

KNOWLEDGE, ATTITUDE AND AWARENESS AMONG DENTAL STUDENTS ABOUT TELEDENTISTRY

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Student:

Chaitanya shree.P

Saveetha Dental College and Hospitals,
Saveetha Institute of Medical and technical Sciences ,
Saveetha University,
Chennai, India.

151701062.sdc@saveetha.com

Guide:

Jayashri Prabakar

Reader

Department of Public health dentistry
Saveetha Dental College and Hospitals,
Saveetha Institute of Medical and technical Sciences ,
Saveetha University,
Chennai, India.

jayashri.sdc@saveetha.com

Corresponding author

Dr.Jayashri Prabakar

Reader

Department of Public health dentistry
Saveetha Dental College and Hospitals,
Saveetha Institute of Medical and technical Sciences ,
Saveetha University,
Chennai, India.

jayashri.sdc@saveetha.com

ABSTRACT

Introduction:

Teledentistry is the practice of using video conferencing technologies to diagnose and provide advice about treatment over a distance and it allows collaboration of various dental professionals regarding consultations and opinions. It is beneficial in getting distant consultations from professionals of various branches. The present study is aimed at assessing the knowledge, attitude and awareness on teledentistry among dental students.

Materials and methods:

The present study is a questionnaire based study which consists of a set of 12 questions. Questions were distributed to undergraduates and postgraduates of Saveetha dental college using online survey. Responses were collected, entered in the MS Excel sheet and transferred to SPSS for analysis. Descriptive statistics were expressed by means of frequency and percentage. Chi Square test was used to find the association between the variables. P value less than 0.05 were considered to be statistically significant.

Results

47% postgraduates and 45.5% undergraduates are aware of the use of telecommunication in screening and diagnosis; 48.5% Postgraduates and 42.5% undergraduates are aware of the fact that teledentistry is useful in gaining knowledge from foreign delegates by means of webinars and for patient diagnosis and screening. 37% postgraduates and 21% undergraduates are aware that teledentistry can be utilised by dentists to collaborate with doctors from other fields. Chi square test was done and P value was found to be statistically significant ($p < 0.05$) in all cases but it was found to be non significant ($p > 0.05$) in case of association of qualification and enhancement of teledentistry in prosthetic works.

Conclusion:

Most of the respondents were aware of teledentistry and its applications in dentistry but still some of them are not aware of it. Hence awareness should be made in this field to overcome difficulties in diagnosis and providing oral care.

Keywords: Teledentistry, Telecommunication, Consultation, Innovative analysis

INTRODUCTION

The field of dentistry consists of broad technologic innovations in recent years. Advances have been made in the use of computers, telecommunications, diagnostic imaging services, devices and software for analysis. These new technologies have not only improved the quality of management of dental patients, but also has made possible their management at distances away from healthcare centers [1]. In some rural and remote areas where there is low economic investment and lack of trained personnel, providing health services is difficult. Telemedicine eliminates those difficulties [2]. Teledentistry is the science of telemedicine concerned with sharing information, distant consultations and analysis [3].

Teledentistry is the practice of using video conferencing technologies to diagnose and provide advice about treatment over a distance, according to Cook (1997) [4]. It employs telecommunication technology, digital imaging to provide consultation, exchanging health

information and maintaining electronic health records [5]. It acts beneficial in improving the provision of oral health care to patients in rural areas and remote locations [4]. It is an alternative method to deliver the existing dental services. Teledentistry allows collaboration of various dental professionals regarding consultations and opinions on the particular case, thus getting rid of doubts in diagnosis [4], [6]. It also benefits in saving time, reducing costs and improving access to services [7]. Teledentistry comprises two techniques namely real-time consultation and technique of store and forwards. Real-time consultation is videoconference between dentist and the patients. The technique of store and forward comprises the exchange of images and clinical knowledge through the telecommunication device [8].

In pandemic situations, teledentistry is beneficial in order to get distant consultations from professionals of various branches [6] and plays a role in monitoring various fields like monitoring orthodontic treatment [9], its use in oral and maxillofacial surgery [9,10], in tobacco cessation counseling [11] etc. Its application is of greater value in rural areas where there is unavailability of specialised dental care [12]. Apart from its applications, it also has obstacles regarding technical, legal, educational, and insurance barriers thus preventing its widespread use by dentists [13]. Teledentistry is used worldwide; but in India, its use is quite limited. This is probably due to lack of awareness on teledentistry among practitioners [4]. Some of the previous studies have also stated the lack of awareness among students on teledentistry[13]. Implementation of teledentistry in the dental field is an efficient way of building up teledental skills [12]. Our team has extensive knowledge and research experience that has translate into high quality publications[14–22],[23],[24],[25,26],[27],[28],[29–33]. Hence we conducted a questionnaire based study on knowledge, attitude and awareness on teledentistry among dental students.

MATERIALS AND METHODS

Study design: A cross sectional study

Study population: Undergraduate and Postgraduate Dental students

Sample size: 200

Method of data collection: The present study is a questionnaire based online survey. Proforma consisted of a set of 12 questions. The first part of the questionnaire consisted of questions related to demographic details. The second part were questions regarding teledentistry in the fields of dentistry, consultations, diagnosis and treatments suggested regarding oral health (refer table 1). The questions were shared with undergraduate students and postgraduate students of Saveetha dental college and responses were collected.

Statistical analysis: The collected responses were entered in the MS Excel sheet and transferred to SPSS for analysis. Dependent variables are qualification (undergraduate or postgraduate) and the responses of each question. Independent variables are age and gender. Descriptive statistics were expressed by means of frequency and percentage. Chi Square test was used to find the association between the variables. P value less than 0.05 were considered to be statistically significant.

Table 1: Questions related to teledentistry

S.No	Questions	Options
1	What aspects do you think teledentistry will be useful in the field of dental practice and academics?	<ul style="list-style-type: none"> ● Gain knowledge from foreign delegates by means of webinars ● Patient diagnosis/screening ● Obtaining opinion from a specialty dental professional ● Patient referral to specialty dental professional ● All of the above ● None of the above
2	Have you come across the use of telecommunication for the purpose of diagnosis/screening of any patient in your practice/institution?	<ul style="list-style-type: none"> ● Yes ● No
3	Are you aware of any applications/technology that are used in teledentistry for patient monitoring/screening?	<ul style="list-style-type: none"> ● Yes ● No
4	Do you think teledentistry will be beneficial for prompt diagnosis of oral lesions of patients in rural areas that have limited access to oral health care?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure

5	Do you think practitioners in rural areas will be able to access at least minimal technology required for teledentistry, that is, Internet, phone/computer?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure
6	Do you think teledentistry can enhance the quality of prosthetic work by facilitating visual communication between dentist and laboratory technician?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure
7	Can teledentistry help general dentists seek advice for radiographic opinion from more experienced professionals/radiologists?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure
8	Can teledentistry be utilized by a dentist/surgeon for collaborating with doctors from other fields such as pediatricians, orthopedic doctors, etc.?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure
9	Do you think minor complications encountered by a relatively inexperienced dentist could be resolved by obtaining guidance from a relatively experienced professional using teledentistry?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure
10	Do you think teledentistry would lead to better diagnosis and provision of oral care as compared to that diagnosed by a single dentist?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure
11	Do you think teledentistry would be essentially beneficial in times of situations like the present COVID-19 pandemic for academic and diagnostic purposes?	<ul style="list-style-type: none"> ● Yes ● No ● Not sure
12	What level of additional technical skills would a dentist need to acquire for inclusion of teledentistry into his academic/practice?	<ul style="list-style-type: none"> ● Simple ● Moderate ● Complex

