

Exploring Patient Needs for Teledentistry Adoption: A UTAUT2-Based Qualitative Study from A Strategic Digital Marketing Perspective

Luthfia Hana Sabrina¹, Harimukti Wandebori²

^{1,2}School of Business and Management, Institut Teknologi Bandung, Bandung, 40132, Indonesia.

ABSTRACT: Although teledentistry is a growing field of digital health innovation with the potential to increase the accessibility of oral health care, its adoption hinges on patients' perceptions of the services' usefulness, ease of use, reliability, cost, and boundaries. The purpose of this study was to investigate the patient side of teledentistry adoption through a strategically oriented digital marketing framework based on UTAUT2. Exploratory qualitative research was used in this study. Online, semi-structured interviews were conducted between October and November 2025 on two patient and four dental informant participants. The resulting transcripts were anonymized, and analyzed with NVivo to complete a thematic analysis. UTAUT2 provided a framework for the application of both deductive and inductive coding. The analysis yielded 859 references distributed among 16 parent nodes, which were consolidated into five advanced themes. The first was consumers' limited formal knowledge and understanding of teledentistry, and its informal practice. The second theme was that teledentistry would provide preliminary advice and would not substitute for treatment. The third theme was the combined assurance of professional engagement, validated service providers, and secure data. The next theme was simple, familiar, and visually enhanced digital engagement, and the last theme was convenience, cost reduction, and integrated payment combined with marketing, which provided strategic value. The outcomes of this research suggest that teledentistry would serve as a complementary, first contact, and symptom clarification consultation service, as well as provide treatment and follow-up, and assist the determination of the need for an in-person visit. The findings also suggest that successful implementation of teledentistry services require clearly articulated service boundaries that are communicated in a manner that is both simple and customer friendly, and are provided through a validated service provider on a secure data protection, low-cost, and simple to use marketing service. The findings have a direct impact on the design and marketing of customer focused teledentistry services.

KEYWORDS: Teledentistry; UTAUT2; Patient Needs; Digital Health Adoption; Strategic Digital Marketing; Qualitative Study; Thematic Analysis

I. INTRODUCTION

Digital transformation has increasingly reshaped health service delivery by integrating information and communication technologies into clinical care, patient education, remote consultation, and service coordination (Dinari et al., 2026; Muñoz-Sepúlveda et al., 2026). This transformation has enabled new models of care, particularly telemedicine and teledentistry, which have been shown to improve access to healthcare services, reduce barriers to service delivery, and enhance patient experiences (Butzner & Cuffee, 2021; Gomez et al., 2021; Gurgel-Juarez et al., 2022). In oral healthcare, such developments are particularly significant because dental services traditionally rely on direct clinical encounters, while many patients continue to face barriers related to geographic distance, treatment costs, waiting times, limited specialist availability, and the unequal distribution of healthcare resources (Briceño-Vergel et al., 2026; Dinari et al., 2026; Kern et al., 2026).

In response to these challenges, teledentistry has emerged as an important digital innovation within contemporary oral healthcare systems. As an application of telemedicine in dentistry, teledentistry enables the remote exchange of clinical information, consultation, diagnosis support, referral, treatment monitoring, and follow-up care through digital communication technologies (Briceño-Vergel et al., 2026; Dinari et al., 2026; Ghai, 2020; Kern et al., 2026). It operates as an important service within healthcare systems to expand access, improve care, and optimize resources, while striving to maintain an uninterrupted continuum of care. The COVID-19 pandemic accelerated the further integration of teledentistry into the dental practice, showing how teledentistry could assist within the oral care domain when the practice of care is limited by contact (Bukhari, 2026). Beyond pandemic-related applications, evidence suggests that teledentistry can support remote triage, oral health education, follow-up, and referral decision-making, particularly in rural and underserved communities where shortages of dental professionals and limited access to facilities remain persistent challenges (Gurgel-Juarez et al., 2022).

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Despite its potential benefits, teledentistry adoption cannot be assumed to occur automatically once digital platforms are available. Patient-oriented studies indicate that willingness to use teledentistry is shaped not only by technological access but also by perceived usefulness, ease of use, social influence, trust, perceived risk, digital confidence, service type, and perceived value. A technology acceptance model-based study among the Saudi population found that perceived risk negatively influenced intention to use teledentistry, whereas social influence had a positive effect, suggesting that adoption is strongly affected by users' psychological evaluation of the service rather than by availability alone (Bahanan & Alsharif, 2023a). Similarly, a UTAUT-based study of adults in the United States showed that behavioral intention to use teledentistry was significantly associated with performance expectancy and social influence, while qualitative responses revealed limited knowledge as a barrier to future use (VanDeWiele et al., 2025).

Patient acceptance also varies by service type and value; for example, patients in Singapore were more willing to accept and pay for video reviews than for initial video consultations, with younger age and higher education associated with greater acceptance (Tan et al., 2025). Broader evidence further shows that public awareness, diagnostic confidence, technical access, age, education, and clinical need influence satisfaction and utilization, with teledentistry being more acceptable for triage, follow-up, and non-urgent care than for conditions requiring direct physical intervention (Alkadhi et al., 2024; Bukhari, 2026). Therefore, teledentistry adoption should be understood as a patient-centered behavioral and service-value issue, requiring not only digital infrastructure but also trust-building communication, clear service boundaries, affordable pricing, user-friendly platforms, and education that reduces perceived risk and improves confidence in remote dental care.

To examine teledentistry adoption from a patient-centered perspective, this study applies the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) as the theoretical foundation. UTAUT2 is appropriate because it extends earlier technology acceptance models by incorporating both utilitarian and consumer-oriented determinants of technology use, including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit (Venkatesh, Walton, et al., 2012). These constructs are relevant to teledentistry because patients' willingness to use online dental services may depend not only on whether the service is clinically useful and easy to access, but also on whether it is socially supported, affordable, emotionally reassuring, compatible with existing digital habits, and adequately resourced. Recent dental technology studies have demonstrated the applicability of UTAUT2 in explaining patient acceptance of digital innovation in dental care, including IT-based patient–dentist communication and AI-supported dental diagnosis (Chang-Tam et al., 2025; Naik et al., 2025). Therefore, in this qualitative study, UTAUT2 is used as a guiding theoretical framework to explore how patients perceive the usefulness, ease of use, social influence, facilitating support, emotional motivation, price-value evaluation, and habitual readiness associated with teledentistry adoption, rather than to statistically test causal relationships among variables.

From a strategic digital marketing perspective, understanding patient needs is essential for transforming teledentistry from a technically available service into a relevant, trustworthy, and acceptable digital health service. The literature on digital health emphasizes that the integration of a service to a digital platform is insufficient for its adoption. Identification of the clientele, pathways for communication, the right persuasive value proposition, user onboarding, and ecosystem engagement, is necessary (Moungui et al., 2024). In healthcare services, digital marketing tools such as search engine optimization, social media, email marketing, websites, and mobile platforms can influence how patients search for information, compare service alternatives, communicate with providers, and evaluate service satisfaction (Al-Weshah et al., 2021; Zade et al., 2024). Evidence from dental service contexts further suggests that digital marketing can support patient awareness, improve patient communication, strengthen institutional visibility, and build trust, especially when digital tools present dental services in an interactive and accessible manner (Beltozar-Clemente et al., 2023; Ohanezova et al., 2024). Therefore, exploring patient needs in teledentistry is strategically important because these needs can guide service positioning, communication strategy, digital platform features, pricing, value propositions, and market segmentation for future teledentistry services.

