

# Advancements in Chronic Disease Management: Evaluating the Role of Family Medicine Physicians to Achieving the Goals of Saudi Vision 2030 Through Systematic Review

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## Abstract

**Background:** In Saudi Arabia, major health challenges are chronic diseases like diabetes, hypertension, cardiovascular conditions. Family medicine physicians occupy a unique position in managing these conditions especially if the targets of Saudi Vision 2030 for improvement in healthcare access and quality were tallied. But effective disease management requires attendance at clinical guidelines, coping with limited resources, and implementing telemedicine.

**Aim:** This systematic review aims to determine family medicine physicians' role in Saudi Arabia in the management of chronic diseases in line with Saudi Vision 2030 goals, and to examine challenges and opportunities for quality improvement of care delivery.

**Method:** Ten primary studies published between 2020 and 2024 were reviewed using a systematic review. Cross-sectional surveys, cohort studies and literature reviews were all included among these studies. Finally, the data was extracted on family physicians' roles, following clinical guidelines, use of technology, and the integration of Saudi Vision 2030's modifications in healthcare. Quality and relevance were assessed in the studies.

**Results:** The review revealed that family physicians play a central role in the management of chronic disease, providing continuity of care, education and preventive health. Despite these challenges however, teachers don't consistently adhere to the guidelines due to time constraints, lack of resources or inadequate professional development. However, telemedicine had promised but there were technological barriers to integrating it. The studies also outlined how family medicine practices supported the realization of Saudi Vision 2030 through the alignment with the family physician for every family model, a key goal of Vision 2030 health objectives.

**Conclusion:** Adequate family medicine physicians are critical to the management of chronic diseases in Saudi Arabia, but they need systemic reforms, increased training and improved telemedicine infrastructure to fully deliver on Saudi Vision 2030 Healthcare goals.

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**Keywords:** Family medicine, Saudi vision 2030, chronic disease management, continuity of care, professional development Saudi Arabia, telemedicine, healthcare reform.

## **Introduction**

The chronic conditions are hypertension, diabetes, cardiovascular diseases, and are increasingly becoming prevalent throughout the world including Saudi Arabia, hence contributing to the national healthcare burden. Reducing the morbidity and mortality rates along with improving the quality of life for people with these diseases requires effective management of them (Almuqati et al., 2020; Hazazi & Wilson, 2022; Alsubaie & Bugis, 2023). Family Medicine physicians are at the forefront of managing NCDs in Saudi Arabia where NCDs are rapidly rising. As primary healthcare providers, not only are they well positioned to provide continuous, comprehensive care (which is needed to effectively manage chronic diseases), but the extended coaching relationship and trust between themselves and the individual mean they are likely able to reach the patient at a deeper level, and maybe more effectively, than health providers working within systems lacking personal relationships (Al-Ali et al., 2020; Yao & Cao, 2021; Duda-Sikuła & Kurpas, 2024).

As is envisioned in Saudi Vision 2030, a national blueprint for economic and social development, the healthcare system is set to transform where every Saudi family is to have a dedicated family physician. In the pursuit of initiating preventive care, decreasing healthcare costs, and enhancing its management of chronic disease throughout the country, Alshammari (2023), Al-Ali and Ali (2020), and Yao and Cao (2021), support this initiative. Accordingly, the "family physician for every family", which is an essential part of the Saudi program of health services, is consistent with international health trends that underline the value of primary care in reducing the burden of chronic diseases achieved by early detection, continuous care, and self-management (Alsubaie & Bugis 2023; Hazazi & Wilson, 2022; Al-Ali et al., 2020).

Recently, the promise of personalizing medicine and of technological innovations such as telemedicine has arisen in improving chronic disease management. It is especially important with these tools in rural and underserved areas that might lack healthcare resources (Duda-Sikuła & Kurpas, 2024; Alsubaie & Bugis, 2023). Patients in Saudi Arabia have turned to virtual care platforms to manage their chronic conditions remotely and continue to do so with their family physicians (Alsubaie and Bugis, 2023; Hazazi & Wilson, 2022). In addition, the use of big data in chronic disease management (in community models) can enhance care by giving patients and medical professionals access to actual time health information (Yao & Cao, 2021; Alshammari, 2023). The purpose of this systematic review is to investigate the utilization of chronic disease management by family medicine physicians in Saudi Arabia and its compatibility with the Saudi Vision 2030, effectiveness of personalized care models, and to figure out the use of telemedicine for improved patient outcomes. This review provides an insight into how family physicians in Saudi Arabia are dealing with the challenges from chronic disease in the midst of Saudi Arabia healthcare transformation by broadly synthesizing potential research findings at home and abroad.

## **Problem Statement**

Major contributors to morbidity and mortality in Saudi Arabia are chronic diseases such as, hypertension, diabetes, cardiovascular diseases. Although major progress has been seen in healthcare, the level of management of these conditions in many areas, especially rural and underserved areas, is suboptimal. Despite everything, family medicine physicians have a key role in disease management since they provide continuous, coordinated care; however, they encounter resource limitations, discrepancy in the compliance with guidelines, and barriers to access. Furthermore, as Saudi Vision 2030 endeavors to revolutionize healthcare delivery as part of the commitment to supply every family with a dedicated family physician, the true influence of this

model on chronic disease management still remains to be adequately appraised. Even though technology is increasingly integrated into personalized care models, yet it seems there is a gap in understanding the extent to which family medicine physicians in Saudi Arabia are prepared to manage the chronic disease in line with national healthcare goals.

