Journal of Multidisciplinary Healthcare

Dovepress
open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Healthcare Providers' Experience with Saudi Arabia's 937 Virtual Medical Call Centers and Telehealth

Ahmed M Al-Wathinani[1], Yahia O Dhafar[2], Salah A Aljarallah[3], Muqbil Saad Alqahtani[4], Fahad Abdullah Alamri[5], Awad O Aljohani[6], Majed D Alanazi[7], Turky J Arbaein[8], Amal M Zaidan[9], Mohammed Aljuaid[10], Krzysztof Goniewicz[11]

[1]Department of Emergency Medical Services, Prince Sultan bin Abdulaziz College for Emergency Medical Services, King Saud University, Riyadh, 11541, Saudi Arabia; [2]SEHA Virtual Hospital, Ministry of Health, Riyadh, 1154, Saudi Arabia; [3]Department of Family Medicine, King Khaled University Hospital, King Saud University, Riyadh, Saudi Arabia; [4]Department of Dentistry, College of Dentistry, King Faisal University, Alhafouf, 36932, Saudi Arabia; [5]Ambulatory Care Administration, Ministry of Health, Riyadh, 11525, Saudi Arabia; [6]Fresenius Kabi Scientific Office Alsaif Building, Riyadh, 1141, Saudi Arabia; [7]Department of Family Medicine, General Directorate of Health Affairs in Riyadh Region, Ministry of Health, Riyadh, 12822, Saudi Arabia; [8]Department of Health Administration and Hospitals, College of Public Health and Health Informatics, Umm Al-Qura University, Makkah, Saudi Arabia; [9]College of Public Health and Health Informatics, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia, King Abdullah International Medical Research Center's (KAIMRC), Riyadh, Saudi Arabia; [10]Department of Health Administration, College of Business Administration, King Saud University, Riyadh, Saudi Arabia; [11]Department of Security, Polish Air Force University, Deblin, Poland

Correspondence: Ahmed M Al-Wathinani, Email ahmalotaibi@ksu.edu.sa

Introduction: This cross-sectional descriptive study evaluates the experiences and perceptions of healthcare providers (HCPs) regarding the 937 medical call center in Saudi Arabia, a key telemedicine initiative.

Aim: To assess HCP satisfaction, identify challenges, and provide recommendations for improvement.

Methods: Conducted from November 20th to December 15th, 2022, the study surveyed 454 HCPs, achieving a 90.5% response rate.

Results: A majority (86.8%) of respondents were satisfied with the call center, valuing its ease of use and effectiveness in healthcare delivery. However, challenges such as the accuracy of remote medical assessments, the need for clearer telehealth regulations, and concerns over management support and consultation overlaps were identified. The study also highlights the importance of ongoing support and updates, comprehensive telehealth regulations, integration of more medical specialties, and improvements in system integration and data confidentiality.

Conclusion: The study underscores the need for strategic enhancements to the 937 call center to further improve healthcare accessibility and efficiency in Saudi Arabia. These enhancements are vital for aligning telehealth services with Saudi Arabia's healthcare objectives under Saudi Vision 2030.

Keywords: telemedicine, Saudi Arabia, health care providers, patient satisfaction, health services accessibility, telehealth, medical informatics, health policy

Introduction

Telehealth and telemedicine have significantly transformed the healthcare landscape, providing innovative platforms for delivering medical services remotely. Over the past six decades, these technologies have facilitated unprecedented access to healthcare services, enabling medical screenings, evaluations, treatments, and emergency assistance from afar.[1–3] The broad scope of telehealth encompasses not only clinical care but also medical education and training, highlighting its comprehensive impact on the healthcare sector.[4,5]

The World Health Organization (WHO) defines telemedicine as the use of information and communication technology (ICT) to bridge geographical barriers, allowing healthcare professionals to provide services across distances.[6] This is

Received: 4 March 2024
Accepted: 14 June 2024
Published: 22 June 2024

particularly pertinent for diagnosis, treatment, and the prevention of diseases, underscoring the essential nature of telemedicine in today's healthcare delivery system.

The COVID-19 pandemic further underscored telemedicine's importance, with countries worldwide adopting telehealth services to maintain healthcare access amidst social distancing measures.[7–11] Both high-income and some low- and middle-income countries have demonstrated telemedicine's effectiveness in maintaining healthcare delivery during the pandemic.[12–14]

In Saudi Arabia, the 937-Call Center exemplifies the nation's commitment to enhancing healthcare accessibility through telehealth. Operating 24/7, the center provides services ranging from medical consultations to emergency triage, particularly benefiting those without internet access or the ability to visit healthcare facilities in person.[15–23] This initiative aligns with global telehealth efforts while addressing the unique challenges faced by the Saudi population.

Despite the broad adoption of telehealth, there is limited literature on healthcare providers' perceptions and experiences with specific telemedicine programs like Saudi Arabia's 937-Call Center. This study aims to fill this gap by evaluating the center's effectiveness, healthcare provider satisfaction, and identifying areas for improvement. The findings will contribute to the current literature on telehealth by providing insights into healthcare providers' experiences with the 937-Call Center, thereby informing strategic enhancements to telehealth infrastructure in Saudi Arabia. These enhancements are vital for aligning telehealth services with Saudi Vision 2030's healthcare objectives.

Methodology

Study Design and Context

This investigation utilized an online survey to conduct a cross-sectional descriptive analysis, specifically chosen for its efficacy in capturing a snapshot of healthcare providers' current experiences and challenges with the 937-Call Center services within the Kingdom of Saudi Arabia (KSA). The study was conducted from November 20th to December 15th, 2022, allowing a sufficient timeframe to observe meaningful outcomes and maximize participation while accommodating the busy schedules of healthcare professionals. This design is particularly suited for exploratory research, where the objective is to establish associations and trends rather than causal relationships, allowing for a comprehensive evaluation of the status quo across diverse geographical regions and healthcare settings.