Numerous studies have investigated the acceptability of telemedicine, satisfaction, and the technology of telemedicine. However, the focus remains on the adoption of telemedicine and technology on a macro level to assess its feasibility. Limited attention has been given to how patients themselves define their functional, emotional, informational, financial, and technical needs when considering teledentistry as a digital health service. Moreover, few studies have integrated UTAUT2 with a strategic digital marketing perspective to explain how patient needs can inform service positioning, communication strategy, pricing, platform design, and market segmentation. Closing this gap is essential, as the successful implementation of teledentistry relies on many factors, including the consumer's perception of the service as beneficial, convenient, affordable, and trustworthy, as well as the service meeting the consumer's needs and expectations. Therefore, this study aims to explore patient needs for teledentistry adoption using a UTAUT2-based qualitative approach from a strategic digital marketing perspective.

II. LITERATURE REVIEW

Technology acceptance theories provide a useful framework for understanding the factors that affect an individual's decision to use digital technologies in the healthcare system. In this respect, a prominent theory is the Unified Theory of Acceptance and Use of Technology (UTAUT), which was created by Venkatesh et al. in (2003), and focuses on the integration of different approaches

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to the acceptance of technology. The original version of the UTAUT proposed four primary constructs the use of technology, and they are: performance expectancy, effort expectancy, social influence, and facilitating conditions. These constructs answer whether an individual perceives a specific technology to be useful and easy to use, and whether they feel there is social and infrastructural support (Venkatesh et al., 2003).

In 2012, Venkatesh and colleagues expanded UTAUT into UTAUT2, giving it better application in consumer technology acceptance. In UTAUT2, three more elements were added: hedonic motivation, price value, and habit. Thus, UTAUT2 identified seven core components. The first four core components were carried forward from UTAUT. The remaining three are hedonic motivation, price value, and habit. Performance expectancy is the belief technology aids goal attainment. Effort expectancy is the perceived ease of the technology. Social influence is the belief important others are supportive of technology use. Facilitating conditions is the support/infrastructure available to use the system. Hedonic motivation is the pleasure derived from the technology use. Price value is the consumer judgment of the technology's worth. Habit is the drawn-from experience routine use of the technology.

For the adoption of teledentistry, UTAUT2 is appropriate because teledentistry is an innovation in both the clinic and the consumer side of a digital service. Patients may assess the clinical relevance of teledentistry, but they may also consider accessibility, the presence and use of the teledentistry platform, social support, costs, trust, and their experience with digital health services. In this case, performance expectancy may be when patients perceive the service as a means to obtain initial advice, describe their symptoms, and receive explanations on the way to and what a direct visit to the clinic may entail. Effort expectancy may be when patients expect an easy-to-use interface with straightforward consultation and the easy uploading of photos or videos, along with the use of WhatsApp or video calls. Social influence in this case may be dentists and other people making referrals, as well as previous users, and online reviews or clinic and hospital promotions. Finally, facilitating conditions may be the presence of a device, a stable Internet connection, and technical support to assist users with registration and provide clear guides and customer service.

Consumer-oriented models of UTAUT2 provide additional relevant constructs valuable in teledentistry. Price Value is relevant as patients may weigh the cost of an online consultation versus an in-clinic appointment, the cost of transportation, the time spent waiting, and the actual value of the feedback. Habit may impact the adoption of teledentistry if the patient is already accustomed to using telemedicine applications, online consultations, mHealth, e-Wallets, or communicating via WhatsApp. Although Hedonic Motivation may play a larger role in non-healthcare-focused entertainment or lifestyle technologies, in healthcare it may be present in the user's experience through the service's design. Using UTAUT2, we can better understand how potential patients assess teledentistry from the perspective of a healthcare service as well as a digital platform.

In health technology research, a range of factors, including perceived usefulness, perceived ease of use, social influence, trust, risk, and facilitating conditions, may impact the acceptance of a technology. Within the fields of telemedicine and health informatics, the Technology Acceptance Model, UTAUT, and UTAUT2 are frequently cited acceptance models for the adoption of digital health technology. In the context of teledentistry, acceptance research suggests that the intention to use teledentistry is impacted by factors related to the system, perceived usefulness, social influence, and perceived risk. For example, Bahanan and Alsharif (2023) showed that perceived social influence on the system has a direct positive impact on the intention to use teledentistry, and that perceived risk has a direct negative impact. Likewise, the recent studies on the acceptance of teledentistry by dentists have focused on the design of survey instruments based on UTAUT2, demonstrating that this framework is appropriate for the study of teledentistry.

Nevertheless, utilizing UTAUT2 in a healthcare context calls for understanding the context. General consumer technologies and teledentistry are different in a number of aspects such as clinical ambiguity, professional trust, personal health data, visibility constraints, and differentiating an online consultation from an in-person clinical interaction. This means UTAUT2 as a set of variables is not confined, but rather, can be used as a framework to assist in exploring the needs of patients and what they mean in the context of a qualitative inquiry. As such, UTAUT2 was applied in this instance as a framework to facilitate exploring the needs of patients in relation to the adoption of teledentistry. The UTAUT2 framework was used to focus the research on the dimensions of, and the data was free to incorporate other dimensions such as trust, privacy, emotional comfort, and service boundaries.

In the context of this study, the adoption of UTAUT2 was appropriate because, unlike other quantitative studies, the focus was to explore the perceptions of patients and dental professionals regarding the barriers and facilitators in the acceptance of teledentistry. From the perspective of strategic digital marketing, UTAUT2 can be employed to articulate the design of the service and its constituent parts in the context of patient acceptance. For instance, benefit clarity can be used to articulate the value of the service, the design of the service can reflect the level of effort required to engage the service, social considerations can shape the service offering, and the balance of price and value can influence the pricing and payment approach. Given these factors, UTAUT2 can be employed to impact patient retention.

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III. METHODOLOGY

A. Research Design and Context

This study employed an exploratory qualitative design to examine patient needs for teledentistry adoption from a UTAUT2-based and strategic digital marketing perspective. A qualitative approach was considered appropriate because the study aimed to explore patients' perceptions, expectations, concerns, and service-related needs in depth, rather than to measure statistical relationships between variables. Qualitative methods are suitable for investigating participants' experiences, meanings, and perspectives, particularly when the research seeks to understand how individuals interpret a phenomenon in their own context (Hammarberg et al., 2016). In healthcare research, this approach is also relevant when information is required directly from individuals experiencing or evaluating the phenomenon under investigation (Bradshaw et al., 2017). Therefore, this study focused on teledentistry as a digital health service in oral healthcare, particularly in relation to how patients evaluate its usefulness, ease of use, trustworthiness, perceived value, emotional comfort, and readiness for adoption.

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) was used as the guiding theoretical framework. In this study, UTAUT2 was not used to test hypotheses quantitatively, but rather to guide the development of interview questions and support the interpretation of the qualitative findings. A strategic digital marketing perspective was also applied to interpret how patient needs may inform service positioning, communication strategy, platform features, pricing, value proposition, and market segmentation for teledentistry services. The study was conducted in the context of dental healthcare service adoption at Padjadjaran Dental Hospital, Bandung, Indonesia, where teledentistry represents a developing digital service model in oral healthcare.

B. Participants and Sampling

Participants were selected using purposive sampling to ensure data were obtained from individuals directly relevant to the research objective. Purposive sampling was considered appropriate because qualitative studies commonly use this approach to identify information-rich participants who have knowledge, experience, or direct relevance to the phenomenon under investigation (Palinkas et al., 2015). In this study, the primary participants were dental patients or potential users of teledentistry who had experience seeking dental care and were able to describe their perceptions, expectations, concerns, and needs regarding online dental consultation.

