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Research Article

The Role of Health Policy in Enhancing Health Security: A Case Study of Nigeria's National Action Plan for Health Security (NAPHS)

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Abstract

Health security remains a critical concern in global public health, particularly in low- and middle-income countries facing recurrent infectious disease outbreaks. National health security plans provide the policy architecture for translating international commitments into domestic preparedness capacities, yet their operational effectiveness depends on stakeholder awareness, financing, coordination and subnational implementation. This study examines the role of health policy in enhancing health security in Nigeria, using the National Action Plan for Health Security (NAPHS) as a case study. Specifically, it assesses stakeholders' awareness of NAPHS, perceived relevance of the policy framework, implementation effectiveness, perceived improvements in health security domains, barriers to implementation and recommendations for strengthening Nigeria's preparedness system. A quantitative cross-sectional survey design supported by documentary policy analysis was adopted. Data were collected from 380 purposively selected stakeholders using a structured questionnaire covering institutional profile, familiarity with NAPHS, perceived relevance, implementation effectiveness, preparedness improvements, funding adequacy, inter-agency coordination, One Health awareness, training exposure, barriers and recommendations. Descriptive statistics, cross-tabulations, chi-square tests of independence and Cramér's V were used for analysis. NAPHS was widely recognised as relevant (90.3%) and strategically aligned with national and international frameworks (81.1% and 80.8%, respectively). However, only 9.2% rated implementation as very effective, while 60.3% rated it moderately effective. Familiarity was strongly concentrated at the federal level (92.4%) compared with state (44.2%) and community/facility levels (15.8%). The strongest improvements were observed in disease surveillance (69.2%) and laboratory capacity (67.1%), whereas funding mobilisation (15.0%), workforce training (26.0%) and inter-agency coordination (26.8%) were the weakest domains. Inadequate funding (84.7%) and weak coordination (76.1%) were the most frequently reported barriers. While NAPHS provides a strong policy foundation for health security in Nigeria, its operational impact depends on sustainable domestic financing, decentralised implementation, strengthened coordination, workforce development and improved subnational awareness. The study contributes evidence-based recommendations for strengthening national preparedness planning in resource-constrained settings.

Keywords

Health Security, Health Policy, National Action Plan for Health Security, Health Regulations, Stakeholder Perception

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1. Introduction

Health security has become a major concern in global public health because infectious disease outbreaks, zoonotic spillovers, antimicrobial resistance, climate-related emergencies and other public health threats can rapidly disrupt health systems, economies and social stability [1-4]. The experiences of Ebola virus disease in West Africa, COVID-19 and recurrent epidemic-prone diseases across sub-Saharan Africa have shown that public health emergencies are not only biomedical events but also governance, policy and security challenges [5-7]. Therefore, strengthening national preparedness requires coherent health policy, sustainable financing, functional institutions, trained human resources, multisectoral coordination, effective surveillance and strong laboratory systems [8-10]. The International Health Regulations (IHR 2005) provide the main global legal framework for strengthening countries' capacities to prevent, detect, assess, notify and respond to public health risks of international concern [11]. Under the IHR framework, countries are expected to build core capacities in surveillance, laboratory confirmation, emergency preparedness, risk communication, response coordination and points of entry [11, 12]. However, the effectiveness of IHR implementation depends largely on domestic policy ownership, institutional capacity, political commitment and the ability to translate assessment findings into funded and measurable actions [13-15]. The National Action Plan for Health Security (NAPHS) was developed as a country-owned, multi-year, multisectoral and all-hazards planning framework for accelerating the implementation of IHR core capacities [16]. The NAPHS approach is based on whole-of-government, whole-of-society and One Health principles, recognising that health threats often emerge at the intersection of human, animal and environmental systems [16-18]. As a policy instrument, NAPHS helps countries identify health security gaps, prioritise interventions, cost activities, assign implementation responsibilities, mobilise resources and monitor progress [16, 19]. Nigeria provides an important case for examining the role of health policy in enhancing health security. As Africa's most populous country, Nigeria faces a complex risk environment shaped by high population mobility, recurrent infectious disease outbreaks, urbanisation, climate-sensitive disease patterns, porous borders and a federal governance structure that requires coordination across federal, state and local government levels [20-22]. The country has experienced repeated outbreaks of Lassa fever, cholera, meningitis, yellow fever, mpox and other epidemic-prone diseases, making preparedness and response capacity a continuing national priority [21, 23]. Nigeria's National Action Plan for Health Security 2018-2022 was developed to address gaps identified through the Joint External Evaluation and related assessments [20, 24]. The plan integrated existing national workplans and strategic priorities, including disease surveillance, emergency preparedness, antimicrobial resistance, immunisation, risk communication and laboratory strengthening [20]. The establishment of the Nigeria Centre for Disease Control and Prevention through the NCDC Establishment Act 2018 further strengthened the legal and institutional basis for disease surveillance, outbreak response and public health emergency coordination in Nigeria [25]. Despite these policy developments, implementation gaps remain. Nigeria's health security system continues to face challenges related to inadequate domestic financing, weak inter-agency coordination, uneven state-level implementation, limited workforce capacity, weak data systems and dependence on donor-supported programmes [24, 26, 27]. These challenges are important because the existence of a national plan does not automatically guarantee operational preparedness unless the plan is adequately financed, decentralised, implemented and monitored [13, 15, 28]. Although previous policy documents and technical reports have described the design and objectives of Nigeria's NAPHS, limited empirical attention has been given to stakeholders' perceptions of its implementation and contribution to health security preparedness. Understanding stakeholder perceptions is important because policy implementation depends on awareness, institutional ownership, coordination, resource mobilisation and frontline engagement [14, 29]. Stakeholder views can therefore reveal whether NAPHS is functioning as a practical implementation framework or merely as a strategic policy document.

This study examines the role of health policy in enhancing health security in Nigeria, using NAPHS as a case study. Specifically, the study assesses stakeholders' awareness of NAPHS, perceived relevance of the policy framework, perceived implementation effectiveness, perceived improvements in health security domains, barriers to implementation and recommendations for strengthening Nigeria's preparedness system. By combining survey evidence with policy analysis, the study contributes to the literature on health security governance, IHR implementation and national preparedness planning in low- and middle-income settings.

The conceptual logic of the study is that health policy enhances health security when it provides a clear strategic framework, mobilises resources, strengthens implementation mechanisms and produces measurable improvements in preparedness outcomes. In this study, NAPHS is conceptualised as a policy instrument linking global and national health security commitments to practical implementation mechanisms such as financing, surveillance, laboratory capacity, emergency response, workforce training, One Health coordination, risk communication, monitoring and evaluation.

