

## Myanmar Dental Students' Knowledge and Attitudes Towards Teledentistry

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A synergistic development in telecommunication technology and internet in combination with dental surgery is known as teledentistry; an essential element for enhancing diagnosis and related treatment in daily dental practice. The aim of this study is to assess the knowledge and attitude of dental students studying at the University of Dental Medicine, Yangon (UDMY) towards teledentistry. A cross-sectional descriptive study was conducted in eight clinical departments of the University of Dental Medicine, Yangon. A total of 228 undergraduate dental students (third year, fourth year and final year) were selected through simple random sampling method. A self-administered structured questionnaire with close-ended questions was used to collect data regarding knowledge and attitude of dental students towards teledentistry. Each questionnaire was set in English with a 3-point Likert scale. In general, undergraduate dental students had known about how to define teledentistry. Significant good knowledge level of study population was noted in the following statements: “teledentistry is not a face to face interview” ( $p=0.001$ ) and “teledentistry has limited use in dentistry” ( $p=0.011$ ). Attitude scores of the studying population were significantly high and the respondents thought teledentistry can increase accessibility of the specialists to rural and underserved communities for their dental needs ( $p<0.001$ ). Regarding total knowledge and attitudes score, 61.4% of study population revealed unfavorable knowledge and 52.6% had poor attitude level. As the university students have poor level of knowledge and attitudes with teledentistry, and these findings promise further research for the awareness programs to promote teledentistry among branches of dentistry in Myanmar.

*Keywords:* Teledentistry, Dental students, Knowledge, Attitude

### INTRODUCTION

Teledentistry is defined as the use of electronic information and telecommunications technology to support long-distance clinical oral health care, patient and professional health-related education, public health and health administration.<sup>1</sup> In addition, teledentistry is an inclusive of dental education, public awareness, assistance of general dentists with specialty work, the exchange of clinical information and images over remote distances for consultation and treat-

ment planning. Thus, teledentistry could apply in every field of dentistry; oral and maxillofacial surgery, endodontics, orthodontics, prosthodontics, periodontics, pediatric dentistry, preventive dentistry, oral medicine and diagnosis.<sup>2,3</sup> Originally, telemedicine is derived from Greek word “Tele” which means “distance” and “Mederi” in Latin means

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“to heal”.<sup>4</sup> Teledentistry is now accepted as useful tools for communicating among health professionals and even, educating dental students. It could be additionally useful in imparting basic knowledge to patients regarding dental health care thereby improving the oral health care facilities to the dental patients.<sup>5, 6, 7</sup> Teledentistry could imply in an urban setup as well as in rural areas. In the former setting, a dental patient under severe distress or in a state of medical emergency would be able to seek a medical physician via teledentistry, but also in rural areas, where money and distance to seek an emergency dental treatment is a major barrier. Again, rural people as well as migrants or undeserved people in urban community who have troubles of minimum or almost no treatment facilities is an ideal example of “inverse care law”.<sup>8</sup> According to previous work, it is believed that teledentistry will reduce the problems related to shortage of dental specialists, access, cost, efficiency and quality of dental services.<sup>3</sup>

Thus, it is essentially needed to imply the knowledge of teledentistry to be incorporated in teaching program of future generation dentists. Generally, dental students need to learn about teledentistry during their undergraduate course, for instance, using intraoral camera, sending of recorded images to specialist dentist like orthodontist for review, to provide referral and treatment recommendation. In addition, if the knowledge related to teledentistry in university students was explored in this study, further plans may be needed to implement in the learning/teaching process. Hence, the present study was conducted with the aim to assess the knowledge and attitude levels regarding teledentistry among the dental students at the University of Dental Medicine, Yangon (UDMY).

