Research Article

Smartwatches' Influence on Health Behavior Change and Occupational Engagement Among African American Students

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ABSTRACT

Background:
African American university students face disproportionate barriers to health and wellness, including elevated stress and limited access to wellness resources. Wearable technologies, such as smartwatches, offer promising tools for promoting health behavior change and occupational engagement in underserved populations.

Methods:
This cross-sectional study examined the relationship between smartwatch usage and perceived behavior change among 44 African American students. Participants completed a self-administered survey assessing usage frequency, duration, and perceived impact on daily habits.

Findings:
Pearson correlation analyses revealed a significant positive association between the frequency of smartwatch use and perceived behavior change ($r = .302$, $p = .046$), while duration of ownership showed no significant relationship.

Conclusion:
These findings suggest that consistent smartwatch use may support self-management and meaningful engagement in daily routines, positioning wearable technologies as valuable adjuncts to digital health strategies for minority student populations.

Key Words: smartwatch, wearable technology, African American students, occupational engagement, health behaviors

INTRODUCTION

The increasing prevalence of sedentary behavior and heightened stress levels among university students has emerged as a significant public health concern, particularly for African American students. These students frequently navigate unique socioeconomic, institutional, and cultural challenges that contribute to elevated stress, disrupted sleep patterns, and limited opportunities for physical activity (Joseph et al., 2015; Jones et al., 2020; Moss et al., 2024). Financial constraints, academic demands, and under-resourced wellness environments further exacerbate these disparities, making it difficult for students to engage in consistent self-care practices (Perry et al., 2023; Slimmen et al., 2022). Such structural barriers necessitate the exploration of innovative, accessible interventions that support holistic health behavior change in underserved academic settings. Wearable technology, particularly smartwatches, has gained prominence as a practical and scalable intervention for health promotion.

These devices provide real-time feedback on physiological and behavioral metrics, including heart rate variability, physical activity, sleep quality, and stress levels (González Ramírez et al., 2023; Greiner et al., 2024; Thapliyal et al., 2017). Embedded features such as guided breathing exercises and movement reminders support users in managing stress and breaking up sedentary periods, promoting greater occupational engagement and well-being (Alhejaili & Alomainy, 2023; Johnson et al., 2020). For African American university students, who may lack consistent access to fitness facilities and campus mental health services, smartwatches offer a portable, autonomous, and culturally adaptable tool for managing physical and psychological health (BlackDeer et al., 2022; Al-Emran, 2021).

Studies have demonstrated the utility of wearable devices in increasing physical activity, improving mood, and enhancing self-regulation among university students (DiFrancisco-Donoghue et al., 2018; Mercer et al., 2016). These benefits are often driven by gamification features, behavioral goal tracking, and motivational cues integrated into smartwatch interfaces. Importantly, González Ramírez et al. (2023) emphasized the adaptability of these devices across various user needs, highlighting their relevance in environments with limited wellness infrastructure. However, while activity tracking and goal-setting features can motivate healthier routines, they may also foster anxiety, compulsive monitoring, or feelings of failure when targets are not achieved (Rupp et al., 2018). Overreliance on device feedback has been linked to reduced intrinsic motivation for exercise, as individuals begin to prioritize external cues from the device rather than internal self-regulation strategies (Kerner & Goodyear, 2017). In some cases, wearables may inadvertently reinforce unhealthy behaviors, such as overexercising, sleep disruption from constant monitoring, or disengagement when technological glitches occur (Etkin, 2016; Higgins, 2016). Therefore, it is essential to frame smartwatch use within clear conceptual frameworks, such as health behavior change and occupational engagement, to better understand its influence on health and wellness.

Health behavior change refers to the process of adopting and sustaining health-promoting actions such as increasing physical activity, improving sleep quality, and managing stress through intentional self-regulation and

supportive interventions (El Kirat et al., 2024; Koulouvari et al., 2025). Within university populations, these changes are critical for addressing wellness disparities and reducing the risks associated with sedentary lifestyles. Occupational engagement, however, emphasizes meaningful participation in daily activities that foster well-being, balance, and identity formation, extending beyond physical behaviors to include academic, social, and restorative pursuits (da Cruz, 2023). These concepts provide a holistic framework for understanding how smartwatches may influence both the adoption of healthier routines and the ability of African American students to remain actively engaged in their academic and personal lives, particularly in contexts where access to traditional health resources is limited.

While existing literature supports the general efficacy of wearable technology, including potential negative effects, few empirical studies have examined its impact specifically within the context of African American university students. Although wearable technology has shown promise for behavior change and stress reduction, its effectiveness among African American students remains underexplored (González Ramírez et al., 2023; Thapliyal et al., 2017). Also, African American students may experience distinct forms of stress, including racialized academic pressure, financial instability, and underrepresentation in health promotion research (Austin et al., 2022; Schwartz et al., 2022). These unique stressors can significantly shape how students engage with health interventions, and wearable technology must be examined within these complex cultural and institutional contexts to determine its actual utility and equity potential. This study aims to address this gap by investigating how smartwatch usage correlates with perceived behavior change and occupational engagement among African American university students.

