Examining the Impact of the dimensions of TAM theory on Patient Satisfaction mediated by patient centricity

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ABSTRACT:
Provide a concise summary of the study, including background, objectives, methods, key results, and conclusion.
The swift use of telemedicine has revolutionized healthcare delivery, especially in technologically advanced health systems like the United Arab Emirates. This study examines the influence of telemedicine service quality and the characteristics of the Technology Acceptance Model (TAM) on patient satisfaction, with patient centricity analyzed as a mediating variable. Data were gathered from 478 outpatient users of telemedicine services at four public hospitals in Dubai. Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized. Findings demonstrate that functional quality, patient cognition, medical costs, and perceived utility greatly impact patient satisfaction, although technical quality does not have a direct effect. Patient centricity substantially mediates all relationships. The research enhances digital health literature by synthesizing the Technology Acceptance Model, SERVQUAL, and patient-centric frameworks.

Keywords: Telemedicine, Patient Satisfaction, Technology Acceptance Model, Patient Centricity, Service Quality.

1. Introduction

The ultimate goal for business continuity is satisfying their clients, and in healthcare sector the customers are the patients. Thus, the leadership in healthcare sector have to keep investigating the impact of information technology such as telemedicine on the level of their patient's satisfaction. Also, the possibility of enhancing patient satisfaction by utilizing patient centricity approach.

Literature on patient satisfaction has gained a lot of attention in the last two decades since it provides healthcare professionals and management with the opportunity to improve healthcare services (Poksinska et al., 2017; Wenxin et al., 2020). Patient satisfaction fulfilment resulted in improving patient's lives because patient centricity provides profound understanding for their clinical status (Yeoman et al., 2017). Hence, customer-centricity is being outlined as a fundamental strategic objective in businesses across numerous industries

throughout the world (Shamoon, & Bosnic, 2022). However, many organizations still struggle to put customer centricity into practice (Shamoon, & Bosnic, 2022).

Patient centered care is the most obvious from the perspective of the customer that has been affected by recent technological advancements such as telemedicine. Likewise, rapid technological advancements have had a tremendous impact on emerging countries' health systems (Al-Samarraie, et al., 2020; Sarsam et al., 2020). International Trade Administration U.S. Department of Commerce in 2022 reported that healthcare industry could undergo a transformation because to digitalization and telemedicine. Subsequently, remote monitoring and consultation solutions will probably dominate the healthcare industry in the future because to the adoption of online collaboration tools and platforms because of the Covid-19 pandemic (United Arab Emirates - Healthcare & Life Science, 2022). It has been demonstrated that telemedicine, e-health, telehealth, and mobile health all reduce medical errors and expenses (Al-Samarraie et al., 2020; Sarsam et al., 2020). Telemedicine has permitted widespread implementation of optimal healthcare practices in developed nations, particularly in Europe (Al-Samarraie et al., 2020; Sarsam et al., 2020).

Prominently, hospitals use patient satisfaction as a widely accepted standard to measure the quality of their services (Manzoor et al, 2019; Afrashtehfar et al., 2020). Patient feedback has become an important factor in determining treatment options and the quality of healthcare (Manzoor et al., 2019; Afrashtehfar et al., 2020). As a result, the opinions of patients on the provision of healthcare have gained greater prominence and have evolved into a crucial component of any healthcare system, particularly in public hospitals where they are used as a key metric for assessing the effectiveness of service delivery (Manzoor et al., 2019; Afrashtehfar et al., 2020).

The UAE government aims to increase the number of people traveling there for medical treatment (The U.S.-U.A.E. Business Council 2021). Additionally, the pandemic's disruption of travel significantly reduced foreign patient care, a crucial aspect of the U.S.-UAE partnership, and strengthened the UAE's resolve to strengthen its domestic healthcare system. Also, the UAE had allocated special week during the EXPO 2020 event for health and wellness in January 2022 for exploring the future if healthcare industry. In addition, the UAE government has designated healthcare as a priority sector in its Vision 2040, and the nation will remain to be a prime location for the establishment of a district distribution hub for healthcare services (The U.S.-U.A.E. Business Council 2021). In the upcoming years, the market for healthcare information technology in the UAE is projected to expand quickly. Moreover, the pandemic continues to present chances for the expansion of the telehealth and medical industries, which are fueled by remote medical services provided by technological platforms. To improve alternatives for tele-based healthcare, the Ministry of Health is collaborating with Emirates Integrated Telecommunication Company PJSC ("Du"). These included "Virtual Hospitals," where medical professionals could treat patients remotely while using AI, smart devices, and monitoring (The U.S.-U.A.E. Business Council 2021).

To survive in an increasingly competitive healthcare industry, the industry is putting more emphasis on marketing than ever before, but it's unfortunate that there isn't more evidence to back up this assertion (Anderson et al., 2018). Argumentatively, health care professionals have an exiguous understanding of patients' experiences and satisfaction perceptions (Afrashtehfar et al., 2020). Certainly, patients' satisfaction has been the subject of numerous studies, but the results are still unsatisfactory (Abdulwahab & Zedan, 2021). Contradictory evidence has been found in various studies on patient satisfaction (Batbaatar et al., 2016). Shilpa, (2016) have concluded in their study that continuing to focus on patient satisfaction as a measure of service outcome and service delivery is seriously imperfect.

In this study will fill the gap in the previous literature by highlighting whether there is an impact of telemedicine on patient satisfaction mediated by a patient-centric approach in the hospitals located in Dubai. This study aims to analyze the correlation between telemedicine with different modalities whether audio or video consultation conducted for the outpatient clinics within public hospitals in Dubai. The research will adapt patient centricity approach as mediating variable using technology acceptance model (TAM) that consists of two main domains: (1) perceived usefulness and (2) perceived ease of use of the new technology.

1.1 Hypotheses development

Technical quality analyses what is delivered, such as clinical accuracy, safety, effectiveness, and the performance of the digital channel itself. Expert frameworks for virtual care stress the importance of monitoring the success rates and functioning of technical components, as well as clinical outcomes, equity, and financial impact. This makes technical reliability the most important factor in determining experience and satisfaction (Hussain et al., 2024; Aboumoussa et al., 2025). Comparative assessments indicate that, when technical execution is robust (stable audio/video, sufficient examination alternatives, suitable triage), virtual visits can attain experience scores comparable to in-person care across various specialities. Conversely, deficiencies in connection stability or device compatibility diminish satisfaction, even with effective clinician communication (Demaerschalk et al., 2022). Thus, this leads to the following hypothesis:

H1: Technical Quality has a significant positive impact on patient satisfaction.