## **MATERIALS AND METHODS**

A cross-sectional descriptive study was conducted in eight clinical departments of University of Dental Medicine, Yangon as follows: Department of Oral and Maxillo-facial Surgery, Oral Medicine, Conservative

Dentistry, Periodontology, Prosthodontics, Pediatric Dentistry, Orthodontics, Preventive and Community Dentistry during 2018. A self-administered structured questionnaire with close-ended questions was used to collect data regarding knowledge and attitude of dental students towards teledentistry. The participants for this study were 228 undergraduate dental students (third, fourth and final year) who are studying at the different clinical departments of UDMY. A study group of participants was selected by simple random sampling method. The questionnaires were designed in English, adapted and modified from Singh and Suma.<sup>9</sup> These questionnaires were divided into three main parts. The first part contained questions related to the socio-demographic data such as age, gender, educational level and hours of internet usage. The second part was designed to measure knowledge regarding the teledentistry (8 items). The third part was designed to measure attitude of dental students towards teledentistry (8 items). Each questionnaire was set with a 3-point Likert response scale ranging from 3 (Agree), 2 (Neutral) and 1 (Disagree). These questionnaires were validated and pretested prior to data collection.

### *Statistical analysis*

The recoded data were compiled, encoded, entered into SPSS 20.0 software and analyzed. The mean, standard deviation and the range for the overall sample for knowledge and attitude were calculated. Further the raw scores for knowledge and attitude were converted to percentage. Knowledge score above the mean is assumed as good knowledge level and below mean is assumed as the poor knowledge level. Attitude score above mean is assumed as good attitude level and below mean is assumed as the poor attitude level. Level of significance was fixed at  $p < 0.05$ . Frequencies, means and standard deviations as part of descriptive statistics were used to describe the data. Chi-square test was performed to assess whether the knowledge and attitude vary according to socio-demographic characteristics and level of education of students towards teledentistry.

### Ethical consideration

This study was approved by Research Ethical Review Committee of the University of Dental Medicine, Yangon.

## RESULTS

A total of 228 dental students, 73.7% (n=168) male and 26.3% (n=60) female participated in this study. Among the study population, 50.4% (n=115) of dental students were 15-20 years age group, 49.1% (n=112) were 21-25 years age group and 0.4% (n=1) were 26-30 years age group. Majority of dental students (78.1%, n=178) surfed on internet more than 2 hours per day. Most students used internet access by using their hand phones i.e. 68.4% (n=156) and 31.1% (n=71) of students used internet via personal computer as well as hand phones (Table 1).

Table 1. Characteristics of the dental students (n=228)

| Socio-demographic data of students                          | n(%)      |
|---|-----------|
| <b>Age (year)</b>   |           |
| 15-20   | 115(50.4) |
| 21-25   | 112(49.1) |
| 26-30   | 1(0.4)    |
| <b>Sex</b>  |           |
| Male  | 168(73.7) |
| Female  | 60(26.3)  |
| <b>Level of education (year)</b>                            |           |
| Third year  | 76(33.3)  |
| Fourth  | 76(33.3)  |
| Final   | 76(33.3)  |
| <b>Level of internet access per day (in general) (hour)</b> |           |
| <1  | 9(3.9)    |
| 1-2   | 41(18.0)  |
| >2  | 178(78.1) |
| <b>Types of internet access</b>                             |           |
| Phone   | 156(68.4) |
| Personal computer   | 1(0.4)    |
| Both  | 71(31.1)  |

Majority of students from final year (96.1%), fourth year (93.4%) and third year (80.3%) knew well about what is teledentistry. In this study, 68.4% of final year students and 67.1% of fourth year students understood that the teledentistry is not a face-to-face interview. However, more than 50% of third

BDS students were not sure about this. Majority of the students from final BDS (61.8%), but 42.1% of fourth and 36.8% of third BDS students knew that teledentistry has limited use in dentistry (Table 2).

Table 2. Comparison of qualifications with dental students' responses in knowledge (n=228)

