

Evaluating the Adoption of Wearable Health Devices in Southwest Nigeria: Information Technology Perspectives

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Abstract

This study investigates the impact of cost, human factors, and technological perceptions on the adoption of wearable health devices among health workers in Southwest Nigeria, specifically from an Information Technology perspective. Using a quantitative research design, data were collected through structured questionnaires from 150 health professionals across the three states adopted. Descriptive statistics and regression analyses were employed to analyse the responses. The findings reveal that while the awareness level of wearable devices among respondents is significantly high, cost remains a critical barrier to adoption. Additionally, human factors such as low digital literacy and concerns about data privacy negatively influence willingness to adopt the technology. Technological challenges, including poor internet connectivity and lack of local technical support, also hinder sustained usage. Conversely, positive perceptions encompassing perceived usefulness, ease of use, and trustworthiness positively and significantly influence health workers' intention to adopt wearable health devices. The study concludes that while there is growing interest in wearable technologies among Nigerian health workers, adoption is moderated by economic, human, and infrastructural constraints. These findings have practical implications for health policymakers, technology developers, and healthcare managers in designing interventions that enhance accessibility, usability, and trust in wearable health technologies.

Keywords: Wearable devices, adoption, digital health, Technology Acceptance Model (TAM), Nigeria.

1. Introduction

Wearable health technologies refer to electronic devices that are worn on the body and are capable of collecting, transmitting, and sometimes analyzing physiological data in real time. Thus, Wearable Health Devices (WHDs), such as fitness trackers and smartwatches, have become essential tools in personal health monitoring and preventive healthcare (Ajibade & Afolabi, 2022; Nwosu & Okeke, 2020). These devices utilize advanced information technology to collect real-time health data, empowering users to actively manage their well-being (Kafle et al., 2021). Globally, WHDs are integral to the evolution of digital health ecosystems focused on patient engagement and data-driven decision-making (Patel et al., 2021). Despite this growth, adoption rates in developing regions like Southwest Nigeria remain low due to socio-economic barriers and infrastructural limitations (Akinyemi & Adebayo, 2021; Ndukwe et al., 2023).

From an IT perspective, multiple factors affect the uptake of wearable health technologies. Cost remains a primary obstacle, encompassing both device acquisition and ongoing service expenses (Akinyemi &

Adebayo, 2021). Additionally, usability challenges and limited digital literacy hinder effective device use (Nwosu & Okeke, 2020). Trust and concerns over data privacy further influence user acceptance (Kafle et al., 2021). The Technology Acceptance Model (TAM) highlights the importance of perceived usefulness and ease of use in determining adoption intentions (Ajibade & Afolabi, 2022). Moreover, inconsistent internet connectivity and lack of local technical support pose significant infrastructural challenges impacting user experience and sustained adoption (Ojo, 2022). Understanding these IT-related factors is essential for developing context-specific solutions that can improve health outcomes in Southwest Nigeria through wearable health technologies (WHO, 2022).

Despite the increasing availability of wearable health devices globally, their adoption in Southwest Nigeria remains limited. A major challenge is the high cost of these devices and associated services, which restricts access for many individuals in the region with varying economic capacities (Akinyemi & Adebayo, 2021; Ndukwe et al., 2023). Furthermore, human factors such as limited digital literacy and concerns over data privacy continue to impede the willingness to use wearable health technologies (Nwosu & Okeke, 2020; Kafle, Aryal, & Shrestha, 2021).

From an IT infrastructure perspective, the region suffers from inconsistent internet connectivity and

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insufficient local technical support, which exacerbate usability and maintenance issues (Ojo, 2022). Additionally, users' perceptions of the usefulness, ease of use, and trustworthiness of wearable devices critically influence adoption intentions (Ajibade & Afolabi, 2022). Without addressing these interrelated factors, the benefits of wearable health devices in improving health outcomes in Southwest Nigeria may remain unrealized.

Therefore, this study aims to evaluate how cost, human factors, and technological perceptions within the IT context influence the adoption of wearable health devices in Southwest Nigeria.