H2: Technical Quality has a positive impact on patient centricity

H.3: Patient Centricity mediates the relationship between technical quality and patient satisfaction.

Functional quality in health care services investigates how care is provided, and SERVQUAL's five dimensions listed below are often used to measure this. First of all, Tangibility (for example, how the app looks and feels, how clear the instructions are, and how well the peripherals work, like camera). Secondly, Reliability (connections that work every time, information that flows correctly, and follow-ups that you can count on). Thirdly, Responsiveness (how quickly you can make an appointment, how long you have to wait to connect, and how quickly you get callbacks and secure messages). Fourthly, Assurance (competence of the clinician shown through video, clear explanations of privacy protections). Finally, Empathy (being warm, understanding different cultures and languages, and listening actively). A recent human-factors study confirms that these are still the most important quality dimensions in digital care. Telemedicine-specific models, on the other hand, group them with platform and outcome quality as part of interaction quality. In structural models, service quality leads to satisfaction, which in turn leads to the intention to reuse (Amin et al., 2022; Laheba et al., 2025). Research collected from hospital and ambulatory health care facilities setting indicates that responsiveness, tangibility, and assurance significantly impact experience and satisfaction scores aligning with SERVQUAL's principles while being tailored to virtual touchpoints (e.g., queue transparency, audio/video clarity as indicators of competence (Amin et al., 2022; Laheba et al., 2025). Thus, this leads to the following hypothesis:

H4: Functional Quality has a positive impact on patient satisfaction

H5: Functional quality has a positive impact on patient centricity

H.6: Patient Centricity mediates the relationship between Functional quality and patient satisfaction.

Patient cognition encompasses awareness, and information and technology skills, motivation,

demand, perceived cost and the level of trust in web-based services (Hage et al., 2013; O'Connor et al., 2016; Du et al., 2022). Furthermore, Lu et al. (2021) denoted that the structure of customer perception is complete and attention must be paid to cognition aspect. Other research implied that patient cognition comprehends patients' beliefs and evaluations regarding telemedicine, including perceived usefulness, ease of use, trust, enjoyment, and confirmation of expectations as articulated by the Technology Acceptance Model (TAM). Perceived usefulness and ease of use which are the components of TAM, are the main cognitive aspects which impact the patient's willingness to use digital health platforms such as telemedicine, both of which have been demonstrated to predict telemedicine satisfaction in recent studies (Aldogiher & Halim, 2025).

Correspondingly, previous systematic reviews suggested that cognitive understanding might have a contextual rather than causal role (Aldogiher & Halim, 2025). Simultaneously, patient-centered communication (a behavioural manifestation of patient-centricity) consistently enhances perceived service quality and patient satisfaction, suggesting a potential mediating role: when functional and technical quality is provided in a manner that patients perceive as aligned with their goals, preferences, and context, satisfaction rises (Yuen et al., 2024). On the other hand, previous research exposed the strong impact of patient cognition on patients' satisfaction (Hoque et al., 2017). Thus, this leads to the following hypothesis:

H.7: Patient Cognition has a positive impact on patient satisfaction

H.8: Patient Cognition has a positive impact on patient centricity

H.9: Patient Centricity mediates the relationship between Patient Cognition and Patient Satisfaction

No doubt telemedicine has progressively been highlighted as a tool of cost effective and a factor to enhance the patient's cantered model of health care due to its advantage of decreasing the medical expenses while promoting the accessibility to health care service and increasing the level of satisfaction (Atmojo et al., 2020; Ong et al., 2024). Healthcare expenses are important in both direct ways (like financial contributions along with information costs) and indirect ways (like travelling, leave requests from the work, and guaranteeing childcare) (Demaerschalk et al., 2022).

Modern virtual-care frameworks consider economics as a fundamental aspect; empirical studies demonstrate cost efficiencies through decreased travel, fewer emergency department visits, and shorter hospitalizations—factors that patients recognise and appreciate, thereby enhancing satisfaction (Demaerschalk et al., 2022). This is aligned with the previous studies held in United Arab Emirates and Kingdom of Saudi Arabia which revealed the effectiveness of telemedicine to reduce the cost of tavel, parking , disturbance to duty which contributed positively to the patient satisfaction (Alanazi & Hader, 2022).

Conversely, Abdulwahab and Zedan (2021) have noticed that long-term engagement or intention to continue utilizing the telemedicine services is not impacted significantly by fee value, though affordability continues to remain an important level of satisfaction. From diverse and varied studies, the literature has demonstrated that economic rationality has conceptualized cognitive trust in service fairness, though eliminating travel, saving time and cost savings raise emotional well-being and perceived accessibility. Thus, this leads to the following hypothesis:

H.10: Medical Expenses have a positive impact on patient satisfaction

H.11: Medical Expenses have a positive impact on patient centricity

H.12: Patient Centricity mediates the relationship between Medical Expenses and Patient Satisfaction

TAM highlights the design gaps of the information system before its employment becomes prevalent among people (Kamal et al., 2020). The purpose of TAM was to serve as a structure for analyzing a broad spectrum of technological users' behaviors while upholding a frugal approach (Marikyan, & Papagiannidis, 2022). TAM has taken over as the standard type for analyzing the variables influencing users' acceptance of cutting-edge technical solutions (Rahimi et al., 2018). The fundamental model presupposes that perceived usefulness and simplicity of use perform a mediating function in the relationship amidst system attributes (external variables) and system utilization (Rahimi et al., 2018).

