



## Barriers and facilitators Influencing Nurses' Utilization of the Hospital management information system at Federal Medical Centre, Gusau, Zamfara state, Nigeria

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### Abstract

**Background:** The adoption of Hospital Management Information Systems (HMIS) is critical for improving healthcare quality and patient safety. However, in many Low- and Middle-Income Countries (LMICs), nurses face significant barriers to system use. This study examined the barriers, facilitators, and strategies for improving HMIS utilization among nurses at Federal Medical Centre (FMC), Gusau, Nigeria.

**Methods:** A quantitative, descriptive cross-sectional survey was conducted among 205 registered nurses selected via stratified random sampling. Data were collected using a structured, validated questionnaire based on the Technology Acceptance Model (TAM) and Diffusion of Innovations (DOI) theory. Descriptive statistics frequencies, means, standard deviations were used for analysis.

**Results:** The overall HMIS utilization was suboptimal (mean=3.01/5.0). Severe infrastructural barriers included frequent power outages (mean=3.82) and unreliable internet (mean=3.71). Organizational barriers included inadequate training (mean=3.67), with 61.5% of nurses reporting no formal HMIS training. Although nurses perceived HMIS as useful (mean=3.54), essential facilitators like stable connectivity (mean=2.21) and technical support (mean=2.45) were absent. Nurses strongly endorsed improving power/internet (98.0%), regular training (96.6%), and dedicated technical support (93.7%) as key strategies.

**Conclusion:** HMIS utilization among nurses at FMC Gusau is hindered by interconnected infrastructural, organizational, and individual factors. Positive attitudes toward HMIS exist but are insufficient to overcome systemic deficits. Targeted investments in reliable infrastructure, continuous training, and responsive support systems are urgently required.

**Keywords:** HMIS, Electronic Health Records, Nursing Informatics, Digital Health, Technology Acceptance Model

### Introduction

The advancement of information and communication technologies has transformed global health service delivery. Digital health systems, specifically Hospital Management Information Systems, are central to improving clinical quality and safety (Nascimento *et al.*, 2023) [13]. HMIS are integrated platforms managing administrative and clinical data, including patient registration, nursing documentation, and reporting dashboards (Burgess & Honey, 2022) [8].

Nurses and midwives constitute the largest professional group in the global health workforce, approximately 50% to 59% (Benavente-Rubio, 2022) [5]. Due to their constant presence at the bedside, nurses are the primary users of HMIS for activities such as care coordination and documentation (Kumari & Kumar, 2023) [12]. Their acceptance is pivotal to realizing benefits like reduced errors and improved decision-making (Sulyman *et al.*, 2025) [17].

The adoption of technology by healthcare professionals is frequently analyzed through established behavioral models, such as the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology. The TAM suggests that users' intentions to use technology are primarily influenced by their "perceived usefulness" and "perceived ease-of-use" (Bester *et al.*, 2021) [6]. In a nursing context, if the staff perceives that the system will improve

patient care accuracy and is user-friendly, adoption increases (Bester *et al.*, 2021) [6].

The UTAUT model expands on this by identifying performance expectancy, effort expectancy, and "facilitating conditions" as key predictors of behavioral intention (Irina, 2025; Zhou *et al.*, 2020) [19]. Studies in Ghana and Botswana have confirmed that effort expectancy and performance expectancy significantly predict nurses' intentions to use digital systems (Irina, 2025; Zhou *et al.*, 2020) [19]. Conversely, factors such as "computer anxiety" have been found to have a significant negative effect on nurses' willingness to engage with electronic health records (Irina, 2025). Additionally, social influence and facilitating conditions (such as technical infrastructure) explain a significant variance in how nurses accept and eventually use hospital information management systems (Zhou *et al.*, 2019) [20].