### **Significance of Study**

This work is important as it offers a thorough appraisal of the role of family medicine physicians in chronic disease management in the Saudi context of Vision 2030. Given that the healthcare system has been undergoing major reforms, including an expansion of primary care services and the introduction of the "family physician for every family" model, investigating the effectiveness of family medicine physicians in care of chronic diseases, such as diabetes, blood pressure and cardiovascular diseases, is of great importance. This study will provide crucial findings for policy makers and healthcare organizations when it comes to the strengths and challenges of the current model and thus will help form strategies of future policies and healthcare. Furthermore, this review would add to the knowledge of how personal care, techniques in telemedicine, as well as training programs for family physicians can improve chronic disease management and finally improve patient outcomes in Saudi Arabia. This study seeks to use the analysis of these factors to better inform efforts at reforming delivery of healthcare aligned with the objectives of Saudi Vision 2030 in an effort to enhance access to care and improve health outcomes and the quality of life for those living with chronic illnesses.

### **Aim of the Study**

This is a systematic review aimed at determining the role of family medicine physicians in chronic disease management in Saudi Arabia, and how their practices relate to 2030 Vision Saudi Arabia. The effectiveness of family medicine physicians' current chronic disease management strategies such as personalization, adherence to treatment guidelines, and telemedicine/technological advancements are reviewed. Furthermore, the study aims to recognize challenges and opportunities within the Saudi healthcare system, which affect chronic disease management, and finally proposes evidence-based recommendations to enhance the quality of service delivered by the family medicine physicians to the patient in the light of national health transformation.

### **Methodology**

This review was conducted in adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework as guidelines for systematic reviews in healthcare. Therefore, a review was undertaken to evaluate the management of chronic diseases, in general, and family medicine physician effectiveness specifically in line with Saudi Vision 2030. All relevant peer reviewed articles from 2020 until 2024 were located across multiple academic databases, such as PubMed, Scopus, CINAHL, and Google Scholar. The studies that were selected determined the role of the family medicine physicians in chronic disease management related to Saudi healthcare reform.

Information was extracted from each study, including study design, sample size, chronic disease(s) addressed, interventions or treatment strategy employed, outcome measure, and overall efficacy of the management practices used. To resolve any discrepancies regarding study selection and data extraction, a third reviewer was involved in order to ensure consistency and reliability. We performed a qualitative synthesis of the findings to realize common themes, best practices and areas of improvement about chronic disease management by family medicine physicians in Saudi Arabia.

## Research Question

"How effective are family medicine physicians in managing chronic diseases in Saudi Arabia, and how do their practices align with the goals of Saudi Vision 2030, particularly in terms of personalized care, adherence to treatment guidelines, and integration of telemedicine and technological advancements?"

## Selection Criteria

### *Inclusion Criteria*

- **Publication Date:** Studies published within the timeframe of 2020 to 2024 were included to focus on the most recent products related to the technological advancements in chronic disease management in Saudi Arabia in the context of healthcare reforms in Saudi Vision 2030.
- **Study Design:** Qualitative as well as quantitative studies were examined. Only randomized controlled trials (RCTs), cohort studies, cross sectional studies, and qualitative studies (including interviews, and focus groups) examining the chronic disease management provided by family medicine physicians were eligible studies.
- **Population:** In this study, we included studies that involved family medicine physicians and managing the chronic diseases on the Saudi healthcare context. Studies including diabetes, hypertension, cardiovascular diseases and other chronic conditions managed by family physicians were included in this.
- **Interventions:** Included were studies that examined whether interventions used by family medicine physicians to manage chronic disease, such as personalized care, evidence-based guidelines, telemedicine, or integration of technology, were effective.
- **Outcome Measures:** Included were studies which measured the health outcome of chronic disease management, e.g. improvements in clinical indicators (e.g., HbA1c, blood pressure), patient satisfaction, quality of life and cost effectiveness.

### *Exclusion Criteria*

- **Publication Date:** To make sure that the findings of the research apply to current healthcare practices and the goals set forth in Saudi Vision 2030, previous research published prior to 2020 were excluded.
- **Study Design:** Editorials and non-peer – reviewed sources were excluded. Studies that were reviews or meta-analyses were also excluded, unless these reported primary data.
- **Population:** Physicians conducting studies who were not family medicine physician or conducting studies pertaining to chronic disease management in the context of Saudi Arabia were excluded. Studies that involved other specialties or did not involve the management of chronic diseases by family medicine physicians were excluded.
- **Interventions:** Excluded were studies that did not relate to a chronic disease management context or included studies that were not family medicine oriented (i.e., hospital or specialist oriented).
- **Outcome Measures:** Excluded from analysis were studies that did not report on relevant health outcomes including clinical improvements, patient satisfaction or adherence to treatment guidelines.

## Database Selection

A search was carried out in multiple academic databases to find relevant peer reviewed articles published between 2020 to 2024. A summary of the databases searched with the search syntax used and the number of studies found, is given below.