In addition to patients, dentists were included as supporting informants. These supporting informants were not used as the primary basis for explaining provider readiness, but rather to enrich the interpretation of patient needs from a service-delivery perspective. Their involvement was intended to provide observational insights into patient behavior, common patient questions, service expectations, and barriers that may influence teledentistry adoption in dental healthcare settings.

The final sample size was guided by the principle of information power and data saturation. Information power was used to assess sample adequacy based on the specificity of the research aim, relevance of participants, use of the UTAUT2 framework, quality of interview dialogue, and the intended thematic analysis strategy (Malterud et al., 2016). Data collection was continued until data saturation was reached, indicated by the point at which additional interviews no longer generated substantially new themes or insights related to patient needs for teledentistry adoption (Saunders et al., 2018). A total of 6 participants were involved in this study, consisting of 2 patients and 4 dentists. Table 1 presents the inclusion and exclusion criteria for each participant group.

Table 1. Participant Eligibility Criteria and Supporting References

Participant Group	Inclusion Criteria	Exclusion Criteria	Supporting References
Patients/potential teledentistry users	(1) Adults aged 18 years or older; (2) had experience seeking dental care at a dental clinic or hospital; (3) had used or were familiar with basic digital communication technologies, such as mobile phones, messaging applications, video calls, or online health information; (4) were able to describe their perceptions, expectations, and concerns regarding online dental consultation; and (5) were willing to participate voluntarily and provide informed consent.	(1) Unable to provide informed consent; (2) unable to participate in the interview; or (3) had severe cognitive, communication, sensory, or physical limitations that prevented them from understanding and responding to the interview questions.	Briceño-Vergel et al. (2026); Bahanan and Alsharif (2023); VanDeWiele et al. (2025); Naik et al. (2025)

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Dentists	(1) Dental professionals who had experience providing or supporting dental services; (2) had direct interaction with patients in dental care settings; (3) were able to describe patient behavior, concerns, expectations, and service-related barriers relevant to teledentistry adoption; and (4) were willing to participate voluntarily and provide informed consent.	(1) Did not have direct interaction with patients; (2) were unable or unwilling to provide informed consent; or (3) were unable to participate in the interview.	Research-objective based; used as supporting informants to enrich patient-need interpretation
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C. Development of Interview Guide

The semi-structured interview guide was developed to ensure that the interviews remained focused on the research objective while allowing participants to express their perceptions, expectations, concerns, and experiences in their own words. Semi-structured interviews were considered appropriate because they provide a systematic yet flexible approach for exploring participants' perspectives, particularly when a study requires both theory-guided inquiry and openness to emerging themes (Kallio et al., 2016).

The development of the interview guide was informed by three main sources: previous literature on teledentistry adoption and dental technology acceptance, the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), and a strategic digital marketing perspective. UTAUT2 was used to guide the main interview domains, including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit (Venkatesh, Thong, et al., 2012). These constructs were adapted into open-ended questions to explore how patients perceived the usefulness, ease of use, social support, technical and service support, emotional comfort, affordability, and the potential for routine teledentistry use.

Additional domains were included to capture issues that are particularly relevant to teledentistry and digital healthcare services, such as trust, privacy, perceived risk, diagnostic confidence, service boundaries, and expectations for future service development. These additional domains were necessary because patients' willingness to use teledentistry may depend not only on technology acceptance factors, but also on their confidence in remote dental advice, comfort in sharing oral photographs, understanding of which cases are suitable for online consultation, and perception of the service as safe and reliable.

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Separate interview guides were prepared for patients and supporting informants. The patient interview guide focused on dental care experiences, awareness of teledentistry, perceived usefulness, ease of use, digital readiness, social influence, emotional comfort, price value, trust, privacy, service expectations, and willingness to continue using teledentistry. The dentist interview guide focused on their observations of patient behavior, common patient questions, patient concerns, service expectations, communication needs, perceived barriers, and opportunities for improving teledentistry services. The use of separate guides enabled the study to rely on patients as the primary source of data, while using supporting informants to enrich the interpretation of patient needs from a service-delivery perspective. Table 2 presents the interview guide domains and their theoretical alignment.

Table 2. Interview Guide Domains and Theoretical Alignment

Interview Domain	Main Construct/Perspective	Purpose of Questions	Representative Interview Questions
Dental care experience and awareness of teledentistry	Background context	To understand participants' previous dental care experiences, awareness of teledentistry, and prior exposure to online health services.	Patients: (1) "Can you describe your most recent experience visiting a dentist or dental clinic?"; (2) "Have you ever heard of teledentistry or online dental consultation?"; (3) "Have you ever used online health services before? If yes, how was your experience?"

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			Dentists: (1) “Can you describe your role in patient care at this clinic or hospital?”; (2) “How familiar are patients with teledentistry based on your observation?”
Perceived usefulness of teledentistry	Performance expectancy	To explore whether participants believe teledentistry can provide practical benefits in dental care.	Patients: (1) “What types of dental services do you think may be suitable for online consultation?”; (2) “In what situations would you choose online consultation rather than visiting the clinic directly?”; (3) “What problems in conventional dental care, such as waiting time, distance, or cost, might be helped by teledentistry?” Dentists: (1) “Based on your experience, what reasons do patients commonly express for wanting online dental consultation?”; (2) “What do patients usually expect from online consultation?”
Ease of use and digital accessibility	Effort expectancy	To understand whether participants perceive teledentistry platforms as easy or difficult to use.	Patients: (1) “What features do you think are important in a teledentistry service, such as video call, chat, appointment reminder, or photo upload?”; (2) “How confident are you in using digital applications or platforms for health consultation?”; (3) “Have you experienced difficulties when using online health services, such as unstable internet, complicated display, or unclear instructions?” Dentists: (1) “Have you ever helped patients access online consultation systems or online registration? What difficulties did they experience?”
Technical and service support needs	Facilitating conditions	To identify the resources and support patients need to use teledentistry successfully.	Patients: (1) “What device do you usually use to search for dental health information?”; (2) “What kind of assistance would help you use teledentistry more easily, such as guidance, customer service, or video tutorials?” Dentists: (1) “What kind of support do patients need to complete online consultation smoothly?”; (2) “How can clinics or hospitals make teledentistry more accessible for different patient groups?”
Social influence and information sources	Social influence/strategic digital marketing	To explore how other people, institutions, and communication channels influence patients’	Patients: (1) “Where did you first hear about online dental consultation?”;

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		willingness to use teledentistry.	(2) “What could encourage you to try teledentistry for the first time, such as dentist recommendation, promotion, or easier access?”; (3) “Who or what most influences your decision to use online dental services?” Dentists: (1) “How do patients usually find out about teledentistry?”; (2) “What communication approach do you think is most effective for explaining teledentistry to patients?”
Emotional comfort and user experience	Hedonic motivation/patient experience	To understand emotional and psychological factors that may affect teledentistry adoption.	Patients: (1) “What would make you feel confident or comfortable using teledentistry?”; (2) “Are there any things that make you hesitant or worried about online dental consultation?”; (3) “How can teledentistry still feel reassuring and warm even without direct face-to-face interaction?” Dentists: (1) “Have patients ever expressed fear or hesitation about using technology for dental consultation?”
Price value and payment preference	Price value	To explore how patients evaluate the cost, value, and payment convenience of teledentistry services.	Patients: (1) “What do you think about the cost of online consultation compared with direct visits to the clinic?”; (2) “What price range would you consider reasonable for online dental consultation?”; (3) “What payment method would be easiest for you?”; (4) “What would make teledentistry feel worth the cost?” Dentists: (1) “How do patients perceive the value or benefits of online consultation compared with direct visits?”; (2) “Have you heard patient complaints about cost or payment methods?”
Digital habit and continued use	Habit/behavioral intention	To examine whether existing digital habits influence regular use of teledentistry.	Patients: (1) “Have you previously used online health consultation services? If yes, how was your experience?”; (2) “What is the most important factor that would make you continue using teledentistry regularly?” Dentists: (1) “What patient characteristics or situations appear to make patients more interested in teledentistry?”
Trust, privacy, and perceived risk	Additional teledentistry consideration	To explore concerns that may influence acceptance	Patients:

