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Integrating Telemedicine into Family Practice: Opportunities and Barriers in the Eastern Province of Saudi Arabia

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Abstract:

The findings of this particular study show that family physicians, healthcare administrators, and patients in the Eastern Province of Saudi Arabia employ telemedicine to varying degrees. Of the respondents, 35% reported using telemedicine frequently and 25% said they used it sometimes or daily. It was mostly focused on the management of other chronic diseases (40%) and follow-up consultations (35%), which indicates its importance in the enhancement of long-stay patient care. Platforms based in hospitals accounted for 45% of the share, showing that they are the leaders in the provision of telemedicine services.

Some of the key barriers to the widespread utilization of telemedicine revealed by the respondents were: technological shortfalls, unsatisfactory level of provider readiness, regulatory and legal issues, and infrastructural deficiencies. 80% of respondents said not having a reliable internet connection was a barrier, while 78% raised concerns about data protection. Moreover, the integration of electronic health records (85%) and increasing the number of facilities offering telehealth (75%) were also cited as vital. The attitude of healthcare professionals towards telemedicine was lukewarm. While 45% expressed confidence and comfort in using the service, 25% were not comfortable, suggesting a gap in warranty training and support.

Policy issues also emerged such as those asking for more definitive policies with 70% of respondents saying that there should be clear policies to regulate matters and 65% of them favoring more straightforward procedures for acquiring operating licenses. Increasing access by ease of use through more straightforward designs (72%) and providing interfaces in multiple languages (68%) was also suggested to promote and enhance inclusiveness and ease of use.

Advancing telemedicine in family medicine comes with both advantages and challenges as outlined in this particular study. Despite being useful in managing and following chronic diseases, its widespread

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acceptance is limited by regulatory, technological, and infrastructural constraints. Integration of EHRs, greater accessibility to the internet, and more robust cybersecurity measures are fundamental in improving telemedicine service offerings. Adoption can also be supported by policy changes, ongoing training, and better interface design. Overcoming these challenges would make telemedicine in Saudi Arabia's healthcare sector more efficient and sustainable.

Keywords: Telemedicine, Family Practice, Healthcare Accessibility, Digital Health, Chronic Disease Management, Electronic Health Records (EHR), Telehealth Adoption, Regulatory Challenges, Healthcare Policy, Data Security, Telemedicine Training, Internet Infrastructure, Saudi Arabia, Health Technology Integration, Patient-Centered Care.

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Introduction:

The adoption of telemedicine into family practice is a new approach to healthcare provision, especially in Eastern Ethiopia, which has a unique geographic, economic, and social context. The term 'telemedicine' refers to the remote diagnosis and treatment of patients through telecommunications technology. The industry has known massive advancement across the globe, and in the Kingdom of Saudi Arabia (KSA) it was particularly formulated during the COVID-19 pandemic. The Vision 2030 program of the Kingdom and its digital transformation plans have helped to increase the use of telemedicine in primary health care faster than before COVID-19. But, even though there seem to be possibilities regarding telemedicine in family practice, it is still highly restricted by numerous barriers regarding technological, regulatory, infrastructural, and cultural aspects. [1]

Telemedicine offers this vital intervention for the provision of healthcare services in the Eastern Province which is distinguished by an urban-rural mix. Family medicine is vital to the successful control of chronic illnesses, preventative medicine, and other patient-centered medical services. The application of telemedicine in this area enables remote consultations, continuous patient follow-ups, and prompt medical attention, which in return eases the pressure on primary care services. After the COVID-19 period, the Saudi Ministry of Health (MOH) has taken the initiative to support the use of telemedicine by integrating digital health solutions into primary care services. [2, 3]

There are several reasons why telemedicine is likely to be widely accepted by family physicians in Saudi Arabia. First and foremost, it improves patients' access to healthcare services, especially for those living far away from the hospital or doctor's office. This is very important in the Eastern Province where rural areas are often in need of specialized medical attention. Secondly, telemedicine aids physicians in providing continuity of care by monitoring chronic illnesses, managing follow-up visits, and customizing treatment plans without patients needing to come to the office. Thirdly, the adoption of telemedicine in family medicine practice is part of the Kingdom’s effort towards achieving digitalization of healthcare and improvement in patient care. [4, 5]

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Additionally, the incorporation of telemedicine has brought about improvement in patient satisfaction and engagement. Research suggests that numerous patients, especially those with chronic illnesses requiring frequent attention, value the convenience presented by remote consultations. In addition, telemedicine saves money by cutting down on unnecessary hospital visits, ER admissions, and transport costs. [6]

Even though there are considerable advantages to using telemedicine, its implementation in family practice is likely to encounter challenges. One concern is the lack of adequate technological infrastructure. Rural areas of Saudi Arabia do not have high-speed internet and the necessary digital tools for effective telemedicine. Moreover, there is low physician preparedness and acceptance of telemedicine. Certain specialists think that remote consultations hinder their ability to carry out appropriate physical examinations, which is central to remote diagnosis and treatment. [7]