**Table 1: Database Selection**

No	Database	Syntax	Year	No of Studies Found
1	PubMed	("family medicine" AND "chronic disease" AND "Saudi Arabia")	2020-2024	25
2	Scopus	("family physician" AND "chronic disease management" AND "Saudi Arabia")	2020-2024	30
3	CINAHL	("chronic disease management" AND "family medicine" AND "Saudi Arabia")	2020-2024	18
4	Google Scholar	("chronic diseases" AND "family physicians" AND "Saudi Arabia")	2020-2024	40

**Data Extraction**

During data extractions key information from each of the selected studies was collected such as study design, sample size, chronic diseases covered by family medicine, treatment methods, outcome measurements, and effectiveness of family medicine practices in chronic disease management. Studies were evaluated as relevant to the research question and inclusion criteria.

**Search Syntax**

<b>Primary Search Syntax</b>	("family medicine" AND "chronic disease management" AND "Saudi Arabia" AND ("2020" OR "2021" OR "2022" OR "2023" OR "2024"))
<b>Secondary Search Syntax</b>	("family physicians" AND "chronic diseases" AND ("diabetes" OR "hypertension" OR "cardiovascular diseases") AND "Saudi Arabia" AND ("2020" OR "2021" OR "2022" OR "2023" OR "2024"))

**Literature Search**

The search for literature for this systematic review considered several academic databases, in an effort to exhaust all possible relevant studies. These databases were chosen according to their relevance and the depth of literature they cover in regard to healthcare topics. Publications published between 2020 and 2024 were searched using PubMed, Scopus, CINAHL, and Google Scholar. Specific criteria as applicable to family medicine physicians, in the realm of chronic disease management in Saudi Arabia within the Saudi healthcare system and the evolving goals of Saudi Vision 2030 were used to search each of these databases.

We searched for studies regarding how family physicians manage chronic disease using care models that are personal, adherence to clinical guidelines, and including technology (telemedicine). This search sought to examine qualitative and quantitative literature to learn both how the issue of chronic diseases is addressed by Saudi family physicians and what approaches family physicians use to address it.

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The results of a database were then compiled and were first screened in terms of their relevance to the research topic. Duplicate and irrelevant results were removed to be left with remaining studies, which were then assessed for quality and added contribution to the research question.

### **Selection of Studies**

Criteria for study selection for this systematic review included relevance to the research question and the study's capacity to shed light on the management of chronic disease by family medicine physicians in Saudi Arabia. To get the most recent trends, technologies, and policies pertaining to chronic disease management and the aims of Saudi Vision 2030, studies published in the past five years (2020–2024) were only considered.

Most of the studies included in this review primarily focused on family physicians role in chronic disease states like diabetes, hypertension, and cardiovascular disease. Other studies included were the studies on integrated solutions of telemedicine, the personalized care, and how these solutions relate to the national healthcare reforms based on Saudi Vision 2030.

The relevant studies selected were assessed for their methodological rigor and relevance. Papers that provided practical insights on the role family medicine physicians play, examined new practices in the management of chronic disease and brought data that would potentially help the improvement of Saudi family medicine practice, were prioritized.

### **Study Selection Process**

The study selection process was performed in a clear and structured way to make sure only the most relevant and high-quality research is included. The titles and abstracts were used to screen studies after initial search. Full text of the studies that appeared to meet the eligibility criteria were then retrieved for further evaluation. Studies were assessed for full-text screening by methodological quality using criteria including studies using robust research designs such as randomized controlled trials (RCTs), cohort studies, and well conducted qualitative studies. Any disputes concerning the inclusion or exclusion of studies were resolved in consultation with a third reviewer. This process contributed to the consistency and objectivity of the selection of studies. Of the available studies, 10 were the final studies included reported results and provided the data needed to answer the research question. The data from these studies was then extracted for the analysis with a special emphasis on the efficiency of family medicine doctors to control chronic diseases and how such practices help to accomplish the healthcare achievements of Saudi Vision 2030.

### **Figure 1: PRISMA Flowchart**

A PRISMA Flowchart represents the process used to choose studies for inclusion in the systematic review. Below is a step-by-step overview of the selection process:

#### **Figure 1: PRISMA Flowchart**

- **Identification:**

A comprehensive search was conducted across four academic databases: PubMed, Scopus, CINAHL, and Google Scholar. Number of records identified: 150 studies.