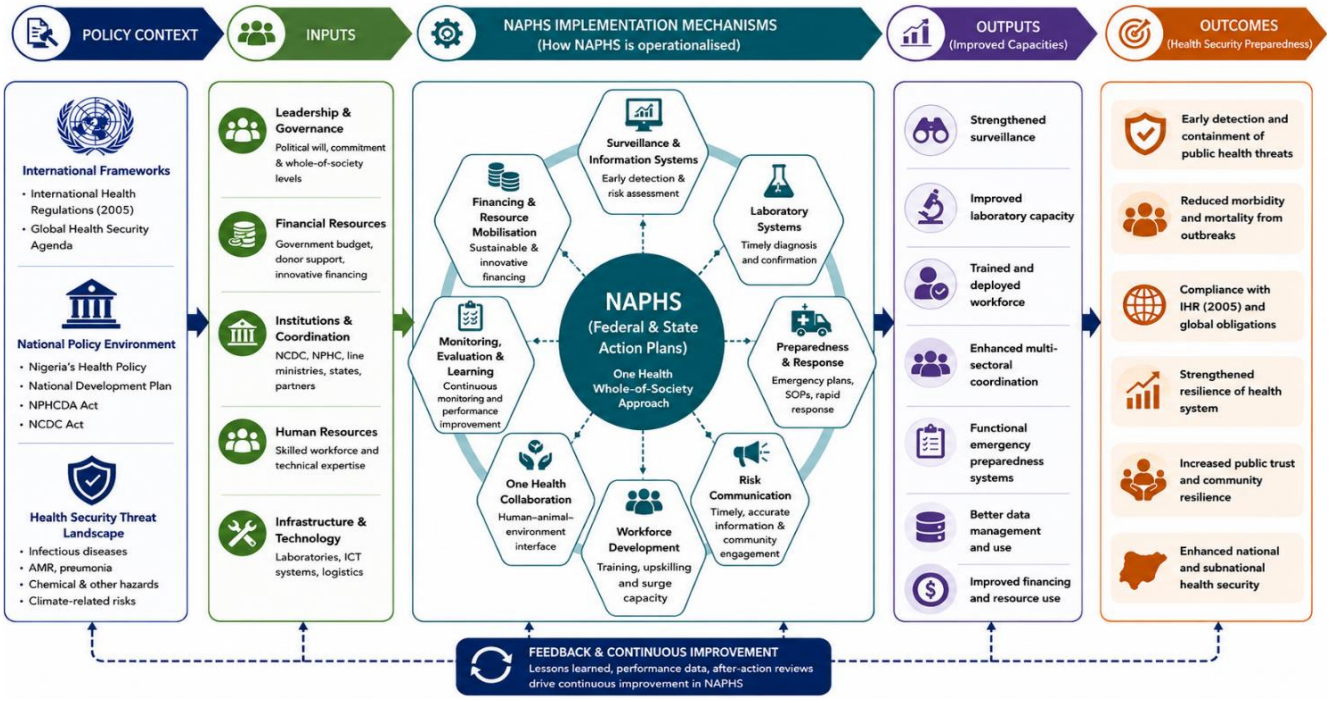


Figure 1. *Conceptual framework showing the role of NAPHS in enhancing health security preparedness in Nigeria.*

2. Literature Review

2.1. Health Security and Health Policy

Health security refers to the capacity of countries and health systems to prevent, detect, assess, report and respond to public health threats that may endanger populations or spread across borders [1, 11]. The concept has expanded from a narrow focus on infectious disease control to a broader concern with antimicrobial resistance, zoonotic diseases, climate-related health risks, chemical hazards, emergency preparedness and health-system resilience [2-4]. This expansion reflects the growing recognition that public health emergencies can produce social, economic and political consequences beyond the health sector [5, 6]. Health policy is central to health security because preparedness requires organised public action. Health policy defines mandates, sets priorities, allocates resources, establishes institutions and creates accountability mechanisms [8, 13]. Without clear policy direction, health security activities may become fragmented across institutions and sectors. This is particularly important in low- and middle-income countries, where health systems may face limited financing, workforce shortages, infrastructure gaps and weak information systems [9, 10]. Studies on health-system resilience show that countries respond better to health emergencies when routine health systems are strong, adaptive and well coordinated [8, 9]. Kruk et al. argued that resilient health systems must be able to prepare for, absorb and learn from shocks while maintaining essential services [8]. Hanefeld et al. similarly emphasised governance, financing, information systems and workforce capacity as important components of resilience [9]. These arguments suggest that health security should not be treated as an isolated emergency agenda but as part of broader health-system strengthening.

2.2. International Health Regulations and Global Health Security Governance

The International Health Regulations provide the legal foundation for global health security by requiring countries to develop capacities for surveillance, notification, preparedness, response and risk communication [11]. The IHR framework recognises that public health threats can spread rapidly through travel, trade, migration and ecological change; therefore, national preparedness contributes to regional and global security [11, 12]. However, the implementation of IHR core capacities has remained uneven across countries. Kandel et al. found wide variation in health security capacities across 182 countries, showing that many countries still had gaps in preparedness and response capacity [13]. Oppenheim et al. also noted that preparedness indices may identify broad capacity gaps but may not fully capture whether health systems can function effectively during real emergencies [14]. These findings show that preparedness requires more than formal compliance; it requires functional systems, financing and operational readiness. The Joint External Evaluation was developed as part of the IHR Monitoring and Evaluation Framework to assess country capacities across technical areas such as sur-

veillance, laboratories, emergency preparedness, risk communication, antimicrobial resistance, zoonotic diseases and points of entry [12, 24]. However, assessment alone is not sufficient. Countries require implementation plans that translate JEE findings into clear activities, budgets and accountability structures. This is the purpose of the NAPHS framework [16].

2.3. National Action Plan for Health Security

NAPHS is a policy and planning instrument designed to help countries strengthen IHR core capacities through a multisectoral and all-hazards approach [16]. It is intended to convert assessment findings into costed and prioritised actions that can guide implementation, resource mobilisation and monitoring [16, 19]. Unlike general health-sector plans, NAPHS focuses specifically on capacities required to prevent, detect and respond to health security threats. The literature identifies NAPHS as important for three main reasons. First, it provides a strategic roadmap for addressing health security gaps identified through JEE, after-action reviews and simulation exercises [16, 24]. Second, it supports multisectoral coordination by bringing together human health, animal health, environmental health, finance, transport, security, agriculture and other sectors [17, 18]. Third, it supports accountability by identifying priorities, responsible institutions, timelines and funding needs [19, 28]. Nevertheless, the effectiveness of NAPHS depends on implementation. A plan may be well designed but remain weak if it is not linked to domestic budgets, legal mandates, trained personnel and subnational implementation structures [13, 15, 28]. This makes the Nigerian case important because it shows how a national health security plan operates within a federal governance system where health responsibilities are shared across federal, state and local levels.

