

KNOWLEDGE, ATTITUDE & PRACTICES REGARDING TELEDENTISTRY AMONGST DENTAL PRACTITIONERS OF PATNA, EASTERN INDIA

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ABSTRACT:

Introduction: Telemedicine is a rapidly forming subset of health informatics. Until now, very few studies are documented on the knowledge, attitude and Practice of practicing dentists on tele-dentistry.

Aim: To conduct a survey among the practicing dentist regarding knowledge attitude, & Practices among practicing dentists about tele-dentistry in Patna, Eastern India.

Materials and Methods: A cross-sectional questionnaire study was conducted among the practicing dentists from March 2016 to April 2016 in Patna. The sample size of 121 dentists was selected through simple random sampling method. A self administered structure questionnaire was used to assess knowledge, attitude and Practice. The response format was based on 5-point Likerts scale. Analysis was done using Graph Pad (version 6). Level of significance ($p < 0.05$) at 95% confidence level and ($p < 0.01$) at 99% confidence level. Chi-square test was used for analysing the association between parameters.

Results: Overall 121 dentists had heard about tele-dentistry. It shows postgraduates have more knowledge than under graduates. Significant knowledge scores were regarding the knowledge about consultation with expert ($p = 0.0297$) and tele-dentistry to be applied to all branches of dentistry ($p = 0.0238$). As per attitude & practice is concerned no significant results were obtained.

Conclusion: Most of the dentists were aware of tele-dentistry, and the practicing dentists are aware of working technique, uses, advantages and disadvantages of tele-dentistry. Until date, very few telemedicine projects are running by the Government of India. There are a lot of gray areas in tele-dentistry to be worked on.

Keywords: Dentist, teledentistry, knowledge, attitude, practice



INTRODUCTION

"Persistence and determination alone are omnipotent. The slogan 'press on' has solved and always will solve the problems of the human race."^[1]

Health care is being changed dramatically with the era of computers and tele communication. There are many implementations of telecommunications for hospitals and with time a new term arrived for it i.e. Telemedicine.

Association of American Medical Colleges states that "Telemedicine is the use of telecommunications technology to send data, graphics, audio, and video images between participants who are physically separated (i.e., at a distance from one another) for the purpose of clinical care."^[2]

In this era of modern medicine, dentistry has been constantly changing with the

advent of information and technology. Teledentistry is a part of Telemedicine. Tele in Greek means distance and mederi in Latin means to heal. Teledentistry has many branches like Tele- stomatology, Tele radiology, Tele pathology, Tele oral surgery and Tele orthodontics. Teledentistry, a budding field in dentistry, uses information based technologies and communication systems to deliver health care services to the people. It involves fast and effective transfer of information pertaining to patients through electronic gadgets over remote distances. This enables an effective exchange of information and knowledge between patient and doctor and among various specialists for a better treatment planning and outcome. [3]

Teledentistry launched in 1994, When the U.S. Army conducted its first study using 15 periodontal patients. "Teledentistry" is very effective and efficient, especially in rural areas for where dental appointments are scarce, "[4]

Cook in 1997 defined teledentistry as "The practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance." Dental professionals have used technology such as intraoral camera, in private practice for patient education and case acceptance, however, teledentistry has been underused as a means of diagnosis and referral in dentistry. [5]

Developing countries have opened up to telemedicine to address various issues which are being faced by the healthcare delivery system, like inadequate health infrastructure and clinical services, paucity of the qualified doctors, the almost non-availability of specialist care, the delay in the delivery of the treatment due to the greater time which is required for the transport of the patients to urban healthcare facilities and the provision of healthcare by inexperienced primary healthcare service providers. Teledentistry can be used in every branch of dentistry. Orthodontists are able to successfully help in the management of children with special needs.

In the study done by N. Vijayakumar [6] he explained that Teledentistry can be successfully implemented for smoking cessation activities, a meta-analysis by Myung SK [7] et al showed. Another study showed that teledentistry can be used for behavioural health treatment counselling of autism related disorder affected patients.