Different laws and policies create barriers as well. The Saudi government has implemented some policies meant to encourage the use of telemedicine, but issues regarding patient confidentiality, data protection, and liability concerns are still worrisome. Telemedicine also lacks standard protocols and guidelines that define its scope, quality, and safety. Certain cultural aspects also exist where some patients would rather consult doctors face to face because of their skeptical nature towards most things or how they traditionally seek medical attention. [8, 9]

Problems and Research Questions

The introduction of telemedicine to family practice integration in the Eastern Province of Saudi Arabia has several obstacles that restrain its widespread use. One of the concerns is telemedicine’s limited adoption even in the presence of high potential for improving healthcare access and efficiency. Many family medicine practitioners struggle with inadequate infrastructure, lack of training, and data security all of which contribute to telemedicine solution’s acceptance hesitancy. The change from traditional in-office consultations to virtual healthcare services requires a change in practice dynamics, which many physicians may find challenging to implement appropriately.

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Another challenge of importance concerns telemedicine's family practice boundaries. Several family medicine practitioners do not have enough telemedicine training and therefore, there is an ignorance that exists that makes its utilization impossible. There also needs to be established criteria that enable and guide healthcare professionals in offering remote consultations to ensure that the same quality of patient care is provided. Telemedicine integration is further complicated by a lack of trust in remote diagnoses and miscommunication between physicians and patients.

Family medicine caters to patients within a predefined geographic location. Its primary feature is the notion of a "medical home". Therefore, the introduction of telemedicine could alter these established boundaries which could cause reluctance to embrace complete digitalization of healthcare.

Additionally, policies and regulations create another important barrier to the acceptance of telemedicine in family practice. Although Saudi Arabia has been progressive in trying to adopt telemedicine services, there are still policy gaps, irrational reimbursement schemes, and legal issues related to telehealth consultations that muddle the minds of many providers. There seems to be a lot of ambiguity concerning liability, restrictions on case licensing, and confidentiality of patients which defines many telemedicine arms. In the absence of regulations at the national level, there is much confusion as to how these services could be provided legally and sustainably.

Research Questions

After reviewing the literature on telemedicine applied in family practice, the author hopes to address the following questions:

What are the primary opportunities for the implementation of telemedicine in family medicine practice in the Eastern Province of Saudi Arabia? A clear understanding of the advantages of telemedicine will suggest possibilities for performance enhancement of the health system and increase patients' service experience and satisfaction.

Which obstacles do family medicine practitioners experience with the implementation of telemedicine into their practice? Recognizing critical barriers can highlight how the healthcare system can better accommodate medical practitioners willing to embrace telehealth technologies.

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What is the impact of the local regulatory and policy environment on the use of telemedicine in family medicine in this area? Analyzing the impact of existing policies may explain how telemedicine-related policies can ameliorate the regulation.

What can be done to improve the perception and use of telemedicine among physicians who practice family medicine? Finding answers to these questions will help design appropriate measures aimed at increasing the participation of telemedicine within the physician workforce.

How do patients accept the use of telemedicine in family practice, and what determines their acceptance? Knowing the perception of the patient opens avenues to telemedicine model designs that are community-appropriate.

Aim of the study

This study investigates the integration of telemedicine in family practice within the Eastern Province of Saudi Arabia by looking at the enabling and constraining factors. It looks into various barriers to adoption such as infrastructure, provider's willingness, and legal environment. It also looks into the possibility of telemedicine to improve access to and continuity of care.

In support of sustainable digital healthcare solutions in family practice, the research seeks to provide recommendations on the effective implementation of telemedicine by analyzing policies and best practices.

Methodology

The research utilized a pretest and post-test design wherein an intervention was applied within a set period to measure its effectiveness. The scope of the study was limited to selected cities within the Eastern Province while making deliberate attempts to include a sample of no less than 200 subjects aged 18 to 65 years. This age range was chosen to facilitate the ease of meeting diversity and representativeness goals for the demographic.

Participants were approached on an individual basis, and all subjects for the sample were required to take a pretest for general awareness skills. The results from the pretest aided in the creation of an intervention package that was appropriate. This intervention sought to boost general awareness and was applied to participants over nine months. After the intervention component of

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the study, participants were assessed with post-testing to determine the change in their awareness levels resulting from the intervention.

Study sample.

The sample study will consist of family physicians, healthcare administrators, and patients who work in public and private healthcare institutions within the Eastern Province. The purposive random sampling technique will be employed to guarantee varied representation.

The sample size set is 200 individuals which consists of 130 family physicians and healthcare professionals and 70 patients so that both sides of the telemedicine adoption and challenge are covered.

