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Innovations in Blood Pressure Monitoring: Physical Therapists' Acceptance of Smartwatch for Patient Self-Monitoring

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Abstract

Blood pressure (BP) monitoring is a vital component of cardiovascular health assessment, yet its routine use is often hindered by accessibility issues and reliance on traditional instruments typically used by medical professionals. This study aimed to assess the acceptance of BP-monitoring smartwatches (wearable devices) among licensed Physical Therapists in Laguna, Philippines.

A quantitative descriptive research design was utilized, with data collected through an online survey administered after participants viewed a standardized video comparing a BP smartwatch with an aneroid sphygmomanometer. The survey measured behavioral intention, perceived ease of use, and overall acceptance using a validated Likert scale-based questionnaire.

Findings revealed that respondents demonstrated a moderately acceptable behavioral intention to use and recommend smartwatches for BP monitoring (mean = 3.63), perceived them as easy to use (mean = 3.88), and moderately accepted their integration into clinical practice (mean = 3.62). These results indicate a favorable outlook among Physical Therapists toward incorporating wearable BP-monitoring devices into patient care, particularly in telehealth and outpatient settings, to support proactive health management and advance digital health innovation.

Keywords: Blood Pressure (BP) Monitoring; Smartwatches (Wearable Devices); Overall Acceptance; Physical Therapists; Telehealth and Outpatient Settings

Introduction

The most indispensable aspect of life is undeniably health (Raoff & Durai 2022). Blood pressure is one of the most important indicators for monitoring the health of a person that all health practitioners are currently using, however important this indicator is it is the most commonly neglected because of several factors like accessibility to Blood pressure devices and available personnel to take the blood pressure of the individual. Blood pressure (BP) measurement is a very significant and crucial parameter for monitoring, controlling and treatment of cardiovascular health conditions (Kumar et al., 2020).

In recent years, each small step of innovation lays the foundation to what is known today as the advanced healthcare system. Innovation is intended to make life easier and convenient for all individuals. The shift from traditional to modern approaches are necessary to address the increasing changes in the lifestyle of every individual, which are necessary actions to address increasing demographic growth and provide health necessity to all individuals. In light of the present problems, a technology that has the capability to do self-screen tests for blood pressure to the users is a significant leap to detect potential health issues or diseases before symptoms appear and promote a culture of health awareness with the confidence of having a peace of mind since the device yield the same as that of the standard measurement device. The introduction of the latter could also help practitioners to determine patients' data of blood pressure readings without having the need of redundant blood pressure reading.

Despite several notable advances in healthcare, numerous individuals still struggle with challenges including health literacy, access to healthcare, and the prevalence of diseases that can be prevented. According to the study of Arandia et al. 2023, there are a large number of wearable devices wherein due to their design and built-in sensors that are functionally adapted to obtain health-related information from non-hospital settings. The application of technology applied to health

services helps individuals especially in the community to have better access to those healthcare services needed and to address potential challenges to maximize the benefits for all. By addressing those challenges and implementing effective strategies, it can empower individuals to take an active role in their health and well-being. The World Health Organization (WHO) has different campaigns that raise awareness and understanding about health issues and mobilize support for action.

There are various health challenges, ranging from chronic diseases to infectious outbreaks that pose a significant burden on individuals, communities and healthcare systems worldwide. Hypertension is one of the major global public health challenges, that means patients with hypertension need more measures to control their blood pressure [19]. Facing hypertension has significant implications for individual's health, healthcare systems and even the economies of each country. Addressing this issue requires a comprehensive approach that involves prevention, treatment, and public health interventions. According to the World Health Organization, 2023, about 30% of the population of the Philippines has a prevalence of hypertension. That statistic shows how hypertension has become a major health concern in the country, that a lot of Filipinos have suffered because of hypertension. Recent studies suggest that proper BP management is essential, as hypertension remains a leading risk factor for morbidity and mortality globally, affecting approximately 1.13 billion individuals (World Health Organization [WHO], 2021). It is indeed needed for devices which can measure blood pressure readings with ease and confidence to accurate readings.

In light of these concerns, the researchers determined to seek the acceptance of wrist-worn smartwatch which may transform health management by leveraging the innovation of technology and sensor capabilities for real-time monitoring and data tracking. To illustrate, the latter seeks if wrist worn smartwatches can be accepted by medical practitioners to empower users, offering independent judgment to basic health literacy such as general health. Blood pressure smartwatches allow users to easily track their readings, helping them identify patterns and trends that could indicate health issues. This active approach can significantly enhance health awareness and encourage individuals to take charge of their well-being.

