

## Original research

# Oral-health-related knowledge, attitude and self-oral care practices among a group of nursing undergraduates in Sri Lanka: A cross-sectional study

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**Introduction:** Assessment of oral-health-related knowledge, attitudes and care practices in healthcare undergraduates would help to identify the necessary curriculum revisions thus, improving the professional attitude as well as the ethical and sensible conduct of the profession.


**Objectives:** This study aimed to assess the oral-health-related knowledge, attitudes and oral care practices among nursing undergraduates in one of the graduate programmes in Sri Lanka.

**Methods:** A cross-sectional study was done using a pre-tested self-administered questionnaire.

**Results:** Out of 148 responders, only 27.70% (n=41, 95% CI 19.8-35.6%) of undergraduates had good knowledge on oral health. The highest mean score was reported on the knowledge on dental plaque 7.16 (SD 4.5) while the lowest was on oral cancers 3.89 (SD 3.13). Positive attitude were reported only in 30.41% (n=45, 95% CI 22.3-38.5%) of undergraduates. However, oral health knowledge and attitude were not statistically significant across the categories of sex and the academic year. Majority of undergraduates brushed twice a day (n=118, 80%) using fluoridated toothpastes (n=107, 72%) while a significant percentage (n=79, 53.4%, 95% CI 44.6-62.2%) had the snacking habits in between the main meals. Only 62 (41.9%, 95% CI 33.3-50.6%) undergraduates showed the good practice of maintaining regular dental visits.

**Conclusions:** The findings of this study highlighted the existing lapses in the knowledge of oral health in nursing undergraduates. No difference was found in scores of knowledge and attitude on oral health care across sexes or the academic year of study. Thus, while recommending further studies, suggest required modifications in the nursing curriculum to improve aspects of oral health.

**Keywords:** Oral-health knowledge, Attitude, Oral care practices, Nursing undergraduates

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## Introduction

Oral health is considered a fundamental part of general health and well-being, which also improves the quality of life of an individual [1]. There is a considerable number of evidence demonstrating that common oral diseases such as periodontal diseases are linked to many non-communicable diseases such as diabetes mellitus. Maintenance of oral health also aids early detection of debilitating conditions such as oral cancer. As prerequisites for achieving satisfactory oral health, adequate knowledge of oral health and a better attitude toward oral care have been shown to play major roles [2]. Moreover, oral health care practices such as regular toothbrushing, supplementary plaque control tools and the use of fluoridated toothpaste are essential elements in maintaining good oral health [3,4]. Nursing as a health care profession, focuses on the overall care of an individual, assisting them to attain optimal health and quality of life. Therefore, nurses can be effectively employed to promote oral health awareness which increases the importance of imposing positive attitudes and adequate oral health knowledge in the nursing curriculum [5].

The assessment of knowledge and the attitudes towards oral health care in nursing undergraduates will help to reflect the necessary amendments in the undergraduate curriculum and also any needs in continuous education programmes in oral health care to ensure the best care given to the patients in the future [6]. Although studies have been conducted among university students in different countries, no studies have been conducted in Sri Lanka to evaluate these aspects. Therefore, the present study was performed to evaluate the oral-health-related knowledge, their attitude towards oral health and self-oral care practices of nursing undergraduates in one of the Allied health sciences faculties in a state university in Sri Lanka. The findings of such studies would be useful in the implementation of any changes in the nursing curriculum on oral health education. Moreover, it will be easy to cultivate these aspects during undergraduate education to ensure a positive outcome in the future.

## Methods

### *Study design*

A questionnaire-based, cross-sectional analytical study was carried out on all undergraduate students from four

academic years at the institute (n=151). The self-administered questionnaire was developed based on the review of the literature adopted into the local context, with the participation of a group of experts including a specialist dental surgeon, a graduate nursing officer, a public health expert and a primary care physician [7]. It consisted of four sections; demographic data, assessment of oral health-related knowledge [17 multiple choice questions (MCQs), maximum score of 10], assessment of attitude towards oral health (6 MCQs, maximum score of 30) and assessment of self-oral care practices. There were six subscales on oral health-related knowledge; (1) Dental plaque, (2) Plaque control, (3) Periodontal diseases, (4) Dental caries, (5) Oral cancer and (6) Systemic-oral health link. Data were collected anonymously ensuring confidentiality and voluntary participation. The study was completed within six months.

### *Statistical Analysis*

To calculate the total score for each participant, for each correct answer, a score was assigned and the wrong answers were assigned zero. Data were entered and analyzed using the statistical software IBM SPSS (Statistical Package for Social Science) Statistics for Windows, Version 23.0. Undergraduates who scored above the score of 75<sup>th</sup> centile score were considered as having good knowledge and good attitude in their respective sections. Medians with quartiles, means with standard deviations and percentages were calculated to describe variables. The acceptance of a level of significance was 0.05.

