# Knowledge, Awareness, Attitude and Practices of Interdental Aids Among Undergraduates in Western Maharashtra

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## Abstract.

This cross-sectional study investigates the knowledge, awareness, attitude, and practices of interdental aids among 422 dental undergraduates in Western Maharashtra using a structured 35-item questionnaire. With 94.3% of participants falling within the 20-25 age range, the majority comprised young adults, emphasizing the relevance of targeting this demographic. Results indicate a significantly higher mean knowledge score among undergraduates compared to interns (p<0.01). While overall awareness about interdental aids is commendable, there is a notable gap in practical implementation, suggesting the need for targeted awareness campaigns. The study underscores the importance of dentist-patient collaboration to enhance understanding and utilization of interdental aids, ultimately promoting better oral hygiene practices among dental undergraduates in the region.

**Keywords:** Oral hygiene, Periodontal disease, Toothbrushing, Interdental aids, Floss, Interdental brush, Dental undergraduates, Awareness, Knowledge, Dental education.

#### I. Introduction

Oral health is a critical component of overall well-being, and dental diseases, including gingival and periodontal conditions, pose significant public health challenges worldwide. The primary etiological factor for these conditions is oral biofilm, emphasizing the importance of effective mechanical plaque control methods. While toothbrushing remains the most common practice, its limitations in reaching interdental areas necessitate the exploration of additional interdental aids to ensure comprehensive oral hygiene. Oral, gingival, and periodontal diseases are prevalent public health concerns globally. The role of oral biofilm as the main etiological factor for gingivitis and periodontitis underscores the need for efficient methods to control its growth. The inadequacy of toothbrushing in interdental areas, where plaque accumulates frequently, makes these regions primary sites for the initiation and progression of oral diseases.

Mechanical removal of oral biofilm is considered the most effective strategy for maintaining oral health. However, toothbrushing alone is insufficient in thoroughly cleaning interdental spaces. Interdental areas, being challenging to reach with a toothbrush, become reservoirs for residual plaque, contributing to the onset and severity of gingivitis and periodontitis. This emphasizes the need for supplementary interdental aids to address the limitations of toothbrushing. To achieve optimal interdental oral hygiene, interventions capable of penetrating the tight spaces between adjacent teeth are necessary. A variety of interdental cleaning aids, such as dental floss, interdental brushes, wooden interdental aids, and oral irrigators, have been developed to cater to this need. These aids have demonstrated efficacy in reducing plaque and gingival inflammation.

Traditionally, self-care recommendations for interdental cleaning primarily involved flossing, a widely practiced method. However, research suggests that interdental brushes may be more effective than dental floss, particularly in open interproximal spaces. Oral irrigators, another category of interdental aids, offer significant benefits for gingival health, especially for individuals who do not consistently clean interproximal spaces. Given the pivotal role of interproximal plaque in initiating and progressing gingival and periodontal diseases,

interdental cleaning becomes a crucial component of oral health education during dental treatment. Patient motivation and education, guided by dentists, play a fundamental role in selecting appropriate interdental aids and fostering improved oral health habits.

In the context of oral hygiene maintenance, especially regarding the use of interdental aids, there exists a noticeable lack of awareness among the population in India. This gap underscores the need for dental professionals to take a central role in raising awareness about the importance and proper use of interdental aids. To address this gap in awareness, the present study focuses on assessing the knowledge, awareness, attitude, and practices related to interdental aids among dental undergraduate students in Western Maharashtra. By targeting this demographic, the study aims to understand the current state of awareness and practices and identify areas for improvement in oral hygiene education. Before delving into the specific details of the study design and methodology, this introduction provides a comprehensive overview of the importance of oral health, the limitations of traditional oral hygiene practices, and the necessity for effective interdental cleaning aids. The subsequent sections will elaborate on the study's objectives, design, and the data collection and analysis processes employed to achieve the outlined goals.

## II. Literature Review

The literature surrounding interdental aids and oral health practices provides a rich landscape of research, highlighting the importance of these aids in preventing and managing oral diseases. The studies conducted worldwide shed light on the efficacy of various interdental cleaning tools, the awareness levels among different populations, and the role of dental professionals in promoting optimal oral hygiene. The foundation of understanding the need for interdental aids lies in acknowledging the etiological factors of periodontal diseases. A study by Tonetti and Claffey (2005) emphasized that bacterial plaque, particularly in interdental areas, is a primary contributor to the initiation and progression of periodontitis. This underscores the significance of effective interdental cleaning to disrupt biofilm formation and prevent periodontal diseases.

Traditional recommendations for interdental cleaning have often centered around dental floss. However, a systematic review by Berchier et al. (2008) challenged this norm, suggesting that interdental brushes may be more effective than floss in removing plaque from interproximal spaces. This shift in focus toward innovative tools prompts a reevaluation of conventional practices and highlights the importance of staying abreast of advancements in oral health care. Studies conducted in diverse populations reveal variations in awareness and practices related to interdental aids. In a survey conducted by Petersen and Jiang (2017) in China, a considerable gap in knowledge and utilization of interdental aids was identified. Similarly, studies in Western countries, such as the one by Slot et al. (2014) in the Netherlands, indicated room for improvement in interdental cleaning practices. These findings underscore the need for region-specific oral health interventions and education campaigns.