Teledentistry can be used in all fields of dentistry. A randomized control trial by Miladinovic M [8] et al showed that there was no difference to diagnostic agreement between real time consultation and that in teledentistry. A study by Jakowenko J [9] et al conducted to analyse the images attached to referral messages in an email-based telemedicine system found the images to be of satisfactory quality. Sharma K et

al^[10] showed that Orthodontic treatment monitored from a distance via teledentistry systems showed very promising nature in the management of occlusions in the disadvantaged children. Park W^[11] et al stated that the advances and availability of Smartphone technology could lead to telemedicine used in oral and maxillofacial surgery. In India the dentist to population ratio in urban areas is 1:10,000 and in rural areas is 1:250,000. To fill the void of dentists in rural areas, especially specialist, the teledentistry network can be used.

There is a definite deficiency of specialist in India. India, with its huge geographic area, enormous rural populace and using the existing health care systems clubbed with advances in teledental machinery, could be an optimal ambience for teledentistry. Since there are very few studies conducted in India, this study was conducted to assess current knowledge, attitude & practices among practicing dentists about teledentistry in Patna .Eastern India.

Aim: The study was aimed to assess the knowledge, and attitude and Practice among dentists about the practice of teledentistry.

OBJECTIVE:

1. To assess the knowledge regarding advantages and disadvantages of teledentistry practice.
2. To assess the knowledge regarding importance & its role in changing the

current scenario of attitude in teledentistry .

3. To assess and compare dependent variables (knowledge, attitude and Practice score) with independent variables (gender, academic qualification, years of experience and hours of internet usage for health related purpose).

MATERIALS AND METHODS

A study group of 121 Dentists were selected from IDA Branch of Patna city through simple random sampling method .The study is a descriptive, cross-sectional survey. Inclusion criteria consisted of Dental Practioners having membership in IDA. Patna Branch and exclusion criteria consisted of Dental Practioners not willing to Participate in the survey .Prior to scheduling the survey, official permission was obtained from, Heads/Concerned authority of the Indian Dental Association. Bihar Branch. Informed verbal consent was obtained from the participating dentists having membership in IDA Patna Branch. The proposed study was reviewed by the Ethical committee of Buddha institute of dental sciences. Patna and clearance was obtained. The Dentist were met and explained regarding the research work. Date and time was fixed for the Interview. A survey was systematically scheduled to spread over a period of 1 month from 2Nd week of March to 2nd week of April. According to the detailed weekly schedule well in advance by informing and obtaining consent from

the selected Dentists, although a detailed schedule plan was prepared meticulously, few adjustments and changes were called for while working it out practically. Duration for data collection from each Dentist was 30 minutes.

Method of collection of data : A self administered structured close ended questionnaire has been designed to obtain information about Knowledge, attitude & practices regarding teledentistry amongst dental practitioners of Patna city Bihar. All the Dental Practitioners were pre-informed about the survey. The questionnaire with 3 point Likerts scale Agree, Disagree and Neutral was used for collecting Data. The questionnaire was peer reviewed and pilot study was conducted in a group of dentist to test the feasibility & validity of questionnaire. It was undisclosed and confidential with an attached brief introduction explaining purpose of investigation with research workers name as well as specific instruction on how to answer and filled form was collected back by the research worker. The Questionnaire consisted of four major groups: Socio demographic factors, Knowledge regarding teledentistry, Attitude amongst practicing dentists regarding use of Teledentistry in their practice, Knowledge regarding practicing teledentistry and role in changing the current scenario. The first group of questionnaire consisted of total 10 questions with subheadings .the second, third and fourth group of questionnaire

pertaining to knowledge, attitude and practitioners consisted of 8 questions each.. The Aims of study were explained and the dentists were met in person by the research worker himself and the questionnaire was given and collected.