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		beyond the original UTAUT2 constructs.	(1) “How confident would you feel if a dentist provided diagnosis or advice through an online platform?”; (2) “Would you feel comfortable sending photos of your teeth or mouth through an application or chat? Why?”; (3) “What would make you trust teledentistry, such as a known dentist, hospital reputation, or system security?” Dentists: (1) “What concerns do patients most often express about teledentistry, such as trust, accuracy, or data security?”; (2) “What factors most prevent patients from trying or continuing teledentistry?”
Service boundaries and future expectations	Strategic digital marketing/service design	To identify how teledentistry should be positioned and developed as a complementary dental service.	Patients: (1) “If you could design a teledentistry application, what features would you add?”; (2) “How do you think teledentistry could help improve dental healthcare services?”; (3) “What suggestions would you give to clinics or hospitals that want to provide teledentistry?” Dentists: (1) “What improvements or features could make patients more interested in using teledentistry?”; (2) “How can teledentistry complement, rather than replace, face-to-face dental care?”; (3) “What should clinics or hospitals focus on to meet patient needs for digital dental services?”

D. Data Collection

Data were collected through individual semi-structured interviews using the interview guides described in the previous section. The interviews were conducted online between October and November 2025. The online format was used to accommodate participant availability and to allow flexible participation without requiring physical attendance. Each interview lasted approximately 30–45 minutes.

Eligible participants were approached based on the inclusion and exclusion criteria described in Table 1. Before the interview, the researcher provided a brief explanation of the study's purpose, interview procedure, voluntary nature of participation, confidentiality protection, and participants' right to withdraw at any time. Informed consent was obtained before data collection. For participants unfamiliar with the term teledentistry, the researcher provided a brief, neutral explanation that teledentistry refers to the use of digital communication technologies to support dental consultation, education, follow-up, or referral without requiring all interactions to occur face-to-face.

The interviews were conducted using open-ended questions, with probing questions when further clarification was needed. Patient interviews focused on participants' dental care experiences, awareness of teledentistry, perceived usefulness, ease of use, digital readiness, social influence, emotional comfort, price value, trust, privacy, service expectations, and willingness to continue using teledentistry. Interviews with dentists focused on their observations of patient behavior, patient questions, perceived barriers, communication needs, service expectations, and opportunities for improving teledentistry services.

With participants' permission, interviews were audio-recorded to support accurate transcription. Field notes were also taken during or immediately after the interviews to document contextual information, notable participant responses, and researcher reflections. Data collection and preliminary review of interview notes were conducted iteratively, allowing emerging issues to be considered in subsequent interviews while maintaining consistency with the main interview domains.

E. Data Management and Transcription

All interview recordings were securely stored and organized immediately after data collection. Each participant was assigned an anonymous code to protect confidentiality, with patient participants coded as P1, P2, and dentist participants coded as D1, D2, D3,

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D4. Identifying information, including names, contact details, and institutional identifiers, that was not relevant to the analysis was removed from the transcripts.

The audio recordings were transcribed verbatim to preserve participants' original expressions and meanings. Field notes taken during or immediately after the interviews were reviewed alongside the transcripts to support contextual understanding of participant responses. The transcripts were then checked against the audio recordings to ensure accuracy before analysis.

As the interviews were conducted in Bahasa Indonesia, the initial transcription and coding were conducted in the original language to preserve the contextual meaning of participants' statements. Selected quotations used in the manuscript were translated into English after analysis. Translation was conducted with attention to conceptual equivalence rather than literal word-for-word translation, so that the meaning of participants' responses remained clear and accurate. All audio files, transcripts, field notes, and coding documents were stored in password-protected files accessible only to the research team.

F. Data Analysis

Data were analyzed using thematic analysis with NVivo software. Thematic analysis was selected because it provides a flexible and systematic approach for identifying, analyzing, and reporting patterns within qualitative data (Braun & Clarke, 2006). NVivo was used to organize transcripts, manage codes, store analytic notes, and support systematic comparison across participant groups. However, the interpretation of themes remained researcher-led and was guided by the study objective, the UTAUT2 framework, and the strategic digital marketing perspective.

The analysis began with repeated readings of the interview transcripts to become familiar with participants' narratives. Transcripts and field notes were imported into NVivo and organized by participant group: patient participants and dentist participants. Each transcript was assigned to the corresponding participant code, such as P1, P2 for patients and D1, D2, D3, D4 for dentists. Analytic memos were written during the familiarization process to record initial impressions, emerging ideas, and possible relationships between participants' responses and the research focus.

Coding was conducted using a combination of deductive and inductive approaches. Deductive coding was guided by the UTAUT2 constructs, including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit (Venkatesh, Thong, et al., 2012). Additional deductive codes were also created for teledentistry-specific and strategic digital marketing considerations, including trust, privacy, perceived risk, diagnostic confidence, service boundaries, communication channels, platform features, pricing, value proposition, and market segmentation. Inductive coding was then used to capture new meanings, concerns, expectations, or service-related needs that emerged directly from participants' narratives.

After initial coding, related codes were reviewed and grouped into broader categories and preliminary themes. NVivo was used to support this process through node organization, coding comparison, memo writing, and retrieval of coded excerpts. Patient interview data were the primary source for identifying patient needs, while dentist interview data served as supporting evidence to enrich and contextualize the interpretation of patient expectations, concerns, and barriers. Similarities and differences between patient and dentist perspectives were examined to identify converging and contrasting insights.

The preliminary themes were reviewed against the original transcripts to ensure that they accurately reflected participants' meanings. Themes were then refined, named, and interpreted in relation to the study objective. The final interpretation connected patient needs for teledentistry adoption with UTAUT2-based adoption factors and strategic digital marketing implications, including service positioning, communication strategy, digital platform design, price-value perception, and potential market segmentation. Representative quotations were selected to support the presentation of findings.

G. Trustworthiness of the Study

Trustworthiness was established by applying the criteria of credibility, dependability, confirmability, and transferability, as commonly used to evaluate rigor in qualitative research (Nowell et al., 2017). These criteria were applied throughout the thematic analysis to ensure that the findings were grounded in participants' narratives and that the analysis was conducted systematically, transparently, and traceably.

Credibility was supported through repeated engagement with the interview transcripts and field notes. The researcher read the transcripts several times to become familiar with the data's depth and breadth before coding. During analysis, coded excerpts and preliminary themes were repeatedly compared with the original transcripts to ensure that the interpretation reflected participants' meanings. Patient interviews were treated as the primary source of data, while dentist interviews served as supporting perspectives to enrich and contextualize the interpretation of patients' needs, expectations, concerns, and barriers related to teledentistry adoption. Representative quotations were selected to support the presentation of themes and demonstrate the connection between the findings and the original data.

Dependability was strengthened by maintaining a clear and consistent analytic procedure. The interview guide was developed based on the UTAUT2 framework, previous teledentistry adoption literature, and strategic digital marketing considerations. The coding process followed a combination of deductive and inductive approaches, and NVivo was used to organize transcripts, manage

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nodes, store analytic memos, and retrieve coded excerpts. Coding decisions, category development, theme refinement, and changes in interpretation were documented to create a clear record of how the analysis was conducted.