1.1 Research Objectives

1. Ascertain the awareness level of wearable devices in tracking health metrics in Southwest, Nigeria.
2. To examine the effect of high cost on the adoption of wearable health devices among health workers in Southwest Nigeria.
3. To investigate how human factors (digital literacy levels and privacy concerns) influence health workers' willingness to use wearable health devices.
4. To assess the impact of technology (internet connectivity and local technical support) on the sustained use of wearable health devices by health workers.
5. To determine how perceptions of usefulness, ease of use, and trustworthiness influence health workers' intention to adopt wearable health devices.

1.2 Research Questions

1. What is the awareness level of wearable devices in tracking health in Southwest, Nigeria?
2. How does high cost affect the adoption of wearable health devices among health workers in Southwest Nigeria?
3. In what ways do human factors (digital literacy levels and privacy concerns) influence the willingness of health workers to use wearable health devices?
4. What is the impact of technology factors (internet connectivity and local technical support) on the sustained use of wearable health devices among health workers?
5. How do perceptions of usefulness, ease of use, and trustworthiness influence health workers' intention to adopt wearable health devices?

1.3 Hypotheses

1. **H₁:** The awareness level of wearable device is high.
2. **H₂:** High cost has a negative linear relationship with the adoption of wearable health devices among health workers in Southwest Nigeria.

3. **H₃:** Human factors (digital literacy levels and privacy concerns) negatively influence health workers' willingness to use wearable health devices.
4. **H₄:** Technology factors (Poor internet connectivity and lack of local technical support) negatively influence the sustained use of wearable health devices by health workers.
5. **H₅:** Positive perceptions of usefulness, ease of use, and trustworthiness positively influence health workers' intention to adopt wearable health devices.

2. Related Works

Digital health technologies (DHTs) which encompassing wearable devices, mobile health (mHealth) applications, telemedicine, and health information system have emerged as pivotal tools for enhancing healthcare delivery, monitoring, and outcomes in developing countries (Oke et al., 2025; Egwudo et al., 2025). In Nigeria, empirical evidence underscores their positive influence amid infrastructural and implementation challenges.

Awoyemi et al. (2025) employed a quantitative design with random sampling (Taro Yamane formula) across 422 Nigerian respondents, analyzing 380 valid responses via logistic regression (Maximum Likelihood Method). Their findings indicate that body-fitting mHealth apps and health trackers elevated good health reporting probabilities by 47.65% and 49.91%, respectively, while smartwatches and glucometers improved it by 34.57% and 42.73%. This supports DHTs' role in informed decision-making.

Oke et al. (2025) conducted a scoping review using the Arksey and O'Malley framework and PRISMA-ScR, screening 1,840 studies from PubMed/MEDLINE, Google Scholar, DOAJ, and AJOL to analyze 230. Publications grew markedly from 2010–2024 (peaking 2022), with cross-sectional studies predominant, followed by reviews and qualitative research. Core themes included mHealth, eHealth, telemedicine, digital devices, and health systems. However, practical uptake remains limited, necessitating stakeholder collaborations for funding and training. While, Egwudo et al. (2025) reviewed 31 studies (2014–2024) from PubMed, Scopus, Web of Science, and CINAHL, revealing DHT benefits in adherence, utilization, data quality, and engagement. Barriers encompassed infrastructure deficits, logistics, and cultural/gender factors; strategies highlighted training, community participation, and data management.

Comparative insights from other contexts reinforce these patterns. In Pakistan, Hayat et al. (2022) surveyed 385 adults using UTAUT2, PLS-SEM, and NCA, identifying health expectancy, vulnerability, price value, consciousness, reliability, and effort expectancy as adoption drivers for wearables, potentially alleviating healthcare pressures. Also, Huarng et al. (2022) examined 5G/AIoT-enabled

wearables via path analysis, finding privacy, ease of use, and data reliability as facilitators, offset by economic burdens.

Collectively, this literature affirms DHTs' efficacy in low-resource settings but identifies gaps in scalability, affordability, and integration informing calls for policy interventions. Thus, this research aims at digging deep to investigate how cost, human factors, and technological perceptions within the IT context influence the adoption of Wearable Health Devices (WHDs) in Southwest Nigeria.

