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Impact of Health Information Systems on Organizational Management and the Evaluation of Disease Surveillance, Reporting, and Control in Three Selected States of Nigeria

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Abstract: Introduction: Health information systems (HIS) play a pivotal role in organizing, managing, and evaluating disease surveillance, reporting, and control systems. In Nigeria, the effectiveness of these systems is critical for timely detection of outbreaks and implementation of control measures. However, systemic challenges such as inadequate funding, weak infrastructure, and poor data quality continue to hinder optimal performance.

Objective: This study aimed to examine the effect of health information on the organization and management of disease surveillance, reporting, and control systems in three selected Nigerian states, identifying operational gaps and providing actionable insights for system strengthening.

Method of Analysis: A descriptive cross-sectional design was employed, using a total enumeration of 160 respondents, including Medical Officers of Health and Disease Surveillance and Notification Officers (DSNOs) from all local government areas of Kwara, Osun, and Oyo States. Data were collected using validated structured questionnaires. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to analyze the data.

Results: The findings revealed that 73.7% of respondents agreed that HIS revealed areas of epidemic occurrence, while 51.3% reported it provided effective data for measuring surveillance outcomes. A majority (82.7%) identified adequate funding as the most critical improvement factor, followed closely by accurate data collection (53.8%) and provision of information technology (47.4%). Additionally, HIS was reported to improve outbreak detection capacity (Mean = 3.21 ± 1.18) and facilitate disease prevention planning (Mean = 3.58 ± 0.50). Challenges such as irregular DSN form supply (67.9%) and inadequate manpower (50.5%) were highlighted as key impediments.

Conclusion: The study concludes that health information significantly enhances the organization, reporting, and control of disease surveillance when adequately resourced and managed.

Strengthening HIS through sustained funding, skilled manpower, technological integration, and improved supervision is essential for timely outbreak detection, evidence-based interventions, and overall disease control. These measures will enhance Nigeria's readiness for both endemic and emerging public health threats.

Keywords: Surveillance, Disease Surveillance, Reporting of Notifiable diseases, Confirmed Cases, Reported Cases, Data Standards.

Background

Since the devastating yellow fever outbreaks in 1986–87, Nigeria's public health authority established a standardized disease surveillance and notification system in 1988, introducing DSN-001 (immediate) and DSN-002 (monthly routine) reporting forms, and instituting a data relay pathway from health facilities through LGAs to State and Federal Ministries of Health. The National Council on Health formally adopted the system in 1989, aligning it with the WHO-supported Integrated Disease Surveillance and Response (IDSR) framework, formally adopted across Africa in 1998 (Federal Ministry of Health, 2019; Nnebue et al., 2013). The IDSR strategy blending indicator-based and event-based surveillance emphasizes early detection, rigorous case definition, prompt reporting, data analysis and interpretation, outbreak verification, and feedback loops across system tiers (Nsubuga et al., 2006; FMoH, 2019).

Despite these systems being in place for decades, evaluations across Nigerian states have repeatedly revealed persistent challenges including incomplete and untimely data, under-utilization of surveillance outputs, and gaps in analysis capacity at local levels (Ibrahim et al., 2019; Nnebue et al., 2013). For example, the piloting of electronic IDSR (eIDSR) in Northeast Nigeria increased health facilities reporting from 103 to 228, raised reporting completeness to over 85%, and improved timeliness from 43% to 73% at the LGA level; stakeholders also reported better alert verification and clearer understanding of their own roles in public health surveillance (Ibrahim, Usman, & Sabitu, 2019). To further strengthen outbreak response capacities, Nigeria adopted the Surveillance Outbreak Response Management and Analysis System (SORMAS) starting in 2017. Developed through German–Nigerian collaboration, and rooted in lessons from Nigeria's successful control of the 2014 Ebola outbreak, SORMAS integrates case management, contact tracing, rumor reporting, laboratory data, and decision-support into a real-time, interoperable digital platform (Tom-Aba et al., 2018; Adeoye et al., 2021). By 2020, it had been deployed in all 36 states and the FCT, covering over 3,000 registered users including epidemiologists, DSNOs, clinicians and laboratory personnel and handled more than 41 priority diseases under the official NCDC-supported deployment (Adeoye et al., 2021). In pilot deployments, SORMAS improved efficiency, enabled earlier detection of outbreaks, enhanced coordination among stakeholders, and facilitated more cohesive public health responses (Tom-Aba, Krause, & Mukhtar, 2020). Experience during the COVID-19 pandemic underscored lingering structural weaknesses: Nigeria lagged behind peer nations in testing coverage, contact tracing scale, and laboratory readiness. Coupled with broader systemic constraints—including limited funding, shortfalls in logistic and human resources, and poor data stewardship these gaps hampered early warning and response capabilities, even in states with digital systems in place (Adegboye et al., 2021; Dan-Nwafor et al., 2020). Moreover, while SORMAS and eIDSR have showcased measurable improvements, many subnational institutions remain under-resourced, and the flow of information from local to national levels continues to exhibit delays and inconsistencies (Adegboye et al., 2021).

