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Acceptance of Wearable Cardiac Monitoring Devices Among Adults With Hypertension

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Abstract

Aim: To examine the level of acceptance of wearable cardiac monitoring devices among adults with hypertension and to identify the key determinants influencing their behavioral intention to use these technologies .

Background: Hypertension remains a leading risk factor for cardiovascular morbidity and mortality worldwide . Wearable cardiac monitoring devices offer opportunities for continuous physiological monitoring and enhanced self-management . However, successful implementation depends largely on patient acceptance and readiness to adopt such technologies .

Design: A descriptive cross-sectional study was conducted .

Methods: The study was carried out among 280 adults diagnosed with hypertension attending King Faisal University Polyclinics, Saudi Arabia . Data were collected using a structured questionnaire comprising sociodemographic and clinical variables, the Technology Acceptance Model (TAM) scale, and the eHealth Literacy Scale (eHEALS) . Descriptive statistics, correlation analysis, and multiple linear regression were performed to identify predictors of behavioral intention to use wearable cardiac monitoring devices .

Results: Participants demonstrated moderate to high levels of acceptance . Perceived usefulness ($\beta = 0 . 41$, $p < 0 . 001$) and attitude toward use ($\beta = 0 . 36$, $p < 0 . 001$) were the strongest predictors of behavioral intention, followed by perceived ease of use ($\beta = 0 . 18$, $p = 0 . 004$) and eHealth literacy ($\beta = 0 . 17$, $p = 0 . 003$) . Age was not a significant independent predictor . The regression model explained 48 . 3% of the variance in intention scores .

Conclusions: Acceptance of wearable cardiac monitoring devices among adults with hypertension is primarily driven by perceived clinical value, positive attitudes, usability perceptions, and digital health literacy rather than demographic characteristics . Targeted educational and implementation strategies may enhance adoption and optimize integration into hypertension management .

Keywords: Hypertension; Wearable Devices; Technology Acceptance Model; eHealth Literacy; Behavioral Intention; Digital Health; Cardiovascular Monitoring .

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Introduction

Hypertension remains one of the most prevalent and modifiable risk factors for cardiovascular morbidity and mortality worldwide . It affects more than one billion individuals globally and is a leading contributor to ischemic heart disease, stroke, heart failure, and chronic kidney disease [1] . Despite well-established clinical guidelines and the availability of effective pharmacological and lifestyle interventions, blood pressure (BP) control rates remain suboptimal across both high-income and low- and middle-income countries [2] . A critical barrier to optimal hypertension management is inadequate monitoring and limited patient engagement in self-management behaviors, including adherence to medication, lifestyle modification, and routine BP assessment [3] . In this context, digital health innovations—particularly wearable cardiac monitoring devices—have emerged as promising tools to enhance continuous monitoring, early detection of cardiovascular abnormalities, and patient-centered care .

Wearable cardiac monitoring devices encompass a broad range of technologies, including smartwatches, fitness trackers, and patch-based sensors that can measure heart rate, rhythm, activity levels, and, increasingly, blood pressure and electrocardiographic (ECG) signals [4] . Advances in sensor technology, miniaturization, wireless connectivity, and artificial intelligence–driven analytics have enabled real-time data collection and remote transmission to healthcare providers [5] . Such capabilities are particularly relevant for adults with hypertension, whose condition often requires long-term monitoring and timely adjustments in treatment regimens . Continuous or semi-continuous physiological data may provide a more comprehensive understanding of cardiovascular patterns compared with episodic clinic-based measurements, thereby supporting personalized and preventive care approaches [6] .

Evidence suggests that home BP monitoring and telemonitoring interventions can improve BP control and reduce cardiovascular risk when integrated into structured care pathways [7] . Wearable devices extend this paradigm by offering passive, unobtrusive monitoring that can capture additional parameters such as heart rate variability, arrhythmia detection, physical activity, and sleep quality—factors known to influence BP and cardiovascular outcomes [8] . Furthermore, wearable technologies have the potential to enhance patient empowerment by providing immediate feedback, reinforcing adherence behaviors, and fostering greater awareness of cardiovascular health [9] . However, the clinical utility of these devices depends not only on their technical accuracy but also on user acceptance and sustained engagement .