3. Materials and Methods

This study employed a descriptive cross-sectional survey design to evaluate the influence of cost, human factors, and technological perceptions on the adoption of wearable health devices among health workers in Southwest Nigeria. The cross-sectional approach allows for the collection of data from a representative sample of health workers at a specific point in time, facilitating an understanding of current adoption patterns and the factors influencing these behaviors.

The target population for this study comprised health workers including doctors, nurses, laboratory scientists, and allied health professionals working in public healthcare facilities across the six states in Southwest Nigeria. The following states (Lagos, Ogun, Ekiti, Oyo, Ondo and Osun) were involved. Using simple random sampling technique, only three states Lagos, Ondo and Ogun States representing 50% of the total numbers of the state in Southwest, Nigeria are selected. From these selected states, proportionate and purposive sampling techniques are adopted in selecting 50 staff of state hospital making a total of 150 as sample size of the study.

Data were collected using a structured self-administered questionnaire developed based on the Technology Acceptance Model (TAM) and relevant literature on wearable health technologies. The questionnaire consisted of five sections: demographic information, cost-related factors, human factors (digital literacy and privacy concerns), IT infrastructure issues (internet connectivity and technical support), and perceptions regarding usefulness, ease of use, and trustworthiness of wearable health devices. Four scaling system was adopted such as strongly agreed, agreed, strongly disagreed and disagreed. The questionnaire was pretested among 30 health workers in a neighboring region to ensure clarity, reliability, and validity, resulting in a Cronbach's alpha of 0.87. Collected data were coded and entered into SPSS version 26 for analysis. Descriptive statistics, including frequencies, percentages, bar chart and pie chart, were used to summarize demographic characteristics and key variables. Inferential statistics, such as multiple regression analysis, were conducted to examine the influence of cost, human factors, and IT infrastructure on the adoption of wearable health devices. Additionally, Pearson's correlation was used to explore

relationships between perceived usefulness, ease of use, trustworthiness, and adoption intentions. Hypotheses were tested at a 0.05 significance level.

4. Result and Discussion

The section is divided into subheadings which includes demographic characteristics of the respondents, testing of hypotheses and discussion of findings.

4.1 Demographic Characteristics of the Respondents

The Figure 1 shows that 45.33% of the respondents were male and 54.67% were female. This implies that the greater numbers of the respondents are female. The Figure 2 indicates that 30 respondents representing 20% of the sample size fell within 20-30 years, 38.67% fell within 31-40 years, 38% fell within 41-50 years as well as 3.333% fell within 51 years and above of age-range respectively. The implications of this result were that greater numbers of the respondents are within their productive age-bracket.

Figure 3 reveals that 16 respondents representing 10.67% of the sample size are O-level holders, 19.33% are OND/NCE holders, 38% are HND/BSC holders, 21.33% are Masters holders and 10.67% were PhD holders. This implies that greater numbers of the respondents are HND/BSC holders. Figure 4 shows that 69 respondents representing 46% of the sample size fell within 0-5 years, 38.67% fell within 6-10 years, 13.33% fell within 11-20 years and 2% fell within 21 years and above.

4.2 Testing of Hypotheses

H₁: *The awareness level of wearable device is high.*

Table 1 shows that the independent variable (awareness level) was found to be significant and strongly determine wearable device application with the P-value less than 0.05 and magnitude of awareness level ($\beta = 0.439$, $t = 11.878$, $P < .05$). This implies that the alternative hypothesis is rejected thus, the awareness level of wearable device is high.

H₂: *High cost has a negative linear relationship with the adoption of wearable health devices among health workers in Southwest Nigeria.*

Table 2 shows the independent variable (cost) was found to be significant and strongly determine the adoption of wearable devices with the P-value less than 0.05 and magnitude of cost ($\beta = 0.657$, $t = 9.379$, $P < .05$). This implies that alternative hypothesis is rejected. Thus, High cost has a negative influence on adoption of wearable health devices among health workers in Southwest Nigeria.

