Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100.00

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

SYSTEMATIC REVIEW

Teledentistry versus Manual Community Dentistry- A Systematic review

Akshita Bansal[1], Dinesh Dhamodhar[2], Sindhu R[3], Sathiyapriya S[3], Prabhu D[4], Rajmohan M[2], Bharathwaj V V[3]

[*1]Undergraduate student, Department of public health dentistry, SRM dental college, Ramapuram, Chennai, Tamil Nadu, India

[*2]Reader, Department of public health dentistry, SRM dental college, Ramapuram, Chennai, Tamil Nadu, India

[*3]Senior Lecturer, Department of public health dentistry, SRM dental college, Ramapuram, Chennai, Tamil Nadu, India

[*4]Head of the Department, Department of public health dentistry, SRM dental college, Ramapuram, Chennai, Tamil Nadu, India

Received: 14, June 2023 Accepted: 18 July, 2023

Corresponding author: Prabhu D, Address: SRM Dental College, Ramapuram, Chennai. Pincode- 600089

This article may be cited as: Bansal A, Dhamodhar D, R Sindhu, S Sathiyapriya, D Prabhu, M Rajmohan M, VV Bharathwaj. Teledentistry versus Manual Community Dentistry- A Systematic review. J Adv Med Dent Scie Res 2023;11(7):44-50.

ABSTRACT

Background: Teledentistry has been used into clinical practice which has increased specially during the covid - 19 pandemic. The out surge of using telecommunication for the treatment of patients in remote places or guiding them for the further oral hygiene and post operation or post surgery treatments has increased manifold despite worrying about the time and location. Teledentistry comes at ease with both the patient and the dentist being concerned. Most of the dentists are now shifting towards the teledentistry field rather than manual community dentistry because it comes out to be more convenient and efficient.

Aim: To enlist the various pros and cons of teledentistry and manual community dentistry and comparing them on the basis of diverse researches and studies being performed to know about the current importance of each.

Methods: A literature search was performed using PubMed,Cochrane Central Register of Controlled Trials, Science Direct, Wiley, Scopus, Medline, Ovid Medicine using MeSH terms- Teledentistry, teleassistance and telemedicine. Of all the 79 articles screened, 67 were full-text articles assessed for eligibility and five were taken for qualitative analysis. This review was reported according to the PRISMA guidelines. In addition, five randomized controlled trials were included in the review process.

Results: Teledentistry was compared to the manual community dentistry, and teledentistry showed increased results of usage, more from the time of the covid-19 pandemic in comparison to the prevalent manual community dentistry.($p<0.05$)

Conclusion: Teledentistry showed a significant level-up as from the period of covid-19 pandemic, and continues to increase manifold unlike the manual community dentistry.

Keywords: Teledentistry, Teleassistance, Telemedicine.

INTRODUCTION

Teledentistry refers to means of practicing using the communication technology including both the audio and video visuals. It uses sources from the data processing and remote communication services for dental care, dental consultations, spreading dental awareness and education in the public sectors. Tracing back the history of teledentistry, according to a survey, According to the Gallup-Healthways Well Being Index, around a third of all Americans do not visit their dentists frequently enough. Teledentistry is also used by direct- to-consumer orthodontic businesses like "SmileDirectClub.". Another reference comes from the covid 19 times, where the dental practices along with a lot more were shut down to help bring down the widespread attacks of the corona virus. As means of still be able to communicate with their patients and provide guidance over their conditions, dentists tried using telecommunication as means for conveying the same. (1)

Access to dental treatment in rural and isolated regions is made easy has been problematic for a long time now. Another challenging factor being motivating practitioners to choose or more than that, continue a rural health career. Here, manual community dentistry comes to a hault, and a point wherein teledentistry steps in. Teledentistry offers some promising methods to assist new, isolated, and rural health care providers.. A comprehensive review of the literature paper summarised the following 5 indices, a)Usage of information technology b)System and regulatory advancements c)Accuracy d)Ease of access to clinical services e) establishing and increasing dental workforce clinical capacity. (2)