In Nigeria, HMIS adoption is heterogeneous. While some tertiary hospitals have functional digital systems, many rely on paper-based workflows due to contextual barriers like unreliable power supply and poor internet connectivity, particularly in Northern Nigeria (Adedeji *et al.*, 2018; Ojo *et al.*, 2021) [1, 16]. While the benefits of HMIS are well-recognized, a significant gap exists between awareness and actual utilization among nurses in Northern Nigerian tertiary

hospitals like the Federal Medical Centre, Gusau. In Niger State, for instance, research found that while nurses were aware of informatics systems, adoption was low due to perceived negligence by health managers (Umoru & Gwarzo, 2025) [18]. At FMC Gusau, there is a need to identify the specific local barriers—whether they be infrastructural like power, or organizational like training gaps—that prevent nurses from fully utilizing the system for clinical decision support and discharge planning. This study aims to evaluate these factors to provide evidence-based recommendations for hospital administrators and policymakers, ensuring that the transition to digital health at FMC Gusau is both sustainable and effective in improving patient outcomes

A significant gap exists regarding the specific barriers affecting nurses in Northern Nigerian tertiary hospitals. This study aims to fill this gap by examining factors at Federal Medical Centre, Gusau, to generate context-specific evidence for policy.

**Objective:** To identify barriers and facilitators influencing nurses’ utilization of the HMIS at FMC Gusau.

### Methodology

**Study Design and Setting** This study employed a quantitative, descriptive cross-sectional survey design at FMC Gusau, a tertiary referral center in Zamfara State (Khan *et al.*, 2022) [10].

**Population and Sample** The target population was 421 registered nurses. Using the Taro Yamane formula, a sample size of 205 was determined (Umoru & Gwarzo, 2025) [18]. A stratified random sampling technique ensured proportional representation across clinical departments.

**Data Collection and Analysis** Data were collected using a structured, validated questionnaire (Content Validity Index >0.78, Cronbach’s alpha >0.70) (Umoru & Gwarzo, 2025) [18]. Analysis was performed using SPSS version 26. Descriptive statistics (means and standard deviations) were computed to answer the research questions.

### Ethical Considerations

Ethical approval was obtained from the Health Research Ethics Committee of FMC Gusau with reference number NHREC/TR/0053/02/04/2026 [14]. Informed consent and confidentiality maintained throughout the study.

### Results

**Table 1:** Distribution of Respondents by Socio-Demographic and Professional Characteristics (N=205)

Variable	Category	Frequency (f)	Percentage (%)
Age (years)	20–29	48	23.4
	30–39	87	42.4
	40–49	52	25.4
	50 and above	18	8.8
Gender	Male	62	30.2
	Female	143	69.8
Highest Nursing Qualification	RN (Diploma)	89	43.4
	BNSc (Degree)	96	46.8
	Post-Basic Diploma	15	7.3
	MSc/PhD	5	2.4
Years of Experience as a Nurse	Less than 5 years	31	15.1
	5–10 years	78	38.0
	11–15 years	54	26.3
	16–20 years	28	13.7
	Above 20 years	14	6.8
Primary Department/Ward	Medical Ward	38	18.5
	Surgical Ward	32	15.6
	Pediatric Ward	24	11.7
	Maternity	29	14.1
	Emergency (A&E)	27	13.2
	Outpatient (OPD)	22	10.7
	Intensive Care Unit (ICU)	18	8.8
	Theatre	15	7.3
Number of computers-based tasks performed daily	1–5	42	20.5
	6–10	89	43.4
	11–15	51	24.9
	Above 15	23	11.2
Formal HMIS training	Yes	79	38.5
	No	126	61.5

The majority of respondents were aged 30–39 years (42.4%), female (69.8%), and held a BNSc degree (46.8%). Notably, 61.5% of respondents had received no formal HMIS training.

### Barriers to HMIS Utilization

**Table 2:** Mean and Standard Deviation of Barriers to HMIS Utilization (N=205)

Barrier Category and Item	Mean (M)	Standard Deviation (SD)
Individual Barriers		
I find the HMIS complicated to use	3.12	0.78
I feel anxious about making errors when using the HMIS	3.34	0.69