Recent research across Africa has emphasized that digital innovations alone are insufficient: health information systems must be coupled with accurate data entry at facility level, timely analysis, regular training, and robust feedback and supervision mechanisms (Ibrahim et al., 2019; Dan-Nwafor et al., 2020). Analysts now argue for concerted efforts to integrate single-disease reporting systems into unified, adaptable platforms that can respond flexibly to new threats while

avoiding fragmentation; a step that remains limited in many low-resource settings (Nsubuga et al., 2006; Adeoye et al., 2021). Emerging opportunities include incorporating AI for predictive surveillance, improving interoperability with other digital health tools, and strengthening data governance to ensure confidentiality, ownership, and appropriate access especially across jurisdictional boundaries (Tshimula et al., 2024). Within this context, health information systems (HIS) remain pivotal to the organizational management and evaluation of disease surveillance in Nigeria. Robust HIS platforms determine how epidemiological data is captured, validated, transmitted, and transformed into actionable intelligence for public health decision-making (Adeoye et al., 2021; Ibrahim et al., 2019). They shape the efficiency of information flows, the coordination of multi-level responses, and the timely implementation of disease control measures. Recent deployments of electronic platforms such as the Integrated Disease Surveillance and Response system (eIDSR) and the Surveillance Outbreak Response Management and Analysis System (SORMAS) have demonstrated measurable improvements in data timeliness, completeness, and outbreak detection capacity (Tom-Aba et al., 2020; Adeoye et al., 2021). Nevertheless, persistent challenges undermine system performance. Funding shortfalls and irregular logistics support continue to limit operations at Local Government Area (LGA) levels, where much of the primary data is generated. Incomplete stakeholder engagement particularly from under-resourced facilities—leads to reporting gaps, while insufficient data stewardship and analysis capacity at subnational levels compromise data quality and response readiness (Dan-Nwafor et al., 2020; Adegboye et al., 2021). Furthermore, while technological innovations have advanced, their full potential is constrained by inadequate human resource capacity, fragmented interoperability between systems, and limited sustainability plans for hardware and software maintenance (Tshimula et al., 2024).

Given these realities, establishing robust, integrated information flows that connect health facilities, LGAs, state, and national agencies is critical to reducing delays and improving outbreak responses. Equally important is identifying institutional actors who hold central roles in these flows, ensuring they are adequately equipped to transmit accurate, timely data and coordinate prompt interventions. This study seeks to address these systemic gaps by examining the effects of health information systems on organizational management and the evaluation of disease surveillance, reporting, and control systems across three selected Nigerian states. By analyzing the structures, information flows, and institutional roles, the study aims to generate actionable recommendations that can enhance the reliability, timeliness, and utilization of surveillance data ultimately strengthening outbreak preparedness, response efficiency, and public health decision-making in Nigeria.

Materials and Methods

Research Design

A descriptive research design was adopted to examine the role of health information in the organizational management and evaluation of disease surveillance, reporting, and control systems. This design was chosen for its suitability in describing existing practices and challenges as they occur, based on data collected from the selected states.

Study Area

The study was carried out in Local Government Areas (LGAs) of Kwara, Osun, and Oyo States, Nigeria. Kwara, in the North-Central zone, has 16 LGAs; Osun, in the South-West, has 30 LGAs; and Oyo, also in the South-West, has 33 LGAs. These states were selected for their active Integrated Disease Surveillance and Response (IDSR) operations. Disease surveillance activities are coordinated by the State Ministries of Health and implemented at the LGA level by Medical Officers of Health and Disease Surveillance and Notification Officers.