Did teledentistry improved the patient monitoring during the COVID 19 epidemic. Herein comes the pros of telemedicine in dental medicine during the tough times. For an instance, the department of oral surgery and pathology, Magna Graecea University of Catanzaro, 2 groups of patients were focused, patients in need of immediate care(group U) and on the other hand, patients who were in immediate follow-up (group F). The procedure involved groups instructing employing a messaging service to implement remote consultations, be it whatsapp messenger, twitter, quora and a lot more other devices. Telemedicine allows for comprehensive patient monitoring., diminishing the costs and even reducing the human contact during the pandemic. (3)The impact of most dental practitioners' attitudes regarding teledentistry were favourable, with the goal of incorporating this technology into their future clinical practises.. A globalised study of the same composed of a survey conducted electronically to dental professionals. The questionnaire including the survey, prepared was divided into 4 domains, Usefulness of teledentistry for patients, how its becoming useful in the dental practice, its willingness to improve the current practices and finally, major concerns related to the use of teledentistry in practice.(4)

Teledentistry came out as a great Boon during the covid 19 pandemic, but the question remains is if it is still a Boon post pandemic or manual community dentistry would be given more incharge of the same. The pubmed, scopus and science direct databases were looked for the answers to the very question. Based on the interrogations being performed that the interest in the field of telemedicine and teleassistance has increased manifold in the dental field, particularly in light of the COVID 19 epidemic and its consequences. Therefore, where on one hand, the dental practitioners should be kept aware and up to date regarding Patients should be continuously informed about the various ways they can access specialised medical treatment as a result of the new technologies..(5)

Teledentistry as a means to distribute children in need of orthodontic intervention services. This mainly includes providing interceptive orthodontic treatments, which is being initiated as part of the service by general dentists in that particular locality under the supervision of the specially trained orthodontic specialists by providing tele assistance , which greatly reduced the extremes of any abnormalities in occlusions, preferably malocclusions in specially challenged children or more precisely, disadvantaged children, when a manual appointment with the orthodontists is not feasible. The orthodontic study includes both the treatment procedures, before the treatment and after the treatment dividing them as per the fact being treated by a general dentist or an orthodontic residents in supervision of orthodontic faculty which was calculated as per the Peer Assessment Training (PAT).(6)

Their clinical requirements and it adheres communication holds a great importance with respect to the patient doctor relationship and acts as a means to understand the situation better and thereby, easy the treatment procedure. Teledentistry has emerged out as a very significant source for improving the relation of a dentist with their patient at certain points. One of the pros that teledentistry holds is that it allows the doctor and patients' ability to communicate in real time irrespective of the actual locations of both; which is quite not

possible in manual dentistry. The online modes definitely has come out to be more feasible, less time consuming, more convenient to the patients in terms of care, procedures, ease to share. Also, the dental practitioner must make sure that whatever mode he or she has chosen for their telecommunication mode, is in handy with all of us with the laws.(7)

OBJECTIVE:

To enumerate the various diverse features with respect to teledentistry and manual community dentistry and comparing the pros and cons of each to find which method would be more public friendly in the long run.

MATERIALS AND METHODOLOGY:

This study includes randomized control trials with interpositions.

Eligibility criteria:

1. **Inclusion criteria;**

- Complete elaborated articles.
- Studies with randomized control trials.
- Diverse studies with verified results.

2. **Exclusion criteria;**

- Preliminary, small scale studies i.e pivot study
- **S**tudies without the sources of teledentistry as their core.
- Studies without the sources of manual community dentistry.
- Studies not explaining a comparative study of teledentistry and manual community dentistry.

SEARCH POLICY:

The results published over the teledentistry versus manual community dentistry which includes full elaborated articles and research papers with verified authors and verified results in databases such as Cochrane library, Science direct, PubMed, Wiley national library, Scopus, Medline, ovid library were taken into study for review. An elaborated search to introspect and retrieve all the possible data were processed using Mesh terminology. "Teledentistry and manual community dentistry."