		<ul style="list-style-type: none">● None required● Not sure
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RESULTS AND DISCUSSION

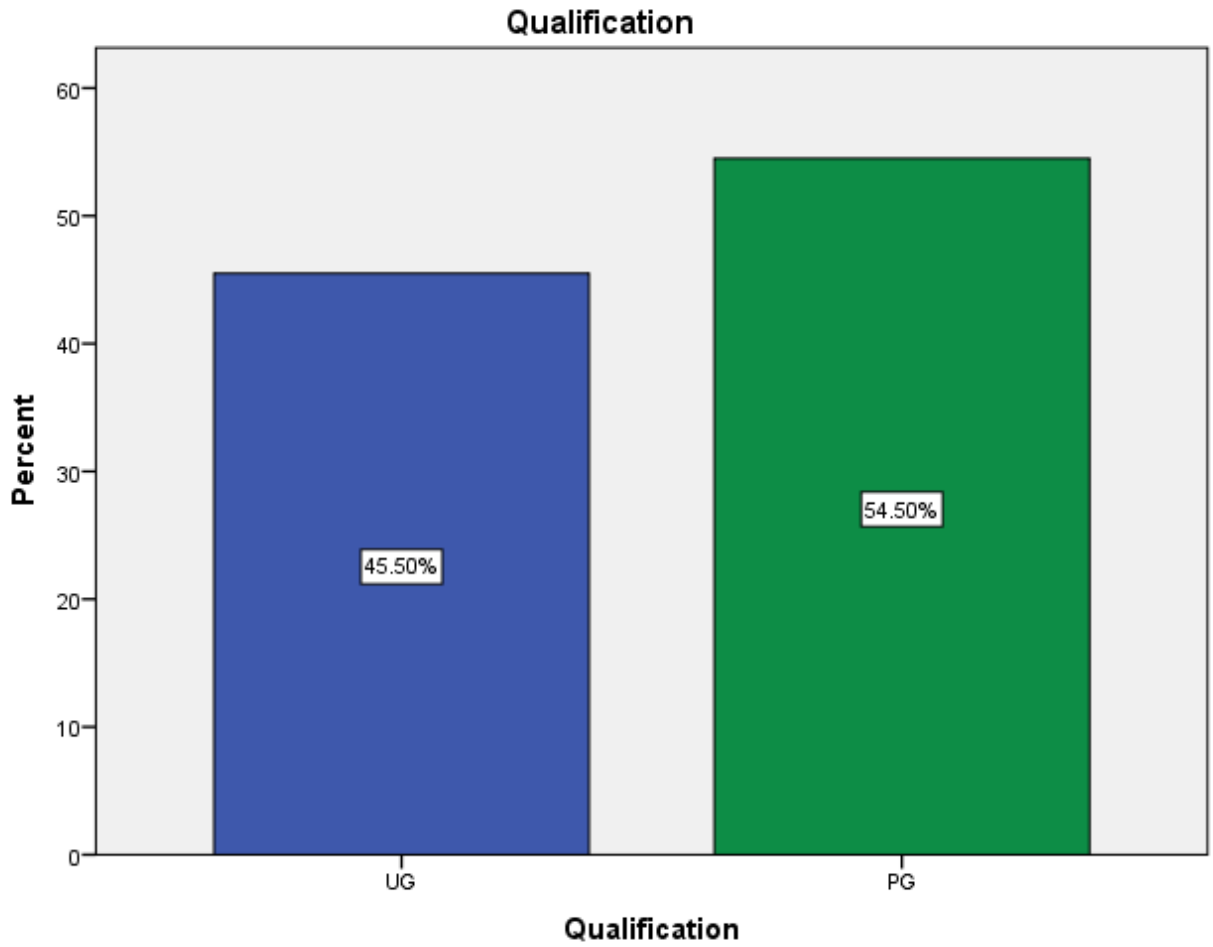


Figure 1: Bar graph showing qualification of students. 45.5% were undergraduate students and 54.5% were postgraduate students.

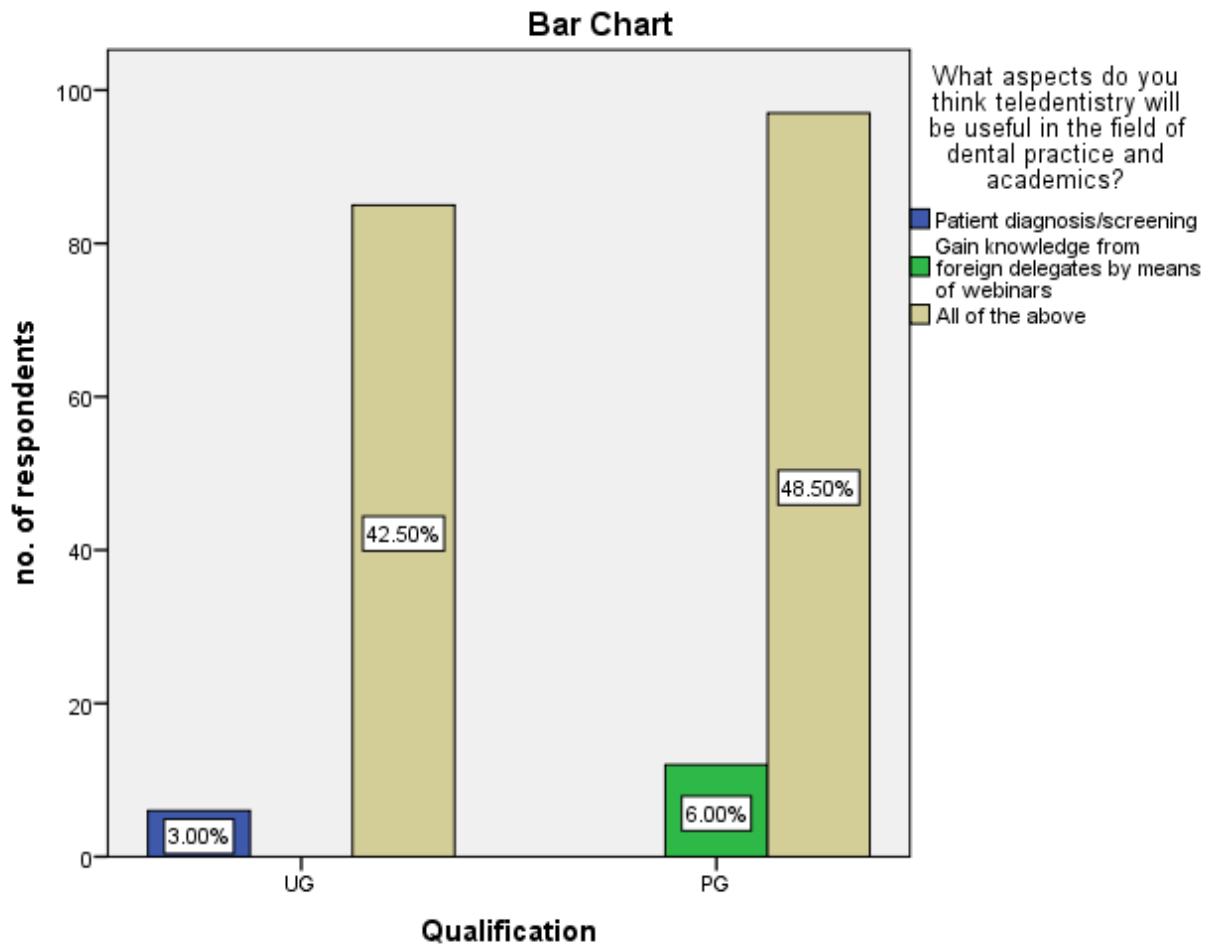


Figure 2: Bar graph showing association of qualification and aspects of teledentistry. 48.5% Postgraduates responded that teledentistry is useful in gaining knowledge from foreign delegates by means of webinars and for patient diagnosis and screening. 42.5% undergraduates responded that teledentistry is useful in gaining knowledge from foreign delegates by means of webinars and for patient diagnosis and screening. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