2.4. Nigeria's Health Security Context

Nigeria faces a complex health security environment due to its large population, high mobility, recurrent disease outbreaks, ecological diversity and federal governance structure [20-23]. Repeated outbreaks of Lassa fever, cholera, meningitis, yellow fever and mpox have demonstrated the need for strong surveillance, laboratory capacity, risk communication and emergency preparedness systems [21, 23]. Nigeria's position in West Africa also makes its preparedness important for regional health security. Nigeria's NAPHS 2018-2022 was developed to address health security gaps identified through national assessments, including the Joint External Evaluation [20, 24]. The plan consolidated several existing strategies and workplans, including disease surveillance, antimicrobial resistance, immunisation, emergency preparedness and laboratory strengthening [20]. This integration was important because fragmented planning can create duplication, weak accountability and inefficient resource use. The Nigeria Centre for Disease Control and Prevention plays a central role in the country's health security system. The NCDC Establishment Act 2018 provides the legal basis for disease surveillance, outbreak detection, investigation, prevention and control of public health threats in Nigeria [25]. National public health institutes are widely recognised as important institutional anchors for health security because they coordinate surveillance, laboratory systems, emergency operations and technical response [26, 27].

2.5. One Health and Multisectoral Coordination

One Health is a major principle in health security because many public health threats emerge from interactions among humans, animals and the environment [17, 18]. Zinsstag et al. described One Health as an integrated approach to human, animal and ecosystem health [17]. Mackenzie and Jeggo argued that One Health is essential for managing zoonotic diseases, antimicrobial resistance and other complex health threats that cannot be addressed by the health sector alone [18]. Nigeria's health security context makes One Health especially relevant. Zoonotic diseases, antimicrobial resistance, food safety risks and environmental health threats require collaboration among public health authorities, veterinary services, agriculture, environment, laboratories and community systems [17, 18, 30]. However, effective One Health implementation requires more than policy statements. It requires joint planning, shared surveillance, interoperable data systems, coordinated response mechanisms and sustainable financing [18, 30]. Weak inter-agency coordination remains a common challenge in health security governance. Different ministries and agencies often operate with separate mandates, budgets and reporting systems [15, 28]. In Nigeria, these coordination challenges are further complicated by the need to align federal, state and local government structures. Therefore, effective NAPHS implementation requires strong horizontal coordination across sectors and vertical coordination across levels of government.

2.6. Surveillance, Laboratory Systems and Workforce Capacity

Surveillance is a core pillar of health security because early detection determines how quickly threats can be investigated and contained [31]. Effective surveillance requires timely reporting, data analysis, feedback, community participation and trained personnel. Weak surveillance systems can delay outbreak detection and increase the risk of wider transmission [31, 32]. Laboratory systems are also central to preparedness because suspected public health events require rapid and accurate confirmation [32]. The West African Ebola epidemic showed that delays in laboratory confirmation and weak diagnostic systems can worsen outbreak spread [5, 6]. For Nigeria, laboratory strengthening and specimen referral systems are therefore essential for improving outbreak detection and response. Workforce capacity is

another important determinant of health security. Preparedness depends on trained epidemiologists, laboratory scientists, clinicians, veterinarians, risk communication officers, emergency managers and community health workers [26, 31]. Field epidemiology and public health emergency operations require skilled personnel who can be rapidly deployed during outbreaks. In federal systems, workforce capacity must also be distributed across subnational levels rather than concentrated only at the national level.

2.7. Financing and Implementation Barriers

Sustainable financing is one of the most important requirements for health security. Preparedness investments often follow a cycle of "panic and neglect," where funding increases during crises but declines when outbreaks subside [7, 19]. This pattern weakens long-term preparedness because surveillance, laboratories, emergency operations centres and workforce development require continuous investment. In many low- and middle-income countries, health security activities depend heavily on donor support [19, 28]. While external support can strengthen capacity, overdependence on donors may reduce sustainability if domestic financing is weak. Bell and Nuzzo argued that preparedness measurement should be linked to financing and accountability if countries are to improve real-world capacity [19]. This is relevant to Nigeria because NAPHS implementation requires predictable funding at both federal and state levels. Implementation barriers also include weak political commitment, poor data systems, limited infrastructure, workforce shortages and weak monitoring and evaluation [13-15, 28]. These barriers can prevent national plans from producing measurable preparedness outcomes. Therefore, NAPHS implementation must be supported by domestic financing, strong coordination, state-level operational plans and regular monitoring.

2.8. Health Security, Universal Health Coverage and System Resilience

Recent literature argues that health security and universal health coverage should be linked rather than treated as separate agendas [10, 33]. Lal et al. argued that COVID-19 exposed the risks of fragmented health systems and showed the need to align health security with universal health coverage [10]. Wenham et al. also argued that global health security and universal health coverage should function as a strategic partnership [33]. This argument is relevant to Nigeria because emergency preparedness depends on the strength of routine health services. Public health threats are often first detected at community or primary health care level. If local health facilities lack trained staff, diagnostic capacity, communication systems and public trust, national preparedness will remain weak. Therefore, NAPHS should be integrated with primary health care strengthening, workforce development, health information systems and universal health coverage.

2.9. Empirical Gap

Existing literature and policy documents provide important evidence on the design, objectives and technical requirements of NAPHS [16, 20, 24]. However, there is limited empirical evidence on how stakeholders perceive NAPHS implementation in Nigeria. This gap is important because policy implementation depends on awareness, ownership, coordination and participation among relevant actors [14, 29]. This study addresses the gap by examining stakeholder awareness of NAPHS, perceived implementation effectiveness, perceived improvements in health security domains, barriers to implementation and recommendations for strengthening the policy. The study contributes to health security literature by linking national health policy planning with empirical evidence on implementation challenges in Nigeria.

3. Materials and Methods

3.1. Study Design

This study adopted a quantitative cross-sectional survey design supported by documentary policy analysis. The cross-sectional design was appropriate because the study examined stakeholders' awareness, perceptions and assessment of Nigeria's National Action Plan for Health Security (NAPHS) at a specific point in time. The documentary component was used to provide policy context by reviewing relevant health security documents, including the International Health Regulations, WHO NAPHS guidance, Nigeria's NAPHS 2018-2022, the NCDC Establishment Act and Nigeria's Joint External Evaluation materials [11, 16, 20, 23, 25].

3.2. Study Setting

The study was conducted within the context of Nigeria's health security system. Nigeria was selected because of its recurrent exposure to epidemic-prone diseases and public health emergencies, including Lassa fever, cholera, meningitis, yellow fever, mpox and other infectious disease threats [21, 23]. The study focused on institutions and stakeholders involved in health security policy, disease surveillance, emergency preparedness, laboratory systems, risk communication, One Health coordination, monitoring and evaluation, and public health programme implementation.

3.3. Study Population

The study population comprised stakeholders involved in Nigeria's health security planning and implementation. These included respondents from federal ministries and agencies, state ministries of health, international partner organisations,

non-governmental organisations, primary health care structures and community-level implementation settings. These categories were considered relevant because NAPHS implementation requires coordination across national, subnational, partner and frontline health system levels.

