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**Pediatric Teledentistry Consultation in Primary Health Care:
Portuguese Parents' Perception**

**Dissertation submitted in partial fulfilment of requirements for MSc in
Health Units Management**

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DEDICATION

This master thesis is dedicated to my family who have always unwaveringly encouraged and supported me in all my pursuits.

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RESUMO

Título: Teleconsulta pediátrica de saúde oral nos cuidados de saúde primários, em Portugal: Perceção dos pais

Em Portugal, a prevalência de patologia oral na população infantil e juvenil é ainda preocupante, encontrando-se o acesso a cuidados de saúde oral limitado a algumas idades ou dependente de serviços privados.

As tecnologias digitais têm emergido como uma solução promissora na medicina, inclusive na saúde oral, facilitando o acesso e reduzindo custos sem comprometer a qualidade dos serviços. A evidência demonstra inúmeras vantagens da teleconsulta pediátrica de saúde oral, com a aceitação parental sendo um fator crucial para sua adoção mais ampla. Contudo, a literatura sobre a perceção dos pais é escassa, tornando essencial entender e avaliar as suas opiniões para a implementação efetiva de novos serviços.

Esta dissertação investiga as perceções dos pais inscritos na Unidade de Saúde Familiar Almada do ACES Almada Seixal, sobre a teleconsulta pediátrica de saúde oral. Disponibilizaram-se dois questionários online sendo o primeiro acedido antes da teleconsulta e o segundo questionário três meses após a intervenção, responderam a ambos 122 pais. Da análise, constata-se que, a totalidade dos inquiridos nunca utilizou a teleconsulta pediátrica de saúde oral e havia um desconhecimento geral sobre facilidade, utilidade e confiabilidade. Após a intervenção, observou-se uma atitude positiva em todas as dimensões avaliadas e um elevado nível de satisfação, realçando-se que na globalidade, os pais adotariam preferencialmente a teleconsulta pediátrica de saúde oral.

Em Portugal, à semelhança de outros países, torna-se necessário *guidelines* na área da telessaúde oral, que garantam a qualidade e eficácia dos cuidados, bem como um maior envolvimento dos pais e sociedade civil na promoção e apoio a estas iniciativas.

Palavras-chave: Cuidados de Saúde; Perceção; Saúde Oral; Teleconsulta; Telemedicina; Telessaúde

Abstract

Title: Pediatric Teledentistry Consultation in Primary Health Care: Portuguese Parents' Perceptions

In Portugal, the prevalence of oral pathology in children and young people is concerning, with access to oral health care limited to a few key ages or dependent on private services and not universally accessible.

Digital technologies have been a boon in various medical areas, including oral health, enhancing access and affordability while preserving quality. Evidence demonstrates numerous advantages of using pediatric oral health teleconsultation, but parental approval is a key factor for its broader acceptance.

The literature on parents' perceptions of oral teleconsultation is scant, highlighting the need to understand and evaluate their views for successful service implementation.

This dissertation explores and analyses the perceptions of Portuguese parents, of Almada Family Health Unit of the ACES Almada Seixal, regarding the implementation of pediatric oral health teleconsultation. Two online questionnaires were provided, with the first accessed before the teleconsultation and the second questionnaire completed three months after the intervention; 122 parents responded to both.

The analysis reveals that all respondents had never used the pediatric oral health teleconsultation service, and overall, there is a high level of unfamiliarity with its ease, usefulness, and reliability. After the intervention, positive attitudes were found towards all analysed dimensions, as well as a high level of satisfaction. It is noteworthy that, overall, parents would preferentially adopt pediatric oral health teleconsultation.

In Portugal, similar to other countries, there is a need for guidelines in the field of oral telehealth that provide a framework for the provision of health care, ensuring the quality and effectiveness of services provided as well as greater involvement of parents and civil society in promoting and supporting these initiatives.

Keywords: Health Care; Perception; Oral Health; Teleconsultation; Telemedicine; Telehealth

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List of Abbreviations:

<i>AAPD</i>	American Academy of Pediatric Dentistry
<i>ADA</i>	Australian Dental Association
<i>DCP</i>	Dental Care Provider
<i>DGS</i>	Directorate General of Health
<i>IT</i>	Information Technologies
<i>NCDs</i>	Systemic Noncommunicable Diseases
<i>NHS</i>	National Health Service
<i>PTD</i>	Pediatric Teledentistry
<i>PTDC</i>	Pediatric Teledentistry Consultation
<i>PEOU</i>	Perceived Ease of Use
<i>PU</i>	Perceived Usefulness
<i>RPM</i>	Remote Patient Monitoring
<i>TAM</i>	Technology Acceptance Model
<i>TD</i>	Teledentistry
<i>UTAUT</i>	Unified Theory of Acceptance and Use of Technology
<i>WHO</i>	World Health Organization

1. INTRODUCTION

Oral health is a significant determinant of quality of life, essential for citizens' well-being, and an integral component of general health (World Health Organization, 2020). Notably, oral diseases represent a significant global health burden with a high prevalence rate. They are associated with noncommunicable diseases (NCDs) such as diabetes mellitus, cardiovascular diseases, depression, neurodegenerative conditions, rheumatic diseases and inflammatory bowel disease, or gastric *Helicobacter pylori* infection (Botelho et al., 2022) and associated with an increased risk of developing other conditions, including endocarditis and cancer (Seitz et al., 2019). There is a notable social gradient in the prevalence of oral disease between individuals with low and high socioeconomic status. The prevalence and severity of oral diseases are higher in individuals with lower socioeconomic status, which places an additional burden on issues of inequalities in access to oral health care (Peres et al., 2019).

As indicated in the Global Oral Health Status Report (World Health Organization, 2023), approximately 3.5 billion individuals are affected by oral disease, resulting in a loss of 15 million years of disability-adjusted life. Dental caries represent one of the most prevalent chronic diseases in childhood, as reported by the World Health Organization (2023). Considering the considerable burden of dental pathology in childhood and adolescence, numerous organisations, including the World Health Organization (WHO), the American Academy of Pediatric Dentistry (AAPD), and the Australian Dental Association (ADA), have advocated for enhanced accessibility to oral health care for the child and youth population (AAPD, 2022; ADA, 2021; WHO, 2023). Taking into account of the limited access to oral health care, exorbitant costs of dental treatments, the necessity of lengthy journeys to specialists, and the scarcity of dental care providers, every endeavour to enhance the availability of oral health services is to be regarded as a positive step forward (Maqsood et al., 2021).

In modern healthcare landscape, technological advancements are transforming traditional paradigms, offering innovative solutions to bridge gaps and enhance accessibility. Among these developments, pediatric teledentistry (PTD) has emerged as a promising avenue, transforming the way oral health promotion and healthcare are delivered to children (Kopycka-Kedzierawski et al., 2018). As we navigate this evolving landscape, it becomes evident that PTD can be adopted at different levels in a strategic manner. This includes the improvement of oral health literacy, the utilisation of the technology as a tool in training and education, as well as the increased early

detection, surveillance, and referral in primary care (WHO, 2023). Furthermore, PTD can be successfully implemented as a component of care delivery that minimises inequalities in access to oral health care, eliminates disparities between rural and urban communities and allows efficient management of pediatric patients for some medical conditions under certain circumstances (Goswami et al., 2021; Kopycka-Kedzierawski et al., 2018). Pediatric teledentistry consultations (PTDC) are defined as the delivery of dental and oral healthcare services that are specifically tailored for children, from the moment of birth until they reach the legal age of majority (American Telemedicine Association (ATA), 2017). This is an efficacious method of early diagnosis, monitoring, and prevention of oral disease, as well as a means of reassuring children's parents or caregivers through the use of messages, photos, and/or videos. Additionally, it has the potential to reduce the number of unnecessary visits for monitoring and follow-up (Goswami et al., 2021; Kopycka-Kedzierawski; Lourenço et al., 2020; Nuvvula & Mallineni, 2021; Sanghvi et al., 2021; Sharma et al., 2021; Viswanathan et al., 2022)

Although PTDC has significant potential for promoting oral health, preventing oral diseases, and enhancing access to dental care for children (AAPD, 2022), it is essential to acknowledge that parents may exhibit diverse attitudes and levels of acceptance towards it. The utilization of PTDC by pediatric patients is contingent upon parental attitudes and diligence. As parents bear the responsibility for facilitating their children's healthcare, their attitudes exert a direct influence on whether children will utilise it. It can be reasonably assumed that parents who are supportive and diligent are more likely to ensure that their children utilise these services. Consequently, the accessibility of paediatric teledentistry, contingent upon parents' favourable attitudes and actions, can markedly impact children's oral health outcomes. Conversely, in the case parents have no interest to PTDC, their children may be deprived of essential dental care, which could result in poorer oral health outcomes.

Inadequate knowledge of how individuals adopt information technology (IT) is a significant factor contributing to the failure of technology implementation (Estai, Kanagasingam, Xiao et al., 2017; Maqsood et al., 2021). User acceptance is a crucial element in the successful implementation of technology (Tao et al., 2020). Furthermore, it is crucial to comprehend the perceptions of parents, as they are instrumental in influencing healthcare decisions for their children ((Estai, Kanagasingam, Xiao et al., 2017). Their attitudes towards telehealth may also be shaped indirectly, which is likely to become increasingly prevalent in the future.

It is worthy of note that existing studies (Chaudhary et al., 2022; Khokhar et al., 2022; Tiwari et al., 2022) The majority of studies in this domain (Chaudhary et al., 2022; Weintraub et al., 2020) have primarily focused on exploring the perceptions of dental care providers, which has resulted in a notable gap in our understanding of the perspectives held by the key stakeholders. The second key stakeholder group is that of parents.

The objective of this research is to examine the factors that shape parental attitudes towards the adoption of PTDC in primary health care in Portugal. A comprehensive examination of perceptions will facilitate the future development and implementation of paediatric teledentistry services, ultimately improving oral health outcomes for the youngest members of our society and fostering positive attitudes towards telehealth.

The analysis will address seven research questions, assessing outcomes and acceptability at the parent level and whether these changed after the intervention. This research employs a descriptive approach, utilising quantitative methods through the use of a survey tool to delineate and comprehend parents' perspectives before and after the intervention.

1.1 Research Questions

The primary objective of this study is to investigate the influence of parents' perceptions on the adoption of PTDC and their subsequent intentions to utilise it. To this end, the following research questions have been formulated:

RQ1. What were the parents' pre- and post-intervention perceptions of PTDC?

RQ2. To what extent did parents' perceptions of PTDC change in comparison to the pre- and post-appointment periods?

RQ3. What is the role of knowledge and awareness of PTDC in shaping parents' perceptions and acceptance of this mode of care delivery?

RQ4. What is the impact of the overall experience of PTDC on parental satisfaction?

RQ5. What factors may influence parents' willingness to adopt PTDC for their children?

RQ6. To what extent can the assessment of parents' perceptions of PTDC after intervention be considered a viable approach for enhancing paediatric oral health care, including diagnosis, monitoring, and follow-up?

RQ7. What is the impact of parental engagement in PTDC on its adoption?

1.2 Dissertation Structure

The second chapter provides a theoretical foundation for the study, based on a comprehensive literature review. The third chapter provides a comprehensive account of the methodology employed, including a detailed description of the design of the research instrument in the form of a questionnaire. The fourth chapter presents the findings, while the fifth chapter engages in a discussion of the results in the context of the research questions, previous work and theoretical background previously presented when relevant. Incorporates the study's limitations and suggestions for future research and recommendations. Finally, the conclusion is advanced in chapter six.

2. BACKGROUND

2.1 Dental Disease/Oral Health in Children

The review synthesised the evidence from existing academic literature on the primary research topic of this dissertation, namely parents' perceptions of pediatric teledentistry consultations. The themes and concepts under study will be elucidated in greater detail above.

Dental caries represents the most common and prevalent oral disease among children, with a considerable economic impact and a significant influence on the quality of life of individuals and their families (World Health Organization, 2019). The most recent oral health information to be collected in Portugal was in 2014, with the study subsequently published in 2015. The III Study on the Prevalence of Oral Diseases revealed that 54.8% of children aged six are caries-free, while at 12 years of age, only 53% have no experience of disease (Direção-Geral da Saúde (DGS), 2015). However, dental caries is a dynamic disease that can be prevented through the implementation of appropriate measures, given the existence of a complex network of interacting risk factors that can either protect against or cause disease progression (Qeranqayeh et al., 2022). As stated by Estai et al. (2020), the impact of developing the disease can be reduced or avoided through early detection and intervention, including tailored oral hygiene interventions, preventive dental care delivery, and behavioural counselling. Nevertheless, providing comprehensive dental care to all children is a significant challenge, both in terms of cost and logistical feasibility. Therefore, there is a pressing need for the development of a fair and cost-effective dental care model that can expand the scope for oral health care provision to the entire pediatric population (Estai et al., 2020). In 2021, the American Academy of Pediatric Dentistry recommended increasing accessibility to oral health care in the child and youth population. The use of teledentistry is considered a valuable tool to improve oral health in the pediatric population (AAPD, 2021).

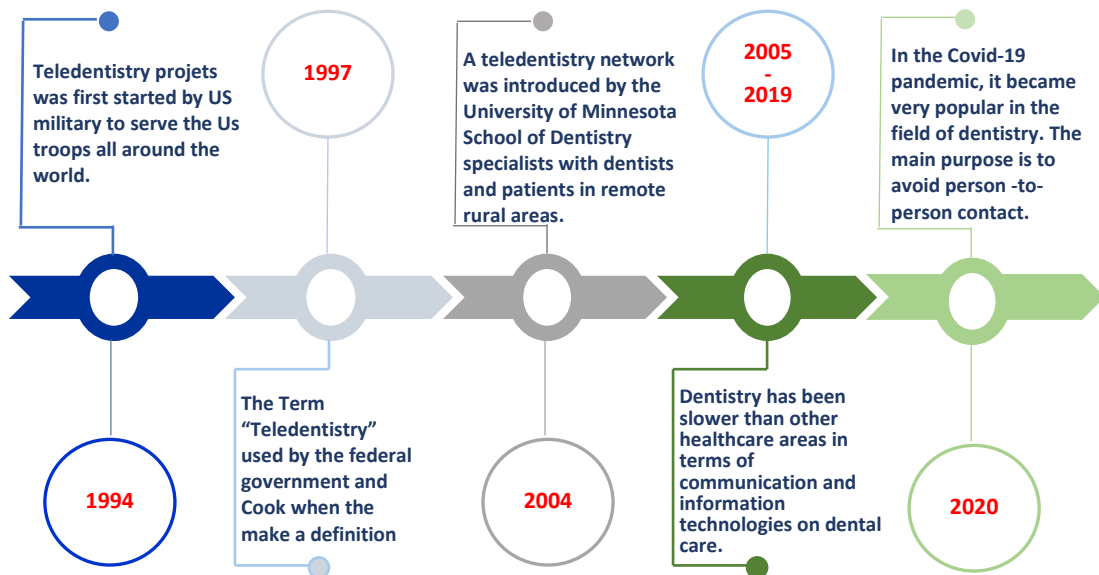
Teledentistry is a telehealth branch that employs electronic information, imaging, and communication technologies, including interactive audio, video, data communications, and store-and-forward technologies, to facilitate and support dental care delivery (Islam et al., 2022). It is defined by the American Dental Association as the use of telehealth systems and methods to provide oral healthcare (ADA Policy on Teledentistry, American Dental Association, n.d.). Tracye A. Moore RDH (n.d.) argues that teledentistry is connecting patients to dental care providers (DCP) to deliver care and advice at a distance. A DCP is a dental health practitioner

who delivers care to improve oral health. This may include dental hygienists, dental therapists, dentists, or other oral health professionals (Ben-Omran et al., 2021).

2.2 Teledentistry History

Teledentistry is a relatively novel field of dentistry, with its origins dating back to the early 1990s. The inaugural documented instance of teledentistry occurred in 1994, when the United States Army initiated the utilisation of telecommunication technologies to facilitate dental care for military personnel stationed in isolated regions. Subsequently, teledentistry has undergone significant advancements. Since then, teledentistry has been increasingly adopted in several parts of the world, particularly in rural and underserved areas where access to dental care is limited (Estai & Kanagasingam, 2018; Thakkar et al., 2023). The advent of digital technologies and the internet has been a pivotal factor in the expansion of teledentistry, facilitating remote consultations, diagnosis, and treatment (Estai & Kanagasingam, 2018).

Figure 1: Evaluation Timeline of Teledentistry



Source: Adapted from Islam, M. R. R., Islam, R., Ferdous, S., Watanabe, C., Yamauti, M., Alam, M. K., & Sano, H. (2022). TD as an Effective Tool for the Communication Improvement between Dentists and Patients: An Overview. *Healthcare (Switzerland)*, 10(8).

In the early years of teledentistry, the primary focus was on providing consultations and diagnoses, with the utilisation of telecommunication technologies for actual treatment being relatively limited. However, with the advent of new technologies, such as intraoral cameras and remote-controlled robotic devices, the scope of teledentistry has broadened to encompass a range of dental treatments (Gurgel-Juarez et al., 2022; Estai & Kanagasingam, 2018).

Furthermore, it has been demonstrated to be an effective method of providing dental care to vulnerable populations, including the elderly, children and those with special needs. It has been demonstrated that teledentistry can reduce the cost of dental care delivery, improve access to care, and increase patient satisfaction (Estai et al., 2016; Maqsood et al., 2021).

Teledentistry is currently a rapidly evolving field, with ongoing research and development aimed at enhancing its efficacy and expanding its applications. The advent of the SARS-CoV-2 pandemic has further accelerated the adoption of TD, as dental practices have had to identify novel strategies to deliver care while minimising in-person contact. This reflects a broader transformation in the healthcare landscape, characterised by a shift towards innovation, integration, and convenient care (Islam et al., 2022).

2.3 Teledentistry Modalities and Applications

Advances in teledentistry led to various care modalities and can be used in combination or individually depending on patient needs (*ADA Policy on TD_ American Dental Association, n.d.*).

- **Live video conferencing:** Involves using video conferencing software to conduct a live consultation between the dental care provider (DCP) and the patient, allowing for a real-time interaction;
- **Store-and-forward:** This requires collected health information as photos, x-rays, or other digital images and shared afterwards with a DCP for review and diagnosis;
- **Remote patient monitoring:** This includes the use of digital tools such as wearable devices to monitor a patient's oral health and provide feedback to the DCP, allowing for continuous care and monitoring;
- **Mobile health:** This involves the use of mobile apps and devices to provide patients with information, reminders, and guidance on oral health care and disease prevention;
- **Virtual consultations:** Use of chat, messaging, or phone calls to conduct consultations with patients who may not have access to video conferencing technology.

Teleconsultation represents the most prevalent form of teledentistry. It is defined as a consultation conducted via information technology (IT), in which both the patient and the dental care provider are situated in disparate geographical locations.

In addition to telemedicine, teledentistry has a multitude of potential applications, which can be classified in accordance with the taxonomy presented in Table 1.

Table 1: Modalities of Teledentistry

MODALITIES OF TELEDENTISTRY		
GROUP	APPLICATION	DESCRIPTION
PATIENTS	Remote Consultation	Allows dental care providers to consult with patients remotely, either through video calls, photos, or messaging. This can help patients who live in remote or underserved areas, or who have difficulty travelling (Joshi et al., 2021).
	Emergency consultations	Employed to provide emergency consultations for dental emergencies such as toothaches or broken teeth, allowing patients to get immediate advice and guidance on how to manage the situation until they can see a dentist in person (Islam et al., 2022).
	Diagnosis and treatment planning	Used to diagnose and plan treatment for certain dental conditions, such as orthodontic problems, gum disease, and oral lesions (Maqsood et al., 2021).
	Monitoring of oral health	Applied to monitor a patient's oral health, such as checking for changes in lesion appearance or monitoring the progress of orthodontic treatment (Islam et al., 2022).
	Follow-up appointments	Utilized for follow-up appointments, such as after a tooth extraction or other dental procedure, reducing the need for in-person visits (Islam et al., 2022).
	Education and prevention	Used to provide education and preventive care to patients, such as demonstrating proper brushing and flossing techniques or providing information on healthy eating habits (Islam et al., 2022).
PROVIDERS	Professional communication	TD can facilitate communication between dental/oral health care providers, to obtain a treatment recommendation (Islam et al., 2022).
	Professional development	Using TD in professional development includes online learning through videoconferencing (Islam et al., 2022).

Research reveals many examples of teledentistry successfully utilized to deliver patient care, especially in maxillofacial surgery, endodontics, implantology, orthodontics, pediatric

dentistry/pediatric oral health, periodontology, prosthodontics and forensic dental medicine, among others (Maqsood et al., 2021; Modak & Basu, 2020).

2.4 Teledentistry Benefits and Challenges

The existing disparities have contributed to the development of new approaches to oral health care access among populations. Consequently, TD has been shown to be an effective method for addressing these disparities, with a significant impact on the delivery of oral care to disadvantaged populations (Kopycka-Kedzierawski et al., 2018). The adoption of this approach allows for the improvement of oral healthcare infrastructures in a safe manner for patients (Al-Khalifa & AlSheikh, 2020), with a reduction in costs for both patients and providers (Estai et al., 2018; Maqsood et al., 2021). Additionally, it has the potential to eliminate disparities between communities (Estai et al., In 2016), it was demonstrated that this approach contributed to superior anxiety management in comparison to traditional face-to-face consultations (Maqsood et al., 2021; Menhadji et al., 2021). Besides, it has been shown to advance environmental sustainability in the context of waste consumable material, as well as unnecessary travel (Duane et al., 2019). Consequently, virtual consultations and high-tech monitoring of patients provide cost-effective and convenient care alternatives for patients (Islam et al., 2022).