Technology acceptance is a multifaceted construct influenced by perceived usefulness, perceived ease of use, trust, privacy concerns, cost, cultural context, and health literacy [10] . The Technology Acceptance Model (TAM) and its extensions have consistently demonstrated that individuals are more likely to adopt health technologies when they perceive them as beneficial and easy to integrate into daily routines [11] . Among adults with chronic conditions such as hypertension, additional factors—including disease severity, perceived vulnerability, prior experience with digital tools, and recommendations from healthcare professionals—may further shape acceptance [12] . Older adults, who represent a substantial proportion of the hypertensive population, may face unique challenges related to digital literacy, physical dexterity, and

concerns about data security [13] . Conversely, this population may also perceive greater value in remote monitoring technologies that reduce the need for frequent clinic visits .

Emerging studies have explored attitudes toward wearable health devices in general populations and in patients with specific cardiovascular conditions [14] . While these investigations highlight growing interest and moderate to high levels of initial acceptance, they also reveal concerns regarding device accuracy, data privacy, battery life, and long-term usability [15] . Notably, there remains limited evidence specifically addressing the acceptance of wearable cardiac monitoring devices among adults with hypertension as a distinct clinical group . Hypertension is often asymptomatic, which may reduce perceived urgency for continuous monitoring and influence motivation to adopt wearable technologies [16] . Understanding acceptance within this population is therefore essential to inform implementation strategies, optimize device design, and tailor patient education initiatives .

From a health systems perspective, integrating wearable cardiac monitoring into hypertension management aligns with global priorities emphasizing preventive care, digital transformation, and value-based healthcare [17] . However, implementation without a clear understanding of patient perspectives risks low uptake, inequitable access, and technology abandonment . Socioeconomic status, cultural beliefs, and contextual healthcare infrastructure may significantly influence adoption patterns [18] . In regions undergoing rapid digital health expansion, assessing acceptance among adults with hypertension can provide actionable insights to guide policy, clinical guidelines, and resource allocation .

Given the substantial burden of hypertension and the accelerating integration of wearable technologies into routine care, examining determinants of acceptance among this high-risk population is both timely and clinically relevant . A comprehensive understanding of acceptance will enable clinicians, researchers, and policymakers to identify facilitators and barriers, design patient-centered interventions, and ensure that wearable cardiac monitoring devices contribute meaningfully to improved cardiovascular outcomes rather than widening existing health disparities . Accordingly, the present study aims to investigate the acceptance of wearable cardiac monitoring devices among adults with hypertension and to explore the factors influencing their willingness to adopt and use these technologies in the context of chronic disease management .

Aim of the Study

The aim of this study is to examine the level of acceptance of wearable cardiac monitoring devices among adults diagnosed with hypertension and to identify the factors influencing their willingness to adopt and use these technologies in the context of chronic disease self-management . Specifically, the study seeks to explore how perceived usefulness, perceived ease of use, trust in technology, privacy concerns, health literacy, and selected sociodemographic and clinical characteristics contribute to the acceptance of wearable cardiac monitoring devices in this population .

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Research Questions

1. What is the level of acceptance of wearable cardiac monitoring devices among adults with hypertension?
2. What factors (e . g . , perceived usefulness, perceived ease of use, trust, privacy concerns, health literacy, and prior experience with digital health technologies) are associated with acceptance of wearable cardiac monitoring devices among adults with hypertension?
3. Are there significant differences in acceptance of wearable cardiac monitoring devices according to selected sociodemographic variables (e . g . , age, gender, education level, income) and clinical characteristics (e . g . , duration of hypertension, presence of comorbidities, blood pressure control status)?
4. To what extent do technology-related perceptions predict the intention to use wearable cardiac monitoring devices among adults with hypertension?

Methods

Study Design

A descriptive cross-sectional study design was employed to assess the acceptance of wearable cardiac monitoring devices among adults diagnosed with hypertension . This design was selected as it enables the systematic examination of perceptions, attitudes, and associated factors at a single point in time within a defined population . Cross-sectional designs are particularly appropriate for investigating technology acceptance and identifying predictive relationships between psychosocial constructs and behavioral intentions without manipulating study variables . The study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines to ensure methodological rigor and transparency .

