain scores for the knowledge, attitude and practice were compared. The mean domain scores for the Knowledge section in case of males is 4.32+1.966. and females were 4.43+1.774. The mean domain score for the Attitude section in case of males is 12.78+3.284, and females is 12.58+3.194. The mean domain score for the Practice section in case of males is 18.82+2.855, and in case of females, it is 20.04+3.667. It was found that the mean domain score of males in knowledge section and attitude section is

more than that of females. But, in the practice domain, the mean score of females is more than that of males.

While comparing the scores of the three groups considering the gender among questions of the Knowledge section and Attitude section, the difference in scores was not found to be statistically significant (p=0.601 and p=0.613 respectively). The difference in scores in the Practice section was found to be statistically significant (p=0.004).

Table 4 -Knowledge attitude and practice of the study participants according to age

Age		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F	Sig.
						Lower Bound	Upper Bound		
Knowledge	<20 years	13	5.08	1.320	.366	4.28	5.87	.932	.425
	21-40	291	4.34	1.873	.110	4.12	4.56		
	41-60	36	4.61	1.591	.265	4.07	5.15		
	>60	2	5.00	.000	.000	5.00	5.00		
	Total	342	4.40	1.825	.099	4.21	4.59		
Attitude	<20 years	13	11.77	4.146	1.150	9.26	14.27	6.901	.000**
	21-40	291	12.70	3.061	.179	12.34	13.05		
	41-60	36	11.94	3.372	.562	10.80	13.09		
	>60	2	22.00	.000	.000	22.00	22.00		
	Total	342	12.64	3.215	.174	12.30	12.98		
Practice	<20 years	13	21.00	4.435	1.230	18.32	23.68	2.396	.048*
	21-40	291	19.81	3.426	.201	19.42	20.21		
	41-60	36	18.50	3.590	.598	17.29	19.71		
	>60	2	17.50	3.536	2.500	-14.27	49.27		
	Total	342	19.71	3.506	.190	19.33	20.08		

Test applied: one way ANOVA; p-value ≤0.05 statistically significant.

In Table 4, Comparisons were made among the various age groups for the knowledge, attitude and practice domain scores. It was seen that majority of the participants belonged to the age group of 21-40 years. Less than 20 years age group had the highest mean score in Knowledge section (5.08+1.320). The highest mean score in the Attitude domain was (22.00+0.000) in the age group of (more than 60years). And, the highest mean score in the Practice section was (21.00+4.435) in the age group of (less than 20years).

While comparing the scores of the three groups while considering different age groups among questions of the Knowledge section, the difference in scores was NOT found to be statistically significant (p=0.425). The difference in scores in the

Attitude section and Practice section was found to be statistically significant i.e., (P=0.000 and 0.048 respectively).

Discussion

The purpose of this study was to assess the knowledge, attitude and practise of oral health and endodontic procedures among the engineering, paramedical, and nursing employees at a tertiary hospital of Bhubaneswar city. Modern medicine has evolved into a collaborative effort including many different types of health professionals, both medical and non-medical. The health team is made up of several health professionals who work together to offer medical treatment to patients and society as a whole. As part of their job, such health teams interact with a wide range of people on a daily basis. A need was identified for assessing paramedical, engineering, and nursing professions' knowledge, attitude, and practise related to oral health and endodontic operations. Oral health educators' main goal is to influence positive oral health knowledge and behaviour in society. There is a significant prevalence of oral illnesses in poor countries. This could be due to illiteracy, neglect, a lack of finances, or other factors. In such countries, the general public views dental treatment as a low priority. As a result, we felt compelled to analyse paramedical personnel, nursing, and engineering professions' oral health knowledge, attitudes, and behaviours.

The majority of the attendees were engineers, followed by nursing academics and staff, and then paramedical staff. The majority of the participants were in the 21-40 age group, followed by 41-60 and > 60 age groups, with no participants in the (under 20) age group.Females were found to engage in the study in greater numbers than males. It was found that more number of females actively participated in the study.

The group of Engineering professionals and staffs has the highest mean knowledge score. Most of the questions of knowledge on oral health and endodontic procedures were correctly answered by the Engineering professionals. In the attitude section and practice section also, engineering professionals answered most of the questions correctly. This indicates that being engineers also they have proper basic knowledge on oral health and other endodontic procedures. From the attitude based questions, we came to know that majority of the engineering professionals visited their dentist whenever they have dental pain, and few of them visited regularly for dental check up, and the most common treatment sought was either root canal treatment or extraction, those who went for regular dental health check up had scaling. Their opinion on scaling was it doesn’t harm the gums, rather it heals the gums and they also agreed that dentists care about both treatment and prevention. They knew that more consumption of sweet and sticky food can lead to tooth decay, and for which RCT maybe needed, and the engineers agreed that RCT is a successful procedure. Their oral hygiene practices were likewise excellent. Almost all of them used a soft toothbrush, and the majority of them used mouthwash. Only a few of them utilised dental floss or interdental brushes. The majority of them brushed for roughly 2-3 minutes, which is a good habit, and replaced their toothbrush every 3 months, with the rest changing it every 6 months. So, when the comparison of knowledge, attitude and practice was made according to the levels of education,

the Engineering professionals were found to have answered most of the questions in all the three sections correctly, followed by Paramedical staffs who answered maximum numbers of questions in all the three sections correctly. And, the least numbers of correct answers in all the three sections were given by Nursing professionals and staffs.