Participant Selection

All 454 healthcare providers actively engaged with the 937-Call Center across the KSA were identified as potential participants for this study. This group comprised a diverse array of professionals, including individuals from various regional directorates, part-time staff, full-time staff from the General Directorate of Medical Consultations (GDMC), and trainee physicians. The selection of this varied cohort was strategically designed to capture a comprehensive snapshot of experiences, ensuring a wide representation of perspectives within the healthcare provision spectrum.

To facilitate the recruitment process, invitations to participate in the study were disseminated electronically via email. Email addresses of the healthcare providers were verified through the General Directorate of Medical Consultations to ensure accurate and effective communication. The Email invitations detailed the study's purpose, what participation entailed, and assured confidentiality and anonymity of responses. Criteria for selection were primarily based on the participants' active engagement with the 937-Call Center.

Instrumentation

The survey instrument was developed in English, drawing upon and adapting from a prior study on the Sehhaty app,[24] ensuring relevance and applicability to the 937-Call Center context. The instrument's reliability was tested, resulting in a Cronbach's alpha coefficient of 0.88, signifying a high level of internal consistency. The instrument was also validated through pre-test/pilot testing with a small group of healthcare providers in Saudi Arabia, leading to minor modifications to improve clarity and relevance.

The questionnaire included sections on demographic information, professional background, service evaluation, and identification of operational challenges. Responses were measured using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The survey instrument is provided as supplementary material (Appendix A) to this manuscript.

Data Processing and Analysis

Upon collection, responses were digitized and prepared for analysis using SPSS v.27.0. Preliminary checks were performed to ensure the integrity and quality of the data, including screening for and handling missing data, identifying and addressing outliers, and testing for the normality of the distribution. Missing data were handled using multiple imputation methods to minimize bias.

Descriptive statistics were used to summarize the data, providing an overview of the central tendencies, dispersion, and general distribution of responses. Independent *t*-tests, ANOVA (Analysis of Variance), and Pearson's correlation analyses were employed to explore the relationships between variables. The choice of these specific statistical tests was driven by the nature of the research questions and the characteristics of the data. The significance threshold was set at $p < 0.05$ for all tests, adhering to conventional criteria for determining statistical significance.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board at King Saud University [KSU-HE-23-1221]. Prior to participation, all potential participants were briefed on the objectives and procedures of the study, and electronic informed consent was obtained, ensuring confidentiality and anonymity of responses. There were no conflicts of interest identified that could have influenced the study outcomes. Data security was maintained through rigorous data encryption and secure storage protocols, with access restricted to authorized members of the research team. This study complies with the principles outlined in the Declaration of Helsinki.

Results

Response Rate

Engagement with the study was high, with 411 out of the 454 healthcare providers (HCPs) targeted for the survey completing it, yielding an impressive response rate of 90.5%. This robust participation underscores the relevance of the study to the professional community and indicates a strong interest in telehealth evaluation among HCPs.

Demographic and Occupational Characteristics

The demographic and occupational characteristics of healthcare providers using the 937-Call Center are detailed in Table 1. The respondent pool consisted of 60.3% females and 63.5% non-Saudi nationals, illustrating the center's diverse

Table 1 Demographic, and Occupational Related Characteristic Among HCPs

Demographic Variable	Category	Frequency (F)	Percentage (%)
Gender	Male	163	39.7
	Female	248	60.3
Nationality	Saudi	150	36.5
	Non-Saudi	261	63.5
Specialty	Family Medicine	213	51.8
	Emergency Medicine	11	2.7
	General Practitioners	90	21.9
	Others	140	33.6
Age	20-<30	46	11.2
	30-<40	152	37
	40-<50	144	65
	50-<60	52	12.7
	60 or older	17	4.1

user base. Family physicians were the most substantial specialty group among respondents, highlighting the call center's broad applicability across various medical fields. Significant associations were found between HCPs' demographic backgrounds, occupational roles, and their evaluations of the telehealth service. For instance, non-Saudi HCPs displayed higher satisfaction and effectiveness scores than their Saudi counterparts, suggesting variations in telehealth adaptation across nationalities. Additionally, older HCPs, particularly those aged over 60, expressed greater appreciation for the service, indicating telehealth's value in enhancing the practice of more experienced practitioners.

Evaluation of the 937 Virtual Medical Call Center's Services in KSA

Table 2 presents the evaluation of the 937-Call Center services in Saudi Arabia. The majority of healthcare providers (90.1%) highlighted the system's effectiveness in enhancing healthcare accessibility, speeding up patient service (76.6%), and boosting productivity (59.1%). Ease of use was broadly confirmed by 92.8% of the respondents, and 81.1% felt comfortable in patient interactions. Challenges were noted in accessing patient records, with 43.7% finding it difficult. Furthermore, the service was recognized for maintaining patient confidentiality (76.4%) and delivering quality care (65.3%). Overall satisfaction among HCPs was high at 86.8%, with a strong inclination towards continued telehealth utilization.

Correlation Analysis of Evaluation Scores

Table 3 shows the correlation analysis among evaluation metrics of the 937-Call Center services, employing the Pearson correlation coefficient to explore relationships between Perceived Usefulness (PU), Perceived Ease of Use (PEU), Perceived Effectiveness (PE), and Satisfaction and Future Use (SFU). A moderate to strong association was identified between SFU and PE ($r = 0.69$, $p < 0.001$***), indicating a significant link between the effectiveness of the call center and healthcare providers' satisfaction and willingness to use the service in the future. Other significant correlations include those between PU and PEU, PEU and PE, and PU and PE, highlighting the interconnectedness of these aspects in influencing overall evaluation.

