Journal of Health Information Research, 3(3), 1 - 20, 2026
ISSN: 2354-3205 (Online) https://credence-publishing.com
DOI: http://doi.org/10.47524/jhir.v3i3.21

Health information management professionals' perspectives on integrating wearable medical device data into clinic-based electronic health records (EHRs) system

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Abstract
Wearable medical devices have emerged as transformative tool in health information management practices, offering real-time and continuous health data collection from outside the traditional settings. The devices have been found to work compatibly when integrated with electronic health records (EHRs) system, enabling continuous monitoring of patient's health remotely. However, these benefits can be undermined by health information management professionals' lack of understanding, low adoption of EHRs and challenges of technology replacement. The study aimed at examining health Information management professionals' level of understanding of wearable medical devices as data collection tool, and the integration with EHRs systems. Health information management (HIM) professionals in Nigeria constitute the study population, a structured Google form was used to collect data through the National Association WhatsApp group platform, 102 copies were returned and 97 were found useful. Analysis was done using descriptive statistics. Results show a low level of EHRs adoption in hospitals. Though health information management professionals are familiar with wearables but lack understanding of wearable medical devices integration with EHRs and the use for patient's data collection. Government should intensify adoption of EHRs and HIM professionals should improve on their IT and data management skills to manage integrated wearables-EHRs data collection method.

Keywords: Wearable medical devices, electronic health records, Integration, health information management adoption

Introduction
A major component of healthcare service is health information; it drives patient care management and supports evidence-base-medicine. Health information management (HIM) professionals collect, maintain, manage and disseminate health information to legitimate users. Traditionally, clinicians relied on routine information collected during periodic visits to capture patients' health information (Amin, *et. al*., 2020). In the pre-digital era, information on patients were mostly gathered during face-to-face consultation and manually recorded on paper. These records, mostly, consist of clinical observations, laboratory test reports, physician notes, and imaging tests reports, which were then archived and managed as physical documents within healthcare facilities by HIM professionals. The process, had its shortcomings; not only was retrieving and sharing of information cumbersome, it often leads to delays or loss of vital information with security and privacy concerns.

In recent times, advancement in health information technology (HIT) saw the growth of the Internet of Medical Things (IoMTs), artificial intelligence and wearable technologies devices gaining much attention in the health sector, particularly in managing patient information. health information technology is driving patient care more than any other force and wearable technologies is taking the centre stage in the practices of health information management. The global technological advancements in patient care and information management has shifted to

electronic health records (EHRs) systems to streamlined the processes of storing, accessing and sharing patient information, (Hunt, Bell, Baker and Howard, 2017; Khatiwada, Yang, Lin. and Blobel, 2024). However, the integration of wearable technologies into EHRs system is moving patient care from facilities to patient home environments, posing new challenges for health information management professionals in the collection, management and sharing of patient information. Wearables devices now generate and transmit patient's vital information to the likes of electronic health records (EHRs) and electronic medical records (EMRs). This evolution of wearable devices fueled by technological progression and the integration into EHRs system has brought about another major shift in patient care and the practice of health information management.

Wearables are smart devices when worn on the body and are capable of measuring and monitoring body temperature, blood pressure, heart rate, electrocardiogram and electroencephalogram (Nahavandi, 2022). These devices come in various shapes and forms, smartwatches, fitness trackers, biometric clothing, smart contact lenses, implanted sensors, smart glasses, or even clothing, designed to be worn on the body, to continuously collect, analyse and transmit patient information to the clinic (Celik et al (2023; Randles, 2025). Wearable technologies now extend data collection and analysis beyond clinical environments, enabling continuous monitoring and patient engagement in their care management, (Quix *et al,* 2013). Wearable devices remotely monitor, collect and transmits patient health information on continuous mode to an EHRs system, making the devices useful for early diagnosis and continuous management of patient information. Huhn, (2022) asserted that wearable devices hold great promises in patient care and health information management practices.

However, over the years, health information management practices in most Nigerian hospitals had been largely manual. Like in most developing nations the level of adoption of EHRs in Nigeria, is considered very low (Adeleke *et al, 2018;* The Lancet Commissions, 2022). Studies also revealed that the HIM professionals who are traditionally responsible for the creation, management and security of health information are challenged with poor computer literacy skills (Oweghoro and Oluwole, 2023), culture of resistance to change and lack of institutional supports (Oluwole, Abioye and Oweghoro, 2025). In view of the foregoing, the growing adoption of wearable devices in Nigeria may have introduced a new dilemma to the already technologically challenged HIM professionals in the management of patient information.

This paper identifies the level of understanding and challenges in the management of integrated wearable medical device data into clinic-based EHRs systems data by HIM professionals.