|  | 3 <sup>rd</sup> BDS (%) | 4 <sup>th</sup> BDS (%) | Final BDS (%) | Total (100%) | Chi-square | p value |
|--|-------------------------|-------------------------|---------------|--------------|------------|---------|
| Teledentistry is the practice of use of computer telecommunication services, etc to diagnosis and provide advice about treatment over a distance |                         |                         |               |              |            |         |
| Agree  | 80.3                    | 93.4                    | 96.1          | 89.9         |            |         |
| Neutral  | 18.4                    | 5.3                     | 3.9           | 9.2          | 11.699     | 0.006*  |
| Disagree   | 1.3                     | 1.3                     | 0             | 0.9          |            |         |
| Teledentistry is not a face-to-face interview  |                         |                         |               |              |            |         |
| Agree  | 43.4                    | 67.1                    | 68.4          | 59.6         |            |         |
| Neutral  | 46.1                    | 23.7                    | 17.1          | 28.9         | 18.135     | 0.001*  |
| Disagree   | 10.5                    | 9.2                     | 14.5          | 11.4         |            |         |
| Teledentistry will help to consult with an expert about specific patient's problem   |                         |                         |               |              |            |         |
| Agree  | 52.6                    | 68.4                    | 65            | 62.3         |            |         |
| Neutral  | 38.2                    | 27.6                    | 25            | 30.3         | 6.064      | 0.201   |
| Disagree   | 9.2                     | 3.9                     | 9.2           | 7.5          |            |         |
| Teledentistry is good for dental education over internet and for training primary care dentists  |                         |                         |               |              |            |         |
| Agree  | 73.7                    | 82.9                    | 75            | 77.2         |            |         |
| Neutral  | 22.4                    | 9.2                     | 19.7          | 17.1         | 6.109      | 0.183   |
| Disagree   | 3.9                     | 7.9                     | 5.3           | 5.7          |            |         |
| Teledentistry can help to monitor patient's oral health  |                         |                         |               |              |            |         |
| Agree  | 73.7                    | 82.9                    | 75            | 77.2         |            |         |
| Neutral  | 22.4                    | 9.2                     | 19.7          | 17.1         | 7.4        | 0.115   |
| Disagree   | 3.9                     | 7.9                     | 5.3           | 5.7          |            |         |
| Teledentistry has limited use in dentistry   |                         |                         |               |              |            |         |
| Agree  | 36.8                    | 42.1                    | 61.8          | 46.9         |            |         |
| Neutral  | 59.2                    | 48.7                    | 34.2          | 47.4         | 12.669     | 0.011*  |
| Disagree   | 3.9                     | 9.2                     | 3.9           | 5.7          |            |         |
| Teledentistry can be useful in improving the access to oral health care  |                         |                         |               |              |            |         |
| Agree  | 78.9                    | 78.9                    | 69.7          | 75.9         |            |         |
| Neutral  | 19.7                    | 17.1                    | 26.3          | 21.1         | 3.368      | 0.499   |
| Disagree   | 1.3                     | 3.9                     | 3.9           | 3.1          |            |         |
| Teledentistry has a potential to be integrated into current dental services  |                         |                         |               |              |            |         |
| Agree  | 56.6                    | 64.5                    | 68.4          | 63.2         |            |         |
| Neutral  | 38.2                    | 32.9                    | 28.9          | 33.3         | 2.807      | 0.605   |
| Disagree   | 5.3                     | 2.6                     | 2.6           | 3.5          |            |         |

Chi-square test, \*p value of <0.05 was regarded as statistically significant

In attitude category, 72.4% of third BDS students, 81.6% of fourth BDS students and 69.7% of final BDS students agreed that teledentistry can provide a good understanding

Table 3. Comparison of qualifications with dental students' responses in attitude (n=228)