Prisma standards state that the Mesh terms being introspected in each search drive when there was a hive of results and a low.

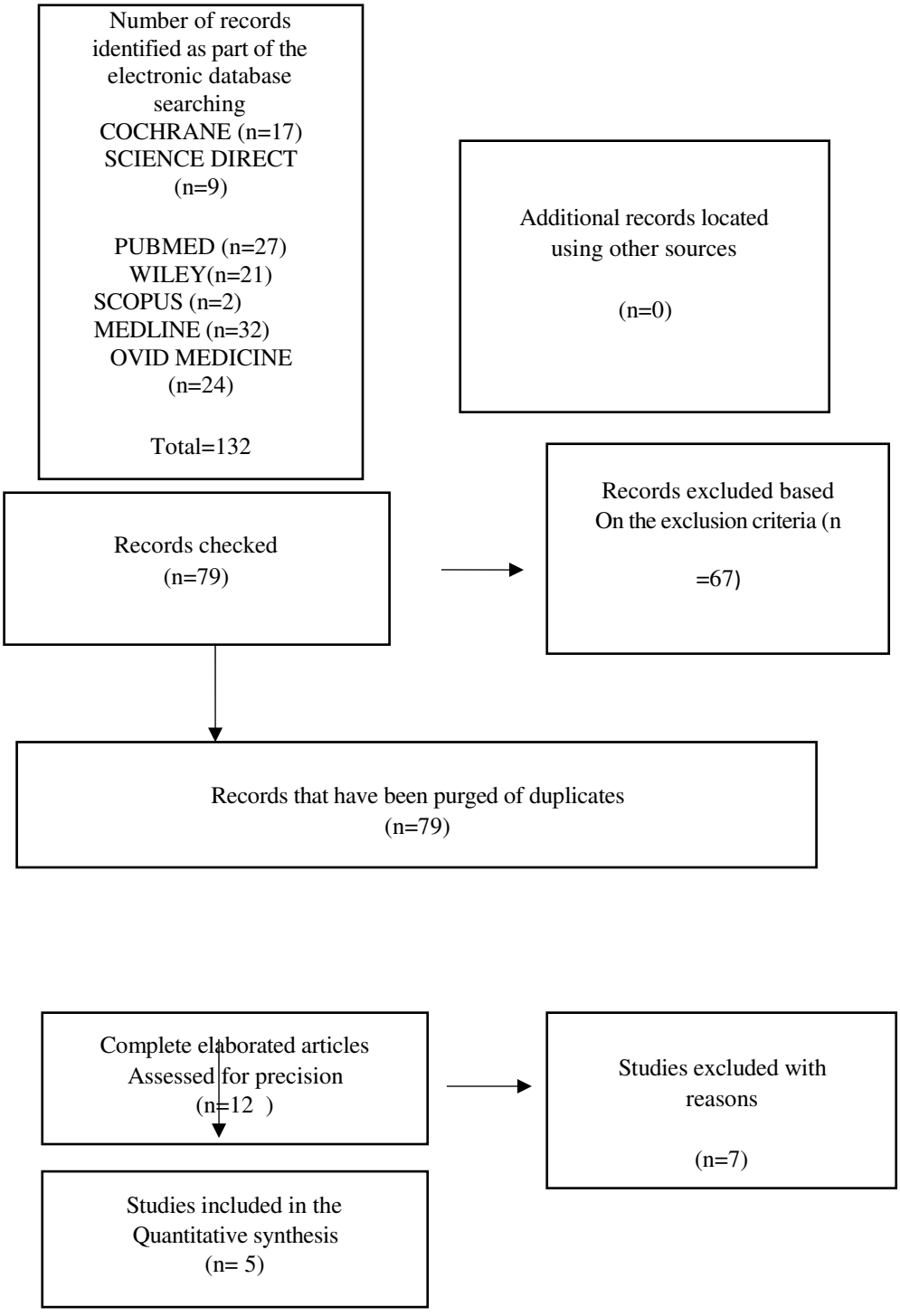

FIGURE 1: Diagram of the study identification, screening, eligibility assessment, and Inclusion in the systematic review process.

