



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research
Vol. 8, Issue, 3, pp. 15952-15956, March, 2017

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

KNOWLEDGE, ATTITUDE & AWARENESS AMONG DENTAL STUDENTS ABOUT TELEDENTISTRY IN KOLKATA, WEST BENGAL, INDIA – A CROSS SECTIONAL STUDY

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DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0803.0041>

ARTICLE INFO

Article History:

Received 16th December, 2016

Received in revised form 25th

January, 2017

Accepted 23rd February, 2017

Published online 28th March, 2017

Key Words:

Teledentistry, Dental Students, Technology, Oral Health Care, Attitude, Knowledge

ABSTRACT

The aim of the study was to assess the knowledge, attitude and awareness regarding teledentistry among dental students of Kolkata, West Bengal, India. A descriptive cross sectional study was conducted among 200 dental students of a dental college & hospital in Kolkata. A self-administered structured questionnaire was circulated among the dental students and the completed questionnaires were statistically analyzed using descriptive statistics including percentages and Chi-square test. Results showed that majority of the respondents were of 18-25 years age [n=140(78.3%)] and gender distribution of sample was 81 males and 119 females. It was observed that knowledge, attitude and awareness were low among postgraduates when compared to first BDS, fourth BDS and interns. Most of the dental students agreed that teledentistry is a time saving approach (69%) but 38.5% said that it is not cost-effective. 42.5% of the participants responded neutrally for the statement that dental procedures can be done more accurately with the help of computers and intraoral camera and 45.5% agreed that teledentistry can help in dental tourism. It can be concluded from the study results that a fair knowledge, attitude and awareness exists regarding teledentistry, its benefits, applicability, and drawbacks among the dental students of Kolkata. In future, this budding technology could be incorporated in dentistry effectively by increasing campaigns/programs promoting teledentistry.

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INTRODUCTION

Teledentistry is an upcoming means of practice which assures enormous prospective in clinical practice and public health care delivery. Cook in 1997 (Cooper and Engeswick, 2007) defined teledentistry as “The practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance.” Tele in Greek means distance and Mederi in Latin means to heal. It is a part of Telemedicine having many branches like Telesomatology, Teleradiology, Telepathology, Tele oral surgery and Teleorthodontics (Boringi *et al*, 2015).

Community people are delivered health care services through different information technologies in the form of Teledentistry, a budding arena of dentistry. It can be useful for communicating among health professionals and even, educating dental students. It also helps in imparting basic knowledge to patients about dental health care thereby improving the health care facilities to the patients (Jain *et al*, 2013, Arora *et al*, 2014, Friction and Chen, 2009).

Oral health is an essential part of general health. Nowadays dental care is relying quite a lot on technology and telecommunication. Teledentistry is a combination of telecommunication and dentistry. Most teledentistry programs till now, have been fixed upon distance supervision and administration of distant services, distant education, and consultation and referral rather than regulation of auxiliaries and direct patient care (Nagarajappa *et al*, 2013).

Developing countries have started to implement telemedicine to deal with diverse matters which are being faced by the healthcare delivery structure, like inadequate health infrastructure and clinical services, scarcity of qualified doctors, the almost non-availability of specialist care, the delay in the delivery of treatment as it is time consuming to transport patients to urban healthcare setups and the provision of healthcare by inexperienced primary healthcare service providers (Nagarajappa *et al*, 2013). It has implications not only in an urban setup when a patient under severe distress or in a state of medical emergency wants to seek a medical physician but also in rural areas, where money is a great concern to people residing in remote areas as well as the

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distance poses a big snag to seek medical or dental treatment. Furthermore, the people in a rural site have troubles of minimum or almost no treatment facilities setting up an ideal example of “inverse care law” (Balsaraf and Chole, 2015, Bhambal et al, 2010).

Teledentistry has a constructive aspect in the field of dentistry in several ways. In Oral medicine and Radiology, it helps in diagnosing and framing a treatment plan by exchanging radiographic images of difficult cases by easy access to various specialists. In maxillofacial surgery, teledentistry may be helpful for suitable treatment of complex cases by analysis of advanced dental imaging method (like CBCT). While in Orthodontics, it helps a great deal to take multiple opinions on routine cephalometric analysis for a better management result. In endodontics, periapical lesions and presence of any additional root canals can be diagnosed. In Prosthodontics, teledentistry along with different computer assisted diagnostic equipments such as CAD, CAM can be a useful tool in designing inlays, onlays and in crown preparation also (Branko et al, 2011).

