



Knowledge, Awareness and Practices About the Use of Powered Toothbrush as Dental Plaque Aids in Eastern Indian Population- A Cross Sectional Study

Nagma Naz Haque¹, Dharendra Kumar Singh², Arzoo Bano¹, Kumari Lucy Bhola², Nirupama Sahoo², Yash²

¹Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Patia, Bhubaneswar – 751024, Odisha, India.

²Department of Periodontology, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Patia, Bhubaneswar – 751024, Odisha, India.

Abstract

The aim of the study was to assess the knowledge and awareness about the use of powered toothbrush as dental plaque aids in eastern Indian population. This cross-sectional survey of the general public was done using questionnaires. It includes 197 study participants whose knowledge was evaluated using a self-designed 14-item questionnaire. Data were imported into an excel spreadsheet from Microsoft and examined with SPSS version 26.0. In the current study, there were 25.4% males and 73.6% females. The knowledge and practice domain scores of the participants were significant with socioeconomic status and awareness domain was significant with gender. The knowledge, awareness and practice was better in 36-45 years of age group which was infemales than males.

Keywords: awareness, knowledge, public health problem, toothbrush, dental plaque

Full-length article

*Corresponding Author, e-mail: dr.dhirendra27@gmail.com, anilkk44@gmail.com

1. Introduction

The mouth cavity contains around 700 different bacterial species, along with fungus, viruses, and transitory microorganisms that may or may not be the source of different disorders [1]. A healthy mouth is essential to overall health. Maintaining dental hygiene becomes essential because it reflects an individual's general health both directly and indirectly. For the purpose of removing dental biofilm, preventing dental caries, and treating periodontal disease, it is imperative to use a toothbrush, powered toothbrush and/or dental floss [2]. Power toothbrushes are tools for removing dental plaque that power their bristles with electricity. It has been demonstrated that they are more successful in removing plaque than manual toothbrushes, particularly in people whose mouths have difficult-to-reach areas [3]. There are many different kinds of power toothbrushes, but they all eliminate plaque by rotating or vibrating the bristles. Timer features are available on some power toothbrushes, which might help you remember to brush for the necessary two minutes. By removing more plaque, they can assist in lowering the risk of gingivitis and periodontitis. They encourage blood flow to the gums, which helps to promote gum health. This may aid in promoting healing and reducing inflammation [4]. The knowledge of the general population about powered toothbrushes as dental plaque aids varies.

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Some people are well-informed about the benefits of power toothbrushes and how to use them effectively, while others are not. Studies have found that only 35% of participants knew the correct brushing technique for using a powered toothbrush [3,5]. The study also found that many participants did not know how often to replace the brush head of their powered toothbrush. Despite the lack of knowledge about powered toothbrushes, many people are using them. A study published in the Journal of the American Dental Association found that 41% of adults in the United States use a powered toothbrush [6]. The use of powered toothbrushes is increasing, and it is likely that more people will become aware of their benefits in the future. Dentists and other healthcare professionals can play an important role in educating the public about powered toothbrushes and how to use them effectively. As a result of these efforts, knowledge of toothbrushes by the general population is improving. However, there is still more work to be done. Future research should focus on developing more effective ways to educate the public about toothbrushes and how to use them effectively. Hence, the aim of the study was to assess the knowledge, awareness and practice about the use of powered toothbrush as dental plaque aids in eastern Indian population.

2. Methodology

A cross-sectional study between 6 May 2023 and 30 August 2023 was conducted among the general population belonging to various age groups and those who visited the dental OPD. The KIIT Ethics Committee, which is considered to be an academic body, independently examined and authorised the study before it was carried out. The study participants were chosen using a convenience sampling procedure, and those who provided verbal consent were included. To a total of 197 study participants, the questionnaire was made available online through Google forms. Before giving out the questionnaire, the study's objectives were conveyed to the study participants. There were two sections to the questionnaire. The sociodemographic information (age, gender, education, occupation, and income) made up the first section. The pupusa scale for 2022 was used for socioeconomic status of the participants [7]. A self-constructed 14-item questionnaire was used to gather information on use of powered toothbrush as dental plaque aids. Participants received a score of 1 for every correct response to a knowledge question and a score of 0 for every wrong response. To establish the viability and validity of the questionnaire, a pilot research was carried out. Before the study began, the validity of the questionnaire was reviewed by a panel of five subject experts, and changes were made as necessary. Under the direction of the guide, the investigator and the assistant received training and calibration at the department of periodontics at the Kalinga Institute of Dental Sciences. The Cronbach's alpha value was determined to be 0.96, indicating very high dependability. Data were entered into a Microsoft Excel spreadsheet, and SPSS Statistics for Windows, version 26.0 (SPSS Inc., Chicago, IL, USA) was used for analysis. The Chi-square test was used to perform inferential statistics. Frequency and percentages were used to describe categorical variables. ANOVA was used to compare scores from different domains between groups. The cutoff point for statistical significance was 0.05.

