Journal of Digital Health Innovation and Medical Technology
Vol. 1 No. 6 Juni 2025
E-ISSN: 3090-0816
Open Access: https://journals.ai-mrc.com/jdhimt

Lived Experiences of Emotional Adaptation to Wearable Health Devices in Type-2 Diabetes Management

Fanni Astuti

Sekolah Tinggi Ilmu Kesehatan Salewangang Maros, Indonesia
fanniastuti055@gmail.com

Article Info

Article history:
Received 30-04-2025
Revised 06-06-2025
Accepted 17-06-2025

Keyword:
Phenomenology; Wearable health devices; Emotional adaptation; Type-2 diabetes; Lived experience; Digital health

ABSTRACT

The integration of wearable health devices has transformed chronic disease managemen within the field of digital health, offering continuous monitoring and personalize feedback to patients. Despite technological progress, little is known about hov individuals with type-2 diabetes emotionally experience and adapt to these devices i everyday life. This study aims to explore how individuals with type-2 diabete emotionally interpret, respond to, and adapt to wearable health technologies over time Using an interpretative phenomenological approach, this study explores the live emotional and psychological experiences of individuals using wearable devices fo diabetes self-care. Data were collected through semi-structured interviews and reflectiv digital diaries with ten adult participants, and analyzed using interpretativ phenomenological analysis (IPA). Findings revealed five key experiential themes including initial emotional resistance, redefinition of control, negotiation of socia visibility, integration into daily routines, and identity transformation. These theme highlight a dynamic process through which users gradually develop emotiona attachment and reconstruct their health identity. The study contributes to a deepe understanding of how wearable devices are more than tools—they become emotiona companions and symbols of self-management. These insights inform the design an implementation of empathetic digital health solutions, and open new directions for futur research on user-centered technology in chronic care.

INTRODUCTION

In recent years, the integration of digital technologies into healthcare has profoundly reshaped the way individuals manage chronic conditions, particularly type-2 diabetes (A. Campbell dkk., 2019). As health systems around the world increasingly embrace digital transformation, wearable health devices have emerged as a key innovation enabling real-time monitoring, personalized feedback, and patient-centered care. These technologies promise not only enhanced medical oversight but also greater autonomy for individuals in managing their own health.

Beyond Function: Emotional and Social Dimensions of Technology Use Despite these advancements, wearable technologies intersect with complex social, emotional, and psychological dimensions of human experience.Managing a chronic condition such as diabetes extends beyond physiological regulation; it is embedded within everyday routines, personal beliefs, cultural norms, and social interactions. The use of wearable devices introduces a new layer of engagement where the body becomes digitized, and health behaviors are continuously surveilled and recorded. This transformation raises important questions about how individuals interpret, internalize, and respond to such technologies within the context of their daily lives.

From a humanistic and experiential perspective, the adoption of wearable health technologies is not a purely functional process. It involves emotional adjustment, identity negotiation, and the reconfiguration of self-understanding (L. Campbell dkk., 2024). Understanding this lived dimension is

essential, particularly as healthcare shifts toward patient empowerment and self-management models. However, much of the existing literature remains focused on clinical outcomes or technical efficiency, often overlooking the subjective realities of those who live with and through these devices.

Given this gap, there is a growing need to explore how individuals experience and make meaning of using wearable health devices in chronic disease management. Phenomenology, with its focus on lived experience and interpretive meaning, offers a powerful framework for examining this intersection between technology, health, and selfhood. By illuminating the emotional and existential dimensions of technology use, this approach provides critical insight into how digital health innovations are assimilated into the fabric of everyday life.

Research on individuals' lived experiences with chronic illness management has increasingly become a critical area within health and social sciences. In particular, studies that explore how patients interpret and emotionally engage with health technologies offer valuable insights into the nuanced relationship between self-care and technological mediation (Clohessy dkk., 2024). The integration of wearable devices into diabetes care represents more than a shift in clinical practice—it reflects a transformation in how individuals perceive, monitor, and take responsibility for their health over time.

However, significant methodological challenges remain in capturing the depth and complexity of such experiences. Quantitative studies, while valuable for measuring efficacy and behavioral outcomes, often fall short in revealing the rich emotional and existential dimensions associated with using health technologies. Metrics and standardized instruments frequently fail to account for the fluid, evolving, and context-dependent nature of personal adaptation, emotional conflict, or perceived identity shifts. As noted by Datlen & Pandolfi, (2020), emotional challenges in digital health are often underrepresented in empirical literature despite their central role in shaping user engagement and sustainability of technology use.

These methodological limitations have led to a fragmented understanding of the phenomenon. Most existing research privileges objective data and overlooks the subjective realities that influence how individuals navigate and internalize their health practices. Without a grounded, interpretive approach, such as phenomenology, critical meanings and transformative experiences remain obscured. Thus, a phenomenological perspective is essential not only for filling these gaps but also for honoring the voices of individuals whose lives are intimately shaped by the convergence of illness, technology, and everyday routines.