3.4. Sample Size and Sampling Technique

Data were collected from 380 respondents. A purposive sampling technique was used to select respondents with relevant knowledge of NAPHS, health security policy, disease surveillance, outbreak preparedness or public health emergency response. This sampling approach was considered appropriate because NAPHS is a specialised policy framework, and the study required responses from individuals with direct or indirect knowledge of health security planning and implementation in Nigeria.

3.5. Data Collection Instrument

Data were collected using a structured questionnaire developed in line with the objectives of the study and the major domains of health security policy. The questionnaire contained categorical, binary and Likert-scale items. It covered respondents' institutional profile, familiarity with NAPHS, perceived relevance of NAPHS, policy alignment, implementation effectiveness, perceived improvement in health security domains, funding adequacy, inter-agency coordination, One Health awareness, NAPHS-related training, implementation barriers and policy recommendations. The Likert-scale items were measured on a five-point scale, where 1 represented the lowest level of agreement or assessment and 5 represented the highest level. Binary response items were used to identify barriers and recommendations, while categorical items were used to capture organisation type, work level, years of experience and direct involvement in NAPHS-related activities.

3.6. Variables and Measurement

The main outcome variable was perceived improvement in health security preparedness under NAPHS. This was measured through respondents' assessment of improvements in disease surveillance, laboratory capacity, emergency response, risk communication, community engagement, digital/data systems, monitoring and evaluation, inter-agency coordination, workforce training, and funding/resource mobilisation. The explanatory variables included respondents' familiarity with NAPHS, direct involvement in NAPHS-related activities, institutional affiliation, work level, years of experience, perceived relevance of NAPHS, policy alignment, funding adequacy, coordination effectiveness, One Health awareness and exposure to NAPHS-related training. Implementation barriers were measured using binary responses. The barriers assessed included inadequate funding, weak inter-agency coordination, inadequate workforce capacity, overdependence on donor funding, limited political commitment, weak state/local implementation, poor infrastructure and poor data management. Policy recommendations were also measured using binary response options.

3.7. Data Sources

The study used both primary and secondary data. Primary data were collected from 380 respondents using the structured questionnaire. Secondary data were obtained through documentary review of relevant official and scholarly sources, including the International Health Regulations, WHO NAPHS guidance, Nigeria's NAPHS 2018-2022, the NCDC Establishment Act, Nigeria's Joint External Evaluation report and related health security literature [11, 16, 20, 23, 25].

3.8. Validity and Reliability

Content validity was ensured by aligning the questionnaire items with the major domains of NAPHS and health security preparedness. These domains included governance, surveillance, laboratory capacity, emergency preparedness, risk communication, workforce development, financing, One Health coordination, monitoring and evaluation, and subnational implementation [16, 20, 23]. Reliability was supported through the use of standardised response options, consistent coding and clearly defined variable categories. Where applicable, internal consistency of related Likert-scale items should be assessed using Cronbach's alpha. A Cronbach's alpha value of 0.70 or above is generally considered acceptable for health policy and social science research.

3.9. Data Analysis

Data were analysed using descriptive and inferential statistical methods. Descriptive statistics, including frequencies and percentages, were used to summarise respondents' background characteristics, NAPHS awareness, perceived relevance, policy alignment, implementation effectiveness, perceived improvement in health security domains, implementation barriers and policy recommendations. Cross-tabulations were used to examine differences in responses across work level, institutional category, NAPHS familiarity and direct involvement in NAPHS-related activities. Chi-square tests of independence were used to test associations between categorical variables. Cramér's V was used to determine the strength of statistically significant associations. Statistical significance was assessed at the 5% level.

Results were presented using Tables and Figures. Figures were used to provide visual summaries of key findings, including familiarity with NAPHS, perceived improvement in health security domains, work-level differences in NAPHS familiarity, implementation barriers and stakeholder recommendations.

3.10. Ethical Considerations

Ethical approval for the study was obtained from the Health Research and Ethics Review Committee, Bingham University Teaching Hospital, Jos, Plateau State. The approval number was not stated in the available thesis document. Respondents were informed about the purpose of the study, and participation was entirely voluntary. Informed consent was obtained from all participants before data collection, and respondents were informed of their right to decline participation or withdraw from the study at any stage without penalty. To ensure privacy and confidentiality, all responses were anonymised and coded before analysis. No personal identifiers, names, job titles or institutional details that could reveal respondents' identities were included in the analysis or final report. The collected data were handled confidentially, stored securely and used strictly for research purposes. Findings were reported in aggregate form to ensure that no individual respondent or institution could be identified.

4. Results

4.1. Respondents' Background Characteristics

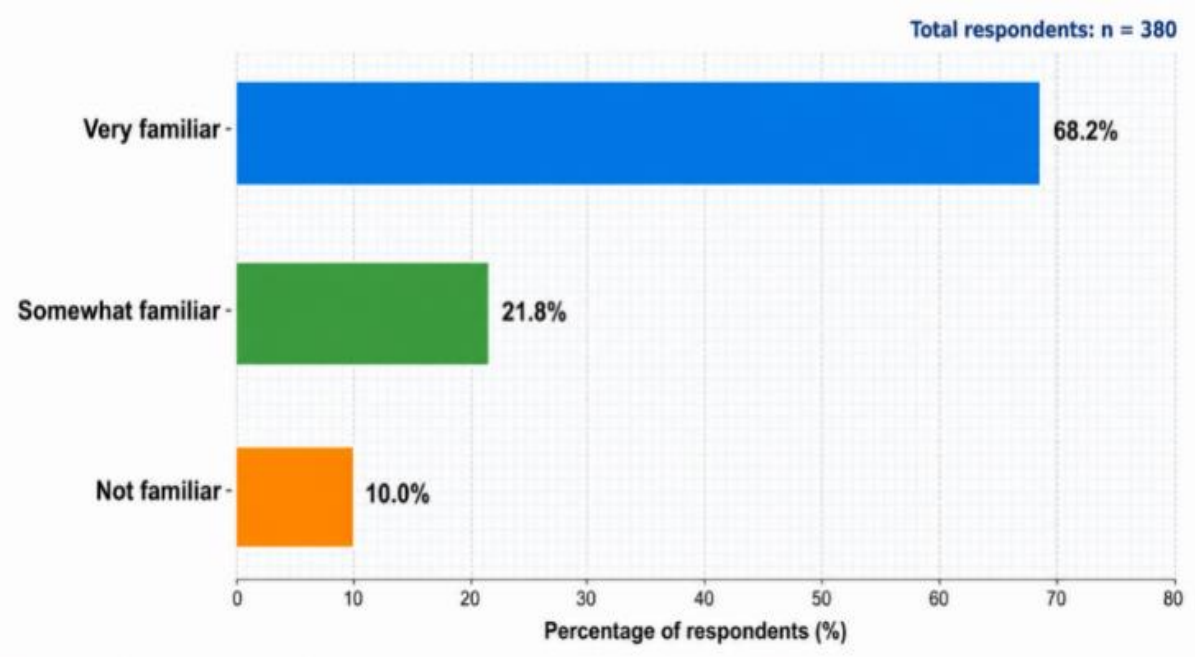
A total of 380 respondents were analysed. Federal ministries/agencies constituted the largest institutional group, representing 45.0% of the sample. State ministries of health accounted for 25.0%, while international partners/NGOs and PHC/community-level stakeholders each accounted for 15.0%. Most respondents had substantial professional experience, with 38.4% reporting 6-10 years of experience and 32.9% reporting more than 10 years. Overall, 71.1% of respondents reported direct involvement in NAPHS-related activities.