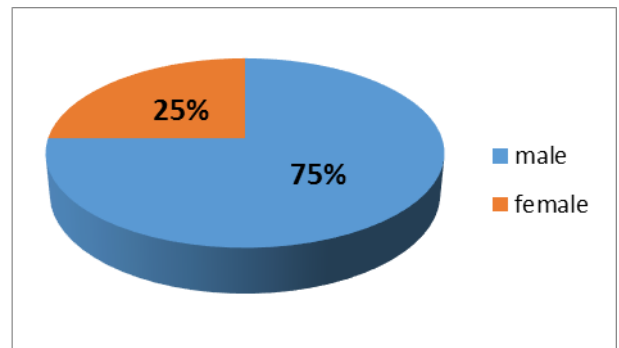
Statistical analysis: The data collected from the questionnaire was entered in the Microsoft excel and analyzed using Graph Pad (version 6).Level of significance (p<0.05) at 95% confidence interval and (p<0.01) at 99% confidence interval is maintained.

Chi-Square test: Categorical data was analyzed by chi square test.

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

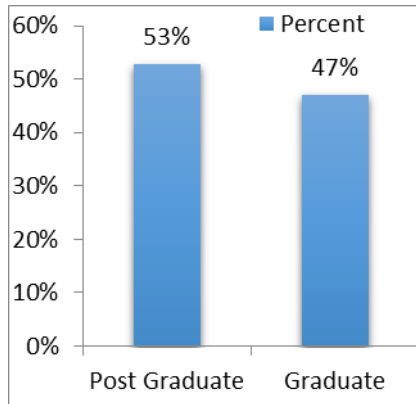
RESULTS:

A total 121 Dentists participated in the present study. Out of Whom 75% (n=91) Male Dentists, 25%(n=30) Female dentists.(Graph1).



Graph 1: Distribution of Dentists according to Gender

Majority of Dentists, 44 (36%) belong to 30-34 year age group. Majority of Dentists, 64 (53%) were Post-Graduates and 57(47%) were Under Graduate group(Graph2)



Graph 2: Distribution of dentists according to Qualification

Majority of Dentists 41 (34%) were Practicing Dentistry for less than 5 years. Majority of Dentists, 48 (40%) used computers and internet less than 1 hour per day, 45(37%) used for 1-2 hrs per day, 28(23%) worked for more than 2 hours per day and worked for less than 5 hours per day, 38(31.40%) worked for computers and internet per day.(Table 1)

Computer & internet use	Frequency	Percent
<1 Hrs	48	40%
1-2Hrs	45	37%
>2 Hrs	28	23%
Don't Use	0	0%
Total	121	100%

Table1: Distribution of Dentists according to Computer & internet use per day

Majority of Post Graduates (MDS) 60(50%) and 46(38%) Under Graduates (BDS) agree that teledentistry will help to consult with an expert about specific patient's problem and is statistically significant ($p < 0.05$). Majority of Post-

Graduates (MDS) 53(44%) and 35(29%) Under Graduates (BDS) agree that Teledentistry can be applied in every branches of dentistry and 9(7%) (MDS) and 20(17%) BDS were Neutral and 2(2%) MDS and 2(2%) BDS disagree to above questionnaire and is Statistically significant ($p < 0.05$). (Table 2)