Keeping in mind, the vast sea of applications of teledentistry and its advances along with the huge rural population of India and current defects in the healthcare system, the knowledge and practice of it should be incorporated in the future generation dentists. It can have a significant contribution in bridging the gap between the demand and the supply of oral healthcare. Hence, the present study was conducted with the aim to assess the knowledge, attitude and awareness levels regarding teledentistry among the dental students of Kolkata, West Bengal, India.

MATERIALS AND METHODOLOGY

Study Design, Study Area and Population

A descriptive cross sectional study was conducted among undergraduate and postgraduate dental students of Kolkata in the month of November-December 2016. Study population consisted of First, Second, Third, Fourth year dental undergraduates, interns and postgraduate students.

Ethical approval & Official Permission

The study protocol was reviewed and approved by the Institutional Review Board of Pacific Dental College & Hospital and was granted ethical clearance. Written informed consent was obtained from participants after explaining the nature and purpose of research.

Pretesting of Questionnaire

Questionnaire was administered to 15 students, twice on successive days, who were interviewed to gain feedback on the overall acceptability of the questionnaire in terms of length, language clarity, time and feasibility of students completing and returning it. Based on their feedback, the questionnaire did not require any corrections. Cronbach's coefficient was found to be 0.80, which showed an internal reliability of the questionnaire. Mean Content Validity Ratio (CVR) was calculated as 0.87 based on the opinions expressed by the panel of six academicians. Face validity was also assessed and it was observed that 92% of the participants found the questionnaire to be easy.

Questionnaire

A self-administered structured questionnaire written in English was used, which consisted of 2 sections. Section I solicited general demographic information (age, gender, education & year of undergraduation/postgraduation). Section II comprised of 15 questions to assess the knowledge, attitude & awareness of dental students regarding teledentistry, and responses were recorded as Agree/Neutral/Disagree.

Pilot study

A pilot survey was conducted among 30 dental students. Based on the results of the pilot study using 95% confidence interval, 5 % allowable error & 80% power of the study, sample size was calculated. The value obtained was corrected using the “finite population correction factor” and the final sample size was calculated to be 200.

METHODOLOGY

Investigator collected the list of dental colleges in Kolkata and it was found that there were a total of 3 dental colleges in Kolkata from which one was randomly selected, i.e. Guru Nanak Institute of Dental Science & Research and Hospital. Using probability proportional sampling technique, 30 from each year of undergraduation and overall 50 from the postgraduate dental students were to be selected. The study participants were then selected by simple random sampling method.

A self-administered structured questionnaire in English was distributed by the investigator to the selected dental students of the college on previously scheduled dates in college working hours. The purpose of the study was informed and explained to the participants. Those willing to participate in the survey were requested to fill in the consent form and complete the questionnaire. Participants were asked to choose the most appropriate response.

The questionnaire was given to Undergraduate students in a classroom, and they were instructed to fill it while Postgraduate students were given the questionnaire in their respective departments. Ample time was given to them to fill the questionnaire and any queries, which the students had, were clarified by the investigator. All questionnaires were collected from the students by 2-3 successive follow-ups and checked carefully for their completeness.

Statistical Analysis

Completed questionnaires were coded, compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of Statistical Package of Social Sciences-SPSS version 20.0 (SPSS Inc., Chicago, Illinois, USA) and analyzed. Descriptive statistics included computation of percentages and Chi-square test was used for intergroup comparisons with confidence interval and p-value set at 95% and 0.05 respectively.

RESULTS

Table 1: A total of 200(100%) subjects participated in the study. Demographic data showed that majority of the respondents were of 18-25 years age [n=140(78.3%)] and

gender distribution of sample was 81 males and 119 females. Among them, 30(15%) subjects participated from each of the first, second, third, fourth BDS years & interns, while 50(25%) were postgraduates.