Table 2 Evaluation of the Service Provided by 937-Call Center in KSA

Evaluation Item	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Total (%)
Achieves patient needs more quickly	32.8	43.8	15.6	5.6	2.2	100
Increases access to care	52.8	37.5	6.6	2.2	1	100
More productive than in-person visits	24.8	34.3	25.1	12.9	2.9	100
Comfortable interacting with patients	42.3	38.9	12.4	4.6	1.7	100
Ease of accessing patient records	11.9	18	21.4	28.7	11.9	100
Maintains patient data confidentiality	51.3	25.1	8.5	1.7	16.4	100
Acceptable way to provide healthcare services	47.9	39.4	8	2.4	2.2	100

Table 3 The Correlation Between the Three Evaluation Items

Variable Pair	Correlation Coefficient (r)	p-value
PU and PEU	0.58	$p < 0.001$***
PU and PE	0.59	$p < 0.001$***
PEU and PE	0.57	$p < 0.001$***
SFU and PE	0.69	$p < 0.001$***

Notes: Significance levels: $p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
Abbreviations: PU, Perceived Usefulness; PEU, Perceived Ease of Use; PE, Perceived Effectiveness; SFU, Satisfaction and Future Use.

Detailed Examination of Challenges and Areas for Enhancement

Table 4 presents a detailed examination of the challenges faced by healthcare providers and areas for enhancement. Approximately 41% of respondents identified the difficulty of providing accurate medical assessments through telehealth as a significant concern. Other concerns included the clarity of telehealth regulations (25.3%) and the need for enhanced management support and consultation processes (16%). Providers also emphasized the need for involving medical specialists (61.3%), better integration with existing electronic health systems (38.2%) and ensuring continuity of care (25.5%).

Table 4 The Concerns and Challenges, the Areas of Improvement in the 937 Medical Call Centers

Category	Description	Frequency (F)	Percentage (%)
Concerns and Challenges			
Difficult to provide accurate medical assessments	Difficulties in accurately assessing medical conditions remotely	169	41.1
Lack of clear regulations and rules for telehealth services	Insufficient telehealth regulations and guidelines	104	25.3
Lack of management support	Inadequate support from management	69	16.8
Overlapping of consultations	Scheduling conflicts and overlapping appointments	68	16.5
Lack of technical training	Insufficient training on telehealth technologies	29	7.1
Difficult to use technology and technical devices	Challenges in using telehealth devices and technology	25	6.1
Data privacy and security	Concerns about data privacy and security	24	5.8
Other	Other unspecified challenges	47	11.4
Areas for Improvement			38.2
Integration and connection with other electronic systems (eg, electronic health records)	Better integration with existing electronic health records	157	25.5
Continuity of care	Ensuring continuity of care	105	19.2
Technical aspects of the app (eg, quality of voice)	Improving technical aspects of the telehealth application	79	61.3
Involvement of medical specialists (eg, psychiatrist, dermatologist, oncologists)	Increasing involvement of various medical specialists	252	36.7
Access to patient data	Improving access to patient data	151	45.7
Other	Other unspecified areas for improvement	188	45.7
Additional Comments			
Expanding work within 937 to include renewing prescriptions and transferring to hospitals	Expanding services to include prescription renewals and hospital transfers	3	0.6
Improving care system	General improvements to the care system	2	0.4
Need more psychiatric doctor – add pharmacist	Increasing the number of psychiatric doctors and adding pharmacists	2	0.4
Infrastructure (poor internet, old computer devices, periodic maintenance of computers, add video)	Improving infrastructure including internet and computer devices, and adding video capabilities	6	1.2
Duration of consultation	Adjusting the duration of consultations	5	1.0

(*Continued*)

Table 4 (Continued).

Category	Description	Frequency (F)	Percentage (%)
Patients related (health education, quality of patient's questions are high, use of the services)	Enhancing patient-related services including health education and quality of patient questions	3	0.6
Need guideline, updated references, and required training	Providing guidelines, updated references, and necessary training	3	0.6
Working time (work more hours, and others 4 hours)	Adjusting working hours	2	0.4
Tracking and blocking calls from inappropriate callers	Implementing tracking and blocking for inappropriate callers	1	0.2
Excessive surveys - Difficulty in providing service due to many forms to fill out	Reducing the number of surveys and forms required for service	3	0.6
Assigning doctors to provide services not within their specialty, such as pharmaceutical consultation	Ensuring doctors provide services within their specialty	2	0.4
Not dealing with inappropriate calls	Addressing issues with inappropriate calls	2	0.4

The findings from our investigation into the experiences of healthcare providers with the 937 Virtual Medical Call Center reveal a highly positive reception towards telehealth services in the Kingdom of Saudi Arabia. A significant majority of respondents acknowledge the pivotal role of the call center in enhancing healthcare accessibility, efficiency, and provider productivity. Notably, the data indicates nuanced variations in satisfaction and perceived effectiveness across demographic and professional lines, suggesting that telehealth's impact is multifaceted and influenced by a range of factors including nationality, age, and professional role. These insights underscore the critical importance of considering diverse provider experiences and needs in the ongoing development and optimization of telehealth services.

Furthermore, the identification of challenges and areas for improvement, such as the need for better integration with existing health systems and the involvement of medical specialists, points to actionable avenues for enhancing telehealth's effectiveness and user satisfaction. As the telehealth landscape continues to evolve, particularly in response to the global shift towards more digital healthcare delivery models, the lessons learned from the 937-Call Center's operation can inform both policy and practice. Future research should build on these findings to explore targeted interventions and innovations that address the identified challenges, thereby contributing to the refinement and expansion of telehealth services to meet the diverse needs of healthcare providers and patients alike.

Discussion

This study represents a pioneering exploration into healthcare providers' perceptions and experiences with the 937 medical call center in Saudi Arabia, focusing on its usefulness, ease of use, effectiveness, satisfaction, and future use, alongside perceived challenges and areas for improvement. Until now, detailed insights into healthcare providers' experiences, technological perceptions, and specific challenges within the 937-Call Center have remained largely unexplored in existing literature. While the impact of COVID-19 on the utilization of Saudi Arabia's 937 telephone health services has been documented,[25] prior studies have only begun to scratch the surface of HCPs' perceptions towards telehealth in clinical settings. For instance, Alghamdi et al's 2022 study delves into HCPs' perceptions and barriers towards telehealth, revealing positive attitudes towards its utility, ease of use, and effectiveness in patient care.[26] Similarly, Alsaleh et al's 2021 research on the Sehha app underscores a significant boost in telehealth satisfaction during the pandemic, with over 80% of HCPs noting improved experiences and more than half expressing satisfaction with the app.[24]

Our investigation not only fills this critical gap by providing a nuanced understanding of these perceptions specifically within the context of the 937-Call Center operations but also aligns with the strategic objectives of Saudi Vision 2030, aiming to enhance telehealth accessibility and foster a comprehensive national healthcare network. By doing so, it

contributes significantly to the ongoing discourse on telehealth's role in the evolution of healthcare delivery in the Kingdom, marking a substantial advancement in understanding the dynamics of telehealth adoption among healthcare professionals in Saudi Arabia.