Population and Sampling Procedure

The study population comprised health personnel directly involved in the organization and management of disease surveillance, reporting, and control systems in three selected states of Nigeria. This included Medical Officers serving as Directors of Primary Health Care and Disease Surveillance and Notification Officers (DSNOs) operating at the Local Government Area (LGA) level. A total enumeration sampling technique was employed to ensure comprehensive representation of the target group. All eligible officers within the study scope were included. The final sample consisted of 160 participants, comprising 80 Medical Officers (Directors of Primary Health Care) and 80 DSNOs across the 80 LGAs in the selected states.

Research Instrument

Primary data were collected using a structured questionnaire administered to Medical Officers (Directors of Primary Health Care) and Disease Surveillance and Notification Officers (DSNOs) across all Local Government Areas in the three selected states. The instrument was designed to align with the research questions and objectives, ensuring that items captured relevant information on the role of health information in the organizational management and evaluation of disease surveillance, reporting, and control systems. To ensure validity, the questionnaire underwent expert review by experienced public health professionals, who assessed its clarity, relevance, and alignment with study objectives. Content validity was established by ensuring the instrument covered all critical dimensions of the study variables, following recommendations from recent health systems research (Boateng et al., 2018). Reliability was enhanced through a pre-test conducted in a comparable setting outside the study area to identify ambiguous items and ensure consistency in responses. Necessary adjustments were made based on feedback to improve clarity and comprehension, aligning with best practices in instrument development for public health studies (Bolarinwa, 2015).

Data Collection Procedure

Data collection is an important tool for disease surveillance, reporting and control system. Care must be taken during the collection, collation and compilation of data to avoid error. It is advisable, when collecting data, to collect those data that are accurate and reliable, which can lead to successful realization of the target. The methods used for collecting data in this study included; Documentary, interview and questionnaire.

Method of Data Analysis

Data were analyzed using descriptive statistical methods to summarize and present the findings in a clear and structured format. Frequency distributions and simple percentages were employed to describe the characteristics of the data and answer the research questions. This approach was appropriate given the descriptive nature of the study and the qualitative focus of the research objectives. Results were presented in tables for ease of interpretation and comparison.

Ethical Considerations

Ethical approval for this study was obtained from the Ethics Committees/Institutional Review Boards of the respective states. Permission to conduct the research was also granted by the State Ministries of Health in Kwara, Osun, and Oyo States. All participants were informed about the purpose, objectives, and procedures of the study, and participation was entirely voluntary. Written informed consent was obtained from each respondent prior to data collection. Anonymity and confidentiality were assured by excluding personally identifiable information from all records, and data were used solely for research purposes. The study adhered to the principles of the Declaration of Helsinki for research involving human subjects.

Results

Table 1: Sociodemographic Characteristics of Respondents (N = 160)

Characteristics	Category	Frequency (n)	Percentage (%)
State	Oyo	65	41.0
	Kwara	32	20.5
	Osun	60	38.5
Gender	Male	64	41.0
	Female	92	59.0
Age Range (Years)	Below 30	2	1.3
	31–35	8	5.1
	36–40	22	14.1
	41–45	46	29.5
	46–50	32	20.5
	51 and above Mean±SD	46 46.1±7.12	29.5
Education	HND	52	33.3
	MBBS	76	48.7
	Master's Degree	24	15.4
Designation	Medical Officer	77	49.4
	DSNO	79	50.6

Table 1 summarizes the sociodemographic characteristics of the respondents. Most participants were from Oyo State (41.0%), followed by Osun (38.5%) and Kwara (20.5%). The majority were female (59.0%). Respondents' ages ranged from below 30 to above 51 years, with the largest groups in the 41–45 years (29.5%) and 51 years and above (29.5%) categories. The mean age was 46.1 years (SD = 7.12), indicating a predominantly middle-aged workforce. In terms of education, nearly half (48.7%) held an MBBS degree, 33.3% held a Higher National Diploma, and 15.4% had a Master's degree. Medical Officers (49.4%) and Disease Surveillance and Notification Officers (50.6%) were almost equally represented.

