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Assessment of the Implementation Level of National Health Information System Policy on Data Quality and Information use in Ondo State, Nigeria

Dorcas O. Johnson[1*], Agboola F. Adebayo[2], Ibukun-ola E. Johnson[3], Kayode O. Adepoju[4], Amitabye Luximon-Ramma[5]

[1]*Department of Planning, Research & Statistics, Ondo State Ministry of Health, Akure, Nigeria*

[2]*Ondo State College of Health Technology, Akure, Ondo State, Nigeria*

[3]*Health Centre, Adeyemi Federal University of Education, Ondo, Ondo State, Nigeria*

[4]*Department of Health Information Management, Faculty of Allied Health Sciences, University of Medical Science, Ondo, Ondo State, Nigeria*

[5]*School of Health Sciences, University of Technology, Mauritius, Mauritius*

Abstract

To better understand the practical challenges of health data utilization in resource-limited settings, this study explored key factors affecting the use of the National Health Management Information System (NHMIS) in Ondo State. One of the foundational components of any health system, the Health Management Information System (HMIS), brings together data collection, processing, reporting, and usage. Although low- and middle-income countries (LMICs) have adopted health information systems as part of broader health reforms, they often encounter difficulties in generating high-quality data. A critical issue raised by district-level informants was the limited human capacity to apply analytical tools and methods necessary for converting data into actionable insights, largely due to insufficient training. To investigate this further, twelve (12) key informants were purposively selected based on their central roles in NHMIS data management within Ondo State. This study revealed that there is a Staff Shortage and Work Overload, Limited Training and Capacity Building, Inadequate Motivation and Incentives, Infrastructure and Tool Gaps, Irregular Supervision and Feedback, and Digital Literacy and Use of Technology. A lack of systematic investment in training, supervision, digital tools, and motivation schemes can even render the most well-designed health information systems ineffective in achieving their intended impact. As such, stakeholders must prioritise expanding the HMIS workforce, standardizing training, equipping facilities with necessary tools, strengthening supervision, and integrating a digital health system.

Keywords: *Data Quality, Health Information System, National Health Management Information System, Routine Health Management Information.*

Introduction

As a foundational element of the health system, the Health Management Information System (HMIS) facilitates the integration of data collection, processing, reporting, and utilization. In low- and middle-income countries (LMICs), health information systems are employed as a component of health system reform, though these nations continue to encounter significant challenges in generating high-quality data [1]. Strengthening health systems without ensuring continuous quality improvement is widely considered ineffective. Conversely, focusing exclusively on quality improvement in resource-constrained settings, without leveraging the broader health system, offers limited value. Therefore, simultaneous advancement of both aspects is essential [2].

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****Corresponding Author: dorcasjohnson77@gmail.com***

Implementation research addresses the scientific investigation of how health interventions, encompassing policies, programs, and services, are enacted in real-world contexts within the bounds of existing health systems [3].

An effective and responsive health system is highly dependent on the availability and accurate utilization of timely and reliable data to inform policy and decision-making. In Nigeria, the National Health Management Information System (NHMIS) was established as a centralized mechanism for collecting, reporting, and utilizing health sector data [4]. However, deficiencies in this system compromise evidence-based planning, monitoring, and evaluation, ultimately diminishing the quality of healthcare delivery [5]. The Nigerian government has implemented several initiatives to enhance NHMIS data quality and its application in decision-making processes.

A major concern raised by district-level key informants is the limited human resource capacity to effectively apply analytical tools and methodologies required for interpreting information to support decision-making. This shortfall is largely attributed to inadequate training [6]. Nevertheless, interventions have contributed to improved reporting rates and heightened awareness regarding data usage among frontline health workers [7]. Notably, the implementation of the District Health Information Software 2 (DHIS2) has shown significant promise by facilitating automated reporting, enabling real-time dashboards, and improving overall data accessibility [8]. This platform has been adopted nationwide and incorporated into several vertical programs such as malaria, tuberculosis, and maternal health. However, its effectiveness remains contingent upon user competency, infrastructure availability, and an established data-use culture.

Despite these advancements, challenges persist. These include the absence of a consistent feedback mechanism that informs program implementers about project outcomes, including failures, achievements, and areas requiring improvement [9]. Moreover, there is no unified definition or conceptual clarity regarding the term “RHIS data use,” with past studies often failing to provide explicit definitions. This observation aligns with findings from recent systematic reviews calling for greater clarity and standardization in defining and measuring data utilization [10]. Technical infrastructure limitations, including unreliable internet connectivity and frequent power outages, also pose ongoing barriers [11]. In recent years, global developments, such as the emergence of surveillance systems to address pandemics and tighter monitoring for international health initiatives, have heightened the urgency for HIS reform. However, existing literature tends to address HIS shortcomings in broad terms, with limited in-depth analysis of implementation at the hospital level [12].