H₃: *Human factors (digital literacy levels and privacy concerns) negatively influence health workers' willingness to use wearable health devices.*

Table 3 shows the independent variables human factors (digital literacy levels and privacy concerns) were

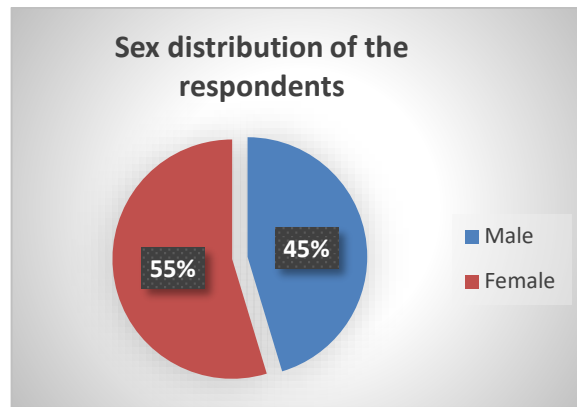


Figure 1: Sex distribution

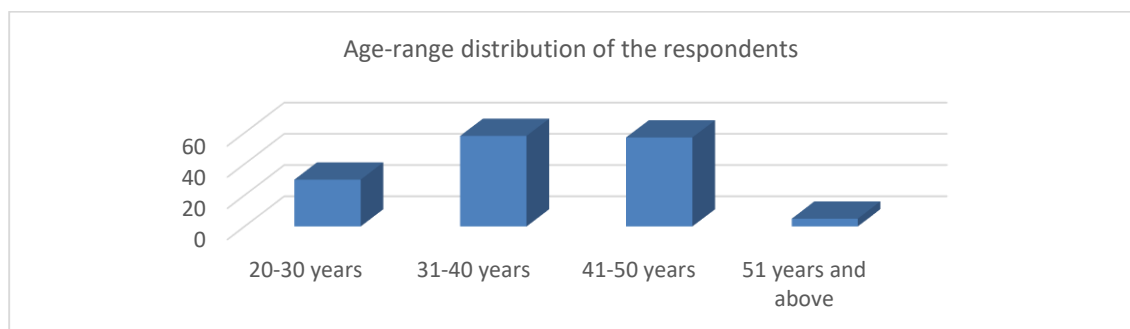


Figure 2: Age-range distribution

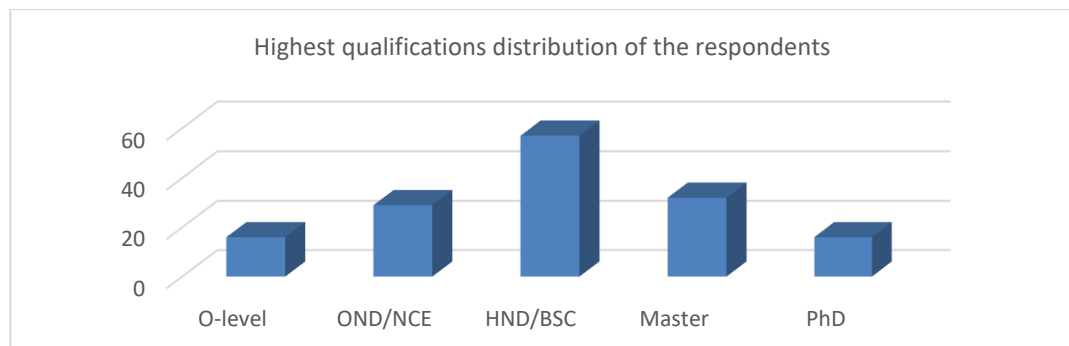


Figure 3: Qualification distribution

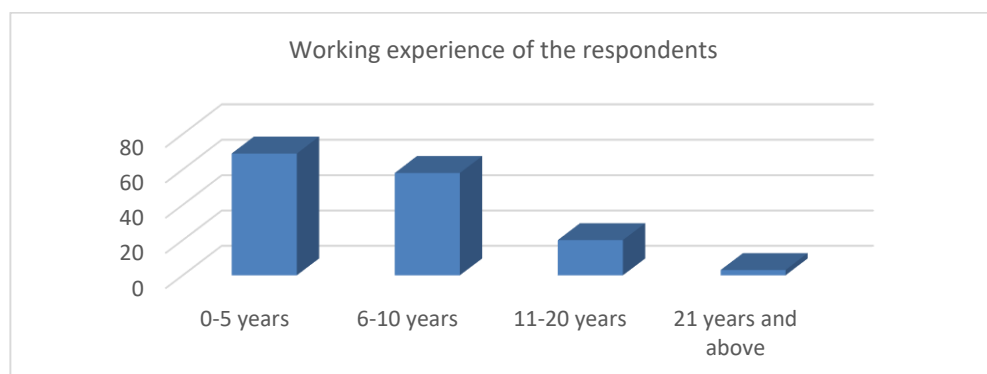


Figure 4: Working experience distribution

found to be significant and strongly determine adoption of wearable devices with the P-value less than 0.05 and magnitude of human factors ($\beta = 0.740$, $t = 11.832$, $P < .05$). This implies that alternative hypothesis is rejected. Thus, the human factors (digital literacy levels and privacy concerns) negatively influence health workers' willingness to use wearable health devices.

H₄: *Technology factors (Poor internet connectivity and lack of local technical support) negatively influence the sustained use of wearable health devices by health workers.*

Table 4 shows that the independent variable technology factors (Poor internet connectivity and lack of local technical support) were found to be significant and strongly determine the adoption of wearable devices with the P-value less than 0.05 and magnitude of technology ($\beta = 0.786$, $t = 13.685$, $P < .05$). This further implies that alternative hypothesis was rejected. Thus, Technology factors (Poor internet connectivity and lack of local technical support) negatively influence the sustained use of wearable health devices by health workers.

H₅: *Positive perceptions of usefulness, ease of use, and trustworthiness positively influence health workers' intention to adopt wearable health devices.*

Table 5 shows that the independent variable (Positive perceptions) was found to be significant and strongly determine the adoption of wearable devices with the P-value less than 0.05 and positive perception ($\beta = 0.555$, $t = 14.614$, $P < .005$). This further implies that alternative hypothesis was rejected. Thus, positive perceptions of usefulness, ease of use, and trustworthiness significantly increase the intention of health workers to adopt wearable health devices.

4.3 Discussion of Findings