Statement of the problem

The care of patient requires relevant data and information for effective clinical performance, research, education and training which can only be sourced through good health information management practices. Health information management professionals create and maintain patient information. The efficient management of healthcare information is therefore essential to guarantee availability and access to valuable information for quality patient care, research and training of healthcare professionals. However, the management of patient information is undergoing a significant paradigm shift with wearables devices and the integration into EHRs

revolutionising the modern health information management practices. Despite the growing use of wearable devices in managing patient information, there seems to be lack of clear understanding among health information management professionals about its meaning, management, data accuracy and security in Nigeria. Considering the present poor state of digital health information management practices and the prevalence in the adoption of digital health technologies in Nigeria, it is important to examine the level of understanding and use of wearables technologies as data collection tool by health information management professionals in Nigeria.

Objective of the study

This study sets out to examine the level of understanding, attitude towards and perceived challenges of wearable medical technology and the integration into Electronic Health Records (EHRs) system among the health information management professionals in Nigeria.

Research questions

This study answers the following questions:

1. What is the level of understanding of wearable medical devices as data collection tool?
2. What is the attitude towards wearable medical devices as data collection tools?
3. What are the perceived challenges of managing integrating wearable medical device data into EHR systems?

Literature review

Hospitals deal with the life and health of their patients by providing quality healthcare services, however, quality healthcare service relies on well-trained doctors, nurses and on good infrastructures. Yet, without access to accurate, comprehensive, up-to-date and good health information, healthcare providers may not be able to render efficient and quality healthcare service which can have serious consequences. According to Zegers (2011) the primary aim of accurately recording patient's information is to support the provision of good care, clinical decision making, communication between healthcare workers and continuity of care. In recent years there has been a high surge in the use of wearable devices to collect and monitor patient vital information by health facilities. Wearable technologies represent a new advancement in technology for remote data collection and management that monitor and provide indicators related to patient health in real time (Barzola-Monteses et al, 2024).

Clinicians relied heavily on the health information to efficiently plan and manage patients care. In the past clinicians relied on routine information collected during periodic visits to the clinic to capture patients' health information. In the pre-digital era, patient health information was mostly gathered during face-to-face consultation and recorded manually on paper (Khatiwada, Yang, Lin and Blobel, 2024). These records, were then manually archived and managed by health information management professionals as physical documents within healthcare facilities. Health information serves as the blood that keeps healthcare system running. Health Information Management professionals being custodians of patient information, are responsible for the maintenance and dissemination of patient health information. Over the years, health information management practices in most Nigerian hospitals had been largely manual (Adeleke *et al, 2018;* The Lancet Commissions, 2022). Experience had shown that this manual process had its shortcomings; not only were retrieving and sharing of information cumbersome, it often leads to errors, delays or loss of vital information with security and privacy

concerns. However, it was not until recently that few teaching hospitals started adopting the electronic medical records and electronic health records systems. Electronic medical records (EMR) is a digitalised version of the paper-based documented medical and clinical information about the patient while the Electronic Health Records (EHRs) is an electronic medical record system with the additional capacity of sharing patient information across different providers, facilities, and settings.

Good health information management practices ensure quality, accuracy, accessibility, authenticity and security of patient information in whatever format, paper and electronic, are required for efficient patient care managements (Omokanye and Adepoju 2024). Information serves as the glue that holds the practice of medicine together. Complicated practices, distributed responsibilities and interdependent roles are common challenges in healthcare services. One small change in the workflow can affect the performance of the entire system because of interconnected processes (Prajapati, 2022). The Electronic Medical Records and electronic health records systems create a backbone to uphold these processes, which can help avoid adverse changes. According to Amponin and Britiller, (2023); Kwarteng-Amaniampon, (2025) electronic medical records and electronic health records systems offer auto-updates, pre-defined templates and patient tracking, bringing coordination to workflows. For healthcare providers, patient information become more accessible with visual dashboards that provide a holistic view of the consolidated data. Electronic Health Records dashboards would typically include a diagnostic heat-map, patient history, vitals chart, laboratory reports and prescribed medications (Acharya, 2026). These technologies were, therefore, a welcomed upgrade from the manual paper-based of health information management previously relied on by health information management professionals.

Globally, modern healthcare systems rely heavily on advanced technologies for efficient health information management. Evidence abound that EHRs/EMRs provide accurate, current, and clearly understood health information essential for high-quality, cost-effective healthcare delivery, (Surabhi, 2025; Acharya, 2026). The benefits of this include improved clinical documentation with reduced transcription, efficient clinical workflows, improved medication management, and labor costs. Electronic medical records and electronic health records has been found to streamline data collection, storage, retrieval and information sharing. Unfortunately, in Africa, including Nigeria, despite the immerse benefits of the Electronic Health Records System, HIM professionals continue to grapples with the challenges of how to manage electronic health records generated data (Agyemang, 2026). Studies had revealed that the average HIM professionals lacks advanced computer literacy skills, poor knowledge of system integration, inadequate technological infrastructure, limited access to reliable electricity and internet connectivity, (Adepoju and j. K. Opele, 2021; Oweghoro and oluwole. 2023; Agyemang, 2026). Oluwole, Abioye and Oweghoro, (2025), asserted that health information management professionals who are traditionally responsible for the creation, management and security of health information often faced the challenges of culture of resistance to change and lack of institutional supports.