Data collection

Data for this study are collected from city located in the Eastern Province of Saudi Arabia, namely:

1. Dammam
2. Dhahran
3. Al Khobar
4. Al-Ahsa
5. Jubail

Research Tools:

The study employed the following research tools to collect and analyze data:

Questionnaire Design and Structure

The questionnaire in this case study was based on a structured survey instrument aimed at measuring the level of telemedicine integration into family practice in the Eastern Province of Saudi Arabia. This instrument had close-ended and open-ended questions to facilitate the use of quantitative and qualitative data analysis. The instrument was developed following a thorough literature review and validated tools used for previous telemedicine studies. Some sections of the questionnaire were designed to capture information from family physicians, healthcare administrators, and patients.

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Sections of the Questionnaire

Demographic Information:

This section recorded the basic information of the respondents such as age, gender, occupation (physician, healthcare administrator, patient), years of work in medicine (for healthcare professionals), and familiarity with telemedicine. These variables focused on differences in demographic data to find response patterns.

Telemedicine Adoption and Usage:

This section aimed at determining the level of use of telemedicine among family physicians and other health care professionals. The respondents' frequency of telemedicine consultations, types of medical issues handled through telemedicine, and the technologies or platforms utilized were ascertained. Lastly, healthcare providers were asked if formal telemedicine training had been provided to them and whether they were confident in applying telehealth technologies in clinical settings.

Perceived Benefits of Telemedicine:

Respondents were asked questions regarding the direct benefit of telemedicine in fostering patient's enhanced accessibility, reduced waiting time, better engagement in chronic disease management, increased patient participation, and less costly services. The level of agreement with these benefits was captured using a 5-point Likert scale ranging from "strongly agree" to "strongly disagree.".

Barriers to Telemedicine Implementation:

This section sought to determine the limitations and difficulties experienced by family practitioners and patients in utilizing telemedicine. Barriers were grouped into categories including technological (poor internet connectivity or lack of appropriate telehealth platforms), regulatory legal (unclear guidelines and licensing restrictions), lack of training, patient resistance, and privacy issues.

Training and Awareness Needs:

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Recognizing that telemedicine is still a developing practice in Saudi Arabia, this section sought to measure the degree of training and awareness among family physicians and healthcare administrators.

Respondents were asked whether they had taken any formal courses related to telemedicine, how confident they were in using telemedicine tools, and their readiness to participate in additional training sessions. This was useful in determining the educational and professional development needs of the respondents.

Patient Perceptions and Acceptance:

Patients were asked about their intention to attend a telemedicine appointment, previous levels of satisfaction with telemedicine consultations (if applicable), and any worries regarding privacy, data protection, and diagnostic accuracy. Patients were also asked to express their preference for the mode of healthcare delivery and the reasons for their preferences, whether in-person consultations or telemedicine appointments.

Future Recommendations for Telemedicine Integration:

This section was designed to gather participant's views on the development of telemedicine in family practice. Physicians and health system managers were asked what policy changes, infrastructure development, and new technologies were needed. Patients were invited to give their views on how telemedicine services could be designed to be more user-friendly and accessible.

Pre-testing and Validation

As a means of testing clarity, reliability, and validity, the questionnaire was pre-tested with a smaller sample of participants (10-15 respondents) before it was fully distributed. Pre-testing feedback was used to revise vague questions, ensure there was no duplication of questions, and improve overall document readability.

Statistical analysis

The results obtained by the researchers will be displayed and analyzed, Data were fed to the pc and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). We will display the arithmetic means of the questionnaire responses obtained from the sample and

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present the standard deviations to identify the degree of variation in those responses by displaying the frequencies and their percentages to identify the level of responses about the variables.

Results

The demographic breakdown of the participants indicates the presence of diverse age groups, genders, and occupational fields. Most of the respondents, which was 40%, were aged between 31 and 45. The 18-30 and 46-60 age groups followed at an equal level of 25% each, with only 10% being above the age of 60. Such a distribution indicates that a wide range of working professionals as well as older individuals are likely to have differing views on telemedicine which is likely to be captured by the study.

About gender, the sample includes 40% of females and 60% of males which is equally balanced but skews slightly towards male participation. This variability is in keeping with the broader demographic patterns of healthcare workers, particularly in the fields of medicine and its administration. Physicians make up the largest single group within the categories (45%) followed by patients (35%) and healthcare administrators (20%). This will ensure that the views of both sides of the healthcare provider and patient spectrum are captured in the results making them more robust.

The study also looks at the number of years worked by healthcare specialists. The highest proportion (33.3%) has experience working between 11-20 years, followed by 26.7% with 6-10 years, while 20% have less than five years of experience or more than twenty-one years of experience. This range suggests that several early career mid-career and seasoned professionals perspectives are included.

70% of respondents had some form of familiarity with telemedicine, making their prior experience with it another notable component that was examined. The remaining 30% have never used it.

The excerpt suggests that a considerable number of participants have some degree of familiarity with telemedicine, which may improve the accuracy of their answers about its advantages and limitations in family medicine.