Teledentistry encompasses several advantages (Islam et al., 2022), the major benefits of teledentistry are:

- Cost reduction to providers by eliminating the use of disposable supplies and to patients in avoiding unnecessary travels.
- Increased access to specialists for consultation and diagnosis services that are not accessible in more remote or rural areas.
- Better continuity of care using TD-based follow-up.
- Increased patient engagement in between necessary in-person visits.
- Reduced stress, anxiety, and desensitization for patients with special health care needs by having some aspects of their care in the comfort of their home.

Despite the advantages, as the same way as telemedicine, the applicability of teledentistry has certain constraints that may influence the adoption of this model of care delivery and may limit its usefulness (Estai et al., 2016). Challenges are presented in Table 2.

Table 2: Challenges Related to Teledentistry

Challenges Related to Teledentistry

Acceptability (Deshpande et al., 2021; Kamal et al., 2020; Sanghvi et al., 2021; Tenore et al., 2021)	Level of acceptance by patients and dental care providers; Linguistic concerns.
Patient Risks Issues (Al-Khalifa & AlSheikh, 2020; AlShaya et al., 2022; Queyroux et al., 2017)	Inaccurate diagnosis or misdiagnosis; Lack of diagnosis.
Ethical and legal issues (ADA Policy on TD _ American Dental Association, n.d.; Haider et al., 2020)	Confidentiality of dental information; Privacy of the patient; Medicolegal issues.
Technology related issues (Gurgel-Juarez et al., 2022; Maqsood et al., 2021; Modak & Basu, 2020; Tan et al., 2021)	Connectivity; Internet connection ; Infrastructure; Technical errors during data transmission; Image quality.
Financial Issues (Maqsood et al., 2021; Modak & Basu, 2020)	Financial reimbursement; Increased costs.

2.4.1 Acceptability

The level of acceptance by patients and DCP represents a significant challenge that may limit the use of TD (Goswami et al., 2021; Nuvvula & Mallineni, 2021; Sanghvi et al., 2021). The complexity of the technology in question may present a challenge for DCP, who may be reluctant to learn and adopt new skills (Goswami et al., 2021). Additionally, they may be concerned about making an inaccurate diagnosis (Nuvvula & Mallineni, 2021). It is therefore recommended that TD should be integrated into the undergraduate and postgraduate curriculum (Haider et al., 2020). Furthermore, the lack of in-person communication may impact the acceptance of a proposed treatment plan (Goswami et al., 2021). However, during the pandemic caused by the SARS-CoV-2 virus, there was an increase in the acceptance of TD among patients and DCP (Kamal et al.,

2020; Menhadji et al., 2021; Rahman et al., 2020; Tenore et al., 2021). A survey analysis conducted by Menhadji et al. (2021) revealed that the majority of patients expressed positive views regarding teleconsultations, and that dental care providers were confident in their efficacy (Menhadji et al., 2021).

2.4.2 Patient Risks Issues - Accuracy/Misdiagnosis

A number of patient-related factors have been identified as potential contributors to the accuracy or misdiagnosis of conditions, as well as the failure to diagnose certain conditions (Goswami et al., 2021; Sanghvi et al., 2021; Wallace et al., 2021). A lack of technical training or experience in the use of TD by dental care providers can present a challenge in accurate diagnosis, which may result in an incorrect treatment plan and pose a risk to the patient (Nuvvula & Mallineni, 2021; Wallace et al., 2021). In the absence of an in-person oral examination, certain silent pathologies may be overlooked, thereby increasing the risk of diagnostic errors and influencing the subsequent treatment plan (Sanghvi et al., 2021). In addition, the incorrect assessment of certain dental lesions can result in misdiagnosis and, subsequently, an inappropriate treatment plan that raises concerns for dental care providers (Goswami et al., 2021). Besides, the accuracy of the diagnosis may be contingent upon the quality of the images received (Wallace et al., 2021). Furthermore, some patients may neglect to provide information that could prove useful in accurately diagnosing their condition and establishing an appropriate treatment plan (Sanghvi et al., 2021; Viswanathan et al., 2022).

Nevertheless, numerous studies have demonstrated the efficacy of teledentistry in diagnosing dental diseases and assessing masticatory function with remarkable precision (Ali & Ansari, 2022; AlShaya et al., 2022; Estai et al., 2016; Estai et al., 2020; Gurgel-Juarez et al., 2022; Queyroux et al., 2017). However, the quality of the images received from patients is a factor that influences accuracy. Fortunately, technology has rapidly improved, and the devices (smartphones, laptops) have excellent image quality, are affordable, user-friendly, and easily available (Estai et al., 2020; Estai & Kanagasingham, 2018).

2.4.3 Ethical and Legal Issues

A number of studies have addressed the ethical and legal issues associated with patient confidentiality and the security of patient data (Goswami et al., 2021; Kopycka-Kedzierawski et al., 2018; Natal et al., 2022; Nuvvula & Mallineni, 2021; Sanghvi et al., 2021; Viswanathan et al.,

2022; Wallace et al., 2021). From the perspective of the DCP, there are concerns regarding the potential for misdiagnosis, which could result in the mismanagement of a patient and, subsequently, lead to patient harm or medico-legal issues (Wallace et al., 2021).

Matters pertaining to the confidentiality and privacy of patients' data, dental records and medical histories emerge from the transfer of medical histories and records, as well as from general security concerns pertaining to the storage of electronic information in mainframes (Goswami et al., 2021; Kopycka-Kedzierawski et al., 2018; Natal et al., 2022; Nuvvula & Mallineni, 2021; Wallace et al., 2021), and that patients' privacy is not compromised during teleconsultations (Deshpande et al., 2021; Talla et al., 2020).

It is imperative that patients are informed of the potential risk of interception of dental information during the electronic exchange of data, despite the implementation of robust security measures (Deshpande et al., 2021; Tan et al., 2021).

The ethical and legal implications of TD must be given due consideration, given the absence of clear guidelines to ensure the quality and safety of information and its exchange. The legal issues of licensure, jurisdiction, and malpractice remain unresolved by some governments (Deshpande et al., 2021; Kopycka-Kedzierawski et al., 2018; Singh et al., 2020).

2.4.4 Technology-Related Issues

The research findings indicate that there are significant technology-related concerns, including the lack of adequate infrastructure, such as internet connectivity, speed, and access to communication devices (e.g., computers or smartphones) to facilitate interaction with the DCP. In addition, the term "connectivity" encompasses the necessity of utilising both internet and mobile devices as instruments (Macapagal, 2020). Moreover, it is recommended that TD services be accessed only by individuals who have attained a reasonable level of digital literacy (Maqsood et al., 2021; Singh et al., 2020). In terms of equipment acquisition, Kopycka-Kedzierawski et al. (2018) indicate that the initial investment in TD services does not necessitate the purchase of costly equipment for dental care providers or patients. No additional devices are required (Kopycka-Kedzierawski et al., 2018; Singh et al., 2020).

In teledentistry, the quality of the video images is of paramount importance. The ability to produce clear and high-resolution images is crucial for the accurate assessment of dental conditions and the effective planning of treatments. The superior image quality afforded by TD

enhances sensitivity and specificity in dental referrals, thereby facilitating more favourable patient outcomes. The early detection of conditions such as caries (cavities) is facilitated by the use of clear imagery, which reduces patient discomfort and anxiety (Gurgel-Juarez et al., 2022).

2.4.5 Financial Issues

In terms of financial considerations, the additional costs associated with the acquisition of infrastructure, internet access and equipment (such as mobile phones or computers) have been identified as a key concern (Kopycka-Kedzierawski et al., 2018; Natal et al., 2022; Nuvvula & Mallineni, 2021; Wallace et al., 2021). Furthermore, given that TD represents a novel practice, concerns have been raised about the potential limitations of inadequate financial reimbursement, which could impede its adoption (Nuvvula & Mallineni, 2021). In accordance with the recommendations set forth by the American Dental Academy, the remuneration for teledentistry services must be consistent with the rates applicable to in-person services (ADA Policy on TD, American Dental Association, n.d.).

2.5 Pediatric Teledentistry

Teledentistry in the pediatric population can be defined as the delivery of dental and oral healthcare services that are specifically tailored for children, from the moment of birth until they reach the legal age of majority (AAPD, 2022). This is achieved through the utilisation of telehealth methods (American Telemedicine Association, 2017). These methods encompass both real-time interactions and "store and forward" technologies, which employ virtual communication technology, and are facilitated through mobile devices (AAPD, 2022).

Teledentistry has been employed for several purposes, including the dissemination of oral health education and the promotion of good practice, the diagnosis and monitoring of dental conditions, and the guidance of patients and their carers on appropriate dental behaviour. This strategy has been instrumental in providing dental care in remote locations and in areas with limited access to pediatric dental care providers. It has also been used to monitor patients between appointments, conduct diagnosis and screening programmes, promote the oral health of children through dental education and behaviour guidance before face-to-face appointments (Lourenço et al., 2020; Sanghvi et al., 2021; Sharma et al., 2021).

Narrowing to oral care, PTD employs a range of digital tools, including electronic dental records, information and communication technologies (ICT), digital dental photography, and mobile data (Internet), to facilitate consultation, supervision, and continuing dental education (Estai et al.,

2020; Islam et al., 2022). It encompasses several elements, including consultation, diagnosis, triage, and monitoring.

The role of mobile technology in PTD is of great consequence; as a result, smartphones represent an appealing innovation due to their increased availability, enhanced digital photography, and data processing capabilities, which permit users access to cost-effective and secure storage. The camera on a smartphone can be used for dental photography, it can be used to record images that can provide information to identify some dental pathologies and for the development of appropriate diagnostics and treatment plans (Estai et al., 2021).

These resources can assist in the provision of pediatric teledentistry consultations (PTDC), which are presented as a behaviour advisor given that young children are less likely to display non-collaborative behaviours than in a face-to-face consultation. In a family setting, the child is more at ease than they would be in a clinical environment. The non-face-to-face approach has been observed to result in children displaying greater enthusiasm and cooperation. For parents and caregivers, convenient access can lead to a reduction in work absenteeism (Sharma et al., 2021).

2.6 Challenges in Pediatric Teledentistry Consultation Adoption

In general, consultation represents the most common form of PTD through which parents or caregivers can obtain advice for children (Goswami et al., 2021; Kopycka-Kedzierawski et al., 2018; Nuvvula & Mallineni, 2021). This encompasses real-time telephone and/or live audio/video interactions with parents, facilitated by the use of smartphones or laptops to enable more direct contact (AAPD, 2021). Many consistent benefits have been reported in the literature, with teleconsultation being demonstrated to be effective and feasible in the pediatric population (Estai et al., 2018). The extant evidence substantiates the accuracy of PTDC for caries diagnosis, which is comparable to that of an in-person diagnosis (AlShaya et al., 2022; Sharma et al., 2021).

In addition to its efficacy in diagnosis, PTDC has been demonstrated to enhance accessibility to dental care for children who have not previously consulted a dental practitioner and may represent a viable approach for early screening of dental pathology (Kopycka-Kedzierawski et al., 2018). Furthermore, there is an opportunity to enhance patient oral health outcomes, including reinforcing self-care, literacy, empowerment, and reducing psychological anxiety (Talla et al., 2020). Additionally, it facilitates access to oral and dental care, as well as assessment for timely diagnosis, follow-up, management, monitoring, and behaviour guidance for children with

special needs (Goswami et al., 2021; Kopycka-Kedzierawski et al., 2018; Lourenço et al., 2020; Natal et al., 2022; Nuvvula & Mallineni, 2021; Sanghvi et al., 2021; Viswanathan et al., 2022; Wallace et al., 2021). Moreover, this approach markedly diminishes the financial burden of care by circumventing the need for unnecessary travel of children and parents/caregivers, as well as the resulting absenteeism from school and work (Kopycka-Kedzierawski et al., 2018; Natal et al., 2022). Moreover, it enhances the quality of healthcare, curbing healthcare disparities, broadening access to dental care for rural and underprivileged children, and mitigating the risks of care disruption (Surdu & Langelier, 2023) through the utilisation of teleconsultation via telephone or video calls (Kopycka-Kedzierawski et al., 2018; Wallace et al., 2021a).

Despite the similarities between pediatric teledentistry and adult teledentistry consultations, parental acceptance is a significant factor (can be an obstacle or an enabler) to the adoption of the fist. Other challenges that are posed to PTDC are:

- The lack of awareness and education among parents, who may be unaware of the benefits or unable to comprehend the technology's functionality. In the absence of adequate education and awareness, parents may be reluctant to embrace this approach.
- Cultural or language barriers can also impede the adoption of PTDC, particularly among families who are not comfortable with technology or who prefer to communicate in their native language.
- Parents' concerns regarding the quality of care, as virtual consultations may not be as effective as in-person consultations, or that their child's dental/oral issue may not be properly addressed. Additionally, there may be a lack of trust by parents who may not entrust a dental care provider they have not met in person, which can lead to scepticism about their effectiveness.
- Fears regarding data privacy and security related to personal and medical information of the child.

In conclusion, these challenges may render it challenging for some parents to accept PTDC as a viable option for their child's dental care. Nevertheless, with the provision of suitable education, assistance and access to technology, some of these obstacles can be surmounted, with PTDC proving instrumental in addressing these challenges and assisting families in comprehending the

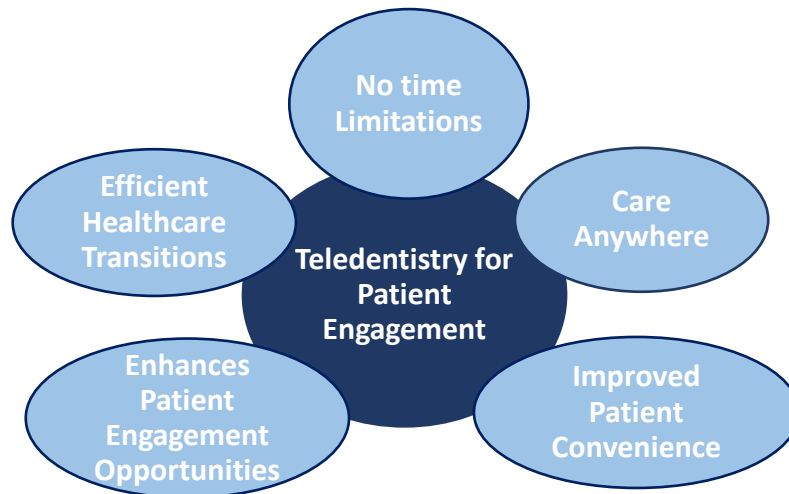
potential advantages (Goswami et al., 2021; Estai et al, 2018; Nuvvula & Mallineni, 2021; Viswanathan et al., 2022).

2.7 Parents' Engagement in Pediatric Teledentistry Consultation

The involvement of parents in the field of dentistry is of paramount importance, particularly in the context of paediatric care, where they assume a pivotal role in the management of their children's oral health (Kaushik & Sood, 2023). The incorporation of teledentistry into paediatric dental care has created new opportunities for parents to become more actively involved in their children's oral health. This involvement encompasses a range of activities, from facilitating access to dental care to participating in the decision-making process regarding treatment options. Furthermore, parents assume the role of educators in this context. Parents who are involved and actively participate in PTDC have the opportunity to learn about proper oral hygiene practices and preventive measures directly from dental care providers. Such knowledge can then be conveyed to their children, thereby fostering good oral health habits from an early age (Dias et al., 2016; Fairweather et al., 2022).

Moreover, parental engagement has been linked to improved health outcomes. When parents are actively involved, they are more likely to adhere to dental advice, ensure their children's compliance with treatment plans, avoid certain risk practices (e.g., consuming excessive amounts of sugar or allowing children to go to sleep without proper oral hygiene), and maintain regular dental check-ups. Furthermore, this active participation serves to mitigate children's anxiety about dental visits, as they have the support and presence of their parents during virtual consultations. A review of the literature on parental engagement in PTDC reveals a significant body of evidence attesting to its benefits in enhancing pediatric oral health care. This not only enhances accessibility to dental services but also enables parents to assume an active role in their children's oral health, which ultimately results in superior dental outcomes and general well-being. As telehealth continues to evolve, it is essential to encourage and facilitate parental engagement in order to maximise the potential benefits for pediatric dental care (Dias et al., 2016).

Figure 2: Teledentistry for Patient Engagement



2.8 Technology Acceptance Models: TAM, TAM 2, UTAUT and TAM 3

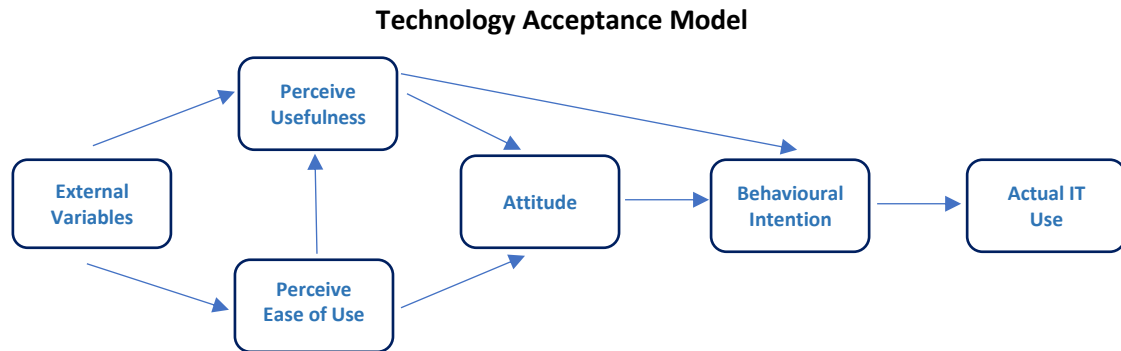
In recent years, a number of theoretical models have been developed with the aim of predicting and explaining the acceptance behaviour of new technologies.

The original technology acceptance model (TAM) was first introduced by Davis (1985) and has subsequently become one of the most influential theories in the field of technology acceptance modelling. In 1989, Davis developed the inaugural version of the TAM to describe computer usage behaviour, as illustrated in Figure 3 (Davis, 1989). The objective is to elucidate the overarching factors that influence the acceptance of computers, thereby facilitating an understanding of user behaviours across a diverse array of end-user technologies and user populations. The model is based on human behavioural and psychological sciences and is widely used in health research related to technology adoption (Davis, 1989). The model proposes a framework that posits that perceived usefulness (PU) and perceived ease of use (PEOU) are the primary determinants of an individual's attitude towards using a particular technology, influencing their intention to use it (Davis, 1989). The intention to utilise a technological device is contingent upon two factors:

- **Perceived usefulness (PU)** - refers to the extent to which a person believes that using a particular technology will enhance their performance or productivity.
- **Perceived ease of use (PEOU)** - refers to the degree to which a person believes that using a technology will be effortless and uncomplicated.

Additionally, TAM considers external variables such as social influence and facilitating conditions when determining the attitude.

Figure 3: Technology Acceptance Model

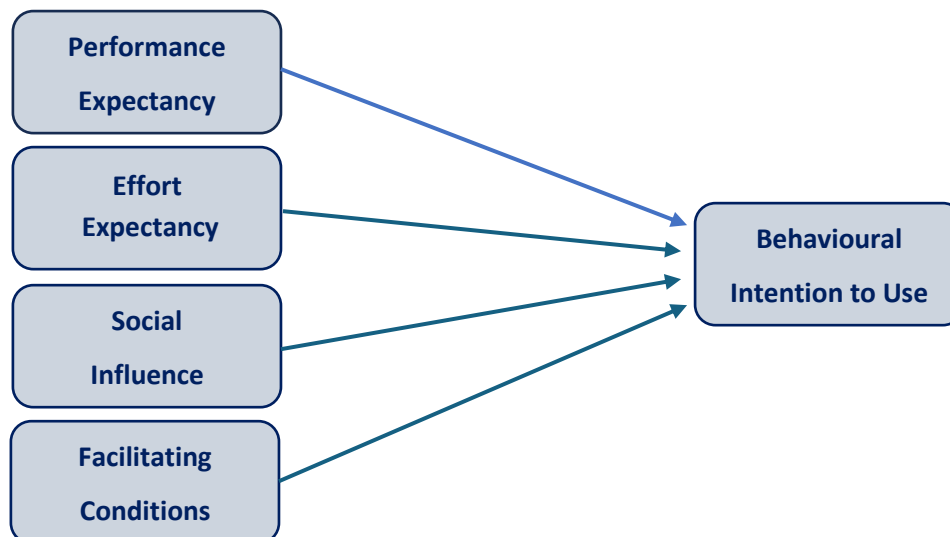


Source: Adapted from Davis, Fred D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, 13(3), 319–339.

Subsequently, the TAM model has undergone significant expansions, resulting in two major developments: the Technology Acceptance Model 2 (TAM 2) (Venkatesh & Davis, 2000) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). TAM 2 provides a more comprehensive explanation of the construct of perceived usefulness. This extended model incorporates social influence processes, including subjective norm and image, along with four cognitive instrumental processes: job relevance, output quality, result demonstrability, and perceived ease of use. These processes serve as crucial predictors influencing perceived usefulness. The subjective norm can be defined as the individual's perception of whether those with whom they have a relationship believe they should or should not engage in a particular behaviour. The term "image" is used to describe the extent to which an individual's status is perceived to be enhanced as a result of utilising the system. The term "job relevance" refers to the extent to which a system is capable of supporting an individual's job-related tasks. The term "output quality" refers to the individual's perception of the system's effectiveness in performing a given task. The concept of result demonstrability suggests that the observation of tangible, positive outcomes resulting from the utilisation of a system may contribute to an enhanced perception of its overall usefulness. The perceived ease of use is a reflection of the degree to which the system is perceived as effortless to use. These factors collectively account for up to 60% of the variance in perceived usefulness. Furthermore, experience and voluntariness act as moderators of perceived usefulness. TAM 2 was developed based on four longitudinal field studies in order to more accurately capture these dynamics.

