

# Physiotherapy students' oral health-related knowledge, attitudes and practices at an identified institution of higher learning in KwaZulu-Natal, South Africa

SADJ APRIL 2024, Vol. 79 No.3 p131-136

T Nadasan<sup>1</sup>, S Maharaj<sup>2</sup>, S Singh<sup>3</sup>

## ABSTRACT

### Background

Oral self-care health is integral to general health. However limited studies reflect physiotherapy students' dental practices such as frequency of toothbrushing, toothbrush replacement, use of oral rinses, dental flossing, use of interdental aids or knowledge of dental plaque.

### Study objectives

This study assessed knowledge, perceptions and oral self-care practices among physiotherapy students.

### Method

This descriptive cross-sectional survey recruited second-, third-, and fourth-year physiotherapy students at an identified training institution in South Africa by means of a self-administered questionnaire

### Results

A total of 137 students participated in the study with a response rate of 83%. Participants indicated that 58%

(n=79) had good knowledge and 85% (n=117) reported oral self-care practices. Almost all participants (99%; n=136) used a brush with toothpaste; 76% (n=104) brushed twice daily; 53% (n=72) replaced their toothbrush every 3 months and 48% (n=66) rinsed their mouth after eating. More than two-thirds of the study sample (62%; n= 84) used an interdental aid and (37%; n=50) reported dental visits once a year with (74%; n=100) only when necessary. From these 96% (n=132) experienced barriers such as costs (54%; n=71) and inadequate time (42%; n = 55). The majority of participants (72%; n=98) supported oral self-care be included in the physiotherapy curriculum.

### Conclusion

Although there were inconsistencies in physiotherapy students' reported oral health-related knowledge, perceptions and self-care practices, the majority of participants supported the inclusion of dental health into the undergraduate physiotherapy curriculum. This will enhance interprofessional education and improve oral health outcomes for both students and patients.

### Keywords

Health, self-care, dental care, knowledge, interprofessional education

## INTRODUCTION

Oral hygiene practices and general health are interrelated.<sup>1-4</sup> Oral self-care practices, such as the frequency of toothbrushing and toothbrush replacement, use of oral rinses, dental flossing, use of interdental aids and understanding dental plaque have been proven to be an effective preventative measure at an individual level to maintain good oral health status as part of general health care.<sup>1,4</sup> Poor oral health status can lead to oral pain resulting in poor eating ability, and oral diseases which impact negatively on self-esteem, impair social interactions and result in overall poor quality of life for the individual.<sup>1</sup> The World Health Organization (WHO) advocates the integration of oral health education and promotion into general health care because health professionals interact daily with patients and this can be an effective strategy to improve oral health outcomes.<sup>1,5-6</sup> Likewise, there is a need for extensive educational programmes to encourage and promote good oral health practices.<sup>4,7</sup>

### Authors' information

1. Thayananthee Nadasan, DPA, School of Health Sciences, Discipline of Physiotherapy, University of KwaZulu-Natal  
ORCID: 0000-0003-2023-0324

2. Sonill Maharaj, DPhil, School of Health Sciences, Discipline of Physiotherapy, University of KwaZulu-Natal  
ORCID: 0000-0001-8288-6105

3. Shenuka Singh, PhD, PhD, School of Health Sciences, Discipline of Dentistry, University of KwaZulu-Natal  
ORCID: 0000-0003-4842-602X

### Corresponding author

Name: S Singh  
Email: Singhshen@ukzn.ac.za

### Author's contribution

1. T Nadasan – data collection, manuscript preparation and editing
2. S Maharaj –draft manuscript preparation and editing
3. S Singh – data analysis, manuscript preparation and editing

### Acknowledgments

The researchers express their appreciation to the students who participated and the Dean/Head of the School of Health Sciences of the University of KwaZulu-Natal for permission to conduct the study.

### Conflict of interest

The authors declare that there is no conflict of interest.

