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The Role Of Virtual Health Coaching In Improving The Quality Of Life Among Patients With Hypertension In Jeddah Community

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Abstract
Background: Hypertension is a significant public health problem in Saudi Arabia that has affected 20.7% of the population. Undertreated hypertension patients face severe, potentially deadly health complications, including cardiovascular disease and stroke. In Saudi Arabia, increasing demand for primary care has made it challenging for patients with hypertension to obtain conventional primary care services. Virtual health coaching clinics are a recent innovation in Saudi Arabia that help patients with chronic diseases make lifestyle changes to reduce their risk of complications.
Aim: To evaluate the effect of virtual health coaching on the Quality of Life of patients with hypertension in the Jeddah community.
Methods: A cross-sectional quantitative research method was used. Adult patients with hypertension in the Jeddah city community completed an online survey comprising a sociodemographic form and the Arabic version of the 36 Item Short Form Survey, which measures Quality of Life. Descriptive and correlational analyses were performed to evaluate the Quality of Life and health-related outcomes. **Results:** Ninety-five patients participated in this study. Female patients, under 40 years of age, unmarried, and with higher education levels reported better general health and physical functioning. In addition, the frequency of clinic sessions was positively associated with improvements in physical and mental health. A substantial positive correlation was observed between vitality and mental health. As well as between social functioning and emotional role.
Conclusion: This study highlights the essential need for continuous support and guidance to achieve a high Quality of Life by delivering individualized assistance, promoting sustainable behavioral changes, and enhancing patient involvement.
Recommendations: Clinicians should incorporate digital health training in remote monitoring and chronic disease management. Policymakers must implement legislation, allocate resources to telemedicine, guarantee reimbursement, and enhance visibility. Addressing these patient-related areas will improve health outcomes and facilitate sustained hypertension management.

Keywords: Quality of life, virtual clinic, Health Coach, Hypertension, and Primary Health Care Center.

Introduction

The prevalence of chronic illnesses has risen significantly over recent decades, representing a major global public health challenge. Noncommunicable diseases (NCDs) are responsible for approximately 41 million deaths annually, accounting for around 74% of all global deaths (World Health Organization [WHO], 2023). Among these, cardiovascular diseases remain the leading cause of mortality, contributing approximately 17.9 million deaths each year, followed by cancers with 9.3 million deaths, chronic respiratory diseases with 4.1 million deaths, and diabetes with 2.0 million deaths, including complications related to diabetic kidney disease (WHO, 2023). These figures highlight the growing global burden of chronic diseases and their strong association with preventable lifestyle factors (WHO, 2023).
In Saudi Arabia, the burden of NCDs is also substantial, with a reported NCD-related mortality rate of 67.6%, where cardiovascular diseases, particularly hypertension, contribute approximately 20.7%

(Alzahrani et al., 2023). Hypertension is a major public health concern due to its silent progression and its severe complications such as cardiovascular diseases, stroke, and renal failure (Alzahrani et al., 2023). The increasing prevalence of hypertension reflects lifestyle transitions, dietary patterns, and reduced physical activity in the population (Alzahrani et al., 2023).

The WHO 2030 Sustainable Development Agenda recognizes NCDs as a major barrier to global development, with member states committing to reducing premature NCD mortality by one-third by 2030 through prevention and treatment strategies (WHO, 2023). However, achieving this goal requires more than pharmacological treatment, as chronic diseases impose significant clinical and economic burdens on healthcare systems through hospital admissions, emergency visits, and long-term care costs (Ju et al., 2022). As these conditions become more complex, the need for integrated and comprehensive healthcare models becomes increasingly essential (Arefin, 2024).

Hypertension is closely linked with lifestyle behaviors, mental health, and overall Quality of Life (QoL). The WHO defines QoL as "an individual's perception of their position in life, in the context of culture and system of values in which they live and in relation to their goals, expectations, standards, and concerns" (World Health Organization Quality of Life [WHOQOL], 2012). Poor management of hypertension can lead to serious complications, disability, reduced productivity, and poor QoL (WHOQOL, 2012). Moreover, chronic diseases affect not only patients but also family members who provide care (Sadeghi et al., 2022).

Effective self-care practices for hypertension include medication adherence, low-salt and low-fat diet, regular physical activity, weight management, smoking cessation, limiting alcohol intake, stress reduction, self-monitoring of blood pressure, and regular follow-up visits (Ahuja et al., 2018). However, maintaining these behaviors over time remains a major challenge for many patients with chronic conditions (Ahuja et al., 2018).

In Saudi Arabia, increasing demand for primary healthcare services has created challenges in ensuring continuous care for patients with hypertension. Traditional healthcare models alone are insufficient to manage the growing burden of chronic diseases, underscoring the need for more advanced, patient-centered approaches that support lifestyle modification and long-term engagement (Lambrinou et al., 2019). Patient involvement in treatment planning, education, goal setting, and self-care is essential for achieving sustainable health outcomes (Lambrinou et al., 2019).

Technological advancement has significantly improved healthcare delivery by increasing accessibility, reducing barriers, and enhancing service efficiency (Rippe, 2024). One of the most important innovations is the virtual clinic model, which provides healthcare services through digital platforms and remote communication tools (Chellaiyan et al., 2019). A virtual clinic enables patients and healthcare providers to communicate via online consultations, medication refills, and health education without requiring physical attendance at healthcare facilities (Chellaiyan et al., 2019).

The development of virtual clinics reflects the evolution of healthcare communication technologies from traditional methods to modern digital platforms, including mobile applications, video conferencing, and messaging systems (Abdulwahab & Zedan, 2021). These systems improve healthcare accessibility, reduce waiting times, enhance continuity of care, and support multidisciplinary collaboration (Abdulwahab & Zedan, 2021). They also facilitate early diagnosis, timely intervention, and improved treatment adherence through remote monitoring and follow-up services (Abdulwahab & Zedan, 2021).

Despite these advancements, many individuals with chronic diseases still struggle to adopt and maintain healthy lifestyles (Lambrinou et al., 2019). This limitation has led to the emergence of health coaching as an effective strategy for chronic disease self-management (Racey et al., 2022). Health coaching is a patient-centered approach that focuses on behavior change, motivation, and goal setting to support individuals in developing sustainable healthy behaviors (Racey et al., 2022). It is delivered by trained professionals using communication techniques such as motivational interviewing to improve patient engagement and self-management (Racey et al., 2022).