Knowledge		Post Graduate (MDS) (N= 64)	Under Graduate (BDS) (N=57)	P value
1. Teledentistry is the practice of use of computers, internet, telecommunication services, video conferencing and intraoral camera technologies to diagnosis and provide advice about treatment over a distance	Agree	60 (50%)	52 (43%)	0.597
	Neutral	4 (3%)	5 (4%)	
	Disagree	0 (0%)	0 (0%)	
2. Teledentistry is not a face to face interview	Agree	52 (43%)	49 (40%)	0.0613
	Neutral	12 (19%)	5 (4%)	
	Disagree	0 (0%)	3 (2%)	
3. Teledentistry will help to consult with an expert about specific patient's problem	Agree	60 (50%)	46 (38%)	0.0297
	Neutral	4 (3%)	11 (9%)	
	Disagree	0 (0%)	0 (0%)	
4. Teledentistry is good for dental education over internet and for training primary care dentists	Agree	54 (45%)	46 (38%)	0.6726
	Neutral	8 (7%)	10 (8%)	
	Disagree	2 (2%)	1 (1%)	
5. Teledentistry can help to monitor my patient's oral health.	Agree	50 (41%)	35 (29%)	0.0878
	Neutral	13 (11%)	18 (15%)	
	Disagree	1 (1%)	4 (3%)	
6. Teledentistry can be applied in every branches of dentistry	Agree	53 (44%)	35 (29%)	0.0238
	Neutral	9 (7%)	20 (17%)	
	Disagree	2 (2%)	2 (2%)	
7. Teledentistry can be useful in improving the access to oral health care	Agree	56 (46%)	42 (35%)	0.1393
	Neutral	7 (6%)	14 (12%)	
	Disagree	1 (1%)	1 (1%)	
8. Teledentistry has a potential to be integrated into our current dental services.	Agree	58 (48%)	48 (40%)	0.2605
	Neutral	5 (4%)	9 (7%)	
	Disagree	1 (1%)	0 (0%)	

Table 2: Association between Qualification of dentists and their Knowledge towards Teledentistry

Majority of Post Graduates (MDS) 57(47%) and 48(40%) Under Graduates (BDS) agree that Teledentistry can provide me a good understanding of the

patient's oral health problem over the internet and 6(5%) (MDS) and 5(4%) BDS were Neutral and 1(1%) MDS .and 4(3%) BDS disagree to above and this is statistically not significant ($p > 0.05$) (Table 3).

Attitude		Postgraduate (MDS) (N= 64)	Under Graduate (BDS) (N=57)	P value
1. Teledentistry can provide me a good understanding of the patient's oral health problem over the internet.	Agree	57 (47%)	48 (40%)	0.322
	Neutral	6 (5%)	5 (4%)	
	Disagree	1 (1%)	4 (3%)	
2. Using teledentistry, I will be able to monitor my patient's condition well.	Agree	38 (31%)	34 (28%)	0.5615
	Neutral	26 (21%)	22 (18%)	
	Disagree	0 (0%)	1 (1%)	
3. I think dental examinations are accurate via computers and intraoral camera as in the traditional office setting.	Agree	49 (40%)	41 (34%)	0.5097
	Neutral	14 (12%)	13 (11%)	
	Disagree	1 (1%)	3 (2%)	
4. I think children and parents would be receptive to having a dental examination done via computers and intraoral camera	Agree	40 (33%)	36 (30%)	0.3020
	Neutral	24 (20%)	19 (16%)	
	Disagree	0 (0%)	2 (2%)	
5. Teledentistry is convenient form of oral health care delivery which makes dental examination easier.	Agree	55 (45%)	43 (36%)	0.2465
	Neutral	9 (7%)	13 (11%)	
	Disagree	0 (0%)	1 (1%)	
6. Teledentistry will be a	Agree	54 (45%)	42 (35%)	0.0758
	Neutral	10 (8%)	11 (9%)	

standard way of oral health care delivery.	Disagree	0 (0%)	4 (3%)	
7. Teledentistry can save time & reduce cost for me.	Agree	49 (40%)	40 (33%)	0.6454
	Neutral	14 (12%)	15 (12%)	
	Disagree	1 (1%)	2 (2%)	
8. I think teledentistry can increase accessibility of the specialists to rural and underserved communities for their dental needs.	Agree	61 (50%)	49 (40%)	0.1724
	Neutral	3 (2%)	7 (6%)	
	Disagree	0 (0%)	1 (1%)	

Table 3: Association between Qualification of dentists and their Attitude towards teledentistry.