### Funding

No funding was sourced for this study

Based on the dynamic relationship between oral and general health which can be influenced by an individual's personal attributes, behaviours and perceptions, there is a need to determine whether health professionals have the relevant and necessary knowledge and behaviour to impart positive oral health information to patients. This is supported by international guiding documents such as the Ottawa Charter on Health Promotion (1986)<sup>5</sup> which advocates health professionals to focus on the prevention of diseases and promotion of a healthy lifestyle, as well as the WHO Global Oral Health Programme, which highlights the need to facilitate, improve and promote oral health and integrate these into chronic disease prevention and health promotion.<sup>9,10</sup> Thus there is a need for all health professionals to ensure that their own knowledge of oral health self-care practices are sound when educating and advocating oral health.<sup>1,5,11</sup>

In addition, a study by De Oliveira Diniz et al.<sup>12</sup> identified knowledge gaps in health professionals' (doctors, nurses, physiotherapists, audiologists, pharmacists, psychologists and others) oral self-care practices such as their consumption of sugary diet, poor brushing techniques and inadequate access to additive fluoride uptake.

Despite the known linkages between oral health status and systemic disorders such as cardiac diseases and diabetes, not much is known on the extent to which such information is covered in health sciences curricula at a higher education level.<sup>1,4</sup>

Additionally, from an undergraduate learning perspective, collaboration and interprofessional partnership between dental and physiotherapy students as well as qualified health professionals (dentists and physiotherapists) are required. The benefit of interprofessional relationships is learning from each other in that way, developing greater respect for each other's profession. By learning together and about each other they could improve undergraduate as well as postgraduate working relationships and the value of a team approach and the holistic management of patients. Moreover, the experience of learning together can break down professional walls, change attitudes and reduce stereotypes. Interprofessional education can be an effective tool for developing collaboration and improving professional practice among health professionals.<sup>13</sup>

Despite the value of interprofessional education, there is little evidence that physiotherapy training includes elements of oral health care, although PHC principles are included in the physiotherapy curriculum.<sup>1,4,12</sup> To our knowledge, this is the first study to examine oral health self-care practices among undergraduate physiotherapy students in South Africa. This study can therefore raise awareness of the need to ensure that the undergraduate physiotherapy curriculum is reviewed and designed in a manner to facilitate a multidisciplinary approach that includes oral health care. To initiate this process, the first step is to determine the relationship between oral hygiene and oral self-care which are influenced by personal attributes, behaviours and perceptions. Therefore, the primary purpose of this study was to determine the knowledge, perceptions and oral health self-care practices of undergraduate physiotherapy students at an identified institution in South Africa. This is a four-year programme offered in the School of Health Sciences and the training focuses primarily on the comprehensive management of health issues to restore the optimal function of individuals and the wider society.

## METHODOLOGY

### Study design

This was a descriptive cross-sectional study.

### Study populations (including sample determination if done, sampling etc)

A whole population approach was used to identify full-time undergraduate physiotherapy students (n=169) at the identified training institution. Four students did not meet the study criteria and were excluded from the study; hence the sample size was 165. The study population was further stratified according to the year of study and students registered in the 2nd (n=60), 3rd (n=61) and 4th levels (n=48) of the physiotherapy programme were included in the study. The inclusion criteria for participation in the study were that students should be engaging and interacting with patients in hospitals, clinics and health centres. The study excluded first-year students because these students do not engage in clinical-based training.

### Data collection (instruments used, validation, reliability)

A self-administered questionnaire was used to collect data and permission was obtained from Oberoi et al.<sup>14</sup> to adapt and use their questionnaire. The first section of the questionnaire focused on the participant's sociodemographic information. The second section focused on the student's oral self-care knowledge, attitudes and practices related to oral health care such as the frequency of toothbrushing and toothbrush replacement, use of oral rinses, dental flossing, use of interdental aids and understanding dental plaque and the relationship between oral and general health. Questions were also designed to elicit information on dental visits, barriers to accessing dental care and perceptions of self-reported dental health status.

The questionnaires were administered in English which is the university's medium for teaching and learning in health sciences.