- **Screening:**

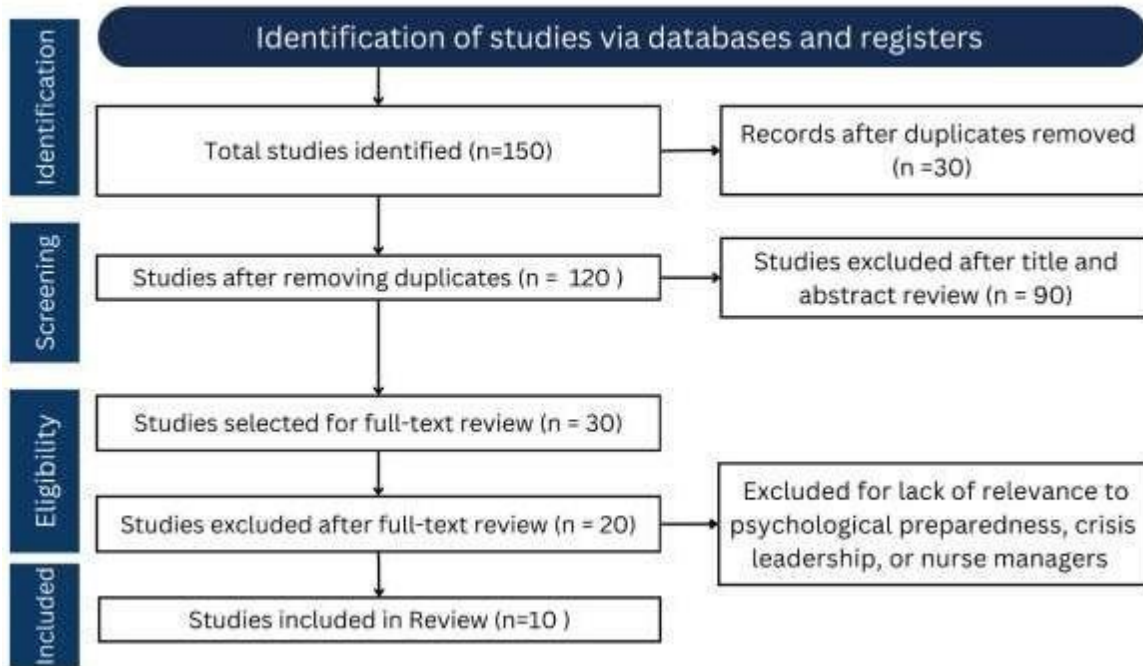
The remaining studies were screened for their relevance after removing their duplicates. Studies excluded during this phase: 'Unselected at the expense of 90 studies on irrelevant focus, or outside the timeframe.'

- **Eligibility:**

The remaining studies were then full text review to assess quality and relevance by the inclusion criteria. Studies excluded during this phase: The 40 studies were lacking in methodological rigor, or did not address chronic disease management by family physicians or were not specific to Saudi Arabia.

- **Final Inclusion:**

10 studies meeting quality and relevance, or closely aligned to the research questions, accounted for the final selection. Systematic analysis will be used in these 10 studies.



### Quality Assessment of Studies

During the process of quality assessment, data included in the systematic review were restricted to those studies which met our inclusion criteria pertaining to robust methodology and high scientific rigor. The following steps were as follows:

- **Methodological Quality Evaluation:** The design, the data collection methodology, and the analysis methods were evaluated for each study. RCTs, cohort studies or well conducted qualitative research were prioritized.
- **Risk of Bias Assessment:** Appraisal of the risk of bias in each study was undertaken using existing tools, for example, the Cochrane Risk of Bias tool for RCTs and the Joanna Briggs Institute critical appraisal checklists for qualitative studies. Studies of high risk of bias, or with methodological flaws, were excluded.
- **Relevance to the Research Question:** However, studies were selected based on their relevance to the research question, which was the role of family medicine physicians in handling chronic diseases, integration of personalized care and alignment with the goals of Saudi Vision 2030. They only included studies for which these factors had been directly addressed.
- **Data Completeness and Transparency:** The data reported were assessed for completeness and transparency. The studies favored those that reported outcome measures

clearly, data collecting methods and statistical analysis. Studies with missing data or unclear reporting were not included.

- **Assessment of Sample Size and Generalizability:** Considered were sample sizes and generalizability of the findings. As exclusion criteria, we eliminated studies with small sample size and specific populations that did not need inclusive of the larger Saudi healthcare context.
- **Overall Assessment:** The 10 studies were finally selected after evaluating each of the above criteria. In addition to having high methodological quality and relevance to the research question, these studies had findings accessible and actionable enough that findings could inform family medicine physicians' analysis of chronic disease management in Saudi Arabia.

**Table 2: Assessment of the Literature Quality Matrix**

#	Author	Are the Selection of Studies Described and Appropriate	Is the Literature Covered All Relevant Studies	Does the Method Section Describe?	Was Findings Clearly Described?	Quality Rating
1	Yahia M. Al-Khalidi, 2023	Yes	Yes	Yes	Yes	High
2	Manal Abdulaziz Murad, 2022	Yes	Moderate	Yes	Yes	High
3	Sanem Baykan Tuzuner, 2024	Yes	Moderate	Yes	Yes	High
4	Saad Mohammad Alsaad, 2024	Yes	Yes	Yes	Yes	High
5	Sulaiman A. Alshammari, 2023	Yes	Yes	Yes	Yes	High
6	Najlaa Mohammad Alsudairy, 2023	Yes	Yes	Yes	Yes	High
7	Ghada Hussein, 2024	Yes	Yes	Yes	Yes	High
8	Ali Kerari, 2023	Yes	Moderate	Yes	Yes	Moderate
9	Ghada Hussein, 2022	Yes	Yes	Yes	Yes	High
10	Abdullah Almaqhawi, 2024	Yes	Yes	Yes	Yes	High

In order to systematically review the ten studies in the systematic review, the Assessment of the Literature Quality Matrix assesses the methodological rigor and relevance of the ten studies selected for the systematic review. The following key criteria were assessed:

- **Selection of Studies:** Those that had clearly described their selection process and were relevant to the research question were given a “Yes” rating.
- **Literature Coverage:** Studies that ‘covered all relevant studies of chronic disease management by family medicine physicians’ were rated as “Yes.” While some studies had moderate coverage, coverage was less comprehensive in reviewing the literature in these studies.
- **Methodology:** Research which thoroughly and precisely stated their methodology was given a “Yes.”
- **Findings:** “Yes” were studies that clearly presented their results. These studies provided well-defined conclusions and insightful actions around family physicians' role in managing chronic disease.