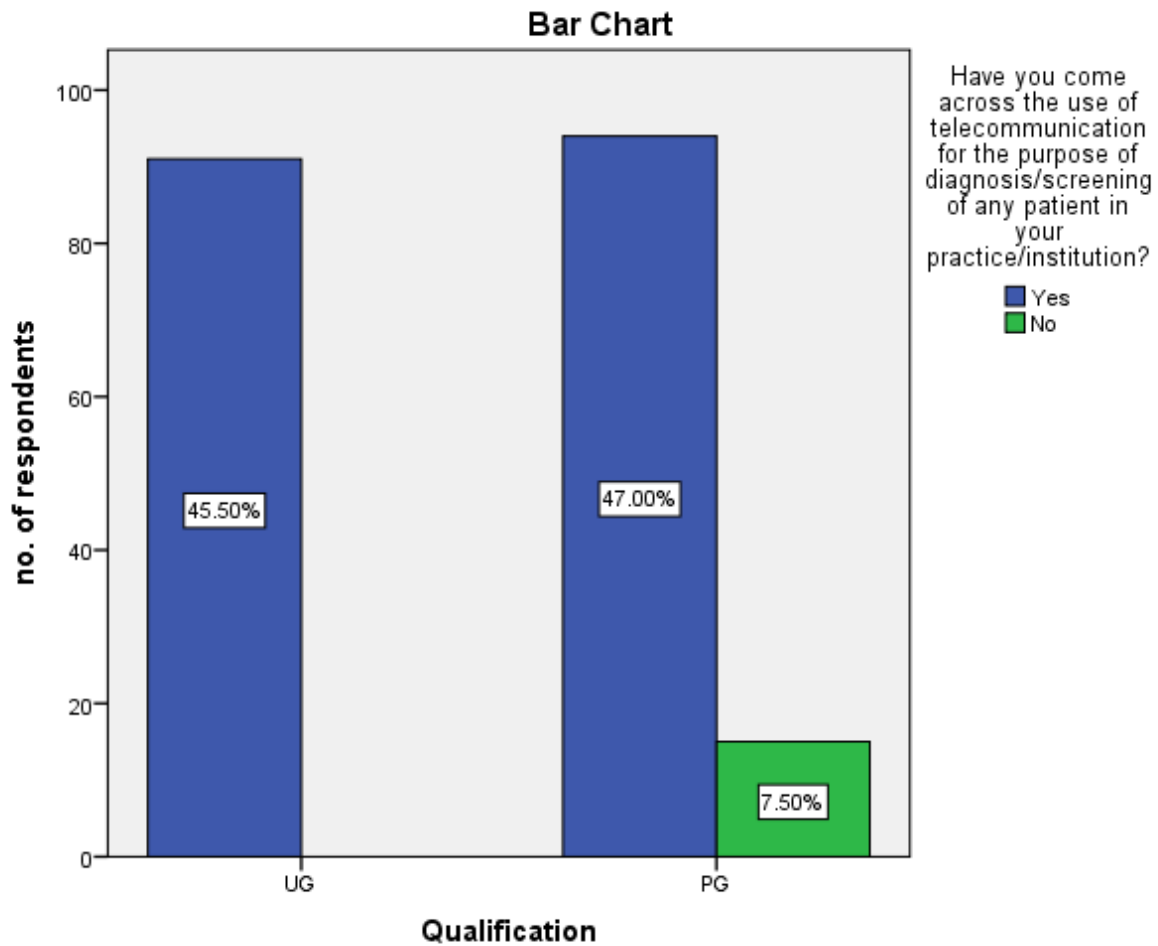


Figure 3: Bar graph showing association of qualification and telecommunication for diagnosis and screening. 47% postgraduates responded that they have come across the use of telecommunication for screening and diagnosis. 45.5% undergraduates responded that they have come across the use of telecommunication for screening and diagnosis. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

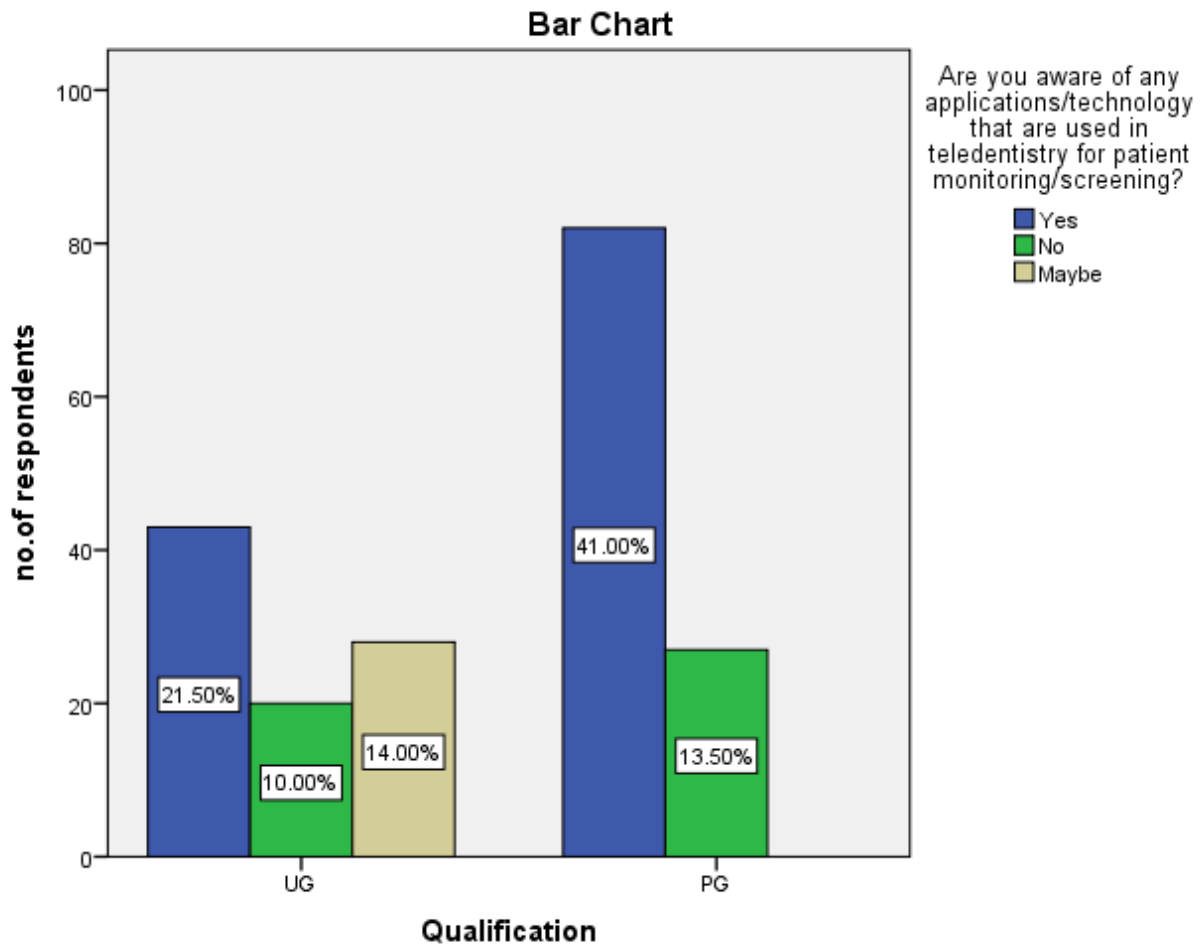


Figure 4: Bar graph showing association of qualification and awareness on applications and technologies in teledentistry. 41% postgraduates responded that they are aware of technologies used in teledentistry. 21.5% undergraduates responded that they are aware of technologies used in teledentistry. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