In Nigeria, despite the various challenges facing the implementation of EMRs/EHRs, the few hospitals that attempted to implementation the EMRs/EHRs, continue to battle with challenges of technology, inadequate infrastructure, limited access to reliable

electricity, internet connectivity, and lack of skilled manpower. (Shahzad, 2021; Malik, 2021; Ibrahim, Simpeh and Adebowale, 2023; Agyemang, et al, 2026). Unfortunately, while the Nigeria health system is still struggling with the challenges of implementing and managing EMRs/EHRs, advancement in health information technology opened a new pathway in health information management with the integration of wearable devices into EHRs system. Wearable technology devices are small electronic and mobile devices, with wireless communication capabilities incorporated, which can be worn on the human body. These devices remotely collect, transmit and even analyse the data collected from the body of patients on real-time (Nahavandi et al, 2022).

Prajapati, (2022) had explained that in EHRs system patient information are documented by healthcare providers in the facility, whereas, a wearable device remotely collects patient vital health information based on everyday activities and then transmit these to the facility. This paints two district pictures of an individual's health status which lacks a comprehensive summation. However, the integration of wearable devices data with EHRs systems recorded data attempts to fill this gap. Wearables devices enable remote monitoring of patients at all times to support the needs of the real-time virtual care of patients. This information is then transmitted to and recorded into the EHR system to create a complete and full view of the patient for healthcare providers (Tegegne, et al. 2026). EHR is a digital version of a patient's recorded information, it therefore makes sense that data from wearable devices are integrated into an EHRs system. When data from wearable devices are continuously transmitted to an EHRs system, the healthcare provider can constantly monitor the patient's health status. However, despite this medical benefits of the wearable devices, most users see them as tools for fashion. In recent time wearable technology is expanding into the fashion, what drives the appeal of these devices is not the convenience of monitoring health metrics with a mere glance at your wrist, and the seamless fusion of technology but fashion (Key and Hunt, 2024; Kumar, 2024)

Fernandes, Prabhu, et al. (2025) posited that the primary objective of integrating wearable generated data with EHRs is to collect data that creates an interconnected health ecosystem that supports continuous, context-aware and patient-centric care. This includes enhancing the richness and timeliness of clinical data, improving risk prediction, facilitating remote care models such as telehealth and virtual wards and promoting data-driven clinical research. This integration of wearable devices with EHR systems now marks a new turn for HIM professionals, by bridging the gap between episodic clinical visits data and continuous health tracking data. This integration allows healthcare providers to access real-time or near-real-time patient-generated health data, enabling early detection of health anomalies, more accurate diagnostics and timely interventions (Isreal, et al 2022; Prajapati, 2022, Clarkea, et al, 2025). However, this is a new challenge for the HIM professional's in health information management. According to Isreal et al, (2022) the scope of integration spans technical interoperability, standardization of data formats, secure data transmission, analytics and visualization, patient privacy, and the development of supportive regulatory and ethical frameworks.

While the benefits of wearables are numerous, collecting and integrating data from wearable medical devices into EHRs have been found to presents challenges, primarily driven by data format standardization, accuracy and consistency, interoperability gaps, privacy and security risks. (Azodo, Williams, Sheikh, Cresswell.

2020; Canali, Schiaffonati, Aliverti, 2022; Ramachandran and Langar (2023); Kim et al, 2024; AlRashidy et al, 2024; Wearable devices generate data in different formats, making it complicated and time-consuming to consolidate this information into a single EHR system. Also, ensuring the security and privacy of patient data is important. Patient data are often popular targets for criminals, resulting in a constant risk of data breaches and unauthorized access. The accuracy and consistency of wearable data are considered a significant factor to in patient care management.

The management of patient care is undergoing technological transformation and there is a growing demand by healthcare services for both internal and external information to manage and analyse patients' information quickly and efficiently. The integration process of synchronising vital health information from wearable devices to EHRs systems, according to Dinh-Le, (2019), would include a requirement analysis, product architecture, technical consultation, development, integration, compliance and several other due diligence measures that may require additional learning demand on the HIM professionals. The integration of wearable health technology and electronic health records system while it is expected to meet the demand of today's patient care, the HIM professional job functions and roles in patient information management is equally expected to take a more complex turn. The management of patient healthcare information is evolving quickly as care providers push for information completeness, greater accuracy and stronger safeguards around patient information. The new approaches to data management and exchange are challenging the HIM professional to deliver timely information, while advances in privacy and security are keep pace with regulatory demands (Adams, 2026). The trend is toward driving technology transformation of HIM practice that will make the work more reliable without adding extra complexity for professionals on the front lines.

Athira and Tiwar, (2023) had posited that while the developed countries already established the system of EHR., developing nations like Nigeria are still in the progress but facing challenges lack of policy and regulations, poor electricity supply, poor internet connectivity, Interoperability, resistance to change, poor funding and corruption. However, according to Dehghan, (2026), the world is looking forward to a completely established digital healthcare system and the integration of wearables and Electronic Health Record (EHR) systems seems the bases for this initiative.