Dental professionals play a pivotal role in disseminating knowledge and promoting effective oral health practices. A study by Van der Weijden et al. (2015) highlighted that patient education by dental practitioners significantly improved interdental cleaning behavior. This emphasizes the importance of the dentist-patient relationship in fostering awareness and encouraging regular use of interdental aids. Specifically focusing on the Indian context, a study by Goyal et al. (2019) revealed a lack of awareness and inadequate oral hygiene practices among the Indian population. The research identified the need for targeted oral health education programs to bridge the awareness gap, particularly in the utilization of interdental aids.

Age and educational status have been identified as factors influencing awareness and practices related to interdental aids. A study by Al-Omari and Hamasha (2005) found that older individuals exhibited better oral hygiene practices, emphasizing the need for targeted interventions among younger age groups. Educational programs tailored to the academic level of individuals can further enhance awareness and promote consistent interdental cleaning practices.

In synthesizing the existing literature, it becomes evident that interdental aids are crucial in maintaining optimal oral health. However, awareness levels and practices vary across populations, necessitating tailored interventions. The role of dental professionals in educating and motivating patients cannot be overstated, and regional disparities highlight the importance of context-specific approaches to oral health promotion. The following sections will delve into the methodology employed in the current study, aiming to contribute to this evolving body of knowledge by assessing the knowledge, awareness, attitude, and practices of interdental aids among dental undergraduate students in Western Maharashtra.

## III. Materials and Methods

## a. Study Design:

The study employed a cross-sectional design to assess the knowledge, awareness, attitude, and practices related to interdental aids among dental undergraduate students in Western Maharashtra.

## b. Questionnaire Development:

A self-designed questionnaire consisting of 35 items was structured to gather data in three domains:

- Demographic data of the participants.
- Knowledge about interdental aids.
- Awareness and practices among dental undergraduate students regarding interdental aids.

## c. Sample Size Determination:

The sample size was determined using a single proportion formula. With a confidence limit of 5% and a confidence interval of 95%, the estimated sample size was calculated to be n=384. To account for potential non-respondents, a larger sample size (5-25% more than the estimated size) was recruited initially, ensuring the study's statistical power.

## d. Study Location:

The research was conducted at the School of Dental Sciences in Karad, Maharashtra, India.

## e. Data Collection:

Participants included dental interns and undergraduate students who voluntarily agreed to participate. The questionnaire was distributed to the identified sample, and responses were collected based on a provided response format. The format included options from which participants selected their responses. Anonymity was maintained throughout the study, and participants were encouraged to seek clarification from the investigator when needed.

## f. Exclusion Criteria:

Individuals who did not agree to participate in the study were excluded from the survey.

## g. Statistical Analysis:

Data obtained were compiled using Microsoft Office Excel (version 2019, Microsoft Redmond Campus, Redmond, Washington, United States). Statistical analysis was performed using SPSS (version 26.0, IBM software). Descriptive statistics, including frequencies and percentages for categorical data and mean and standard deviation for numerical data, were calculated. The chi-square test was employed to compare the frequencies of categories of variables among groups. Knowledge scores, coded as 0 for a wrong response and 1 for a correct response, were compared between groups using the t-test. A p-value of <0.05 was considered statistically significant for all tests.

## h. Ethical Considerations:

The study adhered to ethical guidelines, ensuring the voluntary and informed participation of individuals. Anonymity and confidentiality of participants were maintained throughout the study. Ethical approval was obtained from the relevant institutional review board.

#### i. Limitations:

The study is subject to certain limitations, including the potential for response bias and the reliance on self-reported data. Additionally, the study's cross-sectional design limits the establishment of causal relationships.

The materials and methods employed in this study aimed to comprehensively assess the knowledge, awareness, attitude, and practices related to interdental aids among dental undergraduate students in Western Maharashtra. The rigorous methodology ensures the reliability and validity of the gathered data, paving the way for meaningful analysis and valuable insights into oral health practices in this demographic.

## IV. Method of collection of data

This study was carried out at School of Dental Sciences. Karad, Maharashtra, India

Subjects were asked to respond to all items according to the response format provided during the study. Response format included options in which subjects choose one option from a provided list of options. Participation was volitional and all participants remained anonymous. The participants were always encouraged to approach the investigator whenever they needed clarification at any point.

The dental population included those who were interns and under graduate students were included and those who were not agreed to participate in the study were excluded from the survey.

## V. Statical analysis

Data obtained was compiled on a MS office excel sheet (v 2019, Microsoft Redmond Campus, Redmond, Washington, United States). Data was analysed using SPSS v 26.0, IBM software. Descriptive statistics like frequencies and percentage for categorical data, mean and SD for numerical data has been depicted and a comparison of frequencies of categories of variables with groups was done using the Chi square test. Knowledge scores were coded as 0 for a wrong response and 1 for a correct response and the mean knowledge score was compared using t test between 2 groups using t test. For all the statistical test, p<0.05 was considered statistically significant.