Majority of Post Graduates (MDS) 38(31%) and 34(28%) Under Graduates (BDS) agree that Using teledentistry, I will be able to monitor my patient's condition well and 26(21%) (MDS) and 22(18%) BDS were Neutral and 0(0%) MDS .and 1(2%) BDS disagree to above and this is statistically not significant ($p>0.05$). (Table3)

Majority of Post Graduates (MDS) 49(40%) and 41(34%) Under Graduates (BDS) agree that think dental examinations are accurate via computers and intraoral camera as in the traditional office setting and 14(12%) (MDS) and 13(11%) BDS were Neutral and 1(1%) MDS .and 3(2%) BDS disagree to above and this is statistically not significant ($p>0.05$). (Table3)

Practices		Postgraduate (MDS) (N= 64)	Under Graduate (BDS) (N=57)	P value
1. A telehealth assistant can provide me a good understanding of the patient's oral health problem over the Internet.	Agree	60 (50%)	45 (37%)	0.0562
	Neutral	3 (2%)	9 (7%)	
	Disagree	1 (1%)	3 (2%)	
2. Teledentistry can violate the patient's privacy	Agree	36 (30%)	30 (25%)	0.4739
	Neutral	25 (21%)	21 (17%)	
	Disagree	3 (2%)	6 (5%)	
3. The use of necessary equipment seems difficult to me.	Agree	43 (36%)	33 (27%)	0.4686
	Neutral	15 (12%)	15 (12%)	
	Disagree	6 (5%)	9 (7%)	

4. Using teledentistry, I will be able to monitor my patient's condition well.	Agree	39 (32%)	37 (31%)	0.8788
	Neutral	23 (19%)	18 (15%)	
	Disagree	2 (2%)	2 (2%)	
5. Teledentistry makes it easier for me to contact the patient.	Agree	48 (40%)	42 (35%)	0.8481
	Neutral	14 (12%)	14 (12%)	
	Disagree	2 (2%)	1 (1%)	
6. I cannot always trust the equipment to work.	Agree	42 (35%)	38 (31%)	0.9481
	Neutral	19 (16%)	17 (14%)	
	Disagree	3 (2%)	2 (2%)	
7. I am worried about the data entry mistakes	Agree	49 (40%)	38 (31%)	0.4709
	Neutral	10 (8%)	12 (10%)	
	Disagree	5 (4%)	7 (6%)	
8. Teledentistry will be standard way of oral health care delivery.	Agree	49 (40%)	36 (30%)	0.2730
	Neutral	12 (10%)	17 (14%)	
	Disagree	3 (2%)	4 (3%)	

Table 4: Association between Qualification of Dentists and their Practices Towards teledentistry.

Majority of Post Graduates (MDS) 55(45%) and 43(36%) Under Graduates (BDS) agree that Teledentistry is convenient form of oral health care delivery which makes dental examination easier. And 9(7%) (MDS) and 13(11%) BDS were Neutral and 0(0%) MDS .and 1(1%) BDS disagree to above. P value was 0.2465 and this is statistically not significant ($p>0.05$). (Table 4)

Majority of Post Graduates (MDS) 60(50%) and(49%)Under Graduates (BDS)agree A tele health assistant can provide me a good understanding of the patient's oral health problem over the Internet.. and 3(2%) (BDS) and 9(7%) BDS were Neutral and 1(1%) MDS .and 3(2%) BDS disagree to above and this is statistically not significant ($p>0.05$). Majority of Post Graduates (MDS) 49(40%) and 36(30%) Under Graduates (BDS) agree Using Teledentistry will be standard way of oral health care delivery

and 12(10%) (MDS) and 17(14%) BDS were Neutral and 3(2%) MDS .and 4(3%) BDS disagree to above and this is statistically not significant ($p>0.05$). (Table4)

DISCUSSION :

Teledentistry is a part of Telemedicine. Teledentistry, a budding field in dentistry, uses information based technologies and communication systems to deliver health care services to the people. It involves fast and effective transfer of information pertaining to patients through electronic gadgets over remote distances Developments in the fields of information and technology and has brought immense changes in the field of healthcare services. Teledentistry is of different types like it can be a Patient – dentist, Dentist – specialist, Dentist – data storage bank, Students – dental education and Dentist – research centre. Various internet

modes like tele- communications, video conferencing, through e-data.