In several previous studies, multi-item measures for perceived usefulness (PU) and perceived ease of use (PEU) were constructed, tested beforehand, and validated based on prior experimental research on human interaction and information system management (Aldogiher & Halim, 2025). Due to data from earlier study, it was anticipated that the two constructions were crucial predictors of user approval. According to research, an individual's decision to engage in behavior is the result of an evaluation of the benefit they anticipate from the conduct in relation to the time and money it will take to engage in the behavior. This means that an assessment of the trade-off between the system's perceived usefulness and its perceived difficulty in usage determines how the information system is used. The term "perceived usefulness" (PU) refers to a person's assessment of how much using a particular technology enhances performance. The operationalization of perceived usefulness (PU) was based on data demonstrating how system performance expectations affect system use. Perceived ease of use (PEU) measures how simple a user perceives using a particular technology to be. This construction is developed from the idea of self-efficacy, which denotes a situation-specific opinion of how well a person can carry out actions for a potential task. Self-efficacy was said to have a predicative influence in choosing how to use technology. Additionally, perceived ease of use (PEU) and the complexity factor, which is a hindrance to innovation adoption according to the literature on innovation diffusion, were. It was described as the extent to which people find the innovation challenging to comprehend and apply. By examining the interaction between the self-reported use of the information system and the two suggested elements in the organizational environment, the constructs' validity and reliability were evaluated. The created scales displayed exceptional psychometric qualities (Marikyan, & Papagiannidis, 2022). Thus, this leads to the following hypothesis:

H.13: Perceived Usefulness has a positive impact on patient satisfaction

H.14: Perceived Ease of Use has a positive impact on patient satisfaction

H.15: Perceived Usefulness has a positive impact on patient centricity

H.16: Perceived Ease to Use has a positive impact on patient centricity

H.17: Patient Centricity mediates the relationship between Perceived Usefulness and Patient Satisfaction

H.18: Patient Centricity mediate the relationship between Perceived Ease of Use and Patient Satisfaction

Patient centricity care, which has been defined by Winefield et al. (1996) as ‘value of people as individuals’, is thought to be the best method of delivering healthcare (Thomas et al., 2017). The phrase ‘person-centered’ refers to the fundamental idea that the individual occupies the central position in a partnership that is mutually respectful and beneficial (Thomas et al., 2017).

Patient-centered care, according to the Institute of Medicine, is described as giving treatment that respects and takes into account each patient's unique preferences, desires, and values and ensuring that patient values inform all clinical decisions (Siebinga et al., 2022). Based on the definition stated by the Institute of Medicine,

patient centricity care can be explained as the healthcare that creates a collaboration between clinicians and patients to guarantee that decisions respect patients' wants, needs, and preferences and that patients are sufficiently informed and supported to make decisions and participate in their own care (Bodegård et al., 2019; Siebinga et al., 2022).

Patients are less satisfied, and there is a rise in pointless referrals and drug prescriptions (Bodegård et al., 2019). Other health-related outcomes that are improved with a patient-centered consultation include the patient's emotional health, adherence to therapy, and recovery (Bodegård et al., 2019). Additionally, a customer-centricity strategy can transform this situation by putting the client first and better incorporating them in their own care procedures (Anabila et al., 2019; Hinson et al., 2020). Unquestionably, in this information age, the patient-customer has become the focal point of many healthcare providers' policy decisions (Anabila et al., 2019). However, instead of concentrating on the provision of treatment to patients, health systems have frequently been set up around the demands of clinicians (Moretta et al., 2018).

The importance of patient centricity is not only for healthcare facilities but also for biopharmaceutical industry, because patient centricity fulfils the needs of the patients. Hence, patient's needs fulfilment resulted in improving patient's lives because patient centricity approach provides profound understanding for their clinical status (Patience for Patient-Centricity - KPMG Global, 2021; Heath, 2021). However, the customer centricity concept is dominant in other service industries but still health care services are behind and has to catch up which will impact the patient's experience and satisfaction (Patience for Patient-Centricity - KPMG Global, 2021). Fortunately, the advancement of information technology plays a vital role in employing customer centricity by escalating the interface technologies to make real time encounter with patients (Patience for Patient-Centricity - KPMG Global, 2021). Thus, this leads to the following hypothesis:

H.19: Patient Centricity has a positive impact on patient satisfaction

The research framework below explains the relation between the independent variables (telemedicine, perceived usefulness and perceived ease of use) and the dependent variable (patient satisfaction) as well as the role of patient centricity as mediating variable.

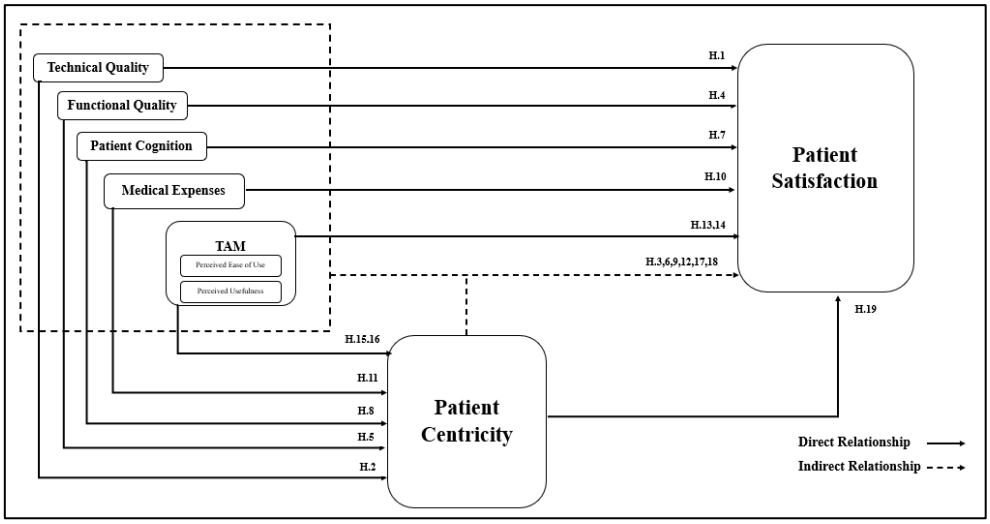

Figure 1: Research Framework

Methodology

The study will be conducted in the four government hospitals in Dubai which are: (1) Rashid Hospital, (2) Dubai Hospital, (3) Latifa Hospital and (4) Hatta Hospital which targets the outpatient clients who have used telemedicine services. These are the four public hospitals located in Dubai, which were the first government hospitals in the region to use the telemedicine service (Press Release, 2016). Also, in December 2019 the Doctor for every citizen initiative which is a free telemedicine service allocated for UAE nationals had been activated in these hospitals.