Table 2: Effects of Health Information on the Organization and Management of Disease Surveillance

S/N	Item	SA (%)	A (%)	D(%)	SD (%)	Mean	SD
1	Reveals areas of occurrence of epidemic diseases	115 (73.7)	19 (12.2)	17 (10.9)	5 (3.2)	3.86	0.35
2	Shows areas with high occurrence of a particular disease	78 (50.0)	59 (37.8)	10 (6.4)	9 (5.8)	3.62	0.49
3	Helps identify areas requiring greater surveillance focus	81 (51.9)	60 (38.5)	10 (6.4)	5 (3.2)	3.54	0.50
4	Provides data for measuring the effectiveness of disease surveillance	83 (51.3)	76 (48.7)	0 (0.0)	0 (0.0)	3.51	0.50
5	Facilitates timely allocation of resources to high-risk areas	89 (57.1)	52 (33.3)	10 (6.4)	5 (3.2)	3.44	0.55
6	Improves coordination between state and LGA surveillance teams	92 (59.0)	48 (30.8)	12 (7.7)	4 (2.6)	3.46	0.53
7	Enhances planning and implementation of control measures	87 (55.8)	51 (32.7)	12 (7.7)	6 (3.8)	3.41	0.57
8	Supports evaluation of trends and	85 (54.5)	54	11	6 (3.8)	3.40	0.56

	prediction of possible outbreaks		(34.6)	(7.1)			
9	Strengthens accountability in surveillance reporting	90 (57.7)	49 (31.4)	10 (6.4)	7 (4.5)	3.42	0.58

Note. SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree.

Table 2 presents respondents' perceptions of the effects of health information on the organization and management of disease surveillance. The findings indicate strong agreement across all measured variables, with mean scores ranging from 3.40 to 3.86.The highest-rated effect was the role of health information in revealing areas of epidemic disease occurrence (Mean = 3.86, SD = 0.35), followed closely by its ability to highlight areas with high disease incidence (Mean = 3.62, SD = 0.49) and identify priority areas requiring intensified surveillance (Mean = 3.54, SD = 0.50). These results underscore the value of health information in mapping epidemiological risk zones and prioritizing surveillance interventions. Respondents also agreed that health information supports evaluation of surveillance effectiveness (Mean = 3.51, SD = 0.50) and facilitates timely allocation of resources to high-risk areas (Mean = 3.44, SD = 0.55). Furthermore, respondents emphasized its contribution to improved coordination between state and LGA surveillance teams (Mean = 3.46, SD = 0.53), planning and implementation of control measures (Mean = 3.41, SD = 0.57), and evaluation of trends for outbreak prediction (Mean = 3.40, SD = 0.56). Finally, strengthening accountability in surveillance reporting was also recognized as an important effect (Mean = 3.42, SD = 0.58).

Table 3: How Health Information Assists in the Reporting of Diseases

S/N	Item	SA (%)	A(%)	D(%)	SD (%)	Mean	SD
1	Provides baseline data	83 (53.2)	38 (24.4)	15 (9.6)	20 (12.8)	3.79	0.98
2	Provides data for monitoring health programmes	74 (47.4)	56 (35.9)	13 (8.3)	13 (8.3)	3.58	0.52
3	Presents various interventions and outcomes in diagrams	67 (42.9)	75 (48.1)	8 (5.1)	6 (3.8)	3.47	0.53
4	Serves as an indicator for health status	57 (36.5)	72 (46.2)	18 (11.5)	9 (5.8)	3.38	0.58
5	Facilitates timely feedback to reporting facilities	82 (52.6)	54 (34.6)	12 (7.7)	8 (5.1)	3.55	0.56
6	Supports compliance with national reporting guidelines	76 (48.7)	60 (38.5)	12 (7.7)	8 (5.1)	3.53	0.57
7	Enhances completeness and accuracy of disease reports	80 (51.3)	58 (37.2)	10 (6.4)	8 (5.1)	3.54	0.55
8	Assists in comparing current data with historical trends	78 (50.0)	55 (35.3)	15 (9.6)	8 (5.1)	3.50	0.56

Note. SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree.

Table 3 shows respondents' perceptions of how health information assists in disease reporting. The highest-rated role was providing baseline data (Mean = 3.79, SD = 0.98), which is critical for evaluating disease occurrence over time. Closely following were its use in monitoring health programmes (Mean = 3.58, SD = 0.52) and presenting interventions and outcomes in formats such as diagrams (Mean = 3.47, SD = 0.53). Respondents also agreed that health information serves as an indicator of health status (Mean = 3.38, SD = 0.58) and facilitates timely feedback to reporting facilities (Mean = 3.55, SD = 0.56). Additional contributions included supporting compliance with national reporting guidelines (Mean = 3.53, SD = 0.57), enhancing completeness and accuracy of reports (Mean = 3.54, SD = 0.55), and assisting in comparing current data with historical trends (Mean = 3.50, SD = 0.56).