The Unified Theory of Acceptance and Use of Technology (UTAUT) represents an extension of the Technology Acceptance Model (TAM) 2. In the Unified Theory of Acceptance and Use of Technology (UTAUT), the constructs of perceived usefulness, perceived ease of use, and subjective norm are renamed as performance expectancy, effort expectancy, and social influence, respectively (Figure 4). Additionally, UTAUT introduces a fourth construct, namely facilitating conditions. These are defined as beliefs about the presence of personal or organisational support that encourage technology acceptance. A longitudinal study demonstrated that UTAUT accounts for 70% of the variance in intention to use technology and approximately 50% in actual use (Venkatesh et al., 2003).

Figure 4: UTAUT Model



Source: Adapted from Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). USER ACCEPTANCE OF INFORMATION TECHNOLOGY: TOWARD A UNIFIED VIEW. *MIS Quarterly*, 27(3), 425–478

Later, an integrated model known as TAM 3 (Venkatesh & Bala, 2008) was developed by combining TAM 2 (Venkatesh & Davis, 2000) with the model of the determinants of perceived ease of use. The determinants of perceived ease of use include computer self-efficacy, perception of external control, computer anxiety, computer playfulness, perceived enjoyment, and objective usability. The first four are anchoring determinants, meaning they influence initial judgments, while the last two, perceived enjoyment and objective usability, are adjusting determinants, which become more influential after gaining experience with the system.

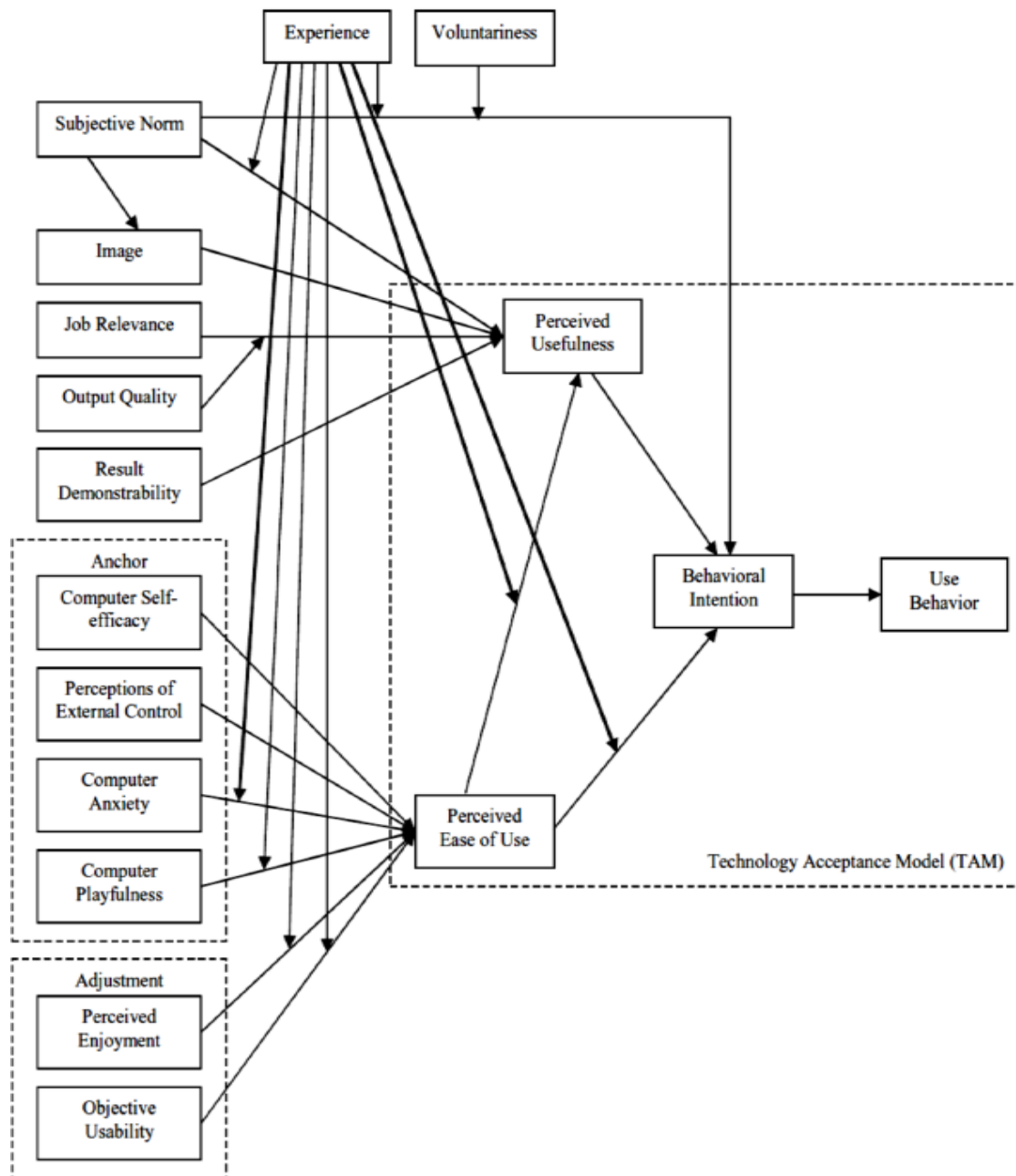
The model proposes that as hands-on experience with a particular technology or system increases, the impact of perceived ease of use on perceived usefulness becomes stronger

(Venkatesh & Bala, 2008). Perceived ease of use is particularly crucial during the initial phase of system use, as perceptions of usefulness are still being established. Furthermore, the model indicates that with growing experience, the influence of computer anxiety on perceived ease of use diminishes. Experience is expected to enable users to have more accurate perceptions of the efforts required to complete certain tasks and derive enjoyment from them. Finally, the model suggests that experience will moderate the effect of perceived ease of use on behavioural intention, causing this effect to weaken over time. In other words, as users gain more experience, they acquire more procedural knowledge about the system, reducing the importance of perceived ease of use in shaping their behavioural intentions (Venkatesh & Bala, 2008) (Figure 5).

In the context of healthcare, certain relationships within the TAM model have consistently proven to be significant. For example, there is strong evidence that perceived usefulness and perceived ease of use influence the acceptance of healthcare technology. While TAM models predict a substantial portion of user acceptance of healthcare technology, the theory could benefit from additions and modifications to better suit the healthcare context (Alqudah et al., 2021).

Figure 5: Technology Acceptance Model 3

Technology Acceptance Model 3



Source: Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273–315

The table below presents an overview of various technology acceptance models, highlighting their key advantages and challenges. Each model is evaluated based on its specific contributions to information system research, ease of application, explanatory power, and comprehensiveness, as well as the limitations such as simplicity, complexity, and missing variables. This comparison provides a concise understanding of how these models have evolved to address various aspects of technology acceptance and usage.

Table 3: Technology Acceptance Models Advantages/Challenges

Technology Acceptance Model

MODEL	REFERENCE	ADVANTAGES	CHALLENGES
Technology Acceptance Model	Fred D. Davis (1989)	<ul style="list-style-type: none"> • Considered a useful and highly reliable model. • Specific to information system research. • Widely used and tested. • Easy to apply 	<ul style="list-style-type: none"> • Too simplistic to address a wide range of technologies. • Missing some variables.
Technology Acceptance Model 2	Venkatesh & Davis (2000)	<ul style="list-style-type: none"> • Specific to information system research. • Superior to TAM in explaining variance in BI and behaviour. • Applied across various fields. 	<ul style="list-style-type: none"> • Fails to address some of the limitations of TAM, particularly in terms of missing variables and explanations. • Merely adds new constructs to perceived usefulness
Unified Theory of Acceptance and Use of Technology	Venkatesh et al. (2003)	<ul style="list-style-type: none"> • Offers better explanatory power than other technology acceptance theories. • Combines the existing knowledge and strengths of previous technology acceptance theories. 	<ul style="list-style-type: none"> • Contains too many independent variables. • More challenging to apply compared to some of its predecessors.
Technology Acceptance Model 3	Venkatesh & Bala (2008)	<ul style="list-style-type: none"> • Introduces additional constructs to perceived ease of use compared to the previous model. • Provides a comprehensive network of the determinants of technology adoption and use. 	<ul style="list-style-type: none"> • Excessive number of variables. • More challenging to apply. • Several relationships between the variables.

2.8.1 Technology Acceptance Model in Teledentistry

The application of TAM to the evaluation of parents' perceptions of PTDC before and after intervention represents a robust methodology for the assessment of the impact of technology on healthcare delivery. By analysing perceived usefulness, perceived ease of use, and external variables, stakeholders can gain valuable insights into how to optimise teledentistry services to better meet the needs of children and their families (Kamal et al., 2020). This approach not only enhances the evaluation of interventions but also informs future developments in paediatric oral health care technology, with the ultimate aim of improving accessibility, quality and outcomes for young patients.

The selection of the Technology Acceptance Model as the framework for the evaluation of parents' perceptions of PTDC before and after intervention offers a number of advantages over other technology acceptance models. TAM, originally developed to understand user adoption of technology in various contexts, provides a structured and widely recognised framework that is particularly well-suited for assessing the complex dynamics of healthcare technology adoption (Bahanan & Alsharif, 2023).

TAM has been extensively applied and validated in healthcare settings, making it an appropriate choice for the study of PTDC. The constructs of perceived usefulness and perceived ease of use are directly relevant to understanding how parents perceive and interact with teledentistry platforms designed for their children's oral health care needs. One of its principal strengths is its capacity to predict future outcomes. TAM is an effective framework for forecasting adoption behaviours, focusing on two key constructs: perceived usefulness (the degree to which parents believe PTDC enhances their child's oral health care) and perceived ease of use (how user-friendly parents find the technology). This predictive capability is of great importance for the assessment of the probability of parents adopting PTDC.

In contrast to alternative models that may concentrate on a subset of factors or particular user characteristics, TAM provides a comprehensive framework that considers a range of influential variables. Such external factors as parental attitudes towards technology, educational background, and privacy concerns can also exert a significant influence on the acceptance of PTDC. However, the adaptability of the model permits researchers to tailor it to specific contexts. It permits the incorporation of additional variables or the refinement of constructs based on empirical evidence and contextual insights gathered during the evaluation process.

The pervasive acceptance and extensive utilisation in the field of healthcare research serve to reinforce the dependability and practical value of the model. The robust theoretical foundation and empirical validation across diverse healthcare technologies enhance confidence in its ability to provide meaningful insights into parents' perceptions.

The use of the Technology Acceptance Model to evaluate parents' perceptions of PTDC before and after intervention represents a methodologically rigorous approach that leverages the model's predictive power, comprehensive framework, and adaptability to teledentistry contexts. By focusing on perceived usefulness, perceived ease of use, and relevant external variables such as knowledge, image quality, data security and professional attitudes, the TAM enables researchers to gain valuable insights into how to optimise teledentistry consultations for children and their families. This approach, which is informed by the available evidence, not only enhances the evaluation of interventions but also informs strategic decisions aimed at improving the accessibility, quality and acceptance of paediatric oral health care technologies.

Overall, studies have identified a range of perceived benefits and challenges associated with the use of PTD from both the provider and patient perspectives (Raucci-Neto et al., 2022; Saraswati et al., 2022). While some of these challenges can be addressed, there is a concern that patient acceptance may impact the use and effectiveness of the technology (Estai et al., 2017). Nevertheless, it is feasible to enhance the uptake and utilisation of the technology by elucidating the elements that influence an individual's intentions (Tenore et al., 2021). Although studies have indicated a general positive attitude towards the use of teledentistry by dental care providers (Bahanan & Alsharif, 2023), the adoption and acceptance of teledentistry consultations, particularly among parents of paediatric patients, remain relatively unexplored. However, two studies have identified overall satisfaction levels. Patients have expressed apprehension regarding data privacy, particularly with regard to health information obtained from the Internet (Alghamdi, 2023; Bahanan & Alsharif, 2023). It is of great importance to gain an insight into the perceptions of parents with regard to PTDC, in order to facilitate the development and implementation of effective PTDC initiatives that are tailored to meet the specific needs and preferences of families with children.

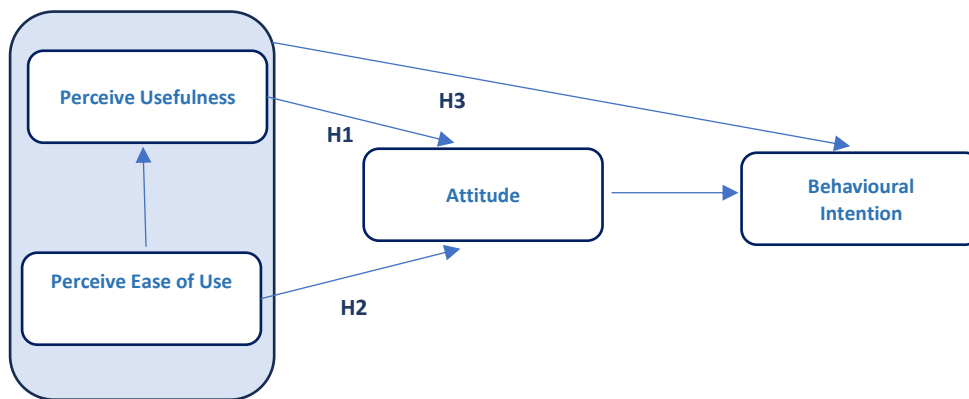
2.8.2 Framework and Hypotheses

This study proposes a model based on the Technology Acceptance Model to evaluate parents' perceptions of pediatric teledentistry consultations. By focusing on key constructs such as

perceived usefulness and perceived ease of use, alongside relevant external variables, this model aims to elucidate the determinants of parents' behavioural intentions and actual use of teledentistry services for their children. The proposed hypotheses will test the impact of teleconsultation on these constructs, thereby providing a comprehensive understanding of the acceptance process and identifying areas for intervention to improve adoption rates.

It is our intention that this proposed model and set of hypotheses will contribute to the growing body of knowledge on telehealth adoption in pediatric dentistry.

Figure 6: Framework



H1: Parents will find PTDC more useful after experiencing it.

H2: Parents will find PTDC easier to use after trying it.

H3: The intervention will lead to a positive change in parents' behavioural intention to use towards PTDC.

3. METHODOLOGY

The selected methodology aims to overcome limitations identified in the existing literature by employing a survey based on the Technology Acceptance Model (TAM) incorporating other dimensions such as image quality, knowledge, satisfaction, reliability, engagement, and dental care provider attitude.

3.1 Research Objective

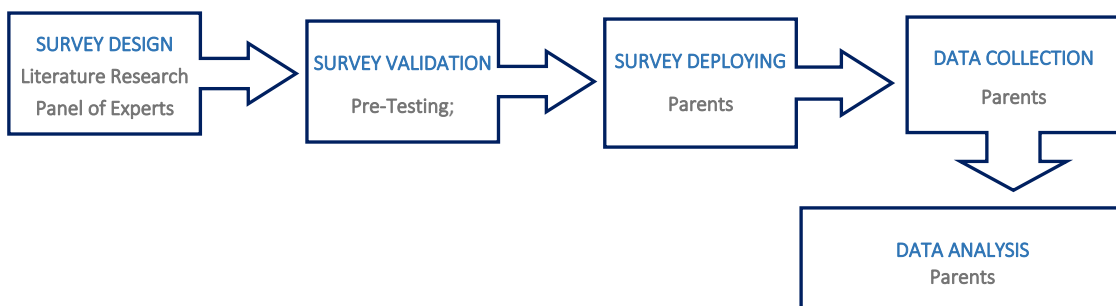
The objective of this quantitative study is to gain insight into parents' perceptions of PTDC and to compare the results of pre- and post-consultation questionnaires using a new, validated research instrument.

3.2 Research Approach

The study was conducted using an exploratory methodology, which involves investigating a relatively new or under-explored area where established theories or extensive prior research might be limited. This approach is particularly well-suited to the comprehension of intricate phenomena or the acquisition of preliminary insights into a subject, which can then be subjected to further investigation with more structured methodologies in future studies (Ranjit, 2019).

The selected quantitative methodology entails the gathering and examination of numerical data to inform conclusions. The research design employed a cross-sectional pre-post design, whereby data were collected from the same participants at two discrete points in time, prior to and following the intervention. This design permits the examination of changes over time and provides a snapshot of the study variables at two distinct points in time (Ranjit, 2019). The methodology process, as described in Figure 7, was followed.

Figure 7: Study Design



3.3 Drafting the Survey

The parental pre and post-survey (Appendix IV and V) was designed explicitly for this research based on relevant literature and review by a panel of dental professionals and digital health experts, to ensure the content validity. It was suggested additional items for inclusion and changes to the wording and structure of the survey.

Associated with this methodology is the specificity of experts, from whom a significant and crucial contribution is expected on a relatively unexplored topic – consensus. Experts personify individuals endowed with extensive competencies and knowledge in the area under investigation (Hetmański, 2018).

Competence encompasses the responsible, effective, and proven knowledge of an individual within a specific professional context, considering their educational background (knowledge, values, and attitudes) and professional experience (Le Boterf, 2003; Roldão, 2003 in Amaral & Figueiredo 2021). Experience in a particular practical context and theoretical mastery of the same field of expertise are thus inseparable from the concept of an expert (Benner 2001 in Amaral & Figueiredo, 2021; Shang, 2023). Although the criteria for defining an expert remain ambiguous and diverse, educational level and years of experience are the most commonly used metrics for classifying experts (Shang, 2023).

The cognitive heterogeneity of the expert panel is essential for more robust and valid results, supporting innovative discussion processes as well as individual capacities, knowledge, and competencies. Heterogeneity can significantly influence data quality, credibility, and the acceptance of quality indicators (Boukdedid et al., 2011; Niederberger & Spranger, 2020; Spranger et al., 2022).

On the other hand, patients and their families are the ultimate users of healthcare services, possessing a comprehensive and unique perspective on their outcomes. Their insights into how care can be made safer are invariably invaluable. This premise makes their involvement in patient safety planning indispensable, allowing all strategies to be viewed through the patient's lens (WHO, 2021).

In summary, the use of experts in this study resulted in a convenience sample of healthcare professionals (oral hygienists, physicians, dentists, and digital health specialists) identified in the field of oral health and digital health. While consensus on this aspect remains elusive, a panel of 5 to 7 experts was deemed relevant, with inclusion criteria summarized in Table 4 (Alexandre &

Coluci, 2011; Marques & Freitas, 2018; Nora et al., 2018; Böhmdorfer-McNair et al., 2021; Shang, 2023).

Table 4: Inclusion Criteria for the Expert Panel

Oral health professionals working in primary health care (> 5 years)	Competence encompasses the responsible, effective, and proven knowledge of an individual within a specific professional context (Amaral & Figueiredo, 2021)
Training in the area of oral health or digital health	The acquisition and evolution of the development of expert skills is based on lived experiences, knowledge and know-how, being symbiotically strengthened through research and clinical practice (Niederberger & Spranger, 2020)
Higher education teacher in the area of intervention	Heterogeneous groups tend to generate deliberations of higher quality and acceptance (Marques & Freitas, 2018)

After identifying potential experts in the field of oral health and digital health through professional orders, societies, higher education institutions, and healthcare professional associations, they were contacted via email. An invitation was extended to join an expert panel and participate in the validation of an instrument as part of the “Parent’s Perceptions of Pediatric Teledentistry Consultation” project. The invitation process involved obtaining informed consent through a form that collected general information and was supported by a consent support document. This document clarified aspects related to the study’s objectives, the instrument to be validated, and the methodology used. Contact information for the researcher was provided for any clarifications or additional information requested by the experts (see Appendix 2).

The questionnaires were developed based on the questionnaire applied to patients and dentists Menhadji et al. (2021) however, some of the questions were duly adapted and others eliminated. Most of the questions were adapted from the studies by, Aboalshamat et al. (2022) and Kamal et al. (2022). The modifications made are due to the fact that Menhadji et al. (2021), concentrate on patients and dentists’ perceptions, whereas the current questionnaire analyses parents’ perceptions. The main differences stem from new issues for parents that did not apply to patients and dentists.

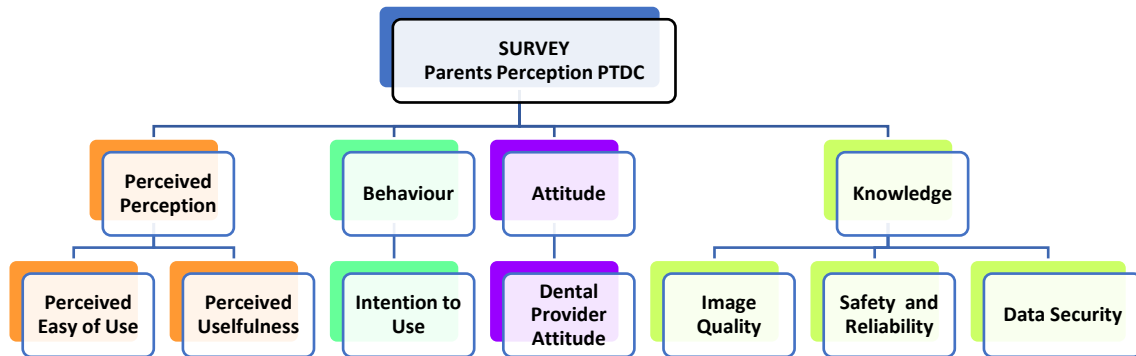
The survey was designed to explore parents' perception of teledentistry consultation in primary health care, by examining their opinion about this new form of oral care delivery. Their understanding of the teledentistry consultations, their perceptions before and after the intervention as well as their attitudes regarding this alternative way of care.