In hypertension management, health coaching supports improvements in medication adherence, diet, physical activity, stress management, and overall lifestyle behaviors (Racey et al., 2022). In Saudi Arabia, health coaching services are delivered through digital platforms such as the "Mawid" App and "Sehhaty" App, as well as through primary healthcare centers (Ministry of Health [MOH], 2022). Health coaches are trained and authorized by the Saudi Commission for Health Specialties (SCFHS), reflecting national efforts to strengthen digital healthcare services (Abdulwahab & Zedan, 2021).

However, despite the expansion of virtual clinics and health coaching services, there is still limited evidence regarding their effectiveness in improving long-term outcomes, particularly QoL among patients with hypertension in Saudi Arabia. Most existing studies focus on clinical outcomes such as blood pressure control rather than comprehensive patient-centered outcomes, including physical, psychological, and social well-being (Racey et al., 2022; Lambrinou et al., 2019).
Despite the availability of primary healthcare services, the prevalence of hypertension and its complications continues to rise globally and in Saudi Arabia (Albaghdadi & Daajani, 2023). Many patients fail to achieve optimal blood pressure control due to poor adherence to treatment plans, irregular clinic visits, and unhealthy lifestyle behaviors (Albaghdadi & Daajani, 2023). Contributing barriers include lack of appointment availability, transportation difficulties, and long working hours that limit access to care (Albaghdadi & Daajani, 2023).
Although virtual clinics provide improved accessibility and support for home-based monitoring, their effectiveness in promoting long-term behavioral change and sustained health outcomes remains uncertain (Cerrato & Halamka, 2021). While they may enhance early detection and treatment delivery, the actual impact on long-term lifestyle modification, patient behavior, and QoL among patients with hypertension has not been clearly established (Cerrato & Halamka, 2021).
This study, therefore, aims to assess the role of virtual health coaching in improving the QoL among patients with hypertension in the Jeddah community (Racey et al., 2022). The study addresses the following questions: what is the impact of attending virtual health coaching clinics on the QoL of patients with hypertension in the Jeddah community (WHOQOL, 2012), and what physical, mental, and social health outcomes are influenced by attending virtual health coaching clinics for patients with hypertension in the Jeddah community (Racey et al., 2022).
Quality of Life in this study refers to physical, psychological, social, and overall health perception as experienced by individuals living with hypertension (WHOQOL, 2012). Hypertension is defined as a persistent elevation of blood pressure ≥140/90 mmHg measured using standardized devices (Arefin, 2024). Health coaching refers to a SCFHS-certified professional approach focused on behavioral change and lifestyle improvement (Racey et al., 2022), while virtual clinics refer to digital healthcare platforms such as “Sehhaty” that enable remote consultation and communication between patients and healthcare providers (Abdulwahab & Zedan, 2021).
In line with Saudi Vision 2030, healthcare transformation through digital innovation is essential to improve clinical outcomes, enhance patient care, and strengthen telemedicine infrastructure across the Kingdom (Saudi Arabia’s Vision 2030, 2020). Health coaching has been shown to support chronic disease management by improving self-care behaviors, overcoming access barriers, and enhancing patient well-being (Racey et al., 2022). Although virtual clinics and health coaching services are now widely implemented in Saudi Arabia, there is still limited evidence evaluating their combined effectiveness in improving QoL among patients with hypertension (WHO, 2023; Albaghdadi & Daajani, 2023). This highlights a significant gap in evidence-based practice, particularly regarding patient-centered outcomes beyond clinical indicators, which this study aims to address.

Literature Review

This chapter presents a comprehensive review of the literature related to virtual health coaching and its impact on QoL among patients with hypertension. Effective antihypertensive therapies have been available for decades; however, control rates have remained relatively stable, indicating persistent challenges in achieving adequate adherence to both pharmacological treatment and lifestyle modifications among patients with hypertension (Racey et al., 2022). This gap highlights the importance of exploring innovative interventions such as virtual health coaching to improve long-term outcomes and QoL. The PICOT question guiding this review is: “In patients with hypertension (P), what is the impact of receiving primary care via virtual health coaching clinics (I) compared to standard primary care centers (C) on improving QoL (O) over a two-month period (T)?”
A systematic search strategy was applied using PubMed and ScienceDirect databases to identify relevant studies on virtual health coaching and QoL in chronic disease populations. The search used combinations of keywords and Boolean operators such as “Quality of life,” “virtual clinic,” “health coach,” “hypertension,” and “primary health care center.” Inclusion criteria included studies published between 2020 and 2024, experimental and non-experimental designs, and English-language peer-

reviewed articles. Exclusion criteria included non-English publications, studies published before 2020, and studies conducted outside primary healthcare settings.

A total of 31 articles were initially identified, including 16 from PubMed and 15 from ScienceDirect. After screening titles and abstracts, 18 full-text articles were assessed for eligibility. Two were removed due to duplication, and six were excluded based on inclusion criteria. Ultimately, 10 studies were included in the final synthesis. Three main themes emerged from the literature: factors influencing QoL in hypertensive patients, the role of health coaching in lifestyle modification and self-management, and the integration of technology in care delivery and patient engagement.

The first theme focused on factors influencing QoL among patients with hypertension. Several studies demonstrated that QoL in hypertensive patients is influenced by multiple interrelated factors, including psychological status, awareness levels, demographic characteristics, and environmental conditions (Albugami et al., 2024; Azar et al., 2020; Mannan et al., 2022; Patil et al., 2023). For example, a cross-sectional study conducted in Riyadh found moderate QoL among hypertensive patients using the SF-36 tool, with relatively better emotional well-being scores but lower scores in other domains, indicating variability in daily functioning (Albugami et al., 2024; Sang et al., 2021). Although awareness of blood pressure monitoring and lifestyle modification was relatively high, stress management awareness remained moderate, suggesting gaps in comprehensive self-care knowledge (Snarska et al., 2020).

Similarly, psychological and environmental determinants were found to significantly influence QoL. Female patients and older adults reported lower QoL compared to males and younger participants, highlighting demographic disparities (Mannan et al., 2022). Psychological factors such as anxiety, depression, and helplessness were also strongly associated with reduced QoL, particularly in the psychological domain (Xie et al., 2019). In addition, socioeconomic and environmental factors such as housing conditions, safety, access to healthcare, transportation, and recreational opportunities significantly influenced overall well-being (Lu et al., 2020).