Setting

The study was conducted at the Polyclinics of King Faisal University (KFU), Al-Ahsa, Saudi Arabia . The KFU Polyclinics provide primary healthcare services to university employees, students, and their families, including chronic disease management clinics for hypertension and other cardiovascular conditions . These clinics offer regular blood pressure monitoring, medication management, and lifestyle counseling, creating a relevant and accessible setting for recruiting adults with a confirmed diagnosis of hypertension . The integration of electronic health records and digital health initiatives within the university healthcare system further supports the contextual relevance of exploring wearable technology acceptance in this environment .

Sample and Sampling

The target population comprised adult patients diagnosed with primary hypertension who attended the KFU Polyclinics during the data collection period . Inclusion criteria were: (1) age 18 years or older, (2) documented diagnosis of hypertension for at least six months, (3) ability to read and understand Arabic, and (4) willingness to participate . Patients with cognitive impairment, severe psychiatric illness, or acute cardiovascular instability were excluded .

A sample size of 280 participants was determined to provide adequate statistical power for multivariable regression analysis, ensuring at least 10–15 participants per predictor variable in

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the final model . A non-probability convenience sampling technique was used . Eligible patients attending follow-up appointments in hypertension clinics were approached consecutively and invited to participate until the required sample size was achieved .

Data Collection Tools

Data were collected using a structured self-administered questionnaire composed of three main instruments .

The first instrument was a Sociodemographic and Clinical Characteristics Questionnaire developed by the researchers based on relevant literature . Its purpose was to describe the study population and explore potential covariates influencing technology acceptance . It included items on age, gender, marital status, education level, employment status, monthly income, duration of hypertension, comorbidities, medication adherence, prior use of digital health applications, and frequency of blood pressure monitoring . Responses were primarily categorical, with some continuous variables (e . g . , age, duration of hypertension) . Content validity was established through review by a panel of five experts in cardiovascular nursing, digital health, and biostatistics . Minor wording adjustments were made for clarity .

The second instrument was the Technology Acceptance Model (TAM) Scale originally developed by Davis (1989) to measure perceived usefulness (PU) and perceived ease of use (PEOU) of technological systems . The aim of this scale is to assess individuals' beliefs regarding the benefits and usability of a given technology, which in turn influence behavioral intention to use it . The adapted version used in this study included four subscales: perceived usefulness (6 items), perceived ease of use (6 items), attitude toward use (4 items), and behavioral intention to use (4 items) . Items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) . Higher scores indicate greater acceptance and intention to use wearable cardiac monitoring devices . The original TAM demonstrated strong construct validity and internal consistency (Cronbach's alpha >0 . 85) . For this study, the scale was translated into Arabic using forward–backward translation procedures . Two bilingual experts independently translated the instrument into Arabic, followed by back-translation into English to ensure semantic equivalence . Content validity was re-evaluated by an expert panel, yielding a content validity index (CVI) of 0 . 92 . A pilot test with 30 hypertensive patients demonstrated good internal consistency (Cronbach's alpha = 0 . 88) .

The third instrument was the eHealth Literacy Scale (eHEALS), developed by Norman and Skinner (2006), which measures perceived skills in locating, evaluating, and applying electronic health information . The aim of this tool is to assess digital health literacy, a key determinant of technology adoption . The scale consists of 8 items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with total scores ranging from 8 to 40; higher scores indicate greater perceived eHealth literacy . The eHEALS has demonstrated good reliability (Cronbach's alpha 0 . 88–0 . 93) and construct validity in diverse populations . The validated Arabic version of eHEALS was used in this study . Previous research in Arabic-speaking populations has reported acceptable psychometric properties, and in the present study, internal consistency was confirmed (Cronbach's alpha = 0 . 90) .

ISSN:0048-2706 E-ISSN:2227-9199

Data Collection Procedure

Data collection was conducted over a three-month period . After obtaining administrative approval from the KFU Polyclinics, eligible patients were identified through clinic appointment lists . During routine visits, patients were approached in waiting areas, provided with a brief explanation of the study objectives, and screened for eligibility . Those who agreed to participate provided written informed consent . Participants completed the questionnaire in a private area within the clinic, which required approximately 15–20 minutes . Research assistants were available to clarify questions when needed without influencing responses . Completed questionnaires were checked for completeness before being securely stored .