Table 1 Distribution of study population according to several demographic variables

Variables	n	%
Age (years)		
18 – 25	140	78.3
26 and above	60	21.7
Gender		
Male	81	40.5
Female	119	59.5
Level of Education		
First year BDS	30	15
Second year BDS	30	15
Third year BDS	30	15
Fourth year BDS	30	15
Interns	30	15
Postgraduates	50	25
Total	200	100

Table 2 shows the comparison of responses of dental students according to their educational qualifications. It was observed that majority of the first(53.3%) and third BDS(53.3%) students had the knowledge about the definition of teledentistry, i.e it is the practice of use of computers, internet and intraoral camera technologies to diagnose and give advice over a distance, but 18% of postgraduates did not. Majority of study subjects, i.e. fourth BDS (100%), Interns (80%), third BDS (76.7%) & first BDS (70%) knew that teledentistry might have limited use in dentistry. Overall 142(71%) and 164(82%) of the subjects agreed that teledentistry is good for dental education and useful for improving access to oral health care respectively. Though maximum answered in favour of the statements that teledentistry should be integrated into our dental service providing system and can be used to monitor patient’s oral health condition respectively, many of the participants were not sure, as they answered ‘Neutral’ (28% and 38% respectively). Almost half of the study population responded in a neutral manner about whether teledentistry can improve health education of masses (43%) and if it can reduce costs in dental practice (41%). When enquired about the opinion on teledentistry as a tool for oral hygiene training, majority of the first BDS (70%), second BDS (70%) & Postgraduates (74%) agreed. 78% postgraduates, 66.7% Interns & 60% fourth BDS students said that dental procedures can be done more accurately with computers and intraoral camera, but 23.3% first BDS & 26.7% fourth BDS students also disagreed to it. About 52.5% of the total participants agreed that teledentistry can increase accessibility of specialists to rural areas and majority(69%) felt that teledentistry is time-saving. 96.7% fourth BDS & 73.3% first BDS said that major challenges in teledentistry are illiterates, poor people and lack of infrastructure in India, while nearly half, 48% postgraduates & 46.7% third BDS answered ‘Neutral’ for it. Almost equal percentages of the total participants responded positively and neutrally for the role of teledentistry in dental tourism and 34.5% of the respondents were not sure if teledentistry is going to be a preamble in robotic dentistry.

DISCUSSION

Teledentistry is still nested under the wings of telemedicine and is yet to be recognized in its own right. Developments in the

fields of information and technology in the form of various internet modes like tele-communications, video conferencing, through e-data, has brought immense changes in the field of healthcare services. Dentistry combined with information technology has the potential to revolutionize the way in which clinical and primary health care is delivered in our country. This new method promises better days to come for both patients as well as practitioners within its limitations.

In the present study, the knowledge and awareness among the postgraduates was low which is in accordance with few studies (Boringi *et al*, 2015, Nagarajappa *et al*, 2013). But our study also showed that the first BDS, fourth BDS & interns had comparatively better knowledge, attitude and awareness than postgraduates, which is a contrary finding to some studies (Boringi *et al*, 2015, Nagarajappa *et al*, 2013). This result can be attributed to the fact that gadgets like smart phones & smart media are apparently used more often by the younger generation, having more exposure to information technology.

The current study depicted that majority of the participants agreed that teledentistry is the practice of use of computers, internet and intraoral camera technologies to diagnose and provide advice about treatment over a distance, which is in accordance with several studies (Chhabra *et al*, 2011, Balsaraf and Chole, 2015, Boringi *et al*, 2015).

Most of the third BDS students answered positively for improvement of health education of masses by teledentistry which is in accordance with a piece of research (Ata and Ozkan, 2009). In contrary, another study in Hyderabad (Boringi *et al*, 2015) stated that majority of first year dental undergraduates agreed to the statement that teledentistry can improve health education of masses. The possible reason for this difference of opinion may be that third years enter their clinical postings of department of public health dentistry, where they are taught about importance of public health education & its measures, hence, they were able to correlate with teledentistry and how it can be useful for public health education better than the first years.

Approximately 70% first BDS and 74% postgraduates agreed that teledentistry can be beneficial for oral hygiene training practices. This is in accordance with the studies (Boringi *et al*, 2015, Nagarajappa *et al*, 2013), where nearly 70% agreed that it can help in training better oral hygiene practices.

The present study showed that most of the dental students agreed that teledentistry is a time saving approach (69%) but 38.5% said that it is not cost-effective. This is in line with a study (Boringi *et al*, 2015), where majority of the third BDS students (79.5%) agreed to the fact that teledentistry is time saving but not financially feasible (46.3%). Dissimilar findings were reported in a study (Ata and Ozkan, 2009) in Turkey, where the authors had found that teledentistry is both time and cost reducing approach.

A research on teledentistry (Daniel *et al*, 2013) presented that clinical outcomes were generally improved following a teledentistry intervention and satisfaction with teledentistry was consistently high.