A total of 121 Dentists participated in the study in which 75% male and 25% female .Majority of dentists are below 50 years age group falling in 30-34 years age group category, only 18% of dentist amongst them had a practice of more than 15 years whereas majority of them 34% were practicing for less than 5 years only. Majority of them were attending less than 10 patients per day and worked for 5 hours /day and used computers & internet for less than 1hour/day.

The results of present study uncovered the fact that the post graduates practicing dentists had a greater mean knowledge score as compared to dental practicing under graduates. This may be attributed to the similar study of post graduate dentist working computers, Internet and similar technology which owes back to their research work during their post Graduates curriculum .Though there was no significance difference observed in the Attitude score of practicing under graduate dentist and practicing post graduates Dentist there exists significant association between knowledge and the level of education that is the post graduates are more knowledgeable than Undergraduates this was similar to studies by Ramesh N et al ^[12], Ata SO et al ^[13] and Mandall NA et al ^[14]. This can be explained on the fact that the postgraduates are more academically expertise and better know the recent advances and improvements in dentistry such as teledentistry than

the undergraduates. Overall it was observed that the post graduates had a favourable in knowledge towards teledentistry as compared to Under graduates but there was overall no statistical difference between them. This may be due to the fact that the post graduates dentist were familiar with the concept of computers during their post graduate curriculum .though this is not significant.

This can be attributed to fact that majority of dentist of study were of 30-34 years age Group and had a practice of not more than 5 years. Inferring that most of them are young entrepreneurs and computers usage (base of teledentistry can be related more with younger generations. As younger generations have a good command on computers, this may be attributed to Availability of smart phones technology. The similar results have been seen in study done by Aziz & Zicardi ^[15] which stated that advances and availability of smart phone technology have contributed feasibility and availability of tele medicines in Oral Surgery . Hence though graduates were not so familiar with the concepts of teledentistry they by their self surfing had an idea about it .thus by bridging the gap between the knowledge of post graduates and graduates practicing “Teledentistry is good for dental education over The internet and for training primary health care dentists”. Various studies by Ignatius E et al ^[16] and Eaton KA et al ^[17] have shown the success of teledentistry programme as a tool for providing

continuing education to the dentists and dental students and for dental consultation. Hence as the difference between knowledge, attitude and practicing the post graduates and Graduates is less, with comparatively a little effort we can totally eliminate the gap in between them and it helps to provide dental care to maximum.

The study was descriptive in nature which assessed knowledge, attitude & practices among practicing dentists about teledentistry in patna.east India and the various factors that influence the knowledge, attitude & practice among practising dentists about teledentistry. The study's limitation could be that the strength of association of the factors that influence teledentistry could not be determined. Since very few studies was available previously prior to this study in India and more studies need to be conducted to know more about the knowledge and attitude of dentist and dental students regarding teledentistry. Further analytical studies are needed to find the strength of association of these factors on knowledge and attitude scores regarding teledentistry.

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CONCLUSIONS:

Despite a positive knowledge ,attitude and practice of dentist towards teledentistry suggested lack of training programme and also many appeared unwilling to adopt new strategies and prefer to continuous with basic oral health service. Favourable knowledge was depicted in the study, but the attitudes of dentists regarding teledentistry were not good. The various steps that can be done to improve the situation could be the implementation of training programmes in teledentistry suggested lack of training programmes. Proper laws need to be framed by the government in regulating the process once it gets implemented. Dentist, especially specialist, could be used for consultation in the rural areas with the dental colleges used a base area for teledentistry operations. Teledentistry theoretical and practical studies incorporated into undergraduate BDS curriculum. If properly tapped, tele-dentistry could lead to betterment of oral health delivery to especially to rural population.

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