### Pilot study

The questionnaire was validated in a previous study that examined dental students' attitudes and practices toward oral care and was found to be reliable, having a Chronbach alpha coefficient of 0.73.<sup>15</sup> The questionnaire was also piloted with third and fourth-year Occupational Therapy students to ensure the relevance and coherence of the questions posed. The questionnaire was also reviewed carefully to avoid any ambiguity in participants' responses to the questions posed and to minimise any potential bias that could occur as a result of missing data in the datasets for analysis. The questionnaire was finalised after reviewing and making the necessary corrections.

### Participant recruitment

As part of the recruitment process, meetings were set up with relevant classes in the undergraduate physiotherapy programme to inform students of the purpose of the proposed study. Students were informed of the voluntary nature of the study. The researchers ensured that the questionnaires were left with the class captains for distribution and completed questionnaires were collected from these identified students. A follow-up was done after one month and all outstanding completed questionnaires were collected.

### Ethical considerations

Ethical clearance for the study was obtained from the Human Social Sciences Research Ethics Committee (HSSREC) at

Table 1: Perceptions of oral health status

|   | Year             |      |                 |      |                  |      |                  |      | p value |
|---|------------------|------|-----------------|------|------------------|------|------------------|------|---------|
|   | Second<br>(n=48) |      | Third<br>(n=42) |      | Fourth<br>(n=47) |      | Total<br>(n=137) |      |         |
|   | n                | %    | n               | %    | n                | %    | n                | %    |         |
| <b>What is the perception of your oral health status?</b> |                  |      |                 |      |                  |      |                  |      |         |
| Excellent/good  | 25               | 52%  | 27              | 64%  | 27               | 57%  | 79               | 57%  | 0.53    |
| Fair/poor   | 23               | 48%  | 15              | 36%  | 20               | 43%  | 58               | 43%  |         |
| <b>Do your gums bleed during flossing?</b>                |                  |      |                 |      |                  |      |                  |      |         |
| Yes   | 20               | 42%  | 22              | 52%  | 33               | 70%  | 75               | 55%  | *0.01   |
| No  | 28               | 58%  | 20              | 48%  | 14               | 30%  | 62               | 45%  |         |
| <b>Do you have halitosis?</b>                             |                  |      |                 |      |                  |      |                  |      |         |
| Yes   | 4                | 8%   | 2               | 2%   | 4                | 9%   | 10               | 6%   | 0.55    |
| No  | 44               | 92%  | 40              | 98%  | 43               | 91%  | 127              | 94%  |         |
| <b>Is mouth hygiene important?</b>                        |                  |      |                 |      |                  |      |                  |      |         |
| Yes   | 48               | 100% | 42              | 100% | 47               | 100% | 137              | 100% | na      |
| No  | 0                | 0%   | 0               | 0%   | 0                | 0%   | 0                | 0%   |         |

\*Denotes significance

an institution of higher learning in KwaZulu-Natal (KZN), South Africa (HSS/1539/01) and the necessary gatekeeper permissions from the Registrar at the same institution in KZN and the Academic Leader of Physiotherapy were sought to access the study population. Written consent was obtained from all study participants and participants were informed of their rights to withdraw from the study at any point without any negative consequences. All data was anonymised and reported in an aggregate format to protect the identity of the participants. The institution's name was also anonymised as per the condition stipulated in the gatekeeper's permission letter. The raw data was stored safely in a locked cupboard and the electronic data was password protected with access being granted only to the research team and the approving research ethics committee.

#### Data analysis (tests used and software used)

The data was first cleaned for any outliers and missing data was excluded from the analysis – for example, a row with missing values was deleted. The data was then coded and analysed using SPSS version 29.0 (IBM Corp, USA). The study included univariate descriptive statistics such as frequency and mean distribution for the categorical data. The Likert scales were dichotomised into two categories of strongly agree/agree and neutral/disagree/strongly disagree. The Pearson's Chi-squared test was used to assess for a possible relationship between the independent variables (age, gender and year of study) and the dependent variables such as frequency of toothbrushing and use of interdental aids. Ordinal data such as the number of dental visits were compared using the Kruskal-Wallis test. A probability level of  $p < 0.05$  was used to indicate significance in the data presented. The open-ended questions were first recorded in a narrative format and were coded. Thereafter, the data was grouped according to the broad themes and then further analysed for emergent themes.