Further evidence from studies using instruments such as the MINI-International Neuropsychiatric Interview and the WHOQOL-BREF confirmed that uncontrolled hypertension is associated with poorer mental health outcomes, reduced social interaction, and impaired family functioning (Patil et al., 2023; Chabaksvar et al., 2020). Moreover, higher educational levels were consistently associated with better QoL across all domains, emphasizing the importance of health education and awareness programs in improving patient outcomes (Ziapour & Kianipour, 2018). Collectively, these studies suggest that improving QoL in hypertensive patients requires comprehensive interventions addressing psychological, social, and educational dimensions rather than focusing solely on clinical management.

The second theme examined the role of health coaching in lifestyle modification and self-management among hypertensive patients. Evidence from multiple studies demonstrates that structured health coaching and continuous care models significantly improve blood pressure control, adherence to treatment, and QoL (Sadeghi et al., 2022; Alshammari et al., 2021). A randomized clinical trial found that continuous follow-up and education resulted in improved blood pressure levels and enhanced QoL among hypertensive patients, highlighting the importance of sustained patient-provider communication (Sadeghi et al., 2022).

Similarly, quasi-experimental research using combined face-to-face and telephone-based health coaching demonstrated improvements in self-care behaviors, including medication adherence, dietary modification, and weight management (Abbas et al., 2024; Meng et al., 2022). These findings suggest that structured behavioral interventions are particularly effective in improving outcomes in resource-limited settings where uncontrolled hypertension is prevalent.

Digital and mobile health interventions have also shown positive effects on lifestyle modification. Studies examining mobile applications and self-management platforms such as Noom demonstrated improvements in cardiovascular risk factors, weight reduction, and sleep quality compared to standard care (Ju et al., 2022; Lee et al., 2020). Additionally, the MyHEART program, which combines tele-coaching and self-monitoring, resulted in improved dietary habits, increased physical activity, and better blood pressure monitoring behavior among participants (Hoppe et al., 2023; Johnson et al., 2019). Overall, these findings consistently highlight that health coaching, whether delivered in-person, via telephone, or digitally, plays a significant role in improving patient engagement, self-management behaviors, and clinical outcomes.

The third theme explored the integration of technology in healthcare delivery and its impact on patient engagement. Recent studies indicate that virtual healthcare services and telemedicine are increasingly

preferred by patients due to their convenience, accessibility, and efficiency (Albaghdadi & Daajani, 2023). A cross-sectional study conducted in Saudi Arabia found high patient satisfaction with telemedicine services and a strong belief in their ability to improve healthcare access, although some concerns were reported among elderly patients and first-time users regarding technology use and communication barriers (Albaghdadi & Daajani, 2023).

Further evidence from virtual care models demonstrates that digital healthcare interventions can lead to significant clinical improvements, including reductions in blood pressure, body weight, and improved chronic disease outcomes such as glycemic control (Modica et al., 2024; Roy et al., 2021). Patients also reported higher satisfaction levels with virtual consultations compared to traditional in-person visits, highlighting the acceptability of digital health models in modern healthcare systems.

Additionally, studies combining digital tools with human coaching demonstrated enhanced effectiveness in managing chronic diseases. The integration of mobile applications with individualized coaching was found to significantly improve lifestyle behaviors and disease management outcomes, particularly in patients with hypertension and other chronic conditions (Ju et al., 2022). These findings collectively suggest that technology-enabled healthcare delivery, when combined with personalized coaching, enhances both clinical outcomes and patient satisfaction.

In summary, the literature demonstrates that QoL in hypertensive patients is influenced by psychological, social, educational, and environmental factors. Health coaching interventions have been shown to improve self-management behaviors and clinical outcomes, while digital health technologies enhance accessibility and patient engagement. However, despite these advancements, there remains limited evidence specifically evaluating the combined effect of virtual health coaching on QoL in hypertensive patients within primary healthcare settings. This highlights the need for further research to explore the effectiveness of virtual health coaching interventions in improving holistic patient outcomes, particularly within the context of Saudi Arabia and alignment with national health transformation goals.

Methodology

This study employed a structured quantitative methodology to assess the role of virtual health coaching in improving QoL among patients with hypertension in Jeddah. The methodology included research design, setting, sampling, instruments, data collection, and statistical and ethical procedures (Nieswiadomy & Bailey, 2017).

Research Design

A non-experimental cross-sectional quantitative design was used to examine the relationship between virtual health coaching and QoL among hypertensive patients. This design allows assessment of variables at a single point in time and identification of associations between them (Nieswiadomy & Bailey, 2017; Sreekumar, 2024).

Research Population and Setting

The study targeted hypertensive patients attending virtual health coaching services in Primary Health Care Centers in Jeddah, Saudi Arabia. A non-probability convenience sampling technique was used to recruit eligible participants from the available population (Saudi Arabia’s Vision 2030, 2020).

Sample Size

The study population included 150 hypertensive patients attending virtual health coaching clinics. Using Raosoft’s (2004) sample size calculation with 95% confidence level and 5% margin of error, the required sample size was 109 participants (Dilsha et al., 2020).

Inclusion and Exclusion Criteria

Included participants were adults ≥18 years with diagnosed hypertension, Saudi citizens, residents of Jeddah, and attendees of virtual health coaching clinics in 2024 who agreed to participate. Excluded were newly diagnosed patients, those with other chronic diseases, and incomplete or non-consenting responses (Nieswiadomy & Bailey, 2017).

Data Collection Method

Data were collected using an online self-administered questionnaire via Google Forms distributed through WhatsApp and QR code. Ethical approval was obtained (HAPO-02-K-012-2025-01-2443). Data collection occurred from 8–16 January 2025. The method ensured anonymity, convenience, and cost-effectiveness (Nieswiadomy & Bailey, 2017).

Instruments of Data Collection

Data were collected using a structured set of instruments designed to ensure accurate eligibility screening, comprehensive sociodemographic profiling, and standardized measurement of QoL. A screening form consisting of five items was used to determine participants' eligibility based on age, confirmed hypertension diagnosis, residency in Jeddah, Saudi citizenship, and attendance at virtual health coaching clinics in 2024. A sociodemographic data form was used to collect participants' background characteristics, including age, gender, marital status, educational level, and number of coaching sessions attended. The form included both nominal and ordinal variables and was used to describe the sample and facilitate subgroup analysis (Nieswiadomy & Bailey, 2017).