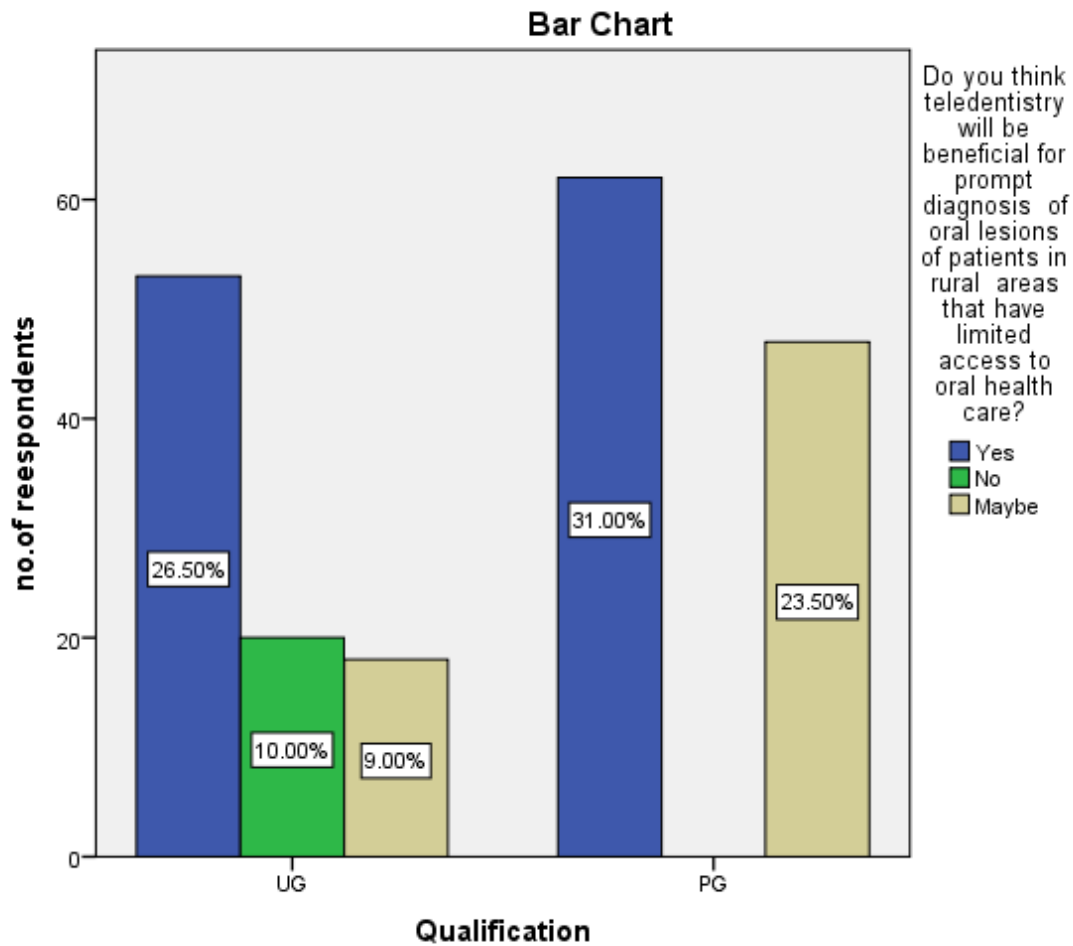


Figure 5: Bar graph showing association of qualification and diagnosis of oral lesions in teledentistry. 31% postgraduates responded that teledentistry will be useful for diagnosing oral lesions of patients in rural areas. 26.5% undergraduates responded that teledentistry will be useful for diagnosing oral lesions of patients in rural areas. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

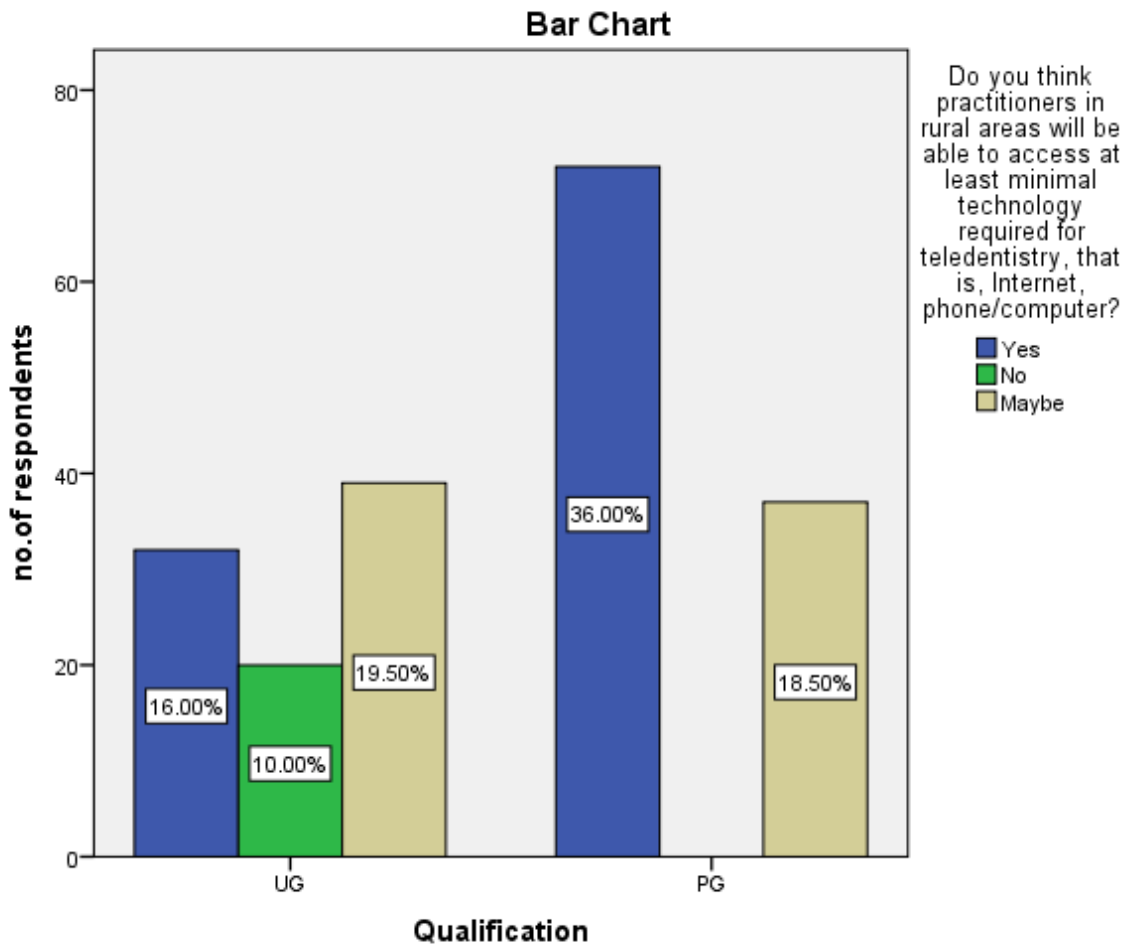


Figure 6: Bar graph showing association of qualification and teledentistry in rural areas. 36% postgraduates responded that practitioners in rural areas can access at least minimal technology required for teledentistry. 16% undergraduates responded that practitioners in rural areas can access at least minimal technology required for teledentistry and 19.5% undergraduates are doubtful about that. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