## RESULTS

A total of 165 questionnaires were distributed with 137 completed and analysed for data, reflecting an 83%

response rate. The responses according to the year of study were: 2nd 48 (35%); 3rd 42 (31%) and 4th 47 (34%) respectively. The participants were predominantly female 104 (76%) with no statistical association found between the level of study and gender.

#### Knowledge and perceptions of oral health status

Dental plaque as indicated by 117 (80%) of participants was: dirt on teeth, 76 (65%); bacteria on teeth, 33 (28%); other 8 (12%) with 15% (n=20) of participants having no knowledge of dental plaque.

Seventy-nine (58%) participants indicated their oral health status to be good or excellent. However, 75 (55%) indicated their gums bled during flossing with the highest percentage being the 4th year students 33 (70%) compared to 22 (52%) and 20 (42%) of 2nd and 3rd year students respectively (0.01). All respondents agreed that oral hygiene was important for general health (Table 1).

#### Reported oral health self-care practices

Almost all participants 136 (99%) reported using a toothbrush and toothpaste to clean their teeth with the duration of brushing varying between 1-2 minutes 57 (42%); 3-5 minutes 73 (53%) and more than 5 minutes 7(5%). One hundred and four (76%) participants brushed twice daily and 72 (53%) changed their toothbrush after every 3 months. Sixty-six (48%) participants rinsed their mouth after meals; 53 (39%) rinsed once only in the morning; 70 (51%) used a mouthwash; 124 (91%) brushed their tongue routinely. Eighty-four (62%) participants used an interdental aid; 64 (76%) a toothpick and 39 (46%) dental floss (Table 2).

#### Access to dental services

There were varying responses with regard to participants accessing facility-based oral health services. This ranged from once a year 50 (37%) to twice a year 20 (15%) with 59 (43%) not having any dental consultations in the past year. More than two-thirds of the study sample 100 (74%) reported seeking dental care only if required. An