#### VI. RESULTS

A total of four hundred forty-two participants, 83 interns and 339 undergraduates completed the survey out of which 5.7% were below 20 years, 94.3% were 20-25 years.

Education		Ν	Mean	Std.deviation	Std.error	T value	P valve of t
					mean		test
Total K	UG	339	6.80	1.794	0.097	4.694	$0.000^{**}$
	Int	83	5.67	2.538	0.279		

Education		Ν	Mean	Std. deviation	Std. error	Tvalve	P valve of
					mean		t test
Total	UG	339	4.05	1.215	0.066	1.443	0.150#
Att	Int	83	3.83	1.248	0.137		

Frequency (%) was more in under graduates compared to interns (Figure 1). Among the sparticipants 268 were females and 154 males. 19.7% of the participants were interns remaining 80.3% were undergraduates.



Figure 1: Distribution as per education.

## Knowledge about interdental aids

Total knowledge score was 5.67 for interns and 6.80 for under graduate students and their comparison are depicted in (Table 1).

There was a statistically highly significant difference seen for the values between the groups (p<0.01) with higher values in undergraduates compared to interns.

#### Awareness about interdental aids

Total awareness score was 3.83 for interns and 4.05 for under graduate students and their comparison are depicted in (Table 2).

There was a statistically non-significant difference seen for the values between the groups (p>0.05).

Majority of people responded (86.3%) brushing alone was not sufficient in interproximal area, they knew (80.1%) interdental cleaning aids, through dentist (81.0%) from family (2.6%) from mass media (6.6%) and other sources (9.7%). Only few people brush their teeth twice daily on regular basis (41.5%), uses mouth wash twice daily (40.5%). Most of responders were aware of why interdental aids are used (80.8%) and use it on a regular basis (74.2%), 88.4% responders recommend others to use interdental aids and educate people about oral hygiene aids (85.3%). Majority thought interdental aids are adequately/regularly prescribed by dental professionals in practice (83.4%), its easily available (82%), essential for maintaining periodontal health (89.6%) and give awareness/advice about interdental aids to patient's (97.2%).

#### VII. DISCUSSION

The discussion of the study's findings delves into the implications of the knowledge, awareness, attitude, and practices of interdental aids among dental undergraduates in Western Maharashtra. The notable positive baseline of awareness and knowledge, especially among the younger age group, signifies the success of educational efforts in the region. The higher mean knowledge score among undergraduates compared to interns suggests that academic exposure plays a crucial role in shaping understanding. However, the observed gap in practical implementation underscores the importance of transforming knowledge into habitual interdental cleaning practices. The findings align with existing literature emphasizing the efficacy of dental education in enhancing oral health knowledge among students. The prevalence of positive attitudes and awareness also indicates the success of current educational initiatives. Nevertheless, the challenge lies in translating this awareness into consistent practices, highlighting the need for targeted interventions beyond theoretical knowledge.

The study's recommendation for meticulous planning in awareness campaigns aligns with the understanding that simply imparting knowledge may not be sufficient. Behavioral change requires targeted strategies that address barriers to implementation, considering factors such as accessibility, affordability, and individual preferences for interdental aids. The collaboration between dentists and patients emerges as a pivotal factor in promoting effective interdental cleaning practices. Dental professionals should play an active role in conveying not only the importance of interdental aids but also providing personalized guidance on selecting and using these aids. This patient-centered approach fosters a sense of responsibility and ownership over oral health, potentially bridging the gap between knowledge and action.

While the study provides valuable insights, certain limitations, such as the cross-sectional design and reliance on self-reported data, should be acknowledged. Future research could explore the long-term impact of educational interventions on sustained interdental cleaning practices and evaluate the effectiveness of different awareness campaigns in diverse demographic groups. In essence, this discussion emphasizes the multifaceted nature of promoting oral health practices, where knowledge is a crucial component, but effective implementation requires a holistic approach that addresses individual, societal, and systemic factors.

#### VIII. Conclusion

In conclusion, this study sheds light on the knowledge, awareness, attitude, and practices concerning interdental aids among dental undergraduates in Western Maharashtra. The findings reveal a positive baseline of awareness and knowledge, particularly among the younger age group, emphasizing the critical role of education in shaping oral health practices. While undergraduates exhibited a higher mean knowledge score than interns, there remains a gap in translating knowledge into consistent interdental cleaning practices. The study advocates for meticulous planning in raising awareness, with a particular emphasis on practical implementation. The collaboration between dentists and patients is highlighted as essential for conveying the importance of interdental aids in maintaining optimal oral hygiene. The outcomes of this research contribute valuable insights for oral health education strategies, emphasizing the need for targeted interventions to bridge the gap between knowledge and practical application in promoting effective interdental cleaning practices among dental undergraduates in Western Maharashtra.

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