Parental attitudes towards video consultation questionnaires were divided in seven sections. The first section of the survey includes questions on demographic information (parent age, gender, residential parish, parent education level and childbirth date) and it also included a question about experience with general teleconsultation in the survey pre-teleconsultation. The questions in the second section of the survey was comprised of seven domains utilising the five-point Likert-scale (5-strongly agree, 4-agree, 3-not agree or disagree, 2-disagree, 1-strongly disagree): 1) ease of use: Assess whether the system is intuitive and easy to navigate; 2) image quality: Focuses on the clarity and resolution of images during teledentistry consultations and how parents perceived that high-quality images are crucial for accurate diagnosis; 3) data security and confidence: Relates to the confidentiality and protection of health information and if parents trust in the teleconsultation service; 4) professional attitudes: Examines the behaviour and communication of oral health professionals and how parents evaluate the professionalism, empathy, and clarity of professionals during consultations; 5) reliability and feasibility: Parents assess whether teledentistry is a viable alternative to in-person visits; 6) usefulness: Evaluate if parents consider whether it meets their needs effectively 7) intention to use: Reflects parents' willingness to continue using teledentistry services and indicates their future adoption and commitment.

The questionnaire also includes an open-ended question to identify the disadvantages of teleconsultation and two yes/no questions in the post-consultation questionnaire, regarding future use of this service and about recommending teleconsultation to others.

The questionnaire was developed based on the script in Appendix 1 and summarised in Figure 3

Figure 8: Survey Script Summary



3.4 Pretesting

A pretesting phase was conducted with a sample of 10 parents (7 females and 3 males) from the target population prior to the commencement of data collection. This was undertaken to identify and address potential issues with the survey instrument, including the presence of ambiguous or confusing questions, unclear response options, or technical issues (Ruel, E., Wagner, W., & Gillespie, 2016). This enables the requisite revisions to be made prior to the deployment of the survey to the study population. The parents who participated in the survey demonstrated an ability to comprehend the questions and provide responses without difficulty.

3.5 Validity and Reliability

To ensure the reliability of the survey, an extensive literature review was conducted in accordance with the recommendations of experts in the field (Al-Khalifa & AlSheikh, 2020; Haddad et al., 2014; Parker & Chia, 2021; Saraswati et al., 2022; Viswanathan et al., 2022). The Cronbach's Alpha was employed as a metric for internal consistency, serving to assess the reliability of statements within the surveys. The Cronbach's Alpha coefficient for the pre-PTDC survey was 0.783, and 0.9 for the post-PTDC survey. These values indicate a high level of reliability among the statements in the questionnaire.

3.6 Data Collection and Study Design

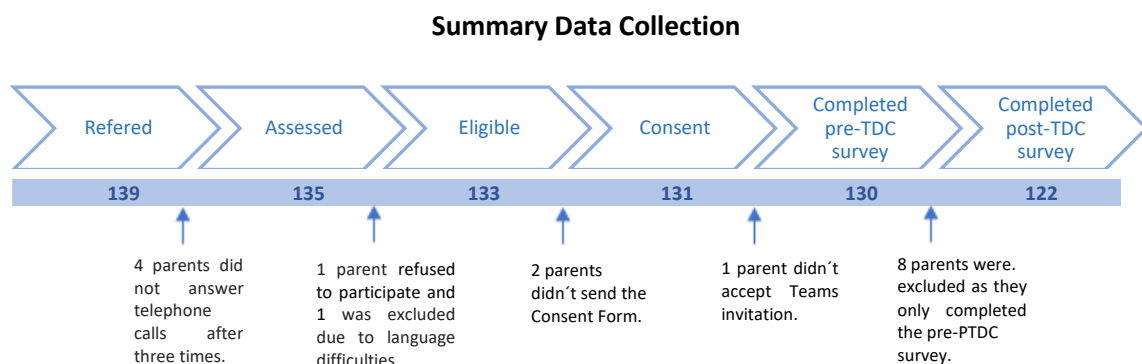
The data were collected after the study's approval by the Ethics Committees of the Tagus Valley Regional Health Administration (see Appendix 3), between April and September 2023 via two online questionnaires, administered through Forms Office 365, and sent by email to parents one day prior to teleconsultations and three months following the intervention.

The research population comprised parents of children aged between 0 and 18 years old, referred for an oral health consultation at the Almada Family Health Unit and the Almada Seixal Health Centres Grouping.

Parents who were not fluent in Portuguese and did not have access to an electronic device were excluded from the study.

Parents were contacted by telephone to provide further information regarding the study's objectives and participation requirements, as well as to address any queries or concerns that they may have had. Concurrently, appointments were arranged and the consent form (see Appendix 5), the pre-PTDC survey (see Appendix 6) and the Teams link were dispatched via email. The participants were requested to respond to both questionnaires only if they were the parent present during the teleconsultation. Of the 139 parents who were referred, four did not answer the telephone. Of the remaining 135, one parent refused to participate, one was excluded due to language difficulties, two did not return the consent form, one did not accept the invitation to join Teams, and the study did not include eight parents who exclusively took part in the pre-PTDC survey. The study population comprised 122 participants who responded to both questionnaires (pre-PTDC and three months post-PTDC).

Figure 9: Summary Data Collection



3.7 Data Analysis

The child's birthdate, the parent's gender and the Residential Parish were used to match each participant's pre- and post-intervention survey answers.

Quantitative data obtained from the survey pre and post-PTDC were recorded in an MS Excel spreadsheet and shortly transferred to IBM SPSS Statistics (Version 27).

Descriptive statistical analyses such as mean, standard deviation, frequency, and percentage were performed.

As data did not follow a normal distribution, the Wilcoxon signed-rank test it was used for measure differences in the median before and after PTDC which provides a powerful alternative to the traditionally paired t-test. This non-parametric method allows researchers to conduct hypothesis testing on paired or matched samples without the stringent assumptions of normality. By comparing median differences rather than mean differences, the Wilcoxon test offers a robust approach to statistical analysis, particularly in studies with small sample sizes or non-continuous data. Its application spans various scientific disciplines, offering a versatile tool for analysing the effects of interventions, treatments, or changes over time within a given sample. A p-value of <0.05 has been considered statistically significant.

3.8 Ethics and Data Protection

The study was conducted after ethical approval by the Ethics Committee for Health of the Lisbon and Tagus Valley Regional Health Administration (see Appendix 3), under Portuguese law on ethics in research. The authorization for conducting the study took about 1 year until its approval. The request was submitted in April 2021, and only after 2 meetings via Teams and several email exchanges, authorization was obtained by the end of March 2023. It was a long journey that had several implications for the study's development as well as the submission of the written work.

All participation in this research was voluntary, and participants were made aware that they could withdraw from the study at any point. All data were stored and analysed confidentially. Information was given both in writing and verbally, and the consent form to participate was collected from all participants before the intervention in accordance with the Declaration of Helsinki and its amendments (see Appendix 4).

All data protection measures were taken also considering the special category of sensitive pediatric health data.

4. Results

In this chapter it will be presented the key findings shedding light on critical insights and contributing valuable knowledge to the field of PTDC. The descriptive statistics of the variables are presented in Appendix 7.

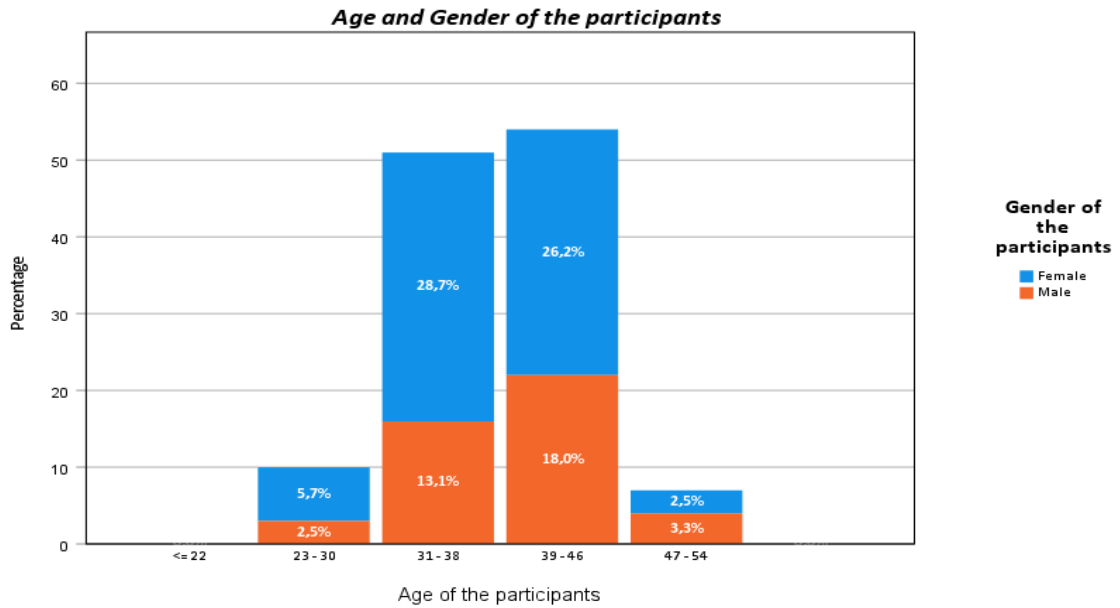
4.1 Demographic Characteristics

The sample of 122 participants was predominantly female (63,1%) with an average of the participants of 38,4 years and the most common age group of participants was between 39 and 46 years of age (44,2%). The average age of the children was 8,3 years, ranging from 2 to 18 years. Considering the level of education, 54,9% of the sample has completed higher education (Table 3).

Table 5: Characteristics of the study population

Characteristics of the study population (n = 122)				
			<i>Frequency</i>	<i>Percentage (%)</i>
<i>Gender</i>	Female		77	63,1 %
	Male		45	36,9 %
<i>Residential Parish</i>	Almada, Cacilhas, Cova da Piedade, Pragal		79	64,8 %
	Feijó, Laranjeiro		8	6,6 %
	Caparica, Trafaria		5	4,1 %
	Charneca de Caparica e Sobreda		19	15,6 %
	Costa de Caparica		7	5,7 %
	Other		4	3,3 %
	<i>Level of Education</i>	1st Cycle		0
2nd Cycle			0	0,0 %
3rd Cycle			13	10,7 %
Secondary Education			42	34,4 %
Higher Education			67	54,9 %
<i>Parents Age</i>	Minimum	Maximum	Mean	Std. Deviation
	23	52	38,42	5,528
<i>Child Age</i>	2	18	8,34	3,325

Figure 10: Age and Gender Distribution of the Sample



Most parents (64,8 %) live near the Health Unit, in the residential parish of Almada, Cacilhas, Cova da Piedade and Pragal.

Figure 11: Almada Council

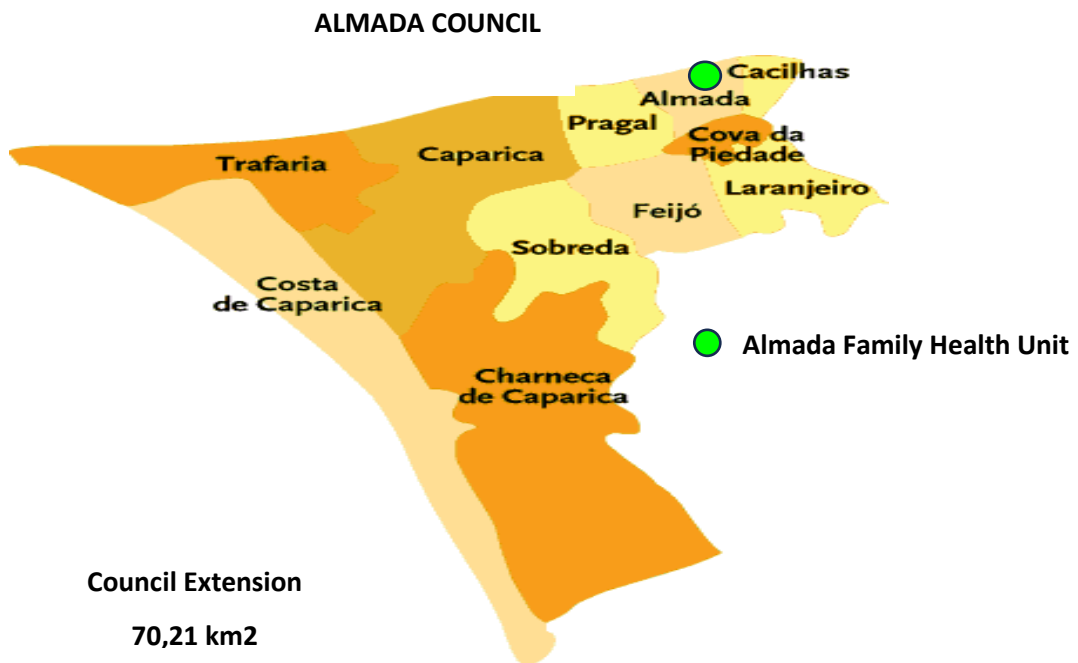


Table 6: Average Distance Residential Parish – Health Unit

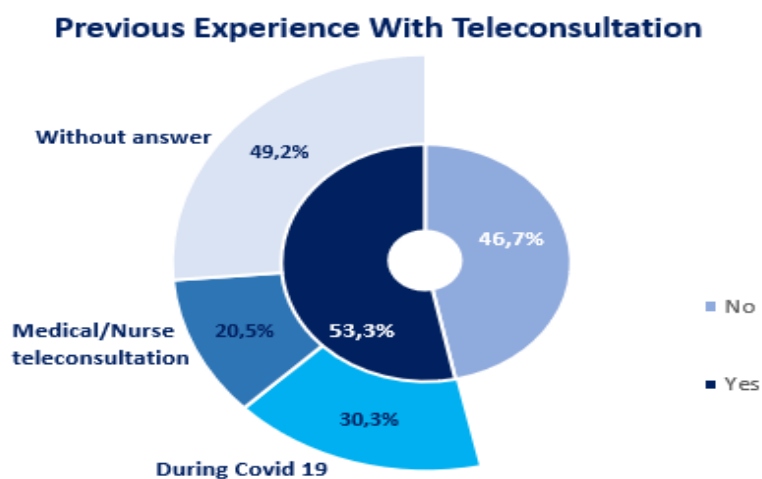
Average Distance Residential Parish and the Health Unit

Residential Parish	Nº of Parents	Average Distance Residential Parish – Health Unit (km)
ALMADA, CACILHAS, COVA DA PIEDADE, PRAGAL	79	2 km
FEIJÓ, LARANJEIRO	8	3,7 km
CAPARICA, TRAFARIA	5	7,6 km
CHARNECA DE CAPARICA E SOBREDA	19	7,6 km
COSTA DE CAPARICA	7	9 km
OTHER	4	-

4.2 Previous Experience with Teleconsultation

The data suggests a relatively balanced distribution between those with and without previous teleconsultation experience (53,3% and 46,7%). A substantial percentage had experienced during the COVID-19 period (30,3%), indicating the increased adoption of teleconsultation during that time. The data also highlights a portion of respondents who did not provide an answer, suggesting a need for further exploration of the reasons behind this lack of response.

Figure 12: Previous Experience with Teleconsultation

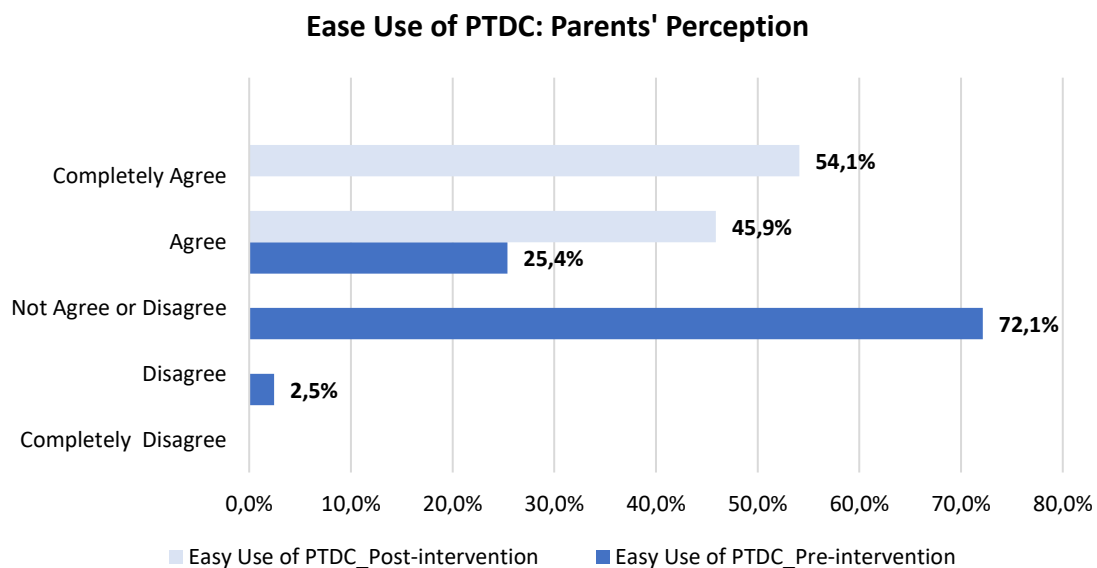


4.3 Perceived Perception of PTDC

4.3.1 Ease Use of PTD

Before the intervention, the majority (72.1%) of the respondents neither agreed nor disagreed regarding the ease of using PTDC (Pre-intervention). A small percentage (2.5%) disagreed, and a notable percentage (25.4%) agreed. After intervention, there is a noticeable shift in responses. No respondents expressed disagreement or complete disagreement. Most of the respondents (54.1%) completely agreed that using PTDC was easy, and an additional 45.9% agreed. Overall, the intervention appears to have had a positive impact on the perceived ease of using PTDC, as reflected in the substantial increase in "Agree" and "Completely Agree" responses post-intervention. The percentage of respondents finding the use of PTDC easy increased significantly after the intervention (Figure 9).

Figure 13: Easy Use of PTDC Parents' Perception

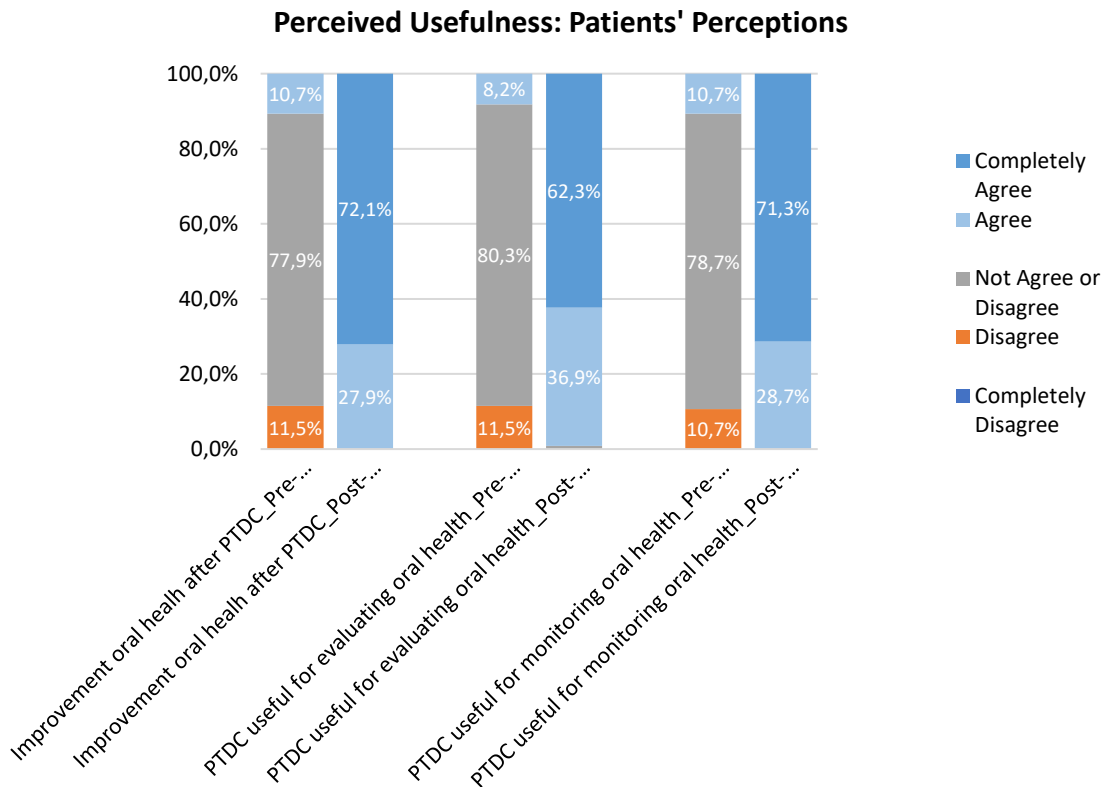


4.3.2 Perceived Usefulness of PTDC

Upon examining the outcomes, the post-intervention phase consistently shows a shift towards higher levels of agreement, indicating that participants perceive more positive outcomes after the intervention with a significant increase in the "Agree" and "Completely Agree" categories. Participants also show an increased agreement on the usefulness of PTDC for evaluating and monitoring oral health after the intervention with a substantial increase in agreement. The PTDC

perceived usefulness for evaluating and monitoring oral health is higher post-intervention, indicating that the intervention positively impacted participants' views on the tool. The trends in the data indicate that the intervention had a positive impact on participants' perceptions of oral health improvement and the utility of PTDC for evaluation and monitoring (Figure 10).