Table 2: Oral self-care practices

|                                    | Year             |      |                 |     |                  |      |                  |     | P value  |
|------------------------------------|------------------|------|-----------------|-----|------------------|------|------------------|-----|----------|
|                                    | Second<br>(n=48) |      | Third<br>(n=42) |     | Fourth<br>(n=47) |      | Total<br>(n=137) |     |          |
|                                    | n                | %    | n               | %   | n                | %    | n                | %   |          |
| <b>Device to clean teeth</b>       |                  |      |                 |     |                  |      |                  |     |          |
| Toothpaste & brush                 | 48               | 100% | 41              | 98% | 47               | 100% | 136              | 99% | 0.38     |
| Other                              | 0                | 0%   | 1               | 2%  | 0                | 0%   | 1                | 1%  |          |
| <b>Cleaning time</b>               |                  |      |                 |     |                  |      |                  |     |          |
|                                    |                  |      |                 |     |                  |      |                  |     | <b>5</b> |
| 1-2 min                            | 24               | 50%  | 15              | 36% | 18               | 38%  | 57               | 42% | 0.44     |
| 3-5 min                            | 21               | 44%  | 24              | 57% | 28               | 60%  | 73               | 53% |          |
| > 5 min                            | 3                | 6%   | 3               | 7%  | 1                | 2%   | 7                | 5%  |          |
| <b>Frequency of cleaning</b>       |                  |      |                 |     |                  |      |                  |     |          |
| Once a day                         | 11               | 23%  | 9               | 21% | 5                | 10%  | 25               | 18% | 0.41     |
| Twice daily                        | 35               | 73%  | 31              | 74% | 38               | 81%  | 104              | 76% |          |
| Three or more times                | 2                | 4%   | 2               | 5%  | 4                | 9%   | 8                | 6%  |          |
| <b>Changing toothbrush</b>         |                  |      |                 |     |                  |      |                  |     |          |
| Once a month                       | 1                | 2%   | 7               | 17% | 6                | 13%  | 14               | 10% | 0.34     |
| Every 3 months                     | 29               | 60%  | 22              | 53% | 21               | 45%  | 72               | 52% |          |
| Every 6 months                     | 13               | 28%  | 12              | 30% | 17               | 36%  | 42               | 31% |          |
| Every year                         | 5                | 10%  | 1               |     | 3                | 6%   | 9                | 7%  |          |
| <b>Rinsing mouth with water</b>    |                  |      |                 |     |                  |      |                  |     |          |
| Always after meals                 | 25               | 52%  | 21              | 50% | 20               | 43%  | 66               | 48% | 0.71     |
| Once in the morning                | 16               | 33%  | 16              | 38% | 21               | 45%  | 53               | 39% |          |
| Always before meals                | 0                | 0%   | 0               | 0%  | 1                | 2%   | 1                | 1%  |          |
| Never                              | 7                | 15%  | 5               | 12% | 5                | 11%  | 17               | 12% |          |
| <b>Use of commercial mouthwash</b> |                  |      |                 |     |                  |      |                  |     |          |
| Yes                                | 21               | 44%  | 24              | 57% | 25               | 53%  | 70               | 51% | 0.40     |
| No                                 | 27               | 56%  | 18              | 43% | 22               | 47%  | 67               | 49% |          |
| <b>Cleaning tongue</b>             |                  |      |                 |     |                  |      |                  |     |          |
| Tooth brush                        | 44               | 92%  | 38              | 90% | 42               | 89%  | 124              | 90% | 0.61     |
| Tongue cleaner                     | 3                | 6%   | 3               | 7%  | 2                | 5%   | 8                | 6%  |          |
| Nothing                            | 1                | 2%   | 1               | 2%  | 3                | 6%   | 5                | 4%  |          |
| <b>Interdental aid</b>             |                  |      |                 |     |                  |      |                  |     |          |
| Toothpick                          | 18               | 35%  | 16              | 38% | 11               | 23%  | 45               | 33% | 0.52     |
| Dental floss                       | 9                | 19%  | 3               | 7%  | 7                | 15%  | 19               | 14% |          |
| Pick & floss                       | 5                | 10%  | 6               | 14% | 6                | 13%  | 17               | 12% |          |
| Floss & brush                      | 1                | 2%   | 0               | 0%  | 0                | 0%   | 1                | 1%  |          |
| Pick & brush                       | 0                | 0%   | 1               | 2%  | 0                | 0%   | 1                | 1%  |          |
| All                                | 0                | 0%   | 2               | 5%  | 0                | 0%   | 2                | 1%  |          |
| Nothing                            | 15               | 31%  | 14              | 33% | 23               | 49%  | 52               | 38% |          |

overwhelming majority of participants 132 (96%) reported barriers to accessing dental care with the following challenges: high cost 71 (54%); not enough time 55 (42%) and fear of a dental visit 19 (14%).

## DISCUSSION

This study's findings indicated that physiotherapy students had varying levels of knowledge related to dental health such

as their knowledge of dental plaque (biofilm). Additionally, although students reported having good oral health status almost half of the study sample 75 (55%) reported their gums bled during flossing. This finding is consistent with the findings reported by Singh and Pottapinjara who also noted that although participants in their study reported good oral health status, a third of their participants reported gingival bleeding during dental flossing.<sup>15</sup>

Generally bleeding gums is a sign of poor gum health, indicating that our sample did not have good oral self-care. Although knowledge does not automatically lead to better self-care behaviour it is possible that those having the relevant knowledge of oral health may adopt these practices and be able to transfer this knowledge to others – for example, physiotherapy students to their patients. Health professionals are expected to serve as role models to their patients and, accordingly, are expected to follow healthy lifestyles and practices and engage in positive self-care recommendations for their own behaviour. Generally, students in the health professions are expected to have good knowledge and practices related to health and one assumes that a similar understanding of dental care related to their knowledge, oral hygiene and self-care practices be relatively good. This is based on the premise that these are related to and influence health which has a direct bearing on health professionals when engaging and inculcating improvements or lifestyle changes for patients. The challenge arises when there is an expectation that health education will inculcate positive notions of the concept of health but it cannot be assumed that students will readily integrate these concepts into their theoretical and practical knowledge.<sup>16-17</sup> This finding is further supported by Raval and Shaikh<sup>4</sup> who concede the need for educational programmes to encourage good oral health and practices among health professionals.