OUTCOMES

The search was done on the basis of the study upon 132 articles out of which 5 articles were evaluated among these entitled articles. A sum of three tables were concluded based on the 5 entitled articles. Figure 1 reflects upon the flow diagrams identified, screened, assessed for their accuracy and the ease to be accepted keeping in mind the inclusions and exclusions for the analysis

TABLE 1 : CHARACTERISTICS OF INTERVENTIONS IN THE STUDY

SL NO.	AUTHOR	YEAR	PATIENT SELECTION	DURATION	PREPARA RTION USED	INTERVEN TION
1.	N A Mandall, K D O' Brien, J Brady, H V Worthington, L Harvey (1)	2005	327 subjects over a period of 15 months assigned to either a control group (n=7) or a test group (n=8) for teledentistry.	15 months	Using a "save and forward" teledentistry system that transmitted photos as email attachments, practitioners in the test group sent patients to one of two consultant orthodontists .. While one's in control group were referred using letter	Validity of teledentistry system for referrals to orthodontics was evaluated. It also aimed to assess the rate of failed appointment s and referral rates
2.	S Can, T MacFarlane, K D O' Brien (2)	2003	232 individuals were randomly assigned to two groups: 116 did not get a reminder, and 115 received one.	An approx of 2 months	Randomly, new patients were assigned to either receive a reminder letter and return a confirmation slip or not.	Effect of providing new orthodontic patients with a patient reminder and a confirmation slip on their attendance

3.	K Fairhurst et al, Abdul Sheikh (3)	2008	415 individuals who missed two additional regular checkups the year before	Year based study	A text message reminder was sent to patients with randomly assigned appointment s in the intervention group. No reminder was given to the control group's patients.	Assessment of the efficiency of SMS appointment reminders to individuals who regularly miss appointment s
4	Diana Heimes, Phillipp Luhrenberg, Peer W. Kammerer (4)	2022	68 participants between the ages of 51.6 and 18.6 were included, with a demographics plit of 45.6% men and 54.4% women.		Following dentoalveolarp rocedures, general advice on how to behave were provided, such as removing wabs after3 0 minutes, extraoral cooling with ice packs for 2 days ,using painkillers as needed, and consuming liquid food. Better outcomes were found when experimentalgr oups were spli tin to telephone-follow-up groups o rcontrol groups (follow up in person)	The basic amenities like time, distance for both the patient and the health are worker were assessed when conditions were not favourable for human travel (covid19p andemic)

5	Khali dT. Aboalshamat,Tariq K. Althagafi, Amjad A. Alemam(5)	2022	71 participants, average age 32.3+/- 11.3years.	An approx. of 2months	Those who participated were split into study and control groups. The study groups received teledentistry diagnoses while the control groups waited, and these diagnoses were compared with baseline clinical examinations obtained from UQU Dental Hospital, Makkah, KSA.	Patient's accuracy, perception, knowledge, attitude & The difficulty of using teledentist y to diagnose Covid 19 was evaluated.

Table 1 illustrates the characteristics of the study that have been ruled out for the Systematic review. Characteristics finally studied include, name of the author, year of study, Sample number including their details such as age and interpositions as mentioned in the study. All the studies listed are randomized control trials. Teledentistry has been used manifold during the covid 19 pandemic eras and continues to be used because of its feasibility and ease to the patients to reach online without even travelling and being in the same location. Manual community dentistry experienced a downfall most likely, after covid 19 pandemic because dentists have become more aligned towards electronic modes of handling patients.