METHODS

Based on the assumption that self-monitoring technologies foster healthier routines, the study examined the relationship between the frequency and duration of smartwatch use (independent variables) and their impact on behavior change (dependent variable). A self-administered online survey was designed to collect behavioral and demographic data from participants using a cross-sectional design. Participants were eligible if they (a) self-identified as African American, (b) were currently enrolled as undergraduate or graduate students, (c) were 18 years of age or older, and (d) owned and used a smartwatch. Participants were recruited using a convenience sampling strategy, a practical approach commonly used in behavioral research to reach specific populations with shared characteristics (Farrokhi & Mahmoudi-Hamidabad, 2012). The investigators contacted African American university students through personal networks, social media platforms, and student group communications. The survey link directed interested participants to the informed consent page that outlined the purpose, procedures, eligibility criteria, confidentiality protocols, and ethical considerations. Only those who agreed to participate were able to access the survey. All responses were anonymous, and no personal identifiers were collected. Participants were informed that their participation was entirely voluntary and anonymous and that they could withdraw at any point. All survey responses were stored securely in a password-protected database

to maintain confidentiality and data integrity. This study was approved by the Institutional Review Boards of Howard University (IRB-2025-1811) and Concordia University, Saint Paul (2025_016).

Instrument

The survey was intentionally designed to be concise (requiring less than five minutes to complete), accessible on both smartphones and computers, and straightforward to navigate. The survey consisted of demographic and usage-based questions, including participants' age, gender identity, race/ethnicity, education level, employment status, and financial aid status, as well as smartwatch ownership, duration and frequency of use, and perceived lifestyle impact. Response options were mostly categorical and aimed to capture both personal background and user engagement with wearable technology. Content validity was supported through alignment of survey items with constructs established in previous literature on wearable technology and health behavior (González Ramírez et al., 2023; Johnson et al., 2020). The survey was piloted among the investigators for clarity and usability. Although the survey captured general usage patterns and perceived influence, it did not account for specific smartwatch features or model variability, as the focus was on overall perceptions of behavior change rather than device-specific effects.

Data Analysis

Descriptive statistics were first calculated to summarize demographic characteristics and smartwatch usage patterns. To evaluate the association between smartwatch usage and perceived behavior change, two separate Pearson correlation analyses were conducted to assess the relationship between smartwatch use frequency and behavior change, and to examine the relationship between length of smartwatch ownership and behavior change. Pearson correlation was selected for its ability to measure the strength and direction of linear relationships between continuous and ordinal variables in cross-sectional survey research (Field, 2018). The significance level was set at $p < .05$. All statistical analyses were performed using SPSS.

FINDINGS

Participant Demographics

The final sample included 44 African American university students who reported owning and using a smartwatch. Most participants identified as female (77.3%, n = 34), with the remainder identifying as male (22.7%, n = 10). Participants varied in academic year, employment status, and financial aid receipt, reflecting a diverse sample of students balancing academic and personal responsibilities. In terms of smartwatch usage, 42.7% (n = 19) reported using a smartwatch for more than one year, while 57.3% (n = 25) had used one for less than a year. Additionally, 33.3% (n = 15) indicated frequent use (daily), while the remaining 66.7% (n = 29) reported less frequent usage (see Table 1).

Table 1: Participant demographic characteristics and frequency distributions

Category	Frequency (n)	Percentage (%)
Total Participants	44	100.0
Female Participants	34	77.3
Male Participants	10	22.7
Used WT > 1 Year	19	43.2
Used WT ≤ 1 Year	25	56.8
Frequent WT Users (Daily)	15	34.1
Infrequent WT Users	29	65.9

Correlations Among Smartwatch Usage and Behavior Change

Table 2 presents the Pearson correlation coefficients among three primary variables: (1) length of time with smartwatch, (2) frequency of smartwatch use, and (3) perceived influence of the smartwatch on habits or lifestyle. A statistically significant positive correlation was found between the frequency of smartwatch use and perceived influence on behavior ($r = .302$, $p = .046$), suggesting that more frequent users were more likely to perceive that their smartwatch had influenced their lifestyle or habits. The association between length of time with a smartwatch and perceived influence was not significant ($r = .057$, $p = .715$), nor was the relationship between duration of ownership and frequency of use ($r = .149$, $p = .333$). These findings indicate that frequency of use, rather than duration of ownership, may be more predictive of users' perceptions of behavior change.