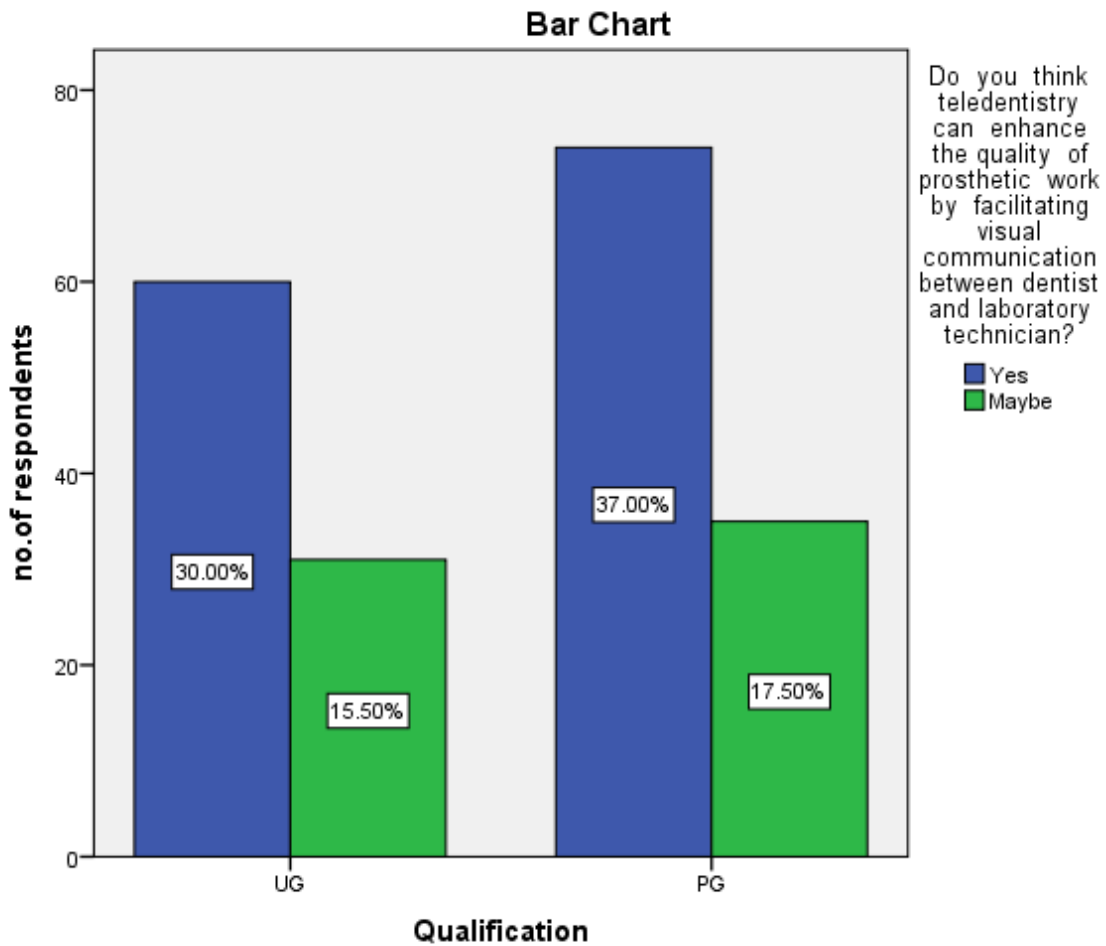


Figure 7: Bar graph showing association of qualification and enhancement of teledentistry in prosthetic works. 37% postgraduates responded that teledentistry can enhance the quality of prosthetic work. 30% undergraduates responded that teledentistry can enhance the quality of prosthetic work. Chi square test was done and P value (0.77) was found to be not significant ($p>0.05$).

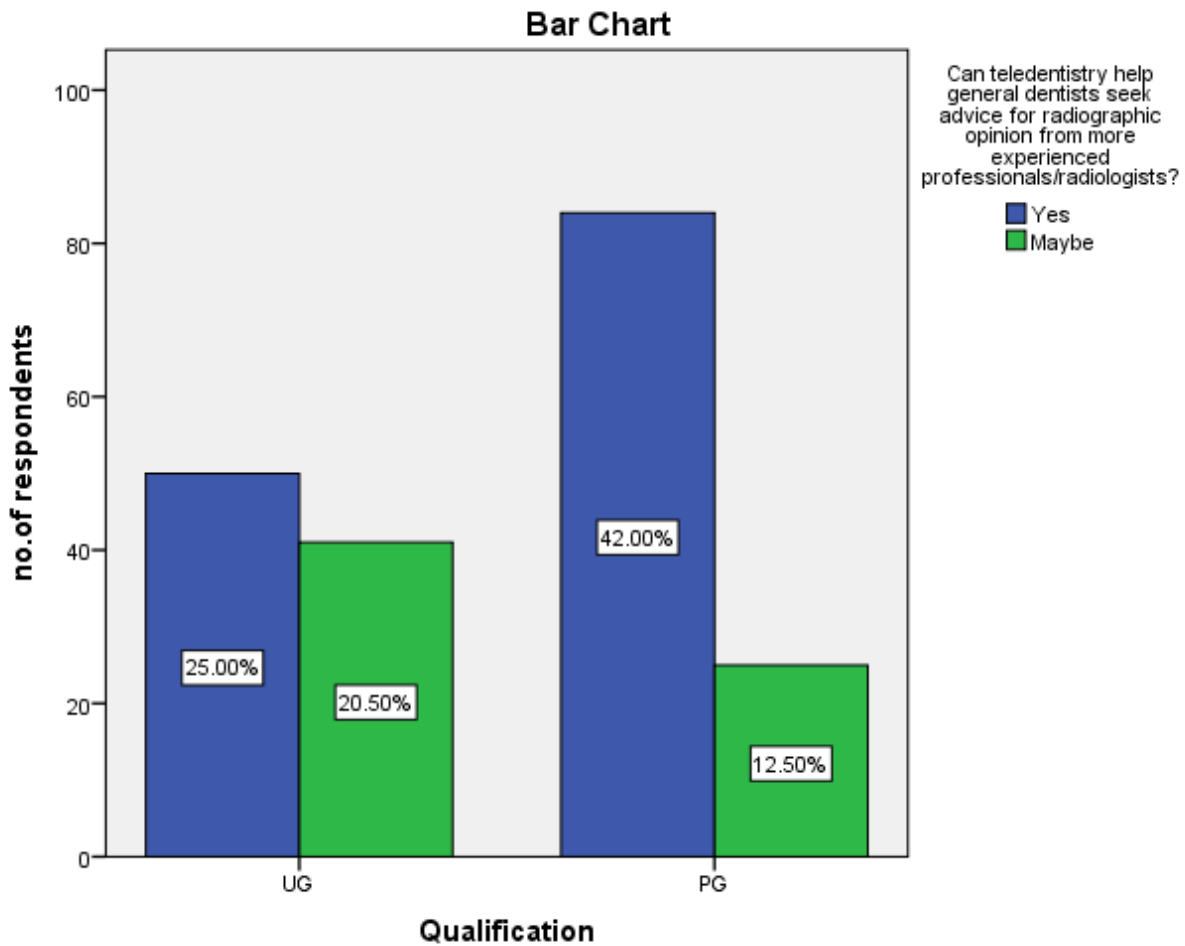


Figure 8: Bar graph showing association of qualification and radiographic opinion in teledentistry. 42% postgraduates responded that teledentistry helps in seeking advice regarding radiographs. 25% undergraduates responded that teledentistry helps in seeking advice regarding radiographs. Chi square test was done and P value (0.001) was found to be statistically significant ($p < 0.05$).