TABLE 2: CHARACTERISTICS OF OUTCOME

S NO.	AUTHOR	YEAR	OUTCOME	RESULT
1.	N A Mandall, K D O' Brien, J Brady, H V Worthington, L Harvey (1)	2005	P=0.36There was no difference in clinical attendance between the teledentistry and control groups that was statistically significant.	A reliable method for determining the most suitable new patient orthodontic referrals is teledentistry.. It also plays a significant factor in reducing inappropriate referral rate

2.	S Can, T Macfarlane, K D O' Brien (2)	2003	P=0.001 (reminders likely to have an affect on attendance) P=0.039 (Patients from poorer communities are less likely to visit)	The use of postal reminders for orthodontic consultation results represents a positive rise in the number of appointments kept or cancelled in advance
3.	K Fairhurst et al, Abdul Sheikh (3)	2008	P=0.11	Texting appointment reminders helped in reducing the non attendance rates and the cancellations prior
4	Diana Heimes, Phillipp Luhrenberg, Peer W. Kammerer (4)	2002	P=0.047 Test group: Unmistakable preference for telephone follow-up (83.3%) over traditional aftercare (16.7%)	The use of telemedicine evaluation in routine clinical practise has proven to be a more convenient and cost-effective option. Additionally, following dentoalveolar surgery, telephone-only follow- up was highly accepted and safe.
5	Khalid T. Aboalshamat, Tariq K. Althagafi, Amjad A Alemam (5)	2022	P<0.05The study found that the diagnosis and recording of primary complaints (74.3%), the number of filled teeth (71.4%), and oral hygiene status (65.7%) were done with good accuracy.	The use of teledentistry was widely recognised and is even effective for initial exams, especially during pandemic lockdowns or inclement weather.

TABLE 3: CHARACTERISTICS OF BIAS IN DIFFERENT STUDIES TAKEN FOR REVIEW

SL NO.	Author and year	Random sequence generation	Allocation concealment	Selective reporting	Incomplete outcome data	Blinding of outcome assessment	Blinding participants and personals
1.	N A Mandall , K D O' Brien, J Brady, H V Worthington, L Harvey 2005 (1)	-	+	+	+	-	-

2.	S Can, T Macfarlane, K D O' Brien 2003 (2)	-	-	+	+	-	-
3.	K Fairhurst et Al, Abdul Sheikh 2008 (3)	-	-	?	-	+	+
4.	Diana Heimes, Phillipp Luhrenber g, Peer W . Kammerer 2022 (4)	-	-	+	+	-	-
5.	Khalid T. Aboalsha mat, Tariq K. Althagafi, Amiad A Alemam 2022 (5)	-	+	+	+	-	-

+ : low risk of bias
- : high risk of bias
? : unclear risk of bias

Table 3 highlights the bias evaluation The research included which were differentiated and categorised according to the three types of bias: high risk, low risk, and uncertain risk.

DISCUSSION

Teledentistry emerged out to be a new concept wherein, telecommunication is combined with the dental practice prevalent in the country, which, can be used not only as a means of dental care but also as a means of education the masses regarding the dental field and its advancements(8) Using the continuing innovations, dental hygienists with a linked practise can use telecommunication as a means of electronically inculcating and spreading the e-data to a dentist situated far away or in a remote area for patient referral and diagnosis in addition to offering a variety of preventive services within the dental hygiene scope of practise. (9)

This is coming out as an online electronically based dental care service that enables the scheduled meeting of patients and dental hygienists, affordably and with keeping in mind the safety and precautions of both the patient and the dentist without even being in the same place, that means it can also be carried out remotely where the two of the candidates be at different locations. (10)

Coming to the aspect of developed countries unlike India, general practitioners have found out ways to show a positive attitude towards inculcating the teledentistry and its applications in the medicine and tele assistance. (11)

As we talk about teledentistry, the major aspect concerning here being the telemedicine, which has anonymously become the most important worldwide spread spectrum. Specially during the Covid 19 pandemic, when the situations were not that good and the whole world was suffering from devastation, this field came up as a special and astonishing outbreak for the people as well as the dentists in providing special attention to the various ongoing opportunities and the multiple IN CONTACT risks associated with it in the near future. (12)