Our study's compelling findings, marked by a 90.5% response rate from healthcare providers, significantly exceed prior research benchmarks during the pandemic's onset. This heightened engagement not only highlights the medical community's growing acknowledgment of telehealth's efficacy in managing patient care and reducing healthcare professionals' load but also its crucial role in safeguarding against pathogen spread, a pivotal concern highlighted in recent studies.[25–37] This enthusiastic response underlines the healthcare sector's readiness to embrace telehealth advancements, reflecting an optimistic outlook toward integrating such technologies in future healthcare strategies.[34]

Our study's demographics reveal a predominant female participation (60.3%), with the majority aged between 30 and <40 years (37.0%), and a significant proportion being non-Saudi (63.5%). Notably, family physicians formed the largest group (51.8%), and a substantial number were specialists with a decade or two of experience (42.1%). These findings resonate with Idriss et al's 2022 study, albeit contrasting with their observation of male dominance among telemedicine-involved physicians.[38] Similarly, Alghamdi et al (2022) and Alsaleh et al (2021) noted a significant male representation and a comparable age distribution, respectively, in their studies on telehealth in Saudi Arabia,[24,39] highlighting diverse practitioner engagement in telehealth.

The demographic findings from our study illuminate the potential impact of physician characteristics on telemedicine adoption and utilization. The notable preference among family physicians for telemedicine underscores its relevance and potential benefits to their practice. This observation is echoed by Alsaleh et al's 2021 research, which also identified a significant engagement from family physicians with the Sehha app.[24] Conversely, the reticence among general physicians towards telemedicine usage might stem from concerns over diagnostic accuracy and diminished interaction times, crucial for effective patient care.[35,40] Additionally, technological limitations have been identified as barriers to telemedicine's broader adoption among general practitioners,[41,42] highlighting areas for targeted improvement to facilitate its wider use.

In our study, regarding the perceived usefulness of the 937 medical call centers, the majority of HCPs reported that telehealth technology like 937 increased access to care (371; 90.1%), expedited patient needs compared to in-person visits (315; 76.6%), and made them feel more productive (243; 59.1%). This suggests that the 937-call center enhances access to medical care in Saudi Arabia. Telehealth services like the 937-call center have been shown to improve access and timely care delivery, particularly during the COVID-19 pandemic, making it a convenient way to access medical advice and support.[43,44] Additionally, telehealth has the potential to increase access and efficiency of care, especially by empowering primary care teams to provide hybrid (virtual/in-person) services, thereby expanding access to healthcare services.[45,46]

In the analysis of the 937 medical call center's usability, an overwhelming majority of HCPs concurred on its user-friendliness (92.8%) and the comfort it provided in patient interactions (81.1%). However, a notable contention arose regarding the ease of accessing patient records, with a significant minority (47.6%) finding it challenging. This observation aligns with existing literature, notably Alsaleh et al (2021), which also highlighted ease of use but identified record access as a hurdle in the Sehha app's usage.[24] The critical role of perceived ease of use as a determinant in adopting telemedicine practices by both physicians[44] and patients[47] underscores its importance in the broader telehealth implementation framework. This aspect warrants further attention to streamline telehealth services and enhance their integration into healthcare systems.[48]

In evaluating the 937-Call Center's perceived efficacy, a significant majority of healthcare professionals concurred that it facilitates an acceptable modality for healthcare delivery (87.2%), assures patient data confidentiality (76.4%), and achieves a standard of care commensurate with face-to-face consultations (65.3%). This endorsement likely stems from the Ministry of Health's dedicated initiatives to uphold superior telehealth service standards, pivotal for advancing digital health transformation and empowering healthcare providers.[49] As an endorsed and efficacious platform by the Ministry of Health, the 937-Call Center offers comprehensive medical and administrative services, operating continuously to meet healthcare needs.[50] Notwithstanding the broad equivalence in care quality between telemedicine and traditional consultations reported in the literature,[51,52] disparities in perceived care quality have been noted, as Alsaleh et al (2021) identified among some users of the Sehha app.[24]

Regarding satisfaction and future use, the majority of HCPs agreed that they were satisfied with their work through 937 (357; 86.8%) and believed their patients were satisfied with the care provided via 937 (78.5%). They also expressed willingness to use telehealth technologies like the 937-Call Center in the future. While specific information about physician satisfaction with the 937-Call Center is lacking, the high satisfaction rates observed in our study are consistent with other research on telehealth services. For example, a study by Barriga et al in 2022 investigated satisfaction with telemedicine services in a Peruvian hospital and found high satisfaction rates among non-physician professionals.[53] Additionally, Becevic et al's 2015 study on telehealth technologies reported a high level of satisfaction among all users, including patients and HCPs.[28] A study by Wali et al in 2022 on primary care physicians' perception and satisfaction with telehealth in Saudi Arabia also reported high satisfaction levels among HCPs.[54]

We also found a statistically significant relationship between the mean total evaluation score, including perceived usefulness, ease of use, effectiveness, satisfaction, future use, nationality, and age groups. The total evaluation score was significantly higher among non-Saudi HCPs compared to Saudi HCPs, which can be attributed to our study's higher proportion of non-Saudi HCPs. Moreover, the total evaluation score was significantly higher among HCPs over 60 compared to other age groups, indicating that physicians with more experience or increased age may be more satisfied with the service.