My computer literacy makes using the HMIS difficult	2.98	0.85
Using the HMIS significantly increases my workload	3.41	0.72
I am confident in my ability to find patient information in the HMIS	2.88	0.91
<b>Organizational Barriers</b>		
The initial training I received on the HMIS was inadequate	3.67	0.58
Ongoing professional development for HMIS is insufficient	3.59	0.62
Technical support is not readily available when I encounter a problem	3.48	0.71
There is a lack of encouragement from management to use HMIS consistently	2.85	0.94
I prefer using paper documentation over the HMIS	2.79	0.99
<b>Infrastructural Barriers</b>		
Internet connectivity for the HMIS is slow and unreliable	3.71	0.55
Frequent power outages disrupt my use of the HMIS	3.82	0.48
Available computers or workstations are often faulty	3.55	0.65
There are not enough functional computers for staff to use	3.63	0.60
The HMIS software is outdated or not user-friendly	3.21	0.81

Infrastructural barriers were the most severe, specifically frequent power outages (M=3.82, SD=0.48) and slow internet (M=3.71, SD=0.55). Organizational barriers included inadequate initial training (M=3.67, SD=0.58), while individual barriers were dominated by increased workload perceptions (M=3.41, SD=0.72).

Facilitators and Practices

**Table 3:** Mean and Standard Deviation of Facilitators of HMIS Utilization (N=205)

Facilitator Items	Mean (M)	Standard Deviation (SD)
I perceive the HMIS as useful for patient care	3.54	0.61
I am confident in my ability to use the HMIS effectively	2.91	0.88
The HMIS improves communication among healthcare teams	3.38	0.70
Adequate training was provided for HMIS use	2.32	0.95
Management encourages and supports HMIS use	2.78	0.91
Technical support is always available when needed	2.45	0.92
The HMIS software is user-friendly	2.68	0.87
Internet connectivity is stable most of the time	2.21	0.96
There are enough functional computers for staff use	2.35	0.94
The HMIS helps reduce medication errors	3.47	0.68

While nurses recognized HMIS as useful for care (M=3.54), enabling facilitators were absent, such as stable connectivity (M=2.21) or technical support (M=2.45). The overall utilization score was suboptimal (M=3.01, SD=0.95), with clinical decision support (M=2.38) and discharge planning (M=2.45) being the least utilized functions.

## Discussion

This study reveals that HMIS utilization at FMC Gusau is suboptimal, which mirrors findings in other Nigerian teaching hospitals where up to 80.1% of nurses have reported never using electronic recording systems despite a high willingness to do so (Adedeji *et al.*, 2018)<sup>[1]</sup>.

**Infrastructural and Organizational Barriers:** The severity of power outages and poor internet connectivity aligns with research in Lagos State, where reporting rates in private facilities remained as low as 44% due to such infrastructural gaps (Ohiri *et al.*, 2023)<sup>[15]</sup>. The finding that 61.5% of nurses had no formal training is higher than some previous reports but aligns with studies showing that 86.9% of nurses in certain Nigerian facilities lack the necessary practical on-the-job training for digital health (Adedeji *et al.*, 2018)<sup>[1]</sup>. According to the Technology Acceptance Model, this lack of training directly reduces perceived ease of use and increases technical anxiety (Khan *et al.*, 2022; Sulyman *et al.*, 2025)<sup>[10, 17]</sup>.

**The Paradox of Facilitators:** There is a "value-chasm" where nurses recognize the clinical benefits but lack the infrastructure to act. This suggests that attitudes are positive (84.2% in some settings), but technical challenges like internet breakdown and equipment shortages remain the

"topmost" barriers (Khan *et al.*, 2022; Sulyman *et al.*, 2025)<sup>[10, 17]</sup>.

**Strategies for Improvement:** Comprehensive, system-wide interventions are required, as highlighted by the WHO Global Strategy on Digital Health 2020<sup>[9]</sup>–2025, which emphasizes the need for institutional commitment and capacity-building to overcome impediments in resource-limited settings (Nascimento *et al.*, 2023)<sup>[13]</sup>.

## Conclusion

While nurses at FMC Gusau are willing to adopt digital tools, suboptimal utilization is driven by infrastructure deficits and a lack of formal training. To bridge this gap, management must prioritize consistent power, reliable internet, and structured, ongoing professional development programs to ensure that the HMIS fulfills its potential for enhancing patient care in Northern Nigeria.

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