This study also indicated that participants reported using toothbrushes and toothpaste for cleaning their teeth at least twice daily (104,76%). A similar finding of 121 (70%) was found in a study conducted with nursing students by Kerr and Singh.<sup>18</sup> These findings are much higher than those reported by Onwubu et al., where only 56.2% of their participants brushed their teeth twice daily.<sup>19</sup> Further, only 53% of the participants in this study changed their toothbrushes after 3 months. This finding is supported by Tadin et al., who reported that 59.7% of their study participants reported replacing their toothbrushes after 3 months; however, only 26.7% of their study sample reported the use of dental floss compared to 46% of participants in this study.<sup>20</sup> Likewise, Okoroafo et al. and Kerr and Singh also reported low use of dental floss in their studies.<sup>18,21</sup> This suggests that the use of dental floss be encouraged in the future when advocating oral self-care.

From the responses of the participants in this study it was evident that participants were aware that brushing one's teeth was not the only effective way to remove dental plaque, but this had to be augmented by using interdental dental aids and having visits to a dentist when additional interventions were required.<sup>22</sup> It should be noted that the participants in this study did not consider the role of diet in oral hygiene self-care practices. The results from this study, however, correlate to the findings by De Oliveira Diniz et al.<sup>12</sup> where although participants had good knowledge and oral self-care practices there were gaps in certain aspects of their oral hygiene knowledge and practices. We support this as the participants in this study indicated gaps in their oral health practices by their responses as the data show they lacked knowledge related to dental plaque, correct use of dental aids and the importance on regular dental consultations. They also lacked knowledge on the use of toothpicks as they did not know that the use of toothpicks was contraindicated in areas with tight interdental contacts and that its use would depend on the interdental spaces,

papillae and tooth crowding. Also using toothpicks in areas where the spaces between the teeth are limited was not recommended by dentists or oral hygienists. The reason for this is that there is a risk of toothpicks breaking during usage and that the broken fragments could get lodged between the teeth and damage the gingiva and surrounding tissues leading to pain, inflammation and discomfort. The correct use of interdental aids is not only relevant for health professionals, but physiotherapists and physiotherapy students as well, because they can educate their patients on the correct use of toothpicks such as the triangular low surface ones which will benefit those with tight interdental spaces.<sup>23-24</sup>

This study showed that regular visits by physiotherapy students to a dentist were poor and some would only seek dental services when there was pain or other oral symptoms. These were similar findings in other studies where dental visits were motivated by the need to relieve pain and discomfort.<sup>18, 25-26</sup> The reported barriers to dental consultations by participants were predominately the cost of dental care and limited time to visit the dental practitioners which concur with the findings as reported by Singh and Pottapinjara as well as Kerr and Singh.<sup>15,18</sup> Perhaps these findings relate to physiotherapy students having lectures and clinical interactions with patients almost the entire day leading to students indicating that their physiotherapy programme was “loaded” and they had time constraints for dental consultations. The “limited” time factor also related to students being constrained to and not being able to engage in part-time activities to supplement their income so “cost” of or payment for dental visits was also a challenge. Although the students reported good oral self-care the large number reported to having bleeding gums and limited knowledge of dental plaque was a concern. It is generally known that most oral health-related habits are established early in life and are mediated by parental behaviour to encourage oral self-care.<sup>27</sup> Perhaps this aspect is neglected during the formal university programme as students have a “loaded” programme and could lead to students neglecting their oral care and failing to integrate their environmental, social and personal resources and abilities.<sup>28</sup> These may be additional reasons to include dental and oral self-care practices in the physiotherapy curriculum because oral self-care practices established early in life can be reinforced and maintained. Further, the advantage of formally introducing oral hygiene and oral self-care into the physiotherapy curriculum could reinforce pre-existing knowledge and build on promoting healthier lifestyle choices for both students and their patients.