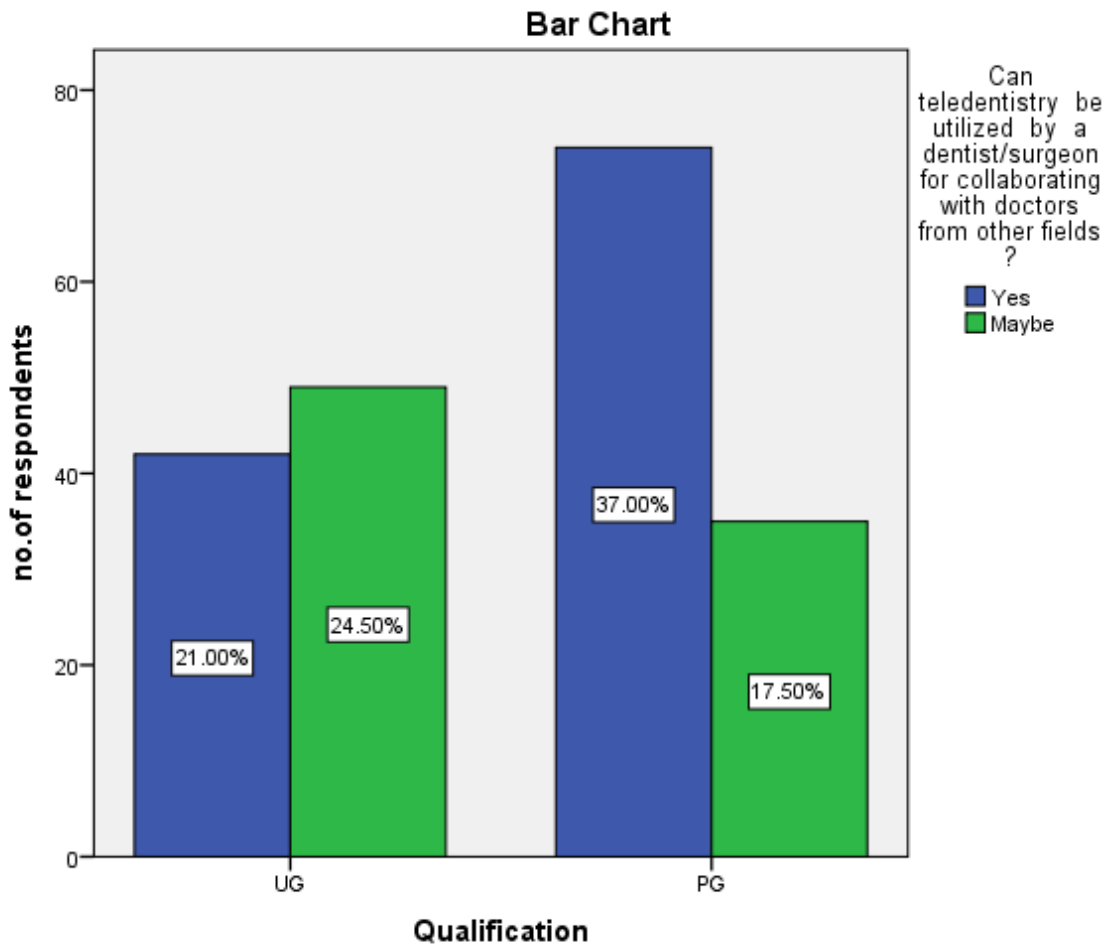


Figure 9: Bar graph showing association of qualification and collaboration with other fields. 37% postgraduates responded that teledentistry can be utilized by dentists to collaborate with doctors from other fields. 21% undergraduates responded that teledentistry can be utilized by dentists to collaborate with doctors from other fields and 24.5% undergraduates were doubtful about that. Chi square test was done and P value (0.002) was found to be statistically significant ($p < 0.05$).

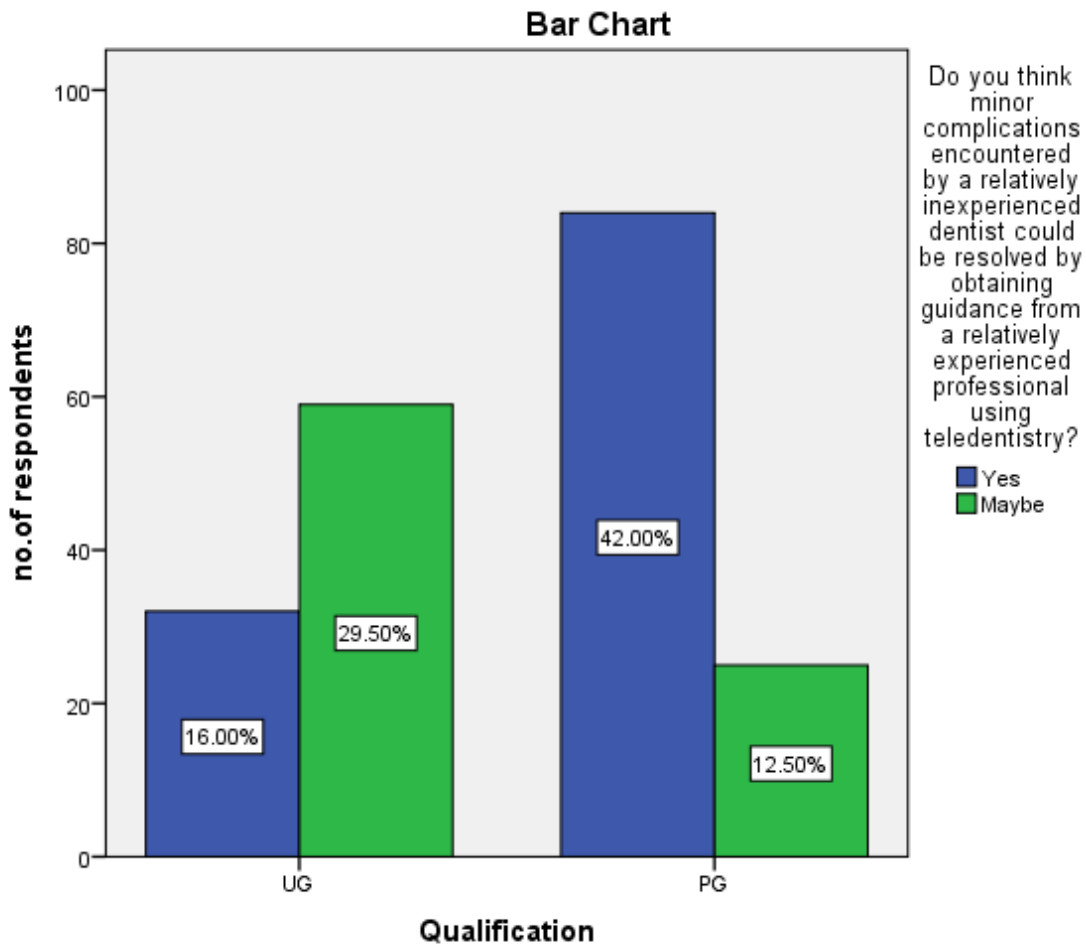


Figure 10: Bar graph showing association of qualification and minor complications. 42% postgraduates responded that minor complications encountered by a relatively inexperienced dentist can be resolved by obtaining guidance from a relatively experienced professional. 16% undergraduates responded that minor complications encountered by a relatively inexperienced dentist can be resolved by obtaining guidance from a relatively experienced professional and 29.5% undergraduates were doubtful about that. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