Table 1. *Respondents' background characteristics.*

Variable	Category	Frequency	Percentage
Organisation type	Federal ministry/agency	171	45.0
	State ministry of health	95	25.0
	International partner/NGO	57	15.0
	PHC/community-level stakeholder	57	15.0
Work level	Federal	171	45.0
	State	95	25.0
	International/partner	57	15.0
	Community/facility	57	15.0
Years of experience	Less than 2 years	23	6.1
	2-5 years	86	22.6
	6-10 years	146	38.4
	More than 10 years	125	32.9
Direct NAPHS involvement	Yes	270	71.1
	No	110	28.9

4.2. Awareness, Relevance and Policy Alignment

Awareness of NAPHS was high among respondents. A total of 68.2% were very familiar with NAPHS, 21.8% were somewhat familiar, and 10.0% were not familiar. The estimated proportion of respondents who were very familiar with NAPHS was 68.2% with a 95% confidence interval of 63.5%-72.8%.



Source Field: Survey dataset, 2025

Figure 2. *Respondents' level of familiarity with Nigeria's National Action Plan for Health Security.*

Most respondents considered NAPHS relevant to Nigeria's health security needs. Overall, 90.3% reported that NAPHS was relevant, with a 95% confidence interval of 87.3%-93.2%. In addition, 81.1% perceived NAPHS as moderately or highly aligned with Nigeria's national policy priorities, while 80.8% perceived it as moderately or highly aligned with international health security frameworks.

Table 2. *Awareness, relevance and alignment indicators.*

Indicator	Frequency	Percentage	95% CI
Very familiar with NAPHS	259	68.2	63.5-72.8
NAPHS relevant to Nigeria	343	90.3	87.3-93.2
Moderate/high alignment with national policy priorities	308	81.1	77.1-85.0
Moderate/high alignment with international frameworks	307	80.8	76.8-84.8
Very/moderately effective implementation	264	69.5	64.8-74.1
Significant/moderate preparedness improvement	303	79.7	75.7-83.8
NAPHS adequately funded	50	13.2	9.8-16.6
Aware of formal One Health mechanism	133	35.0	30.2-39.8
Received NAPHS-related training	190	50.0	45.0-55.0

4.3. Policy Perception Indicators and Implementation Effectiveness

The highest mean scores were recorded for clarity of the NAPHS framework and policymaker understanding, each with a mean score of 4.15. Preparedness support also recorded a high mean score of 4.13, followed by IHR alignment with a mean score of 4.06. Multisectoral collaboration recorded a moderate score of 3.51, while frontline understanding recorded the weakest score of 2.59. This indicates that respondents perceived NAPHS as clear and policy-relevant, but less

well understood at frontline implementation levels.

Table 3. Mean scores for selected NAPHS policy perception indicators.

Indicator	Mean	Standard deviation
Framework clarity	4.15	0.93
Policymaker understanding	4.15	0.90
Preparedness support	4.13	0.91
IHR alignment	4.06	0.99
Multisectoral collaboration	3.51	1.05
Frontline understanding	2.59	1.10

NAPHS implementation was perceived as moderately effective. Only 9.2% of respondents rated implementation as very effective, while 60.3% rated it as moderately effective. In contrast, 20.3% rated implementation as slightly effective, 7.4% rated it as not effective, and 2.9% were not sure. Overall, 69.5% of respondents rated implementation as either very or moderately effective.

Table 4. Perceived implementation effectiveness of NAPHS.

Implementation effectiveness	Frequency	Percentage
Very effective	35	9.2
Moderately effective	229	60.3
Slightly effective	77	20.3
Not effective	28	7.4
Not sure	11	2.9
Total	380	100.0

4.4. Health Security Preparedness Improvement

Overall, 79.7% of respondents reported significant or moderate improvement in Nigeria's health security preparedness under NAPHS. At the domain level, improvement was strongest in disease surveillance and laboratory capacity. Disease surveillance recorded 69.2% significant/moderate improvement, while laboratory capacity recorded 67.1%. Community engagement, emergency response and risk communication recorded moderate levels of perceived improvement, each slightly above 50%. The weakest domains were funding/resource mobilisation, workforce training and inter-agency coordination. Funding/resource mobilisation recorded only 15.0% significant/moderate improvement, while workforce training and inter-agency coordination recorded 26.0% and 26.8%, respectively.