The research followed and utilized a systematic assessment framework constructed based and grounded in standard measurements and metrics to assess and evaluate the multifaceted dimensions of telemedicine service provision including service quality, patient experience, and satisfaction. The construction of the questionnaire was developed as per prevailing literature and recognized frameworks, guaranteeing theoretical rigor, diligence and empirical dependability. Each construct was measured with multiple items adapted from previous studies and adjusted for the telemedicine context. The measurement scales covered 13 components starting with sociodemographic characteristics, technical quality, patient cognition, medical expenses, service quality dimensions (tangibility, reliability, responsiveness, assurance, and empathy), perceived ease of use, perceived usefulness, patient centricity, and ending with patient satisfaction. All these constructions reflect the telemedicine functional quality, telemedicine technical quality and the patient-centered outcomes that are crucial for assessing the provision of healthcare through telemedicine. Gender, age, level of education, experience with telemedicine and distance from the health care facility are the demographic characteristics. The scales for assessing technical quality were derived from the information systems success model and previous implementations of the Technology Acceptance Model (TAM) in the healthcare sector (Zobair et al., 2021; Lu et al., 2021). Additionally, the patient cognition components were mostly derived from TAM studies (Lu et al., 2021), matching the knowledge that patients were adopting telemedicine services. The research on healthcare economics and telemedicine satisfaction that investigated concerns such as reimbursement and the cost transparency were utilized for medical expenses constructs. The dimensions of functional quality—tangibility, reliability, responsiveness, assurance, and empathy—were assessed using scales based on the SERVQUAL framework, a widely acknowledged model for evaluating service quality (Lu et al., 2021). The measurement scales indicate the patient-oriented or patient-facing aspects of telemedicine, including staff professionalism, network reliability, consultation timeliness, privacy, and compassionate care. The concepts of perceived ease of use and perceived usefulness were derived from the Technology Acceptance Model (TAM) and subsequent research on healthcare technology adoption (Parra et al., 2012; Ohliati & Abbas, 2019; Cheng et al., 2021). These factors examine patient interactions with telemedicine technologies and the degree to which these systems enhance health management. The measurement scales of the patient centricity were derived from research focused on patient-centered healthcare practices, highlighting the access for medication, the transparency of the communication, and level of involving the patients in their healthcare planning (Yeoman et al., 2017). In the end, the measurements of patient satisfaction were adopted from systematic reviews and empirical studies of telemedicine services (Parmanto et al., 2016; Kruse et al., 2017).

A statistical method for determining and estimating causal relationships which is termed as Structural equation modeling (SEM), which is also considered as a statistical representation of linear connections or relationships between the latent (unobserved) variable and the manifest (observable) variable. In this study, SEM will be used by utilizing Smart PLS 4 to validate hypothesis tests. Moreover, the study sought to evaluate the necessity of any changes made to the

research methodology. Typically, Likert scale questions range from 1 to 5, with respondents indicating their level of agreement on a scale: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree (Saunders et al., 2019). The number of distributed questionnaires via google link are 1000, returned questionnaires 679, uncompleted questionnaires 201, completed questionnaires are 478 and this number of questionnaires used to full data systematic analysis. The questionnaires are distributed in the outpatient clinics at the 4 hospitals in Dubai.

3. Results

The demographic analysis encompasses various aspects of respondents' profiles, such as gender, age, education level, experience with telemedicine, and distance to the health center from home (measured in minutes). Table 1 illustrates the frequency and percentage distribution of respondents across each category of demographic variables, providing a comprehensive description of the sample composition.

Table 1: Demographic Profile

Item	Categories	Frequency	Percentage
Gender	Male	253	52.9%
	Female	225	47.1%
Total		478	100%
Age	Below 30 years old	126	26.4%
	From 30 to 40 years old	184	38.5%
	From 41 to 50 years old	125	26.2%
	From 51 to 60 years old	27	5.6%
	Above 60 years old	16	3.3%
Total		478	100%
Education Level	High school or equivalent	86	18%
	Bachelor's degree or equivalent	222	46.4%
	Master's degree or equivalent	144	30.1%
	PhD or equivalent	26	5.4%
Total		478	100%
Past experience with Telemedicine	Used	333	69.7%
	Never Used	145	30.3%
Total		478	100%
Distance to health center (minutes) from home	below 20 minutes	66	13.8%
	from 21 to 40 minutes	284	59.4%
	more than 40 minutes	128	26.8%
Total		478	100%

Measurement Model Assessment

The data underwent analysis using Partial Least Squares Structural Equation Modeling (PLS-

SEM), a variance-based method recommended for its high statistical power and suitability for small sample sizes. Unlike covariance-based approaches, PLS-SEM does not rely on stringent distributional assumptions and can efficiently model complex structural relationships indirectly. The analysis was conducted using SmartPLS 4, software specifically developed for PLS-SEM applications.

This study incorporated a Higher-Order Construct (HOC), also referred to as a Second-Order Construct (SOC) as shown in Figure 2 within the PLS-SEM framework. SOCs enable researchers to represent abstract concepts in a more parsimonious manner by grouping related substructures. However, their proper application requires strong theoretical grounding and careful specification of the construct conceptualization (Hair et al., 2017).

The reliability of indicators was assessed using factor loadings, which reflect the extent to which individual items contribute to their corresponding latent construct. High load values suggest that the indicators share strong commonality with the underlying construct (Hair et al., 2017). According to Hair et al. (2010), factor loadings above 0.70 are generally considered significant, while values below this threshold may indicate weak indicator reliability.

In this study, all retained items surpassed the minimum threshold of 0.70, ensuring satisfactory reliability as shown in Table 2. Items that fell below 0.70 were excluded during the analysis. This refinement is depicted in Figures 2, where factor loadings were recalculated after removing the low-loading indicators which are, Tangibility (FQ.T.1), Reliability (FQ.R.5), Assurance (FQ.A.5), Technical Quality (TQ.5), Patient Cognition (PCO.5), Perceived Ease to use (PE.5), Perceived Usefulness (PU.5), Patient Centricity (PCE.1), and Patient Satisfaction (PS.1). The remaining items met the convergent validity criteria, confirming their ability to positively correlate with other measures of the same construct.