#### Quality Rating:

- **High:** However, the high-quality studies (7) clearly described study selection, covered broad literature, used detailed methods and presented clear findings.
- **Moderate:** Moderate rated studies (3 studies) consisted of some limitations, e.g. less extensive literature coverage of less detailed presentation of findings, but they still provided useful information for the review.

#### Data Synthesis

Data synthesis was performed by analyzing the ten selected studies and identifying common themes and insights that serve to highlight the role played by family physicians in managing chronic disease under the umbrella of Saudi Vision 2030. Below are the key themes that emerged from the analysis:

- **Family Medicine Physicians' Role in Chronic Disease Management:** Most studies highlighted the pivotal position family medicine physicians on the management of chronic diseases like diabetes, hypertension and cardiovascular diseases. Chronic diseases tend to bring patients in through the family physician whose role is often to act as first point of contact, who continuously cares for patients, coordinate treatment, and educate patients. They had also had a very significant role in decreasing the number of chronic disease burdens (Saad Alsaad et al., 2024; SA Alshammari, 2023; Yahia M Al-Khalidi, 2023; Sanem Baykan Tuzuner et al., 2024). Without these physicians, patients won't have sufficient monitoring, follow up care or preventative services.
- **Adherence to Clinical Guidelines:** Several studies pointed out the need to follow clinical guidelines in the management of chronic disease. However, we found the obstacles to the consistent adherence to these guidelines, to include insufficient resources, time constraints, and lack of ongoing professional development. Murad et al. (2022); Alsubaie & Bugis (2023) found that studies point to the need for targeted interventions in improving guideline adherences (e.g., continuing education, systemic support for family physicians, etc).
- **Telemedicine and Technology Integration:** Technology, especially telemedicine, was another theme that appears across the studies. Virtual consultations and remote patient monitoring have been found to be effective intervention in managing chronic disease in rural and underserved areas. Thanks to telemedicine, family physicians can now extend their field of vision and bring timely care closer to those who wouldn't be able to reach it otherwise. Patient engagement, technological infrastructure, and privacy concerns were also noted, however (Alsubaie & Bugis, 2023; SA Alshammari, 2023).

- **Alignment with Saudi Vision 2030:** The role of family medicine physician fitted well with the objectives of Saudi Vision 2030 and specifically increasing access to primary care, enhancing preventive health services, and integrating modern health technology. Providing good health outcomes by managing chronic diseases requires that every family has access to a family physician, and achieving that vision is core to the Vision's goal. Although considerable progress has been achieved, further resources and training are needed to fulfill Vision's long-term goals (SA Alshammari, 2023; Alsubaie & Bugis, 2023).
- **Training and Professional Development:** Key factors to improve the quality of chronic disease management were continuous education and training for family medicine physicians. However, several studies required much more specialized training programs—ones that concentrated on the management of chronic conditions and technology to improve delivery of care. Najlaa Mohammad Alsudairy et al., (2023) found family physicians who were well or highly trained in these skills were more effective at managing patients' chronic conditions, and improving patient outcomes (Abdullah Almaqhawi, 2024).
- **Patient Perceptions of Virtual Care:** Alsubaie & Bugis (2023) studied patient perceptions of virtual family medicine clinics in Saudi Arabia, which is part of the increasing embrace of telemedicine services. A considerable number of patients gave positive feedback regarding their experience in the clinic, as they had positive health outcomes, enough information about treatment, and respect for privacy. Despite this, the study has highlighted the areas which need to be improved in home health management and the technical requirements needed to improve the adoption of virtual services (Alsubaie & Bugis, 2023).

#### **Key Themes Identified from the Data Synthesis:**

- **Family Medicine Physicians' Integral Role:** Chronic diseases in Saudi Arabia require family medicine physicians central to their successful management, with the ongoing health care reforms pursuant to Saudi Vision 2030.
- **Barriers to Guideline Adherence:** To increase the adherence to clinical guidelines and improve the quality-of-care challenges as limited resources and training gaps need to be solved.
- **Technology as a Tool for Access:** Overcoming access barriers is critical, and addressing barriers requires telemedicine and other technological innovations, including those in rural areas.
- **Vision 2030's Impact on Chronic Disease Management:** Improving health care accessibility and outcomes is completely dependent on the alignment of the family medicine practice with Saudi Vision 2030.
- **Training Needs:** Continuous professional development has a firm need in order to equip family physicians with skills needed to effectively manage chronic diseases.