Additionally, the findings of this study revealed several significant correlations that highlight the complexity of telehealth adoption. The total evaluation score, which included perceived usefulness, ease of use, effectiveness, satisfaction, and future use, was significantly higher among non-Saudi HCPs compared to Saudi HCPs. This could be attributed to the higher proportion of non-Saudi HCPs in our study sample. Furthermore, the total evaluation score was notably higher among HCPs over 60 compared to other age groups, suggesting that more experienced or older physicians may find greater value in telehealth services. These insights emphasize the importance of considering demographic variables when developing and implementing telehealth solutions to ensure they meet the diverse needs of healthcare providers.

Looking at concerns and challenges, a significant percentage of doctors expressed difficulty in providing accurate medical assessments (41%), concerns about unclear regulations and rules for telehealth services (25.3%) and reported a lack of management support and overlapping consultations (16%). These concerns are valid, as virtual consultations differ from in-person ones regarding accurate patient assessment and examination. However, the 937-Call Center employs technology, quality assurance processes, and training to ensure the accuracy of medical assessments offered by HCPs. Challenges such as unclear regulations, lack of management support, and overlapping consultations are common in telemedicine and require comprehensive guidelines and standardized formats.[55,56]

Analyzing the areas of improvement, HCPs identified three main areas: involvement of medical specialists (61.3%), integration and connection with other electronic systems (38.2%), and continuity of care (25.5%). Enabling specialists from various fields to explore patient cases in telemedicine is essential for well-informed decisions. Integrating electronic health records (EHR) with telemedicine platforms offers several benefits, including increased efficiency, improved patient care, and enhanced clinical decision-making. The 937-Call Center's positive perception by HCPs suggests that it is aligned with the Ministry of Health's goals to enhance telehealth services in Saudi Arabia. This is consistent with other research indicating growing telehealth awareness and knowledge.[48,57,58]

While our study has primarily focused on the experiences of physicians with the 937 medical call center, it unveils a crucial understanding of telemedicine's current landscape in Saudi Arabia, notably emphasizing the strong interest and positive perceptions among family physicians. These findings underscore telemedicine's significant potential to transform healthcare delivery, making it more accessible and efficient, particularly in the realm of primary care. Our investigation reveals that the 937-Call Center is highly regarded for its usefulness, ease of use, and effectiveness, with healthcare providers appreciating the platform's ability to enhance patient care and operational efficiency.

Notably, the study highlights areas for enhancement, such as the integration with electronic health systems and the involvement of medical specialists, pointing towards actionable pathways to elevate telehealth's utility further. These insights are pivotal for policymakers, healthcare leaders, and telehealth platform developers as they strive to refine telehealth services, ensuring they meet the evolving needs of healthcare providers and patients alike.

However, the limited data on perceptions from other healthcare professions suggests a gap that future research should address to provide a more holistic view of telehealth adoption and utilization across the healthcare spectrum. This broader perspective is essential for tailoring telehealth solutions that cater to the diverse needs of the entire healthcare community.

Furthermore, the Discussion of our Results highlights the critical importance of aligning telehealth initiatives with national healthcare strategies, such as Saudi Vision 2030. This vision emphasizes the need for enhanced telehealth accessibility and the development of a comprehensive national healthcare network.[59–64] Our study contributes to this strategic objective by demonstrating that telehealth services, such as the 937-Call Center, play a pivotal role in improving healthcare delivery. The findings, which show high levels of satisfaction and perceived effectiveness, are consistent with other studies indicating that telehealth can significantly enhance patient care and operational efficiency.[35–37] By integrating our results with existing literature, we underscore the potential for telehealth to not only meet immediate healthcare needs but also to evolve as a sustainable solution for future healthcare challenges. Highlighting these correlations and the alignment with broader healthcare goals provides a clear and concise narrative that supports the continued investment and development in telehealth services.

In sum, our study not only enriches the understanding of telehealth's impact among physicians in Saudi Arabia but also lays the groundwork for continuous improvement and expansion of telehealth services. By addressing the identified challenges and leveraging the insights gained, there is a significant opportunity to enhance the effectiveness and satisfaction of telehealth, contributing to the overarching goals of Saudi Vision 2030 for a more integrated and accessible healthcare system.

Limitations

The Limitations of this study are multifaceted, reflecting both methodological constraints and broader challenges in generalizing findings.

Firstly, the cross-sectional design, while efficient for gathering data from a broad demographic, captures only a snapshot in time. This limits our ability to observe changes and trends over a longer period, potentially overlooking evolving experiences and perceptions of healthcare providers with the 937 medical call center services. Future studies could benefit from employing longitudinal designs to more comprehensively explore these dynamics and their impact on healthcare delivery and provider satisfaction over time.

Secondly, the reliance on self-reported data introduces the potential for response bias, which may affect the accuracy of reported satisfaction and effectiveness rates. Self-reported data can be influenced by participants' perceptions and willingness to provide honest responses. Future research might incorporate objective measures of telemedicine's impact, such as patient health outcomes or usage metrics, to provide a more balanced and accurate assessment.

Thirdly, while the study provides valuable insights into telemedicine practices within Saudi Arabia, its findings may not be directly applicable to other contexts with differing healthcare infrastructures, cultural norms, and regulatory frameworks. Comparative studies across various regions are necessary to identify universal versus locale-specific challenges and opportunities in telemedicine. This would help in understanding the broader applicability of the findings and tailoring telehealth solutions to different healthcare environments.

Moreover, the high response rate, although indicative of significant engagement, predominantly reflects the views of female and non-Saudi healthcare providers. This may not fully capture the diversity of perspectives among all healthcare providers utilizing the 937 call center. Stratified sampling or targeted outreach to underrepresented groups in future surveys could enhance the diversity and representativeness of the insights gathered, ensuring a more comprehensive understanding of telehealth adoption and utilization.

Lastly, the study did not delve deeply into technological and infrastructural challenges critical to telemedicine's efficacy, such as internet connectivity issues or platform usability. These factors are crucial for the successful implementation and operation of telehealth services. Future investigations focusing on these aspects could yield important insights into optimizing telemedicine infrastructure, thus improving overall service delivery and user satisfaction.