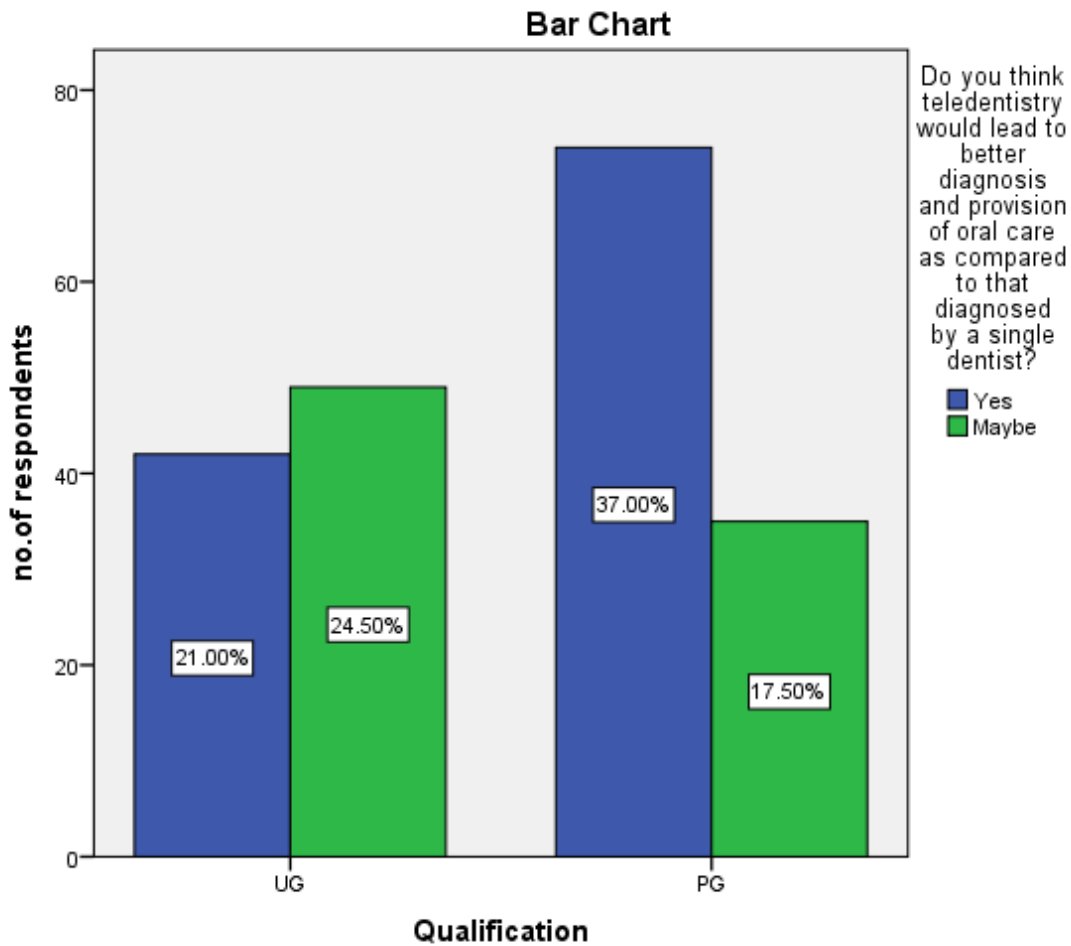


Figure 11: Bar graph showing association of qualification and diagnosis. 37% postgraduates responded that teledentistry will lead to better diagnosis and provision of oral care. 21% undergraduates responded that teledentistry will lead to better diagnosis and provision of oral care and 24.5% undergraduates are doubtful about that. Chi square test was done and P value (0.002) was found to be statistically significant ($p < 0.05$).

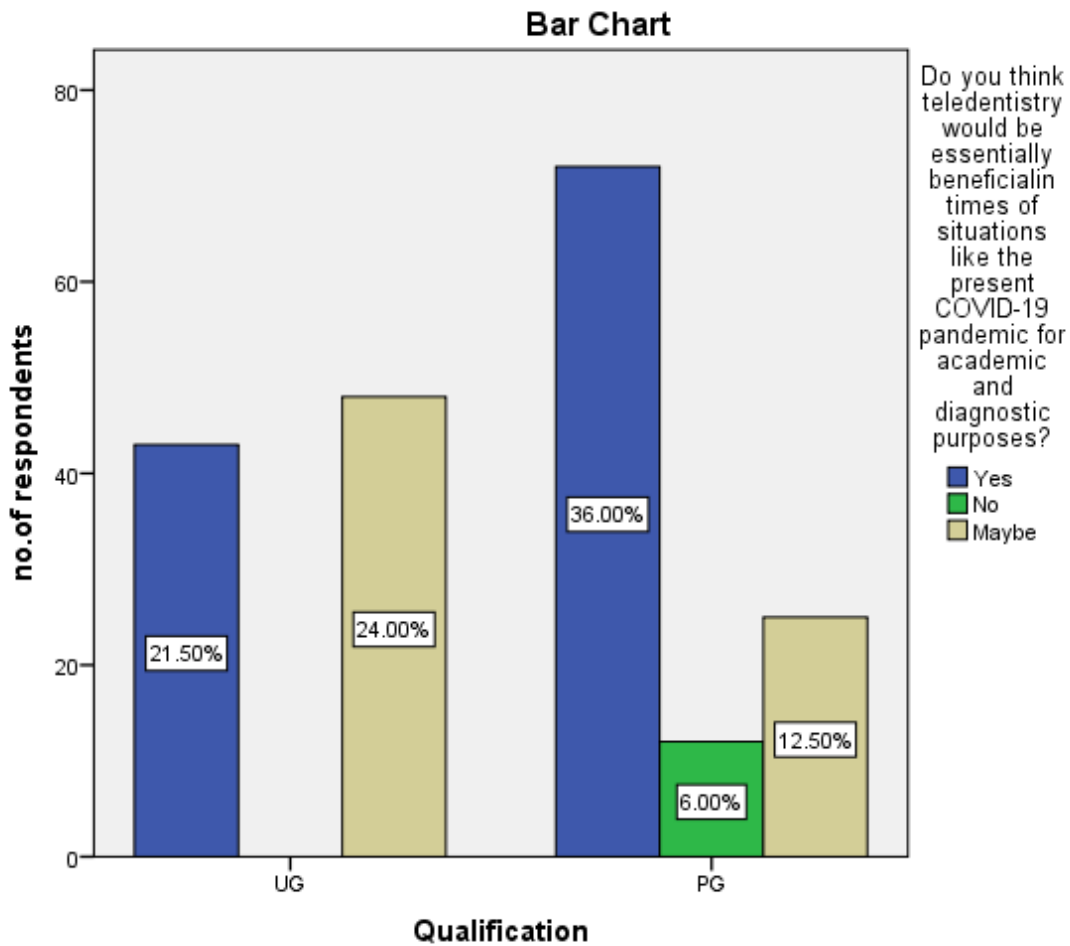


Figure 12: Bar graph showing association of qualification and teledentistry in COVID-19. 36% postgraduates responded that teledentistry is useful in situations like COVID-19 pandemic. 21.5% undergraduates responded that teledentistry is useful in situations like COVID-19 pandemic and 24% undergraduates were doubtful about that. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