Materials and Methods

1. Description of the Site

This study was conducted in Central Senatorial district of Ondo state, one of the 36 states of Nigeria. Ondo State was created on 3rd of February, 1976 from the former Western Region and has a land area of 14,606 km² which represents about 1.66 percent of the total surface area of Nigeria. The State is located in the South Western part of Nigeria. Ondo State has a population of 5,970,448 (projected to 2025 from NPC 2006), of which 2,961,342 (49.6%) are females and 3,009,106 (50.4%) males. The State has its capital situated in Akure and is made up of eighteen (18) Local Government Areas. It is divided into three political zones: Ondo north, Ondo south and Ondo central. The administration is organized at state and local area levels of government. Figure 1 shows the Map of Ondo State.

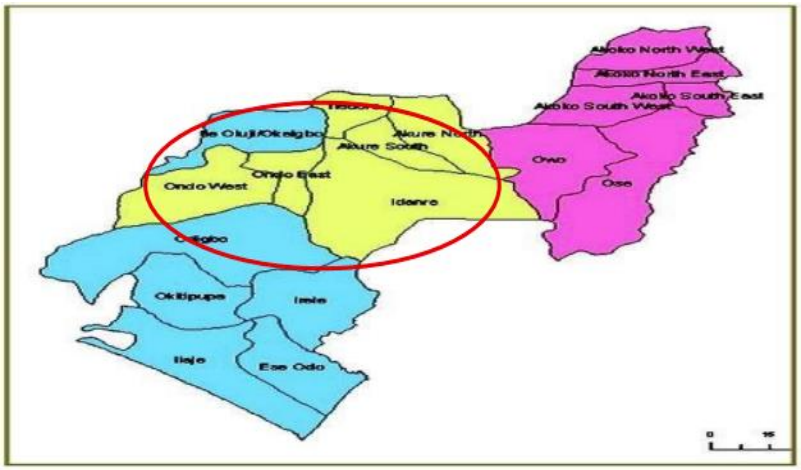

Figure 1. Ondo State Map

2. Description of the Experiments done

Twelve (12) key informants were purposely selected due to the peculiarity of their roles in NHMIS data management in Ondo State as follows: 1 private secondary health facilities that are identified yet to comply and 1 non-compliant with NHMIS monthly summary data submission. 1 Private Primary Health facility involved in monthly data validation, 1 public primary health facilities participating in NHMIS monthly data submission, The M&E officers of the 6 LGAs in the central senatorial district, Officer in charge of State NHMIS at the Ministry of Health.

3. Description of statistical methods used.

The thematic analysis was conducted on the qualitative data that was jointly collected from the Health Management Information System (HMIS) Officers at the six LGAs of the Central Senatorial District of Ondo State using the Key Informant Interviews (KIIs) and aligned with the six-step methodology of thematic analysis recommendations by Braun and Clarke (2006). The selection of this approach was based on its flexibility in identification, analysis, and reporting of patterns (themes) in qualitative data. This was followed by the analysis process that commenced with familiarization whereby transcripts of interviews were read severally to help have a comprehensive perspective of the data. Subsequently, first codes were developed manually through the identification of key statements connected to the focus of research facts that impact on the usage of National Health Management Information System (NHMIS) information. These codes were sort into larger categories, which later were analyzed to come up with early themes.

After an iterative check and reflection, the themes were developed and designated to describe the possible recurrent patterns over the dataset. These include: 1. Shortage of staff and overload of work 2. Weak Training and Capacity Building 3. Poor Motivation and rewards 4. Infrastructure and Tools Gap 5. Spotty Supervision and Feedback 6. Digital Literacy and Technology usage

A thematic matrix (see Table 1) was also created which focused on the transformation of raw data excerpts into codes, categories and into final themes. It also involved inductive analysis to some degree, where you let thematic patterns to surface out of data rather than being limited by a coding framework. Nevertheless reflections were also reflected against the conceptual frameworks, namely WHO PRISM framework, and Technology Acceptance Model (TAM), that were utilised as guiding conceptual frameworks. In order to make the analysis more trustworthy, peer review of codes and literature triangulation was used. Appropriate quotations were reaped to support major findings and the themes were given a discussion in relationship with the available empirical studies.