Confirmability was supported through the development of an audit trail. Raw data, transcripts, field notes, coding notes, analytic memos, and theme development records were systematically organized and stored. This documentation helped show how the findings were derived from the data rather than solely from the researcher's assumptions. Reflexive notes were also used to record the researcher's thoughts, methodological decisions, and emerging interpretations throughout the analysis. In addition, contrasting or negative views toward teledentistry were considered during coding and theme development to avoid presenting only favorable interpretations of adoption.

Transferability was enhanced by providing a detailed description of the study context, participant groups, eligibility criteria, interview procedure, and analytic framework. The study context, namely dental healthcare service adoption and teledentistry development, was described to help readers assess whether the findings may be relevant to other digital health or teledentistry settings. The distinction between patient participants and dentist participants was also explained to help readers understand how each group contributed to interpreting patient needs.

H. Ethical Considerations

This study was conducted in accordance with ethical principles for research involving human participants, including respect for autonomy, beneficence, non-maleficence, justice, privacy, and confidentiality (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979; World Medical Association, 2024). The use of the interview data analyzed in this article, which were collected as part of a preliminary study for the main research, was reviewed and permitted by the Research Ethics Committee Universitas Padjadjaran Bandung under approval number 269/UN6.KEP/EC/2026.

Participants were provided with detailed information regarding the study purpose, interview procedures, estimated interview duration, voluntary nature of participation, confidentiality safeguards, and the intended use of interview data for research publication. They were informed of their right to decline to answer any question or to withdraw from the interview at any stage without any consequences. Informed consent was obtained from all participants prior to data collection.

As the interviews were conducted online, participant privacy was maintained by ensuring that participants joined the interview from a setting that allowed them to speak comfortably and confidentially. With participants' permission, interviews were audio-recorded only for transcription and analysis purposes. No clinical treatment, diagnosis, or intervention was provided during the interview process.

Confidentiality was protected by assigning anonymous participant codes to all transcripts and research documents. Identifying information, including names, contact details, and unnecessary institutional identifiers, was removed from the transcripts. Audio recordings, transcripts, consent documentation, field notes, and coding files were stored securely in password-protected files accessible only to the research team.

IV. RESULT

A. Participant Characteristics

Six participants were included in the analysis, consisting of two patient participants and four dental informants. The patient participants represented the user-side perspective on teledentistry adoption, while the dental informants provided provider-observed insights into patients' needs, behaviors, and barriers to online dental consultation. Participant codes were used to preserve confidentiality.

Table 3. Participant Characteristics and Interview Context

Participant Code	Role	Analytical Representation	Main Relevance to The Study
P1	Patient	Digitally confident young adult patient	Provided patient-side expectations regarding trust, price value, platform usability, feature needs, and willingness to try teledentistry.
P2	Patient	Patient with prior telemedicine experience	Provided patient-side reflections on prior telemedicine use, convenience, payment preference, communication quality, and perceived value of online consultation.
D1	Dental informant	Provider-observed patient perspective	Described patients' low formal awareness of teledentistry, informal consultation behavior, screening needs, and the potential role of teledentistry for initial advice.
D2	Dental informant	Provider-observed patient perspective	Highlighted WhatsApp-based informal consultation, patient education needs, access/procedure gaps, preventive care potential, and promotion strategies.

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D3	Dental informant	Provider-observed patient perspective	Emphasized patient concerns about privacy, data protection, AI versus doctor verification, service boundaries, and the need for clear access procedures.
D4	Dental informant	Provider-observed patient perspective	Provided insights on patient comfort, visual communication barriers, KTP/data concerns, BPJS/registration assistance, and treatment explanation needs.

B. Overview of Coding Results

The NVivo-assisted thematic analysis generated 859 coded references across 16 parent nodes. The most frequently coded parent nodes were Perceived Usefulness, Service Boundaries, Future Service Development, Ease of Use, Price Value, Awareness of Teledentistry, Trust, Social Influence, Market Segmentation, and Information Needs. These parent nodes appeared across all six participants, indicating that perceived usefulness, service boundaries, awareness, trust, platform usability, value perception, and information clarity were central to patient needs for teledentistry adoption.

Table 4. Interview Context

Parent Node	Total Coded References	Participant Coverage	Interpretation
Perceived Usefulness	133	6/6	Teledentistry was perceived as useful for initial assessment, symptom discussion, quick advice, medication advice, patient education, follow-up, and reducing time or distance barriers.
Service Boundaries	90	6/6	Participants consistently positioned teledentistry as a complementary service rather than a replacement for direct examination or clinical dental procedures.
Future Service Development	82	6/6	Participants suggested features such as video calls, photo/video uploads, pharmacy integration, FAQs, an anatomy guide, reminders, clearer platforms, and stronger promotion.
Ease of Use	70	6/6	Participants emphasized the need for a simple, familiar, and easy-to-navigate platform that includes WhatsApp, video calls, a clear workflow, and a user-friendly interface.
Price Value	59	6/6	Teledentistry was considered valuable when it saved time, reduced travel, avoided queues, was affordable, or provided clear outcomes such as advice, prescriptions, or referrals.
Awareness of Teledentistry	56	6/6	Formal awareness of teledentistry remained limited, although informal online dental consultations were already occurring via WhatsApp or chat.
Trust	52	6/6	Trust was shaped by the doctor's and platform's credibility, professional communication, clear explanations, and confidence in the provider being a real dentist.
Social Influence	51	6/6	Social media, word of mouth, reviews, recommendations, and hospital or clinic promotion influenced awareness and willingness to try teledentistry.
Market Segmentation	50	6/6	Potential users included young adults, digitally confident users, busy workers, young mothers, students, distance-constrained patients, and patients seeking urgent advice.
Information Needs	48	6/6	Patients needed clearer information about access, procedure, doctor identity, payment, benefits, limitations, privacy, and service boundaries.

From these coding results, five integrated themes were developed: (1) limited formal awareness but existing informal teledentistry practice, (2) teledentistry as preliminary advice rather than treatment replacement, (3) trust through professional communication, provider verification, and data assurance, (4) simple, familiar, and visually supported digital access, and (5) strategic value through convenience, affordability, payment support, and marketing.

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C. Theme 1: Limited Formal Awareness but Existing Informal Teledentistry Practice

The first theme shows that formal awareness of teledentistry remained limited, although informal teledentistry practices were already present in patient-provider communication. Several dental informants observed that patients rarely asked directly whether “teledentistry” was available. Instead, patients tended to send complaints or ask questions via WhatsApp, chat, or by contacting someone they knew in dentistry. This suggests that patients may already engage in online dental consultations without recognizing them as teledentistry.

D1 explained that patients rarely explicitly asked whether online dental consultation was available, but they often communicated their complaints directly via chat. D2 similarly observed that some patients asked dental questions via WhatsApp but did not realize this could be considered teledentistry. D3 also stated that informal online consultation had occurred frequently, although it remained personal and lacked an official, structured platform. D4 added that most patients were less familiar with the term “teledentistry” and more likely to recognize the concept as “online dental consultation.”

This finding indicates a distinction between conceptual awareness and formal awareness. Patients may understand the idea of asking dental questions online, but they still need clearer information about whether a formal teledentistry platform exists, where to access it and how to use the service.