The ethical clearance to conduct this study was received from the Ethics review committee of the institute (AHS/ERC/2018/067).

## Results

The survey was completed by 148 undergraduates with a response rate of 98%. The majority of participants were females, (73.65%, n=109). Slightly higher proportions of undergraduates were in the initial academic years. The majority of undergraduates (n=96, 64.87%) had given oral healthcare advice to patients during their clinical training (Table 1).

**Table 1:** Number (%) of participants by sex and academic year and who had given oral health care advice to patients

Academic year	n (%)			
	Male	Female	Total	Had given oral health care advice to patients
1 <sup>st</sup> year	14 (27.4)	37 (72.5)	51 (34.46)	10 (19.61)
2 <sup>nd</sup> year	06 (16.7)	30 (83.3)	36 (24.32)	30 (83.33)
3 <sup>rd</sup> year	12 (40.0)	18 (60.0)	30 (20.27)	27 (90)
4 <sup>th</sup> year	07 (22.6)	24 (77.4)	31 (20.95)	29 (93.55)
Total	39 (26.35)	109 (73.65)	148 (100.00)	96 (64.87)

**Knowledge of oral health**

The highest proportion of students knew the correct way to brush (97.9%), and the need for advice on cleaning the tongue (97.3%). Only one-fourth (25.6%, n=38) of students knew the type of appropriate toothbrush. Less than one-sixth (16.2%, n=24) had knowledge on carcinogens. (Table 2)

The highest mean score was reported for knowledge of dental plaque, 7.16 (SD 4.5). Knowledge of plaque control and dental caries carried the second and third highest scores, 6.74 (SD 1.7) and 6.73 (SD 2.9)

respectively. The lowest mean score was reported for knowledge of oral cancers. The 2<sup>nd</sup> year undergraduates reported the highest percentage of good knowledge of oral health, n=12 (33.33%) (Table 3).

The distribution of scores for overall knowledge of oral health was the same across both categories of sex, p=0.49 (Independent-Samples Mann-Whitney U test). Similarly, the distribution of scores for knowledge on dental plaque, plaque control, periodontal diseases, caries, oral cancers and systemic links were the same across the categories of the academic year (Table 2).

**Table 2:** Responses to questions on oral health knowledge

No	Question	n (%) correctly answered
1	What is meant by dental plaque?	106 (71.60)
2	What is the main purpose of tooth brushing?	56 (37.80)
3	What is the commonest reason for bleeding from gums?	80 (54.0)
4	What is the main cause of periodontal disease?	63 (42.60)
5	What is the best way to control gum disease?	115 (77.70)
6	What do you think periodontal disease if untreated may ultimately lead to?	72 (48.60)
7	Should you advice a person to clean their tongue?	145 (97.90)
8	Do you know the correct way to brush your teeth?	144 (97.30)
9	How many times should a person brush his/her teeth a day?	116 (78.40)
10	What kind of brush is ideal to use?	38 (25.60)
11	What is the commonest cause of tooth decay?	86 (58.10)
12	How do you identify initial tooth decay?	80 (54.00)
13	Which one of the following statements is correct regarding tooth decay?	132 (89.20)
14	With regards to oral cancer, what is the most harmful ingredient involved in initiating the disease?	24 (16.20)
15	Do you think a white/red patch in the mouth is a possible initial sign of cancer?	91 (61.40)
16	What are the diseases that have shown the link to gum diseases?	69 (46.62)
17	A patient tells you that he is unable to brush his/her teeth because the gum bleeds. What would you do?	110 (74.30)

**Table 3:** Mean scores on oral health-related knowledge by different academic years

The score of knowledge on oral health	Mean Score out of 10 (SD)					p-value (Independent sample, Kruskal-Wallis test)
	Year 1	Year 2	Year 3	Year 4	Overall	
Dental plaque	6.67 (4.76)	7.50 (4.39)	6.67 (4.80)	8.06 (4.02)	7.16 (4.52)	0.49
Plaque control	6.78 (4.79)	6.5 (1.29)	6.4 (1.85)	7.29 (1.90)	6.74 (1.73)	0.18
Periodontal diseases	5.98 (3.08)	4.93 (2.50)	5.33 (2.84)	5.89 (2.29)	5.57 (2.75)	0.25
Dental caries	7.32 (2.75)	6.48 (2.51)	6 (3.44)	6.77 (2.92)	6.73 (2.90)	0.28
Oral cancer	4.02 (2.83)	3.89 (3.19)	4.5 (3.04)	3.06 (3.58)	3.88 (3.13)	0.25
Systemic links with oral health	4.12 (4.97)	5.28 (5.06)	5 (5.08)	4.52 (5.06)	4.66 (5.01)	0.72
Overall Score	6.16 (1.38)	5.76 (1.32)	5.75 (1.34)	6.19 (1.54)	5.98 (1.39)	
Number (%) of students scored above the 75 <sup>th</sup> percentile	13 (25.49)	12 (33.33)	7 (23.33)	9 (29)	41 (27.7)	

However, the score for knowledge on dental plaque was significantly higher (mean 7.8, SD 4.1) among the group who had provided advice on oral health care to patients compared to the undergraduates who have not had (mean 5.9, SD 4.9),  $p=0.017$  (independent sample t-test) any experience in giving oral health care advice to a patient.