Table 1. Thematic Coding for Objective 3: Factors Influencing the Usage of NHMIS Data

Raw Data Excerpt (from KII)	Initial Code	Category	Final Theme
"We have only four HMIS officers… just three people I know."	Staff shortage	Human resource constraints	1. Staff Shortage and Work Overload
"Most of the people handling registers now are not trained HMIS personnel."	Lack of trained staff	Inadequate workforce	1. Staff Shortage and Work Overload
"Only the HMIS in Basic Health Fund facilities are trained. Others are not."	Unequal training access	Capacity-building gaps	2. Limited Training and Capacity Building
"They just give small money for transport to validation, not real incentive."	Lack of motivation	Low staff morale	3. Inadequate Motivation and Incentives
"We are short of all general outpatient registers… using hardcover notebooks."	Improvised tools	Tool unavailability	4. Infrastructure and Tool Gaps
"We go once in a month, but that's not enough."	Infrequent supervision	Weak oversight	5. Irregular Supervision and Feedback
"Only one laptop in our whole LGA. The rest use manual registers."	Lack of digital tools	Technology barriers	6. Digital Literacy and Use of Technology
"We have network issues, so we go to nearby communities to upload."	Connectivity problems	Infrastructure limitation	4. Infrastructure and Tool Gaps
"We organize validation, then make corrections and share feedback."	Data validation sessions	Existing coordination mechanism	5. Irregular Supervision and Feedback
"Training was last done 2–3 years ago."	Outdated training schedule	Capacity-building gap	2. Limited Training and Capacity Building
"The motivation is just moral support; no money, no reward."	Lack of incentives	Staff disengagement	3. Inadequate Motivation and Incentives
"DHIS2 is used only by LGA officers; facilities don't have access."	Limited DHIS2 access	Uneven technology use	6. Digital Literacy and Use of Technology

Results and Discussion

This section focuses on identifying the factors influencing the use of National Health Management Information System (NHMIS) data at the health facility level within Ondo State's Central Senatorial District. The analysis draws on insights gathered from Key Informant Interviews (KIIs) held with Health Management Information System (HMIS)

Officers across the six local government areas (LGAs) in the district. The findings are interpreted in light of relevant literature and conceptual frameworks.

Shortage of Staff and Overloads at Work

The limited trained staff in the facilities is one of the most vivid factors that influence NHMIS data utilization. A majority of LGAs indicated that there are insufficient HMIS officers to serve very many health facilities. That is, three or four officers had to maintain more than 30 health centers in some instances, and both cannot see to it that there is sufficient data management. In settings lacking HMIS officers, community health officers or pharmacy technicians (as untrained staff) were to collect and enter data. This can cause multitasking, inaccuracy in documenting data, and slow reporting. The results align with [13] and [14] who highlighted the fact that the lack of human resources and low competencies of staff have a negative influence on the working of routine health information systems (RHIS). These studies emphasize the importance of the availability and competency of human resource that facilitates the effective use of health data. A study in Nigeria by [15] found that health facilities with trained HMIS officers had significantly higher data completeness and timeliness compared to those without ($p < 0.01$).

It was reported that training of HMIS officers was uneven and occasionally offered. The regular training of health workers on the use of tools and the DHIS2 platform was only provided in the facilities with donor-funded programs, including Basic Health Care Provision Fund (BHCPF). Conversely, several frontline health workers in non-BHCPF facilities had depended on informal and on-the-job training that was not comprehensive and consistent. The results are consistent with the literature that states that regular and systematic capacity-building programs are essential in enhancing the quality and use of data. [16] observe that health workers with no access to the training required have a lower chance of making use of routine data. For example, a study by [17] found that structured training improved data utilization practices by 37.5%, with a statistically significant association ($p = 0.002$). Training is also an important input to improve data demand and use in health systems as indicated by the WHO PRISM framework.

Lack of financial or other gifts to motivate health workers to participate in data management is also a major factor that determines the use of NHMIS data. The analysis established that most facilities do offer little transport allowances or photocopying money, but there exists no systematic motivation program. The fact that it is not recognized and rewarded thus is a factor towards poor staff morale and decreased dedication towards proper and efficient data reporting. This observation aligns with the findings by [18, 19] who pointed out that the quality and use of health data improves when staff members are motivated using incentives based on their performance. A study by [20] revealed that incentivized workers were 45% more likely to complete data reports accurately and on time than non-incentivized ones ($p < 0.05$). Without these incentives, health workers can tend to forego documentation of data in favour of clinical work, compromising the performance of NHMIS as a whole.