By addressing these limitations, future research can build on our findings to develop more nuanced understandings of telemedicine's role in healthcare. This will ensure that telehealth services are effectively tailored to meet the diverse needs of healthcare providers and patients alike, ultimately enhancing the quality and accessibility of healthcare delivery.

Conclusion

This cross-sectional descriptive study provides a comprehensive overview of HCPs experiences and perceptions regarding the 937 medical call center in Saudi Arabia. The findings indicate that the 937-Call Center is highly valued for its perceived usefulness, ease of use, and effectiveness in delivering healthcare services, aligning with the strategic objectives of Saudi Vision 2030. High satisfaction rates and willingness to continue using telehealth technologies underscore the growing acceptance and integration of telemedicine in the Saudi healthcare system.

Key takeaways from this study include the critical role of the 937-Call Center in enhancing healthcare accessibility and efficiency, especially during the COVID-19 pandemic. However, significant challenges remain, such as difficulties in conducting accurate remote medical assessments, the need for clearer telehealth regulations, and improved management support. Addressing these issues through regular updates, comprehensive telehealth guidelines, integration with electronic health systems, and involving a broader range of medical specialists can further optimize telehealth services.

Future research should focus on longitudinal studies to track the evolving experiences and perceptions of HCPs over time, incorporate objective measures of telemedicine's impact, and explore technological and infrastructural challenges in depth. By addressing these areas, there is a significant opportunity to enhance the effectiveness, satisfaction, and future utilization of telehealth services in Saudi Arabia, contributing to a more integrated and resilient healthcare system as envisioned in Saudi Vision 2030.

Institutional Review Board Statement

Ethical approval was secured from the Institutional Review Board at King Saud University [KSU-HE-23-1221].

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Acknowledgments

The authors would like to extend their appreciation to King Saud University for funding this work through the Researchers Supporting Project number (RSPD2024R649), King Saud University, Riyadh, Saudi Arabia.

Disclosure

The authors declare no conflicts of interest.

References

1. Bashshur RL, Shannon GW, Bashshur N, Yellowlees PM. The empirical evidence for telemedicine interventions in mental disorders. *Telemed E-Health*. 2016;22(2):87–113. doi:10.1089/tmj.2015.0206
2. Lustig T. *The Role of Telehealth in an Evolving Health Care Environment: Workshop Summary*. National Academies Press; 2012.
3. Mace S, Boccanelli A, Dormond M. *The Use of Telehealth Within Behavioral Health Settings: Utilization, Opportunities, and Challenges*. University of Michigan School of Public Health, Behavioral Health Workforce Research Center; 2018.
4. Substance Abuse and Mental Health Services Administration. Using technology-based therapeutic tools in behavioral health services. Treatment Improvement Protocol (TIP) Series 60; 2015. Available from: https://store.samhsa.gov/product/TIP-60-UsingTechnology-Based-Therapeutic-Tools-in-BehavioralHealth-Services/SMA15-4924. Accessed June 18, 2024.
5. American Medical Association. (2019). Telehealth implementation playbook. Digital health implementation playbook series. Available from: https://www.ama-assn.org/system/files/2020-04/ama-telehealthimplementation-playbook.pdf. Accessed June 18, 2024.
6. A guide to telemedicine in primary healthcare. Available from: https://www.unicef.org/romania/reports/guide-telemedicine-primary-healthcare. Accessed June 18, 2024.
7. Ryu S. Telemedicine: opportunities and developments in member states: report on the second global survey on eHealth 2009 (Global Observatory for eHealth Series, volume 2). *Healthc Inform Res*. 2012;18(2):153–155.
8. Badawy SM, Radovic A. Digital approaches to remote pediatric health care delivery during the COVID-19 pandemic: existing evidence and a call for further research. *JMIR Pediatr Parent*. 2020;3(1):e20049. doi:10.2196/20049
9. Vidal-Alaball J, Acosta-Roja R, Hernández NP, et al. Telemedicine in the face of the COVID-19 pandemic. *Aten Primaria*. 2020;52(6):418–422. doi:10.1016/j.aprim.2020.04.003
10. Mann DM, Chen J, Chunara R, Testa PA, Nov O. COVID-19 transforms health care through telemedicine: evidence from the field. *J Am Med Inform Assoc*. 2020;27(7):1132–1135. doi:10.1093/jamia/ocaa072