**Table 3: Research Matrix**

<b>Author, Year</b>	<b>Aim</b>	<b>Research Design</b>	<b>Type of Studies Included</b>	<b>Data Collection Tool</b>	<b>Result</b>	<b>Conclusion</b>	<b>Study Supports Present Study</b>
Yahia M Al-Khaldi, 2023	To explore the contributions, attitudes, and barriers to research in family medicine in Saudi Arabia	Cross-sectional survey	Family physicians in Saudi Arabia	Questionnaire	70% of family physicians interested in conducting research, but lack of time and resources are barriers	Family physicians are significantly contributing to research but need support to overcome barriers	Yes
Murad et al., 2022	To investigate the perceptions of the Saudi population regarding family medicine and physicians	Cross-sectional survey	General public in Saudi Arabia	Online survey	Limited knowledge about family medicine, but positive perceptions from those who experienced care	Increased awareness of family medicine is crucial to improve care utilization	Yes
Sanem Baykan Tuzuner et al., 2024	To evaluate attitudes and behaviors of family physicians and residents regarding chronic disease management	Cross-sectional study	Family physicians and residents	Survey (Patient Assessment of Chronic Illness Care Scale)	57.3% of physicians use treatment guidelines, but lack of motivation and time are barriers	Family physicians' involvement in chronic disease management is essential but requires structural support	Yes
Saad Alsaad et al., 2024	To assess the impact of continuity of	Retrospective cohort study	Patients with diabetes and hypertension	Electronic health records	Significant improvements in health outcomes	Continuity of care improves chronic disease	Yes

	care on clinical outcomes among patients with chronic conditions				(HbA1c and blood pressure) post-continuity of care	management outcomes	
SA Alshammari, 2023	To highlight the benefits of implementing the "family physician for every family" model in Saudi Arabia	Viewpoint	Healthcare system and policy-related studies	Literature review and policy analysis	The extensive network of family physicians and health centers in Saudi Arabia supports the feasibility of this model	The model is ready for implementation and can reduce morbidity and mortality from non-communicable diseases	Yes
Najlaa Mohammad Alsudairy et al., 2023	To explore best practices and evidence-based approaches for managing chronic diseases in family medicine	Literature review	Family medicine practices	Literature review	Emphasized the importance of patient-centered models like CCM and PCMH for chronic disease management	Evidence-based practices are key for managing chronic diseases effectively	Yes
Hussein, 2024	To assess the impact of continuity of care on health indicators in patients with Type 2 Diabetes in Riyadh	Retrospective cohort study	Patients with Type 2 diabetes	Electronic health records	Continuity of care did not result in improved health indicators or screening completion	Further studies are needed to explore the long-term impact of continuity of care	Yes

Kerari et al., 2024	To evaluate the effectiveness of the Stanford Chronic Disease Self-Management Program (CDSMP) in Saudi Arabia	Quasi-experimental study	Patients with chronic conditions	Surveys, questionnaires, and follow-up assessments	Significant improvements in self-efficacy and health-related behaviors post-CDSMP	CDSMP can be integrated into primary care settings for better chronic disease management	Yes
Abdullah Almaqhawi, 2024	To assess family medicine physicians' knowledge and confidence in managing chronic kidney disease in Saudi Arabia	Cross-sectional study	Family medicine physicians	Online survey	71.8% of physicians reported high confidence in managing CKD, but younger physicians showed higher confidence	Continuous education is crucial to improve CKD management in primary care	Yes
Hajer Adel Alsubaie & Bussma Ahmed Bugis, 2023	To evaluate patient perceptions of family medicine virtual clinics in Saudi Arabia	Cross-sectional descriptive study	Patients using virtual family medicine services	Online survey	Positive perceptions of virtual family medicine, but room for improvement in home health management and technical requirements	Virtual family medicine clinics need improvement for wider adoption	Yes

The Research Matrix offers an overview of the ten studies which are selected for the systematic review. The research question for each study is the role of family medicine physicians in managing chronic diseases in Saudi Arabia, given the framework of Saudi Vision 2030.

- **Aims:** The studies include evaluation of physician behavior and perceptions, patient outcomes and the effect of technological innovations such as telemedicine in chronic disease management.
- **Research Design:** The studies use designs ranging from cross sectional surveys to retrospective cohort studies and quasi-experimental designs. The feasibility of using these designs to assess attitudes, behaviors, and outcomes of chronic disease management and family medicine practices is supported.
- **Data Collection Tools:** Common tools used are survey, questionnaire, and electronic health records, all standard, and reliable methods for gathering information, such as within the setting of study from healthcare providers and patients.
- **Results and Conclusions:** The study shows that these family medicine physicians have a large, positive effect on the chronic disease population, and our learning continues in becoming more equipped to provide the high quality chronic disease care that will continue to be needed for our population; continuing professional development, continuing adherence to evidence based guidelines, and integration of telemedicine into clinic practice as a cost saving approach that provides accessibility for those who need it in our large provinces. Furthermore, multiple studies put an emphasis on the benefits of continuity of care and patient centered approaches in positive outcome. Nevertheless, though several studies report these benefits, it is also discovered that time, resources, and even patient participation are challenges that are critical for disease management to work optimally.
- **Study Support:** All the studies chosen were highly relevant and offered useful insights about family medicine physicians' role in the management of chronic diseases in Saudi Arabia, which adds weight to the current systematic review's aim, which is to assess how family physicians affect the management of chronic diseases in Saudi Arabia as well how this does correspond with the goals of Saudi Vision 2030.

## Results

The key themes and subthemes derived from the selected studies are synthesized in the Results section and trends are highlighted to explain how family medicine physicians help in chronic disease management in Saudi Arabia. This aligns with the objectives of Saudi Vision 2030 as well as the research question.