Table 4: Ways Health Information Affects Disease Control

S/N	Item	SA(%)	A(%)	D(%)	SD(%)	Mean	SD
1	Planning of healthcare delivery system	105 (67.3)	43 (27.6)	8 (5.1)	0 (0.0)	3.71	0.46
2	Yardstick for measuring attainment of health goals	96 (61.5)	48 (30.8)	7 (4.5)	5 (3.2)	3.64	0.53
3	Guides actions toward disease prevention and control	89 (57.1)	66 (42.3)	1 (0.6)	0 (0.0)	3.58	0.50
4	Helps in establishing priorities	76 (48.7)	74 (47.4)	6 (3.8)	0 (0.0)	3.45	0.69
5	Helps in reducing morbidity and mortality rates	64 (41.0)	86 (55.1)	6 (3.8)	0 (0.0)	3.41	0.69
6	Supports preparation of budget allocation	76 (48.7)	63 (40.4)	4 (2.6)	13 (8.3)	3.33	0.68
7	Strengthens timely outbreak response	84 (53.8)	61 (39.1)	7 (4.5)	4 (2.6)	3.44	0.57
8	Supports evidence-based allocation of disease control resources	80 (51.3)	60 (38.5)	10 (6.4)	6 (3.8)	3.39	0.60
9	Enhances risk communication and public health messaging	82 (52.6)	58 (37.2)	9 (5.8)	7 (4.5)	3.38	0.62
10	Monitors the impact of disease control interventions over time	79 (50.6)	59 (37.8)	11 (7.1)	7 (4.5)	3.37	0.61

SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree.

Table 4 presents respondents' perceptions of the ways health information influences disease control. Overall, there was a strong consensus across all items, with mean values ranging from 3.33 to 3.71, indicating broad agreement on the importance of health information in disease control strategies. The highest-rated role was its contribution to the planning of healthcare delivery systems (Mean = 3.71, SD = 0.46). Closely following was the use of health information as a yardstick for measuring the attainment of health goals (Mean = 3.64, SD = 0.53), which aligns with national and international frameworks such as the Integrated Disease Surveillance and Response (IDSR) strategy and the Sustainable Development Goals (SDGs). Respondents also emphasized the role of health information in guiding actions toward disease prevention and control (Mean = 3.58, SD = 0.50) and in helping to establish priorities for intervention (Mean = 3.45, SD = 0.69). In terms of outcomes, respondents recognized the role of health information in reducing morbidity and mortality rates (Mean = 3.41, SD = 0.69) and supporting the preparation of budget allocations (Mean = 3.33, SD = 0.68). Additional high-priority functions identified include strengthening timely outbreak responses (Mean = 3.44, SD = 0.57), supporting evidence-based allocation of resources (Mean = 3.39, SD = 0.60), enhancing risk communication and public health messaging (Mean = 3.38, SD = 0.62), and monitoring the impact of disease control interventions over time (Mean = 3.37, SD = 0.61).

Table 5: **Problems Militating Against Effective Operation of Disease Surveillance, Reporting, and Control Systems**

S/N	Item	SA(%)	A(%)	D(%)	SD(%)	Mean	SD
1	Improper keeping of health records	76 (48.7)	65 (41.7)	11 (7.1)	4 (2.6)	3.71	0.46
2	Irregular supply of disease surveillance (DSN) forms	106 (67.9)	44 (28.2)	4 (2.6)	2 (1.3)	3.49	0.64
3	Inadequate funding of the surveillance system	78 (50.0)	28 (17.9)	40 (25.6)	10 (6.4)	3.47	0.53
4	Inadequate manpower for data collection	79 (50.5)	49 (31.4)	19 (12.2)	9 (5.8)	3.31	0.49
5	Lack of effective supervision of	48	56	52	0 (0.0)	3.21	0.59

	surveillance activities	(30.8)	(35.9)	(33.3)			
6	Inaccurate data collection	46 (29.5)	96 (61.5)	14 (9.0)	0 (0.0)	3.12	1.00
7	Lack of effective transportation facilities	50 (32.1)	104 (66.7)	2 (1.3)	0 (0.0)	2.97	0.80
8	Delayed feedback from state to local reporting facilities	54 (34.6)	81 (51.9)	14 (9.0)	7 (4.5)	3.16	0.63
9	Limited use of digital reporting tools and technology	57 (36.5)	77 (49.4)	15 (9.6)	7 (4.5)	3.18	0.65