The mean domain score of males in the knowledge section (4.32+1.966) and attitude section(12.78+3.284) was found to be higher than that of females(mean domain score in knowledge section is 4.43+1.774 and attitude section is 12.58+3.194). Females, on the other hand, had a higher mean score in the practice domain (mean score of females in practice section is 20.04+3.667 and of males is 18.82+2.855).

Because males have comparatively higher oral health knowledge and attitude scores than females, males have been reported to have superior oral health knowledge, positive attitude, and behaviour toward oral health. This is in contrast with another study where females had more knowledge about oral health and also had higher attitude scores than that of males.[7] Similar results were found in study by Khami *et al.*;[8] and Rabiei et al.[9]

Although the knowledge score and attitude score was higher in males, but the practice score was higher in females. This is in contrast with the previous studies [10] where but the differences were not significant in the knowledge and attitude section, it was only significant in practice section. The results of this study were in contrast with other studies such as studies by Lim et al.[11], Al-Omari and Hamasham [12] , Pellizzer et al. [13] , Kawamura et al.[14], Schwarz [15] and Fukai et al.[16], in which the females had higher knowledge regarding oral health than males.

Females had a better score in practice section than males, this is in accordance with other studies [15,16,17,18]. This could be because women are more concerned about oral hygiene than men. Males had higher mean knowledge and attitude scores than females, according to the study, however males visited the clinic whenever they felt any form of tooth pain, indicating that all of their knowledge and attitude were not put into effect. The most prevalent cause for visit to the dentist was toothache, according to the majority of them, similar to a study by Doshi et al.[18]Females were more likely than males to visit the dentist for a routine check-up. This could be explained by the fact that females are more concerned about their bodies and attractiveness.[7] This finding has similarity with the results of the study by Astrom et al. [19]

Majority of the males answered the knowledge based questions correctly. Most of the questions based on attitude were also answered correctly by males than that of females, like most of the males visited the clinic regularly for regular check-up and the treatment sought was mostly scaling, followed by root canal treatment and extraction. Males also agreed that scaling is not harmful for gums rather it is good for the gums, and also agreed to the statement that dentists care both about treatment and prevention. The males had positive attitude towards Root canal treatment and also agreed that root canal treatment is a successful procedure and they would also recommend their friends and relatives for RCT.

Practice based questions were answered correctly by majority of the females. Most of the females used soft brushes, majority of the females often used mouthwash and few of them used other oral hygiene aids such as interdental brushes and dental floss. Majority of the females brushed for 2-3 minutes and changed toothbrush in 3months. It was seen that majority of the participants belonged to the age group of 21-40 years. In the knowledge section, the highest mean score was (5.08+1.320), that belonged to (less than 20 years) age group.

Only about less than half of the subjects said they liked going to the dentist on a regular basis. When the subjects had any form of oral pain, the majority of them went to the dentist. For most of the people, toothaches were the reason for their last visit.In our research, we discovered that most people are unaware of endodontic procedures and root canal treatment. They aren't knowledgeable about root canal operations. The majority of participants gave incorrect answers to knowledge-based questions about endodontic operations.

About half of the population is aware that scaling is not detrimental to gums and that it is preferable to have scaling done once a year or twice a year. However, few people believe that scaling is harmful. In our study, less than half of the participants indicated that going to the dentist on a regular basis was necessary. This outcome was lower than those reported in earlier research such as studies by Timmerman et al.[21]

The majority of the participants felt that dentists are concerned not just with treatment but also with prevention. The majority of the participants (almost 80%) believe root canal therapy to be a successful operation. They stated that if root canal treatment is required, they can recommend it to their friends. The majority of participants believe that the price charged for RCT was worth it.

Females were significantly more likely to use dental floss as compared to males. This result was in contrast with the previous study by Khami et al. [8] .About 60% of the participants brushed their teeth twice a day, in the morning and at night. Rest others brushed one time a day, only in the morning. Females brushed their teeth for an average of 2-3 minutes in our study, but males brushed for around 1-2 minutes, and the study was statistically significant. Most of the participants were found to use soft brush, and a few of them used medium brush and majority of the participants changed the toothbrush once in 3 months and rest changed their toothbrush once in 6 months. Females have some of the parafunctional habits like lip biting, nail biting, pencil or pen biting and grinding of teeth. Only a few males habit of mouth breathing or thumb sucking.

The study's methodological strength was that it was the first of its kind at Bhubaneswar city involving paramedical workers, nursing, and engineering experts. The study's shortcomings include the lack of comparable study instruments as well as a standard questionnaire, the dependence on self-reported data has a key drawback.Such data is frequently vulnerable to response bias, and replies may have been affected by social acceptability. Because the current study's findings are based on self-reported data, oral health practises may be skewed by over- and under-reporting due to social desirability. Secondly,this study is cross-sectional and the nature of data collection method cannot indicate

directionality of the cause and the outcome. The present study was limited to a single college.Hence the results may vary and may not be applicable to the other colleges.

Conclusion

It may be concluded that paramedical personnel, engineering, and nursing professionals had significantly less understanding of oral health and endodontic operations than would be expected of these groups, but they had a positive attitude toward professional dental care. However, all of the groups practised appropriate dental hygiene. However, the results of this study revealed that all of the groups lacked understanding of oral health and endodontic procedures including root canal therapy.

As a result, we propose and advocate that these paramedical personnel, nursing, and engineering professionals boost their oral health awareness and fundamental knowledge of endodontic operations such as root canal therapy. A dental hygienist should always be a part of the team that provides school dental health programmes in order to emphasise the importance of oral cleanliness.

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