Another crucial element influencing NHMIS data use is the availability of data collection tools in the form of registers, form summaries, laptops, and the internet. In the majority of LGAs, the availability of basic tools in health facilities was reported to be lacking and so tools were improvised by the use of hardcover notebooks and hand-made registers. Although such initiatives will guarantee data recording, it creates a lot of inconsistencies, gaps, and issues of validation. Also, inadequate power supply and poor internet connectivity also suppress the prompt data entry especially in rural facilities. These infrastructural drawbacks coincide with

[21] study, where the authors stressed the importance of stable infrastructure that could help to maintain standard health-data operations. [22] also emphasized the fact that the tools and equipment shortage have profound limitations on the effectiveness of health information systems in Nigeria.

The supportive process of supervision and feedback was also reported to be inconsistent. Although monthly validation meetings in LGAs were organized in some, the quality and frequency of supervision was quite different among the facilities. A considerable number of the respondents indicated that the performance of their staff would be boosted by more visits by supervisors and that such visits would also lead to the collection of quality data. This result aligns with the WHO PRISM framework, which underscores supportive supervision as a reimbursement towards data quality and use. [23] indicated that frequent performance appraisals, cautions, and supervisions of employees also helped enhance data management practices in Botswana. Evidence from [5] found that consistent supervisory visits increased data use by 28% in facilities receiving monthly feedback compared to those without ($p < 0.01$). In the absence of such mechanisms, the errors and problems with data quality might not be observed and corrected over long intervals.

Lastly, the researchers identified that most data entry and analysis using digital tools was limited to LGA-level HMIS officers, and a few donor-funded facilities. Primary health centers are still stuck with manual, paper-based systems. This inability to access technology, combined with a low digital literacy, will limit the capacity of health workers to use NHMIS platforms effectively, like DHIS2. This is highly reflected in the technology acceptance model (TAM) used in this study and this explains that the acceptance of technology has a lot to do with the perceived usefulness and ease of use. In cases where employees do not have the equal access to computers or do not train on the digital platforms, they are less confident of NHMIS data use. [24] also claim that data quality and information use rely on a digital infrastructure and skills. A Nigerian study by [25, 26] found that digital literacy training significantly improved HMIS engagement scores (mean difference = 1.7, $p < 0.001$) among frontline health workers.

There are multifaceted human, infrastructural, and systemic factors that determine the use of NHMIS data at the health facility level in Ondo State. These are personnel shortages, the insufficiency of training, the absence of motivation, the absence of tools and infrastructure, ineffective supervision, and poor digital access. These challenges will be critical to overcome through directed investment in workforce training, means and equipment provision, and frequent training and incentive systems to enhance the use and decision-making of data in the health sector.

Conclusion

Finally, despite the indications that the HMIS structure in the Central Senatorial District of Ondo State is improving, especially in terms of computerization and validation, there are still significant issues to consider. It will be necessary to find a solution to these issues in an integrated approach that involves more staffing, specific and periodical training, better supply chain management, regular provision of data collection tools, greater supervision, better involvement in the private sector, and regular partner involvement. It is only after that the full potential of HMIS can be utilized in making efficient health systems and proper decision-making at all levels of care.

Recommendation and Suggestion for Further Studies

In order to make the most of the opportunities presented by the HMIS within the Central Senatorial District of Ondo state, it was recommended that a multi-pronged approach should be implemented with primary focus on recruitment of sufficient staff, targeted and

periodic training of existing staff as well as reinforcement of the supply chain systems to guarantee steady supply of data collection tools. This ought to be supplemented by increased supervision and monitoring, participation of private healthcare providers and continued partnership with development partners. This would integrate closely the various activities to not only improve the gap but would also enhance the functionality of HMIS resulting in timely, accurate, and evidence-based decision making at all levels of healthcare delivery.

In future studies, researchers should examine how the effectiveness and sustainability of HMIS in the Central Senatorial District of Ondo State, depends on the long-term effects of targeted measures, like staff capacity building, provision of effective supply chain mechanisms, engagement of the private sector, and so on. Comparative research among those districts that differ in the level of HMIS development may shed light on context effects on system efficiency. Also, a study comparing both the quantitative aspects of improved data quality and users of the locating system patients and policy-makers would assist in defining viable options to improve use of the systems and lead to effective policy changes in states and nationwide.

Ethical Approval

Ethical approval for the study was obtained from the Ondo State Health Research Ethics Committee with the Protocol number: OSHREC/24/03/2025/831. Informed consent was obtained from research participants before proceeding with the interviews. Privacy and confidentiality were maintained throughout the period of the study.

Conflict of Interest

There is no conflict of interest as it relates to the Study. The researchers have no financial, commercial, legal, or professional relationship with the organizations used for the study.

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