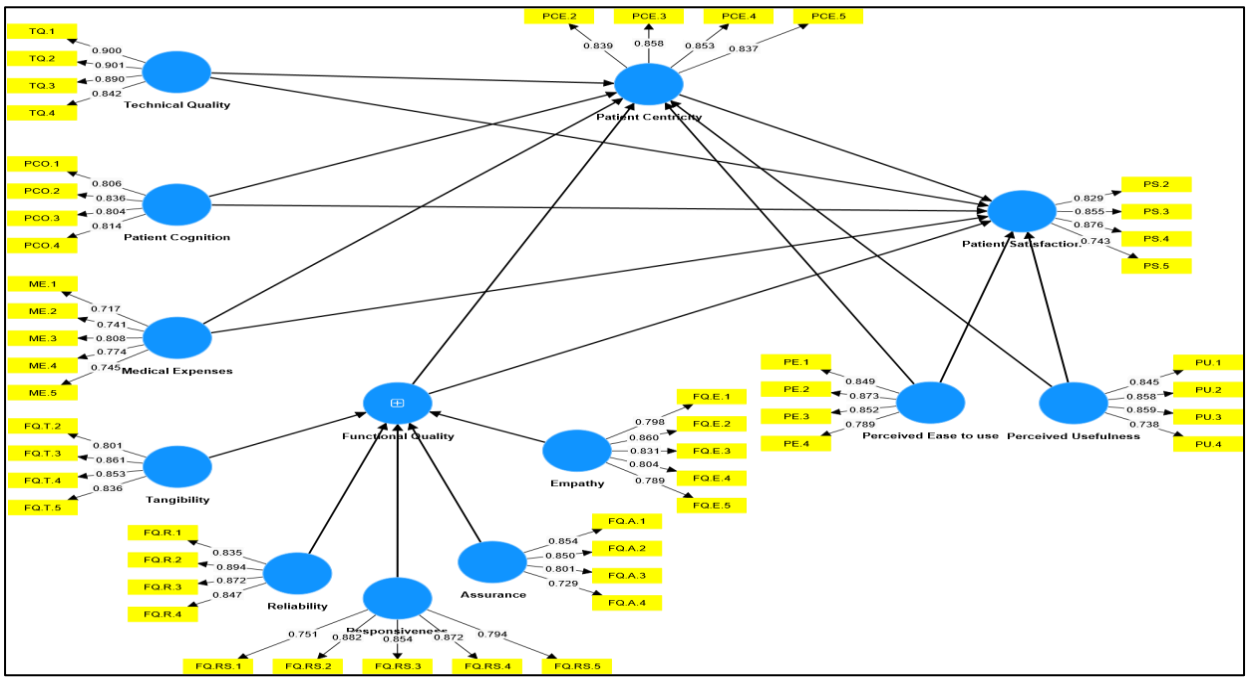

Figure 2: Factor Loading After Delete Items

The objective of this study was to test the reliability of the measurement model using Cronbach's alpha coefficients. This test determines the internal consistency of each construct and evaluates the degree to which the indicators measure the same underlying variable.

The results revealed that all Cronbach's alpha coefficients exceeded the recommended threshold of 0.60 (Hair et al., 2014), indicating satisfactory reliability.

In addition, composite reliability (CR) was assessed to further validate construct reliability. Consistent with established guidelines, CR values should surpass the reference threshold of 0.70 (Hair et al., 2014). The findings of this study confirmed that all constructions achieved CR values above this threshold, as summarized in Table 2.

Table 2: Cronbach's Alpha and Composite Reliability Outcome

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
Tangibility	0.859	0.859	0.904	0.702
Reliability	0.885	0.887	0.921	0.744
Responsiveness	0.888	0.889	0.918	0.692
Assurance	0.824	0.829	0.884	0.656
Empathy	0.875	0.876	0.909	0.667
Functional Quality	0.919	0.920	0.928	0.530
Technical Quality	0.906	0.911	0.934	0.781
Patient Cognition	0.836	0.866	0.888	0.664
Medical Expenses	0.816	0.823	0.870	0.574
Perceived Ease to use	0.862	0.868	0.906	0.708
Perceived Usefulness	0.845	0.847	0.896	0.684
Patient Centricity	0.869	0.871	0.910	0.717
Patient Satisfaction	0.845	0.845	0.896	0.684

The recommended threshold for AVE is 0.50 or higher, indicating that a construct explains at least 50% of the variance of its indicators (Sarstedt et al., 2019). In this study, the AVE values were automatically computed using SmartPLS for most constructs. However, in the case of hierarchical component models (HCMs), such as Functional Quality modelled as a second-order construct, AVE was calculated manually using the loadings of the first-order constructs (Sarstedt et al., 2019). Table 2 summarizes the AVE values for all constructions in this study.

The measurement model's discriminant validity was assessed using three established approaches: the Fornell–Larcker criterion, cross-loadings, and the Heterotrait–Monotrait (HTMT) ratio, as shown in Table 3 and Table 4. According to Hair et al. (2017), evaluating cross-loadings is the first step to ensure that each indicator loads more strongly on its associated construct than on any other construct where all the results of cross-loading are accepted, which confirms that this condition was satisfied, thereby supporting the presence of discriminant validity in the model.

Table 3: Discriminant Validity by Fornell-Larcker Criterion Outcome

	Functional Quality	Medical Expenses	Patient Centricity	Patient Cognition	Patient Satisfaction	Perceived Ease to use	Perceived Usefulness	Technical Quality
Functional Quality	0.609							
Medical Expenses	0.674	0.758						
Patient Centricity	0.405	0.354	0.847					
Patient Cognition	0.558	0.660	0.291	0.815				
Patient Satisfaction	0.438	0.332	0.529	0.275	0.827			
Perceived Ease to use	0.420	0.272	0.504	0.258	0.433	0.841		
Perceived Usefulness	0.379	0.248	0.457	0.206	0.640	0.549	0.827	
Technical Quality	0.540	0.442	0.329	0.355	0.255	0.224	0.280	0.884

Table 4: Discriminant Validity by HTMT Outcome

	Functional Quality	Medical Expenses	Patient Centricity	Patient Cognition	Patient Satisfaction	Perceived Ease to use	Perceived Usefulness	Technical Quality
Functional Quality								
Medical Expenses	0.774							
Patient Centricity	0.446	0.410						
Patient Cognition	0.621	0.779	0.325					
Patient Satisfaction	0.494	0.387	0.615	0.308				
Perceived Ease to use	0.464	0.305	0.581	0.291	0.501			
Perceived Usefulness	0.433	0.310	0.522	0.240	0.732	0.633		
Technical Quality	0.592	0.509	0.366	0.390	0.285	0.251	0.318	

As shown in Table 3, the square root of the AVE (diagonal values, bolded) for each construct is higher than the correlations with other constructs. This satisfies the Fornell–Larcker criterion (Fornell & Larcker, 1981), confirming that constructs are distinct from one another. Moreover, none of the inter-construct correlations exceeded the recommended threshold of 0.85 (Chin, 1998; Hair et al., 2017), indicating robust discriminant validity.