## STRENGTHS AND LIMITATIONS OF THE STUDY

Since this was an initial study, the data offers useful insight into physiotherapy students' knowledge of mouth hygiene and oral self-care practices but the authors concede some limitations with the study. The first is the use of a single site hence the findings are only generalisable to the identified site. A second limitation is that the researchers could not differentiate the possibility of bias as self-reported responses can sometimes reflect what the participants considered to be ideal rather than what they really practiced. Despite these limitations, the study provides valuable baseline data that could inform curriculum review in physiotherapy in the identified institution. At the same time, the study could be replicated in other universities offering physiotherapy

curricula as well as other health science training programmes. More research is recommended to explore health science academics for the inclusion of oral hygiene self-care in undergraduate physiotherapy curricula.

## CONCLUSION

The study findings indicate that physiotherapy students had inconsistent reported knowledge, perceptions and oral health-related practices. This further iterates the need to support, through the learning process, oral health self-empowerment, where the individual student takes responsibility for his/her own oral health. Such efforts could reap better oral health outcomes for both students as well as the communities they serve.

## Acknowledgment

The researchers express their appreciation to the students who participated in the study as well as the Head of the School of Health Sciences for permission to conduct the study.

## Funding

This study did not receive any funding.

## Conflicts of interest

The authors declare no conflict of interest.