Telemedicine mainly aims at the transfer of data in the medical field between 2 geographically different and diverse areas. (13) Medical and dental consultations being held online or through video conferencing and other

online modes, tends to provide online and distant emergency consultations to the people suffering from the same. (12)

Coming to the prevalence of the dental caries in early stages of childhood days can be well diagnosed using the means of teledentistry mainly among the age group, 12 to 60 month old children. (14)

Talking about the covid 19 pandemic, teledentistry has come out as a boon in the way the dental treatments are assessed and put into action. Dental care, oral health care, oral hygiene, emergency situations and teledentistry affecting the very same aspects was looked at inculcating to the point if it is actually safe to go to the dentist or a dental hygienist, in particular to the developed countries. Here is where the "PPE dentist" actually came into existence. (15)

Teledentistry paves its way not only into the general dentistry but also into various other departments, some of which the most came out to be the "ORTHODONTIC" department. Everyone is not willing to attend the clinics specially when they are so distant from the required location. Various Health Insurance Probability And Accountability Act (HIPAA)- complaint telecommunication and teledentistry aspects have been brought up into force of action for numerous orthodontic treatments. (16)

Regardless of improving dental treatments in specific areas, it has been a great boon for the improvisation of the use of handy technology as per the ease of the patient unlike manual community dentistry, where the patient may be a little hindering towards the ease of communication with their dentist. Messages and apps have come out to be in use electronically for the spread of dentistry through telecommunication. (17)

It's crucial to consider the accuracy and precision involved when discussing teledentistry and its applications. Understanding the significance of dental caries and educating people about it are crucial given the rise in the prevalence of dental caries and the slight drop in efficient screening techniques, particularly in non-dental contexts like schools and other kid groups.. (18)

Teledentistry has also been developed to enhance the standard of care and attention given to the diagnosis and treatment of oral lesions, which are more often known as lesions of the oral cavity. (19)

Coming to one more boon to the field of teledentistry, is educating the primary healthcare professionals to diagnose different oral lesions which can be a significant cause for the oral cancer or leukoplakia leading to significant deaths. (20)

Additionally, teledentistry systems have improved public dental health services in some way or another to reduce potential future failures and maximise system use.. (21

CONCLUSION

The study has come to a conclusion that teledentistry has come out as a major boon to the patients as well as the dentists as compared to the manual community dentistry. There have been a lot of factors concluding in part to the teledentistry system, being ease of communication, discussing problems and solutions even remotely, even though not present at the same location at the same time; so tends to save both time and money, also, is at ease with the patients since everyone is on their electronic gadgets as per the generation, like messages, diverse apps and video conferencing..

REFERENCES

1. Mandall NA, O'Brien KD, Brady J, Worthington HV, Harvey L. Teledentistry for screening new patient orthodontic referrals. Part 1: A randomised controlled trial. British dental journal. 2005;199(10):659-62.
2. Can S, MacFarlane T, O'Brien KD. The use of postal reminders to reduce non-attendance at an orthodontic clinic: a randomised controlled trial. British dental journal. 2003;195(4):199- 201.
3. Fairhurst K, Sheikh A. Texting appointment reminders to repeated non-attenders in primary care: randomised controlled study. BMJ Quality & Safety. 2008;17(5):373-6.
4. Heimes D, Luhrenberg P, Langguth N, Kaya S, Obst C, Kämmerer PW. Can Teledentistry Replace Conventional Clinical Follow-Up Care for Minor Dental Surgery? A Prospective Randomized Clinical Trial. International journal of environmental research and public health. 2022;19(6):3444.
5. Aboalshamat KT, Althagafi TK, Alsaeedi SA, Alhumaidi SN, Alemam AA. Accuracy and perceptions of teledentistry in KSA during the COVID-19 pandemic: A single-centre randomised controlled trial. Journal of Taibah University Medical Sciences. 2022;17(3):506- 15.
6. Berndt J, Leone P, King G. Using teledentistry to provide interceptive orthodontic services to disadvantaged children. American Journal of Orthodontics and Dentofacial Orthopedics. 2008;134(5):700-6.
7. Islam MR, Islam R, Ferdous S, Watanabe C, Yamauti M, Alam MK, Sano H. Teledentistry as an Effective Tool for the Communication Improvement between Dentists and Patients: An Overview. InHealthcare 2022 (Vol. 10, No. 8, p. 1586). MDPI.
8. Chen JW, Hobdell MH, Dunn K, Johnson KA, Zhang J. Teledentistry and its use in dental education. The Journal of the American Dental Association. 2003;134(3):342-6.