3. Results

In the current study, there are 73.6% women and 25.4% men. The majority of participants were between the ages of 15 and 25 (Figure 1,2). Comparisons were made among the various socioeconomic status groups for the knowledge, awareness and practice domain scores. It was seen that majority of the participants belonged to the upper class and also had the highest mean knowledge score (4.57 ± 0.53). The highest mean score in the attitude domain was (13.79 ± 2.53) in the age group of 26-39 years. No significant differences among the groups were observed (Table 1). Comparisons were made among the various age groups for the knowledge, awareness and practice domain scores. The bulk of participants were found to be between the ages of 15 and 25. This age group also had the lowest mean knowledge score (3.11 ± 1.19). The highest mean score in the attitude domain was (3.43 ± 0.62) in the age group of 26-35 years and practice was (1 ± 1.41). Significant differences among the groups were observed ($p=0.032$) (Table 2). Comparisons were made among the various gender groups for the knowledge, awareness and practice domain scores. It was seen that majority of the participants were females and also had the highest mean knowledge score (3.21 ± 1.19). The highest mean score in the attitude domain was (2.65 ± 1.31) were also females. No significant differences among the groups were observed (Table 3).

4. Discussion

Dental plaque is a primary contributor to oral health issues, including cavities and gum diseases. Maintaining optimal oral hygiene is crucial to prevent plaque accumulation. Traditional manual toothbrushes have been widely used for this purpose, but the advent of powered toothbrushes has introduced a new dimension to oral care. A multitude of mechanical and chemical oral hygiene aids have been developed since it has been found that keeping proper oral hygiene is crucial to preventing dental illnesses including gingivitis and periodontitis. The effective maintenance of dental health is made possible by using these oral hygiene procedures. Dental health and good oral hygiene are strongly impacted by the frequency and length of brushing [8,9]. In this project, a quantitative research methodology has been used. In order to collect information about KAP among the population in the city of Bhubaneswar, a self-administered questionnaire was used. The majority of the participants had some understanding of toothbrushes. The World Health Organisation advises scheduling a regular dental examination every six months to maintain good oral hygiene. Medical and dental experts are well aware of the microbial contamination of toothbrushes, according to a study by Abraham et al. Similar results were discovered in the current study [10-14]. In the current study, it was discovered that women were more knowledgeable about and more aware of powered toothbrushes than men. This possibly could have been due to the reason of maintaining good oral health among females. Similar findings were found in a study conducted in Saudi Arabia. A US study comparing the oral health activities of men and women found that women have more positive perceptions of their tooth health [15]. Regular visits are advised by the American tooth Association (ADA) to monitor for symptoms of various diseases and to guard against tooth disease. According to earlier research, men, those with poor incomes, and those who are afraid of dentists see the dentist less frequently. The latest study found that while females see dentists more frequently for checkups, males visit less frequently and are more likely to seek dental care for acute issues, such as pain. This supports past research's results that men are less inclined to visit the dentist for preventive treatment. Such variations in oral health care utilisation could be caused by a number of factors [16]. Males' stereotypically masculine attitudes may have a negative impact on their health-seeking behaviours, according to one theory. Self-reliance, emotional restraint, and physical toughness are all traits that males value and which keep them from seeking medical assistance. The fact that men do not use dental services as frequently as women is not surprising. On the other hand, women are more likely than men to believe that their oral health has an impact on their general wellbeing, appearance, and quality of life. Women prioritise preventive care more as a result, and they also visit dentists more frequently [17-18].