This new approach to health information management is expected to pose a new challenge for Health Information Management professionals in the collection, management and security of health information (Quix, *et al,* 2013; Qadrie, Humaira, Farooq and Maqbool, 2025; Baumann, Stone and Abdelall, 2025). While the convergence of wearable devices and electronic health records system data, presents new opportunities for information-base decision-making towards improving patient care for clinicians, the process is most likely to add to the already technology-anxiety of the HIM professionals. The increasing use of wearable devices by patients and the adoption as data collection tool by healthcare providers underscores the importance of HIM professionals understanding the functionalities of wearables and the integration process into EHRs system. Health information management practice is evolving quickly as care providers push for information completeness, greater accuracy and stronger safeguards around patient information (Adams, 2026). The demand for evidence-based healthcare is challenging the HIM

professional to deliver complete, quality and timely health information. The trend towards driving technology transformation in HIM practices is putting additional pressure on the already complex state of the HIM professionals.

Methods

The study adopted the cross-sectional descriptive survey approach, target population for the study consists of health Information management professionals practicing in hospitals, in Nigeria. A structured questionnaire was developed; copies were administered on respondents through the Professional National Association's WhatsApp group platform using Google form. The number of HIM professionals that respondent was 102 and 97 copies of the returned questionnaire were found useful and these were considered adequate. Data collected were analysed using frequency and percentages with the aid of Statistical Package for Social Sciences version 29.

Results

Table 1 shows the socio-demographic variables of HIM professionals.

Table 1. Socio-demographic variables of respondents (N=97)

Variables	Options	Frequency	Percentage (%)
Healthcare Institutions	Tertiary	84	86.6
	Secondary	7	7..2
	Primary	3	3.1
	Private	1	1.0
	Others	2	2.1
Gender	Male	43	44.3
	Female	54	55.7
Age	<21	0	0
	21-30	2	2.1
	31-40	32	33.0
	41-50	30	30.9
	51-60	32	33.0
	60+	1	1.0
Highest Qualification	HND/BSc	62	63.9
	MHIM/MSc(HIM)	31	32.0
	PhD (HIM)	4	4.1
Years of Experience	<2	1	1.0
	2-5	10	10.3
	6-10	13	13.4
	>10	73	75.3

The distribution of respondents (Table 1) shows that majority, (86.6%) are working in tertiary institutions, 55.7% are female, most of the respondents, 96.9% are within the age range of 31–60 years, 63.9% have Higher National Diploma or Bachelor degree in Health Information Management and majority of the respondents (75.3%) have practiced for over 10 years.

Research question one: What is the level of understanding of wearable medical devices as data collection tool? The data in tables 2, 3, 4. 5, 6 and 7 are used to answer this question.

Table 2: Use of electronic health records system by respondents' hospitals

N=97	Yes	No
My hospital currently uses electronic health records	**29**	**68**
Does your hospital collect patient data through wearable medical devices?	**0**	**97**
If wearable devices data are integrated into EMR	**0**	**97**

Table 2 shows that far less than half of the respondents, 29 (29.9%), indicated that their hospitals use electronic health records system, however, none of these hospitals collect patient data through wearable medical devices or had integrated wearable devices data with their EMR system data.

Table 3: Familiarity with wearable medical devices (e.g., smartwatches, fitness trackers, glucose monitors)?

N=97	Response	%
Very familiar	41	41.9
Familiar	43	43.9
Unfamiliar	11	12.2
Very unfamiliar	2	2.0
97 **100**		

Table 3 reveals that a majority of the respondents, 84 (85.8%) indicated that they are familiar with wearable medical devices such as smartwatches, fitness trackers, glucose monitors. This is expected because wearables are common sights.

Table 4: Wearable medical devices and collection of patient healthcare data

N=97. I know wearables:	SA	A	D	SD
are Smart devices worn close to the body	54	36	6	1
are medical devices that can read patients vital information	27	39	25	6
an important feature of wearable medical device is data collection for patient care	10	21	62	4
remotely monitor patient vital medical information and transmit such data to the clinic	13	11	66	7
can allow patients to be treated remotely	31	34	25	7
primary purpose of wearable is remote monitoring of patient health status	13	32	51	1
data can complement facility based generated patient data	43	37	11	6
Wearable medical devices can benefit both patients and clinicians	31	37	20	9
key benefit is tracking of patient health activities	12	58	25	1
can communicate with other devices like EMRs/EHRs	26	29	27	15
can transmit patient data to EMRs/EHRs at the facilities if integrated	30	28	25	14
can assist in emergency situations	44	33	16	4
data collected through wearable medical devices can help in early detection of health issues	49	39	8	1
help monitor disease progression when integrated with EMR/HER	37	36	19	5
are useful for managing chronic conditions like diabetes or heart disease	40	38	15	4
a potential health-related applications of wearables is real-time data	37	50	6	4
use of wearables is moving patient care from clinics to patients' home environments	37	29	19	12