Methodology

The study utilized a quantitative descriptive research design to determine the acceptance of smartwatch technology for blood pressure self-monitoring among licensed Physical Therapists in Laguna. A researcher-made questionnaire served as the primary data collection instrument, assessing respondents' behavioral intention to use, perceived ease of use, and overall acceptance of smartwatch technology. The questionnaire underwent content validation by experts in psychometrician, information technology, healthcare, and research, and employed a 5-point Likert scale to measure varying levels of acceptability. 33 Participants consisted of licensed Physical Therapists currently practicing in hospitals, clinics, and healthcare institutions within Laguna, selected through purposive sampling based on predefined inclusion criteria. Data collection was conducted through an online survey, wherein respondents first viewed a video demonstration comparing a blood pressure-enabled smartwatch and a traditional sphygmomanometer. The demonstration included two measurement trials performed on both arms of a consenting subject, with the sphygmomanometer calibrated by a biomedical engineer to ensure validity as the reference standard. Following the video presentation and informed consent process, respondents completed the survey questionnaire. The study was conducted during the academic year 2024–2025 to evaluate professional perceptions regarding the adoption of smartwatch technology in healthcare practice.

Results

Behavioral Intention to Smartwatch Use

Table 1 presents the behavioral intention of the respondents regarding smartwatch use. A five-point Likert scale was used to measure behavioral intention, with the following scale: 1 – Poorly Acceptable, 2 – Fairly Acceptable, 3 – Acceptable, 4 – Moderately Acceptable, and 5 – Highly Acceptable.

Based on the responses, the physical therapists find it acceptable to use smartwatches for daily blood pressure monitoring (M = 3.39, SD = 1.06). At a slightly higher level, they find it moderately acceptable to utilize smartwatches for long-term blood pressure monitoring (M = 3.48, SD = 1.15). Furthermore, it is moderately acceptable for them to plan on frequently using a smartwatch as a blood pressure monitoring tool in the future (M = 3.55, SD = 0.83).

However, the physical therapists express greater acceptance when it comes to integrating smartwatches for regular health-tracking (M = 3.82, SD = 1.07) and in encouraging their patients to wear smartwatches for daily health monitoring (M = 3.91, SD = 0.77).

These results suggest that while physical therapists are open to using smartwatches for their own personal use – that is, blood pressure tracking – they show even stronger behavioral intention toward a much wider health applications and to even encourage others, such as their own patients, to use smartwatches for their own health-tracking. Different research studies have also explained how physical therapists exhibit a strong behavioral intention in using smartwatches. Patel et al., 2012; Wang et al., 2020 asserts that the physical therapists exhibit a strong behavioral intention in using smartwatches in exploring more the broader health applications of smartwatches such as physical activity monitoring, sleep detection and many more. There was also a study that investigated the factors affecting the behavioral intention in adapting to wearable gadgets. Aseron et al., 2023 stated that the behavioral intention in using the smartwatches for healthcare and wellness is significantly influenced by the perceived usefulness, ease of use and social influence of it.

Perception of the Ease of Use of Smartwatch

Table 2 presents the respondents' perception of the ease of use of the smartwatch. A five-point Likert scale was used, with the following scale: 1 – Poorly Acceptable, 2 – Fairly Acceptable, 3 – Acceptable, 4 – Moderately Acceptable, and 5 – Highly Acceptable.

The responses indicate that physical therapists find it moderately acceptable that using the smartwatch for monitoring blood pressure provides accurate readings (M = 3.42, SD = 0.83), and that the device is reliable for tracking blood pressure over time (M = 3.48, SD = 0.91).

Physical therapists also express a greater level of acceptance in the idea that using the smartwatch can help manage their health (M = 4.00, SD = 0.83). Moreover, they find it highly acceptable to use the smartwatch for blood pressure monitoring even as first-time users (M = 4.21, SD = 0.70), and to learn how to operate it for checking blood pressure (M = 4.27, SD = 0.72).

In terms of ease of use, these findings suggest that physical

Table 1: Respondents' Behavioral Intention to Smartwatch Use.

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1. I intend to use my smartwatch for blood pressure monitoring daily.	3.39	1.06	Acceptable	5
2. I intend to frequently use a smartwatch as a Blood pressure monitoring tool in the future.	3.55	0.83	Moderately Acceptable	3
3. I intend to encourage patients to wear smartwatches daily to track their health.	3.91	0.77	Moderately Acceptable	1
4. I intend to incorporate the smartwatch for regular tracking of health.	3.82	1.07	Moderately Acceptable	2
5. I intend to utilize my smartwatch to for long-term to monitor my Blood pressure	3.48	1.15	Moderately Acceptable	4
Mean	3.63		Moderately Acceptable	

Table 2: Respondents' Perception of the Ease of Use of Smartwatch.