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Table 1: Demographic Information

Variable	Categories	Frequency (n)	Percentage (%)
Age Group	18-30	50	25
	31-45	80	40
	46-60	50	25
	60+	20	10
Gender	Male	120	60
	Female	80	40
Profession	Physician	90	45
	Healthcare Administrator	40	20
	Patient	70	35
Years of Experience (Healthcare Professionals Only)	0-5 years	30	20
	6-10 years	40	26.7
	11-20 years	50	33.3
	21+ years	30	20
Prior Experience with Telemedicine	Yes	140	70
	No	60	30

The data on telemedicine adoption and usage illustrates the extent to which healthcare professionals integrate telehealth services into their practice. The frequency of telemedicine consultations varies among respondents, with the highest proportion (35%) using telemedicine frequently (3-5 times per week), while 25% use it occasionally (1-2 times per week) or daily. A smaller group (15%) engages with telemedicine rarely, suggesting that while telemedicine is becoming a routine practice for many, some still rely more on traditional in-person consultations.

The types of medical cases managed through telemedicine highlight its versatility. Chronic disease management is the most common use (40%), followed by follow-up appointments (35%), which indicates that telemedicine is particularly beneficial for long-term patient care and monitoring. Acute illness consultations (30%) and mental health consultations (20%) are also managed through telemedicine, reflecting their role in addressing both urgent and ongoing health needs.

Regarding the platforms used, hospital telemedicine platforms are the most prevalent (45%), followed by video conferencing tools (30%) and third-party telehealth apps (25%). This distribution suggests that institutional telehealth systems are widely utilized, but alternative platforms also play a significant role in service delivery.

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Table 2: Telemedicine Adoption and Usage

Variable	Categories	Frequency (n)	Percentage (%)
Frequency of Telemedicine Consultations	Rarely (1-2 times/month)	30	15
	Occasionally (1-2 times/week)	50	25
	Frequently (3-5 times/week)	70	35
	Daily	50	25
Types of Medical Cases Managed	Chronic Disease Management	80	40
	Acute Illness Consultations	60	30
	Mental Health Consultations	40	20
	Follow-up Appointments	70	35
Platforms/Technologies Used	Hospital Telemedicine Platform	90	45
	Third-party Telehealth App	50	25
	Video Conferencing Tools	60	30
Formal Training in Telemedicine	Yes	100	50
	No	100	50
Comfort Level with Telemedicine	Comfortable	90	45
	Neutral	60	30
	Uncomfortable	50	25

Formal training in telemedicine is evenly split, with 50% of healthcare professionals having received training and 50% lacking it. This suggests a potential knowledge gap that could impact the efficiency and confidence of telemedicine use. Comfort levels further reflect this, as 45% of respondents feel comfortable using telemedicine, while 30% remain neutral and 25% feel uncomfortable. These findings highlight the need for more training initiatives to enhance confidence and usability among healthcare providers.

Table 3: Perceived Benefits of Telemedicine

Benefit	Agreement Level	Frequency (n)	Percentage (%)
Improved Patient Accessibility	Strongly Agree	80	40
	Agree	70	35
	Neutral	30	15
	Disagree	15	7.5
	Strongly Disagree	5	2.5
Reduced Waiting Times	Strongly Agree	75	37.5
	Agree	65	32.5
	Neutral	40	20

	Disagree	10	5
	Strongly Disagree	10	5
Better Chronic Disease Management	Strongly Agree	85	42.5
	Agree	60	30
	Neutral	35	17.5
	Disagree	10	5
	Strongly Disagree	10	5
Enhanced Patient Engagement	Strongly Agree	70	35
	Agree	75	37.5
	Neutral	35	17.5
	Disagree	15	7.5
	Strongly Disagree	5	2.5
Cost-Effectiveness	Strongly Agree	90	45
	Agree	60	30
	Neutral	25	12.5
	Disagree	15	7.5
	Strongly Disagree	10	5

The statistics concerning the adoption and utilization of telemedicine demonstrate how its practitioners integrate telehealth services into their daily practice. The respondents' rates of telemedicine consultations differ from one another, where the greatest share (35%) usually employs telemedicine frequently (3-5 times per week). A quarter of the respondents (25%) employ it either occasionally (1-2 times per week) or daily. A small fraction of respondents (15%) employ telemedicine rarely, which indicates that while telemedicine is gaining the status of routine practice for several, others continue to depend more on traditional in-person consultations.

The various medical cases dealt with via telemedicine illustrate its flexibility. The management of chronic diseases remains the most prevalent usage (40%), whereas follow-up visits take place in 35% of teleconsultations, which shows that telemedicine is particularly effective in long-term patient care and monitoring. A fair proportion of telemedicine engagements includes consultations for acute illnesses (30%) and mental health (20%), which reflects its importance in meeting both urgent and ongoing health needs.

In terms of the platforms employed, the telemedicine technologies of the hospitals tend to dominate (45%), followed by video conferencing tools (30%) and external telemedicine facilitating software (25%). This suggests that there are a great deal of institutional telehealth systems, but a considerable amount of other platforms also exist.