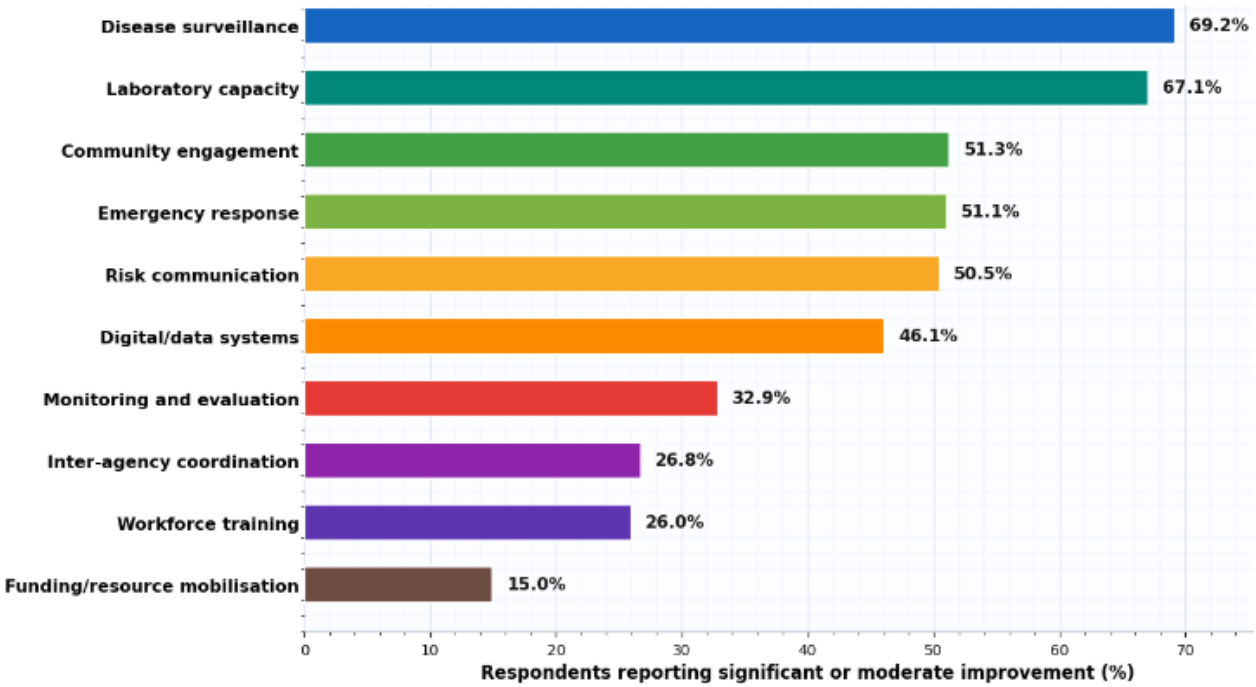


Figure 3. Perceived improvement in selected health security domains under NAPHS implementation.

Note: Mean scores were calculated using the following coding: 1 = no improvement, 2 = minimal improvement, 3 = moderate improvement, and 4 = significant improvement. "Not sure" responses were excluded from mean-score computation.

The overall domain improvement index had a mean of 2.51 and a standard deviation of 0.29 on a four-point scale. This shows that respondents' overall assessment clustered between minimal and moderate improvement, confirming that NAPHS was perceived to have made progress but not yet reached strong implementation impact across all health security domains.

4.5. Financing, Coordination, One Health and Training Capacity

Financing emerged as one of the weakest implementation areas. Only 13.2% of respondents stated that NAPHS was adequately funded, while 86.8% reported inadequate funding. International donors/partners were the most frequently reported funding source, followed by federal government budgetary support. This indicates that NAPHS implementation remains strongly dependent on external financing. Coordination was also mixed. Only 6.3% of respondents rated coordination as very effective, while 40.0% rated it as moderately effective. However, 37.4% rated coordination as slightly effective, and 12.4% as ineffective. Awareness of formal One Health mechanisms was low, with only 35.0% of respondents reporting awareness. Training coverage was also limited, as only 50.0% had received NAPHS-related training.

Table 5. Implementation capacity indicators.

Indicator	Strong/positive response (%)
NAPHS adequately funded	13.2
Coordination very/moderately effective	46.3
Aware of formal One Health mechanism	35.0
Received NAPHS-related training	50.0
Community involvement moderate/very high	41.1
Risk communication very/moderately effective	55.5
Clear M&E indicators available	46.6
M&E very/moderately effective	46.0

4.6. Barrier Burden and Implementation Constraints

Respondents reported multiple barriers to NAPHS implementation. The mean number of barriers identified per respondent was 4.62 out of 8, with a standard deviation of 1.34. The median number of barriers was 5, indicating that most respondents perceived NAPHS implementation as constrained by several simultaneous institutional and operational weaknesses.

The most frequently reported barrier was inadequate funding, identified by 84.7% of respondents. This was followed by weak inter-agency coordination at 76.1%, inadequate workforce capacity at 59.7%, and overdependence on donor funding at 57.6%. Limited political commitment and weak state/local implementation were also reported by approximately half of respondents.

Barrier co-occurrence analysis showed that inadequate funding and weak coordination were jointly reported by 62.9% of respondents. Inadequate funding also co-occurred with inadequate workforce capacity among 50.8% and with donor dependence among 50.3%. This indicates that the implementation problem is not limited to one isolated constraint but reflects a combined financing, coordination and capacity gap.

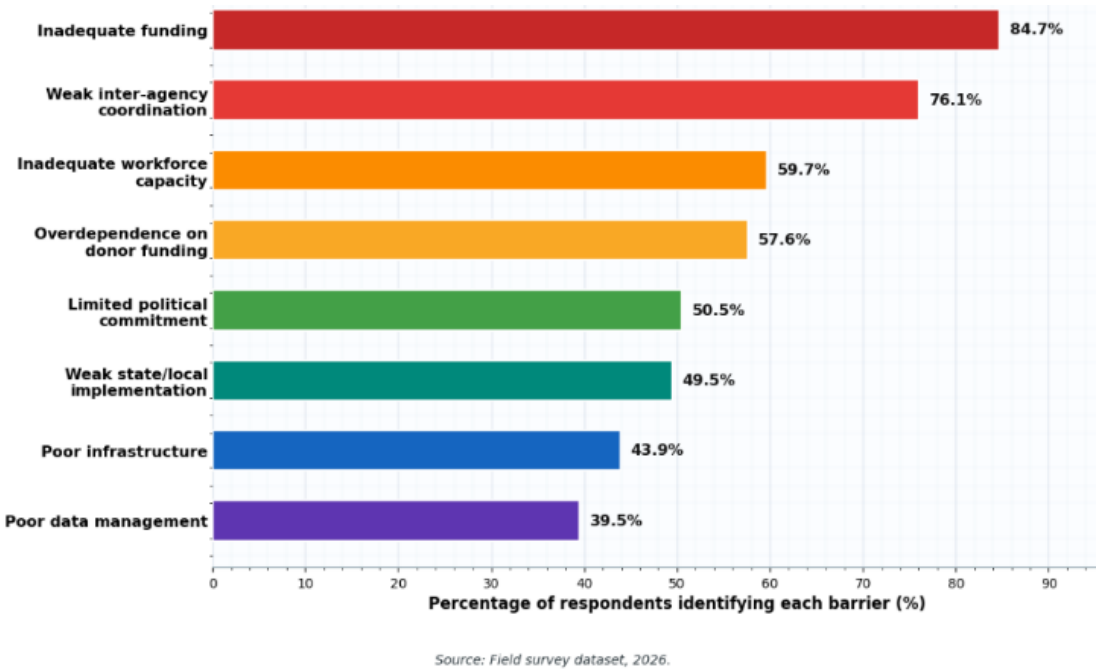


Figure 4. *Major barriers to effective NAPHS implementation in Nigeria.*

4.7. Work-Level Differences in NAPHS Familiarity and Implementation Capacity

Familiarity with NAPHS varied sharply by work level. Federal-level respondents recorded the highest familiarity, with 92.4% reporting that they were very familiar with NAPHS. International/partner respondents followed closely at 87.7%. However, only 44.2% of state-level respondents and 15.8% of community/facility-level respondents reported being very familiar with NAPHS. The association between work level and NAPHS familiarity was statistically significant, $\chi^2(3) = 153.48$, $p < 0.001$. The effect size was large, Cramér's V = 0.636. This indicates a strong relationship between respondents' location in the health security system and their familiarity with NAPHS.