The HTMT values presented in Table 4 were all below the conservative threshold of 0.85 and the more liberal threshold of 0.90 (Henseler et al., 2015). This further supports the presence of discriminant validity, suggesting that constructions are empirically distinct despite being related. By combining the results of cross-loadings, the Fornell–Larcker criterion, and the HTMT ratio, this study establishes strong evidence of discriminant validity, thereby ensuring that each construct uniquely captures its intended dimension without excessive overlap.

3.1 Structural Model Assessment

The structural model was assessed using Partial Least Squares Structural Equation Modeling (PLS-SEM) procedures. Following the guidelines of Sarstedt et al. (2019), a bootstrapping resampling procedure with 5,000 iterations was performed to evaluate the significance and robustness of the model estimates. The key parameters examined include the path coefficients (β), coefficient of determination (R^2), and t-values, which together provide insights into the explanatory power and statistical significance of the model relationships.

The R^2 values of the endogenous latent constructs were assessed to determine the explanatory power of the structural model. R^2 represents the proportion of variance in the dependent variable that can be explained by the independent variables, while the adjusted R^2 accounts for the number of predictors included in the model. According to Chin (1998), R^2 values can be interpreted as follows: less than 0.19 is considered weak and unacceptable, values between 0.19–0.33 indicate weak explanatory power, values between 0.33–0.67 indicate moderate explanatory power, and values exceeding 0.67 suggest substantial explanatory power.

For Patient Centricity, the R^2 value of 0.355 suggests that approximately 35.5% of the variance in patient centricity is explained by the independent variables, with the adjusted R^2 of 0.346 confirming this interpretation after accounting for model complexity. This falls within the medium range as proposed by Chin (1998). Similarly, Patient Satisfaction yielded an R^2 value of 0.505, indicating that the independent variables account for approximately 50.5% of the variance in patient satisfaction. The adjusted R^2 of 0.498 supports this finding, also aligning with the medium level of explanatory power. Overall, these results suggest that the predictors in the model provide a moderate contribution to explaining variance in both patient centricity and patient satisfaction, offering meaningful insights into their determinants while leaving room for additional explanatory variables.

The effect size (f^2) was assessed to determine the relative influence of exogenous constructs on endogenous constructs within the structural model. The f^2 value reflects the magnitude of change in R^2 when a specific predictor is included or excluded, thereby providing insights into the strength of each predictor's contribution (Hair et al., 2017). No Effect: Functional Quality (→ Patient Centricity), Medical Expenses, Patient Cognition, and Technical Quality all demonstrated negligible contributions, with f^2 values below 0.02. in addition, Small to Medium Effects: Functional Quality (→ Patient Satisfaction, $f^2 = 0.023$), Patient Centricity (→ Patient Satisfaction, $f^2 = 0.090$), Perceived Ease of Use (→ Patient Centricity, $f^2 = 0.096$), and Perceived Usefulness (→ Patient Centricity, f^2 =

0.042) all demonstrated meaningful but modest effects. Finally, Medium to Large Effect: Perceived Usefulness exerted a notably strong influence on Patient Satisfaction ($f^2 = 0.298$), highlighting its importance as a determinant of satisfaction with telemedicine services.

3.2 Hypothesis Tests

For the direct relationship, Table 5 presents the results of a detailed analysis of various hypotheses pertaining to the relationship between different factors and patient satisfaction and patient centricity within the healthcare domain. Each hypothesis represents a specific assertion about how certain factors influence patient satisfaction or centricity, and Table 5 provides statistical metrics to evaluate the validity of these assertions.

The first hypothesis, which explores the impact of technical quality on patient satisfaction, is rejected. This indicates that there is no statistically significant relationship between technical quality and patient satisfaction based on the data analyzed. Conversely, the second and third hypotheses, which investigate the relationship between technical quality and patient centricity, and patient centricity and patient satisfaction, respectively, are both supported. This suggests that there is strong evidence to conclude that technical quality positively influences patient centricity and, subsequently, patient satisfaction.

Furthermore, hypotheses 4 through 5 examine the relationship between functional quality and patient satisfaction/centricity, as well as its sub-dimensions such as tangibility, reliability, responsiveness, assurance, and empathy. All these hypotheses are supported, indicating that functional quality, as well as its specific aspects, has a positive influence on both patient satisfaction and centricity.

Hypotheses 7 through 10 explore the impact of patient cognition and medical expenses on patient satisfaction and centricity. All of these hypotheses are supported, suggesting that patient cognition and medical expenses play significant roles in shaping both patient satisfaction and centricity within healthcare settings. Moreover, hypothesis 13, which investigates the relationship between perceived usefulness and patient satisfaction, is strongly supported. This indicates that perceived usefulness has a substantial positive impact on patient satisfaction. However, hypothesis 14, which explores the impact of perceived ease of use on patient satisfaction, is rejected. This suggests that perceived ease of use does not significantly influence patient satisfaction based on the data analyzed.

Table 5: Results of Hypothesis Tests for Direct Relationship

	Hypothesis	Original Sample	Sample Mean	Standard Deviation	T-Statistics	P-Value	Results
H.1	Technical Quality To Patient Satisfaction	0.019	0.020	0.033	0.563	0.573	Rejected
H.2	Technical Quality To Patient Centricity	0.193	0.194	0.048	4.064	0.000	Supported
H.19	Patient Centricity To Patient Satisfaction	0.263	0.262	0.044	6.026	0.000	Supported
H.4	Functional Quality To Patient Satisfaction	0.164	0.167	0.041	3.969	0.000	Supported
H.5	Functional Quality To Patient Centricity	0.197	0.199	0.055	3.588	0.000	Supported
H.7	Patient Cognition To Patient Satisfaction	0.093	0.095	0.037	2.505	0.012	Supported