In the current discourse on digital health solutions for chronic disease management, prevailing approaches primarily rely on practical frameworks that emphasize usability, adherence, and clinical outcomes. These models often incorporate behavioral metrics, compliance rates, and quantitative evaluations to determine the effectiveness of wearable health devices. While such methods provide important operational insights, they lack the sensitivity to uncover the nuanced emotional, psychological, and existential dimensions of user experience. The focus on measurable behaviors, though pragmatic, frequently neglects the inner world of users—their fears, motivations, moments of resistance, and evolving self-understandings in relation to the technology.

As highlighted by Filia dkk., (2024), existing studies on wearable devices for diabetes care tend to prioritize performance indicators over personal narratives, resulting in a limited portrayal of how users integrate such tools into the rhythm of everyday life. This partial lens contributes to a fragmented understanding of the user's journey, especially in contexts where personal meaning and cultural context are central to technology adoption.

To address this limitation, a phenomenological approach is not merely suitable—it is necessary. By attending to lived experience and subjective meaning-making, phenomenology offers a powerful alternative to prevailing reductionist paradigms. It enables the exploration of how individuals emotionally and psychologically navigate health technologies in their own terms, revealing essential structures of experience that are otherwise obscured. This research seeks to fill that critical gap by employing interpretative phenomenology to uncover the deeper meanings behind the

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use of wearable devices in managing type-2 diabetes, with particular attention to the emotional and adaptive processes that unfold over time.

Previous studies have examined how individuals engage with digital health technologies, particularly in managing chronic conditions like diabetes. However, most research has focused on behavioral outcomes or clinical performance, with limited attention to how users interpret and emotionally respond to these tools. Literature on wearable health devices often neglects the subjective meaning that individuals assign to their use in daily life. Some scholars, such as Fortune dkk., (2024), have highlighted the importance of understanding health technology as part of one's identity and emotional world. Yet, few studies have employed phenomenological methods to deeply explore this lived experience.

This study adopts an interpretative phenomenological approach to understand how individuals with type-2 diabetes emotionally and psychologically adapt to using wearable health devices. The method was chosen because it allows for detailed exploration of subjective experiences and meanings, which are often invisible in quantitative frameworks. The study addresses the knowledge gap by focusing on personal narratives and emotional processes rather than performance metrics. It explores how wearable devices are experienced not only as tools but also as companions that influence identity and behavior (Mahmood & Kalo, 2024). This approach aims to uncover how users construct meaning around health, control, and responsibility.

The article is structured in several sections. It begins with an introduction that outlines the context, research gap, and rationale for the study. The next section describes the methodological approach and details the data collection and analysis processes. This is followed by the results section, which presents major experiential themes grounded in participants' narratives. The discussion interprets these findings in relation to existing literature and theoretical frameworks. The article concludes by highlighting the study's contributions, limitations, and suggestions for future research.

RESEARCH METHODS

Study Design

This study employed an interpretative phenomenological approach to explore the emotional experiences and psychological adaptation of individuals with type-2 diabetes using wearable health devices. Phenomenology, as a qualitative research design, emphasizes the exploration of lived experiences and seeks to uncover the meaning structures embedded in personal narratives (Griffith dkk., 2023). The interpretative dimension, grounded in Heideggerian philosophy, allows for an in-depth understanding of how individuals interpret and make sense of their experiences in the context of their sociocultural environment. This approach was deemed appropriate for addressing the research question, which focused on subjective emotional responses and adaptive behaviors within the health technology domain.

Participants

Participants were selected using purposive sampling based on their direct experience with wearable health devices for diabetes management. Inclusion criteria required participants to be diagnosed with type-2 diabetes, aged between 30 and 65 years, and to have been actively using wearable devices for self-monitoring blood glucose levels and physical activity for a minimum of six months. Individuals with cognitive impairments or those using the device under clinical supervision without independent engagement were excluded. A total of 10 participants (6 females, 4 males) were included, with ages ranging from 34 to 62 years (mean age: 48.7) (Hews-Girard dkk., 2024). All participants resided in urban or peri-urban areas and had varying degrees of technological familiarity, providing diverse perspectives on the phenomenon.

Data Collection

Data were collected through in-depth, semi-structured interviews conducted face-to-face in private, quiet settings to ensure participant comfort and confidentiality. An interview guide was used

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to explore experiences, emotions, and personal reflections related to the use of wearable devices. Interviews lasted between 45 and 75 minutes and were audio-recorded with participant consent. A supplementary method involving reflective digital diaries was employed over a two-week period to capture ongoing emotional and behavioral responses. All sessions were transcribed verbatim, and observational notes were maintained to enrich contextual understanding.