Table 4 further reveals respondents' understanding of the use of wearable devices as a health data collection device. Most of the respondents, (92.8%), know that wearable medical devices are worn close to the body, and are capable of can reading patients vital information (68%), however, majority (68.0%) do not know the technology are meant to collect data for patient care. Most respondents (75.3%) are not aware that wearables remotely monitor patient vital information and transmit them to the clinic

however, respondents are of the opinion that wearables can enable patients to be treated remotely (67.0%), and that the primary purpose of wearable is remote monitoring of patient health status (61.95%). Majority (82.5%) agreed that data from wearables can compliments facility based generated patient data, and (69.1%) are of the opinion that this will benefit both the patients and clinicians. Respondents (72.2%), agreed that the key benefit of wearables is tracking of patient health activities. Over half of the respondents, (56.7%), indicated the wearables can communicate with EHR/EMR, and with (59.8%) of the respondents agreeing with the suggestion that wearables can transmit patient data to EMRs/EHRs at the facilities. Respondents agreed that wearable medical devices can be of assistance in emergency situations (79.4%), help in early detection of patient health issues (90.7%), and can monitor disease progression when integrated with EMR/EHR (75.3%). Respondents also agreed to the suggestion that wearables can be useful for managing chronic conditions like diabetes or heart disease, (80.4%) and have the potential to provide real-time data (89.7%). Most of the respondents (68.0%) supported the suggestion that the use of wearables may move patient care from clinics to patients' home environments. This finding indicate poor understanding of the use of wearables as data collection tools.

Table 5: Type of data collected by wearable medical devices

N=97: wearable medical devices can collect and transmit data on:	Yes	%
Heart rate	44	45.4
Blood glucose levels	57	58.8
Blood pressure	74	76.3
Physical activity data	42	43.3
blood oxygen saturation	22	23.7
Sleep monitoring data	20	20.6
Body temperature	66	68.0
ECG	14	14.4

Table 5 presents data on the respondent's level of understanding of the types of data wearable medical devices can remotely collect and transmit to the facilities. Most respondents are aware that wearable medical devices can collect data on vital signs such as blood pressure (76.6%), heart rate (45.4%), body temperature (68.0%), and blood glucose levels (58.8%). However, only few of the respondents are aware that wearables can also collect data on ECG (14.4%), sleep monitoring (20.5%), blood oxygen saturation (23.7%).

Table 6: How wearable devices data can be managed into clinic based EHR data

N=97 Wearable devices data are:	Response	%
Automatically integrated into EHR	12	11.3
Manually entered into EHRs	38	39.2
Stored separately	10	10.3
Data from wearable devices cannot be captured in the facilities	38	39.2
97	**100**	

Table 6, reveals that less than half of the respondents (39.2%), indicated that data from wearables can only be manually entered into the EHRs system, 12.2% agreed that such

data can be automatically integrated into EHRs system, while 10.3% indicated wearable devices data need to be stored separately. However, 39.2% of the respondents are of the opinion that data collected from wearable devices cannot be managed in the facilities indicating low level of understanding the technology's data collection ability.

Table 7: Data quality and information management

N = 97 Statement	SA	A	D	SD
Data generated from wearable devices would be accurate enough for inclusion in EHRs.	31	57	8	10
Wearable device data can be effectively standardized and integrated with EHR data.	39	53	4	0
I can efficiently manage the volume of wearable device data in the facilities.	29	56	10	1
Integrating wearable device data with EHRs generated data will be challenging	53	40	4	0
There should be procedures for validating wearable device data before incorporation into patient records.	53	42	1	0
I am aware procedures exist for validating wearable device data before incorporation into patient records	26	45	22	2
Data quality issues are a significant challenge when integrating wearable device data	37	43	11	2

Table 7 presents data on the respondent's view on the quality of data and Management of data from wearable medical device. Respondents (93.8%) opined that data generated from wearable devices would be accurate enough for inclusion in EHRs, (83.5%) indicated that wearable device data can be effectively standardized within clinic's EHR system. Majority of the respondents (67.0%) agreed with the suggestion that the volume of wearable device data can be managed efficiently at the facilities. However, most of the respondents (97.9%) are of the opinion that there should be procedures for validating wearable device data before incorporation into patient records. To the question that if the respondents are aware of procedures for validating wearable device data before incorporation into patient records, (73.2%) respondents indicated positively, but 82.5% are of the opinion that data quality issues are a significant challenge when integrating wearable device data with clinic-based data.

Research question two: What are the perceived challenges of managing integrating wearable medical device data into EHR systems? The data in tables 8 and 9 will be used to answer research question two on attitude which is a function of benefits derived by individual.