|   | 3 <sup>rd</sup><br>BDS<br>(%) | 4 <sup>th</sup><br>BDS<br>(%) | Final<br>BDS<br>(%) | Total<br>(100%) | Chi-<br>square | p<br>value |
|---|-------------------------------|-------------------------------|---------------------|-----------------|----------------|------------|
| Teledentistry can provide me a good understanding of the patient's oral health problem over the internet                        |                               |                               |                     |                 |                |            |
| Agree   | 72.4                          | 81.6                          | 69.7                | 74.6            | 11.914         | 0.011*     |
| Neutral   | 27.6                          | 11.8                          | 27.6                | 22.4            |                |            |
| Disagree  | 0                             | 6.6                           | 2.6                 | 3.1             |                |            |
| Using teledentistry, I will be able to monitor my patient's condition well  |                               |                               |                     |                 |                |            |
| Agree   | 51.3                          | 38.2                          | 38.2                | 42.5            | 8.553          | 0.073      |
| Neutral   | 42.1                          | 48.7                          | 40.8                | 43.9            |                |            |
| Disagree  | 6.6                           | 13.2                          | 21.1                | 13.6            |                |            |
| I think dental examinations are accurate via computers and Intraoral camera as in the traditional office setting                |                               |                               |                     |                 |                |            |
| Agree   | 46.1                          | 59.2                          | 38.2                | 47.8            | 9.505          | 0.050      |
| Neutral   | 39.5                          | 26.3                          | 35.5                | 33.8            |                |            |
| Disagree  | 14.5                          | 14.5                          | 26.3                | 18.4            |                |            |
| I think children and parents would be receptive to having a dental examination done via computers and Intraoral camera          |                               |                               |                     |                 |                |            |
| Agree   | 73.7                          | 82.9                          | 75                  | 77.2            | 6.109          | 0.183      |
| Neutral   | 22.4                          | 9.2                           | 19.7                | 17.1            |                |            |
| Disagree  | 3.9                           | 7.9                           | 5.3                 | 5.7             |                |            |
| Teledentistry is convenient form of oral health care delivery which makes dental examination easier                             |                               |                               |                     |                 |                |            |
| Agree   | 53.9                          | 75                            | 52.6                | 60.5            | 11.942         | 0.016*     |
| Neutral   | 40.8                          | 22.4                          | 36.8                | 33.3            |                |            |
| Disagree  | 5.3                           | 2.6                           | 10.5                | 6.1             |                |            |
| Teledentistry will be a standard way of oral health care delivery   |                               |                               |                     |                 |                |            |
| Agree   | 51.3                          | 56.6                          | 36.8                | 48.2            | 11.236         | 0.023*     |
| Neutral   | 40.8                          | 30.3                          | 39.5                | 36.8            |                |            |
| Disagree  | 7.9                           | 13.2                          | 23.7                | 14.9            |                |            |
| Teledentistry can save time and reduce cost for me  |                               |                               |                     |                 |                |            |
| Agree   | 47.4                          | 63.2                          | 60.5                | 57              | 4.922          | 0.3        |
| Neutral   | 38.2                          | 27.6                          | 26.3                | 30.7            |                |            |
| Disagree  | 14.5                          | 9.2                           | 13.2                | 12.3            |                |            |
| I think teledentistry can increase accessibility of the specialists to rural and underserved communities for their dental needs |                               |                               |                     |                 |                |            |
| Agree   | 50                            | 71.1                          | 67.1                | 67.1            | 22.857         | 0.000*     |
| Neutral   | 47.4                          | 26.3                          | 28.9                | 28.9            |                |            |
| Disagree  | 2.6                           | 2.6                           | 3.9                 | 3.9             |                |            |

Chi-square test, \*p value of <0.05 was regarded as statistically significant

of the patient's oral health problem over the internet. Again, fourth year students (75%) agreed that "teledentistry is convenient form of oral health care delivery which makes dental examination easier". It seems that fourth BDS students had better attitude level than that of third (53.9%) and final BDS (52.6%).

Regarding the statement "Teledentistry will be a standard way of oral health care delivery" 56.6% of fourth BDS students and 51.3% of third BDS students had higher attitude level than final year students (36.8%) ( $p < 0.05$ ) (Table 3). Higher percentage of the participants (50%) from third BDS, 71.1% from fourth BDS, and 67.1% from final BDS students thought teledentistry can increase accessibility of the specialists to rural and underserved communities for their dental needs. As previous categories, fourth BDS students had higher attitude level than that of other student groups ( $p < 0.05$ ) (Table 3).

Table 4. Knowledge and attitude level of dental students (n=228)

|                  | Level | No(%)     | Total<br>n(%) |
|------------------|-------|-----------|---------------|
| Knowledge level* | Good  | 88(38.6)  | 228(100)      |
|                  | Poor  | 140(61.4) |               |
| Attitude level + | Good  | 108(47.4) | 228(100)      |
|                  | Poor  | 120(52.6) |               |

\*Knowledge score above mean is assumed as good knowledge level and below mean is assumed as the poor knowledge level.

+Attitude score above mean is assumed as good attitude level and below mean is assumed as the poor attitude level.

When total knowledge and attitudes scores were considered, the raw scores were calculated for all the sections of knowledge and attitude. Among 228 dental students, majority of students had poor knowledge level regarding teledentistry (61.4%) as well as they have higher percentage in poor attitude level (56.6%) (Table 4).

## DISCUSSION

Information technology coordinated with dental care services known as teledentistry, is an instant and beneficial information transferring system via internet or telecommunication over remote distances and has now developed immense changes in the field of dental care services.<sup>9</sup> It is now possible for Myanmar people as the country is rapidly blooming with information technology.