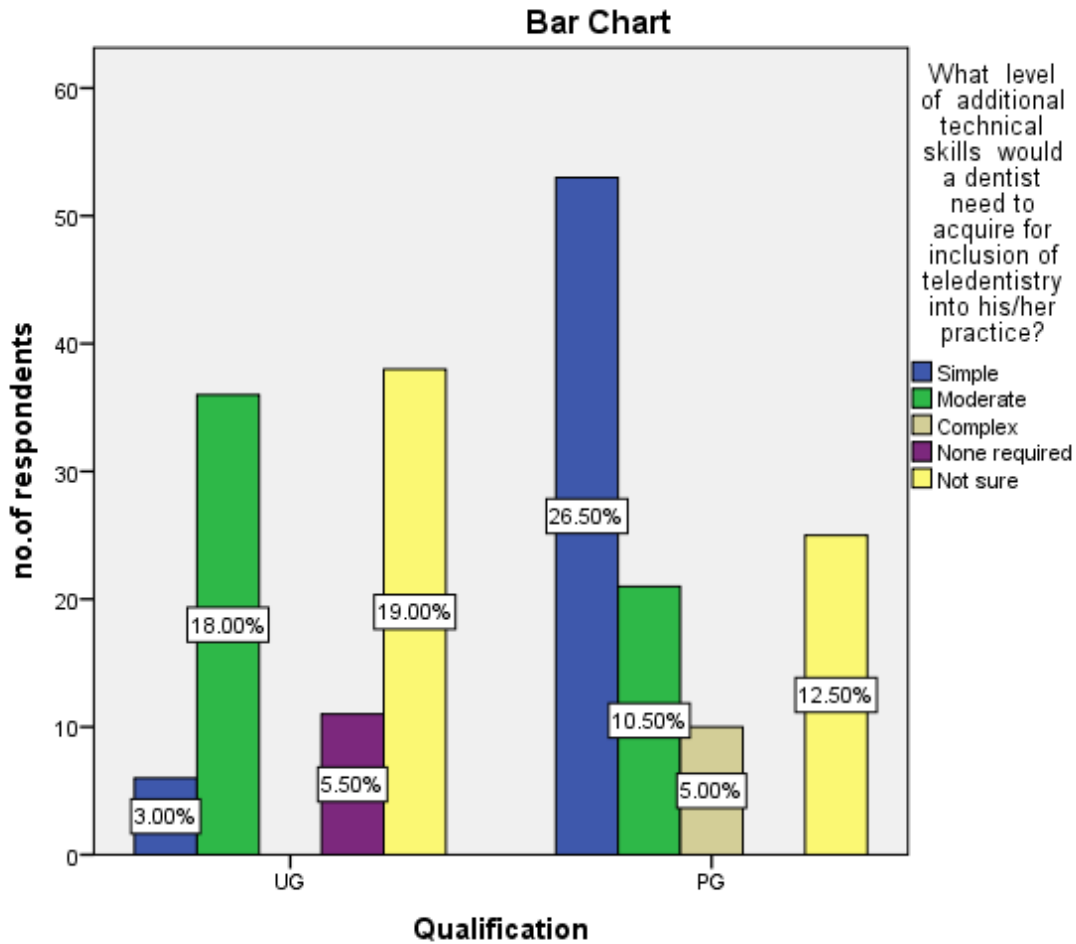


Figure 13: Bar graph showing association of qualification and additional skills. 26.5% postgraduates responded that a simple level of additional technical skills would be needed for inclusion of teledentistry in their practice. 18% undergraduates responded that a moderate level of additional technical skills would be needed for inclusion of teledentistry in their practice and 19% undergraduates were doubtful about that. Chi square test was done and P value (0.00) was found to be statistically significant ($p < 0.05$).

47% postgraduates and 45.5% undergraduates have come across the use of telecommunication for screening and diagnosis and most of them are aware of its use in various fields like diagnosing oral lesions, enhancing prosthetic works and to get opinions from other professionals. In rural areas and remote areas, it is difficult to provide oral care due to limited dental professionals in those areas. Teledentistry can play a useful role in providing oral care for people living in those areas. Even in the present study, 36% postgraduate students and 16% undergraduate students believed that practitioners in rural areas can access at least minimal technology required for teledentistry to provide oral care in those areas [34].

Minor complications are often encountered by a professional in dental clinics and younger professionals might face difficulty in handling those emergencies. In such cases, professional guidance can be obtained to handle such emergencies through teledentistry[35]. 42% postgraduate students and 16% undergraduate students have responded the same. Contrary to the present study, a study conducted by Boringi M reported that most of the respondents in their study believed that teledentistry has limited use in case of dental emergencies [36]. Dentistry is a relatively vast field involving many branches. Sometimes a dentist may face difficulty in obtaining accurate diagnosis for a particular case. In that situation, he/she might need an opinion from another dental professional of speciality expertise. In that situation, teledentistry can be used to get opinions from other dental professionals [35]. 37% postgraduate students and 21% undergraduate students are aware of this.

Radiographs play an important role in diagnosing oral lesions but sometimes it won't give accurate diagnosis, especially in case of malignancies. Hence consultation from a radiologist is very much needed [37]. Even in the present study, 42% postgraduate students and 25% undergraduate students supported this. Certain prosthodontic cases are complex enough to diagnose and determine a treatment plan. In those cases, teledentistry can be beneficial for obtaining diagnosis by consulting prosthodontists [38]. 37% postgraduate students and 30% undergraduate students are aware of this.

To practice teledentistry, it requires dental professionals to acquire technical skills. In the present study, 26.5% postgraduate students and 18% undergraduate students responded that a simple and moderate level of additional technical skills would be needed for inclusion of teledentistry in their practice, respectively. In previous studies, they reported that a moderate level of additional technical skills would be needed [4]. The minimal requirements for practicing teledentistry comprises a smartphone and Internet [39].

In the present study, most of the students are aware of teledentistry, yet still a small population of students were not aware of it. Study conducted by JahanpourAlipour et al in Zahedan stated that most of the respondents in their study are aware of teledentistry and its applications, similar to the present study [13]. Contrary to the present study, a study conducted by Bahaadinbeigi K et al in Kerman University reported that the majority of the respondents in their study were not aware of teledentistry[40].

CONCLUSION

Within the limits of the present study, it is observed that most of the undergraduate students and postgraduate students were aware of teledentistry and its applications in dentistry, and it is statistically significant ($p < 0.05$) but still most of them are not aware of it. Hence further studies should be conducted to learn more about teledentistry and its applications in daily practice.

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Conflict of interest:

The author declares no conflict of interest.

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