9. Summerfelt FF. Teledentistry-assisted, affiliated practice for dental hygienists: an innovative oral health workforce model. Journal of dental education. 2011;75(6):733-42.
10. Islam MR, Islam R, Ferdous S, Watanabe C, Yamauti M, Alam MK, Sano H. Teledentistry as an Effective Tool for the Communication Improvement between Dentists and Patients: An Overview. InHealthcare 2022 (Vol. 10, No. 8, p. 1586). MDPI.
11. Suetenkov DE, Popkova OV, Kiselev AR. Possibilities and limitations of teledentistry. Revista Cubana de Estomatologia. 2020;57(1):1-8.
12. Wolf TG, Schulze RK, Ramos-Gomez F, Campus G. Effectiveness of Telemedicine and Teledentistry after the COVID-19 Pandemic. International journal of environmental research and public health. 2022;19(21):13857.
13. Boringi M, Waghray S, Lavanya R, Babu DB, Badam RK, Harsha N, Garlapati K, Chavva S. Knowledge and awareness of teledentistry among dental professionals–A cross sectional study. Journal of clinical and diagnostic research: JCDR. 2015;9(8):ZC41.
14. Kopycka-Kedzierawski DT, Bell CH, Billings RJ. Prevalence of dental caries in Early Head Start children as diagnosed using teledentistry. Pediatric dentistry. 2008;30(4):329-33.
15. Sycinska-Dziarnowska M, Maglitto M, Woźniak K, Spagnuolo G. Oral health and teledentistry interest during the COVID 19 pandemic. Journal of Clinical Medicine. 2021;10(16):3532.
16. Park JH, Rogowski L, Kim JH, Al Shami S, Howell SE. Teledentistry platforms for orthodontics. Journal of Clinical Pediatric Dentistry. 2021;45(1):48-53.
17. Fernández CE, Maturana CA, Coloma SI, Carrasco-Labra A, Giacaman RA. Teledentistry and mHealth for promotion and prevention of oral health: a systematic review and meta-analysis. Journal of dental research. 2021;100(9):914-27.
18. AlShaya M, Farsi D, Farsi N, Farsi N. The accuracy of teledentistry in caries detection in children–A diagnostic study. Digital Health. 2022;8:20552076221109075.
19. Flores AP, Lazaro SA, Molina-Bastos CG, Guattini VL, Umpierre RN, Gonçalves MR, Carrard VC. Teledentistry in the diagnosis of oral lesions: A systematic review of the literature. Journal of the American Medical Informatics Association. 2020;27(7):1166-72.
20. Roxo-Gonçalves M, Strey JR, Bavaresco CS, Martins MA, Romanini J, Pilz C, Harzheim E, Umpierre R, Martins MD, Carrard VC. Teledentistry: A tool to promote continuing education actions on oral medicine for primary healthcare professionals. Telemedicine and e-Health. 2017;23(4):327-33.
21. Böhm da Costa C, da Silva Peralta F, Maeyama A. Teledentistry System in Dental Health Public Services: A Mixed-Methods Intervention Study. International Journal of Medical Informatics. 2021;153:104533-.