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1. I believe utilizing a smartwatch to track blood pressure would help to manage health.	4.00	0.83	Moderately Acceptable	3
2. I believe using smartwatch for Blood pressure monitoring provides an accurate reading.	3.42	0.83	Moderately Acceptable	5
3. I believe that my smartwatch is reliable to monitor and track blood pressure reading over time.	3.48	0.91	Moderately Acceptable	4
4. I believe that using a smart watch for Blood pressure monitoring would be simple even for first-time users.	4.21	0.70	Highly Acceptable	2
5. I believe it would be simple to learn how to use the smartwatch to check blood pressure.	4.27	0.72	Highly Acceptable	1
Mean	3.88		Moderately Acceptable	

Table 3: Respondents' Overall Acceptance Towards the Use of Smartwatch for Patient BP Monitoring.

	Weighted Mean	Standard Deviation	Verbal Interpretation	Rank
1.I'm in favor of utilizing a smartwatch to track my Blood pressure reading.	3.88	0.99	Moderately Acceptable	1
2. I'm in favor of integrating the use of smartwatch for my patient Blood pressure monitoring.	3.33	1.16	Acceptable	5
3. I'm satisfied with the overall performance of smartwatch as Blood pressure monitoring.	3.76	1.12	Moderately Acceptable	2.5
4. I'm trusting the results provided by the smartwatch for blood pressure readings.	3.39	1.03	Acceptable	4
5. I believe that smartwatch provides a convenient way to track blood pressure.	3.76	0.94	Moderately Acceptable	2.5
Mean	3.62		Moderately Acceptable	

therapists perceive the smartwatch as an accessible and user-friendly tool for health monitoring, especially in terms of ease of use, reliability, and learnability. Different research studies have also looked into the ease of using a wearable device such as a smartwatch. The study conducted by Althobaiti and Alshamari (2024) evaluated that the smartwatch can perform tasks effectively and quickly while relishing the experiences. Using the UTAUT2 framework, it was discovered that most healthcare professionals, particularly Physical Therapists, favor simple to learn and use smartwatches (Aseron et al., 2023). The study revealed that the ease of use had a significant influence on the behavioral intention to use smartwatches for health monitoring for personal and even professional purposes.

Acceptance Towards the Use of Smartwatch

Table 3 presents the overall acceptance of using a smartwatch for patients' blood pressure monitoring. A five-point Likert scale was used with the following values: 1 – Poorly Acceptable, 2 – Fairly Acceptable, 3 – Acceptable, 4 – Moderately Acceptable, and 5 – Highly Acceptable.

The results range from acceptable to moderately acceptable. Specifically, respondents favor using a smartwatch to track their own blood pressure readings (M = 3.88, SD = 0.99). They also support integrating smartwatch use for monitoring their patients' blood pressure (M = 3.33, SD = 1.16), indicating an overall positive reception.

Moreover, satisfaction with the smartwatch's overall performance in monitoring blood pressure (M = 3.76, SD = 1.12) further supports its acceptance. Respondents are also trustful of the blood pressure results provided by the smartwatch (M = 3.39, SD = 1.03). They also agree that it offers a convenient way to track blood pressure (M = 3.76, SD = 0.94).

On a descriptive level, the findings highlight that physical therapists are generally open and accepting into using the smartwatch as a support tool for themselves – and, eventually, for their patients – to effectively monitor one's blood pressure. In a study, monitoring and measuring a patient's blood pressure is critical for managing and diagnosing Parkinson's disease. Cho et al. (2021) verified the accuracy of blood pressure measurement in patients. Smartwatches for blood pressure monitoring in Parkinson's disease patients will become a significant tool in disease management (Cho et al., 2021).

Conclusions

The study found that Physical Therapists generally accepted the use of smartwatches as alternative tools for blood pressure monitoring, particularly for patient self-monitoring and long-term health management. Respondents demonstrated moderate acceptance regarding their intention to use smartwatches, recognizing their

potential benefits while still showing a preference for conventional blood pressure devices due to familiarity and established clinical reliability. Perceived ease of use received high acceptance, with participants agreeing that smartwatches are easy to learn, operate, and capable of providing reasonably accurate readings. Although smartwatches were viewed as convenient and valuable monitoring tools, they were not considered complete replacements for traditional blood pressure measurement methods. Limitations such as the restricted respondent population, limited exposure to smartwatch technology, and reliance on a single video demonstration may have influenced the findings. Overall, the results support the integration of smartwatches as supplementary blood pressure monitoring devices, with recommendations for greater user education, continued technological development, and future studies involving broader healthcare populations, direct device interaction, and expanded research methodologies.

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