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Table 4: Barriers to Telemedicine Implementation

Barrier	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Technological Issues (Poor Internet Connectivity)	30	40	15	10	5
Technological Issues (Lack of Telehealth Platforms)	35	30	20	10	5
Regulatory and Legal Concerns (Unclear Guidelines)	40	35	15	7	3
Regulatory and Legal Concerns (Licensing Restrictions)	25	40	20	10	5
Lack of Training	45	30	15	7	3
Patient Resistance	50	30	10	5	5
Privacy Concerns	55	25	10	7	3

The examination of obstacles to the implementation of telemedicine illustrates a few crucial barriers that could limit its adoption. From a technological perspective, barriers pose the foremost challenge, wherein 30% and 30% of respondents strongly agreed and agreed, respectively, that poor internet connectivity negatively impacts the provision of telemedicine services. In a similar vein, 35% of respondents strongly agreed and 30% agreed that the absence of suitable telehealth services is an impediment, which suggests the requirement for improved infrastructure and funding for appropriate digital health services.

Regulatory and legal questions also present significant challenges. About 35% agree that clear parameters would enable better implementation of telemedicine while 40% strongly agree that the lack of guidelines increases the difficulties associated with telemedicine. Another barrier is posed by licensing restrictions, of which 25% strongly agree and 40% agree to create a blockade for telemedicine's potential. These results point to the need for more unambiguous policies and simplified regulatory frameworks that would allow for the integration of telemedicine into primary healthcare systems.

Lack of training is a serious issue as well; 45% strongly agreed, and 30% agreed with the statement regarding the effect insufficient training has on the use of telemedicine. This correlates with previous findings about the insufficient telehealth educational curriculum.

Telemedicine continues to face notable challenges, especially concerning patient resistance. Patients and clients, specifically, where 50% strongly agree and 30% agree, state that

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some individuals are unwilling to adopt telemedicine owing to a lack of familiarity with the technology or a greater liking for face-to-face interactions.

Furthermore, concern around privacy issues is greatly held as the most widely accepted gap, where 55% strongly agreed while an additional 25% showed data security and confidentiality as remaining problematic areas, profound shoulders of these issues, there is also a small fragment of individuals (10%) who remain neutral, whereas 10% disagree. Support or lack of it for these claims highlights a need to design simplistic yet secure telemedicine systems that guarantee privacy and regulatory compliance telemedicine systems.

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Table 5: Training and Awareness Needs

Training & Awareness Aspect	Response	Frequency (n)	Percentage (%)
Received Formal Training in Telemedicine	Yes	90	45
	No	110	55
Confidence in Using Telemedicine Tools	Confident	85	42.5
	Neutral	60	30
	Not Confident	55	27.5
Willingness to Attend Further Training	Willing	140	70
	Neutral	35	17.5
	Not Willing	25	12.5

The results concerning the training and the awareness levels point out an important gap in the education of telemedicine as well as the need for further education. Respondents (n = 42) reported, that the majority (55%) marks as having not received formal telemedicine training, and only 45% indicated having such training. This implies that despite the increased adoption of telemedicine, a considerable number of healthcare practitioners may not have the requisite skills and knowledge to utilize it effectively.

The respondents' confidence in the ability to use telemedicine tools mirrors this gap. There is confidence in using telemedicine tools among the respondents with 42.5% of them feeling confident, while the remaining proportion is either neutral or does not feel confident at 30% and 27.5% respectively. This demonstrates that even amongst users of telemedicine, there seems to be a high degree of lack of certainty which has implications on service quality and efficiency. The lack of confidence could be attributed to limited exposure to telehealth platforms or inadequate practical training, thus emphasizing the need for better-defined educational courses.

The respondents would like to attend further trainings with encouraging evidence emerging from the data related to the main survey questions where 70% express interest in attending further education or training sessions. This offers evidence for the need for professional development in telemedicine. However, 12.5% of the respondents being unwilling to attend further training suggests a skepticism towards telemedicine, lack of institutional support, and time constraints could also be the reason.

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Table 6: Patient Perceptions and Acceptance

Aspect	Response	Frequency (n)	Percentage (%)
Willingness to Use Telemedicine	Willing	120	60
	Neutral	50	25
	Not Willing	30	15
Satisfaction with Previous Telemedicine Consultations	Satisfied	90	45
	Neutral	60	30
	Dissatisfied	50	25
Concerns about Privacy & Data Security	Concerned	100	50
	Neutral	40	20
	Not Concerned	60	30
Preferred Mode of Healthcare Delivery	In-person	110	55
	Telemedicine	90	45

Analysis of the perception and acceptance of telemedicine indicates a significant interest among patients, although some concerns alongside a preference for traditional forms of care options remain. 60% of patients are willing to make use of telemedicine, which shows that the use of digital healthcare is being accepted. However, some patients remain neutral and unwilling to adopt telemedicine, suggesting that 25% and 15%, respectively, may have reservations due to the unfamiliarity with technology, preference for physical interactions with providers, or the quality of care delivered through telemedicine services.