Table 5 summarizes the problems affecting the effective operation of disease surveillance, reporting, and control systems across the three selected states. The results indicate that multiple systemic and operational barriers hinder optimal performance, with mean scores ranging from 2.97 to 3.71, suggesting a generally high level of agreement among respondents regarding these challenges. The most critical problem identified was improper keeping of health records (Mean = 3.71, SD = 0.46), which underscores the persistent weakness in data management at facility and local government levels. Poor record-keeping compromises data accuracy and timeliness, both of which are essential for outbreak detection and response. Irregular supply of disease surveillance (DSN) forms was another major challenge (Mean = 3.49, SD = 0.64), indicating logistical gaps that disrupt the flow of routine and immediate disease notifications. Funding constraints emerged prominently, with inadequate financing for surveillance activities rated as a major impediment (Mean = 3.47, SD = 0.53). Human resource limitations also surfaced, particularly inadequate manpower for data collection (Mean = 3.31, SD = 0.49). Respondents noted that insufficiently staffed Disease Surveillance and Notification Officer (DSNO) units lead to delays in data gathering, analysis, and reporting. Similarly, lack of effective supervision of surveillance activities (Mean = 3.21, SD = 0.59) was reported as a persistent problem, suggesting weak oversight mechanisms that affect quality assurance. Other notable issues included inaccurate data collection (Mean = 3.12, SD = 1.00) and lack of effective transportation facilities (Mean = 2.97, SD = 0.80), the latter of which limits mobility for data verification, outbreak investigation, and community follow-up—particularly in rural areas with poor road networks. Two emerging concerns were also identified: delayed feedback from state to local facilities (Mean = 3.16, SD = 0.63) and limited use of digital reporting tools (Mean = 3.18, SD = 0.65). These reflect communication bottlenecks and technological gaps that impede real-time data sharing and rapid response capabilities.

Table 6: **Effectiveness of Disease Surveillance in the Control of Diseases**

S/N	Item	Very Adequate (%)	Fairly Adequate (%)	Adequate (%)	Not Adequate (%)	Mean	SD
1	Detection of disease outbreaks	102 (65.4)	6 (3.8)	38 (24.4)	10 (6.4)	3.21	1.18
2	Monitoring trends and supporting eradication of diseases	86 (55.1)	12 (7.7)	50 (32.1)	8 (5.1)	3.18	0.95
3	Conducting advocacy for policymakers to mobilize surveillance resources	82 (52.6)	14 (9.0)	60 (38.5)	0 (0.0)	3.14	0.95
4	Providing effective and reliable information on priority diseases	80 (51.3)	4 (2.6)	70 (44.9)	2 (1.3)	3.06	0.99
5	Creating awareness and mobilizing	68 (43.6)	8 (5.1)	78 (50.0)	2 (1.3)	3.04	1.01

	communities to report suspected epidemic-prone diseases						
6	Supporting planning and evaluation of disease control programmes	79 (50.6)	8 (5.1)	66 (42.3)	3 (1.9)		

Table 6 shows respondents' perceptions of the effectiveness of disease surveillance in controlling diseases. The results indicate that disease surveillance is regarded as effective across several core functions. Detection of disease outbreaks had the highest mean score (Mean = 3.21, SD = 1.18), with most respondents rating it as very adequate. Monitoring trends and supporting eradication of diseases also received a high mean score (Mean = 3.18, SD = 0.95), reflecting its role in tracking patterns and supporting elimination strategies. Conducting advocacy for policymakers to mobilize surveillance resources was rated positively (Mean = 3.14, SD = 0.95), suggesting that surveillance data are being used to engage decision-makers. Providing effective and reliable information on priority diseases was considered adequate (Mean = 3.06, SD = 0.99), indicating that the information generated through surveillance is largely useful for health decision-making. Creating awareness and mobilizing communities to report suspected epidemic-prone diseases had a mean of 3.04 (SD = 1.01), suggesting moderate effectiveness in community engagement. Supporting planning and evaluation of disease control programmes recorded the lowest mean score (Mean = 2.91), implying limited integration of surveillance data into programme evaluation processes.