Table 5. Theme 1 Representative Quotations

Sub-theme	Quotation	Participant
Low formal awareness	“They are still not familiar with the term teledentistry, but indirectly they know that there are platforms or contacts that can be used for consultation.”	D1
Informal consultation practice	“Indirectly, they are already using teledentistry, for example by asking us through WhatsApp. They just do not realise that it is also a form of teledentistry.”	D2
Need for formal platform	“Officially through the RSGM Unpad teledentistry system, I have not found it. But unofficially, often.”	D3
Conceptual awareness without term	“Most patients are less familiar with the term teledentistry. They know it more as online dental consultation.”	D4

D. Theme 2: Teledentistry as Preliminary Advice rather than Treatment Replacement

The second theme shows that teledentistry was primarily perceived as a form of preliminary advice. Participants repeatedly described teledentistry as useful for initial consultation, symptom discussion, early assessment, medication or temporary advice, patient education, follow-up, and visit decision support. Patients wanted to know whether their dental condition required an immediate clinic visit, whether medication or temporary advice was sufficient, and what type of treatment might be needed.

Patient participants valued teledentistry as a means of reducing uncertainty. P1 described online consultation as useful for screening and determining whether a dental problem was severe enough to require a clinic visit. P2 similarly viewed online consultation as useful when patients only needed advice, medication, or an initial assessment before deciding to visit a clinic. Dental informants also supported this view. D1 described patients who wanted to know whether they needed to come directly to the dentist or could temporarily use medication. D3 added that teledentistry could support initial consultation, light follow-up, post-treatment instructions, and remote monitoring.

At the same time, all participants emphasized that teledentistry could not fully replace face-to-face dental care. Dental cases often require direct examination, clinical procedures, or better visibility than online consultation can provide. Participants repeatedly described teledentistry as complementary to conventional dental care rather than a substitute for clinical treatment.

Table 6. Theme 2 Representative Quotations

Sub-theme	Quotation	Participant
Initial assessment	“Online consultation can become an initial screening. Patients can know whether their condition needs a clinic visit or not.”	P1
Medication or temporary advice	“If I think I may only need advice or medication, online consultation is better than going back and forth to the clinic.”	P2
Visit decision support	“Patients usually ask first whether their condition needs to be examined by a dentist or whether medication is enough.”	D1
Complementary role	“For now, teledentistry is more appropriate as a complement. It is good for initial screening, but not to replace dental treatment.”	D1

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Direct treatment remains necessary	"If the patient eventually needs treatment, face-to-face care still cannot be replaced."	D2
Clinical limitation	"Dental and oral care without direct examination is less optimal."	D4

E. Theme 3: Trust through Professional Communication, Provider Verification, and Data Assurance

The third theme concerns trust. Trust was shaped by both professional and digital factors. Patient participants linked trust to doctors' credibility, reputation, ratings, reviews, communication quality, and the platform's perceived seriousness. P1 emphasized the need to know that the consulted provider was a legitimate doctor, not a fake or unverified one. P2 also stated that doctor availability and doctor credibility were central to the decision to use online consultation. A well-designed, professional-looking platform was also viewed as important, as the application or website is the first point of contact between patients and the service.

Dental informants added that some patients needed reassurance about diagnosis, data privacy, and provider identity. D3 expressed concern about whether the response would come from a real doctor or AI. D4 reported that some patients questioned why KTP or personal data were needed, and that one patient requested the deletion of a KTP photo after treatment. These findings indicate that trust in teledentistry depends not only on the dentist but also on transparent information about provider identity, data use, and data protection.

Communication quality also emerged as an important trust-building mechanism. Participants expected the online consultation to be clear, informative, respectful, empathetic, and unhurried. Poor communication, unclear answers, or overly fast consultation could reduce confidence and discourage continued use.

Table 7. Theme 3 Representative Quotations

Sub-theme	Quotation	Participant
Doctor verification	"As a patient who does not really understand the medical world, I want to see proof that the doctor I consult is really a doctor, not a fake doctor."	P1
Doctor credibility	"In the end, what matters is the doctor."	P2
AI concern	"There is also concern about whether the one answering is really a doctor or only AI."	D3
Data confidentiality	"Patients need to be told that their data are safe and protected."	D3
KTP/data concern	"There was a patient who asked what the KTP photo or personal data were for."	D4
Clear communication	"The communication must be informative. Dentists need to provide clear information because many patients do not yet understand oral health."	D4

F. Theme 4: Simple, Familiar, and Visually Supported Digital Access

The fourth theme shows that adoption depends on whether the digital service is easy to access, familiar, and visually supportive. Participants suggested that teledentistry should be available through simple and familiar channels, such as WhatsApp, websites, applications, chat, video calls, or social media. For younger users, digital platforms were generally viewed as acceptable. However, older patients were perceived as needing more assistance, clearer steps, and more visual guidance.

The need for guidance was repeatedly mentioned. Participants suggested step-by-step tutorials, visual guides, video tutorials, FAQ, help menus, and assisted registration. D3 and D4 emphasized that patients unfamiliar with applications may need direct explanation and step-by-step guidance. D4 specifically highlighted that older patients may be confused if instructions are provided only in text, so visual guides, posters, images, or videos would be helpful.

A specific challenge in dental consultation was visual communication. Unlike general health complaints, dental complaints often require visual inspection of the teeth or oral cavity. Several participants noted that patients may struggle to photograph the correct area, identify the tooth location, or provide a clear image. This finding supports the need for video calls, photo/video uploads, clear photo guidance, and an anatomy guide to help patients describe the location of the problem more accurately.

Table 8. Theme 4 Representative Quotations

Sub-theme	Quotation	Participant
Familiar channel	"WhatsApp can also be one of the media because almost everyone uses it."	D1
User-friendly platform	"If using an application, website, or certain platform, the system needs to be simple, easy to use, and user-friendly."	D3

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Step-by-step guidance	"I strongly agree if patients are given step-by-step guidance."	D3
Visual guidance	"For older patients, there needs to be a clear procedure or steps, for example through small posters, pictures, or videos."	D4
Photo difficulty	"Not everyone can take photos of their oral condition easily. Taking photos inside the mouth is difficult."	P1
Anatomy guide	"There needs to be simple information about dental anatomy. Sometimes patients are confused when we ask which tooth."	D4

G. Theme 5: Strategic Value through Convenience, Affordability, Payment Support, and Marketing

The fifth theme reflects the strategic digital marketing dimension of teledentistry adoption. Participants perceived teledentistry as valuable when it offered convenience, reduced waiting time and travel, saved transportation costs, and allowed patients to access consultations from home. Both patient participants expected online consultation to be more affordable than direct visits, or at least worth the cost if it provided clear advice, recommendations, medication, or referral.

Payment convenience was also important. P1 preferred multiple payment options, including bank transfer, QRIS, e-wallet, card payment, BPJS, or insurance, if the process was simple. P2 preferred transfer or QRIS because they were simpler and considered insurance confirmation potentially time-consuming. Dental informants also observed that QRIS and e-wallet payments were generally familiar to younger patients.

Promotion and social influence were also important for adoption. Participants mentioned social media (TikTok, Instagram, YouTube), hospital social media, posters, flyers, word of mouth, reviews, and previous user recommendations as potential sources of awareness and influence. D2 suggested TikTok as an effective channel because of its broad reach. D3 suggested digital education through TikTok or Instagram. P2 was more cautious toward online endorsement and considered word of mouth from friends more convincing than paid promotion. Promotion strategies such as free initial consultation, loyalty points, discounted online registration, and soft advertisement were also suggested to encourage first-time use.

Table 9. Theme 5 Representative Quotations

Sub-theme	Quotation	Participant
Convenience value	"Practicality is number one."	P2
Time and travel saving	"Online consultation can save time because patients do not need to queue, and it can save costs because they do not need to travel far."	P1
Affordable price	"Online consultation should be cheaper because technology should make things easier and reduce cost."	P2
Outcome-based value	"They will be more satisfied when there is a concrete result, such as medication or a recommendation that can be directly used."	D2
Payment support	"The easiest method may be bank transfer or QRIS. E-wallet is also fine."	P2
Social influence	"Word of mouth from friends who have used the service is very influential."	P2
Soft promotion	"Soft advertisement is more appropriate, for example a scaling promotion through online registration."	D2

Overall, the results indicate that patients' needs for teledentistry adoption are multidimensional. Patients and dental informants did not position teledentistry as a replacement for face-to-face dental care. Instead, they consistently viewed it as a complementary service that can support early screening, symptom discussion, treatment explanation, medication or temporary advice, follow-up, and visit decision-making.