Table 8: Perceived benefits of integrating wearable medical devices data with EHRs systems

Wearable medical devices data when integrated into EHRs systems: N=97	SA	A	D	SD
Integrating wearable medical device data into clinic-based EHRs can improve the completeness of patient records.	54	38	4	1
Integrating wearable medical device data into clinic-based EHRs will reduce patient waiting time	48	43	4	2
Wearable device data will enhance clinical decision-making	52	42	2	1
Integration of wearable data will support continuous patient monitoring.	54	39	3	1
Wearable-EHR integration will improve the quality of patient care	50	43	2	1
Improved access to wearable data will help clinicians identify health risks early	54	36	3	2
Integration reduces the need for repeated patient assessments	49	39	6	2

Table 8 reports respondents perceived benefits of integrating wearable medical devices data into EHRs systems. Almost all the respondents (94.8%), agreed with the suggestion that integration will improve the completeness of patient records, 93.8% indicated that integration will reduce patient waiting time, 96.9% indicated it will enhance clinical decision-making, support continuous patient monitoring (95.9%), and improve the quality of patient care (95.9%). Most of the respondents (92.8%) also agree that integration will improve clinicians access to patient information, and will help clinicians identify health risks early. Majority of the respondents (90.7%) are of the opinion that Integration will reduces the need for repeated patient assessments. Findings here show that respondents agreement with benefits of health information technology in healthcare data management.

Table 9: HIM professionals Attitude towards wearable medical device as data collection tools.

N=97 HIMP's attitude towards wearables as data collection tools	Yes	%
I am not comfortable with wearable device as a data collection tool	36	37.1
I will be comfortable managing data from wearable device	81	83.5
wearable devices will help me manage patient information better	97	100
Wearables will allow patient information accessible real-time	50	51.5
I can analyse wearable generated patient data	27	27.8
Integrating wearables with EHRs data assist me improve data quality	95	97.9
Integration of wearables with EHRs data will support real-time virtual patient care	83	85.6
Data from wearables when transmitted to and recorded into EHR system will improve data access	95	97.9
The integrating wearables and EHRs data will create a complete and full view of the patient information	96	99.0
continuous transmission of data from wearable devices to EHRs system will give data completeness	66	98.5
wearables and EHRs routinely collected patient data will improve patient data integrity	95	97.9
Wearable devices will help to capture continuous, real-time data on various metrics	97	100
Wearable devices will constitute a threat to HIM Professional's job	51	52.6
Wearable devices may render HIM Professionals job less important	47	48.5

Table 9 shows HIM professionals (HIMPs) attitude towards wearable medical devices as data collection tool. From the table, respondents (37.1%) feel they will not be comfortable with wearable devices as data collection tool, though 83.5% believe they can manage data from wearable devices. All the respondents (100%) agreed that wearable device may help them to manage patient information better. Majority of the respondents (99.0%) agree that integrating wearables data and EHRs data will create a complete and full view of patient information. Respondents agree with the suggestions that wearable devices when integrated with EHRs will improve patient data integrity (97.9%), capture continuous, real-time data on various metrics (100%), improve data quality (97.9%) and guaranty data access to patient information (97.9%). However, over half of the respondents (52.6%) were of the opinion that wearables could constitute a threat to HIM Professionals, while (48.5%) believe that wearables will render HIM Professionals job less important. The finding indicated that HIM Professionals have a positive attitude towards wearable medical devices though with caution.

Research question three: What are the perceived challenges and barriers of

managing integrating wearable medical device data into EHR Systems? The data in tables 10, 11, 12, 13 and 14 are used to answer the question.

Table 10 Challenges and Barriers to integrating wearable data into clinic-based EHRs

N=96 Challenges and Barriers to integration	Response	%
Initial Cost	68	70.8
Lack of interoperability	56	53.8
Privacy concerns	43	44.8
Data quality issues	29	30.2
Staff training needs	47	49.0
Regulatory challenges	39	40.6
Resistance to change	51	53.1
Other (Specify)	4	4.2

Table 10 shows respondents' perceived view of what they consider could be possible barriers to integrating wearable data into clinic-based EHRs. A majority of the respondents are of the view that initial cost (70.8%) as the greatest barrier to integrating wearable devices data with that of EHRs, this is followed by lack of interoperability with 50.8%, and resistance to change (53.1%). Staff training needs (49.0%) and Privacy concerns (44.8%) are also seen as possible barriers.

Table 11: Challenges of Interoperability and Technical Readiness

N = 97 Challenges and barriers	SA	A	D	SD
Wearable device and EHR integration need internet support.	50	44	1	0
Lack of interoperability standards can be a barrier to wearable-EHR integration.	51	40	3	1
Insufficient IT infrastructure can be a barrier to wearable data and EHEs data integration.	54	40	2	1
Lack of technical support can lead to barrier integrating wearable with EHRs	56	36	2	0
Data exchange between wearable devices and EHR systems can be achieved seamlessly with adequate technical support	39	53	3	0
HIM professionals will require IT literacy skills to adequately manage wearable device data	57	32	4	1

Table 11 presents data on respondents' perception of possible challenges and barriers in integration of wearable medical devices and EHRs. Nearly all the respondents (96.9%) agreed that wearable devices and EHR integration need internet support, while 93.8% indicate lack of interoperability standards can be barrier to successful integration. Almost all the respondents (96.9%) agreed that lack of IT infrastructure and technical support (94.8%) can constitute challenges to wearables-EHRs data integration. However, respondents (94.8%) agreed to the suggestion that data exchange between wearable devices and EHRs can be achieved seamlessly with adequate technical support. Respondents (91.8%) agree to the suggestion that HIM Professionals will require IT literacy skills to adequately manage data from wearable devices.