The demographic characteristics of the respondents offer important context for understanding the adoption patterns of wearable health devices among health workers in Southwest Nigeria. The study revealed that a higher proportion of respondents were female (54.67%), which aligns with the findings of Okafor and Oladele (2021), who observed a higher participation rate of female healthcare workers in technology-related health programs. This trend may reflect women's frontline role in patient care and monitoring activities, potentially increasing their exposure to and interest in wearable health technologies.

The majority of respondents were within the 31–50 years age range, which represents a productive and professionally active population segment. Adewuyi, Hassan, and Uche (2023) highlighted that healthcare professionals in this age group are more receptive to adopting technological innovations, likely due to their career stage and engagement with continuing professional education. Furthermore, most respondents

held HND/BSc degrees (38%) or Master's degrees (21.33%), suggesting a relatively high level of educational attainment. This supports the assertion by Olatunji and Bello (2022) that higher education levels are positively correlated with the uptake of digital health tools, as individuals are better equipped to comprehend and use such technologies effectively.

Work experience data indicated that 84.67% of respondents had between 0–10 years of experience. According to Chukwu, Ogu, and Asogwa (2020), early- to mid-career professionals are more adaptive and willing to explore innovative technologies compared to their older counterparts, who may be more resistant to change due to established routines and practices.

Regarding hypothesis testing, **Hypothesis 1 (H₁)** established that awareness significantly predicts the application of wearable devices ($\beta = 0.439$, $p < 0.05$). This is consistent with Ibrahim and Sanni (2021), who emphasized that awareness plays a fundamental role in the adoption of digital health tools. Without sufficient knowledge about the existence and potential benefits of such devices, even well-educated and tech-savvy health professionals may remain hesitant to use them.

Hypothesis 2 (H₂) found that high cost negatively impacts the adoption of wearable devices ($\beta = 0.657$, $p < 0.05$), which corroborates Adepoju, Lawal, and Ogunbiyi (2022), who identified affordability as a critical barrier in the deployment of wearable and mobile health technologies in low-resource settings. The financial burden associated with acquiring and maintaining wearable devices may limit their adoption, especially among health workers in publicly funded or rural health facilities.