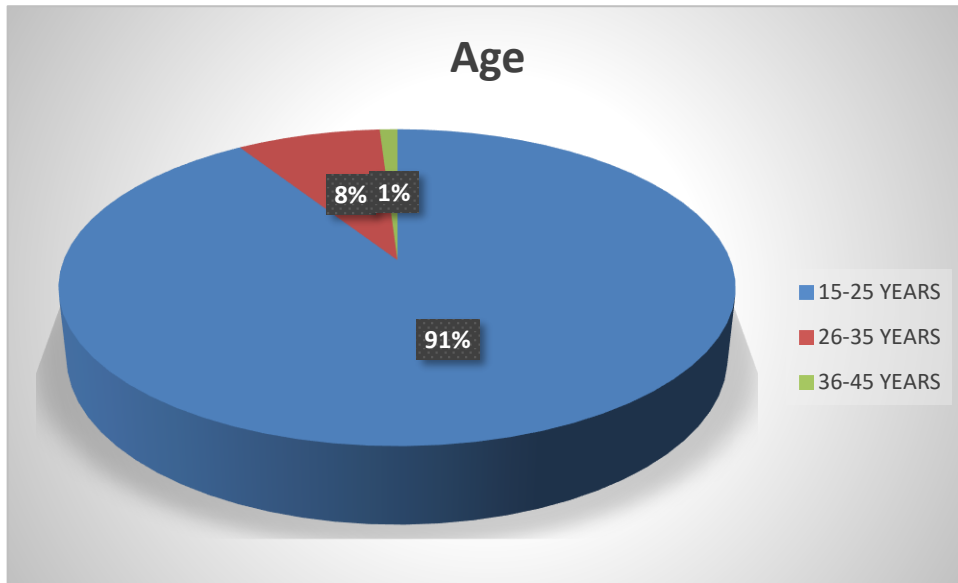


Figure 1: Age of the study participants

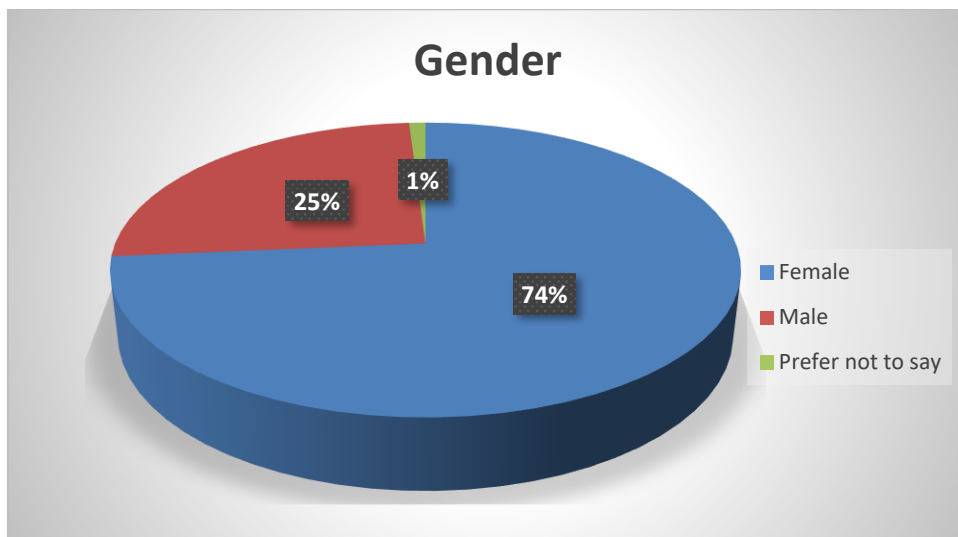


Figure 2: Gender of the study participants

Table 1: Comparison of knowledge, awareness, and practice with Socioeconomic status of the study participants