Table 2 Comparison of responses of dental students according to their educational qualifications [n (%)]

Questions	I BDS	II BDS	III BDS	IV BDS	Interns	PG	Total	Chi-square	p-value
1. Teledentistry is the practice of use of computers, internet and intraoral camera technologies to diagnose and provide advice about treatment over a distance.									
Agree	16 (53.3)	11 (36.7)	16 (53.3)	21 (70)	15 (50)	24 (48)	103(51.5)	25.02	0.005*
Neutral	12 (40)	19 (63.3)	12 (40)	9 (30)	15 (50)	17 (34)	84(42)		
Disagree	2 (6.7)	0	2 (6.7)	0	0	9 (18)	13(6.5)		
2. Teledentistry has limited use in dentistry.									
Agree	21 (70)	6 (20)	23 (76.7)	30 (100)	24 (80)	33 (66)	137(68.5)	84.01	0.001*
Neutral	9 (30)	10 (33.3)	5 (16.7)	0	2 (6.7)	17 (34)	43(21.5)		
Disagree	0	14 (46.7)	2 (6.7)	0	4 (13.3)	0	20(10)		
3. Teledentistry is good for dental education over internet and for training primary care dentists.									
Agree	20 (66.7)	25 (83.3)	19 (63.3)	19 (63.3)	23 (76.7)	36 (72)	142(71)	13.80	0.182
Neutral	8 (26.7)	4 (13.3)	11 (36.7)	11 (36.7)	5 (16.7)	14 (28)	53(26.5)		
Disagree	2 (6.7)	1 (3.3)	0	0	2 (6.7)	0	5(2.5)		
4. Teledentistry can be useful in improving access to oral health care.									
Agree	19 (63.3)	18 (60)	27 (90)	30 (100)	29 (96.7)	41 (82)	164(82)	33.62	0.001*
Neutral	6 (20)	9 (30)	3 (10)	0	1 (3.3)	7 (14)	26(13)		
Disagree	5 (16.7)	3 (10)	0	0	0	2 (4)	10(5)		
5. Teledentistry should be integrated into our current dental service providing system.									
Agree	17 (56.7)	20 (66.7)	21 (70)	18 (60)	26 (86.7)	36 (72)	138(69)	18.11	0.053
Neutral	13 (43.3)	8 (26.7)	9 (30)	9 (30)	3 (10)	14 (28)	56(28)		
Disagree	0	2 (6.7)	0	3 (10)	1 (3.3)	0	6(3)		
6. Teledentistry can be used to monitor patient's oral health condition.									
Agree	23 (76.7)	11 (36.7)	13 (43.3)	17 (56.7)	12 (40)	17 (34)	93(46.5)	53.28	0.001*
Neutral	5 (16.7)	12 (40)	17 (56.7)	13 (43.3)	4 (13.3)	25 (50)	76(38)		
Disagree	2 (6.7)	7 (23.3)	0	0	14 (46.7)	8 (16)	31(15.5)		
7. Teledentistry can improve health education of masses.									
Agree	16 (53.3)	6 (20)	17 (56.7)	10 (33.3)	14 (46.7)	24 (48)	87(43.5)	50.52	0.001*
Neutral	12 (40)	22 (73.3)	13 (43.3)	18 (60)	3 (10)	18 (36)	86(43)		
Disagree	2 (6.7)	2 (6.7)	0	2 (6.7)	13 (43.3)	8 (16)	27(13.5)		
8. Teledentistry can be a good tool for oral hygiene training.									
Agree	21 (70)	21 (70)	19 (63.3)	16 (53.3)	17 (56.7)	37 (74)	131(65.5)	15.52	0.114
Neutral	9 (30)	9 (30)	11 (36.7)	12 (40)	13 (43.3)	13 (26)	67(33.5)		
Disagree	0	0	0	2 (6.7)	0	0	2(1)		
9. Dental procedures can be done more accurately with the help of computers and intraoral camera.									
Agree	7 (23.3)	13 (43.3)	13 (43.3)	18 (60)	20 (66.7)	39 (78)	110(55)	48.64	0.001*
Neutral	16 (53.3)	15 (50)	16 (53.3)	4 (13.3)	10 (33.3)	9 (18)	70(35)		
Disagree	7 (23.3)	2 (6.7)	1 (3.3)	8 (26.7)	0	2 (4)	20(10)		
10. Teledentistry can reduce costs in dental practice.									
Agree	5 (16.7)	18 (60)	7 (23.3)	13 (43.3)	17 (56.7)	17 (34)	77(38.5)	68.99	0.001*
Neutral	12 (40)	1 (3.3)	23 (76.7)	17 (56.7)	13 (43.3)	16 (32)	82(41)		
Disagree	13 (43.3)	11 (36.7)	0	0	0	17 (34)	41(20.5)		
11. Teledentistry can increase accessibility of the specialists to rural and underserved communities for their dental needs.									
Agree	20 (66.7)	8 (26.7)	10 (33.3)	20 (66.7)	15 (50)	32 (64)	105(52.5)	33.43	0.001*
Neutral	10 (33.3)	20 (66.7)	15 (50)	7 (23.3)	15 (50)	18 (36)	85(42.5)		
Disagree	0	2 (6.7)	5 (16.7)	3 (10)	0	0	0		
12. Teledentistry can save time in dental practice.									
Agree	23 (76.7)	22 (73.3)	21 (70)	17 (56.7)	20 (66.7)	35 (70)	138(69)	46.01	0.001*
Neutral	0	3 (10)	9 (30)	13 (43.3)	15 (30)	15 (30)	50(25)		
Disagree	7 (23.3)	5 (16.7)	0	0	0	0	12(6)		
13. In India, major challenges in teledentistry are illiterates, population below the poverty line and lack of infrastructure.									
Agree	22 (73.3)	19 (63.3)	16 (53.3)	29 (96.7)	18 (52)	26 (52)	130(65)	33.04	0.001*
Neutral	6 (20)	11 (36.7)	14 (46.7)	1 (3.3)	12 (40)	24 (48)	24(48)		
Disagree	2 (6.7)	0	0	0	0	0	0		
14. Teledentistry can help in dental tourism.									
Agree	8 (26.7)	12 (40)	13 (43.3)	16 (53.3)	12 (40)	30 (60)	91(45.5)	21.55	0.018*
Neutral	18 (60)	13 (43.3)	17 (56.7)	7 (23.3)	12 (40)	14 (28)	81(40.5)		
Disagree	4 (13.3)	5 (16.7)	0	7 (23.3)	6 (20)	6 (12)	28(14)		
15. Teledentistry is going to be a preable in robotic dentistry.									
Agree	18 (60)	17 (56.7)	20 (66.7)	11 (36.7)	23 (76.7)	39 (78)	128(64)	35.75	0.001*
Neutral	12 (40)	13 (43.3)	7 (23.3)	19 (63.3)	7 (23.3)	11 (22)	69(34.5)		
Disagree	0	0	3 (10)	0	0	0	3(1.5)		
Total	30 (100)	30 (100)	30 (100)	30 (100)	30 (100)	50 (100)	200 (100)		