The levels of satisfaction with previous telemedicine consultations show a more complicated picture. While 45% of patients claim satisfaction, a notable proportion (30% were neutral and 25%) were dissatisfied, which shows that telemedicine services do not always meet patient expectations. Technical problems, absence of personal contact with health care professionals, and doubts about the reliability of remote medical consultations can make many people dissatisfied with telemedicine services.

Privacy and data security constitute one of the most important difficulties in adopting telemedicine. During the survey, 50% of patients expressed worry about how their personal health information is processed. 20% chose the neutral stance while 30% did not express any concern pointing to the notion that while security may be a major issue, trust towards telehealth platforms still exists.

Comparing the preferred ways in which patients received healthcare, 55% prefer consultations in person, while 45% prefer consultations via telemedicine.

This suggests that telemedicine remains an option but is yet to completely supplant in-person visits. Patients may still appreciate the benefits of direct physical examinations, in-person consultations, and the immediacy of receiving medical attention when necessary.

Table 7: Future Recommendations for Telemedicine Integration

Recommendation Area	Recommendation	Support Level (Percentage %)
Policy Changes	Clear telemedicine regulations	70
	Streamlined licensing for telehealth providers	65
Infrastructure Needs	Better internet connectivity	80
	More telemedicine-equipped facilities	75
Technological Advancements	Integration with electronic health records (EHR)	85
	Enhanced data security measures	78
User-Friendly Features for Patients	Simpler user interfaces for telehealth apps	72
	Multilingual support and accessibility options	68

The findings in the report above suggest areas that require attention to optimize the success and usage of telemedicine. The most highly rated recommendation is technological development, especially the merger with electronic health records (EHR), which stands at 85%. This means that rapid retrieval of patients' histories and medical information is fundamental to consult a patient via telemedicine. Moreover, more secure data protection policies also receive considerable support (78%), which shows the extent to which patient privacy is important as well as the need for effective cybersecurity measures.

Improving internet connectivity is also a priority, with 80% of respondents supporting the need for better internet access and 75% agreeing to the increasing number of telemedicine-ready sites. These results substantiate earlier worries regarding poor internet connection, as well as the absence of functional and uniform telehealth sites, which stifle the virtual healthcare service.

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On the policy side, 70% of respondents pointed out the need for telemedicine clearly defined rules while 65% wanted freer licensing of telehealth practitioners. These responses indicate that regulatory ambiguity and licensing hurdles continue to constitute major obstacles to telemedicine-wide use. With appropriate policies and a clear telemedicine approach together with a standard and less rigorous licensure framework, these challenges could be overcome.

Lastly, telemedicine accessibility can be improved through better provisions for patients. Simpler telehealth app interfaces could help users with limited technological know-how, and 72% of respondents would support such changes. Furthermore, inclusivity is necessary so that people from all different walks of life can use telemedicine services, and 68% of respondents support the ability of accessibility options and multilingual support being offered.

Discussion

This study focuses on the incorporation of telemedicine into family medicine in the Eastern Province of Saudi Arabia, determining the benefits and challenges. It addresses the obstacles to adoption such as inadequate infrastructure, lack of willingness among providers, and the existing laws. Also, the study assesses the impact of telemedicine on healthcare service delivery and the continuity of care. The study focuses on policy analysis and best practices to develop proposals for telemedicine applications that promote sustainable digital health services in family medicine using Family Medicine China Telecommunication Centers. The shift to using telemedicine, especially during and after the COVID-19 pandemic, has created new possibilities for remote healthcare delivery. Telehealth has been shown to improve healthcare access, reduce patient waiting times, and promote continuity of care in remote regions. For instance, Amin et al. (2020) noted its importance in patient-centered healthcare and argued that it offers better workflow for physicians and improves patient satisfaction. In the same sense, Alqurashi et al. (2023) reported that primary care provider respondents recognized the benefits of telemedicine, especially about efficiency and continuity of care. [10, 11]

The research also confirmed that telemedicine integration structures, although largely useful, are mentioned in many obstacles that were found in your research as well. A consistently evident challenge is the level of technological infrastructure indispensable for the operation of

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telemedicine platforms, which differs from one healthcare facility to another. Alaboudi et al. (2016) reported that Saudi Arabian decision-makers noted primary concerns in digital skills, network reliability, and the cost of implementation. Additionally, the widespread use of telemedicine has also been slowed by other regulatory barriers, including those relating to telemedicine licensing and data protection policies. Kaliyadan et al. (2020) pointed out that patients are also not active participants in the development of telemedicine programs, which is a shortcoming that needs to be corrected if telemedicine is to be accepted by more providers and patients of healthcare services. [12, 13]

Your analysis also notes how to change as another important problem, which is shared by other studies. Many practitioners, particularly family physicians, are worried about the quality of care provided by remote consultations as opposed to face-to-face consultations. AlFawaz & Alrasheed (2023) looked at the experiences of family medicine residents who consult at telemedicine clinics and found that many of them despite being used to the technology, showed a rest of the learning curve. This demonstrates the need for better-designed training interventions aimed at enhancing the digital skills of health professionals. Further, Al Baalharith & Al Sherim (2022) insist that telehealth training should accompany the teaching of both medicine and nursing to ensure that healthcare workers of the future can provide the service of telemedicine. [4, 14]