	Socioeconomic status	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F	Sig.
						Lower Bound	Upper Bound		
Knowledge	Upper	7	4.5714	.53452	.20203	4.0771	5.0658	4.809	.003*
	Upper Middle	74	3.2703	1.06369	.12365	3.0238	3.5167		
	Lower Middle	4	2.7500	1.25831	.62915	.7478	4.7522		
	Upper Lower	112	2.9643	1.25151	.11826	2.7300	3.1986		
	Total	197	3.1320	1.20070	.08555	2.9633	3.3007		
Attitude	Upper	7	3.2857	.48795	.18443	2.8344	3.7370	2.123	.099
	Upper Middle	74	2.6892	1.22671	.14260	2.4050	2.9734		
	Lower Middle	4	3.7500	.95743	.47871	2.2265	5.2735		
	Upper Lower	112	2.4732	1.40116	.13240	2.2109	2.7356		
	Total	197	2.6091	1.32269	.09424	2.4233	2.7950		
Practice	Upper	7	1.1429	.89974	.34007	.3107	1.9750	3.668	.013*
	Upper Middle	74	.9595	.88270	.10261	.7550	1.1640		
	Lower Middle	4	1.7500	.95743	.47871	.2265	3.2735		
	Upper Lower	112	.6964	.75742	.07157	.5546	.8382		
	Total	197	.8325	.83137	.05923	.7157	.9493		

*significant

Table 2: Comparison of knowledge, awareness, and practice with age of the study participants

	Age (years)	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F	Sig.
						Lower Bound	Upper Bound		
Knowledge	15-25	179	3.1173	1.19582	.08938	2.9409	3.2937	.183	.833
	26-35	16	3.2500	1.23828	.30957	2.5902	3.9098		
	36-45	2	3.5000	2.12132	1.50000	-15.5593	22.5593		
	Total	197	3.1320	1.20070	.08555	2.9633	3.3007		
Attitude	15-25	179	2.5363	1.34188	.10030	2.3384	2.7342	3.503	.032*
	26-35	16	3.4375	.62915	.15729	3.1022	3.7728		
	36-45	2	2.5000	2.12132	1.50000	-16.5593	21.5593		
	Total	197	2.6091	1.32269	.09424	2.4233	2.7950		
Practice	15-25	179	.8268	.83340	.06229	.7039	.9497	.065	.937
	26-35	16	.8750	.80623	.20156	.4454	1.3046		
	36-45	2	1.0000	1.41421	1.00000	-11.7062	13.7062		
	Total	197	.8325	.83137	.05923	.7157	.9493		

Table 3: Comparison of knowledge, awareness, and practice with gender of the study participants

	Gender	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F	Sig.
						Lower Bound	Upper Bound		
Knowledge	Male	50	2.9000	1.19949	.16963	2.55	3.2409	1.286	.279
	Female	145	3.2138	1.19714	.09942	3.01	3.4103		
	Prefer not to say	2	3.0000	1.41421	1.00000	-9.70	15.7062		
	Total	197	3.1320	1.20070	.08555	2.96	3.3007		
Attitude	Male	50	2.5400	1.31258	.18563	2.16	2.9130	1.647	.195
	Female	145	2.6552	1.31961	.10959	2.43	2.8718		
	Prefer not to say	2	1.0000	1.41421	1.00000	-11.70	13.7062		
	Total	197	2.6091	1.32269	.09424	2.42	2.7950		
Practice	Male	50	1.0000	.92582	.13093	.73	1.2631	2.271	.106
	Female	145	.7862	.79220	.06579	.65	.9162		
	Prefer not to say	2	.0000	.00000	.00000	.00	.0000		
	Total	197	.8325	.83137	.05923	.7157	.9493		

It was also seen that the knowledge was high among upperclass. Numerous studies have shown how socioeconomic status can affect someone's oral health. Furthermore, it has been proven that there is a direct link between someone's dental health and their level of awareness about it. Lower socioeconomic group members are less aware of dental care and have less access to it. The high expense of oral hygiene products like mouthwash, interproximal brushes, and various medicated toothpaste prevents people from lower socioeconomic categories from using them. Comparatively speaking, people with better socioeconomic level have access to all the oral health aids listed above and are also aware of how important they are for enhancing periodontal health [19].

Clinical and practice-based studies conducted in the past have shown that electric toothbrushes are more effective and efficient than manual toothbrushes. Additionally, the research by Warren et al [20]. suggests that dentists' perceptions of electric toothbrushes and their impact on patients' oral hygiene can be improved by educating them about the devices. The primary drawback of this study is its reliance on self-reported data, which is frequently vulnerable to response bias because of the variety of ways that people can interpret the questions. Additionally, the responses might have been affected by the social desirability bias, which is the tendency for people to respond in ways that are accepted by others.

5. Conclusions

The knowledge, awareness and practice were better in females than males. The socioeconomic position of the population has an effect on the affordability of healthcare, which has an effect on the oral hygiene practices of the patients.

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