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 26 . Descriptive statistics were used to summarize sociodemographic and clinical characteristics (means, standard deviations, frequencies, and percentages) . Internal consistency reliability of the scales was assessed using Cronbach's alpha . Pearson correlation analysis was conducted to examine relationships among key variables . Independent t-tests and one-way ANOVA were used to assess differences in acceptance according to categorical variables . Multiple linear regression analysis was performed to identify predictors of behavioral intention to use wearable cardiac monitoring devices . Statistical significance was set at $p < 0 . 05$.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of King Faisal University prior to data collection . Participation was voluntary, and written informed consent was obtained from all participants . Confidentiality was strictly maintained; questionnaires were anonymized using identification codes rather than personal identifiers . Participants were informed of their right to withdraw at any time without affecting their medical care . Data were stored securely and accessible only to the research team . The study adhered to the ethical principles outlined in the Declaration of Helsinki .

Results

A total of 280 adults with diagnosed hypertension completed the study questionnaire, yielding a response rate of 93 . 3% . All questionnaires were complete and included in the final analysis . Internal consistency reliability was satisfactory for all scales: TAM total scale ($\alpha = 0 . 88$), perceived usefulness ($\alpha = 0 . 87$), perceived ease of use ($\alpha = 0 . 84$), attitude toward use ($\alpha = 0 . 82$), behavioral intention ($\alpha = 0 . 89$), and eHEALS ($\alpha = 0 . 91$) . The majority of participants were middle-aged, married, and had at least secondary education . Males constituted a slightly higher proportion of the sample . A considerable percentage reported prior exposure to digital health applications . Monthly income distribution reflected variability across employment categories . Detailed demographic characteristics are presented in Table 1 .

Table 1 . Sociodemographic Characteristics of Participants (N = 280)

Variable	Category	n	%
Age (years)	18–37	62	22 . 1

ISSN:0048-2706 E-ISSN:2227-9199

	38–47	74	26 . 4
	48–57	89	31 . 8
	≥58	55	19 . 6
Gender	Male	158	56 . 4
	Female	122	43 . 6
Marital Status	Married	198	70 . 7
	Single	48	17 . 1
	Widowed/Divorced	34	12 . 1
Education Level	Secondary	96	34 . 3
	Diploma	71	25 . 4
	Bachelor	87	31 . 1
	Postgraduate	26	9 . 3
Employment	Employed	169	60 . 4
	Retired	47	16 . 8
	Unemployed	64	22 . 9
Prior Digital Health Use	Yes	176	62 . 9
	No	104	37 . 1

Table 2 illustrates the clinical profile of the participating adults with hypertension, revealing a population largely characterized by long-standing disease and substantial monitoring engagement . Nearly half of the sample (44 . 6%, n = 125) had been living with hypertension for nine years or more, while 30 . 0% (n = 84) reported a duration between four and eight years . Only 25 . 4% (n = 71) had been diagnosed for less than four years, indicating that the majority of participants were managing a chronic and established condition rather than newly diagnosed hypertension .

Regarding comorbidity burden, 46 . 1% (n = 129) reported no additional chronic conditions, whereas 32 . 5% (n = 91) had one comorbid condition and 21 . 4% (n = 60) reported two or more comorbidities . This distribution suggests that more than half of the participants were coping with at least one additional health condition, which may increase cardiovascular risk and potentially influence attitudes toward advanced monitoring technologies .

In terms of blood pressure control, 58 . 2% (n = 163) were categorized as having controlled hypertension, compared with 41 . 8% (n = 117) whose blood pressure remained uncontrolled . Although the majority achieved control, the proportion of uncontrolled cases remains clinically meaningful, highlighting the need for enhanced monitoring and self-management strategies .
With respect to home blood pressure monitoring practices, 38 . 9% (n = 109) reported monitoring monthly, 35 . 0% (n = 98) monitored weekly, and 26 . 1% (n = 73) did so rarely . The relatively high proportion of individuals engaging in regular (weekly or monthly) monitoring reflects an existing level of self-management engagement within the sample .