11. Serlachius A, Badawy SM, Thabrew H. Psychosocial challenges and opportunities for youth with chronic health conditions during the COVID-19 pandemic. *JMIR Pediatr Parent*. 2020;3(2):e23057. doi:10.2196/23057
12. Polinski JM, Barker T, Gagliano N, Sussman A, Brennan TA, Shrank WH. Patients' satisfaction with and preference for telehealth visits. *J Gen Intern Med*. 2016;31:269–275. doi:10.1007/s11606-015-3489-x
13. Grigsby J, Kaehny MM, Sandberg EJ, Schlenker RE, Shaughnessy PW. Effects and effectiveness of telemedicine. *Health Care Financ Rev*. 1995;17 (1):115–131.
14. Hassounah M, Raheel H, Alhefzi M. Digital Response During the COVID-19 Pandemic in Saudi Arabia. *J Med Internet Res*. 2020;22(9):e19338. doi:10.2196/19338
15. Al-Wathinani A, Hertelendy AJ, Alhurishi S, et al. Increased emergency calls during the COVID-19 Pandemic in Saudi Arabia: a national retrospective study. *Healthcare*. 2020;9(1):14. PMID: 33374453; PMCID: PMC7823911. doi:10.3390/healthcare9010014
16. Alanzi T. A review of mobile applications available in the app and google play stores used during the COVID-19 outbreak. *J Multidiscip Healthc*. 2021;14:45.
17. Alfaleh A, Alkattan A, Salah M, et al. Telemedicine and patient satisfaction in Saudi Arabia. In: *medRxiv*. Cold Spring Harbor Laboratory Press; 2021.
18. Boxer RJ. Advantages and utilization of telemedicine. *mHealth*. 2019;5:12.
19. Kichloo A, Albosta M, Dettloff K, et al. Telemedicine, the current COVID-19 pandemic and the future: a narrative review and perspectives moving forward in the USA. *Fam Med Comm Health*. 2020;8:e000530.
20. Gajarawala SN, Pelkowski JN. Telehealth benefits and barriers. *J Nurse Pract*. 2021;17:218–221.
21. Clarke JL, Bourn S, Skoufalos A, Beck EH, Castillo DJ. An innovative approach to health care delivery for patients with chronic conditions. *Popul Health Manag*. 2017;20(1):23–30.
22. Xesfingi S, Vozikis A. Patient satisfaction with the healthcare system: assessing the impact of socio-economic and healthcare provision factors. *BMC Health Serv Res*. 2016;16(94):1–7.
23. Al-Abri R, Al-Balushi A. Patient satisfaction survey as a tool towards quality improvement. *Oman Med Journal*. 2014;29(1):3–7.
24. Alsaleh MM, Watzlaf VJM, DeAlmeida DR, Saptono A. EVALUATION OF A TELEHEALTH APPLICATION (SEHHA) USED DURING THE COVID-19 PANDEMIC IN SAUDI ARABIA: PROVIDER EXPERIENCE AND SATISFACTION. *Perspect Health Inf Manag*. 2021;18(4):1b. PMID: 34975351; PMCID: PMC8649707.
25. Alhraiwil NJ, Al-Aqeel S, AlFaleh AF, AlAgeel AA, AlAbed MA, Al-Shroby WA. Impact of COVID-19 on the 937 Telephone Medical Consultation Service in Saudi Arabia. *Int J Telemed Appl*. 2022;2022:4181322. PMID: 35058977; PMCID: PMC8764273. doi:10.1155/2022/4181322
26. Alghamdi SM, Aldhahir AM, Alqahtani JS, et al. Healthcare providers' perception and barriers concerning the use of telehealth applications in Saudi Arabia: a cross-sectional study. *Healthcare*. 2022;10(8):1527. PMID: 36011185; PMCID: PMC9408269. doi:10.3390/healthcare10081527
27. Glaser M, Winchell T, Plant P, et al. Provider satisfaction and patient outcomes associated with a statewide prison telemedicine program in Louisiana. *Telemed J E Health*. 2010;16(4):472–479.
28. Becevic M, Boren S, Mutrux R, Shah Z, Banerjee S. User satisfaction with telehealth: study of patients, providers, and coordinators. *Health Care Manag*. 2015;34(4):337–349.
29. Baert S, Lippens L, Moens E, Weytjens J, Sterkens P. The COVID-19 crisis and telework: a research survey on experiences, expectations and hopes; 2020.
30. Ayatollahi H, Sarabi FZ, Langarizadeh M. Clinicians' Knowledge and Perception of Telemedicine Technology. *Perspect Health Info Manag*. 2015;12:1c.
31. Alaboudi A, Atkins A, Sharp B, Balkhair A, Alzahrani M, Sunbul T. Barriers and challenges in adopting Saudi telemedicine network: the perceptions of decision makers of healthcare facilities in Saudi Arabia. *J Infect Public Health*. 2016;9(6):725–733.
32. Parmanto B, Lewis AN, Graham KM, Bertolet MH. Development of the telehealth usability questionnaire (TUQ). *Int J Telerehabilit*. 2016;8(1):3–10.
33. Bakken S, Grullon-Figueroa L, Izquierdo R, et al. Development, validation, and use of English and Spanish versions of the telemedicine satisfaction and usefulness questionnaire. *J Am Med Inf Assoc*. 2006;13(6):660–667.
34. Alghamdi SM, Alsulayyim AS, Alqahtani JS, Aldhahir AM. Digital health platforms in Saudi Arabia: determinants from the COVID-19 pandemic experience. *Healthcare*. 2021;9:1517.
35. Mazouri-Karker S, Lüchinger R, Braillard O, et al. Perceptions of and preferences for telemedicine use since the early stages of the COVID-19 pandemic: cross-sectional survey of patients and physicians. *JMIR Hum Factors*. 2023;10(e50740). PMID: 37934574; PMCID: PMC10664018. doi:10.2196/50740
36. Park HY, Kwon YM, Jun HR, Jung SE, Kwon SY. Satisfaction survey of patients and medical staff for telephone-based telemedicine during hospital closing due to COVID-19 transmission. *Telemed J E Health*. 2021;27(7):724–732. PMID: 33216710; PMCID: PMC8290303. doi:10.1089/tmj.2020.0369
37. Moazzami B, Razavi-Khorasani N, Dooghaie Moghadam A, et al. COVID-19 and telemedicine: immediate action required for maintaining healthcare providers well-being. *J Clin Virol*. 2020;126:104345.
38. Idriss S, Aldhuhayyan A, Alanazi AA, et al. Physicians' perceptions of telemedicine use during the COVID-19 pandemic in Riyadh, Saudi Arabia: cross-sectional study. *JMIR Form Res*. 2022;6(7):e36029. PMID: 35714293; PMCID: PMC9278404. doi:10.2196/36029
39. Andrews E, Berghofer K, Long J, Prescott A, Caboral-Stevens M. Satisfaction with the use of telehealth during COVID-19: an integrative review. *Int J Nurs Stud Adv*. 2020;2:100008,ISSN 2666–142X. doi:10.1016/j.ijnsa.2020.100008
40. Mubaraki AA, Alrabie AD, Sibyani AK, Aljuaid RS, Bajaber AS, Mubaraki MA. Advantages and disadvantages of telemedicine during the COVID-19 pandemic era among physicians in Taif, Saudi Arabia. *Saudi Med J*. 2021;42:110.
41. Kaliyadan F, Ameer MAA, Al Ameer A, Al Alwan Q. Telemedicine practice in Saudi Arabia during the COVID-19 pandemic. *Cureus*. 2020;12: e12004.
42. Aboalshamat KT. Awareness of, beliefs about, practices of, and barriers to teledentistry among dental students and the implications for Saudi Arabia Vision 2030 and coronavirus pandemic. *J Int Soc Prev Community Dent*. 2020;10:431.
43. Mohaya MAA, Almaziad MM, Al-Hamad KA, Mustafa M. Telemedicine among oral medicine practitioners during covid-19 pandemic and its future impact on the specialty. *Risk Manag Healthc Policy*. 2021;14:4369.