Hypothesis 3 (H₃) revealed that human factors, particularly digital literacy and privacy concerns, significantly and negatively influence the willingness to adopt wearable health devices ($\beta = 0.740$, $p < 0.05$). This finding resonates with the conclusions of Nwachukwu and Alabi (2021), who pointed out that many health workers express anxiety over data privacy, compounded by limited digital competencies. These factors can erode trust in wearable technologies and reduce motivation to use them, regardless of perceived benefits.

In line with Hypothesis 4 (H₄), the study found that technological constraints—such as poor internet connectivity and inadequate local technical support—significantly hinder the sustainable use of wearable devices ($\beta = 0.786$, $p < 0.05$). Similar results were reported by Eze and Ajayi (2023), who emphasized that infrastructural challenges, particularly in underserved areas, remain a persistent barrier to the successful implementation and use of digital health technologies.

Table 1: Testing for awareness level of wearable device

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	16.041	1.341		11.959	.000
Awareness level	.273	.023	.439	11.878	.000

a. Dependent Variable: Wearable device

Table 2: Regression results on cost effect on adoption of wearable devices

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	24.940	4.182		5.964	.000
Cost	.604	.064	.657	9.379	.000

a. Dependent Variable: Adoption of wearable devices

Table 3: Regression results on human factors effect on adoption of wearable devices

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	18.045	3.898		4.629	.000
Human factors	.719	.061	.740	11.832	.000

a. Dependent Variable: Adoption of wearable devices

Table 4: Regression results on technology effect on adoption of wearable devices

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	17.001	3.448		4.931	.000
Technology	.732	.053	.786	13.685	.000

a. Dependent Variable: Adoption of wearable devices

Table 5: Regression results on Positive perceptions of usefulness, ease of use, and trustworthiness on adoption of wearable devices

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.461	.097		4.764	.000
Positive perception	.556	.038	.555	14.614	.000

a. Dependent Variable: Adoption of wearable devices

On a more optimistic note, **Hypothesis 5 (H₅)** demonstrated that positive perceptions of wearable devices including perceived usefulness, ease of use, and trustworthiness significantly enhance intention to adopt these tools ($\beta = 0.555, p < 0.05$). This supports the Technology Acceptance Model (TAM), which has been widely validated in health technology research. Ogunlana, Etim, and Bello (2024) similarly found that positive user perceptions strongly predict the willingness of healthcare workers to integrate wearable health technologies into their routine practice. Collectively, these findings emphasize that while awareness and interest in wearable health technologies are growing among health professionals in Southwest Nigeria, multiple barriers still constrain their full adoption. These include economic limitations, human capacity challenges, and infrastructural deficits. Therefore, promoting adoption will require multi-level interventions, including cost-reduction strategies, digital skills training, privacy assurance frameworks, and investment in supportive technological infrastructure.

5. Conclusion

This study explored how cost, human factors, and technological perceptions influence the adoption of wearable health devices among health workers in Southwest Nigeria. The findings indicate a high level of awareness of wearable technologies; however, barriers such as high costs, low digital literacy, privacy concerns, and inadequate technological infrastructure significantly hinder adoption. In contrast, health workers who perceive wearable devices as useful, easy to use, and trustworthy are more likely to adopt them, highlighting the role of positive perception in influencing technology uptake.

The results emphasize the need for targeted interventions to address the identified challenges, including cost subsidies, digital literacy training, and improvements in internet connectivity and technical support. This study contributes to the literature by validating the Technology Acceptance Model (TAM) in a Nigerian healthcare context, revealing the often-overlooked impact of human factors like digital literacy and privacy concerns. It also provides actionable insights for policymakers, technology developers, and public health professionals, supporting efforts to enhance digital health adoption, improve healthcare delivery, and guide future research in resource-constrained settings.

6. Further Studies

Further studies can be done in the following areas;

1. Exploring how geographical location influences the adoption of wearable health technologies, examining differences in infrastructure, access, digital literacy, and cultural perceptions between urban and rural health workers.
2. Assessing how digital literacy programs, cost-reduction initiatives, and supportive policy

frameworks affect long-term usage and effectiveness of wearable devices among health workers over time.

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