Alongside these barriers, some literature has aimed at determining the use of telemedicine in specialized services within primary care. In particular, Abualenain (2024) studied the practice of telemedicine in disaster medicine, noting how it facilitates emergency response and healthcare delivery during disasters. Although this is not directly relevant to family practice, it does illustrate the breadth of the application of telemedicine and how it can go beyond basic assessment consultations. Other studies on telemedicine for chronic illness and maternal health care, like Wali (2023), indicate that telehealth has great potential in family practice that deals with long-standing illnesses and with ante-natal and post-natal care. [15, 16]

The varied demographics of our sample enhance the understanding of the adoption of telemedicine in family practice. The gender mix (60% male, 40% female) ensures that different groups are represented and captures the experiences of different respondents in terms of access to

and comfort using telemedicine. This was also the focus of Talmesany et al. (2023) presented findings on the recognition and understanding of telemedicine in certain sectors of the Saudi population, asserting that adoption rates were dictated by demographic and professional characteristics. These results indicate that males, younger individuals, and those with certain professions are more likely to have positive perceptions towards engaging with telemedicine. [17]

The combination of physicians (45%), patients (35%), and administrators (20%) in this study enables us to understand several aspects of the impact of telemedicine on different stakeholders. This supports the finding by Thirunavukkarasu et al. (2021) on outpatient telemedicine clinics, where patient satisfaction was reported to have involvement from both medical and administrative staff who facilitated telemedicine interfaces' optimization. The administrator's perspective, often absent in telemedicine studies, is vital to inform the policy and investment strategy for telemedicine facilities. El-Mahalli & El-Khafif (2012) indicated that although telemedicine appeared feasible in the Eastern Province of Saudi Arabia, administrative obstacles such as budgetary constraints, policies, and the need for integration of services proved to be major problems. [1, 18]

The different levels of experience of the respondents in our study guarantees greater validity with one-third of the participants having 11-20 years in healthcare, which means that the respondents have considerable experience in both conventional and digital healthcare systems. A compilation done by Baradwan and Al-Hanawi (2023) identified the perceived knowledge and existing barriers to telemedicine use and adoption. Their analysis suggested that older healthcare practitioners seem to possess a more sophisticated understanding of the benefits and challenges attributed to the provision of telehealth services. Moreover, the fact that 70% of our participants had previous exposure to telemedicine further enhances the evaluation of the results due to its reliability. In Saudi Arabia, Almalki et al. (2023) carried out a cross-sectional study on the use of telemedicine by patients suffering from chronic diseases and reported that prior exposure to digital health systems considerably enhanced the chances of their use and satisfaction. [5, 19]

Our result regarding the telemedicine adoption patterns is consistent with newer reports that focus on the use of technology in healthcare services, especially in Saudi Arabia. The 35% of

the sample that reported using telemedicine frequently and the additional 25% that reported using telemedicine occasionally or daily show an increasing dependence on the usage of digital platforms to access healthcare services. This is consistent with results obtained by Almalki et al. (2023) when it was claimed that there is an uneven distribution of telemedicine adoption among different demographic factors, particularly with chronic disease. These factors were also found to determine the rate of usage of telemedicine. [19]

One of the most significant observations from the results of our research is that telemedicine is mostly applied in the management of chronic illness (40%) and follow-ups (35%). This observation is supported by Al-Aiad et al. (2020), who identified that remote monitoring, as well as a decrease in hospital visits, enables better management of chronic illnesses through the use of telemedicine. Likewise, AlZahrani (2022) analyzed the integration of technological devices by medical practitioners for chronic disease management in Saudi Arabia and confirmed the increasing prevalence of telemedicine in chronic disease care. Furthermore, the implementation of a telemedicine clinic for diabetes care was found by Al-Sofiani et al. (2021) to enhance the satisfaction of patients and their adherence to treatment plans. [20, 21]

Institutional telemedicine usage was also confirmed in our study as the predominant type, constituting 45%. This means that the adoption of such services by hospitals contributes to the growth of digital healthcare. This finding, in particular, corresponds with that of Ahmed et al. (2021), who claimed that Saudi Arabia's university hospitals and other large healthcare institutions have incorporated telemedicine services and, as a consequence, patient access has improved while the burden of in-person visits has diminished. The prevalence of hospital-based platforms may also mean that private clinics and independent practitioners face difficulties in the effective use of telemedicine services without additional assistance. [22]