The Short Form (SF) Survey-36 QoL Survey was used to assess QoL using the validated Arabic version. It measures eight domains: Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional, and Mental Health (Ware & Sherbourne, 1992; Xiao et al., 2019). Scores range from 0 to 100, with higher scores indicating better QoL. Regarding validity and reliability, the SF-36 has well-established psychometric properties, with reported Cronbach's alpha values above 0.85 across most domains (Al-Ghamdi et al., 2002). Face validity was reviewed by three experts to ensure clarity and relevance, and a pilot study involving 10% of the sample was conducted to assess feasibility and comprehensibility. Internal consistency reliability was further confirmed using Cronbach's alpha (Nieswiadomy & Bailey, 2017).

Data Analysis

Data were analyzed using SPSS version 29. Descriptive statistics (mean, frequency, SD) summarized participant characteristics and QoL. Inferential analysis included Pearson correlation for continuous variables, Chi-square test for categorical variables, and independent t-test and Fisher's exact test where appropriate. Statistical significance was set at $p \leq 0.05$ (Nieswiadomy & Bailey, 2017; Janse et al., 2021).

Ethical Considerations

Ethical approval was obtained from Umm Al-Qura University IRB (HAPO-02-K-012-2025-01-2443). Participation was voluntary, anonymous, and confidential. Data were password-protected and used solely for research purposes. Informed consent was obtained from all participants prior to data collection (Nieswiadomy & Bailey, 2017).

Results

Reliability of the 36-Item Short Form Survey (SF-36)

The internal consistency of QoL dimensions was assessed using Cronbach alpha coefficients. The results revealed high level of internal consistency among the items of QoL dimensions as shown in the table below:

Table 4.1 Cronbach Alpha Results

Dimension	α
Physical Functioning	0.854
Role-Physical	0.822
Bodily Pain	0.931
General Health	0.751
Vitality	0.743
Social Functioning	0.823
Role-Emotional	0.776

Mental Health	0.763

Sample Characteristics

At the completion of the study, the final sample was 95 Saudi patients with hypertension who attended a health coach virtual clinics in Jeddah city. All participants responded to all items of the survey. There were no reported withdrawals or missing data in the study.

Table 4.2 presents the baseline socio-demographic characteristics of the 95 patients with hypertension. More than two-thirds (60%) of participants were males, 56.8% aged between 40-49 years old, and 83.2% were married. Regarding of educational attainment, 69.5% of participants held a university degree, 26.3% had secondary education, and only 4.2% had intermediate education. Most of the participants (50.5%) attended clinic sessions three to four times, while 47.4% attended one to two times.

Table 4.2 Sociodemographic Data of the Study Participants

Variable	Frequency (N=95)	Percentage
Gender		
Male	57	60.0 %
Female	38	40.0 %
Age		
18-29	7	7.4 %
30-39	26	27.4 %
40-49	54	56.8 %
50-59	3	3.1 %
60+	5	5.3 %
Marital status		
Single	12	12.6 %
Married	79	83.2 %
Divorced	2	2.1 %
Widowed	2	2.1 %
Level of Education		
Intermediate	4	4.2 %
Secondary	25	26.3 %
University	66	69.5 %
Virtual Health Coach Sessions		
1-2	45	47.4 %
3-4	48	50.5 %
More than 4	2	2.1 %

The Description of the Quality-of-Life Dimensions of Patients with Hypertension

Table 4.3 shows the Mean (M) and Standard Deviation (SD) of the QoL dimensions among the patients with hypertension. The overall mean of the QoL dimensions score was 61.1 (SD = 13.6), indicating a moderate level of QoL among patients with hypertension. The social functioning dimension had the highest mean value of QoL (M = 74.8, SD = 18.3), which was classified as moderate, while the physical functioning dimension had a mean score of 72.2 (SD = 17.7), which was also rated as moderate. Similarly, the dimensions of role-emotional and role-physical were moderate (M = 70.2, SD = 43.1) and (M = 48.7, SD = 38.1), respectively. The component of QoL with the lowest mean was the general health dimension (M = 46.1, SD = 17.0), followed by bodily pain (M = 70.4, SD = 15.4), mental health (M = 58.6, SD = 14.0), and vitality (M = 47.7, SD = 13.7) (Figure 4.1and 4.2).

Figure 4.1 The Mean and Standard Deviation SD of the Quality-of-Life Dimensions of Patients with Hypertension