Figure 14: Perceived Usefulness of PTDC Parents' Perception

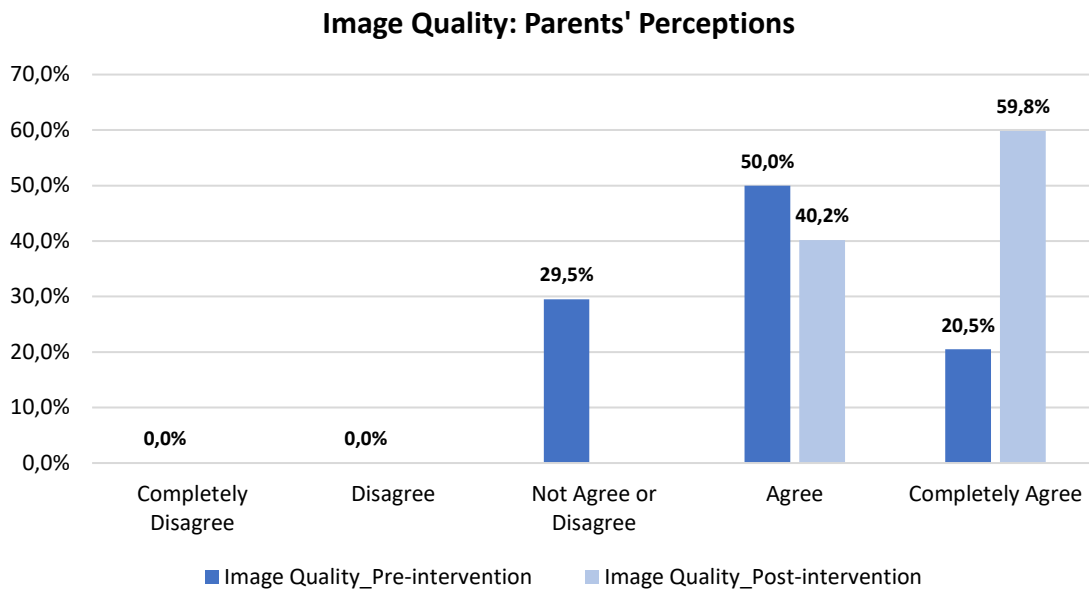


4.4 Knowledge of PTDC

4.4.1 Image Quality of PTDC

The results for image quality showed a significant percentage of respondents (29.5%) neither agreed nor disagreed with the statement about image quality before the intervention. A significant portion (50.0%) agreed, and a smaller but still substantial percentage (20.5%) completely agreed that the image quality was satisfactory. After intervention a positive change in perceptions of image quality, was reflected in the substantial increase in "Agree" (40,2%) and "Completely Agree"(59,8%) responses. (Figure 11)

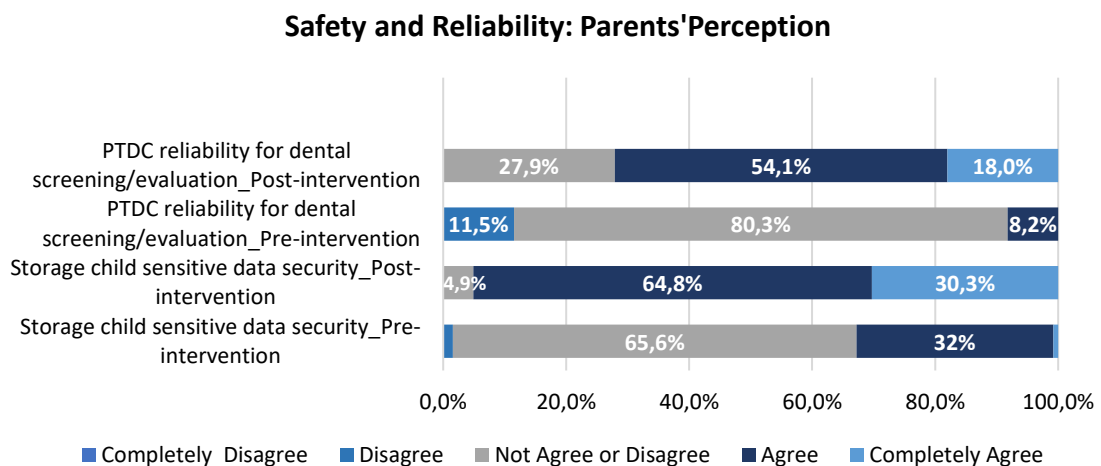
Figure 15: Image Quality Parents' Perception



4.4.2 Safety and Reliability

From the data collected the percentage of respondents who did not agree or disagree decreased (65,6%) significantly after the intervention (4,9%), indicating a more defined stance on the security of child-sensitive data storage. The post-intervention data shows an increase in agreement, with a notable percentage agreeing (64,8%) or completely agreeing (30,3%). For reliability of PTDC for dental screening/evaluation, a significant percentage of respondents were uncertain (80,3%), however after the intervention, there was a substantial shift, with an increase in agreement, particularly in the categories of "Agree" with 54,1% and "Completely Agree." with 18,0%.

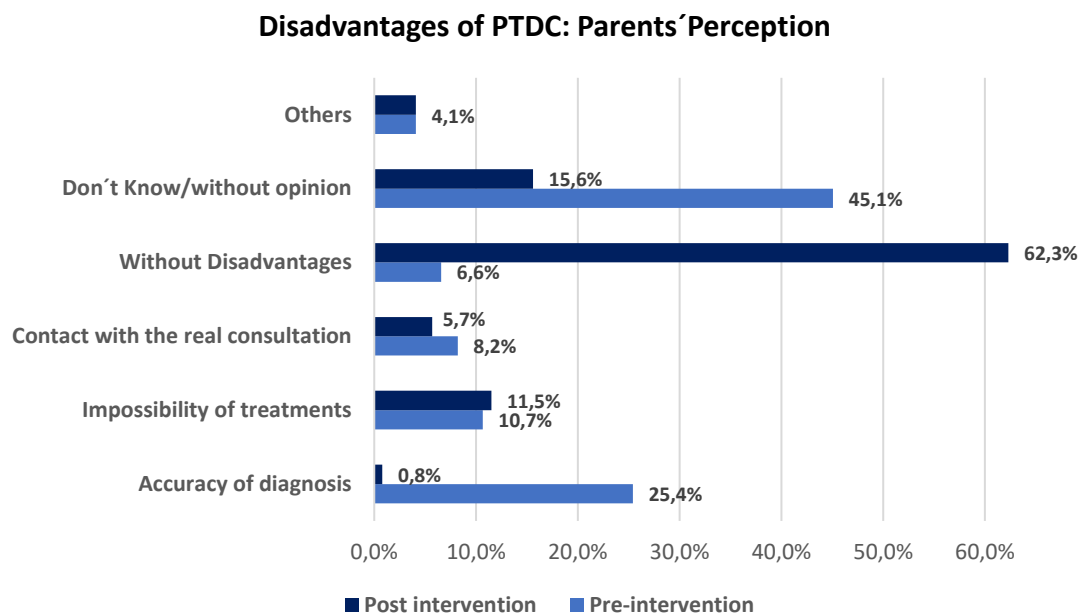
Figure 16: Safety and Reliability Parents' Perception



4.5 Disadvantages of Pediatric Teledentistry Consultation

Concerning the disadvantages of PTDC for pre-intervention, most of the respondents expressed uncertainty or did not have a clear opinion about the disadvantages of PTDC, with 45.1% selecting "Don't Know/Without Opinion." After the intervention, a significant proportion (62.3%) reported that PTDC had no disadvantages. Accuracy of Diagnosis" was a considerable concern before the intervention, but its significance decreased post-intervention. For the "Impossibility of Treatments" and "Contact with the Real Consultation" were mentioned as concerns, but their impact varied.

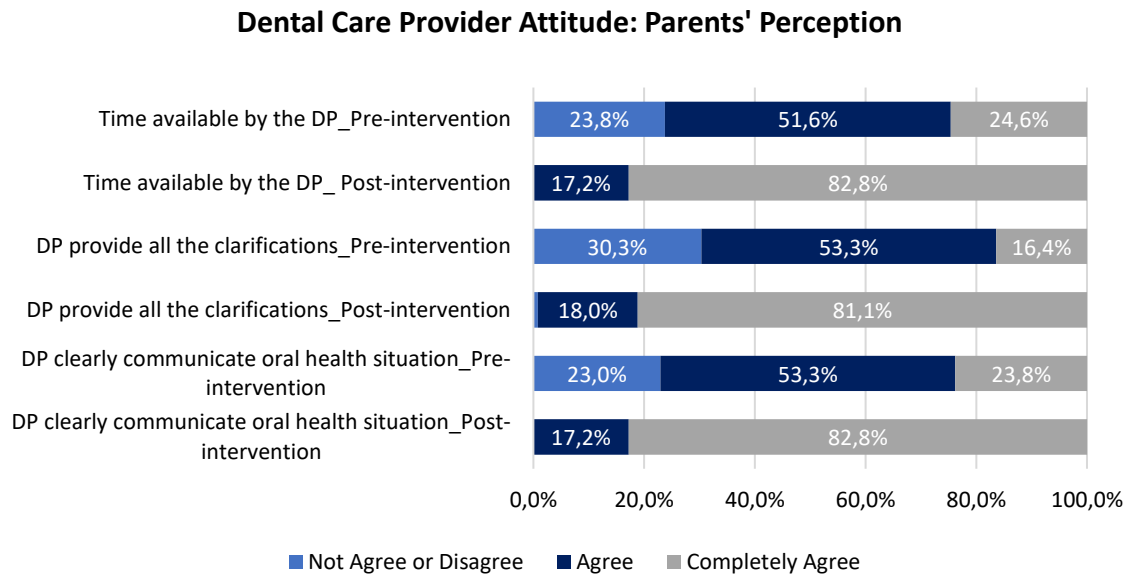
Figure 17: Disadvantages of PTDC Parents' Perception



4.6 Dental Care Provider Attitude

Data analysis indicates that the intervention positively influenced participants' perceptions of Dental care providers' communication effectiveness, their ability to provide clarifications, and the availability of time. The significant increase in the "Completely Agree" (82,8%; 81,1%; 82,8%) category post-intervention indicates a strong positive influence on these aspects.

Figure 18: Dental Care Provider Attitude Parents' Perception



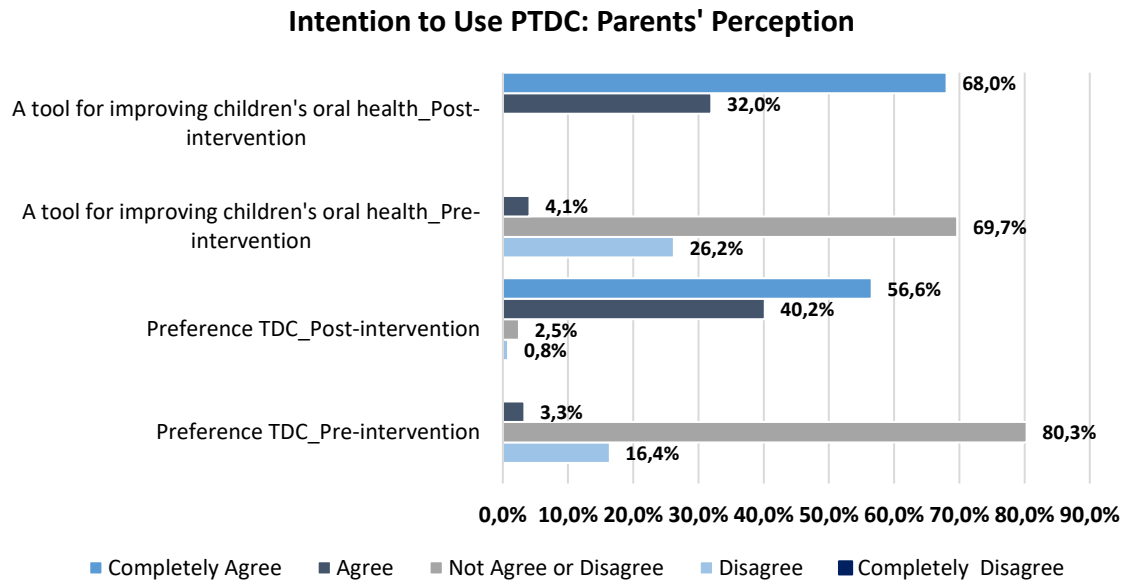
4.7 Intention to Use

The data represents the respondents' preferences and considerations regarding PTDC consultations before and after intervention.

Considering their preferences for PTDC, pre-intervention, parents had a neutral stance (80.3%) regarding post-intervention, there was a notable shift, with a substantial percentage (56.6%) completely agreeing with the preference for PTDC. Considering if PTDC can be a tool for improving children's oral health, in pre-intervention, a significant proportion of parents (69.7%) had a neutral standpoint while in post-intervention, a remarkable shift occurred, with 68.0% completely agreeing that PTDC can be used as a tool to enhance oral health.

According to the findings, the totality of parents prefers a teledentistry consultation to a face-to-face appointment and recommend video consultation. Convenience, accessibility, and time savings were commonly cited as benefits by participants.

Figure 19: Intention to Use Parents' Perception



4.8 Wilcoxon Signed-Rank Test

The outcomes of the Wilcoxon signed-rank test are compelling and suggest a significant impact of the intervention across various parameters related to PTDC. The regularly negative Z-values, which are substantial in magnitude and a significance level of 0.05 for all variables, indicate that the post-intervention scores are consistently higher than the pre-intervention scores (see Appendix 8).

H1: Parents' Perceived Usefulness of PTDC will Increase After the Intervention

This hypothesis is supported by the results of the Wilcoxon rank test, with a 0.05 significant level, which shows significant improvements in various aspects of perceived usefulness: improving, evaluating and monitoring oral health. All these results indicate that parents found PTDC significantly more useful after the intervention.

H2: Parents' Perceived Ease of Use of PTDC will Increase After the Intervention

The Wilcoxon rank test results strongly confirm this hypothesis with a Z value of -9.350. This result, significant at the 0.05 level, demonstrates a significant increase in parents' perceptions of the ease of use of PTDC after the intervention. This could be due to enhanced user interfaces, better instructions, or improved user support during the intervention.

H3: The intervention will lead to a positive change in parents' behaviour intention to use towards PTDC

The H3 asserts that the intervention will lead to an overall positive change in parents' intention to use towards PTDC. The significant improvements in both perceived usefulness and ease of use indicate a comprehensive positive shift in parents' attitudes. The significant results for perceived ease of use and perceived usefulness suggest that parents' overall intention to use PTDC improved after the intervention. When parents perceive a technology as both useful and easy to use, their overall acceptance and intention to use towards it are likely to increase.

Table 7: Hypotheses Validation

Wilcoxon Signed-Rank Test

Dimension	Question	Mean Pre	Sd	Mean Post	Sd	Wilcoxon's Signed Rank Test (two tailed p)	Hypotheses Validation
PU (H1)	Q8 - Do you think, after a PTDC the oral health of the child can change?	2,99	,472	4,72	,450	-9,73	Supports the hypothesis
	Q10 - Do you think PTDC is useful for evaluating the oral health of your child's?	2,97	,444	4,61	,505	-9,71	
	Q11 - Do you consider PTDC useful for monitoring your child's oral health?	3,00	,464	4,71	,454	-9,87	
PEOU (H2)	Q1 -Do you think it's easy use PTDC services? change?	3,23	,48	4,54	,5	-9,35	Supports the hypothesis

Dimension	Question	Mean Pre	Sd	Mean Post	Sd	Wilcoxon's Signed Rank Test (two tailed p)	Hypotheses Validation
Behavioural Intention (H3)	Q12 -In general, do you consider that, in some situations, teleconsultation is an alternative way of receiving oral health care?	2,86	,451	4,62	,487	-9,716	Supports the hypothesis
	Q13 - If you can choose, you prefer a TDC, rather than a face-to-face appointment?	2,87	,425	4,52	,592	-9,629	
	Q15- Considering the benefits and disadvantages of PTDC, do you consider it to be a tool that can contribute to improving the oral health of children?	2,78	,506	4,68	,468	-9,793	

5. DISCUSSION

The concept of teledentistry is not a novel phenomenon; its utilisation increased during the period of the global pandemic caused by the SARS-CoV-2 virus. To the best of our knowledge, this is the inaugural study to assess parents' perceptions of PTDC. The findings can be situated within the wider research field of parental perceptions of telehealth for children and adolescents. As with other studies of parental perceptions of telehealth (Allison et al., 2022; Cheung et al., 2023), the majority of respondents were female (63.1%), which may reflect an imbalance in parental healthcare responsibilities and parenting activities in general. In consideration of their experience, while some parents are conversant with teleconsultation in general, none have had the opportunity to utilise teleconsultation specifically for oral health purposes. This observation corroborates the dearth of data on the subject of teledentistry in our country. Nevertheless, since 2019, Portugal has implemented a National Strategic Plan for Telehealth (Martins, 2019).

The data on the relationship between residential proximity to the health unit and the adoption of remote dental services indicate a diverse range of distances, with the majority of parents residing in close proximity to the health unit. Nevertheless, while distance is a significant factor influencing the uptake of teledentistry (Kopycka-Kedzierawski et al., 2018; Surdu & Langelier, 2023), it is not the sole determining factor. The data indicates that even those situated in close proximity to the health unit perceive value in the convenience and flexibility afforded by remote dental consultations. This phenomenon may indicate a broader shift in healthcare preferences, where digital solutions are increasingly sought after due to their ability to fit seamlessly into modern lifestyles.

The perception of parents regarding PTDC is a complex issue that encompasses several different domains, each of which contributes to the overall acceptance and effectiveness of an oral healthcare service. The adoption of new forms of care delivery by parents is influenced by a few factors, including ease of use, usefulness, image quality, safety and reliability, dental health provider attitudes and intention to use (Nuvvula & Mallineni, 2021; Surdu & Langelier, 2023; Wallace et al., 2021). In accordance with the Technological Acceptance Model Theory, the perceived usefulness and perceived ease of use of a new technology influence the user's willingness to accept it, which in turn affects the technology's actual use (Kamal et al., 2020). The perceived ease of use is a fundamental aspect that influences a parent's willingness to

engage with PTDC and is often the primary factor influencing the adoption of new technology (Estai et al., 2017). In the context of teledentistry, a lack of intuitive or straightforward technology may act as a deterrent for parents in using the service. However, when platforms are user-friendly, they can significantly enhance parents' willingness to engage with these services for their children's dental care needs (Tan & Chua, 2024). The results of our study indicate a notable increase in positive responses regarding ease of use following the PTDC intervention. The intervention had a discernible positive impact on the respondents' perceptions of PTDC ease of use, as evidenced by the significant increase in the proportion of respondents who found PTDC easy (combining the "Agree" and "Completely Agree" responses). In essence, the intervention led to an improvement in the user experience among the respondents, which is corroborated by a study that has demonstrated that when parents find the system easy to navigate, their satisfaction with PTDC increases (Alghamdi, 2023).

Considering perceived usefulness, which is closely associated with ease of use but distinct, parents seem to be more likely to utilise the service if they believe it will result in an improvement in their child's oral health (Estai et al., 2017). This encompasses the utility of PTDC for assessing and tracking their child's condition. When parents observe concrete benefits, such as the early detection of dental issues or the effective management of oral health, their trust in PTDC is reinforced (Kanani et al., 2024). It was observed that participants noted an improvement in their child's oral health. This is arguably the most significant indicator of the effectiveness of PTDC. A review by Goswami et al. (2021) indicates that parents have demonstrated a positive acceptance of PTDC for pain monitoring and follow-up, indicating trust in the system when tangible benefits are observed (Goswami et al., 2021).

The success of PTDC is contingent upon the quality of images used for diagnosis. The quality of images is of paramount importance, as they directly influence diagnostic accuracy, which is a cornerstone of effective dental care (Kopycka-Kedzierawski et al., 2018). The existing literature emphasises the significance of image quality, underscoring its pivotal role in teledentistry (Kopycka-Kedzierawski et al., 2018; Nuvvula & Mallineni, 2021; Sanghvi et al., 2021). Following the intervention consensus, 59.8% of participants expressed satisfaction, indicating a notable improvement in the PTDC experience due to recent technological advancements. This positive response serves as testament to the effectiveness of enhanced protocols for image capture and transmission, which have likely contributed to the increased diagnostic accuracy. This notion is further supported by studies which emphasise the

advancements in digital imaging technology (Aboalshamat et al. 2022 ; Rahman et al., 2020). Such developments have not only enhanced the clarity and detail of images. The advancement of digital imaging in PTDC has resulted in enhanced patient outcomes and more effective dental care delivery. Furthermore, the systematic review conducted by Gurgel-Juarez et al. (2022) corroborates the efficacy of PTDC in dental referrals, treatment planning, and monitoring (Gurgel-Juarez et al., 2022). The quality of the images remains a critical factor in the success of TD. However, the field is moving in the right direction, with technological advancements enhancing the overall efficacy of TD services.

It can be reasonably assumed that parents will engage with and benefit from PTDC to a greater extent if they believe that their child's data is secure. It is therefore evident that trust is a crucial factor in the continued growth and acceptance of telehealth solutions (Di Fede et al., 2023). The favourable shift in perceptions of data security, with 95.1% of parents reporting feelings of security post-intervention, represents a notable indicator of parental trust in security measures. It is therefore essential to recognise the importance of this high level of trust, particularly in light of the significant challenges posed by concerns over data security to the adoption of PTDC, as highlighted by Kopycka-Kedzierawski et al. (2018). The implementation of optimal telehealth security practices is not merely a matter of compliance with regulations; it is primarily about fostering user confidence and trust (Di Fede et al., 2023). As PTDC continues to evolve, it is of the utmost importance to maintain this trust in order to ensure its success and to facilitate even greater adoption of these services.