Therefore, it is essential to explore the dental students' awareness to the teledentistry, with the aim of facilitation in the implementation of teledentistry in Myanmar. When enquiring about knowledge regarding teledentistry, majority of study population had good knowledge level in defining teledentistry, among them, final year students possess better knowledge level than that of remaining groups. The reason may be due to the fact that the final year students were familiar with the concept of academic education on internet and had more chances to attend the continuing dental education programs. The current study depicted that majority of the participants (89.9%) have sound knowledge on "teledentistry is the practice of use of computers, internet and intraoral camera technologies to diagnose and provide advice about treatment over a distance". This is contrary with the study of Singh and Suma in 2016, where they explored a non-significant result with this issue.<sup>9</sup> On the other hand, similar findings in "what is the teledentistry" as mentioned in this study were noted in several studies.<sup>10, 11</sup> These varying findings pointed out the need of further studies regarding in teledentistry with various study populations, for instance, dentists from private and public sectors, or faculty staff. It was observed that majority of the dental students agreed that teledentistry has limited use in dentistry. Sen and co-workers reported that all fourth year students and more than 75% of third year students responded the same answer and it might be reflected by their education level.<sup>12</sup>

In this study, 81.6% of fourth BDS students, about 70% of third and final BDS students agreed that "teledentistry is a good understanding of the patient's oral health problem over the internet". Thus, fourth BDS students had higher attitude level than that of others ( $p < 0.05$ ). Inferring that fourth BDS students in UDMY have exposed to hospital setting in General Medicine and General Surgical wards, and this seems that they adapt better attitude towards this issue. This finding is similar to the study of Singh and Suma (2016) in which 87% of the study population

including practicing dentist and students agreed on the same issue.<sup>9</sup> Hence, this can be concluded that practicing dentists as well as dental students have a positive attitude on teledentistry in general. In addition, 75% of fourth year students in this study agreed that "teledentistry is a convenient form of oral health care delivery which makes dental examination easier". This finding is similar to that of Singh and Suma in which most of the respondents in their study agreed for the similar statement.<sup>9</sup> Again, the authors found that majority of participants knew that "teledentistry will be a standard way of oral health care delivery".<sup>9</sup>

More than 50% of third and fourth year students have similar positive attitude in the current study ( $p < 0.05$ ). Reporting attitude to the statement of "Teledentistry can increase accessibility of the specialists to rural and underserved communities for their dental needs", 71.1% of fourth BDS students, 67.1% of final BDS students and 50% of third BDS students had significantly higher attitude score ( $p < 0.05$ ). These findings are in accordance with the report of Singh and Suma which revealed 90% of the participants agreed with same statement and this was the key features of their report that all dental professionals accepted that teledentistry must implement for oral health care to the rural population.<sup>9</sup> In determining knowledge level regarding teledentistry, only 38.6% of the under graduate students in this study had good knowledge level on the teledentistry.

The present study is in contrast with the study of Sen and co-workers where they found that undergraduate students had comparatively better knowledge and awareness related to teledentistry compared to postgraduate students.<sup>12</sup> Aforementioned studies with the results of the current study indicated that students as well as dentists in the field of dentistry had positive attitude towards the teledentistry, thus dental health education and training purpose with teledentistry may useful for remote area. It would be of interest to expand the teledentistry research to postgraduate and practicing dentists. However,

it seems that the costs and barriers of utilization of teledentistry technology such as its application in clinical practice in remote area are still needed to consider.

### Conclusion

In this study, the total knowledge and attitudes score towards teledentistry among Myanmar dental students was poor, however, majority of the students believed that teledentistry is convenient form of oral health care delivery which makes dental examination easier. However, they thought that teledentistry has limited used in dentistry. Therefore, it is an urgent need to improve the knowledge and promote teledentistry by implementation of training program for dental students and dental health professionals. Telecommunications with its implications in dental fields in the form of teledentistry has benefited to patients to a great extent by local dentist by consulting with dental specialists or dental Universities used a base area for teledentistry operations. Teledentistry theoretical and practical studies should be incorporated into undergraduate BDS curriculum. If properly tapped, teledentistry could lead to betterment of oral health delivery especially to outreach areas.

### Competing interests

The authors declare that they have no competing interests.

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