Data Analysis

Data were analyzed using interpretative phenomenological analysis (IPA), following a systematic sequence of immersion, coding, theme development, and abstraction. Transcripts were first read multiple times to gain holistic familiarity (Kelley dkk., 2020). Significant statements and meaning units were identified, coded, and organized into initial categories using NVivo software. Themes were then developed inductively, focusing on the interpretative meaning of the participants' narratives. The analysis aimed to uncover essential structures of experience, with close attention paid to emotional tone, language, and shifts in perception over time. Reflexivity was maintained throughout the process to acknowledge the interpretive nature of the analysis.

Ethical Considerations

Ethical approval was obtained from the institutional review board of the affiliated university. All participants provided written informed consent after receiving detailed information about the study's objectives, procedures, and their rights (Kenworthy dkk., 2023). Anonymity and confidentiality were strictly maintained by assigning pseudonyms and securely storing data. The study adhered to the ethical guidelines outlined in the Declaration of Helsinki and followed all applicable national regulations for research involving human subjects.

RESULTS

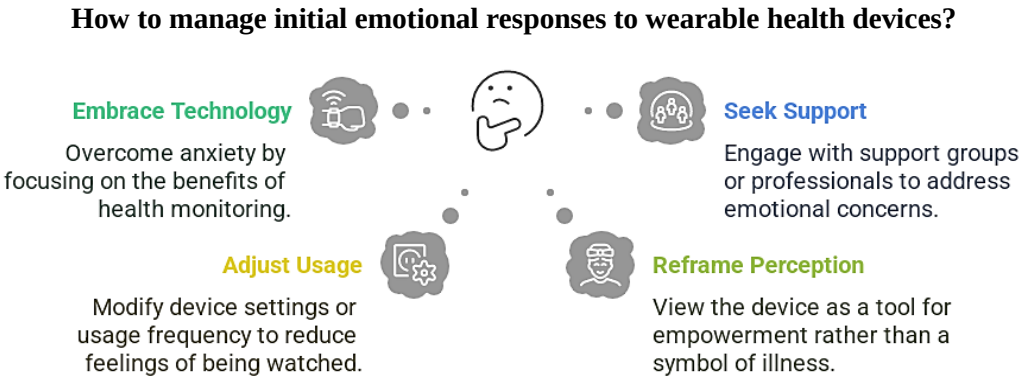
Navigating Initial Emotional Turbulence

Many participants described a complex emotional response upon first being introduced to wearable health devices. Feelings of anxiety, technological intimidation, and vulnerability emerged strongly.

"When I first wore the device, I felt like it was watching me all the time. It made me nervous, like I had to be perfect every second." (P3)

For some, the technology became a symbol of illness rather than empowerment, evoking fear rather than reassurance. This emotional turbulence often delayed consistent use.

"Instead of helping, it reminded me constantly that I'm sick. I felt more like a patient than a person." (P7)



Reframing Control and Self-Efficacy

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Over time, participants began to shift their perception, viewing the device as a tool of empowerment rather than surveillance. This reframing marked a crucial transition in psychological adaptation.

"After a few weeks, I started to see it differently. It wasn't judging me—it was helping me stay on track, like a friend that nudges you gently." (P1)

This transition often aligned with moments of tangible feedback, such as improved blood glucose levels or affirmation from healthcare professionals.

"I saw my numbers getting better. It felt good—like I was finally doing something right, and the device was part of that success." (P9)

Negotiating Social and Cultural Boundaries

Participants reported discomfort when wearing the devices in social settings, especially in cultures where visible signs of illness are stigmatized. The visibility of the technology created new layers of social interaction that required negotiation.

"People would stare at my wrist, ask questions I didn't want to answer. I had to explain my condition all the time. It was exhausting." (P4)

Some participants chose to hide or remove the device in public, reflecting internal conflict between health management and social identity.

Developing Emotional Attachment and Routine Integration

As emotional resistance diminished, participants described a growing attachment to the devices, integrating them into daily routines and perceiving them as part of their personal health journey.

"Now I don't even think about it—just like brushing my teeth. It's part of my day, part of me." (P2)

This habituation was often accompanied by a sense of reassurance, where the device functioned as a source of emotional stability.

"On days I forget to wear it, I feel uneasy. It gives me comfort, like someone is watching over me." (P6)

Meaning-Making and Health Identity Transformation

Beyond functional usage, participants reflected on how the wearable device influenced their identity as health-conscious individuals. For many, the technology became a catalyst for redefining self-worth and responsibility.

"I used to feel helpless, like my body was out of control. But now, I feel responsible. I am managing this." (P5)

This internal transformation was not uniform but represented a key moment of empowerment, particularly for those who previously relied heavily on external medical interventions.