Test applied: Chi-square Test, *p 0.05 statistically significant

Several other studies reported that the key methods used in teledentistry are electronic health records, electronic referral systems, digitizing images, teleconsultations, and telediagnosis,

all of which aim to improve the accuracy of treatment, accessibility to people below poverty line and reduce disease

burden in the community (Khan *et al*, 2013, Ireland *et al*, 2010, Brullmann *et al*, 2011).

Approximately 71% dental students agreed that teledentistry is good for dental education over internet and for training primary care dentists. Another study (Nagarajappa *et al*, 2013) conducted in Udaipur reported that comparatively less proportion of dentists (58%) agreed to this fact of dental education over internet & training. This shows a healthier and positive attitude of our study subjects towards teledentistry.

The present study also revealed that 42.5% of the participants responded neutrally for the statement that dental procedures can be done more accurately with the help of computers and intraoral camera, which is accordance with another study (Nagarajappa *et al*, 2013), which showed around 43% dentists disagreed. More than half of the dental students in our study believed that in India, major challenges in teledentistry are illiterates, population below the poverty line and lack of infrastructure, which is also supported by a study on dentists of Udaipur (Nagarajappa *et al*, 2013).

In India, the requirement for dental tourism has increased many folds, hence approaches to reach dentistry to widespread metropolitan cities have become a necessity, for which, teledentistry can be a helpful aid. The present study findings depicted that majority voted for the view that teledentistry can be helpful for dental tourism. This is in accordance with a study conducted on dental students of Hyderabad where 45.3% of the participants agreed (Boringi *et al*, 2015).

Limitations

The study was conducted on dental students of academic college and hospital hence the results of the study cannot be attributed to the whole dental population. The sample size also was not sufficient to generalize the findings of the study. Study population from the dentists working in rural areas could have been considered to get a better view of teledentistry in the unreached localities.