The attitude towards oral health was assessed through several questions scaled with a five-point Likert scale (Table 4). Mean scores for the attitude were ranging from 25.53 (SD 3.7) to 26.65 (SD 2.0). Second-year undergraduates scored the highest for the attitude above the 75<sup>th</sup> percentile, 13 (36.11%) (Figure 1).

**Table 4:** Attitude on oral health

Question on attitude	Number (Percentages %)				
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Oral health and care is an important part of nursing care	3 (2.03)	1 (0.68)	3 (2.03)	28 (18.92)	113 (76.35)
Oral health is as important as maintaining good general health	-	2 (1.35)	3 (2.03)	35 (23.65)	108 (72.97)
Oral health education should be updated & expanded in the nursing education	-	1 (0.68)	9 (6.08)	54 (36.49)	84 (56.76)
Do you think that a regular visit to the dentist is necessary?	4 (2.70)	15 (10.14)	19 (12.84)	59 (39.87)	51 (34.46)
Do you think it is your responsibility to look into the patient's mouth to detect oral health problems?	3 (2.03)	7 (4.73)	16 (10.81)	80 (54.05)	42 (28.38)
Do you think that it is necessary to learn how to identify common oral diseases?	-	2 (1.36)	11 (7.43)	66 (44.60)	69 (46.62)

The distribution of scores for attitude was not statistically different across the categories of the academic year,  $p=0.73$  (independent sample, Kruskal-Wallis test). Also, there were no differences in the distribution of scores for attitude across the categories of sex,  $p=0.12$  (Independent-Samples Mann-Whitney U test).

Though the mean score for the knowledge on caries was significantly higher among undergraduates who scored below the 75<sup>th</sup> percentile of the score for attitude (mean 7.0, SD 2.9) compared to others (mean 5.6, SD 2.5),  $p=0.03$  (independent sample t-test), correlations between scores for knowledge on different categories were poor and none of them were significant. A poor but significant positive correlation between the score for attitude and the score for the knowledge on plaque control (Pearson Correlation 0.2,  $p=0.03$ ) was evident.

Approximately 75% of participants believed that regular dental visit is a necessity. More than three-fourths of the participants (76%) in this study believed that oral health care is an important part of nursing care and 73% of nursing undergraduates accepted that the maintenance of oral health is important as maintaining good general health. More than half of the undergraduates (57%) in this study agreed that oral health education should be updated and expanded in the nursing curriculum.

### *Oral care practices*

The majority of the undergraduates (69%,  $n=102$ ) were found to be using toothbrushes with medium-textured bristles. Only one-fifth of undergraduates used toothbrushes with soft bristles. On average, 47% ( $n=70$ ) of undergraduates had a brushing time of 3-4 minutes. Most of the undergraduates (80%) were found to brush their teeth twice a day and 72% of the undergraduates used fluoridated toothpaste. Also, 46% reported that they usually change their toothbrush within 3 months. In addition to these good practices, 91% of the undergraduates used the toothbrush to clean their tongues. However, the same percentage was reported for those who do not use any supplementary plaque control tools. Furthermore, 79 (50%) of undergraduates had snacks more than twice a day. The percentage of undergraduates who visited the dental health care professional at least once within the last six months duration was 42% ( $n=62$ ).

Comparatively, the distribution of scores for knowledge on the plaque ( $p=0.56$ ), plaque control ( $p=0.16$ ), periodontal diseases ( $p=0.86$ ), caries ( $p=0.72$ ), oral cancer ( $p=0.13$ ), systemic link ( $p=0.76$ ) and overall knowledge on oral health ( $p=0.93$ ) were same across the undergraduates who visited a dental health care

professional, at least once, during the last 6 months and who do not (Independent-Samples, Mann-Whitney U test). Moreover, the distribution of scores for the attitude toward oral health care of the same group also was found to have similar scores,  $p=0.33$  (independent sample Mann-Whitney U test).

The distribution of scores for knowledge on plaque, plaque control, caries, and overall knowledge on oral health were the same across the undergraduates who had the snacks more than twice a day as a habit compared to others (independent sample, Mann-Whitney U test).