The findings also show that adoption depends on more than clinical usefulness. Patients need a clear, trusted access pathway, verified providers, transparent data protection, simple payment options, a user-friendly design, familiar communication channels, and a strong social media presence. From a strategic digital marketing perspective, teledentistry should therefore be positioned as a practical, accessible, trusted, and value-adding service that helps patients make better decisions before seeking direct dental care.

V. DISCUSSION

A. Principal Findings

Participants consistently described teledentistry as a service that complements, rather than replaces, conventional dental care. They perceived its primary role to be supporting initial consultation, symptom discussion, preliminary assessment, treatment explanation, temporary advice or medication guidance, follow-up care, and determining whether an in-person dental visit was necessary. These findings are consistent with previous studies suggesting that teledentistry is most appropriately implemented as an adjunct to face-to-face dental care by facilitating triage, remote communication, follow-up consultations, and improving access to dental services while enhancing service efficiency (Menhadji et al., 2021). Furthermore, this interpretation aligns with the broader conceptualization of teledentistry as a digital health approach that supports screening, treatment planning, patient monitoring, and coordination of oral healthcare through information and communication technologies, with the overarching goal of improving access to and the quality of oral healthcare services.

Five main findings emerged from the analysis. First, formal awareness of teledentistry remained limited, although informal teledentistry practices were already occurring through WhatsApp, chat, and personal communication with dental professionals. Second, teledentistry was primarily perceived as a source of preliminary advice and guidance rather than a replacement for conventional dental treatment. Third, trust was shaped by professional communication, provider verification, platform credibility, and assurance regarding personal data protection. Fourth, participants emphasized the importance of simple, familiar, and visually supported digital platforms that were easy to navigate. Fifth, the perceived strategic value of teledentistry was associated with convenience, affordability, flexible payment options, social influence, and effective digital marketing.

Collectively, these findings indicate that patient adoption of teledentistry is not determined solely by technological readiness. Rather, adoption depends on whether patients understand the service, trust its providers, perceive meaningful benefits, feel capable of using the platform, and consider the service to provide practical value compared with conventional face-to-face care. These findings reinforce the applicability of UTAUT2, particularly the roles of performance expectancy, effort expectancy, social influence, facilitating conditions, and price value as key determinants of technology acceptance (Venkatesh et al., 2012). However, the findings also demonstrate that these constructs alone do not fully explain patient adoption in the context of teledentistry. Trust, privacy and data security, emotional comfort during remote consultation, and a clear understanding of the clinical boundaries of teledentistry emerged as complementary dimensions that shape patients' acceptance decisions. These findings suggest that extending UTAUT2 with healthcare-specific relational and contextual factors may provide a more comprehensive explanation of teledentistry adoption from both patient and provider perspectives.

B. Teledentistry Awareness: From Informal Practice to Formal Service Recognition

One of the most important findings of this study is the discrepancy between informal practice and formal recognition of teledentistry. Both patients and dental providers described that online dental communication was already taking place through WhatsApp, chat applications, and personal contact with dental professionals. However, these interactions were rarely recognized as teledentistry. This suggests that the primary adoption challenge is not simply introducing a new digital health service, but rather formalizing, standardizing, and effectively communicating a practice that patients already perceive as an ordinary form of informal consultation.

This finding is particularly relevant in the Indonesian context. Previous studies have reported that Indonesian dentists generally perceive teledentistry as a useful approach to improving access to oral healthcare, although concerns regarding implementation, regulation, and clinical practice remain (Soegyanto et al., 2022). The present study extends this evidence by incorporating the patient perspective and demonstrating that awareness of the formal concept of teledentistry has not kept pace with existing digital communication behaviours. Although many participants were already comfortable seeking preliminary advice through online communication, they remained uncertain about where to access an official teledentistry service, who would provide the consultation, which conditions were appropriate for remote assessment, how the consultation process would be conducted, and how personal information would be protected.

From a strategic digital marketing perspective, these findings suggest that awareness-building should focus on communicating the service concept rather than merely promoting the term teledentistry. Patient-friendly terminology, such as online dental consultation or *konsultasi gigi online*, may provide a more accessible entry point before gradually introducing the formal concept of teledentistry. More importantly, communication strategies should clearly position teledentistry within the patient journey by explaining what the service offers, when it should be used, who provides the consultation, and how it complements rather than replaces conventional dental treatment. Accordingly, effective digital marketing should extend beyond promotional activities to include service education, transparent access pathways, and expectation management, thereby reducing uncertainty and facilitating informed adoption.

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C. Performance Expectancy: Usefulness as Initial Assessment, Guidance, and Access Support

The strongest theme emerging from this study was perceived usefulness, which closely corresponds to the performance expectancy construct of UTAUT2. Participants consistently perceived teledentistry as valuable because it enabled them to obtain initial professional guidance, discuss symptoms, understand possible treatment options, receive temporary advice or medication guidance, and decide whether an in-person dental visit was necessary. These findings support the definition of performance expectancy proposed by Venkatesh et al. (2012), which describes users' belief that a technology will help them achieve valued outcomes. However, the present findings further suggest that, within the context of teledentistry, these valued outcomes extend beyond clinical diagnosis to encompass reassurance, informed decision-making, and improved navigation of the patient care pathway.

Rather than expecting teledentistry to replace conventional dental treatment, both patients and dental providers viewed it as a decision-support service that reduces uncertainty before clinical care. Participants emphasized practical outcomes such as determining whether symptoms were serious, understanding whether medication or self-care was sufficient, avoiding unnecessary clinic visits, and feeling better prepared before attending face-to-face consultations. This finding indicates that the perceived usefulness of teledentistry lies primarily in its ability to facilitate informed healthcare decisions rather than to provide definitive treatment remotely.

The findings also demonstrate that perceived usefulness is closely linked to healthcare accessibility. Participants described teledentistry as a means of reducing travel time, avoiding unnecessary waiting, improving convenience for individuals with busy schedules, and increasing access for patients living far from dental facilities. These perceptions are consistent with previous evidence showing that teledentistry can improve access to oral healthcare, facilitate screening and patient monitoring, and enhance the efficiency of oral health service delivery through digital communication technologies. In the Indonesian context, Amtha et al. (2021) likewise reported high levels of patient satisfaction with teledentistry during the COVID-19 pandemic, with convenience, accessibility, and communication identified as important contributors to positive patient experiences. Collectively, these findings suggest that performance expectancy in teledentistry is driven not only by expected clinical outcomes but also by patients' perceptions that the service improves access to professional advice, reduces barriers to care, and supports timely and informed decision-making before direct treatment.

D. Service Boundaries: Teledentistry as Complement, Not Replacement

Although participants recognized the usefulness of teledentistry, they also clearly identified its limitations. Dental care often requires direct visual inspection, tactile examination, radiographs, and clinical procedures. Participants repeatedly stated that teledentistry is suitable for consultation, screening, education, follow-up, and simple complaints, but not for cases requiring direct examination or treatment procedures.

This finding is important because patient adoption depends not only on perceived usefulness, but also on perceived service boundaries. If patients overestimate what teledentistry can do, they may become disappointed when online consultation cannot solve their problem. Conversely, if they underestimate it, they may avoid using the service even when it could help them obtain initial guidance. Previous studies have similarly noted that teledentistry can be accepted by patients and dentists, but its role must be understood within the limits of remote assessment and clinical suitability (Menhadji et al., 2021; Talla et al., 2024).