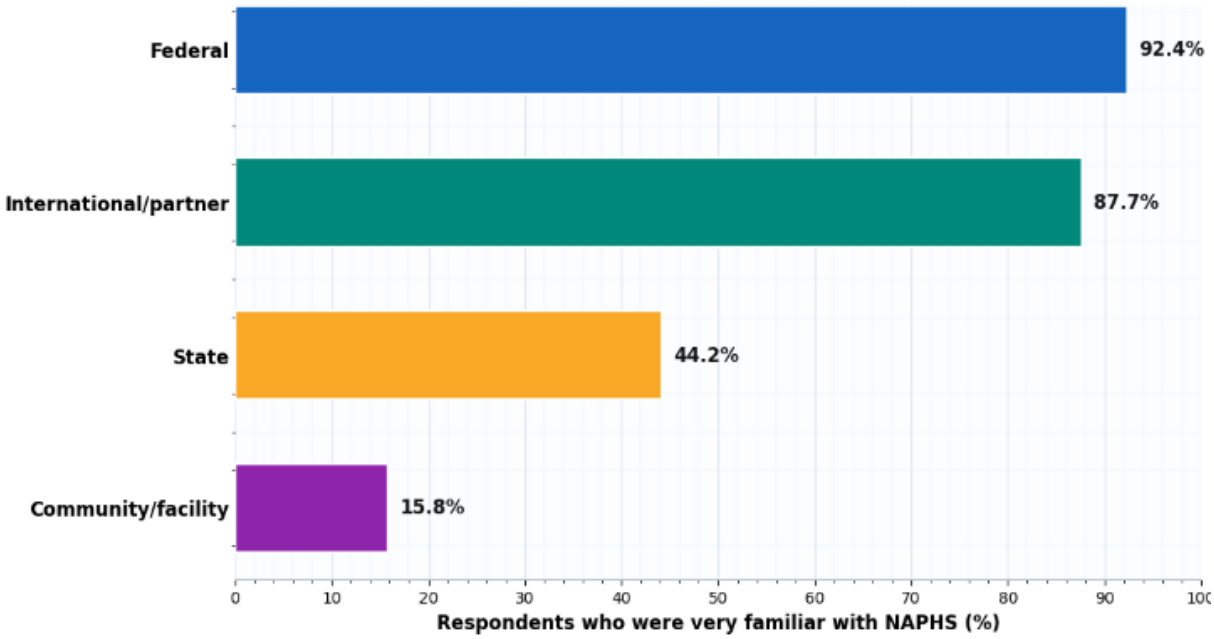


Figure 5. *Variation in NAPHS familiarity by respondents' work level.*

Table 6. Work-level differences in selected NAPHS indicators.

Work level	Very familiar with NAPHS (%)	Implementation very/moderately effective (%)	Preparedness significant/moderate improvement (%)	Aware of One Health mechanism (%)	Received training (%)
Federal	92.4	69.6	76.6	48.5	53.2
International / partner	87.7	63.2	80.7	35.1	56.1
State	44.2	73.7	82.1	20.0	51.6
Community / facility	15.8	68.4	84.2	19.3	31.6

Work level was not significantly associated with perceived implementation effectiveness, $\chi^2(3) = 1.90$, $p = 0.594$, or perceived preparedness improvement, $\chi^2(3) = 2.10$, $p = 0.551$. However, it was significantly associated with NAPHS-related training, $\chi^2(3) = 9.40$, $p = 0.024$, Cramér's $V = 0.157$, and awareness of formal One Health mechanisms, $\chi^2(3) = 29.35$, $p < 0.001$, Cramér's $V = 0.278$.

4.8. Association Between Direct Involvement and Perceived Improvement

Direct involvement in NAPHS-related activities was not significantly associated with perceived preparedness improvement. Among respondents directly involved in NAPHS-related activities, 77.8% reported significant or moderate improvement. Among respondents not directly involved, 84.5% reported significant or moderate improvement. The association was not statistically significant, $\chi^2(1) = 1.82$, $p = 0.178$, Cramér's $V = 0.069$.

This suggests that perceived preparedness improvement was broadly shared across respondents, rather than being limited only to those directly involved in NAPHS-related activities.

4.9. Stakeholder Recommendations

The mean number of recommendations selected per respondent was 3.53 out of 8, with a standard deviation of 1.29. The most frequently selected recommendation was the establishment of a dedicated National Health Security Fund, supported by 68.4% of respondents. This was followed by increased domestic government funding at 55.3%, stronger One Health coordination at 51.3%, and improved workforce training and retention at 46.1%.

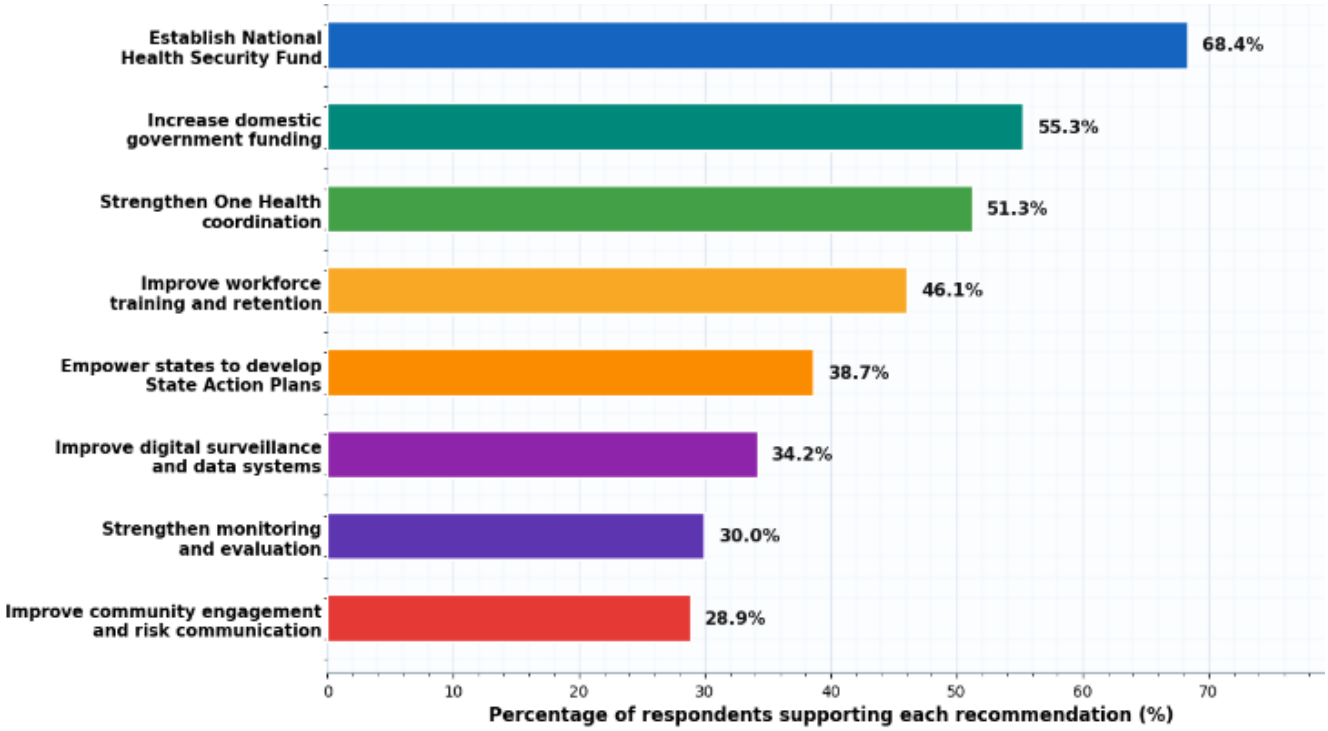


Figure 6. Stakeholder recommendations for strengthening NAPHS implementation in Nigeria.