A frequently cited challenge to the acceptance of PTDC for dental screening and evaluation by parents is the lack of reliability (Purohit et al., 2017). The endorsement of PTDC's reliability is in accordance with the findings of Saha et al. (2019), who emphasised the potential of PTDC as a dependable tool for dental care. The study indicates that several factors contribute to this perception of reliability. These include standardisation of procedures, training and education, and improvements in technology, including better imaging and data transmission, which enhance the accuracy of remote consultations (Saha et al., 2019). The high percentage of participants who expressed confidence in the reliability of PTDC post-intervention is a positive indicator of the service's capacity to provide dependable dental screening and evaluation. It is of the utmost importance that PTDC is perceived as reliable in order to ensure its continued use and integration into regular dental care practices. Furthermore, it provides a foundation for trust in remote consultations and encourages ongoing engagement from parents who

perceive benefits in the health outcomes of their children. This level of agreement among participants indicates that PTDC has been effective in providing accurate assessments of dental health, which is essential for both preventative care and the management of existing dental conditions (Estai et al., 2018; Estai et al., 2016).

Furthermore, the PTDC plays a pivotal role in facilitating communication between patients and healthcare providers. Nadia et al. (2022) and Sujatmoko & Laksmiastuti (2024) have demonstrated that the use of teledentistry can lead to a notable enhancement in the quality of healthcare communication. Dental care providers who are enthusiastic and proficient in the utilisation of teledentistry technologies exert a positive influence on parents' attitudes (Islam et al., 2022). Their capacity to communicate effectively, demonstrate empathy, and deliver high-quality care remotely is beneficial in encouraging parents to consider PTDC as a viable option for their child's dental care (Ben-Omran et al., 2021; Kopycka-Kedzierawski et al., 2018). The data from our study indicates a notable enhancement in parents' perceptions of dental care provider attitudes, particularly with regard to clear communication about oral health status, clarification of queries, and availability of time. This suggests that parents are more appreciative of the attention they received, which in turn fosters trust and confidence in the care being provided. As a result, parents reported greater comfort and satisfaction, having been furnished with the requisite knowledge to make informed decisions regarding their child's oral health (Estai et al., 2016). This positive perception results in higher levels of trust, adherence to recommended dental care practices, and superior oral health outcomes for children. Kopycka-Kedzierawski et al. (2018) demonstrated that the combination of enhanced communication, greater efficiency, and positive attitudes among dental care providers contributes to a more favourable view of paediatric teledentistry consultations (Kopycka-Kedzierawski et al., 2018). Moreover, the attitudes of dental care providers towards PTDC are of great consequence in influencing parental perceptions (Islam et al., 2022). As these elements continue to advance and strengthen, teledentistry is positioned to become an integral component of paediatric dental care, offering a convenient, efficient, and reliable alternative to traditional in-person visits. Notwithstanding the favourable trends, some perceived disadvantages persist following the intervention, including the inability to undertake treatments and the absence of direct contact with a qualified dental practitioner. These concerns underscore the necessity for further expansion of PTDC, a view also espoused by Irving et al. (2017). The current data corroborates the findings of existing literature,

indicating that PTDC can markedly enhance communication and satisfaction. Nevertheless, it underscores the necessity for continuous assessment to guarantee that PTDC aligns with the established standards of traditional care, a point underscored by Estai et al. (2016).

With regard to parental acceptance of PTDC, the favourable shifts in perceived usefulness and ease of use indicate a comprehensive enhancement in parents' overall attitudes towards PTDC. These findings demonstrate the efficacy of the intervention in enhancing parents' perceptions and acceptance. The intervention's success in enhancing parents' perceptions and acceptance of PTDC is contingent upon its ability to improve both the perceived usefulness and ease of use, which in turn fosters a more positive overall attitude towards the service. A number of studies have highlighted the significance of perceived usefulness and ease of use in the acceptance of teleconsultation. Olateju et al. (2022) reported a growing acceptance of telemedicine as a means of providing appropriate healthcare for children and adolescents (Olateju et al., 2022). Furthermore, Singh et al. (2020) provided evidence to support this trend, indicating that only 9% of respondents had previously utilised mobile dental applications. However, 82.4% of respondents expressed support for the provision of teledentistry services in all dental hospitals and clinics. This considerable degree of consensus indicates that upon parents perceiving teledentistry as beneficial and straightforward to utilise, their acceptance and demand for such services markedly increase (Singh et al., 2020). Furthermore, a study by Estai et al. (2017) highlighted the significance of perceived ease of use in the adoption of teledentistry. The researchers found that user-friendly interfaces and clear communication channels significantly enhanced the acceptance of teledentistry services among parents, which aligns with the findings from the aforementioned intervention (Estai et al., 2017). The demonstration of these positive changes in perceived usefulness and ease of use lends support to the notion that targeted interventions are effective in improving attitudes towards paediatric teledentistry. This improvement is crucial for the broader acceptance and integration of teledentistry into routine dental care, which will ultimately lead to improved oral health outcomes for children.

Ultimately, the intention to utilise PTDC as a tool for enhancing oral health is a crucial indicator of its perceived value among parents (Aboalshamat et al., 2022; Alghamdi, 2023; Daniel & Kumar, 2014; Maqsood et al., 2021; Tenore et al., 2021). The post-intervention findings of our study demonstrate a remarkable consensus, with no respondents remaining neutral or expressing disagreement. Instead, a substantial majority (68.0%) indicated complete

agreement, while 56,6% expressed intention to utilise PTDC in the future. This strong endorsement indicates that the intervention was not only efficacious but also pivotal in influencing future behaviours with regard to children's oral health. As observed by Calvo et al. (2021) and Goswami et al. (2020), a preference to continue using and to recommend a service to others is often a direct consequence of a convinced initial experience. This experience is influenced by a number of factors, including convenience and the perceived quality of care. The resounding positive response following the intervention suggests that these aspects were effectively addressed, thereby fostering a robust intention among parents to utilise PTDC for the improvement of their children's oral health. This intention provides evidence of the effectiveness of the intervention and the potential for PTDC to become a mainstay in dental care.

The data from Portuguese parents' perceptions of PTDC provide valuable insights that could serve as a reference for future research in this field. As PTDC continues to evolve, it is essential to gain a deeper understanding of these perceptions in order to optimise the service and achieve better health outcomes, as well as wider acceptance by parents and dental care providers.

It is imperative that we examine the data and gain an understanding of the evolving landscape of oral health. While some aspects are subject to change, others remain static. It is not a lack of knowledge that presents an obstacle, but potentially a lack of investment. In order to facilitate genuine transformation, investment is required. However, this transformation will entail a shift in perceptions. A change in perspective can lead to the discovery of an alternative reality. In the field of oral health, both patients and professionals may be confronted with a similar reality, yet their perceptions of this reality may differ. In order to make progress, it is essential to gain an understanding of these viewpoints and to modify our interventions in accordance with them. It is insufficient to merely reiterate established strategies and to seek additional funding.

The primary research question is as follows: This study aims to ascertain how parents perceived PTDC both before and after the intervention.

RQ1. How did parents perceive PTDC before and after the intervention?

The data analysis revealed that, while some parents were aware of teleconsultation in general, none had had the opportunity to utilise PTDC specifically for oral health purposes. The parents' lack of familiarity with and limited knowledge of this form of healthcare delivery may have contributed to their neutral responses prior to the PTDC. However, following the intervention, parents' perceptions are likely to have been influenced by their actual experiences of PTDC, which were perceived as successful and useful. The positive experiences that parents had, such as convenient access, effective communication and satisfactory outcomes, may have enhanced their perceptions and acceptance. Conversely, the difficulties experienced during the course of the intervention may have contributed to the formation of less favourable perceptions. The analysis of these changes in perception demonstrates the potential benefits and areas for improvement in the implementation of teledentistry services for paediatric oral health. The parents in this study appear to hold positive perceptions of PTDC across all domains, a finding that aligns with the results of a previous study conducted in Saudi Arabia that assessed the attitudes and responses of paediatric parents towards virtual dental clinics (Alghamdi, 2023).

RQ2: To what extent did parents' perceptions of PTDC change before and after the appointment?

The findings indicate a notable improvement in parents' perceptions following the intervention, suggesting that PTDC is perceived as a viable approach for enhancing paediatric oral healthcare. The observed increase in satisfaction with communication, clarity, availability, and security, along with the perceived effectiveness of PTDC in improving oral health, indicate the efficacy of the intervention and a promising outlook for the future of TD in paediatric care. The findings emphasise the necessity of addressing parental needs and concerns to guarantee the effective implementation and adoption of teledentistry services.

The assessment of parents' perceptions before and after PTDC reveals a significant shift, which is essential for understanding the impact of teledentistry on paediatric oral health care. The results of the post-intervention evaluation demonstrated a notable increase in parental satisfaction across all key areas. One of the most notable improvements was in communication by the dental care provider, with a significant increase from 23.8% to 82.8% of parents who completely agreed that their child's oral health situation was communicated. This finding highlights the importance of building trust and ensuring that parents are informed and

comfortable with the care their children receive. These challenges have been previously described in the literature, including in the systematic review and narrative analysis by Kruse et al. (2017) and Nadia et al. (2022) on telehealth and patient satisfaction (Kruse et al., 2017; Nadia et al., 2022).

Furthermore, the provision of clarifications also saw a substantial increase in satisfaction, with parents reporting that all of their questions were adequately addressed. These findings demonstrate that parents are now equipped with the knowledge and resources to effectively understand and manage their child's oral health, which in turn fosters greater parental engagement in their child's oral health care (Estai et al., 2016). Furthermore, the accessibility of dental health professionals for consultations improved significantly, with 82.8% of parents post-intervention indicating that professionals were readily available. It seems reasonable to posit that this enhanced accessibility will encourage ongoing engagement with PTDC. With regard to the impact on oral health, 72.1% of participants post-intervention indicated that they completely agreed that PTDC had led to an improvement in their child's oral health, representing a substantial increase from the 10.7% who expressed this view pre-intervention. This suggests that PTDC is not only accepted by parents but is also perceived as an effective method for improving health outcomes. Furthermore, the utility for assessing and tracking oral health was acknowledged by over 60% of parents post-intervention, representing a notable enhancement from the pre-intervention figures. This indicates that PTDC was regarded as a beneficial instrument for maintaining oral health. With regard to image quality, which is of the essence for accurate diagnosis, a 59.8% improvement was reported by parents post-intervention. This improvement in image quality is likely to contribute to enhanced diagnostic accuracy and greater overall satisfaction with TD services. This is corroborated by the study assessing parental use and acceptance of an intraoral camera, in which the authors highlighted the feasibility of the camera and a high level of caregiver-child acceptance (Tan & Chua, 2024). The issue of data security and reliability was addressed in an effective manner, resulting in a notable increase in the number of parents who expressed confidence in the protection of their child's sensitive data following the intervention. This increase in trust is crucial for the sustained utilisation of video consultation (Estai et al., 2018). Furthermore, the simplicity of PTDC was reported to have enhanced, with over half of the parents' post-intervention deeming it straightforward to use. This is a significant consideration in the uptake of new technology, as user-friendly systems are more likely to be adopted and used consistently.

RQ3: What is the impact of knowledge and awareness of PTDC on parents' perceptions and acceptance of this mode of care delivery?

It is evident that knowledge and awareness play a pivotal role in shaping parental perceptions and acceptance, as evidenced by the notable enhancements in parental satisfaction following the intervention. The significant increase from 23.8% to 82.8% in parents who agree that dental professionals communicate their child's oral health situation via TD highlights the importance of effective communication in enhancing parental trust and acceptance. Furthermore, the intervention's impact is evidenced by the rise in parents' belief that all necessary clarifications are provided during teledentistry consultations, increasing from 16.4% to 81.1% post-intervention. This indicates that when parents are adequately informed, they are more likely to engage with and support teledentistry as a mode of care delivery. Furthermore, the perception of increased availability of dental professionals, which improved from 24.6% to 82.8% post-intervention, indicates that accessibility is a significant factor influencing the adoption of teledentistry. It can be reasonably assumed that parents are more likely to utilise services that are readily accessible and responsive to their needs. The considerable enhancement in parents' concurrence that PTDC resulted in superior oral health outcomes for their children, from 10.7% to 72.1% post-intervention, substantiates the assertion that perceived efficacy is a pivotal determinant of acceptance. When parents observe concrete advantages, such as enhanced oral health, they are more inclined to endorse and maintain the utilisation of TD services. The improvements in image quality, with 59.8% of parents post-intervention agreeing that it was enhanced, along with the increased sense of data security and reliability of PTDC, from 54.1% to 64.8% agreement post-intervention, indicate that addressing privacy concerns and providing high-quality diagnostic tools are crucial for the adoption of PTDC. Furthermore, the simplicity of the PTDC interface, as evidenced by the 54.1% agreement rate among parents post-intervention, is a crucial factor influencing its adoption. Systems that are user-friendly are more likely to be embraced by parents, which in turn leads to wider acceptance and utilisation. In conclusion, it can be stated that knowledge and awareness play a significant role in shaping parents' perceptions and acceptance. The intervention's success in improving communication, providing clarifications, ensuring availability, and enhancing the overall quality of care has resulted in increased parental satisfaction and acceptance of PTDC as a viable mode of pediatric oral health care delivery. The findings indicate that parents who are well-informed and perceive

the benefits and convenience of PTDC are more likely to embrace this innovative approach to their children's dental care. These findings align with those of Marino et al. (2018).

RQ4: What is the impact of the overall experience of PTDC on parental satisfaction?

The overall experience of teledentistry consultations has a direct impact on parental satisfaction with this mode of care delivery. Factors such as the ease of scheduling appointments, the quality of interaction with dental professionals, the perceived effectiveness of remote assessments, and the convenience of follow-up care all contribute to parental satisfaction levels. It can be reasonably assumed that positive experiences, such as the prompt attention given to concerns and the effective treatment recommendations provided, will enhance satisfaction and promote confidence in PTDC. Conversely, challenges such as technical difficulties or perceived limitations in remote assessments may result in a reduction in satisfaction levels. In conclusion, the comprehensive experience of PTDC, encompassing enhanced communication, transparency, accessibility, and perceived efficacy, has resulted in elevated parental satisfaction. It is therefore evident that these improvements are crucial for the acceptance and success of video consultation as a mode of pediatric oral health care delivery. The favourable outcomes yielded by the study, with respect to the aforementioned dimensions, serve to emphasise the necessity of addressing parental needs and concerns in order to guarantee the successful implementation and adoption of PTDC. The observed changes following the intervention indicate that video consultation has the potential to significantly enhance the parental experience and satisfaction with pediatric dental care. These results are consistent with the findings of a study conducted by Menhadji et al. (2021), which observed that the majority of patients expressed high levels of satisfaction following the use of TDC (Menhadji et al., 2021).

RQ5: What factors may influence parents' willingness to adopt PTDC for their children?

The willingness of parents to adopt teledentistry consultations is a complex phenomenon, shaped by a multitude of factors spanning from the precision of diagnoses to the quality of communication between dental care providers and patients (Chung et al., 2022). Several studies have indicated that accurate diagnoses are a fundamental aspect of trust in PTDC (Aboalshamat et al., 2022; Yang, 2021). The notable decline in accuracy-related concerns following the intervention, from 25.4% to 0.8%, aligns with this finding and indicates that as PTDC demonstrates its diagnostic precision, parents' confidence in the service grows. The consistent concern about the impossibility of certain treatments in PTDC, noted by approximately 11.5% of

parents both pre- and post-intervention, underscores the necessity for transparent communication about the capabilities of teledentistry. It is of the utmost importance to establish realistic expectations and gain parental acceptance. Prior to the intervention, 8.2% of parents reported difficulty in connecting with real consultations, a figure that decreased significantly following the intervention. Enhanced connectivity is in accordance with research indicating that seamless integration with actual consultations can have a positive effect on parental willingness to use teledentistry consultation (Aboalshamat et al., 2022; Homsy et al., 2023). It is noteworthy that the majority of parents (62.3%) did not perceive any additional drawbacks, both pre- and post-intervention. This stable perception indicates a consistent level of acceptance, which is corroborated by studies demonstrating that the perceived benefits of TD frequently outweigh its drawbacks (Bahanan & Alsharif, 2023; Tan & Chua, 2024). The ease of use of the system is a critical factor to consider. While 72.1% of respondents found the system easy to use prior to the intervention, this figure declined to 45.9% following the intervention. This decline highlights the necessity of maintaining a user-friendly interface, as evidenced by research underscoring the significance of ease of use in technology adoption (Alghamdi, 2023). The factors influencing parents' willingness to adopt PTDC for their children are complex and interrelated. While improvements in accuracy, data security, and communication post-intervention have positively influenced parental willingness, other factors, such as the perceived decline in reliability and usefulness, highlight areas for further improvement.

RQ6: To what extent can the assessment of parents' perceptions of TD after intervention be considered a viable approach for enhancing pediatric oral health care, including diagnosis, monitoring, and follow-up?

The assessment of parents' perceptions of PTDC after intervention represents a promising approach for enhancing pediatric oral health care across the full range of diagnosis, monitoring and follow-up procedures. This conclusion is supported by a comprehensive analysis of the key findings derived from the pre- and post-intervention data sets. Firstly, the considerable enhancement in perceptions of accuracy post-intervention, with concerns dropping from 25.4% to a mere 0.8%, underscores the potential of PTDC to bolster parental confidence in the accuracy of diagnosis. This improvement is consistent with the findings of previous studies that have emphasised the reliability of TD platforms (Abdullah et al., 2018), which is a crucial factor in determining the extent to which these platforms can be adopted. The necessity for effective communication strategies to address treatment limitations, which were identified as a

disadvantage by approximately 11.5% of parents both pre- and post-intervention, is highlighted. It has been demonstrated that effective communication can facilitate parental acceptance of teledentistry (Daniel & Kumar, 2014). The significant decrease in the number of challenges encountered when connecting with real consultations (8.2% to a lower rate) observed in the post-intervention phase indicates an enhanced level of acceptance due to the improved accessibility afforded by the enhanced connectivity. This finding is supported by the findings of Estai et al. (2016). Furthermore, the study demonstrates a notable change in attitudes towards data security, with concerns decreasing from 65.6% prior to the intervention to 4.9% following it. This highlights the efficacy of data security protocols, reinforcing the significance of secure telehealth practices (Kopycka-Kedzierawski et al., 2018). Although there are discrepancies in perceptions regarding ease of use, reliability, and usefulness post-intervention, ongoing studies have underscored the necessity for uninterrupted enhancement in these domains to optimise the advantages of TD (Bradley et al., 2017; Mertz et al., 2019). The noteworthy enhancement in communication between dentists and their patients following the intervention, with a greater proportion of individuals reporting that their dental care provider communicated effectively, suggests the potential for teledentistry to facilitate more productive interactions between patients and their healthcare providers (Daniel & Kumar, 2014). These findings suggest that the assessment of parents' perceptions post-intervention may represent a viable approach for the improvement of pediatric oral health care through the use of telehealth. By addressing concerns, improving accuracy, and enhancing communication and accessibility, PTDC has the potential to transform the delivery of paediatric dental care.

RQ7: What is the impact of parental engagement in pediatric telehealth consultations on the uptake of this approach?

The involvement of parents in PTDC has been shown to have a significant impact on its adoption, as evidenced by the results of various intervention studies. The notable increase to 82.8% of parents who completely agree that dental professionals communicate their child's oral health situation post-intervention indicates that when parents are well-informed, they are more likely to trust and utilise PTDC. A study by Alghamdi (2023) indicates that effective communication is a key factor in parental satisfaction. Furthermore, 81.1% of parents indicated that they believe that dental professionals provide all necessary clarifications, which suggests that parental engagement is enhanced when their concerns and questions are adequately addressed. Smith et al. (2019) also found that clear explanations are crucial for patient understanding in TD. The

perception of increased availability of dental professionals, as indicated by 82.8% of parents, is contingent upon timely interactions with dental professionals, which are a critical factor in the adoption of TD. Johnson et al. (2024) have highlighted the importance of accessibility to dental professionals in TD. The fact that 72.1% of participants agree that PTDC improved their child's oral health after the appointment serves to underscore the direct impact of parental engagement on health outcomes and the subsequent adoption of TD. This finding is aligned with the findings of Lam et al. (2021), who demonstrated that TD interventions have a positive effect on oral health outcomes. The high levels of agreement on the usefulness of PTDC for evaluation and monitoring indicate that engaged parents recognise the practical benefits of TD, which can drive its adoption (Garcia et al., 2020).

As agreed by 59.8% of parents, improved image quality enhances the diagnostic process, increasing the likelihood of parental engagement and TD adoption. The significance of optimal image quality is underscored by the findings of Patel et al. (2018). The enhanced confidence in the security and dependability of PTDC, as evidenced by parental consensus, underscores the necessity of addressing privacy concerns to facilitate TD adoption. A reduction in the perceived disadvantages of teleconsultations, which address potential drawbacks, can significantly influence parental engagement and adoption. Rodriguez et al. (2019) investigated methods for mitigating the potential disadvantages of TD.