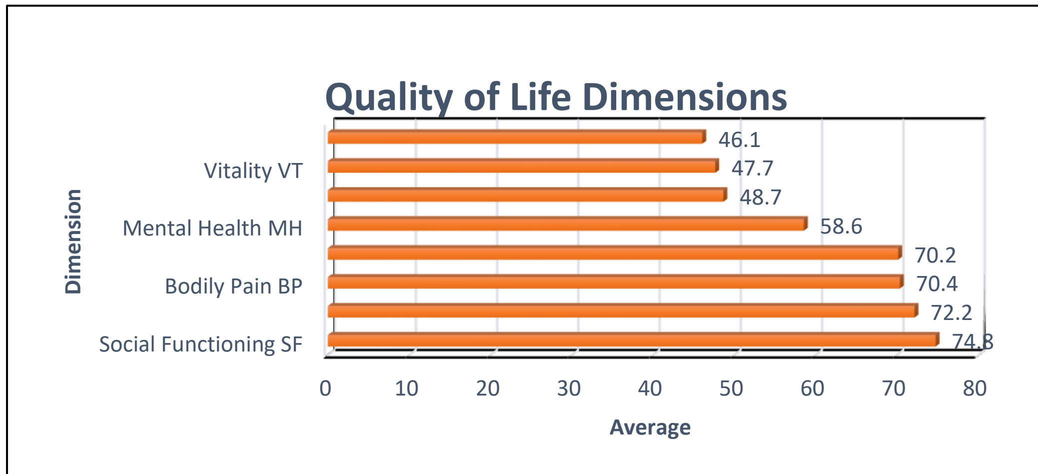

Figure 4.2 Overall Quality of Life

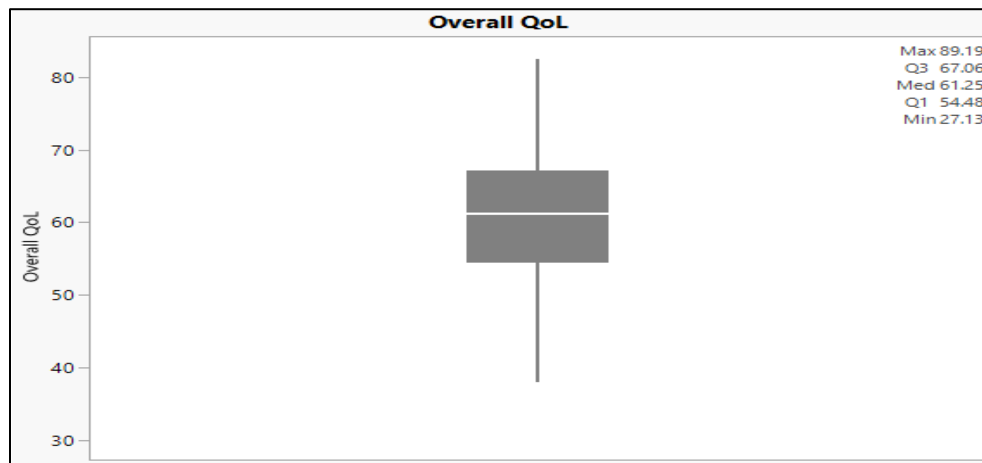

Table 4.3 Quality of Life Dimensions of Patients with Hypertension

Dimensions	Mean	SD
Physical Functioning	72.2	17.7
Role-Physical	48.7	38.1
Bodily Pain	70.4	15.4
General Health	46.1	17.0
Vitality	47.7	13.7
Social Functioning	74.8	18.3
Role-Emotional	70.2	43.1
Mental Health	58.6	14.0
Overall QoL	**61.1**	**13.6**

SD = Standard Deviation
QoL = Quality-of-Life

Association between Virtual Health Coach clinic sessions and QoL dimensions of Patients with Hypertension

Table 4.4 shows the association between QoL dimensions and the number of virtual health coach clinic sessions, grouped into two categories: 1-2 sessions and ≥ 3 sessions. Chi square (χ^2) test was applied to test these associations, with the level of significance = $p < 0.05$. We categorized the scores of QoL dimensions as low (less than 50.0) and high (50.0 and above). The results showed significant associations between the number of virtual health coach clinic sessions and the dimensions of role physical ($\chi^2 = 8.615$, $p = 0.003$) and mental health ($\chi^2 = 4.478$, $p = 0.034$).

Interestingly, patients with hypertension who attended three or more sessions significantly reported low QoL in the role-physical health dimension (72%). In contrast, patients with hypertension who attended fewer sessions (1-2) reported high QoL of the role-physical health dimension (57.8%). These findings may suggest that the number of virtual health coaching sessions may not necessarily have a positive impact on the role-physical health dimension of QoL. The analysis reported that hypertensive patients who attended more than three virtual health coach sessions reported high QoL in the mental health dimension (90%). On the other hand, patients with hypertension who attended (1-2) sessions showed low mental health (73.3%).

This may indicate that increased engagement in clinical sessions is positively associated with better mental health outcomes among patients with hypertension. The significance of the p-value underscores the importance of regular clinic attendance for mental health, suggesting that more frequent interactions with healthcare providers may contribute to improved mental well-being.

Table 4.4 Association Between Clinic Sessions and QoL Dimensions

QoL Dimensions	1-2 Sessions Frequency (%)	≥ 3 Sessions Frequency (%)	χ^2	P-value
Physical Functioning			0.957	0.328
Low	4 (8.9)	2 (4.0)		
High	41 (91.1)	48 (96.0)		
Role-Physical			8.615	*0.003
Low	19 (42.2)	36 (72.0)		
High	26 (57.8)	14 (28.0)		
Bodily Pain			0.018	0.892
Low	5 (11.1)	6 (12.0)		
High	40 (88.9)	44 (88.0)		
General Health			1.693	0.193
Low	21 (46.7)	30 (60.0)		
High	24 (53.3)	20 (40.0)		
Vitality			3.554	0.059
Low	25 (55.6)	37 (74.0)		
High	20 (44.4)	13 (26.0)		
Social Functioning			0.018	0.894
Low	3 (6.7)	3 (6.0)		
High	42 (93.3)	47 (94.0)		
Role Emotional			1.521	0.218
Low	17 (37.8)	13 (26.0)		
High	28 (62.2)	37 (74.0)		
Mental Health			4.478	*0.034
Low	12 (26.7)	5 (10.0)		

High	33 (73.3)	45 (90.0)		
Overall QoL	**1-2**	**3 and more**	**χ^2**	**P-value**
			1.090	0.297
Low	10 (22.2)	7 (14.0)		
High	35 (77.8)	43 (86.0)		

QoL = Quality-of-Life
Sessions = Virtual Healh Coach Sessions
χ^2 Test = Chi-Square Test
Frequency (Percentage)
* The level of significance = $p < 0.05$

Associations Between Quality-of-Life Dimensions and sociodemographic Characteristics of Patients with Hypertension

The differences in the dimensions of QoL were examined by the sociodemographic characteristics of patients with hypertension using the independent samples t-test.

There was a significant difference in the physical functioning dimension of QoL between participants with a secondary education and those with a university education. People with a university education had higher levels of physical functioning than people with secondary education or less (t = 2.343, p = 0.046) (Table 4.5).

Table 4.5 Physical functioning Dimension of Quality-of-Life by Sociodemographic Characteristics
SD = Standard Deviation
Test = Independent samples t-test

Sociodemographic Characteristics	Mean	SD	Test	p-value
Gender			0.555	0.580
Male	73.0	15.5		
Female	70.9	20.7		
Age			1.456	0.149
Less than 40	75.8	19.3		
40 and above	70.2	16.6		
Marital status			0.393	0.695
Unmarried	73.7	18.0		
Married	71.8	17.7		
Education Level			*2.343	*0.046
Secondary and less	67.4	17.4		
University	74.2	17.5		
Virtual Health Coach Sessions			1.189	0.237
1-2	69.9	19.7		
≥ 3	74.2	15.5		

* The level of significance = $p < 0.05$

Table 4.6 shows that the role-physical dimension of QoL was significantly different by the participant's gender, age, education level, and virtual health coach clinic session number. Higher scores of role-physical dimensions were found among female patients, patients less than 40 years old, participants with high educational levels, and patients who attended 1 - 2 virtual health coach clinic sessions (t = 4.165, p = 0.001), (t = 4.46, p = 0.001), (t = 2.312, p = 0.023), (t = 2.545, p = 0.013), respectively. (Table 4.5).