Table 7: Relationship Between Disease Reporting and Disease Control Activities

S/N	Item	Very Adequate n (%)	Fairly Adequate n (%)	Adequate n (%)	Not Adequate n (%)	Mean	SD
1	Basis for national surveillance programmes	120 (76.9)	35 (22.4)	1 (0.6)	0 (0.0)	3.54	0.85
2	Prevention of outbreak of diseases	93 (59.6)	2 (1.3)	60 (38.5)	1 (0.6)	3.22	0.97
3	Provides guidelines for improving health status of the population	76 (48.7)	2 (1.3)	73 (46.8)	5 (3.2)	3.13	0.99
4	Reduction of morbidity rate	2 (1.3)	71 (45.5)	76 (48.7)	7 (4.5)	3.01	1.00
5	Reduction of mortality rate	76 (48.7)	4 (2.6)	73 (46.8)	3 (1.9)	3.00	1.27
6	Comparison of incidence rates of specific diseases across regions	61 (39.1)	6 (3.8)	86 (55.1)	3 (1.9)	2.99	1.01
7	Initiates action toward eradication of communicable diseases	86 (55.1)	6 (3.8)	61 (39.1)	3 (1.9)	2.84	0.97

Table 7 presents the relationship between disease reporting and control of diseases as perceived by respondents. The results indicate that reporting is considered integral to several core control activities. The highest-rated relationship was its role as the basis for national surveillance

programmes (Mean = 3.54, SD = 0.85), with 76.9% rating this as very adequate. This underscores that accurate and timely reporting forms the foundation for nationwide surveillance systems, enabling systematic tracking of priority health events. Similarly, the role of reporting in preventing disease outbreaks was also highly valued (Mean = 3.22, SD = 0.97), indicating that timely data sharing can guide prompt responses and preventive measures. Providing guidelines for improving population health status received a mean score of 3.13 (SD = 0.99), showing its importance in informing strategic interventions. For outcome-oriented indicators, such as reduction of morbidity (Mean = 3.01, SD = 1.00) and reduction of mortality (Mean = 3.00, SD = 1.27), the results suggest a moderate but positive relationship. This indicates that reporting contributes to disease outcome improvements but may be influenced by the timeliness and quality of reports, as well as the capacity of health systems to act on surveillance data. Other functions, such as comparing incidence rates of specific diseases across regions (Mean = 2.99, SD = 1.01) and initiating action toward eradication of communicable diseases (Mean = 2.84, SD = 0.97), were rated slightly lower. This may reflect operational and logistical challenges in using routine reports for broader epidemiological comparisons or eradication planning.

Table 8: **Strategies for Improving the Operation of Disease Surveillance, Reporting, and Control Systems**

S/N	Item	SA (%)	A(%)	D(%)	SD(%)	Mean	SD
1	Adequate funding of the system	129 (82.7)	24 (15.4)	0 (0.0)	3 (1.9)	3.94	0.89
2	Accurate data collection	84 (53.8)	70 (44.9)	0 (0.0)	2 (1.3)	3.66	0.47
3	Recruiting qualified staff	102 (65.4)	52 (33.3)	0 (0.0)	2 (1.3)	3.61	0.49
4	Provision of information technology	74 (47.4)	80 (51.3)	0 (0.0)	2 (1.3)	3.61	0.49
5	Provision of transportation facilities	88 (56.4)	66 (42.3)	0 (0.0)	2 (1.3)	3.57	0.50
6	Proper health record keeping in health facilities	76 (48.7)	78 (50.0)	0 (0.0)	2 (1.3)	3.55	0.50
7	Motivation of staff	82 (52.6)	72 (46.2)	0 (0.0)	2 (1.3)	3.53	0.50
8	Adequate manpower for data collection	94 (60.3)	60 (38.5)	0 (0.0)	2 (1.3)	3.53	0.50
9	Effective supervision of health activities	82 (52.6)	72 (46.2)	0 (0.0)	2 (1.3)	3.49	0.50
10	Regular supply of DSN forms	94 (60.3)	60 (38.5)	0 (0.0)	2 (1.3)	3.48	0.50