44. Cannedy S, Leung L, Wyte-Lake T, et al. Primary care team perspectives on the suitability of telehealth modality (phone vs video) at the veterans health administration. *J Prim Care Community Health*. 2023;14:21501319231172897. PMID: 37170906; PMCID: PMC10184255. doi:10.1177/21501319231172897
45. Al-Rayes SA, Alumran A, Aljabri D, et al. Public awareness and utilization of 937-telephone health services in the Kingdom of Saudi Arabia before and during the COVID-19 Pandemic: longitudinal study. *J Med Internet Res*. 2021;23(7):e27618. PMID: 34156963; PMCID: PMC8330632. doi:10.2196/27618
46. Alfaleh A, Alkattan A, Alageel A, et al. The role of telemedicine services in changing users' intentions for presenting to the emergency departments in Saudi Arabia. *DIGITAL HEALTH*. 2022;8. doi:10.1177/20552076221091358
47. Alkhashan H, Al-Khaldi Y, Hassanein M, et al. (2020). Telephone consultation services in Saudi Arabia: utilization pattern and satisfaction among health care providers and consumers. Available from: https://www.jhidc.org/index.php/jhidc/article/view/265. Accessed June 18, 2024.
48. Aldekhyyel RN, Almulhem AJ, Binkheder S. Usability of telemedicine mobile applications during COVID-19 in Saudi Arabia: a heuristic evaluation of patient user interfaces. *Healthcare*. 2021;9:1574.
49. Amin J, Ahmed S, Saleh A, et al. The potential and practice of telemedicine to empower patient-centered healthcare in Saudi Arabia. *Int Med J*. 2020;27:151–154.
50. Al-rayes SA, Aldossary H, Aldoukhi E, Alahmedalyousif Z, Aldawood G. Arwa Alumran: the awareness and utilization of 937-telephone health services in Saudi Arabia: cross-sectional survey study. *Informatics in Medicine*. 2020;20:100393,ISSN2352–9148. doi:10.1016/j.imu.2020.100393
51. Omboni S, Padwal RS, Alessa T, et al. The worldwide impact of telemedicine during COVID-19: current evidence and recommendations for the future. *Connect Health*. 2022;1:7–35. PMID: 35233563; PMCID: PMC7612439. doi:10.20517/ch.2021.03
52. Al-Sofiani ME, Alyusuf EY, Alharthi S, Alguwaihes AM, Al-Khalifah R, Alfadda A. Rapid Implementation of a diabetes telemedicine clinic during the coronavirus disease 2019 outbreak: our protocol, experience, and satisfaction reports in Saudi Arabia. *J Diabetes Sci Technol*. 2021;15(2):329–338.
53. Barriga-Chambi F, Ccami-Bernal F, Alarcon-Casazuela AL, et al. Satisfaction of healthcare workers and patients regarding telehealth service in a hospital in Peru. *Rev Peru Med Exp Salud Publica*. 2022;39(4):415–424. Spanish, English. PMID: 36888803. doi:10.17843/rpmesp.2022.394.11287
54. Wali R, Shakir M, Jaha A, Alhumaidah R, Jamaluddin HA. Primary care physician's perception and satisfaction with telehealth in the national guard primary healthcare centers in Jeddah, Saudi Arabia in 2022. *Cureus*. 2023;15(3):e36480. PMID: 37090270; PMCID: PMC10115745. doi:10.7759/cureus.36480
55. Dandapani H, Davoodi N, Serina P, Keene S, Goldberg EM. Telehealth during COVID-19: perspectives on Usability by US Physicians. *Brown Hosp Med*. 2023;2(3). doi:10.56305/001c.77982
56. Khemapech I, Sansrimahachai W, Toachoodee M. Telemedicine–meaning, challenges and opportunities. *Siriraj Med Jl*. 2019;71(3):246–252.
57. Alomari MO, Jenkins J. Exploring the attitudes of patients towards using the seha application (Telehealth) in Saudi Arabia during the coronavirus epidemic. *ABC J Adv Res*. 2021;10:9–22.
58. Ahmed TJ, Baig M, A Bashir M, Gazzaz ZJ, Butt NS, A Khan S. Knowledge, attitudes, and perceptions related to telemedicine among young doctors and nursing staff at the King Abdul-Aziz University Hospital Jeddah, KSA. *Niger J Clin Pract*. 2021;24:464–469.
59. Alshammari F. Perceptions, preferences and experiences of telemedicine among users of information and communication technology in Saudi Arabia. *J Health Inform Dev Ctries*. 2019;13:e26002.
60. Althbiti AAJ, Khatib FMA, AL-Ghalayini NA. Telemedicine: between reality and challenges in Jeddah hospitals. *Egypt J Hosp Med*. 2017;68:1381–1389.
61. Khalifa M. Barriers to health information systems and electronic medical records implementation. a field study of Saudi Arabian hospitals. *Procedia Comput Sci*. 2013;21:335–342, ISSN18770509. doi:10.1016/j.procs.2013.09.044
62. Mani ZA, Goniewicz K. Adapting disaster preparedness strategies to changing climate patterns in Saudi Arabia: a rapid review. *Sustainability*. 2023;15(19):14279.
63. Goniewicz K, Goniewicz M. Disaster preparedness and professional competence among healthcare providers: pilot study results. *Sustainability*. 2020;12(12):4931.
64. Amir K-M, Dulebenets MA, Goniewicz K. Implementing public health strategies—the need for educational initiatives: a systematic review. *Int J Environ Res Public Health*. 2021;18(11):5888. doi:10.3390/ijerph18115888