**Table 4: Results Indicating Themes, Sub-Themes, Trends, Explanation, and Supporting Studies**

Theme	Sub-Theme	Trend	Explanation	Supporting Studies
<b>Family Medicine Physicians' Role</b>	Management of Chronic Diseases	Positive impact on disease outcomes	Family physicians are central to managing chronic diseases, offering continuity of care, patient education, and preventive health services.	Yahia M Al-Khalidi, 2023; Saad Alsaad et al., 2024; SA Alshammari, 2023
	Continuity of Care	Improved patient outcomes	Studies showed that continuity of care with family physicians led to significant improvements in chronic disease indicators like HbA1c and blood pressure.	Saad Alsaad et al., 2024; Hussein, 2024
<b>Adherence to Guidelines</b>	Clinical Guideline Adherence	Challenged by time and resource constraints	Family physicians struggle to consistently adhere to clinical guidelines due to time limitations and a lack of resources.	Tuzuner et al., 2024; Najlaa Mohammad Alsudairy et al., 2023
	Need for Professional Development	Continuous education essential for adherence	Ongoing training and access to updated guidelines are crucial for improving adherence and overall chronic disease management.	Abdullah Almaqawi, 2024; SA Alshammari, 2023; Murad et al., 2022
<b>Technology and Telemedicine</b>	Virtual Care and Telemedicine	Increasing adoption but requires improvement	The adoption of telemedicine for chronic disease management has increased, but there are barriers such as technological infrastructure and patient engagement.	Alsubaie & Bugis, 2023; SA Alshammari, 2023
	Technology Infrastructure	Technological barriers remain	Although telemedicine shows promise, there are ongoing challenges with internet access and patient	Hajer Adel Alsubaie & Bussma Ahmed Bugis, 2023

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			familiarity with technology.	
<b>Alignment with Saudi Vision 2030</b>	Primary Care Integration	Aligned with Vision 2030 healthcare goals	Family medicine practices are critical to the success of Saudi Vision 2030, particularly in increasing access to care and promoting preventative health.	SA Alshammari, 2023; Kerari et al., 2024
	"A Family Physician for Every Family"	Vision-driven healthcare reform	The "family physician for every family" model aligns with Vision 2030 and aims to improve healthcare access, particularly in rural areas.	SA Alshammari, 2023; Yahia M Al-Khalidi, 2023
<b>Training and Professional Development</b>	Specialized Training Programs	Needed to improve chronic disease management	There is a clear need for specialized training for family physicians in managing chronic diseases and using technology effectively.	Najlaa Mohammad Alsudairy et al., 2023; Abdullah Almaqhawi, 2024
	Professional Development Barriers	Lack of resources for ongoing education	Despite the recognized need for further training, barriers such as lack of time, funding, and institutional support hinder professional development.	Sanem Baykan Tuzuner et al., 2024; Abdullah Almaqhawi, 2024
<b>Patient Perceptions</b>	Acceptance of Virtual Care	Growing but requires further enhancement	Patients reported positive experiences with virtual care, but improvements in technical and communication aspects are needed.	Hajer Adel Alsubaie & Bussma Ahmed Bugis, 2023; Hussein et al., 2023
	Impact on Health Outcomes	Positive effects reported by patients	Virtual family medicine has had positive effects on health outcomes, including improved health knowledge and patient satisfaction.	Hajer Adel Alsubaie & Bussma Ahmed Bugis, 2023

The ten selected studies generate key themes and sub-themes as summarized for quick reference on the Results Table. The trends show that family medicine physicians are efficient in managing chronic diseases and they showcase how factors like adherence with clinical guidelines, use of technology, alignment with Saudi Vision 2030 and professional development contribute to an overall managing of chronic diseases in Saudi Arabia.

- **Family Medicine Physicians' Role:** Together, the studies highlight the important role family medicine physicians play in managing chronic disease, primarily through continuity

of care and patient education. In the studies, family physicians play an important role in enhancing outcomes of chronic diseases (Yahia M Al-Khaldi, 2023; Saad Alsaad et al., 2024).

- **Adherence to Guidelines:** Family physicians attribute value to adhering to clinical guidelines, but limited time, resources, and opportunities for professional development hinder consistency of their adherence (Sanem Baykan Tuzuner et al., 2024; Najlala Mohammad Alsudairy et al., 2023; Abdullah Almaqhawi, 2024). As a consequence, systemic change is necessary to afford support to family physicians that adhere to best practices.
- **Technology and Telemedicine:** It is evident that the adoption of telemedicine is increasing for chronic disease management, but it poses challenges among others technological challenges and patient engagement (Hajer Adel Alsubaie & Bussma Ahmed Bugis, 2023; Kerari et al., 2024). This pattern matches the systems' need for improvement and broader adoption in virtual care.
- **Alignment with Saudi Vision 2030:** The studies prove that family medicine bears a conspicuous alignment with the objectives of Saudi Vision 2030, especially to augment the way towards creating access to primary care and securing each family a family physician. Instead, the family physician for every family model needs to be fully implemented (SA Alshammari, 2023; Murad et al., 2022) and that requires the continuation of reforms.
- **Training and Professional Development:** However, the recurring theme is that family physicians need specialized training in order to improve chronic disease management and knowledge of the health technology that should be applied to improve patient care. Other barriers to continuous professional development; time and resource limitations, (Alsudairy et al., 2023; Almaqhawi, 2024; Hussein et al., 2023).
- **Patient Perceptions:** Results were positive towards adoption of virtual family medicine services to improve health outcomes as well as patient satisfaction, which signifies great potential of telemedicine in the Saudi healthcare system. Still, technical challenges need to be solved to enhance patient experiences and increase the number of people with access (Hajer Adel Alsubaie & Bussma Ahmed Bugis, 2023).