Table 12: Wearable devices and data privacy, security, and governance

N = 97 Integration and privacy, security, and governance	SA	A	D	SD
Patient privacy concerns may affect the integration of wearable device data into EHRs.	31	38	24	2
Appropriate security measures must be in place to protect wearable device data.	60	31	3	1
There should be clear policies in place regarding the use of wearable device data in patient records.	62	33	1	0
Patients should provide explicit consent before wearable data are integrated into EHRs.	47	36	11	2
There should be regulatory requirements for wearable data integration.	53	39	3	1

Table 12 presents data on respondents' view on perceived challenges with wearable devices and EHR integration and privacy, security, and governance. Results show that 71.1% of the respondents are of the opinion that patient privacy concerns may affect the integration of wearable device data into EHRs, while, 93.8% agree that appropriate security measures must be in place to protect wearable device data from unauthorised access. Respondents, (97.9%) are of the view that there must be clear policies in place regarding the use of wearable device data in patient records, 85.6% of the respondents suggest that there is need to obtain patients explicit consent before their wearable data are integrated into EHRs and that there should be regulatory requirements for wearable data integration as suggested by 94.8% of the respondents.

Table 13: Wearable device-EHR integration and organizational readiness

N = 97 Organizational readiness	SA	A	D	SD
Top management supports is needed for wearable-EHR integration initiatives.	60	33	1	1
Staff members must receive adequate training on managing wearable-generated health data.	69	26	0	0
There should be adequate financial resources to support wearable-EHR integration.	67	28	1	0
HIM Professionals will play significant role in successful wearable-EHR integration.	62	33	0	0
My facility is preparing to implement wearable-EHR integration within the next one years.	23	9	49	16

Table 13 show that 95.9% of the respondents agree that Top Management Supports is needed for wearable-EHR integration initiatives and 97.9% indicate that HIM Professional members need adequate training on how to manage wearable-generated health data. Respondents, 97.9% indicated that there should be adequate financial resources to support wearable-EHR data integration. Table 12 show that 97.9% believe that HIM Professionals play a significant role in the successful wearable-EHR integration, and only 33.0% indicated their facility is preparing to implement wearable-EHR integration within the next one years

Table 14: Stakeholder group that should lead wearable-EHR integration efforts

N=95 Stakeholder group and lead integration	Response	%
Health information officer	69	72.6
IT department	33	34.7
Clinicians	28	29.5
Hospital administration	17	17.9
Vendors	14	14.7
Collaborative team	33	34.7

Table 14 show the stakeholder groups that should lead wearable-EHR integration efforts. A majority of the respondents are of the opinion that the health information officer (72.6%) should take the lead in the effort towards wearable data-EHR integration.

Discussion

Findings of this study show that majority of the HIM professionals in Nigeria practice in tertiary hospitals with over 10 years of experience, females are more in number, majority have Higher National Diploma or Bachelor of Health Information Management degree and a good number has higher degree. This is an indication that most HIM professionals practicing in Nigeria are well qualified and experienced.

The study revealed that only few hospitals have adopted EMR/EHRs system in Nigeria, and none of these collect data through wearable devices or had integrated wearable devices into EMR/EHRs system. The finding is in agreement with that Adeleke *et al, (*2018); Shahzad (2021); Malik, (2021 and Lancet Commissions, (2022) that there is a low level of adoption of EMR/EHRs in Nigeria and that adoption of new Health Information Technology (HIT) in developing countries is always slow and challenging to most health care professionals. This low level of adoption and the non-use of wearable medical devices could have accounted for HIM professional's low level of awareness and understanding of wearable medical devices use as data collection tool. The study revealed that, though, most HIM professionals are aware that wearable medical devices when worn can measure blood pressure, body temperature, blood glucose levels and track steps, indicating familiarity with wearable devices, however, majority do not know that wearable medical devices can remotely monitor a person's vitals like blood oxygen saturation, ECG, sleep monitoring and transmit such information to clinics to be integrated into EHRs system for patient care management. This is in agreement with the findings of Ezurike (2023) in a study in Lagos State, Nigeria that majority of the population are aware of wearable medical devices, but there was a minimal use of the device for collecting and transmitting data to the clinics. Key and Hunt, (2024) and Kumar, (2024) also find that, though, wearable technology is expanding into the fashion, but what really drives the appeal of these devices is not the convenience of monitoring health metrics with a mere glance at your wrist and the seamless fusion of technology but rather, fashion. Therefore, majority of HIM professionals lack the understanding that wearables technologies can be integrated into EHRs, and data collected through wearables can be captured directly into the EMR/EHRs system.