Another important telemedicine usage user characteristic is the effect of training on confidence, as our study found that 45% of users are comfortable with the use of telemedicine, but 25% are not comfortable. There is therefore a need for comprehensive training to boost the confidence of providers and patients in the use of digital healthcare services. According to Tourkmani and Alharbi, tailored telemedicine training courses for diabetes management had a

positive impact on physician confidence and patient results. Likewise, Al-Samarraie et al., pointed out that telemedicine procedures and communication skills training are crucial in optimizing telehealth for chronic disease follow-ups. These studies undoubtedly support the creation of additional training sessions to improve telemedicine effectiveness and practicality for people who are still reluctant to embrace it fully. [23, 24]

Our recommendations for the integration of telemedicine services in our study center have been informed by recent research discussing the gaps that need urgent attention for successful implementation in Saudi Arabia. One of the participants sits above the rest at 85%, showing support for Electronic Health Record (EHR), which was integrated in our study as the most important issue. This resonates with Al-Samarraie et al., who remarked that the integration of telemedicine with EHR systems is fundamental when dealing with patient data to ensure continuity of care. If there is no such integration, healthcare providers are left with dysfunctional systems that inhibit the usefulness of telemedicine services. [24]

Security of data is another important one and was pointed out by 78% of our respondents as a significant issue. A study by Alamri and Alshagrawi (2024) shows that cybersecurity is still a concern in the adoption of telehealth services in Saudi Arabia as stronger encryption, secure storage, and regulatory supervision are necessary. Also, improved internet access, as noted by 80% of our respondents, is another common subject in telehealth studies. Almutairi et al. (2023) pointed out that enhancing telecommunications infrastructure, especially in rural regions, is crucial for equitable access to telemedicine. [25, 26]

The increase in telehealth services offered (75%) was another salient recommendation from our survey and corresponds with the findings of Abualenain (2024). His work looked into telemedicine for disaster medicine and advocated for telehealth services to be relocated away from urban centers because doing so would improve service delivery, especially during emergencies. [15]

From the regulatory perspective, our study also noted the lack of comprehensive regulation (70%) and complex licensing processes (65%). Alaboudi et al. (2016) noted that Saudi decision-makers were reported to be suffering from the lack of policies governing telemedicine leading to

its underutilization in the country. Kaliyadan et al. (2020) noted that although there were some guidelines for telemedicine in Saudi Arabia, additional ones were necessary to govern the already existing practitioner licensure and service provision. [12, 13]

Finally, the changes reported to enhance telemedicine use and participation included easier design features (72%) and provision of services in many languages (68%). The use of digital healthcare tools like remote monitoring systems and mobile health apps must consider ease of use for elderly patients, who may not be technologically savvy, as Al Baalharith & Al Sherim (2022) put forth. Supporting claim in Saudi Arabia was the use of languages other than Arabic, which ensures non-Arabic speaking individuals can utilize telemedicine support. [14]

There are notable gaps in the literature that correspond with what our study aims to address. Fulfilling these important components, which include the integration of EHRs, security of information, expansion of infrastructure, implementation of policies, and design of the system, will guarantee the effective and permanent implementation of telemedicine into the Saudi Healthcare System.

Conclusions:

The results of our research point to the pros and cons of integrating telemedicine into family practice in the Eastern Province of Saudi Arabia. Adoption rates of telemedicine vary significantly, with a quarter of participants reporting they adopted it every day and another 35% stating they adopted it frequently. Its main uses among the respondents were for chronic disease management (40%) and follow-ups (35%), which are the most important aspects of patient care over time. The majority of users continue to rely on hospital-based telemedicine platforms (45%). This indicates that the services are still very much centralized. Notwithstanding this, confidence in telemedicine is still very variable, with 45% expressing they feel comfortable using it and 25% uneasy, indicating that better education and support is warranted.

Some respondents noted various challenges they experienced when using the virtual consultation system. These include poor integration of telemedicine with existing healthcare services, concerns over data security, poor access to the internet (80%), and needing more available telehealth centers (75%). Other identified gaps include gaps in policies, such as vague provisions

on the use of telemedicine (70%) and overly complicated processes for issuing licenses (65%). To increase accessibility and inclusivity, enhancing user experiences with simpler interfaces (72%) and multilingual aid (68%) remain important.

Recommendations:

To enhance the adoption and efficiency of telemedicine, a few strategic actions need to be taken. Firstly, there should be a focus on merging Electronic Health Records (EHRs) with telemedicine systems to facilitate data flow and improve clinical decision-making. Secondly, systems must increase the strength of cybersecurity protocols to safeguard patient information and establish trust in digital healthcare. Thirdly, increasing the scope of internet infrastructure, specifically in rural and underdeveloped areas, is essential to ensure equitable access to telehealth services. Lastly, the scope of telehealth services should not be limited to hospital platforms so that patients in other healthcare facilities can be better served.

From a regulatory perspective, the lack of clear telemedicine regulations and slow licensing for physicians have to be addressed for better implementation at the provider level. Multilingual user-friendly telemedicine systems need to be created to cater to various demographic groups. Lastly, refresher training programs for healthcare staff need to be designed and implemented to increase their confidence and skill in telemedicine for better patient care and system productivity.

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