Recommendations

Dentists who are engaged in teledentistry must make every effort to ensure the security of their systems, as well as of any data that they may transmit. For example, data encryption, password protection and user access logs can help in deterring most of the people and in protecting patient confidentiality (Golder and Brennan, 2000). Dentists are encouraged to remain aware of the legal needs in their states of practice and to remain cautious about the parliamentary changes in this rapidly developing field. Awareness of teledentistry among health professionals can be increased by conducting CDE programs and awareness campaigns/programs which will help in professional advancement.

CONCLUSION

The present study exhibited a fair knowledge, attitude and awareness regarding teledentistry, its benefits, applicability, and drawbacks among the dental students of Kolkata. Kolkata, the city of joy, is currently a developing hub for dentists and the newer advances in information technology is rapidly changing the approach of dental practice.

Henceforth, this budding technology could be incorporated in dentistry effectively by increasing campaigns promoting teledentistry.

References

- Arora S, Dwivedi S, Vashisth P, Mittal M, Nayak S. Teledentistry: A review. *Annals of Dental Specialty*. 2014; 2(1):11-3.
- Ata SO, Ozkan S. Information technology in oral health care: attitudes of dental professionals on the use of teledentistry in turkey. European and Mediterranean Conference on Information Systems 2009; 13-14:1-8.
- Boringi M, Waghay S, Lavanya R, Gandhi Babu GBD, Badam KR, Harsha N, *et al*. Knowledge and Awareness of Teledentistry among Dental Professionals – A Cross Sectional Study. *Journal of Clinical and Diagnostic Research*. 2015 Aug; 9(8):ZC41-ZC44.
- Balsaraf SV, Chole RH. Knowledge, awareness, and attitude among practicing dentists about teledentistry in Indore, Central India. *J Indian Assoc Public Health Dent* 2015; 13:434-7.
- Bhambal A, Saxena S, Balsaraf S. Teledentistry: Potentials unexplored. *J Int Oral Health* 2010;2:1-7.
- Branko M, Milan M, Biljana V. Advances in Telemedicine: Applications in Various Medical Disciplines and Geographical Regions, Prof. Georgi Graschew (Ed.). InTech, China. 2011. Chapter 11, Telemedicine in Dentistry (Teledentistry); pp.215-30. Available from: <http://www.intechopen.com/books/advances-in-telemedicine-applications-in-various-medical-disciplines-and-geographical-regions/telemedicine-in-dentistry-teledentistry>.
- Brullmann D, Schmidtman I, Warzecha K, Dhoet BJ. Teledentistry: Recognition of root canal orifices at a distance - a preliminary study of teledentistry. *Telecare*. 2011; 17(3):154-57.
- Cooper BR, Engeswick LR. Knowledge, attitude and confidence level of dental hygienists students regarding teledentistry. A pilot study. *The Internet Journal of Allied Health Science and Practices* 2007; 5:1-4.
- Chhabra N, Chhabra A, Jain RL, Kaur H, Bansal S. Role of Teledentistry in Dental Education: Need of the Era. *Journal of Clinical and Diagnostic Research* 2011; 5(7):1486-88.
- Daniel SJ, Wu L, Kumar S. Teledentistry: a systematic review of clinical outcomes, utilization and costs. *J Dent Hyg* 2013; 87(6):345-52.
- Fricton J, Chen H. Using Teledentistry to Improve Access to Dental Care for the Underserved. *Dent Clin North Am*. 2009; 53(3):537-48.
- Golder DT, Brennan KA. Practicing dentistry in the age of telemedicine. *JADA* 2000; 131: 734-44.
- Ireland N, Bradley M, Black P, Noble S, Thompson R, Lamey R, *et al*. Application of teledentistry in oral medicine in a community dental service. *Br Dent J* 2010; 209(8):399-404.
- Jain A, Bhaskar DJ, Gupta D, Agali C, Gupta V, Karim B. Teledentistry: Upcoming Trend in Dentistry. *J Adv Med Dent Sci*. 2013; 1(2):112-15.
- Khan SA, Omar H. Teledentistry in practice: literature review. *Telecare*. 2013; 19(4):179-83.
- Nagarajappa R, Aapaliya P, Sharda AJ, Asawa K, Tak M, *et al*. Teledentistry: Knowledge and Attitudes among Dentists in Udaipur, India. *Oral Health Dent Manag* 2013; 12(3):138-44.