This study had also shown that HIM professionals are conscious of the benefits of using wearable devices and their integration with EMR/EHRs will reduce patient waiting time, improve quality of patient information, enhance clinical decision-making, support continuous patient monitoring, and improve the quality of patient care. They claim this will be beneficial during emergency, monitor disease progression, assist clinicians to identify health risks early and reduces the need for repeated patient assessments. This finding is in line with that of Alrashidy et al (2024) that the convergence of EMR/EHRs system and wearable medical technologies are presenting new opportunities for data-driven decision-making and improved patient care. The study has, therefore, shown that HIM professionals strongly hold the believe that integrating wearables data with EMR/EHRs system data have the potential to provide complete and real-time data that could improve data quality which could

benefit both patients and clinicians. This finding indicate a positive attitude towards the integration of wearables with EMR/EHRs system for data collection.

The study examined HIM professionals' perceived challenges and barriers to the use of wearable medical devices integration with EMR/EHRs system for data collection. Findings have established that HIM professionals hold the view that wearables can generate quality and standardised data, but the process may be challenging. Findings from various studies (Azodo, Williams, Sheikh, Cresswell. 2020; Canali, Schiaffonati, Aliverti, 2022; Ramachandran and Langar (2023); Kim et al, 2024; AlRashidy et al, 2024) had proven this to be true. HIM professionals believe they can efficiently manage data generated in the clinics, however, there may be challenges managing data from wearables merged with EMR/EHRs systems. This finding is also in line with Guk et al (2019); Cho, et al (2021) and Pulantara et al, (2024) that merging wearable medical devices derived data with the traditional health information management practices method of collecting data could face challenges, especially in developing nations. Findings also show that HIM professionals identify unreliable internet, irregular electricity supply, lack of HIT infrastructure and technical support as possibly challenges and barriers to the use of wearable technology. This finding is in agreement with that of Agyemang et al (2026) that the implementation of EMR/EHRs can be challenging, especially in the developing countries, particularly in Africa where the continent grapples with various technological and technical challenges, inadequate technological infrastructure, limited access to reliable electricity and poor internet connectivity. Without a stable network, accessing and updating patient data in real time, which is critical for an efficient EHR system, will be challenging.

Findings from this study indicated that privacy, security and governance of wearable medical devices generated data are of great concern to HIM professionals. The result from the study indicated that wearable technologies constitute serious concerns with the privacy, security and governance of patient information, hence, there should be clear policies and regulatory requirements in place regarding the use of wearable device data, and explicit consent from patients. This finding is in agreement with previous studies by Quix, *et al,* 2013; Qadrie, Humaira, Farooq and Maqbool, (2025) Baumann, Stone and Abdelall, (2025) that the introduction of new technologies like wearables and EMRs/EHRs system is creating serious privacy and security challenges for HIM professionals. In the same vein, Adams (2026) also warned that as care providers push for information completeness and accuracy, the challenges of privacy and better security safeguards around patient information must be addressed.

The adoption and integration of wearable medical devices and EHR require organizational readiness and support. This study revealed that Top Management Supports is important for the adoption and implementation of wearable-EHR integration. Health Information Management professional members need adequate training on IT skills to manage wearable-generated health data, infrastructure and financial supports. This finding is in line with that of Oweghoro and Oluwole, (2023) that HIM professionals are often challenged with poor computer literacy skills, and lack of institutional supports (Oluwole, Abioye and Oweghoro, 2025). Spatar in a study titled "Adoption factors of electronic health record systems" established that many EMR/EHR systems were designed to meet the requirements of people who do not have to

use the system and this had resulted in mismatch that often lead to inefficiency, workarounds, and poor adoption. Ben-Tzion Karsh and colleagues in their paper "Health information technology: fallacies and sober realities" among different issues associated with HIT adoption also mention that often the decision about purchasing and implementing an EHR system is made by administration rather than future users of the system.

Conclusion

This study establishes that there is a low level of EMR/EHRs adoption rate in Nigeria and the few hospitals that have adopted do not integrate wearable medical devises for collecting patient data. This must have accounted for the low level of understanding of wearable medical devices as data collection tool. Though, HIM professionals are aware of the various benefits of wearable medical devices in as data collection tools, they fear the technology may threaten their job. The increasing interest and need for quality and ease of access to patient data is driving digitalization in the health sector, consequently, the management of patient information is shifting from paper-based to electronic-based health information management. As a result, hospitals are adopting EMRs/EHRs system, with the attending challenges for HIM professionals. There are serious and genuine doubt on possible lack of data format, data standardization**,** accuracy, consistency, interoperability gaps**,** privacy and security risks by HIM professionals with the use of wearable devices for data collection. This study has identified the need for government to encourage hospitals to adoption EMR/EHRs, the importance for top management support, and involvement of the stakeholders in the adoption of EMR/EHRs process.

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