H.8	Patient Cognition To Patient Centricity	0.156	0.159	0.044	3.566	0.000	Supported
H.10	Medical Expenses To Patient Satisfaction	0.117	0.119	0.036	3.292	0.001	Supported
H.11	Medical Expenses To Patient Centricity	0.210	0.211	0.044	4.747	0.000	Supported
H.13	Perceived Usefulness To Patient Satisfaction	0.482	0.478	0.045	10.725	0.000	Supported
H.14	Perceived Ease to use To Patient Satisfaction	0.032	-0.031	0.047	0.673	0.501	Rejected
H.15	Perceived Usefulness To Patient Centricity	0.203	0.203	0.052	3.939	0.000	Supported
H.16	Perceived Ease to use To Patient Centricity	0.310	0.310	0.052	5.962	0.000	Supported

For indirect relationships, The table 6 illustrates the results of a mediation analysis examining the relationships between several factors—technical quality, functional quality, patient cognition, medical expenses, perceived usefulness, and perceived ease of use—and patient satisfaction, with patient centricity as a mediating variable. Each hypothesis explores the indirect effect of the predictor variables on patient satisfaction through patient centricity.

The hypothesis (H.3) investigates the relationship between technical quality and patient satisfaction mediated by patient centricity. The results indicate statistical significance, with a T statistic of 3.741 and a p-value of 0.000, supporting the hypothesis. This suggests that technical quality has a significant indirect effect on patient satisfaction through patient centricity. The confidence intervals for the indirect effect (0.028 to 0.087) further reinforce this finding.

Similarly, hypotheses 6,9,12,17, and 18 explore the mediation relationships between various predictor variables and patient satisfaction through patient centricity, including functional quality, patient cognition, medical expenses, perceived usefulness, and perceived ease of use. All of these hypotheses yield statistically significant results, with T statistics ranging from 3.115 to 3.812 and p-values less than 0.05, supporting the mediation effects.

Table 6: Results of Hypothesis Tests for Indirect Relationship

	Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	Confidence Intervals		P Values	Results
						LL	UL		
						2.5%	97.5 %		
H.3	Technical Quality To Patient Centricity To Patient Satisfaction	0.056	0.056	0.015	3.741	0.028	0.087	0.000	Supported
H.6	Functional Quality To Patient Centricity To Patient Satisfaction	0.051	0.051	0.016	3.130	0.023	0.087	0.002	Supported

H.9	Patient Cognition To Patient Centricity To Patient Satisfaction	0.043	0.043	0.014	3.115	0.19	0.072	0.002	Supported
H.12	Medical Expenses To Patient Centricity To Patient Satisfaction	0.055	0.055	0.016	3.519	0.028	0.089	0.000	Supported
H.17	Perceived Usefulness To Patient Centricity To Patient Satisfaction	0.053	0.053	0.015	3.550	0.025	0.085	0.000	Supported
H.18	Perceived Ease to use To Patient Centricity To Patient Satisfaction	0.082	0.082	0.021	3.812	0.045	0.128	0.000	Supported

In

this research the first objective pursued is to determine the influence level of technical quality on patient satisfaction. In this study, the systematic analysis indicates that technical quality employs no effect on patient satisfaction, subsequently rejecting hypothesis H1. This misaligned with the previous studies that have excessively highlighted the significance of system reliability, ease of connectivity, and technological stability in shaping patients' overall satisfaction with telemedicine services (Demaerschalk et al., 2022; Hussain et al., 2024; Aboumoussa et al., 2025). On the other hand, the study reveals that patients in Dubai's public hospitals also place substantial emphasis on the functional aspects of care.

The functional quality is operationalized through the SERVQUAL's five dimensions, which are tangibility, reliability, responsiveness, assurance and empathy, which is the focus of the second objective of this research. The research's results revealed that functional quality within the telemedicine mode of service has a considerable influence on patient satisfaction. The functional quality exhibited explicitly a statistically substantial and positive relationship with patient satisfaction, which confirms the fourth Hypothesis, and these findings are matching with the previous studies highlighted in chapter two (Amin et al., 2022; Laheba et al., 2025). However, this study revealed that f^2 value of 0.023, indicating a medium effect which denotes that enhancement in service function quality improve patient satisfaction moderately but meaningfully.

This outcome ascertains the significance of the functional quality as a human-based service interface, consistent with the five dimensions of the service functional quality model. Among those five dimensions, responsiveness and assurance were the strongest contributors, implying that patients who utilised telemedicine value the quick and immediate professional support and confidence in provider skills during the telemedicine session which also match with Manzoor et al. (2019). The medium f^2 effect in this research denotes that though the significance role of functional quality aspect, but it operates alongside other determinants such as perceived usefulness and patient centricity in influencing satisfaction.

As per the analysis results of this research, it has been reported that patient cognition exhibited a significant positive effect on the patient satisfaction, suggesting that patients with better understanding and awareness of telemedicine would be more satisfied, and this research finding is aligning with previous researches which have

been mentioned in the literature review which they are (Hoque et al., 2017; Lu et al., 2021). This result is signifying that the cognition aspect is vital in enhancing the level of patient satisfaction. Henceforth the current research result depicted statistically the significance impact of patient cognition on patient satisfaction. Interestingly, there is a contradiction with another contemporary research such as (Yuen et al., 2024).

In addressing the fourth objective, the research systematically analyzed the relationship between medical expenses and patient satisfaction within telemedicine services. This objective aligns with the fourth hypothesis (H4: Medical Expenses have a positive impact on patient satisfaction, which posited a positive impact of medical expenses on patient satisfaction. The findings from the analysis confirmed this hypothesis. This outcome highlights the significance of cost as a factor influencing patient perceptions and satisfaction with telemedicine. The acceptance of this hypothesis underscores the importance of considering financial aspects when evaluating patient satisfaction in the context of telemedicine.

The fifth objective of this research is to assess the level of impact of perceived usefulness and perceived ease of use constricts which derived from TAM theory on patient satisfaction within telemedicine settings. Hence the two hypotheses were developed, which are H5: Perceived Usefulness has a positive impact on patient satisfaction, and H6: Perceived Ease of Use has a positive impact on patient satisfaction.

The confirmed outcome from this research about accepting the strong association between the perceived usefulness and patient satisfaction is aligned with prior literature. For example, Wijaya and Darma (2022) denoted that perceived usefulness has impacted positively and significantly patient satisfaction. Harmoniously, another study conducted by Abdulwahab and Zedan (2021) reported the strong influence perceived usefulness on patient satisfaction. This outcome is an output from the patient satisfaction survey the include questions about the constructions related to perceived usefulness such as (time, money, access, communication). Likewise, numerous previous studies have asserted the strong impact of perceived usefulness on patient satisfaction (Aldogiher & Halim, 2025).