Table 2: correlation among wearable technology usage and influence on lifestyle

Variables	1	2	3
1. Length of Time with Smartwatch	—		
2. Frequency of Using Smartwatch	0.149(p = .333)	—	
3. Influence on Habits or Lifestyle	0.057 (p = .715)	0.302* (p = .046) *	—

* $p < 0.05$

DISCUSSION

Interpretation of Findings

The findings revealed a statistically significant positive correlation between the frequency of smartwatch use and self-reported behavior change, indicating that students who used their smartwatches more frequently perceived greater influence on their lifestyle habits. In contrast, no significant associations were found between duration of smartwatch ownership and behavior change or between ownership duration and usage frequency. These findings suggest that frequency of use, rather than length of ownership, is more closely linked to users' engagement with health-related behaviors, a pattern that aligns with previous studies emphasizing the importance of consistent interaction with wearable devices for maximizing their behavioral impact (González Ramírez et al., 2023; Johnson et al., 2020). Indeed, frequency of smartwatch use emerged as the strongest predictor of perceived behavior change, indicating that regular engagement with the device is more influential than merely possessing it over time. Similar findings have been reported in previous work, where frequent interaction with wearable trackers supported self-regulation and adherence to health-promoting routines, whereas intermittent use produced limited effects (Kerner & Goodyear, 2017; Rupp et al., 2018). This evidence suggests that the behavioral benefits of smartwatches depend less on access to the technology itself and more on sustained, purposeful use of its functions.

The study's results are consistent with the motivational role of real-time feedback and daily activity tracking in promoting physical activity and self-regulation (Greiner et al., 2024; Thapliyal et al., 2017). Indeed, features such as guided breathing exercises, step counters, and sleep monitoring functions can contribute to an increased awareness of health routines and support healthier choices when used consistently (Alhejaili & Alomainy, 2023). At

the same time, wearable technologies may also facilitate unintended negative outcomes. For example, continuous self-tracking can produce heightened anxiety, compulsive monitoring, or guilt when daily targets are not achieved (Rupp et al., 2018). Overreliance on external device feedback has also been associated with reduced intrinsic motivation for exercise, as individuals prioritize meeting numerical goals rather than cultivating autonomous, health-oriented habits (Kerner & Goodyear, 2017). The positive and potential negative influences of wearable technology support why simply owing a smartwatch may not guarantee a positive change, which highlight the need for future studies to examine diverse behavioral outcomes.

Moreover, the lack of a significant relationship between duration of smartwatch ownership and perceived behavior change in this study suggests that simply owning the device over a long period is insufficient to foster change unless the device is actively and consistently used. This is an important distinction, particularly within underserved populations, where access to technology may be intermittent or influenced by financial and environmental constraints (Moss et al., 2024; Slimmen et al., 2022). It highlights the need for interventions that not only improve access to wearable technology but also support sustained, purposeful engagement with the technology's health-promoting features.

Implications for Occupational Engagement

Occupational engagement refers to a person's active involvement, commitment, and meaningful participation in daily life activities (occupations) that contribute to well-being, identity, and life satisfaction

(da Cruz et al., 2023). The findings have important implications for promoting occupational engagement among African American university students through the strategic use of wearable technology. Institutions should consider integrating smartwatches into campus wellness initiatives not only as health-monitoring tools but also as facilitators of meaningful participation in daily routines. Features such as activity tracking, sleep monitoring, and stress regulation can support students in organizing their time, managing academic demands, and maintaining self-care, core components of occupational engagement. Targeted education on how to use these features effectively can empower students to build sustainable habits that align with their personal, academic, and professional roles. Additionally, peer-led programs and gamified wellness challenges may foster greater motivation and community support for occupational participation. Future research should explore how consistent smartwatch use influences engagement in specific occupations, including sleep hygiene, physical activity, study routines, and leisure, while accounting for variables such as socioeconomic status, academic stress, and digital literacy. Longitudinal studies could further clarify whether sustained interaction with wearable technologies leads to long-term improvements in occupational balance and role performance.

Limitations

This study has several limitations. The relatively small sample size (N = 44) limits the generalizability of the findings and may have reduced the statistical power needed to detect additional associations. The study also relied on self-reported data, which may be influenced by recall bias or social desirability effects. additionally, the measure

of behavior change was based on a single perceived influence question rather than a validated scale, limiting the depth of behavioral assessment. The survey did not capture information about the specific features or models of participants' smartwatches, even though these devices may differ in their health-related functions. As a result, it is unclear which device features contributed most strongly to perceived changes. Lastly, the study focused solely on smartwatch users, and comparisons with non-users were not made, leaving open questions about the relative effects of wearable technology compared to other forms of health behavior interventions.

CONCLUSION

This study explored the relationship between smartwatch usage and perceived behavior change among African American university students. The findings revealed that while the length of device ownership was not significantly associated with behavior change, the frequency of smartwatch use was positively correlated with students' perceptions of positive lifestyle impact. These findings underscore the importance of consistent engagement with wearable health technologies and suggest that such devices, when used regularly, may serve as practical tools for promoting occupational engagement, physical activity, and overall well-being among underserved college populations. By addressing existing gaps in technology use and health equity, smartwatch-based interventions may contribute to more inclusive and effective digital health strategies in academic settings.

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