Table 4.6 Role physical Dimension of Quality-of-Life by Sociodemographic Characteristics

Sociodemographic Characteristics	Mean	SD	Test	P-value
Gender			*4.165	*0.001
Male	36.4	29.2		
Female	67.1	42.8		
Age			*4.446	*0.001
Less than 40	70.5	39.2		
40 and above	37.1	32.2		
Marital status			1.978	0.051
Unmarried	65.6	37.5		
Married	45.3	37.6		
Education Level			*2.312	*0.023
Secondary and less	35.3	31.7		
University	54.5	39.4		
Virtual Health Coach Sessions			*2.545	*0.013
1-2	58.9	40.3		
≥ 3	39.5	33.9		

SD = Standard Deviation
Test = Independent samples t-test
* The level of significance = $p < 0.05$

Table 4.7 shows a significant difference in the bodily pain dimension of QoL scores by participants' age and marital status. Participants aged less than 40 had higher scores than those aged 40 and older ($t = 2.178$, $p = 0.032$). Unmarried participants had a higher score of bodily pain compared to married participants ($t = 2.111$, $p = 0.037$).

Table 4.7 Bodily Pain Dimension of Quality-of-Life by Sociodemographic

Sociodemographic Characteristics	Mean	SD	Test	P-value
Gender			0.725	0.470
Male	69.4	12.1		
Female	71.7	19.4		
Age			*2.178	*0.032
Less than 40	75.0	20.4		
40 and above	67.9	11.4		
Marital status			*2.111	*0.037
Unmarried	77.7	16.2		
Married	68.9	14.9		
Education Level			1.352	0.180
Secondary and less	67.2	13.9		
University	71.7	15.9		
Virtual Health Coach Sessions			0.610	0.543
1-2	71.4	16.3		
≥ 3	69.5	14.6		

SD = Standard Deviation
Test = Independent samples t-test

* The level of significance = $p < 0.05$

Table 4.8 reveals that the general health dimension of QoL was significantly higher among female participants, those aged less than 40 years, unmarried participants, and participants with a high level of education ($t = 7.194$, $p = 0.001$), ($t = 6.339$, $p = 0.001$), ($t = 2.003$, $p = 0.048$), ($t = 2.979$, $p = 0.004$), respectively. This may be associated with the difference in health-seeking behaviors, social support systems, and possibly better health management practices among female participants. Younger individuals may have a more optimistic outlook on their health, which may contribute to higher overall health scores. Unmarried participants reported a high mean score (53.8). This could be due to the potential stressors related to marital relationships, which may impact health perception. Higher levels of education are often associated with better health literacy, greater access to healthcare resources, and healthier lifestyle choices, all of which can enhance perceptions of general health. On the contrary, there were no significant differences in the vitality dimension of QoL scores across participants' characteristics (Table 4.9).

Table 4.8 General Health Dimension of Quality-of-Life by Sociodemographic Characteristics

Sociodemographic Characteristics	Mean	SD	Test	P-value
Gender			*7.194	*0.001
Male	37.8	15.2		
Female	58.5	11.2		
Age			*6.339	*0.001
Less than 40	58.8	13.1		
40 and above	39.3	14.9		
Marital status			*2.003	*0.048
Unmarried	53.8	14.7		
Married	44.5	17.1		
Education Level			*2.979	*0.004
Secondary and less	38.5	13.7		
University	49.4	17.4		
Virtual Health Coach Sessions			1.428	0.157
1-2	48.7	16.5		
≥ 3	43.7	17.3		

SD = Standard Deviation
Test = Independent samples t-test
* The level of significance = $p < 0.05$

Table 4.9 Vitality Dimension of Quality-of-Life by Sociodemographic Characteristics

Sociodemographic Characteristics	Mean	SD	Test	P-value
Gender			0.320	0.749
Male	47.4	11.7		
Female	48.3	16.4		
Age			0.941	0.349
Less than 40	49.5	15.6		
40 and above	46.8	12.5		
Marital status			0.124	0.902
Unmarried	48.1	9.9		
Married	47.6	14.3		
Education Level			0.314	0.754

Secondary and less	47.1	13.1		
University	48.0	14.0		
Virtual Health Coach Sessions			0.572	0.569
1-2	46.9	14.7		
≥ 3	48.5	12.7		

SD = Standard Deviation
Test = Independent samples t-test

Table 4.10 shows that the social functioning dimension of QoL scores was significantly higher among female participants, aged 40 and older, and married participants ($t = 3.534$, $p = 0.001$), ($t = 3.489$, $p = 0.001$), ($t = 2.444$, $p = 0.016$), respectively. Moreover, the role-emotional dimension of QoL scores was significantly higher among male participants, aged 40 and above years, and married participants ($t = 2.858$, $p = 0.005$), ($t = 4.475$, $p = 0.001$), ($t = 2.551$, $p = 0.012$), respectively (Table 4.11). In contrast, the mental health dimension of QoL scores did not differ significantly by gender, age, marital status, education, or number of virtual health coach clinic sessions (Table 4.12).

Table 4. 10 Social Functioning Dimension of Quality-of-Life by Sociodemographic Characteristics

Sociodemographic Characteristics	Mean	SD	Test	P-value
Gender			*3.534	*0.001
Male	79.9	16.9		
Female	67.1	17.8		
Age			*3.489	*0.001
Less than 40	66.3	19.1		
40 and above	79.3	16.2		
Marital status			*2.444	*0.016
Unmarried	64.8	20.0		
Married	76.8	17.3		
Education Level			1.464	0.146
Secondary and less	78.9	18.9		
University	72.9	17.8		
Virtual Health Coach Sessions			1.580	0.118
1-2	71.7	19.5		
≥ 3	77.5	16.8		

SD = Standard Deviation
Test = Independent samples t-test
* The level of significance = $p < 0.05$

Table 4.11 Role Emotional Dimension of Quality-of-Life by Sociodemographic Characteristics

Sociodemographic Characteristics	Mean	SD	Test	P-value
Gender			*2.858	*0.005
Male	80.1	37.7		
Female	55.3	46.7		
Age			*4.475	*0.001
Less than 40	45.5	45.5		
40 and above	83.3	35.6		
Marital status			*2.551	*0.012
Unmarried	45.8	46.9		

Married	75.1	40.8		
Education Level			1.201	0.233
Secondary and less	78.2	40.1		
University	66.7	44.1		
Virtual Health Coach Sessions			1.560	0.122
1-2	62.9	46.2		
≥ 3	76.7	39.4		