## REFERENCES

- Sudhakar U, Vishnupriya R, Varsha V. (2019). Knowledge of periodontal disease among various health care professionals. *International Journal of Applied Dental Sciences*, 5(3): 284-292.
- Dewald, Lori EdD, ATC, MCHES, F-AAHE. (2016). "Dental Health Practices in US College Students: The American College Health Association-National College Health Assessment Findings". *Journal of Health Disparities Research and Practice*, 9 (1), Article 3.
- Schechter SR, Lynch J. (2011). Health learning and adult education: In search of a theory of practice. *Adult Education Quarterly*. DOI: 10.1177/0741713610380438
- Raval AJ, Shaikh SK. (2021). A survey about knowledge, attitude, and practice of oral health among the students of Faculty of Medicine, Medical College, Vadodara – A comparative study. *J Dent Res Rev*, 8:36-9. DOI: 10.4103/jdrr.jdrr\_123\_20
- Athobaiti FAA, Manjunatha BS, Amith HV, Alshamrani AS, Alotaibi HAH, Alharthi MMR, Alhumaidi ATM. (2019). Attitude and Behavior of Oral Hygiene among Taif University Students – A questionnaire study. *Merit Research Journal of Medicine and Medical Sciences*, 7(12): 483-488, Available online. <http://www.meritresearchjournals.org/mms/index.htm>
- Bourgeois DM, Phantumvanit P, Llodra JC, et al. (2014). Rationale for the prevention of oral diseases in primary health care: an international collaborative study in oral health education. *International Dental Journal*, 64 (2): 1-11. DOI: 10.1111/idj.12126
- Petersen P. (2014). Strengthening of oral health systems: oral health through primary health care. *Medical Principles and Practice*. Available at: <https://www.karger.com/Article/Abstract/356937>
- World Health Organization (WHO), Ottawa Charter for Health Promotion, 1986
- Petersen PE. (2008). World Health Organization global policy for improvement of oral health – World Health Assembly 2007. *International Dental Journal*, 58(3): 115-121. DOI: 10.1111/j.1875-595X.2008.tb00185.x
- World Health Organization (WHO), the United Nations Children's Fund (UNICEF) Declaration of Alma-Ata. *International Conference on Primary Health Care*, Alma-Ata, USSR, 6-12 September 1978
- Mumghamba EG. (2014). Integrating a primary oral health care approach in the dental curriculum: A Tanzanian experience. In: *Medical Principles and Practice*, 69-DOI: 10.1159/000355520
- De Oliveira Diniz LV, da Costa CHM, Oliveira AFB, et al. (2012). Health professionals' knowledge of oral health preventive practices regarding early childhood health care. *Journal of Public Health*, 20(5): 513-518. DOI: 10.1007/s10389-012-0492-0
- National Department of Health (2019). *The National Health Promotion Policy and Strategy, 2015-2019*. Pretoria. Available: <https://knowledgehub.health.gov.za/elibrary/national-health-promotion-policy-and-strategy-2015-2019>
- Oberoi SS, Mohanty V, Mahajan A, Oberoi A. (2014). Evaluating awareness regarding oral hygiene practices and exploring gender differences among patients attending for oral prophylaxis. *J Indian Soc Periodontol*, 18(3):369-374. <https://doi.org/10.4103/0972-124X.134580>
- Singh S, Pottapinjara S. (2017). Dental undergraduate students' knowledge, attitudes and practices in oral health self-care: A survey from a university in South Africa. *African Journal of Health Professions Education*, 9(2): 83-87
- Habib SR, Alotaibi AK, Alabdulkader MA, Alanazi SM, Ahmedani MS. (2020). Self-reported oral hygiene practices and oral health status among dental professionals. *South African Dental Journal*, 75(1): 7-13. <https://dx.doi.org/10.17159/2519-0105/2020/v75no1a1>
- Almoteb MM, Alalyani SS, Gowdar IM, Penumatsa NV, et al. (2019). Oral hygiene status and practices among health-care workers: A cross-sectional study. *J. Int. Oral Health*, 11 (5): 268-273. DOI: 10.4103/jioh.jioh\_315\_18
- Kerr J, Singh S. (2018). Nursing students' attitudes and practices of oral health self-care. *African Journal for Physical Activity and Health Sciences*, 24(2): 143-155
- Onwubu SC, Ogwo KC, Onyenu UP, Iwueke GC, Mokhothu TH. (2022). Evaluating the oral health knowledge, attitude, and practice among undergraduate students and staff at selected federal University in Imo state, Nigeria. *South African Dental Journal*, 77(10): 610-619. <http://dx.doi.org/10.17159/2519-0105/2022/v77no10a4>.
- Tadin A, Poljak Guberina R, Domazet J, Gavic L. (2022). Oral Hygiene Practices and Oral Health Knowledge among Students in Split, Croatia. *Healthcare (Basel)*, Feb 21, 10(2):406. doi: 10.3390/healthcare10020406
- Okoroafor CC, Okobi OE, Owodeha-Ashaka M, Okobi E, Oluseye B, Ekpang OB, Aya LE, Owolabi OJ, Oru-Betem TE, Nwafor JN. (2023). Dental Health Knowledge Attitude and Practice Among University of Calabar Students. *Cureus*, Jun 6; 15(6):e40055. doi: 10.7759/cureus.40055
- Bashiru BO, Anthony IN. (2014). Oral self-care practices among university students in Port Harcourt, Rivers State. *Nigerian Medical Journal*, 55(6): 486-9. DOI: 10.4103/0300-1652.144703
- Quinlan K. Does floss have a future? (2016). *Br Dent Journal*. Aug 26; 221(4):152-3. doi: 10.1038/sj.bdj.2016.588
- Van de Wiejden G, Slot D. (2012). Interdental oral hygiene: The evidence. In: *Multi-Disciplinary Management of Periodontal Disease 2012: 1-18*. Available at: <http://www.parodontologie-utrecht.nl/media/boeken/boekintrorahygienevidence.pdf>
- Nazir M, Almulhim KS, AlDaamah Z, Bubshait S, Sallout M, AlGhamdi S, Alhumaid J. (2021). Dental Fear and Patient Preference for Emergency Dental Treatment Among Adults in COVID-19 Quarantine Centers in Dammam, Saudi Arabia. *Patient Prefer Adherence*, Jul 30; 15:1707-1715. doi: 10.2147/PPA.S319193
- Armfield JM. (2013). What goes around comes around: revisiting the hypothesized vicious cycle of dental fear and avoidance. *Community Dent Oral Epidemiology*, 41:279-287. doi: 10.1111/cdoe.12005
- Mohebbi SZ, Virtanen JI, Murtomaa H, et al. (2008). Mothers as facilitators of oral hygiene in early childhood. *International Journal of Paediatric Dentistry*, 18(1): 48-55. DOI: 10.1111/j.1365-263X.2007.00861.x
- Strandmark M. (2007). The concept of health and health promotion. *Scandinavian Journal of Caring Sciences*. DOI: 10.1111/j.1471-6712.2007.00501.x

# CPD questionnaire on page 174

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.