Synthesis of Themes

The five major themes form a coherent emotional and psychological trajectory that users undergo in adapting to wearable health technologies. Beginning with initial fear and resistance, participants moved toward reframing the device as supportive, navigating social challenges, integrating it into daily life, and ultimately experiencing a shift in health identity. This progression highlights the dynamic interplay between emotion, technology, and personal agency, revealing that adaptation to health technology is a deeply transformative and human process.

Rather than being passive users, individuals engage in an ongoing negotiation of meaning, shaped by emotional resilience, cultural contexts, and evolving relationships with their own health.

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DISCUSSION

The findings of this study reveal a profound emotional and psychological journey experienced by individuals with type-2 diabetes as they adapt to using wearable health devices. Participants' narratives uncovered themes of initial emotional resistance, progressive psychological adaptation, and eventual integration of the device into their identity and daily routines (Lakshminarayanan dkk., 2020). This emotional trajectory is closely intertwined with evolving self-identity, illustrating how users come to perceive the device not merely as a tool but as a meaningful part of their health journey. These insights directly address the central research question concerning how users experience and assign meaning to wearable technology in the context of chronic illness management.

The study offers a unique contribution by demonstrating that the adoption of wearable devices is not merely a behavioral or technical shift, but a deeply personal transformation. Rather than focusing on compliance or usage statistics, the phenomenological analysis reveals how emotional responses—ranging from anxiety and discomfort to empowerment and routine—shape users' ongoing relationships with these devices. The device becomes a symbolic extension of the self, a "silent companion" that influences both health behavior and identity reconstruction. This understanding responds to the critical gap identified in the introduction, emphasizing the importance of subjective, lived experiences in evaluating digital health tools.

These findings align with and expand upon previous literature. Lupton (2019) emphasized the "data self," suggesting that digital devices mediate how individuals perceive and construct their health identities (Lykens dkk., 2019). This study supports that claim while extending it by demonstrating how emotional and cultural contexts mediate such processes. Similarly, Park and Choi (2023) acknowledged the emotional tensions present in digital health adoption but did not explore how users resolve those tensions over time. The current study builds on their work by showing a trajectory of emotional adaptation, offering a more holistic view of how meaning evolves through continued use. While previous research has often relied on static snapshots, this study presents a dynamic understanding of the evolving relationship between the user and the device, grounded in lived experience.

The implications of this study extend beyond individual experiences to broader social and professional contexts. The findings suggest that emotional adaptation to wearable health devices is influenced not only by personal perception but also by cultural norms, social expectations, and the visibility of illness in public life. For healthcare providers, recognizing the emotional landscape that accompanies digital health adoption can enhance patient-centered care, particularly in tailoring communication, support, and training. From a policy perspective, these insights underline the importance of designing health technologies that are not only functionally effective but also empathetically responsive to users' lived realities (Lapierre dkk., 2024). These findings may be especially relevant in societies where chronic illness carries stigma or where technology literacy varies across populations.

This study, while offering rich experiential insights, is subject to certain limitations. The use of purposive sampling and a relatively small sample size limits the generalizability of the findings to broader populations. Additionally, the study focused on individuals from urban or peri-urban environments, potentially excluding rural perspectives where technological access and cultural dynamics may differ significantly. The subjective nature of phenomenological analysis, though appropriate for this inquiry, may also reflect interpretative bias despite efforts to ensure reflexivity and rigor. These limitations should be considered when applying the findings to different settings or demographic groups.

Future research could expand upon these insights by exploring comparative experiences across different cultural or socioeconomic contexts. Longitudinal studies might also examine how emotional adaptation evolves over time, particularly as technological features and health conditions change. Furthermore, integrating phenomenological inquiry with participatory design could yield more inclusive and user-sensitive health technologies (Lepore-Stevens dkk., 2021). This study provides a foundation for continued investigation into the intersection of chronic illness, digital

health, and identity, reinforcing the value of phenomenology in uncovering deeply human dimensions of technological engagement.

CONCLUSION

This study explored the emotional and psychological adaptation of individuals with type-2 diabetes to wearable health devices, addressing the need to understand lived experiences beyond clinical effectiveness. The findings revealed a progression from emotional discomfort to psychological integration, where devices evolved from sources of anxiety into tools of empowerment and identity. These insights respond directly to gaps in the existing literature that often overlook subjective meaning and emotional depth in digital health adoption. By using an interpretative phenomenological approach, this study offers a richer, more holistic understanding of how health technologies are experienced in real life. What sets this study apart is its focus on the emotional-identity transformation of users—an area rarely examined through a phenomenological lens in the context of wearable health technologies. The results can inform healthcare professionals and designers to better support users emotionally and socially in their technological journey. Future research may extend this work by including more diverse populations or integrating longitudinal perspectives to track evolving user experiences.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article. All authors have approved the final manuscript and have no financial, personal, or institutional interests that could be perceived as influencing the outcomes of this research.

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