SD = Standard Deviation
Test = Independent samples t-test
* The level of significance = $p < 0.05$

Table 4. 12 Mental Health Dimension of Quality-of-Life by Sociodemographic Characteristics

Sociodemographic Characteristics	Mean	SD	Test	P-value
Gender			0.309	0.758
Male	59.0	12.3		
Female	58.1	16.4		
Age			0.915	0.363
Less than 40	56.8	16.7		
40 and above	59.6	12.3		
Marital status			0.908	0.366
Unmarried	55.8	12.2		
Married	59.2	14.4		
Education			0.238	0.812
Secondary and less	59.2	14.2		
University	58.4	14.0		
Virtual Health Coach Sessions			1.832	0.070
1-2	55.9	15.1		
≥ 3	61.1	12.6		

SD = Standard Deviation
Test = Independent samples t-test

Associations Among Quality-of-Life Dimensions

A Pearson correlation coefficient analysis was conducted to identify the correlations among QoL dimensions. These dimensions represent different aspects of QoL, including Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional, and Mental Health.

There was a strong positive correlation between the Vitality (VT) and Mental Health (MH) dimensions, with $r = 0.740$, $p < 0.01$. This suggests that participants who report higher vitality have better mental health. Moreover, the Social Functioning (SF) and Role Emotional (RE) were negatively correlated ($r = 0.631$, $p < 0.01$). This indicates that patients with hypertension who have low social functioning may face more emotional difficulties.

Table 4.13 Associations Correlation Among Quality-of-Life Dimensions

	PF	RF	BP	GH	VT	SF	RE	MH
PF	-							

RF	0.192	-						
BP	0.418**	0.359*	-					
GH	0.105	0.518**	0.434**	-				
VT	0.319*	0.354*	0.608**	0.328*	-			
SF	0.262*	-0.004	0.317*	-0.316*	0.299*	-		
RE	0.318*	0.181	0.244*	-0.315*	0.173	0.631**	-	
MH	0.261*	0.238*	0.431**	0.213*	0.740**	0.551**	0.408**	-

Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional, and Mental Health.
* The level of significance = * $p < 0.05$ ** $p < 0.01$

Discussion

Quality of Life of Patients with Hypertension

The mean of the (QoL) score was 62.7 (SD = 17.3), categorized as moderate, indicating that hypertension significantly impacts persons' psychological well-being, especially in mental and general health, where participants indicated lower scores. This aligns with research by Albugami et al. (2024), which reported an overall HRQoL score of 62.7 (SD = 17.3), indicating a moderate QoL. The data revealed a significant reduction in blood pressure and QoL scores in the experimental group following the intervention, but the control group showed no notable changes. Azar et al. (2020) found that the QoL of patients with hypertension is moderate and undesirable, and that educational level is a significant factor across all QoL domains.

The positive correlation between the Vitality (VT) and Mental Health (MH)665 dimensions in this study aligns with other studies that have confirmed this relationship. Funuyet-Salas et al. (2022) demonstrate that persons with elevated vitality levels typically have improved coping mechanisms and more efficient stress management strategies, thereby establishing a positive feedback loop that enhances overall psychological well-being.

Enhancement of Virtual Health Coaching in QoL

The analysis reveals that virtual health coaching significantly impacts multiple domains of QoL, including physical, psychological, and social well-being. It significantly enhanced participants' physical and social health domains, as measured by standardized QoL instruments. Virtual health coaching appeared particularly effective in alleviating anxiety and stress related to hypertension by providing consistent support and education. The findings corroborate research linking health coaching with improved psychological well-being in chronic disease populations (Boehmer et al., 2023). This result is consistent with that of Abbas et al. (2024), who found that health coaching, compared with a non-intervention control, had a substantial effect on BP control in the intervention group (51.4%) vs. the control group (11.3%). The outcomes from Albaghdadi and Daajani (2023) indicated that 76.2% of respondents believed telemedicine was suitable for all medical issues, and 93.1% of respondents felt that telehealth delivery made it easier to receive healthcare. Zahed et al. (2023) discovered that mobile health coaching interventions may help participants improve beliefs regarding hypertension self-management. Ju et al. (2022) determined that computer based self-management and mobile health care applications, when combined with human health coaching, are superior to conventional care for chronic illness management.

In contrast, Hoppe et al. (2023) convey that the MyHEART intervention did not make significant difference in blood pressure levels compared to standard care. However, it did make a big difference in

the physical activity, dietary habits, and weight among young adults with uncontrolled hypertension. Patients reported improved adherence to medication, healthier dietary habits, increased physical activity, and reduced stress levels. These behavioural changes improved blood pressure control, ultimately enhanced their overall health and lifestyle satisfaction. Al-Anezi revealed the potential of utilizing ChatGPT as a virtual health coach for the management of chronic diseases. Identifying important prospects involved lifelong learning, enhanced health literacy, cost-effectiveness, behavioral change support, scalability, and accessibility. Ali et al. (2024) indicated that clinical outcomes such as blood pressure control, have markedly enhanced for patients using telemedicine for hypertension treatment, achieving results equal to those of patients receiving in-person care. Zhang et al. (2024) reported a positive correlation between physically active and diastolic blood pressure (P = .0007). Similarly, a study by Abbas et al. (2024) found that BP strongly improved after receiving health coaching. This aligns with the results from the studies held by (Kappes et al., 2023; Kes & Polat, 2021; Kim, 2019), which showed that telehealth-based health coaching was significantly effective in medication adherence along with improving BP. On the other hand, Hoppe et al. (2023) revealed that the MyHEART intervention did not demonstrate a significant change in systolic or diastolic blood pressures at 6 or 12 months between control and intervention group.

Associations between QoL and Clinic Sessions

The finding of this study illustrates a positive and significant correlation between attending clinic sessions and improved QoL dimensions among patients with hypertension. Patients who attended more clinic sessions reported better scores in physical and social functions, and general and mental health. Similarly, Modica et al. (2024) found that patients completing the baseline visit and at least 4 virtual visits reported statistically significant enhancements in clinical outcomes, less depression, and higher satisfaction compared to in-person visits. Moreover, uncontrolled hypertension is associated with a diminished QoL compared to individuals with normal blood pressure, particularly in mental health, including distress and challenges in social interactions (Patil et al., 2023). Mannan et al. (2022) reported that the mean score of environmental dimensions was higher than that of psychological dimensions, indicating that environmental factors might have a more positive impact on HRQoL than psychological factors.