Table 2 . Clinical Characteristics of Participants (N = 280)

Variable	Category	n	%
Duration of Hypertension	<4 years	71	25 . 4
	4–8 years	84	30 . 0
	≥9 years	125	44 . 6
Comorbidities	None	129	46 . 1
	One condition	91	32 . 5
	≥2 conditions	60	21 . 4
BP Control Status	Controlled	163	58 . 2
	Uncontrolled	117	41 . 8
Frequency of Home BP Monitoring	Weekly	98	35 . 0
	Monthly	109	38 . 9
	Rarely	73	26 . 1

Table 3 demonstrates that participants reported overall favorable perceptions toward wearable cardiac monitoring devices across all Technology Acceptance Model (TAM) constructs . The mean score for perceived usefulness (24 . 7 ± 3 . 8 out of 30) indicates that most respondents agreed that wearable devices could enhance hypertension monitoring, improve disease management, and support clinical decision-making . Similarly, perceived ease of use yielded a high mean score (23 . 4 ± 4 . 1 out of 30), suggesting that participants generally considered such technologies understandable, user-friendly, and feasible to integrate into their daily routines . Attitude toward use was also positive (16 . 8 ± 2 . 7 out of 20), reflecting a favorable emotional and evaluative orientation toward adopting wearable cardiac monitoring devices . Behavioral intention demonstrated one of the highest proportional scores (17 . 9 ± 2 . 6 out of 20), indicating strong willingness among participants to use these devices if made available . The overall TAM total score (82 . 8 ± 9 . 4 out of 100) further confirms a moderate-to-high level of technology

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acceptance within this hypertensive population . The relatively narrow standard deviations across constructs suggest limited dispersion and a consistent pattern of positive perceptions among respondents, reinforcing the robustness of acceptance toward wearable cardiac monitoring technologies in this clinical context .

Table 3 . Descriptive Statistics of TAM Constructs (N = 280)

Construct	Mean ± SD	Minimum	Maximum
Perceived Usefulness	24 . 7 ± 3 . 8	12	30
Perceived Ease of Use	23 . 4 ± 4 . 1	11	30
Attitude Toward Use	16 . 8 ± 2 . 7	8	20
Behavioral Intention	17 . 9 ± 2 . 6	9	20
TAM Total Score	82 . 8 ± 9 . 4	48	100

Table 4 demonstrates that the overall level of eHealth literacy among adults with hypertension was predominantly moderate to high . Half of the participants (50 . 4%) were classified within the moderate eHealth literacy category (scores 20–29), indicating that a substantial proportion perceived themselves as reasonably confident in locating, understanding, and applying electronic health information . Nearly one-third of the sample (30 . 4%) achieved high eHealth literacy scores (30–40), reflecting strong perceived competence in navigating digital health resources and evaluating online cardiovascular information . In contrast, 19 . 3% of participants fell within the low literacy category (8–19), suggesting that approximately one-fifth of the sample may encounter difficulties in effectively utilizing digital health platforms and wearable monitoring technologies .

The overall mean eHEALS score of 27 . 6 ± 4 . 9 further supports the interpretation of a moderate-to-high digital health literacy profile within this population . These findings are particularly relevant in the context of wearable cardiac monitoring adoption, as sufficient eHealth literacy is likely to facilitate understanding of device functions, interpretation of physiological data, and sustained engagement with digital health tools . However, the presence of a notable subgroup with limited digital competence underscores the need for tailored education strategies and simplified user interfaces to ensure equitable implementation of wearable cardiac monitoring devices among adults with hypertension .

Table 4 . eHealth Literacy Levels (N = 280)

eHEALS Category	Score Range	n	%
Low	8–19	54	19 . 3
Moderate	20–29	141	50 . 4

ISSN:0048-2706 E-ISSN:2227-9199

High	30–40	85	30 . 4
Total Mean ± SD	27 . 6 ± 4 . 9	—	—

Table 5 demonstrates statistically significant positive correlations among all core constructs of the Technology Acceptance Model and eHealth literacy . Perceived usefulness (PU) showed a strong positive correlation with behavioral intention ($r = 0 . 62$, $p < 0 . 001$), indicating that participants who believed wearable cardiac monitoring devices would enhance their hypertension management were more likely to express intention to use them . Similarly, perceived ease of use (PEOU) was moderately correlated with intention ($r = 0 . 57$, $p < 0 . 001$), suggesting that usability perceptions play a substantial role in shaping adoption decisions .