## Discussion

Consequently, this review systematically evaluated the role of Saudi family medicine physicians in managing chronic diseases, in accord with the Saudi Vision 2030 goals, through reviewing ten studies selected as the source of the included research. The studies persistently emphasize the indispensable function of family physicians in enhancing chronic disease results, essentially through persistence of care, patient training, and preventive medical services. What can be obtained from family physicians is crucial in the improvement of the management of chronic conditions like diabetes, hypertension, and cardiovascular diseases (Yahia M Al-Khaldi, 2023; Saad Alsaad et al., 2024).

Among the important findings is the importance of following clinical guidelines as key elements of good chronic disease management. However, for physicians to routinely carry out such best practice guidelines, there are barriers of limited time, resources, and inadequate professional development opportunities. Currently, guideline adherence is low because of barriers created by the health care organization, most of which can be addressed through systemic reforms and improved professional support (Sanem Baykan Tuzuner et al., 2024; Najlala Mohammad Alsudairy et al., 2023; Abdullah Almaqhawi, 2024).

Integration of technology, particularly telemedicine, topped out as another key theme. Virtual care has great promise in enhancing patient access to care including in rural and underserved areas. The studies identified challenges, however, such as technology infrastructure and patient engagement as well as the need to protect privacy. Despite the positive reception of telemedicine services, the technological barriers need to be dealt with to increase the pervasiveness of telemedicine services and give virtual care its full potential (Hajer Adel Alsubaie & Bussma Ahmed Bugis, 2023; Kerari et al., 2024).

Family medicine practices were identified as key players in facilitating the Vision's goals of expanding primary care access and ensuring that every family has a family physician under Saudi Vision 2030. Additionally, the widespread implementation of the family physician for every family system is a challenge still in need of investment and reform (Murad, et al 2022; SA Alshammari 2023).

In addition, the studies emphasized the need for continuing education of family physicians, focusing primarily on managing chronic illnesses, as well as applying new technology. Family physicians who continue to grow professionally are more capable of responding to the needs of those with chronic diseases, this provides them both with better care and higher patient satisfaction (Alsudairy et al., 2023; Almaqhawi, 2024; Hussein, 2023).

### **Future Directions**

Based on the findings from this systematic review, several areas need further research and development:

- **Improved Professional Development:** Further research will be necessary to identify effective models for continuing education and training programs, for family physicians. By way of specialized training on managing chronic diseases, using telemedicine, and clinical guidelines this will ensure better patient outcomes.
- **Telemedicine Infrastructure:** This needs more extensive research in the sense of developing better telemedicine infrastructures, with better technological tools, better privacy protection means and simpler interfaces for patients and physicians. Rural areas will benefit from this, as it will encourage higher rates of adoption of virtual care.
- **Systemic Support for Family Physicians:** Future studies are needed to identify what type of systemic changes (e.g. better resource allocation, creating multidisciplinary teams, supportive healthcare policies, etc.) would address barriers to guideline adherence and how they would enhance the efficiency of family physicians in chronic disease management.
- **Patient Engagement in Virtual Care:** Additional research on patient engagement strategies for virtual family medicine shall be further needed. Improvements in adoption rates and patient outcomes will follow investigation of methods to maintain patient trust and overcome patient reluctance to adopt virtual care.
- **Evaluation of Vision 2030 Initiatives:** There should also be research conducted on the effect of Saudi Vision 2030 initiatives on family medicine and chronic disease management. Studies should also measure the effectiveness of the Family Physician for Every Family and identify remaining gaps in reaching Vision's health related goals.

### **Limitations**

While this systematic review provides valuable insights, there are several limitations to consider:

- **Study Heterogeneity:** Studies used in this review included cross sectional surveys, cohort studies and opinion-based articles. However, this heterogeneity may constrain the comparability of the results.
- **Geographic Focus:** Most of the studies were taking place in specific areas of Saudi Arabia, notably the urban centers of Riyadh. The findings may not be a complete reflection of how family physicians in rural or remote areas of the country see their practice and it may not fully reflect their practices.
- **Limited Longitudinal Data:** Some of the studies included in the review were also cross sectional in nature with limited conclusions that could be drawn about the potential long-term impacts of family medicine practices, or family medicine practices for chronic disease management.
- **Patient-Reported Outcomes:** There was considerable investigation on patient perception but very few studies included objective health outcome data (e.g. clinical measures, biomarkers) as a means to correlate with patient reported satisfaction.

## Conclusion

The main role of family medicine physicians in management of chronic diseases in Saudi Arabia emerges as a critical finding of this systematic review. The studies show that family physicians play a large role in improving health outcomes through their provision of continuity of care, and their patient education and preventive health measures. But clinical guidelines adherence, small resources, professionals development and inclusion of telemedicine are obstacles that must be resolved.

According to the objectives of Saudi Vision 2030, these findings confirm the need of the creation of systemic reforms to support the work of family physicians, improve training programs, and implement new technologies available to them. By concentrating more on these areas, family medicine can play a bigger role in realizing the health targets in Vision 2030, improving chronic disease management and providing every family with quality care.

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