The relationship between demographic factors, health behaviors and health outcomes supported by finding from Abuduxike et al. (2019), That the health-seeking behaviors were determined by need factors including chronic disease status and having poor health perception. Moreover, healthcare utilization patterns and concerning social determinants of health behaviors.

Relation between the dimensions of quality of life and participants' socio-demographic data

The correlation between the QoL dimensions and participants' socio-demographic data revealed substantial differences in the QoL dimensions scores based on gender, age, marital status, education, and number of virtual health coaching clinic visits. In this study, were identified among female hypertensive patients who are under 40 years old, went to university, and attended one to two clinic sessions have high score in role physical which indicate better QoL. Similarly, studies conducted in Saudi Arabia indicates that male patients and those with higher levels of education tend to exhibit a better QoL compared to the rest of patients with hypertension (Abd, 2021; Albugami et al., 2024).

In addition, Azar et al. (2020) represented that demographic variables have a significant relationship with the QoL dimensions of patients with hypertension. Overall, his result identified significant correlations between QoL and demographic variables such as education level, job status, and duration of hypertension. In addition, Mannan et al. (2022) found that gender, age, negative feelings, co-morbid conditions, and educational level were found to be significant predictors of hypertension-related QoL. Ma et al. (2024) demonstrated that underscore the ongoing importance of incorporating education level into hypertension management strategies, recommending for the formulation of customized intervention methods rooted on individual educational backgrounds.

Implications for Nursing

Clinical Practice

The potential role of nurses is to provide more general self-care teaching in areas such as compliance with medications, diet, and exercise in the most accessible way (Xiao et al., 2019). Also, nurses must

employ standardized evaluations of QoL to enhance the efficiency of virtual health coaching clinic on clinical outcome in routine care practice. In addition, collaboration with multidisciplinary professionals is needed to provide holistic patient care.

Education

Incorporating virtual nursing care into academic programs, nursing students have the necessary technological abilities to thrive in modern healthcare delivery models. Such adaptability is essential as the practice paradigms are still changing (Jean, 2024). Nurses must undergo continuous training in using virtual health coaching platforms and analyzing digital health data. Health educators should educate hypertension patients on the benefits of virtual health coaching and how to use digital health tools effectively. Nursing education program and training should integrate Health coach curriculum.

Research

A mixed-methods approach can provide a deeper understanding of the impact of virtual health coaches. Indeed, future research should focus on how artificial intelligence and predictive analytics can enhance the effectiveness of virtual health coaching programs. Researchers should identify the most effective methods for increasing patients compliance with virtual health coaching interventions.

Policy

Guidelines and clinical standards must be developed to ensure the safety, privacy, and efficacy of the virtual health coaching programs. Government investment in digital healthcare system can ensure reliable internet access especially in rural and underserved areas. Health insurance companies should consider incorporate virtual health coaching as a reimbursable service to promote its application in clinical environments.

Strengths and Limitations

The study supports Saudi Arabia's Vision 2030 by promoting digital health solutions and improving healthcare accessibility. The virtual health coach clinic provides guidance and addresses patients' needs effectively. In addition, it reduces hospital visits, promotes preventive care and encourages self-management (Abdulwahab & Zedan, 2021). However, no studies have assessed the role of virtual health coaching clinics in improving QoL among patients with hypertension in Saudi Arabia. The recruitment for this study was from all Jeddah community Saudi citizens. Moreover, self-administered questionnaires were inexpensive because they did not require additional researchers or assistants to collect insights within a short period of time.

There are some limitations were considered in this study. The research was carried out in a limited time frame of three months, which is quite a short time for addressing the population of Jeddah city and measuring long-term outcomes. The plan should assess changes in blood pressure levels, medication adherence, and lifestyle modification over time to strengthen the findings. Also, there was a limited study sample. Increase the variety of the sample to increase generalizability and decrease selection bias. Moreover, the use of virtual health coaching presented difficulties for certain hypertensive individuals. This barrier presents the possibility that populations with poor levels of digital literacy or limited access to technology may not benefit from the study's conclusions. Finally, there is a lack of references related to the topic, particularly in Saudi Arabia. The study recommends additional research on the function of virtual health coach clinics in numerous aspects of the Kingdom of Saudi Arabia.

Conclusion

Virtual health coaching is one way to bring nursing practice to contemporary health needs and can potentially enhance the QoL of patients with chronic diseases such as hypertension. By embracing strategies for conducting remote monitoring and digital approaches, nurses can contribute significantly to improving patients' self-care and outcomes of in the community. This research underscores the effectiveness of virtual health coaching as an effective method for managing hypertension and improving patients QoL. The findings emphasize the vital role of ongoing support and guidance in achieving good QoL through providing personalized support, fostering sustainable behavioral changes, and enhancing patient engagement.

Key Findings

The analysis revealed significant associations between various socio-demographic characteristics and QoL dimensions. Moreover, the frequency of clinic appointments exhibited a positive correlation with enhancements in both physical and mental health dimensions. The researchers identify a significant positive association between vitality and mental health, as well as between social functioning and role emotions Conversely, poorer social functioning and emotional well-being correlate with diminished overall health. Technology enabled virtual health coaches will facilitate interaction among patients and healthcare practitioners to minimize gaps, enable regular follow-ups, and alleviate the challenges encountered by patients with uncontrolled hypertension. Findings suggest that patients engaged in virtual health coaching generally have superior health outcomes, claim improved blood pressure regulation, and indicate an improved QoL with targeted intervention

As digital health solutions become a primary focus of healthcare systems worldwide, including the initiatives of Saudi Arabia's Vision 2030. More research is needed to identify the key elements that will help design the most effective digital interventions and integrate them into current health systems, considering accessibility concerns and the digital divide. In conclusion, virtual health coaching can change the chronic disease management world and result in a healthier population.

Recommendations

The study could be replicated with larger samples and expanded to the general population of the Kingdom of Saudi Arabia to obtain more generalizable results and measure long-term outcomes. Moreover, further studies using different designs with revered or distracted questionnaire answers are needed. Design awareness campaigns to educate the public about the benefits of virtual health coaching related to hypertension management. Ensure the provision of stable internet connections, particularly in rural regions.

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Conflict of interest

The authors declare no conflict of interest in the preparation of this study.

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