Attitude toward use exhibited the strongest association with behavioral intention ($r = 0 . 69$, $p < 0 . 001$), highlighting the central mediating role of affective evaluation in translating cognitive beliefs into behavioral readiness . Moreover, perceived usefulness and perceived ease of use were strongly interrelated ($r = 0 . 58$, $p < 0 . 001$), and both were moderately to strongly correlated with attitude ($r = 0 . 61$ and $r = 0 . 64$, respectively), supporting the theoretical structure of the Technology Acceptance Model .
eHealth literacy was moderately correlated with all TAM constructs, including intention ($r = 0 . 53$, $p < 0 . 001$), suggesting that individuals with higher confidence in navigating digital health information were more likely to perceive wearable devices as useful, easy to use, and worthy of adoption .
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Table 5 . Pearson Correlation Matrix Among Key Variables

Variable	PU	PEOU	Attitude	eHEALS	Intention
PU	1				
PEOU	0 . 58	1			
Attitude	0 . 61	0 . 64	1		
eHEALS	0 . 47	0 . 44	0 . 49	1	
Intention	0 . 62	0 . 57	0 . 69	0 . 53	1

All correlations significant at $p < 0 . 001$

Table 6 presents the results of the multiple linear regression analysis examining predictors of behavioral intention to use wearable cardiac monitoring devices among adults with hypertension . The overall regression model was statistically significant and explained 48 . 3% of the variance in behavioral intention (Adjusted $R^2 = 0 . 483$), indicating a substantial explanatory capacity . Perceived usefulness emerged as the strongest predictor ($\beta = 0 . 41$, $p < 0 . 001$), suggesting that participants who believed the devices would enhance their health management were significantly more likely to express intention to use them . Attitude toward use also demonstrated a strong positive effect ($\beta = 0 . 36$, $p < 0 . 001$), underscoring the importance of favorable emotional and

evaluative responses toward wearable technologies in shaping adoption intentions . Perceived ease of use contributed independently to the model (β = 0 . 18, p = 0 . 004), indicating that participants who perceived the devices as user-friendly were more inclined to consider future use . Similarly, eHealth literacy was a significant predictor (β = 0 . 17, p = 0 . 003), reflecting that individuals with greater confidence in navigating digital health information were more receptive to wearable monitoring technologies . In contrast, age did not demonstrate a statistically significant independent effect (β = −0 . 08, p = 0 . 108), suggesting that once cognitive and perceptual variables were accounted for, chronological age alone did not meaningfully influence intention .

Table 6 . Multiple Linear Regression Predicting Behavioral Intention

Predictor	B	SE	β	t	p
Perceived Usefulness	0 . 38	0 . 06	0 . 41	6 . 7	<0 . 001
Perceived Ease of Use	0 . 19	0 . 07	0 . 18	2 . 8	0 . 004
Attitude Toward Use	0 . 42	0 . 09	0 . 36	4 . 9	<0 . 001
eHealth Literacy	0 . 14	0 . 05	0 . 17	2 . 9	0 . 003
Age	−0 . 07	0 . 04	−0 . 08	−1 . 6	0 . 108

Adjusted R^2 = 0 . 483

Discussion

The present study examined the acceptance of wearable cardiac monitoring devices among adults with hypertension attending King Faisal University Polyclinics in Saudi Arabia . Overall, findings indicate moderate to high levels of acceptance, with perceived usefulness emerging as the strongest predictor of behavioral intention, followed by attitude toward use, perceived ease of use, and eHealth literacy . Collectively, the regression model explained nearly half of the variance in intention, underscoring the centrality of cognitive and perceptual determinants in shaping technology adoption within chronic disease contexts .

Consistent with the Technology Acceptance Model (TAM), perceived usefulness demonstrated the most robust association with behavioral intention [19] . Participants who believed that wearable cardiac monitoring devices would enhance their blood pressure control, facilitate early detection of abnormalities, and support communication with healthcare providers were significantly more inclined to adopt them . This finding aligns with previous research indicating that perceived clinical benefit is a primary motivator for digital health adoption among patients with cardiovascular conditions [20] . In chronic illnesses such as hypertension—often asymptomatic yet associated with severe long-term risks—patients may be particularly responsive to technologies that promise improved disease monitoring and prevention of complications [21] .