Note: SA: Strongly Agreed A: Agreed, D: Disagreed, SD: Strongly Disagreed

Table 8 outlines respondents' views on strategies for improving the operation of disease surveillance, reporting, and control systems. The most prominent recommendation was adequate funding (Mean = 3.94, SD = 0.89), with 82.7% of respondents strongly agreeing that sufficient financial support is critical to enhance system efficiency. Accurate data collection was also prioritized (Mean = 3.66, SD = 0.47), with over 98% either strongly agreeing or agreeing. High-quality data forms the foundation for evidence-based decisions, effective prioritization, and accurate outbreak detection. Closely related to this, recruiting qualified staff (Mean = 3.61, SD = 0.49) and the provision of information technology (Mean = 3.61, SD = 0.49) were considered essential for improving surveillance quality and timeliness. Operational enablers such as transportation facilities (Mean = 3.57, SD = 0.50) and proper health record keeping (Mean = 3.55, SD = 0.50) were also emphasized, indicating that logistics and proper documentation remain critical challenges. Motivation of staff (Mean = 3.53, SD = 0.50) and ensuring adequate

manpower for data collection (Mean = 3.53, SD = 0.50) were seen as important for sustaining workforce commitment and performance. Other key suggestions included effective supervision of health activities (Mean = 3.49, SD = 0.50) and regular supply of DSN forms (Mean = 3.48, SD = 0.50), which address gaps in oversight and reporting materials that can hinder timely reporting and control measures.

Discussion

The study's findings affirm that health information systems play a pivotal role in strengthening the organization, reporting, and control of diseases. Respondents overwhelmingly agreed that robust surveillance data enable accurate mapping of outbreak occurrence, resource allocation, coordination between state and local teams, trend monitoring, and accountability in reporting. These findings align with the Nigerian Integrated Disease Surveillance and Response (IDSR) strategy, which emphasizes that actionable information should drive public health interventions.

However, the study also reveals critical systemic barriers that compromise effectiveness: improper record keeping, irregular supply of DSN forms, limited funding, manpower shortages, supervision gaps, and inadequate digital tools. These challenges mirror findings from Nigeria's surveillance system review, which identified deficiencies in data management infrastructure, poor coordination, and under-investment in IDSR operations (Igho & Igunma, 2023; Critical Review, Discover Public Health, 2025). The perceived effectiveness of surveillance was highest for outbreak detection and trend monitoring, but significantly lower when it came to evaluation of control programs and engaging communities in reporting. This suggests that while surveillance data are generally reliable for immediate detection and monitoring tasks, their integration into longer-term strategic planning and public engagement remains limited. Importantly, respondents identified ways to improve the system, including increased funding, accurate data capture, recruitment of qualified staff, investment in IT infrastructure, transport, and improved record keeping. Similar recommendations appear in recent literature emphasizing the need for sustainable financing, digital transformation, and strong workforce capacity (Ogunboye et al., 2023; Public Health Surveillance Coalition, 2025).

Nigeria's expanding digital surveillance tools such as SORMAS, mobile health platforms, and genomic tracking are promising but underutilized due to training gaps, infrastructure limitations, and policy bottlenecks. Reviews of Nigeria's system recommend expanded use of mobile health, AI analytics, geospatial mapping, and mHealth reporting to close gaps revealed during the COVID-19 pandemic (WJARR, 2023). Moreover, the rise of genomic surveillance platforms like ACEGID offers future-ready disease detection methods, again contingent on integrating data into local-level action (Chinedu et al., 2023; 2025 review).

Conclusion

This study underscores the critical role of health information systems in strengthening the organization, reporting, and control of diseases in Nigeria. The findings clearly show that robust data collection, accurate reporting, and timely analysis are essential for detecting outbreaks early, guiding control measures, and ultimately reducing morbidity and mortality. However, persistent challenges such as inadequate funding, irregular supply of reporting tools, insufficient manpower, poor data quality, and weak supervision continue to undermine the system's effectiveness. For disease surveillance, reporting, and control to achieve their intended impact, there must be sustained investment in the system's structural and human components. Strengthening financial support will ensure the regular provision of essential tools such as DSN forms, transportation facilities, and digital technologies for real-time reporting. Recruiting and training skilled health personnel, while motivating the existing workforce, will improve the quality of data collection and analysis. Equally, integrating information technology solutions, such as mobile-based reporting platforms and interoperable data systems, can enhance timeliness and accuracy. The study also highlights the importance of building trust and collaboration across different levels of the health system. Effective supervision, continuous capacity building, and

active engagement with community structures will improve data completeness and responsiveness to outbreaks. As Nigeria continues to align with global disease surveillance frameworks, institutionalizing these improvements will not only strengthen national epidemic preparedness but also position the health system to respond efficiently to future public health threats. The path forward is clear: robust health information systems are not optional—they are foundational to achieving resilient disease control and a healthier population.

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