The favourable perceptions of parents towards PTDC, as evidenced by the findings of the intervention, represent a noteworthy outcome that is consistent with the TAM. The Technology Acceptance Model, developed by Fred Davis in the 1980s, posits that two key determinants of an individual's intention to use and actual use of technology are perceived usefulness and perceived ease of use. In this context, perceived usefulness can be defined as the extent to which parents believe that the intervention will improve their child's oral health. Perceived ease of use, on the other hand, can be defined as the extent to which parents believe that the consultation process is straightforward to use. A review of the literature reveals a paucity of studies that employ the Technology Acceptance Model to assess parents' acceptance of PTDC. A study was conducted to assess parental acceptance and utilisation of a commercially available intraoral camera for effective remote monitoring (Tan & Chua, 2024). The Technology Acceptance Model was employed to predict user adoption. The findings indicated that it was feasible to use an IOC for TD with a high level of parental and child acceptance. A study conducted among the Saudi population sought to identify the predictors and challenges that influence user intention to

adopt TD services. The TAM) as employed to examine the factors that influence patients' intention to utilise telehealth (TD) services. The perception of risk constituted a significant impediment, whereas social influence exerted a favourable influence on the adoption process (Bahanan & Alsharif, 2023). In the present study, the favourable perceptions of parents towards PTDC subsequent to the intervention can be attributed to a number of factors. Firstly, it is probable that the intervention provided parents with a more comprehensive understanding of the functioning of PTDC and its potential benefits for their child's oral health. This enhanced comprehension is likely to have resulted in a greater perceived usefulness among parents. Secondly, it is possible that the intervention addressed any concerns or misconceptions that parents may have had regarding the simplicity of video consultation. For instance, the intervention may have provided parents with clear instructions on how to use it and resolved any technical issues that they encountered. This increased ease of use is likely to have resulted in a higher perceived ease of use among parents.

It is also possible that the participants were not excluded on the basis of their inexperience with TD. The findings of a TD survey conducted by Rahman et al. (2020) indicated that 96% of participants who had utilised either a virtual clinic or telephone clinic visit in the U.K. would utilise TD services again, a result that aligns with that of the present study.

Given that the experiment was conducted in a real-world setting, the results obtained are deemed to be pertinent in terms of parents' acceptance and engagement with PTDC, based on their initial experience.

Ultimately, the findings provide compelling evidence to support the hypothesis that PTDC has the potential to markedly enhance numerous facets of oral healthcare delivery and patient satisfaction. Notable improvements were observed in ease of use, image quality, data security, confidence in PTDC, communication clarity, and time availability following the intervention. These factors are of critical importance for the success of telehealth initiatives, indicating that PTDC is not only a viable alternative to traditional in-person consultations but may also offer additional benefits. The high Z-values and corresponding significance levels indicate that these are not random variations but rather systematic improvements attributable to the intervention. Furthermore, positive changes were observed in parental perceptions regarding the reliability of PTDC for dental screening and evaluation, its usefulness in evaluating and monitoring oral health, and as an alternative way of receiving oral health care. Additionally, the preference for

PTDC post-intervention and its recognition as a tool that contributes to the improvement of children's oral health indicate the potential for PTDC to become an integral part of pediatric oral health care strategies. The data indicates that this represents a transformative approach to pediatric oral health care, offering a more accessible, efficient and satisfactory experience for both patients and healthcare providers.

During the course of this research, certain constraints were identified with regard to the implementation of this novel approach to the delivery of oral health care. The approval phase of the research protocol was completed by the Ethics Committee of ARSLVT in a period of 12 months. It was determined that the lack of familiarity with the concept of pediatric oral health teleconsultation among the members of the ethics committee contributed significantly to the prolonged waiting period. During the development of the intervention, certain difficulties were encountered due to infrastructure limitations. Dental hygienists employed by the National Health Service (SNS) in Portugal lack access to a platform for conducting teleconsultations. Consequently, the researcher scheduled the consultation via telephone with the parents, who then proceeded with the consultation via TEAMS. Subsequently, clinical records were compiled, resulting in an increase in the overall time required for the process. It is also noteworthy that this approach to primary health care is novel in Portugal, representing the inaugural experience of its kind. At the level of middle/top management and health professionals, it can be stated that there is a general lack of awareness of the potential of this service as a tool for reducing waiting lists, increasing equity in access to oral health care, promoting the provision of quality care sustainably, reducing absenteeism from work/school, greater involvement of parents and children, and early diagnoses to prevent oral problems, as well as monitoring and follow-up of children considered to be at risk of developing caries. In light of the parents' willingness to adhere to this novel approach and their positive reception of it, as evidenced by the outcomes, it became evident that parents are receptive to innovative strategies in oral health care. Nevertheless, there is a considerable scope for enhancing TD literacy and knowledge among dental care providers, as well as their involvement.

5.1 Limitations and Further Research

The study was conducted with a limited sample size, which may have resulted in findings that are not representative of the population or a lack of diversity in parental perspectives. Furthermore, the sample does not represent the entire population, which may introduce

potential biases. It must be acknowledged that the findings of this study may not be applicable to all demographics or geographical locations, due to the specific characteristics of the sample or the region in which the study was conducted. It is possible that the responses provided by participants in surveys may be subject to bias, such as social desirability bias or recall bias, which could affect the accuracy of their perceptions. It is possible that the research may have focused on specific aspects of paediatric teledentistry consultation, which may have resulted in the overlooking of other relevant factors that could potentially influence the perceptions of the participants. As video consultation is a relatively novel model, all participants had not previously experienced this modality. It is therefore possible that the results of this study would have differed had they done so.

In light of the aforementioned limitations, it is recommended that future research employ a larger sample size and include participants from a greater number of regions across Portugal, thereby better representing the diverse perspectives of parents. Furthermore, future efficacy studies should be conducted to determine the long-term impact of teledentistry consultations and to identify any differences between in-person and remote consultations. Also, studies that examine the cost-effectiveness of this approach will provide valuable insights for its implementation. Moreover, to gain a more comprehensive understanding of this topic, future research should focus on optimising the integration of teledentistry for patient safety. This will provide valuable insights into the global landscape of teledentistry research and its impact on patient safety.

A broader scope of research involving dental care providers could facilitate a more comprehensive understanding of the potential benefits and challenges of teledentistry consultation in pediatric care, as well as for other groups, particularly within the context of primary health care.

Moreover, a more comprehensive examination of forthcoming teledentistry projects could yield valuable insights into the challenges and benefits associated with the expansion of teledentistry offerings. Consequently, future research endeavours will be well-positioned to collate data from operational contexts within the wider healthcare ecosystem, facilitating an assessment of their practicality and efficacy.

By addressing these limitations and pursuing future research directions, the field of teledentistry will continue to evolve and expand, ultimately improving access to quality dental care for individuals worldwide.

5.2 Recommendations

A number of recommendations can be put forth to enhance the Portuguese population's access to dental and oral care.

- **Ministry of Health and Regulators (Direcção-Geral da Saúde/Entidade Reguladora da Saúde)**

It is recommended that the Ministry of Health and Regulators (DGS/ERS) include teledentistry in the 2021-2025 revision of the National Oral Health Program, given that it enhances access to high-quality dental care, encourages preventive oral health practices, and mitigates disparities in oral healthcare delivery. This can be achieved by the establishment of explicit guidelines and government regulations for the practice of teledentistry, with a view to ensuring patient safety, data privacy and the quality of care. Furthermore, the integration of these services into existing healthcare systems, such as electronic health records and referral networks, will facilitate seamless collaboration between dental care providers and other healthcare professionals. However, it is recommended that studies be conducted periodically to assess the oral health status of children and young people in order to facilitate the monitoring of the National Health Plan and the incorporation of new approaches into the National Oral Health Promotion Programme, as well as the updating of the available data.

Finally, the Ministry of Health should earmark funds for the development and implementation of teledentistry infrastructure, encompassing telecommunication networks, secure platforms and equipment for remote consultations. Furthermore, investment in training programmes for dental care providers is essential to enhance their proficiency in teledentistry technologies and practices. The implementation of these recommendations would enable the Ministry of Health to assume a pivotal role in the utilisation of teledentistry.

- **Local Health Units Administration (Unidades Locais de Saúde)**

Organisations should invest in robust IT infrastructure and offer training programmes to enhance the literacy and skills of dental health professionals. The establishment of systems for the assessment of the effectiveness and impact of TD programmes, coupled with the solicitation of feedback from patients and providers, will facilitate the achievement of continuous improvement. It is crucial to engage patients and their families in the development and implementation of teledentistry initiatives, and to gather their input in order to customise services based on their needs and preferences. The implementation of these recommendations will enable Boards of Directors to leverage TD effectively in order to enhance dental care delivery, improve patient outcomes and address oral healthcare challenges in local communities.

- **Dental Care Providers and Dental Professional Association**

Teledentistry has emerged as a vital component of modern dental care, offering a convenient and efficient way to provide services. To achieve its full potential, dental care providers and professional associations must adopt an innovative approach and be receptive to integrating new technologies that can enhance patient care and practice efficiency. It is recommended that collaborative relationships with other healthcare professionals be fostered in order to provide comprehensive care through teledentistry platforms.

Ensuring compliance with all necessary legal requirements and ethical standards is essential for all teledentistry practices, including those pertaining to patient privacy and data security. Additionally, quality assurance measures must be implemented to ensure the maintenance of the standard of care provided through teledentistry services. It is essential to effectively communicate the benefits and availability of teledentistry services to patients and the wider community. Besides, a system for collecting and analysing patient feedback should be established in order to facilitate continuous improvement of teledentistry services.

The ongoing development of technology, including artificial intelligence and machine learning, will further enhance the capabilities of teledentistry, including remote diagnosis and treatment planning.

- **Academic and Education Dental Schools**

It is paramount that academic and educational dental schools revise their syllabi to ensure that the next generation of dental professionals is adequately prepared for the advancements in teledentistry. This necessitates the cultivation of an understanding, mindset, and abilities aligned with clinical teledentistry, as well as the discernment to assess its relevance accurately, thereby fostering proficient teledentistry providers. The incorporation of specialised courses, hands-on experiences and interactions with seasoned professionals represent a strategy for enhancing consciousness and general perceptions regarding TD.

- **Society and Telehealth Associations**

It is recommended that civil society advocate for telehealth to expand access to dental care and to contribute to the development of policies and guidelines that ensure its safe and effective application. Besides, educational initiatives should be implemented to enhance awareness of the advantages of TD and its significance in preventive and early-stage care. It is incumbent upon telehealth associations to strive for the standardisation of telehealth practices in order to maintain the quality and consistency of care, as well as to facilitate the integration of teledentistry consultation into existing health information systems and national eHealth strategies. Moreover, they should provide risk management guidance to dental care professionals engaged in teledentistry, thereby ensuring patient safety and compliance with legal requirements.

6. CONCLUSION

The utilisation of pediatric teledentistry consultation presents an opportunity to enhance healthcare accessibility and overcome the challenges posed by socioeconomic, geographical, and accessibility factors. Besides, it has the potential to enhance the quality of care by facilitating access to specialist consultations and improving parental literacy.

This research explores parents' attitudes, beliefs, and experiences with pediatric teledentistry consultations in primary healthcare. It highlights perceived benefits such as improved accessibility, diagnosis, monitoring, and follow-up, with convenience, accessibility, time efficiency, and remote consultation capacity being key influences. Prior to video appointments, parents had concerns about care quality, remote diagnosis effectiveness, and PTDC's utility for oral health monitoring. However, post-intervention, parental perceptions shifted positively, with reports of satisfaction and positive experiences, emphasizing the role of knowledge and perceived usefulness. The study underscores the importance of parental engagement for the initiative's success, offering insights into integrating PTDC into primary healthcare. The findings guide organizational decisions and suggest effective adoption strategies, providing a foundation for further research in pediatric teledentistry.

By leveraging telecommunication technologies and addressing parental concerns, pediatric teledentistry consultations has the potential to revolutionize dental and oral care delivery for children. This approach efficiently meets their oral health needs, leading to improved outcomes. Through this, the Portuguese National Health Service (NHS) enhances access to quality dental care, promote preventive practices and improve parental engagement. For this purpose, all stakeholders must be involved in a well-defined strategy to ensure value for parents and pediatric patients.

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Appendix

Appendix I – Survey Script

Appendix I – Survey Script

Survey Script			
Subject	Specific Subject	Author	Question
Perceived	Perceived Ease of Use	Davis, 1989; Kamal et al., 2020	Q1 -Do you think it's easy use TD consultation services?
	Perceived Usefulness		Q8 - Do you think, after a TD consultation the oral health of the child can change?
			Q10 - Do you think TD consultation is useful for evaluating the oral health of your child's?
			Q11 - Do you consider TD consultation useful for monitoring your child's oral health?
knowledge	Service Use Quality	Menhadji et al., 2021	Q2 - During TD consultation, do you consider that image quality was good?
	Safety and Reliability	Menhadji et al., 2021	Q3 -Generally, do you consider the storage of your child's sensitive data secure?
			Q4 -Feels confident in the teleconsultation?
			Q9 - Do you think, TD consultation is reliable for the evaluation of oral health?
	Disadvantages	Aboalshamat et al., 2022	Q14 -In your opinion, what are the disadvantages of TD consultation?
	Attitudes	Heath Professional Attitude	Menhadji et al., 2021)
Q6 -Do you think the oral health professional provided all the clarifications?			
Q7 - Do you think that the time provided by the oral health professional for clarification of doubts was adequate?			
Behavioral	Behavior Intention of use	Kamal et al., 2020	Q12 -In general, do you consider that, in some situations, teleconsultation is an alternative way of receiving oral health care?
			Q13 - If you can choose, you prefer a TD consultation, rather than a face-to-face appointment?
			Q15 - Considering the benefits and disadvantages of pediatric TD consultation, do you consider it to be a tool that can contribute to improving the oral health of children?
		Menhadji et al., 2021	Q16 -Would you highlight something, from the teleconsultation?
		Menhadji et al., 2021	Q17 - Would you perform a TD consultation again?
			Q18 - Would you recommend it to any friend?

Appendix II – Expert Invitation

Appendix II – Expert Invitation

Caro(a) (Expert)

Célia Maria Lima Moreira, Higienista Oral do ACES Almada-Seixal e aluna do Mestrado em Gestão de Unidades de Saúde do Instituto Politécnico de Santarém, a realizar um trabalho de investigação sobre a perceção dos pais no âmbito da teleconsulta de saúde oral, em cuidados de saúde primários, gostaria de convidá-lo(a) a participar na validação do instrumento de avaliação (2 questionários), em virtude da sua vasta experiência nesta área.

O objetivo deste estudo quantitativo é obter informações sobre as perceções dos pais sobre a PTDC e comparar os resultados de questionários pré e pós-consulta usando um instrumento de pesquisa validado. Para o desenho da pesquisa será utilizada uma abordagem transversal pré-pós, no qual os dados serão colhidos da mesma amostra de participantes em dois momentos distintos, antes da teleconsulta e 3 meses após a intervenção

Pretende-se com este estudo explorar as atitudes dos pais em relação à teleconsulta de saúde oral. O instrumento a ser validado serão dois inquéritos que medem as atitudes dos pais (perceção de facilidade de uso, perceção de utilidade, qualidade da imagem, segurança e fiabilidade, intenção de uso), antes da teleconsulta e 3 meses após a intervenção.

Se tiver alguma dúvida ou necessitar de informações adicionais, não hesite em contactar-me diretamente através do e-mail 200100344@esg.ipsantarem.pt ou do telefone 964171182. Terei todo o prazer em fornecer quaisquer esclarecimentos de que possa necessitar.

Grata pela sua colaboração,

Cmc

Célia Moreira

(Higienista Oral - ACES Almada Seixal)

Appendix III – Ethical Approval

Appendix III – Ethical Approval

Parecer da Comissão de Ética para a Saúde



Exma. Senhora

Dr.ª Célia Moreira

celia.m.moreira@arslvt.min-saude.pt

C/C:

Sua Referência	Sua Comunicação de	Nossa Referência	Data
		1710/CES/2023	

Assunto: Teleconsulta Pediátrica de saúde oral: uma abordagem em cuidados de saúde primários no ACES Almada Seixal.

A Comissão de Ética para a Saúde da ARSLVT, apreciou na sua reunião da secção de investigação do dia 03.03.2023, o projeto mencionado em epígrafe, e emitiu um parecer favorável ao estudo.

Declaração de conflito de interesses: nada a declarar

O Conselho Directivo, atento ao teor do parecer emitido, entende estarem reunidas as condições para a sua concretização.

Com os melhores cumprimentos,


O Conselho Directivo
LUIS PISCO
Presidente do Conselho Directivo da
ARSLVT, I.P.

Appendix IV – Consent Form

Appendix IV – Consent Form

CONSENTIMENTO LIVRE, INFORMADO E ESCLARECIDO

(nos termos da norma nº015/2013 da Direcção-Geral da Saúde)

Aos Pais/Encarregados de Educação/Representante Legal

Célia Maria Lima Moreira, Higienista Oral do ACES Almada-Seixal e aluna do Mestrado em Gestão de Unidades de Saúde do Instituto Politécnico de Santarém, a realizar um trabalho de investigação sobre "Teleconsulta pediátrica de Saúde Oral, nos cuidados de saúde primários", vem solicitar a sua colaboração neste estudo.

Informo que a sua participação é voluntária, podendo desistir a qualquer momento sem que por isso o seu filho(a)/educando(a) venha a ser prejudicado nos cuidados de saúde prestados pelo ACES Almada-Seixal; informo ainda que a sua privacidade será respeitada, todos os dados recolhidos serão confidenciais e não serão fornecidas quaisquer compensações.

Objetivo do trabalho de investigação: Compreender a perceção dos Pais/Encarregados de Educação/Representantes Legais sobre a teleconsulta pediátrica de saúde oral.

Critérios de Inclusão: Crianças e jovens (0-18 anos) referenciados pela equipa de família da Unidade de Saúde Familiar de Almada para a consulta de saúde oral.

Critérios de Exclusão: utentes com idade superior a 18 anos.

Procedimentos Necessários: 2 Questionários

Aplicar dois questionários aos Pais/Encarregados de Educação/Representantes Legais. O primeiro questionário será aplicado antes da realização da teleconsulta de saúde oral e o segundo questionário será enviado 90 dias (3 meses) após a realização da teleconsulta de saúde oral. Os possíveis participantes foram referenciados pelas equipas de família da Unidade de Saúde Familiar Almada, do ACES Almada-Seixal.

Risco/Benefício da sua participação: Não existem riscos associados à participação no estudo. Os benefícios da participação no estudo centram-se na brevidade do acesso a um profissional de saúde oral.

Confirmo que expliquei à pessoa abaixo indicada, de forma adequada e explícita os procedimentos necessários ao ato referido neste documento. Respondi a todas as

questões que me foram colocadas e assegurei-me de que houve um período de reflexão suficiente para a tomada de decisão. Também garanti que, em caso de recusa, serão assegurados os melhores cuidados nesta Unidade de Saúde, mantendo a assistência necessária à situação de saúde que apresenta.

Célia Maria Lima Moreira,
Higienista Oral, Cédula Profissional
Nº C-012990086

Por favor, leia com atenção todo o conteúdo deste documento. Não hesite em solicitar mais informações se não estiver completamente esclarecido/a. Verifique se todas as informações estão corretas. Se tudo estiver conforme, então responda a este documento.

Antes de submeter/enviar este formulário imprima a sua resposta ou faça uma cópia para o seu computador.

* Obrigatória

Consentimento

Ao assinalar uma das opções, está a confirmar o seguinte: O Sr(a) leu e compreendeu todas as informações deste documento e teve tempo para as ponderar; todas as suas questões foram respondidas satisfatoriamente; Se não percebeu qualquer das palavras, solicitou ao aluno/investigador uma explicação, tendo este esclarecido todas as dúvidas.

1. Assinale uma das opções “**Declaro que concordo / Declaro que Não concordo** em participar no estudo sobre a teleconsulta em saúde oral, que me foi proposto e explicado pelo profissional de saúde/aluno/investigador que envia este documento, tendo podido fazer todas as perguntas sobre o assunto. *

- Declaro que concordo
- Declaro que não concordo

Teleconsulta de Saúde Oral

CONSENTIMENTO INFORMADO, ESCLARECIDO E LIVRE PARA REALIZAÇÃO DE TELECONSULTA DE SAÚDE ORAL

(nos termos da norma nº015/2013 da Direcção-Geral da Saúde)

Aos Pais/Encarregados de Educação/Representante Legal

Confirmando que expliquei à pessoa abaixo indicada, de forma adequada e inteligível, os procedimentos necessários ao ato referido neste documento.

De que a teleconsulta de saúde oral possibilita o contacto à distância entre o profissional de saúde e o utente, através de videoconferência, para fins exclusivos de orientação clínica.

Todas as informações recolhidas ficarão registadas no processo clínico do utente.

Que respondi a todas as questões que me foram colocadas e assegurei-me de que houve um período de reflexão suficiente para a tomada de decisão. Também garanti que, em caso de recusa, serão assegurados os melhores cuidados nesta Unidade de Saúde, mantendo a assistência necessária à situação de saúde que o seu filho(a)/Educando apresenta, sendo agendada consulta presencial, tão breve quanto possível.

Célia Maria Lima Moreira, Higienista Oral,
Portadora da Cédula Profissional Nº C-012990086

Por favor, leia com atenção todo o conteúdo deste documento. Não hesite em solicitar mais informações se não estiver completamente esclarecido/a. Verifique se todas as informações estão corretas. Se tudo estiver conforme, então responda a este documento.

Antes de submeter/enviar este formulário imprima a sua resposta ou faça uma cópia para o seu computador.