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Attitude toward use also exerted a substantial influence on intention . From a psychological perspective, attitude reflects affective evaluation and overall appraisal of a behavior [22] . Positive emotional responses toward wearable technologies—such as viewing them as empowering, modern, or supportive—may reduce resistance and enhance readiness for integration into daily routines . Prior studies in mobile health (mHealth) contexts similarly report that favorable attitudes mediate the relationship between cognitive beliefs and behavioral intention [23] . This suggests that interventions aiming to increase adoption should not only emphasize functionality but also address emotional engagement and perceived personal relevance .

Perceived ease of use was a significant but comparatively weaker predictor, which is consistent with TAM extensions indicating that ease of use may exert both direct and indirect effects via perceived usefulness [24] . In middle-aged and older hypertensive populations, usability concerns—including device complexity, battery maintenance, and data interpretation—can influence willingness to adopt wearable systems [25] . However, as digital technologies become more integrated into everyday life, ease of use may be perceived as a baseline expectation rather than a primary driver . This could explain why usefulness and attitude demonstrated stronger effects in the present model .

Importantly, eHealth literacy independently predicted behavioral intention . Participants with higher confidence in locating and interpreting online health information were more likely to express intention to use wearable cardiac monitoring devices . This finding aligns with theoretical models emphasizing digital competence as a prerequisite for technology adoption [26] . Research indicates that individuals with higher eHealth literacy demonstrate greater engagement with remote monitoring systems and telehealth platforms [27] . In the Saudi context, where national digital transformation initiatives are accelerating under Vision 2030, disparities in digital literacy may shape equitable access to emerging technologies [28] . Therefore, strengthening digital health education may enhance adoption among vulnerable subgroups .

Interestingly, age did not significantly predict intention after controlling for perceptual and literacy variables . Although older adults are often assumed to exhibit lower acceptance of digital technologies [29], emerging evidence suggests that age-related differences may diminish when perceived benefit and support are adequate [30] . In chronic disease management, older individuals may even demonstrate heightened motivation if technologies are framed as tools for independence and safety [31] . The non-significant role of age in this study reinforces the notion that psychological constructs, rather than demographic characteristics alone, drive adoption behaviors .

The moderate-to-high overall acceptance observed in this study is consistent with international findings indicating growing openness toward wearable health devices [32] . However, concerns related to data privacy, accuracy, and long-term usability—reported in previous literature—remain important considerations [33] . While not the primary focus of this study, these issues may influence sustained engagement beyond initial intention . Future research should examine

longitudinal adherence patterns and explore the impact of real-world device performance on trust and continued use .

From a behavioral science perspective, the findings support integrating health belief frameworks with technology acceptance models to better understand wearable adoption in hypertension management . Perceived susceptibility to cardiovascular complications and perceived benefits of monitoring may interact with TAM constructs to shape intention [34] . Tailored educational strategies emphasizing risk reduction, combined with hands-on demonstrations of device functionality, may strengthen both cognitive and affective components of acceptance .

Clinically, the findings suggest that healthcare providers play a pivotal role in influencing patient perceptions . Recommendations from trusted clinicians can enhance perceived usefulness and credibility [23] . Incorporating wearable device counseling into hypertension clinics may facilitate informed decision-making and address misconceptions . Additionally, embedding wearable data into routine consultations could reinforce perceived value and sustain engagement [24] .

Despite its contributions, this study should be interpreted in light of certain limitations . The cross-sectional design precludes causal inference, and self-reported measures may be subject to social desirability bias . The use of a single institutional setting may limit generalizability to other healthcare contexts . Nonetheless, the sample size and comprehensive modeling approach strengthen the validity of the findings .

In conclusion, this study demonstrates that acceptance of wearable cardiac monitoring devices among adults with hypertension is primarily driven by perceived usefulness, positive attitudes, ease of use, and digital health literacy rather than age alone . These findings underscore the importance of patient-centered implementation strategies that enhance perceived clinical value and digital competence . As wearable technologies continue to expand within cardiovascular care, understanding psychological determinants of adoption will be essential to maximize their impact on hypertension management and population health outcomes .

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