### **Discussion**

This study demonstrated that the overall knowledge score for oral health was not satisfactory although higher scores were reported for knowledge on plaque and dental caries. Moreover, the score received for the knowledge of oral cancer was comparatively low although it is a highly prevalent disease in Sri Lanka. A considerable proportion had inadequate knowledge on some of the basic concepts in oral health such as the purpose of toothbrushing and the features of a good toothbrush. This could be due to both the less awareness of oral health among the general public as well as inadequate coverage within the curriculum.

Among the study group, only 30.41% had a positive attitude towards oral health. No difference was found in scores of knowledge and attitude on oral health care across sexes or the academic year of study.

A higher proportion of nursing undergraduates were females. This could be partially described by the sex ratio of university undergraduates in Sri Lanka and the sex ratio of nursing officers in the Ministry of Health, Sri Lanka [8,9]. The proportion of undergraduates, who had given oral health care advice to patients, increased with the academic year which reflected the gradual increase in exposure to clinical care. However, the second-year undergraduates demonstrated the highest percentage of good knowledge of oral health. It may be due to; a higher proportion of oral-health-related clinical exposure receives during the second year, and, the majority (>80%) got opportunity to deliver oral care advice.

The present study reported that the overall score for knowledge of oral health is 5.98 out of 10. Comparatively, higher and better scores were reported for attitude on oral health. Various studies conducted in different study settings reported different proportions for satisfactory knowledge of oral health in nursing students. Although the format and the design of the questionnaires were different in those studies, they

covered similar aspects of the knowledge. However, the overall score demonstrated in this study was slightly less than most of the reported values [10-13]. In contrast to the studies conducted by Deogade et al and Muttineni et al, approximately half of the undergraduates were aware that untreated periodontal disease may ultimately lead to tooth loss [11,12]. This positive finding was similar but lower than the findings reported by Bhattarai et al [7]. Therefore, in curriculum revisions, more emphasis should be paid to the improving retention of knowledge and expanding clinical exposure.

The majority of nursing undergraduates were aware of the correct way to brush and that at least brushing twice a day is adequate to maintain proper oral hygiene, similar to the other studies reported [11,12,14]. However, it was interesting to find that about one-third of the undergraduates (37.84%) were not aware of the main purpose of toothbrushing and in contrast to the existing literature, the majority (74.32%) were not aware of the features of a good toothbrush [14,15]. This is also reflected in the finding that the majority of the students (69%) using a medium-textured toothbrush.

According to the literature, varied presentations have been discussed in relation to the awareness of oral cancer, its aetiology and the risk factors [7]. In this study as well, a higher proportion of undergraduates (83.78%) demonstrated lack of knowledge about the most important aetiological factor for oral cancer, although a majority of the undergraduates were aware of the initial signs of oral cancer.

Nearly half (46.62%) of undergraduates had adequate knowledge regarding the link between periodontal diseases and systemic diseases. However, this was about 20% lower compared to the studies conducted by Deogade et al and Muttineni et al [11,12]. These changes could be partially explained by differences in curricula, quality of teaching and assessment tools.

Similar to most of the studies reported, around three-fourths of participants in the present study believed that oral health care is an important aspect of nursing care as well as in general health [10,16,17]. Moreover, it was an interesting positive finding that most of the participants agreed that oral health care is one of the responsibilities of nursing care thus, it is necessary to learn to detect common oral diseases [11,12,16]. The majority of undergraduates believed that the present

level of oral health education is inadequate, which was in accordance with the other similar studies reported in the literature [10-12, 18].

Therefore, these findings could be used by policymakers to formulate oral health education strategies in the nursing curriculum aiming to improve oral health knowledge, attitude and practices by assuring the earliest possible exposure, retention of the knowledge and expanding the clinical exposure.

The authors acknowledge the limitations in this study due to limited sample size, limitations of generalizability, the possibility of bias due to the selection of participants from a single educational institute and the study based on self-reported data.

### Conclusion

In conclusion, the present study highlighted that the overall knowledge score for oral health was not satisfactory. It was also evident that a considerable proportion lacked adequate knowledge of some of the basic concepts in oral health such as the main purpose of toothbrushing and the features of a good toothbrush. Among the study group, only 30.41% had a positive attitude toward oral health. No difference was found in scores of knowledge and attitude on oral health care across sexes or academic years of study.

Required modifications should be done in the nursing curriculum to improve knowledge, attitude and self-care practices on oral health. Motivating students to provide oral care advice may be a strategy to improve their knowledge. As the study population in this study was limited to a single university, further studies using a larger sample size are recommended to assess the knowledge, attitude and self-care practices on oral health.

### Data availability

The observational data used to support the findings of this study are available from the corresponding author upon request.

### Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper

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