2. Assinale uma das opções **Autorizo / Não Autorizo** a realização da teleconsulta de saúde oral que me foi proposto e explicado pelo profissional de saúde identificado e que constam deste documento." *

- Autorizo
- Não Autorizo

3. Nome do seu filho(a)/Educando*

⋮

4. Nome Pai/Mãe/Representante Legal:

5. Doc. Identificação Nº *

6. Data ou Validade do Documento de Identificação *

7. Grau de Parentesco ou Tipo de Representação: *

Este conteúdo não foi criado nem é aprovado pela Microsoft. Os dados que submeter serão enviados para o proprietário do formulário.

 Microsoft Forms

Appendix V – Survey Pre-Pediatric Teledentistry Consultation

Appendix V – Survey Pre-Pediatric Teledentistry Consultation

Questionário Pré-Teleconsulta pediátrica de saúde oral

Perceção dos pais/cuidadores sobre a teleconsulta pediátrica de saúde oral

O meu nome é Célia Moreira e gostaria de obter a sua colaboração através do preenchimento do questionário que se segue, desenvolvido no âmbito do Mestrado em Gestão de Unidades de Saúde que me encontro a realizar no Instituto Politécnico de Santarém, orientado pelo Professor Henrique Martins (ISCTE) e pela Professora Sandra Oliveira (Politécnico de Santarém).

Pretende-se estudar a perceção dos pais/cuidadores sobre a teleconsulta pediátrica em saúde oral. O questionário demora cerca de 8 minutos a ser preenchido. No entanto, é livre de desistir de o preencher.

Cumprindo com o Regulamento Geral de Proteção de Dados (RGPD), informo que se assegura aos inquiridos a segurança, o anonimato e a confidencialidade dos dados fornecidos. Mais informo que os dados recolhidos se destinam, exclusivamente, à prossecução da investigação, à publicação de artigos e apresentação dos resultados em conferências, não sendo recolhida qualquer informação pessoal e adicional.

Em caso de dúvida sobre o preenchimento do questionário, ou até mesmo sobre o próprio estudo, poderá contactar-me através do email: celia.m.moreira@arslvt.min-saude.pt.

Face ao exposto, aceita participar no estudo e permite a utilização dos dados, que de forma voluntária fornece, confiando que apenas serão utilizados para fins científicos e publicações que dela decorram e nas garantias de confidencialidade e anonimato fornecidas pela investigadora.

Caracterização Sócio-Demográfica

Idade	___ anos				
Género	Masculino	Feminino	Não Responde		
Freguesia de Residência	<input type="radio"/> Almada, Cacilhas, Cova da Piedade, Pragal <input type="radio"/> Feijó, Laranjeiro <input type="radio"/> Caparica, Trafaria <input type="radio"/> Charneca de Caparica e Sobreda <input type="radio"/> Costa de Caparica <input type="radio"/> Outro				
ESCOLARIDADE	1ºCiclo	2ºCiclo	3ºCiclo	Secundário	Ensino Superior
Data de nascimento do seu filho(a)/Educando	DD/MM/ANO				

Utilização da tecnologia

Em alguma ocasião utilizou o serviço de teleconsulta? Sim _____ Quando? _____
Não _____

Facilidade de utilização do serviço

Q1	Considera que é fácil utilizar serviços de teleconsulta em saúde oral?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
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Qualidade de utilização do serviço

Q2	Durante a teleconsulta de saúde oral, considera que a qualidade da imagem deve ser adequada?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
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Segurança e confiabilidade

Q3	De uma forma geral, considera seguro o armazenamento de dados confidenciais do seu filho(a)/Educando?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q4	Sente-se confiante na realização da teleconsulta?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Atitude do profissional de saúde

Q5	Considera que o profissional de saúde/Higienista Oral deve comunicar de forma clara a situação de saúde oral do seu filho(a)/Educando?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q6	Acha que o profissional de saúde/Higienista Oral deve prestar todos os esclarecimentos?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Q7	Acha que o tempo disponibilizado, pelo profissional de saúde/Higienista Oral, para o esclarecimento de dúvidas deve ser adequado?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
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Utilidade Percebida

Q8	Acha que a situação de saúde oral do seu filho(a) irá alterar-se após a teleconsulta de saúde oral?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q9	Considera que a avaliação de saúde oral do seu filho(a)/educando através da teleconsulta é fiável?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Perceção da utilidade da teleconsulta em saúde oral

Q10	Considera que a teleconsulta é útil para avaliar o estado de saúde oral do seu filho(a)/educando?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q11	Considera que a teleconsulta é útil para monitorizar a saúde oral do seu filho(a)/educando?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Atitude de utilização

Q12	De uma forma geral, considera que, em alguma situação, a teleconsulta é uma forma alternativa de receber cuidados de saúde oral?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q13	Se for possível escolher, tem preferência pela teleconsulta de saúde oral?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q14	Na sua opinião, qual/quais as					

	desvantagens da teleconsulta de saúde oral?					
Q15	Ponderando os benefícios e as desvantagens de teleconsulta pediátrica de Saúde Oral, considera ser uma ferramenta que pode contribuir para melhorar a saúde oral das crianças?	1 Discordo completamente	2 Não concordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Appendix VI – Survey Post-Pediatric Teledentistry Consultation

Appendix VI – Survey Post-Pediatric Teledentistry Consultation

Questionário Pós-Teleconsulta pediátrica de saúde oral

Perceção dos pais/cuidadores sobre a teleconsulta pediátrica de saúde oral

No seguimento do estudo sobre a utilização da teleconsulta pediátrica de saúde oral e em virtude do seu consentimento inicial no preenchimento do primeiro questionário, envia-se o questionário após a realização da teleconsulta para preenchimento.

Relembro que o meu nome é Célia Moreira e este estudo é desenvolvido no âmbito do Mestrado em Gestão de Unidades de Saúde que me encontro a realizar no Instituto Politécnico de Santarém, orientado pelo Professor Henrique Martins (ISCTE) e pela Professora Sandra Oliveira (Politécnico de Santarém).

Pretende-se estudar a perceção dos pais/cuidadores sobre a teleconsulta pediátrica em saúde oral. O questionário demora cerca de 8 minutos a ser preenchido. No entanto, é livre de desistir de o preencher.

Cumprindo com o Regulamento Geral de Proteção de Dados (RGPD), informo que se assegura aos inquiridos a segurança, o anonimato e a confidencialidade dos dados fornecidos. Mais informo que os dados recolhidos se destinam, exclusivamente, à prossecução da investigação, à publicação de artigos e apresentação dos resultados em conferências, não sendo recolhida qualquer informação pessoal e adicional.

Em caso de dúvida sobre o preenchimento do questionário, ou até mesmo sobre o próprio estudo, poderá contactar-me através do email: celia.m.moreira@rslvt.min-saude.pt

Face ao exposto, aceita participar no estudo e permite a utilização dos dados, que de forma voluntária fornece, confiando que apenas serão utilizados para fins científicos e publicações que dela decorram e nas garantias de confidencialidade e anonimato fornecidas pela investigadora

Caracterização Sócio-Demográfica

Idade	___ anos				
Género	Masculino	Feminino	Não Responde		
Freguesia de Residência	<input type="radio"/> Almada, Cacilhas, Cova da Piedade, Pragal <input type="radio"/> Feijó, Laranjeiro <input type="radio"/> Caparica, Trafaria <input type="radio"/> Charneca de Caparica e Sobreda <input type="radio"/> Costa de Caparica <input type="radio"/> Outro				
ESCOLARIDADE	1ºCiclo	2ºCiclo	3ºCiclo	Secundário	Ensino Superior
Data de nascimento do seu filho(a)/Educando	DD/MM/ANO				

Facilidade de utilização do serviço

Q1	Considera que é fácil utilizar serviços de teleconsulta em saúde oral?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
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Qualidade de utilização do serviço

Q2	Durante a teleconsulta de saúde oral, considera que a qualidade da imagem deve ser adequada?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
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Segurança e confiabilidade

Q3	De uma forma geral, considera seguro o armazenamento de dados confidenciais do seu filho(a)/Educando?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q4	Sente-se confiante na realização da teleconsulta?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Atitude do profissional de saúde

Q5	Considera que o profissional de saúde oral comunicou de forma clara a situação de saúde oral do seu filho(a)/Educando?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q6	Acha que o profissional de saúde/Higienista Oral prestou todos os esclarecimentos?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q7	Acha que o tempo disponibilizado, pelo profissional de saúde oral, para o esclarecimento de dúvidas foi adequado?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Utilidade Percebida

Q8	Acha que a situação de saúde oral do seu filho(a) irá alterar-se após a teleconsulta de saúde oral?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q9	Considera que a avaliação de saúde oral do seu filho(a)/educando através da teleconsulta é fiável?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Perceção da utilidade da teleconsulta em saúde oral

Q10	Considera que a teleconsulta foi útil para avaliar o estado de saúde oral do seu filho(a)/educando?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q11	Considera que a teleconsulta foi útil para monitorizar a saúde oral do seu filho(a)/educando?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

Atitude de utilização

Q12	De uma forma geral, considera que, em alguma situação, a teleconsulta é uma forma alternativa de receber cuidados de saúde oral?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q13	Se for possível escolher, tem preferência pela teleconsulta de saúde oral?	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo
Q14	Na sua opinião, qual/quais as desvantagens da teleconsulta de saúde oral?					
Q15	Ponderando os benefícios e as desvantagens da teleconsulta pediátrica de Saúde	1 Discordo completamente	2 Discordo	3 Não concordo nem discordo	4 De acordo	5 Completamente de acordo

	Oral, considera ser uma ferramenta que pode contribuir para melhorar a saúde oral das crianças?				
Q16	Da teleconsulta, destacaria alguma coisa?	Sim	Não	Qual?	
Q17	Voltaria a realizar a teleconsulta em saúde oral?	Sim	Não		
Q18	Recomendaria a algum amigo/conhecido?	Sim	Não		

Appendix VII – Descriptive Statistics

Appendix VII – Descriptive Statistics

Ease Use of PTDC: Parent's Perception Pre-Intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	3	2,5	2,5	2,5
	Not Agree or Disagree	88	72,1	72,1	74,6
	Agree	31	25,4	25,4	100,0
	Total	122	100,0	100,0	

Ease Use of PTDC: Parent's Perception Pre-Intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	56	45,9	45,9	45,9
	Completely Agree	66	54,1	54,1	100,0
	Total	122	100,0	100,0	

Estadísticas

		Easy Use of PTDC_Pre-intervention	Easy Use of PTDC_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		3,23	4,54
Mediana		3,00	5,00
Erro Desvio		,477	,500
Variância		,228	,250

Image Quality

Image Quality: Parents Perception Pre-Intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	36	29,5	29,5	29,5
	Agree	61	50,0	50,0	79,5
	Completely Agree	25	20,5	20,5	100,0
	Total	122	100,0	100,0	

Image Quality: Parents Perception Post-Intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	49	40,2	40,2	40,2
	Completely Agree	73	59,8	59,8	100,0
	Total	122	100,0	100,0	

Estatísticas

		Image Quality_Pre-intervention	Image Quality_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		3,91	4,60
Mediana		4,00	5,00
Erro Desvio		,704	,492
Variância		,496	,242

Storage Child Sensitive Data Security

Storage child sensitive data security_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	2	1,6	1,6	1,6
	Not Agree or Disagree	80	65,6	65,6	67,2
	Agree	39	32,0	32,0	99,2
	Completely Agree	1	,8	,8	100,0
	Total	122	100,0	100,0	

Storage child sensitive data security_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	6	4,9	4,9	4,9
	Agree	79	64,8	64,8	69,7
	Completely Agree	37	30,3	30,3	100,0
	Total	122	100,0	100,0	

Estatísticas

		Storage child sensitive data security_Pre-intervention	Storage child sensitive data security_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		3,32	4,25
Mediana		3,00	4,00
Erro Desvio		,519	,539
Variância		,269	,290

Confident in PTDC

Confident in PTDC - Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	7	5,7	5,7	5,7
	Not Agree or Disagree	94	77,0	77,0	82,8
	Agree	21	17,2	17,2	100,0
	Total	122	100,0	100,0	

Confident in PTDC_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	52	42,6	42,6	42,6
	Completely Agree	70	57,4	57,4	100,0
	Total	122	100,0	100,0	

Estatísticas

		Confident in PTDC - Pre-intervention	Confident in PTDC_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		3,11	4,57
Mediana		3,00	5,00
Erro Desvio		,467	,497
Variância		,218	,247

Dental Care Provider Attitudes

DP clearly communicate oral health situation_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	28	23,0	23,0	23,0
	Agree	65	53,3	53,3	76,2
	Completely Agree	29	23,8	23,8	100,0
	Total	122	100,0	100,0	

DP clearly communicate oral health situation_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	21	17,2	17,2	17,2
	Completely Agree	101	82,8	82,8	100,0
	Total	122	100,0	100,0	

Estatísticas

		DP clearly communicate oral health situation_Pre-intervention	DP clearly communicate oral health situation_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		4,01	4,83
Mediana		4,00	5,00
Erro Desvio		,686	,379
Variância		,471	,144

DP provide all the clarifications_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	37	30,3	30,3	30,3
	Agree	65	53,3	53,3	83,6
	Completely Agree	20	16,4	16,4	100,0
	Total	122	100,0	100,0	

DP provide all the clarifications_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	1	,8	,8	,8
	Agree	22	18,0	18,0	18,9
	Completely Agree	99	81,1	81,1	100,0
	Total	122	100,0	100,0	

Estatísticas

		DP provide all the clarifications_P re-intervention	DP provide all the clarifications_P ost-intervention
N	Válido	122	122
	Omisso	0	0
Média		3,86	4,80
Mediana		4,00	5,00
Erro Desvio		,672	,419
Variância		,451	,176

Time available by the DP_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	29	23,8	23,8	23,8
	Agree	63	51,6	51,6	75,4
	Completely Agree	30	24,6	24,6	100,0
	Total	122	100,0	100,0	

Time available by the DP_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	21	17,2	17,2	17,2
	Completely Agree	101	82,8	82,8	100,0
	Total	122	100,0	100,0	

Estatísticas

		Time available by the DP_Pre- intervention	Time available by the DP_ Post- intervention
N	Válido	122	122
	Omisso	0	0
Média		4,01	4,83
Mediana		4,00	5,00
Erro Desvio		,698	,379
Variância		,488	,144

Improvement in Oral Health

Improvement in oral health after PTDC_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	14	11,5	11,5	11,5
	Not Agree or Disagree	95	77,9	77,9	89,3
	Agree	13	10,7	10,7	100,0
	Total	122	100,0	100,0	

Improvement in oral health after PTDC_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	34	27,9	27,9	27,9
	Completely Agree	88	72,1	72,1	100,0
	Total	122	100,0	100,0	

Estatísticas

		Improvement in oral health after PTDC_Pre- intervention	Improvement in oral health after PTDC_Post- intervention
N	Válido	122	122
	Omisso	0	0
Média		2,99	4,72
Mediana		3,00	5,00
Erro Desvio		,472	,450
Variância		,223	,203

PTDC Reliability For Dental Sreening/Evaluation

PTDC reliability for dental screening/evaluation_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	14	11,5	11,5	11,5
	Not Agree or Disagree	98	80,3	80,3	91,8
	Agree	10	8,2	8,2	100,0
	Total	122	100,0	100,0	

PTDC reliability for dental screening/evaluation_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	34	27,9	27,9	27,9
	Agree	66	54,1	54,1	82,0
	Completely Agree	22	18,0	18,0	100,0
	Total	122	100,0	100,0	

Estatísticas

		PTDC reliability for dental screening/evaluation_Pre-intervention	PTDC reliability for dental screening/evaluation_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		2,97	3,90
Mediana		3,00	4,00
Erro Desvio		,444	,673
Variância		,197	,453

PTDC Usefull For Evaluating Oral Health

PTDC useful for evaluating oral health_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	14	11,5	11,5	11,5
	Not Agree or Disagree	98	80,3	80,3	91,8
	Agree	10	8,2	8,2	100,0
	Total	122	100,0	100,0	

PTDC useful for evaluating oral health_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Not Agree or Disagree	1	,8	,8	,8
	Agree	45	36,9	36,9	37,7
	Completely Agree	76	62,3	62,3	100,0
	Total	122	100,0	100,0	

Estatísticas

		PTDC useful for evaluating oral health_Pre-intervention	PTDC useful for evaluating oral health_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		2,97	4,61
Mediana		3,00	5,00
Erro Desvio		,444	,505
Variância		,197	,255

PTDC Useful for monitoring oral health

PTDC useful for monitoring oral health_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	13	10,7	10,7	10,7
	Not Agree or Disagree	96	78,7	78,7	89,3
	Agree	13	10,7	10,7	100,0
	Total	122	100,0	100,0	

PTDC useful for monitoring oral health_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	35	28,7	28,7	28,7
	Completely Agree	87	71,3	71,3	100,0
	Total	122	100,0	100,0	

Estatísticas

		PTDC useful for monitoring oral health_Pre- intervention	PTDC useful for monitoring oral health_Post- intervention
N	Válido	122	122
	Omisso	0	0
Média		3,00	4,71
Mediana		3,00	5,00
Erro Desvio		,464	,454
Variância		,215	,206

PTDC Alternative Way of Receiving Oral Health Care

PTDC alternative way of receiving oral health care_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	22	18,0	18,0	18,0
	Not Agree or Disagree	95	77,9	77,9	95,9
	Agree	5	4,1	4,1	100,0
	Total	122	100,0	100,0	

PTDC alternative way of receiving oral health care_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	46	37,7	37,7	37,7
	Completely Agree	76	62,3	62,3	100,0
	Total	122	100,0	100,0	

Estatísticas

		PTDC alternative way of receiving oral health care_Pre- intervention	PTDC alternative way of receiving oral health care_Post- intervention
N	Válido	122	122
	Omisso	0	0
Média		2,86	4,62
Mediana		3,00	5,00
Erro Desvio		,451	,487
Variância		,204	,237

Preference of PTDC

Preference TDC_Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	20	16,4	16,4	16,4
	Not Agree or Disagree	98	80,3	80,3	96,7
	Agree	4	3,3	3,3	100,0
	Total	122	100,0	100,0	

Preference TDC_Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	1	,8	,8	,8
	Not Agree or Disagree	3	2,5	2,5	3,3
	Agree	49	40,2	40,2	43,4
	Completely Agree	69	56,6	56,6	100,0
	Total	122	100,0	100,0	

Estatísticas

		Preference TDC_Pre-intervention	Preference TDC_Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		2,87	4,52
Mediana		3,00	5,00
Erro Desvio		,425	,592
Variância		,181	,351

Considering the benefits and disadvantages of pediatric teledentistry consultation, do you consider it a tool that can contribute to improving children's oral health?Pre-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Disagree	32	26,2	26,2	26,2
	Not Agree or Disagree	85	69,7	69,7	95,9
	Agree	5	4,1	4,1	100,0
	Total	122	100,0	100,0	

Considering the benefits and disadvantages of pediatric teledentistry consultation, do you consider it a tool that can contribute to improving children's oral health?Post-intervention

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Agree	39	32,0	32,0	32,0
	Completely Agree	83	68,0	68,0	100,0
	Total	122	100,0	100,0	

Estatísticas

		Considering the benefits and disadvantages of pediatric teledentistry consultation, do you consider it a tool that can contribute to improving children's oral health?Pre-intervention	Considering the benefits and disadvantages of pediatric teledentistry consultation, do you consider it a tool that can contribute to improving children's oral health?Post-intervention
N	Válido	122	122
	Omisso	0	0
Média		2,78	4,68
Mediana		3,00	5,00
Erro Desvio		,506	,468
Variância		,256	,219

Would you perform a teledentistry consultation again

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Yes	122	100,0	100,0	100,0

Would you recommend it to any friend

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	Yes	122	100,0	100,0	100,0

Appendix VIII – Wilcoxon Rank Test

Appendix VIII – Wilcoxon Rank Test

Estadísticas de teste ^a														
	Easy Use of PTDC_Post-intervention - Easy Use of PTDC_Pre-intervention	Image Quality_Post-intervention - Image Quality_Pre-intervention	Storage child sensitive data security_Post-intervention - Storage child sensitive data security_Pre-intervention	Confident in PTDC_Post-intervention - Confident in PTDC - Pre-intervention	DP clearly communicate oral health situation_Post-intervention - DP clearly communicate oral health situation_Pre-intervention	DP provide all the clarifications_Post-intervention - DP provide all the clarifications_Pre-intervention	Time available by the DP_Post-intervention - Time available by the DP_Pre-intervention	Improvement in oral health after PTDC_Post-intervention - Improvement in oral health after PTDC_Pre-intervention	PTDC reliability for dental screening/evaluation_Post-intervention - PTDC reliability for dental screening/evaluation_Pre-intervention	PTDC useful for evaluating oral health_Post-intervention - PTDC useful for evaluating oral health_Pre-intervention	PTDC useful for monitoring oral health_Post-intervention - PTDC useful for monitoring oral health_Pre-intervention	PTDC alternative way of receiving oral health care_Post-intervention - PTDC alternative way of receiving oral health care_Pre-intervention	Preference TDC_Post-intervention - Preference TDC_Pre-intervention	Considering the benefits and disadvantages of pediatric teledentistry consultation, do you consider it a tool that can contribute to improving children's oral health?Post-intervention - Considering the benefits and disadvantages of pediatric teledentistry consultation, do you consider it a tool that can contribute to improving children's oral health?Pre-intervention
Z	-9,350 ^b	-7,101 ^b	-8,782 ^b	-9,626 ^b	-8,257 ^b	-8,640 ^b	-8,182 ^b	-9,728 ^b	-8,227 ^b	-9,709 ^b	-9,871 ^b	-9,716 ^b	-9,629 ^b	-9,793 ^b
Significância Sig. (2 extremidades)	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
a. Teste de Classificações Assinadas por Wilcoxon														
b. Com base em postos negativos.														