Despite this, previous studies suggested that perceived ease of use affects patient satisfaction; however, the analysis of the data collected for this research does not align with those findings (Rahimi et al., 2018; Hoque & Sorwar, 2017; Kamal, et al, 2020; Marikyan & Papagiannidis, 2022; Aldogiher & Halim, 2025). This is an unexpected finding from this study because the UAE is considered to have advanced tech infrastructure and settings; thus, perceived ease of use has more impact on intention to use rather than satisfaction (Wijaya & Darma, 2022). Henceforth, telemedicine services and their related logistics with administrative support are dynamically administered by information and communication technology as well as the healthcare provider staff. Eventually, patients have no control over technical difficulties (Aldogiher & Halim, 2025). In other words, patients have very limited interaction with the technical aspects during the consultation session. This is also influenced by the geographical boundaries of the study and the varying levels of technical maturity among the participants.

Remarkably, the analysis confirmed that patient centricity as a mediating variable is significantly mediating the relationships between all six independent variables and the dependent variable. This outcome suggests that patient centricity plays a pivotal role in effectively translating all dimensions into increased patient satisfaction. Therefore, they validate the mediating mechanism of patient centricity within telemedicine services in Dubai.

4. Discussion

The results show that the level of telemedicine satisfaction in Dubai is shaped more by the perceptions of service quality and patient-centered nature of delivery than by technology

itself. Technical quality did not have a direct effect on satisfaction, implying that the patients may see the reliable service as a minimum level of requirement rather than a source of satisfaction. Moreover, technical quality, indeed, improved patient centricity, which in turn increased satisfaction, proving a significant indirect path. Functional quality had a positive impact on both patient centricity and satisfaction focusing on the importance of responsiveness, assurance, empathy, reliability and tangibility in online medical services. Cognition and positive perception regarding medical expenses were also relevant in increasing satisfaction, meaning that understanding, trust and affordability affect a patient's experience. Perceived usefulness was the strongest factor contributing to satisfaction, demonstrating that patients appreciate telemedicine when it helps save money and time as well as enhances access to medical services. Perceived ease of use had no direct influence on the satisfaction but had a considerable indirect impact on the patient centricity. Overall, patient centricity mediated all examined relationships, demonstrating that technological investments should be combined with empathetic communication, transparent processes, and active patient involvement.

5. Conclusion

The research outcomes have addressed that technical quality, functional quality, patient cognition and patient expenses have substantially impacted the dependent variable which is patient satisfaction within telemedicine services in the exitance of the mediating variable which is patient centricity approach. Subsequently, the study proposes first, Public health care facilities must provide more focus on the stable and secure digital platforms which warrant seamless and interoperable communication and data sharing between the health care providers and their patients. Investment in integrating EMR systems, high-speed internet connectivity, and user-friendly telehealth interface will significantly enhance both satisfaction and trust. Secondly, Strengthen patient-centric care training, Continuous training and professional development should be provided to the health care professionals to improve empathy, advance assurance, and cultivate responsiveness in the telemedicine. Moreover, patient centricity should be incorporated in the clinician's training program to advance profound emotional involvement with deeper understanding to the patient's queries during the teleconsultation service. Thirdly, Optimize Telemedicine Design and Accessibility, Implementers of telemedicine services should emphasize on the importance of intuitive, multilingual telemedicine interfaces that provided to diverse nationalities in Dubia. Furthermore, to enhance perceived ease of use, accessibility facilities such as fonts style and size, ease navigation between tabs, and flexible scheduling system can be considered. Finally, Transparent and Fair fees Systems, To ensure transparency and fair pricing system, health care decision makers should empower the clear sharing of telemedicine services fees, insurance coverages and the related co-payments, as well as the multiple payment options. By providing affordable pricing system for telemedicine services, the reduction in financial barriers and increasing of patient satisfaction can be achieved.

Unquestionably, the research has multiple essential contributions to the health care policy makers and leaders as well as the quality of provided services. Firstly, the integration of TAM and SERVQUAL models is a key contribution. This study has provided a novel empirical model for understanding satisfaction dynamics in digital health by integrating the Technology Acceptance Model (TAM) and SERVQUAL with the patient-centricity approach as a mediating construct. Secondly, the introduction of the patient-centricity approach as a mediating variable reconciles the conceptual disparity between technology adoption theories and healthcare quality models. Henceforth, the study offers a multidimensional interpretation of patient satisfaction. Finally, applying Partial Least Squares Structural Equation Modelling (PLS-SEM) as a statistical methodology demonstrates precise and rigor approach which can harnessed as reference for the researchers to analysis the complex relationships between technology,

quality and satisfaction on health care services context.

Practical Implications, utilizing research outcomes and literature, patient service administrators can use the validated model to evaluate telemedicine service performance by focusing on specific service quality dimensions and patient feedback measures. Furthermore, findings can be used as a contribution to regulatory bodies in developing digital health standards and policies that prioritize patient-centric communication, safety, and affordability. Additionally, the results provide actionable practical guidance into user-friendly navigation design, highlighting the dependence of patient satisfaction on technology reliability and emotional and cognitive engagement. Eventually, medical expenses impact patient satisfaction; thus, designing an inclusive medical insurance scheme for telemedicine services can assure the broader acceptance and equity in access to digital health care services.

Limitations, This research has focused only on the public hospitals in Dubai jurisdiction, which may limit the generalizability to private settings of rural health care provider across UAE or GCC. Besides, dependence on self-administrative questionnaires to collect data may have response bias particularly in assessing subjective perceptions such as satisfaction. Language and cultural nuances would impact patient's interpretations of telemedicine experiences. The study undistinguished the type of telemedicine platforms (audio, video, or hybrid), which may affect satisfaction variously.

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8. Author Declaration

The authors declare that this manuscript is an original work and is it under consideration for publication elsewhere. All sources used in this study have been appropriately cited and referenced. The authors further declare that there are no financial, professional, or personal conflicts of interest that could have influenced the research, analysis, interpretation of findings, or preparation of this manuscript. All authors have read and approved the final version of the manuscript and agree to its submission for publication.