4.10. Inferential Summary

The strongest statistically significant association observed in the study was between work level and NAPHS familiarity, indicating that awareness is highly concentrated at federal and partner levels. Work level was also significantly associated with One Health awareness and NAPHS-related training, suggesting uneven distribution of implementation knowledge and capacity. However, work level was not significantly associated with perceived implementation effectiveness or perceived preparedness improvement.

Table 7. Summary of inferential tests.

Relationship tested	χ^2	p-value	Cramér's V	Interpretation
Work level × NAPHS familiarity	153.48	<0.001	0.636	Significant, large association
Work level × implementation effectiveness	1.90	0.594	0.071	Not significant
Work level × preparedness improvement	2.10	0.551	0.074	Not significant
Work level × One Health awareness	29.35	<0.001	0.278	Significant, moderate association
Work level × NAPHS-related training	9.40	0.024	0.157	Significant, weak association
Direct involvement × preparedness improvement	1.82	0.178	0.069	Not significant

5. Discussion

The findings show that NAPHS is widely recognised as a relevant policy framework for strengthening health security in Nigeria. Most respondents considered the plan aligned with national and international health security priorities, confirming its importance as a tool for implementing IHR core capacities [11, 16, 20]. The study found that NAPHS contributed most strongly to improvements in disease surveillance and laboratory capacity. This suggests that the plan has supported key technical areas needed for early detection, diagnosis and outbreak response. These findings are consistent with the literature, which identifies surveillance and laboratory systems as central pillars of health security preparedness [31, 32]. However, implementation effectiveness was rated mainly as moderate. This indicates that although NAPHS has policy relevance, its operational impact remains limited. The major constraints were inadequate funding, weak inter-agency coordination, limited workforce capacity and donor dependence. These challenges reflect broader concerns that national preparedness plans may remain weak if they are not supported by sustainable financing and strong implementation systems [13, 14, 28].

The results also show that familiarity with NAPHS was higher among federal and international/partner-level respondents than among state and community/facility-level respondents. This is a major concern because public health threats are often first detected at subnational and community levels. Therefore, low awareness at these levels may weaken early detection and response capacity. The low awareness of formal One Health mechanisms also suggests that multisectoral coordination has not been fully institutionalised. Since many health threats involve human, animal and environmental systems, stronger One Health collaboration is necessary for effective preparedness and response [17, 18, 30]. Overall, the findings suggest that NAPHS has strengthened Nigeria's health security policy architecture, but its effectiveness depends on improved financing, workforce development, state-level implementation, One Health coordination and monitoring systems. The next phase of NAPHS should focus less on policy design and more on practical implementation across all levels of the health system.

6. Conclusion and Recommendations

6.1. Conclusion

This study examined the role of health policy in enhancing health security in Nigeria, using the National Action Plan for Health Security (NAPHS) as a case study. The findings show that NAPHS is widely recognised as a relevant and strategically aligned policy framework for strengthening Nigeria's preparedness and response capacity. The plan was perceived to have contributed most strongly to disease surveillance and laboratory capacity, which are essential for early detection and confirmation of public health threats. However, the study also found that NAPHS implementation remains moderate rather than strong. The main weaknesses include inadequate funding, weak inter-agency coordination, limited workforce capacity, donor dependence, low awareness of One Health mechanisms and weak state/local implementation. Familiarity with

NAPHS was also concentrated among federal and partner-level stakeholders, while state and community/facility-level actors showed lower awareness. This suggests that the policy has not been fully operationalised across all levels of Nigeria's health system. The study concludes that health policy is essential for strengthening health security, but policy design alone is insufficient. For NAPHS to achieve stronger impact, it must be supported by sustainable financing, effective coordination, trained personnel, clear monitoring systems and stronger sub-national implementation. Nigeria's NAPHS provides an important foundation for national health security, but its long-term success depends on moving from strategic planning to practical, funded and measurable implementation.

6.2. Recommendations

1) The Federal Government should establish a dedicated National Health Security Fund to provide predictable and sustainable financing for NAPHS implementation.
2) NAPHS should be integrated into federal and state annual health budgets to reduce overdependence on donor support.
3) State governments should be supported to develop State Action Plans for Health Security that align with the national NAPHS.
4) NAPHS implementation should be decentralised to state, local government and community/facility levels.
5) Inter-agency coordination should be strengthened through regular joint planning, simulation exercises, emergency preparedness reviews and accountability meetings.
6) One Health mechanisms should be institutionalised across human health, animal health, environmental health, agriculture and emergency management sectors.
7) Awareness of NAPHS should be improved among state-level and community/facility-level stakeholders.
8) Workforce development should be prioritised through regular training and retention of surveillance officers, laboratory personnel, field epidemiologists, emergency response teams, risk communication officers and community health workers.
9) Nigeria should strengthen laboratory networks, specimen referral systems and diagnostic capacity across states.
10) Digital surveillance platforms and real-time health information systems should be improved to support faster detection, reporting and response.
11) Monitoring and evaluation of NAPHS should be strengthened using clear performance indicators such as time to detection, time to notification, time to laboratory confirmation and time to response.
12) Community engagement and risk communication should be improved to strengthen public trust and community participation during health emergencies.
13) NAPHS should be linked with broader health-system strengthening, primary health care development and universal health coverage.
14) Future NAPHS reviews should use evidence from Joint External Evaluations, after-action reviews, outbreak reports and stakeholder feedback.

Abbreviations

CI	Confidence Interval
IHR	International Health Regulations
JEE	Joint External Evaluation
M & E	Monitoring and Evaluation
NAPHS	National Action Plan for Health Security
NCDC	Nigeria Centre for Disease Control and Prevention
NGO	Non-Governmental Organisation
PHC	Primary Health Care
SD	Standard Deviation
WHO	World Health Organization

Author Contributions

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Conflicts of Interest

The authors declare no conflicts of interest.

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