The findings suggest that service-boundary information should become part of the adoption strategy. Patients need to understand that teledentistry can help with early assessment, symptom discussion, treatment explanation, pre-visit instruction, post-treatment follow-up, and referral decisions. At the same time, the service should transparently state that direct examination and clinical procedures still require face-to-face care. This balanced positioning can protect patient safety, manage expectations, and strengthen trust in the service.

E. Effort Expectancy and Facilitating Conditions: Simple, Familiar, and Visually Guided Access

The findings also support the relevance of effort expectancy and facilitating conditions. Participants emphasized that teledentistry platforms should be simple, familiar, easy to navigate, and supported by clear guidance. WhatsApp, websites, mobile applications, video calls, chat, FAQ menus, step-by-step instructions, visual guides, and assisted registration were repeatedly mentioned as important supports.

This finding indicates that patients may be willing to use teledentistry if the access process feels familiar and low-effort. In UTAUT2, effort expectancy refers to the perceived ease of using a technology, while facilitating conditions refer to the perceived availability of resources and support required to use the technology (Venkatesh et al., 2012). These constructs are highly relevant in this study because participants did not only discuss whether teledentistry was useful, but also whether patients could easily access and understand the service.

For digitally confident users, a well-designed application or website may be sufficient. However, for older patients or users with lower digital literacy, additional support is needed. This includes simple language, visual tutorials, posters, videos, and assistance

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during registration. This aligns with acceptance research showing that perceived ease of use, facilitating conditions, trust, and perceived risk are important considerations in teledentistry adoption (Bahanan & Alsharif, 2023).

A specific issue in teledentistry is the difficulty of visual communication. Participants described that patients may struggle to take clear photos of the mouth, identify the affected tooth, or describe the exact location of pain. This finding is particularly important in dentistry because oral conditions are often difficult for patients to document without guidance. Therefore, teledentistry platforms should include photo-taking instructions, video call options, tooth-location guides, and simple dental anatomy visuals. These features can reduce misunderstanding and improve the quality of online consultation.

F. Trust, privacy, and emotional comfort as adoption conditions

Trust emerged as a central condition for adoption. Participants indicated that patients need to know who the dentist is, whether the provider is legitimate, whether the platform is official, and whether the consultation is handled professionally. Trust was also influenced by the perceived quality of communication. Patients expected the dentist to provide clear, respectful, empathetic, and non-rushed explanations.

This finding suggests that trust in teledentistry is both relational and technological. Relational trust is built through the dentist's credibility, communication, empathy, and ability to explain the patient's condition clearly. Technological trust is built through the platform's credibility, interface quality, provider verification, data protection, and transparency. This supports previous findings that perceived risk can be a major barrier to teledentistry adoption, while social influence and trust-related perceptions can shape intention to use the service (Bahanan & Alsharif, 2023).

Privacy and data security also appeared as important concerns. Participants mentioned discomfort about sending oral photos, concerns about personal data or KTP use, fear of data misuse, and questions about whether the response comes from a real doctor or AI. These concerns are consistent with Indonesian evidence showing that dentists perceive teledentistry as useful but remain concerned about issues such as digital forgery and technical barriers (Soegyanto et al., 2022). They are also consistent with broader digital health literature showing that confidentiality, privacy, and security remain important concerns in mobile health services (Alhammad et al., 2024).

These findings suggest that privacy assurance should not be treated as a technical back-end issue only. It should be communicated clearly to patients before consultation begins. Patients should know what data are collected, why the data are needed, who can access them, how long they are stored, and whether they can request deletion. Emotional comfort also played an important role. Teledentistry can reduce panic and help patients feel more certain before visiting the clinic. However, it can also create concern if the patient cannot explain symptoms clearly or if the provider seems rushed. Therefore, successful teledentistry should combine clinical guidance with humanized communication.

G. Social Influence and Strategic Digital Marketing

The findings also highlight the role of social influence. Participants mentioned word of mouth, recommendations from friends or family, previous user experiences, doctor recommendations, social media, reviews, and hospital promotion as factors that shape awareness and willingness to try teledentistry. This finding supports the relevance of the social influence construct in UTAUT2 (Venkatesh, et al., 2012). It is also consistent with Bahanan and Alsharif (2023), who found that social influence positively affected intention to use teledentistry services.

From a strategic digital marketing perspective, social influence should be managed through credible and educational communication. Participants suggested TikTok, Instagram, YouTube, hospital social media, posters, flyers, and soft advertisements. However, patient participants also showed caution toward paid endorsement or unclear online promotion. This suggests that teledentistry marketing should prioritize trust-building content rather than aggressive selling.

Effective marketing should explain the practical benefits, access procedure, service boundaries, doctor identity, payment process, privacy protection, and examples of suitable cases. Social media content can be used not only for promotion, but also for digital health literacy. For example, short educational videos can explain when online dental consultation is appropriate, how to take oral photos, what information patients should prepare, and when they should visit the clinic directly. Because dental care involves clinical risk and personal health data, patients may be more willing to use teledentistry if the service is associated with a trusted institution. Therefore, official hospital social media, verified dentist profiles, and institutional branding may strengthen adoption.

H. Price Value, Payment Preference, and Continued Use

Price value was another important adoption factor. Participants expected teledentistry to be cheaper than direct consultation or at least clearly worth the cost. The perceived value of teledentistry was linked to time saving, reduced transportation costs, avoiding queues, receiving clear advice, obtaining prescriptions, and getting actionable recommendations. This supports the price value construct in UTAUT2, which is especially relevant in consumer technology contexts where users evaluate whether the benefits justify the cost (Venkatesh et al., 2012).

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The findings suggest that patients may not reject paid teledentistry if the value is clear. However, they need transparent pricing and concrete outcomes. If online consultation only feels like a short conversation without clear advice, patients may perceive it as less valuable. In contrast, if the consultation provides clear explanations, treatment direction, medication advice, referral, or follow-up instructions, patients are more likely to see it as worth paying for. This is consistent with literature suggesting that teledentistry can improve access and efficiency, although its implementation should consider patient safety, cost, and quality of care (Talla et al., 2024).

Payment simplicity also matters. Participants mentioned bank transfer, QRIS, e-wallet, BPJS, private insurance, and easy claims as possible payment supports. However, the process should not be complicated. A payment system that is technically available but difficult to understand may reduce the perceived convenience of teledentistry. Therefore, payment design should support the overall value proposition: practical, simple, transparent, and affordable.

Continued use was associated with satisfaction, problem resolution, easy access, trusted providers, and payment support. This is consistent with UTAUT2, which positions habit and previous experience as important factors in continued technology use (Venkatesh et al., 2012). In this study, habit formation appears to depend on whether the first experience is useful, clear, easy, and trustworthy. If the first consultation is helpful and low-effort, patients may be more willing to reuse the service for future dental concerns.

CONCLUSIONS

The findings suggest that teledentistry adoption depends on a combination of clinical usefulness, clear service boundaries, trust, privacy assurance, ease of use, affordability, payment convenience, and effective socialisation. Patients and dental informants viewed teledentistry as a valuable complement to face-to-face dental care, especially for initial consultation, symptom discussion, education, follow-up, and visit decision support. However, adoption requires more than platform availability. Teledentistry must be clearly explained, professionally delivered, easy to access, visually supported, financially reasonable, and institutionally trusted. From a strategic digital marketing perspective, teledentistry should be positioned as a practical, safe, and value-adding service that helps patients understand their dental condition and make better decisions before seeking direct dental care.

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