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EVALUATION OF THE HEALTH EMERGENCY PREPAREDNESS STRATEGIES OF HEALTH INSTITUTIONS IN BAYELSA STATE

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Abstract

This paper evaluated the emergency preparedness and response strategies for public health institutions in Bayelsa State, Nigeria. The aim was to identify the policy on public health emergency preparedness strategy in the health institutions in Bayelsa State and also to determine the level of emergency preparedness in the health institutions across Bayelsa State. Descriptive survey design guided the research, targeting an estimated population of 5,086 health personnel, including doctors, nurses, pharmacists, community health officers, medical laboratory scientists, and other relevant staff. A sample of 735 health care workers was used in the study and distributed across primary, secondary, and tertiary care facilities. Data collection was carried out using structured questionnaire and WHO health emergency preparedness checklist Descriptive statistics and Chi-square were used for data analyses. Results revealed that 63% of the study participants affirmed the availability of emergency preparedness policy in the health institutions across Bayelsa State while the Chi-square results showed that there is no statistically significant difference in the ratings on emergency preparedness and response levels across health institutions in Bayelsa state ($\chi 2 = 8.60$; $p = 0.072$) but there was a significant difference in perceptions of emergency preparedness and responses among health workers across the different local government areas of the State ($\chi^2 = 162.66$; $p = 0.001$). The results on level of emergency preparedness revealed moderate level of leadership and triage system (42.5%), moderate level of Communication, Safety, and Security level (42.9%), average level of Logistic/Supply, Health workforce and operational capacity (52.4%) and average level of surge capacity (51.8%) The study concluded that there is availability of emergency preparedness policy in the health institutions across Bayelsa State and there is moderate to average level of health emergency preparedness across the health institutions in the state.

Keywords:

Health Emergency Preparedness Strategy, Health Institutions, Bayelsa State.

1.0 INTRODUCTION

Public health emergency preparedness is a set of actions aimed at preventing potential emergencies and organizing plans to ensure a timely and effective response and recovery in the event of emergencies (Hess et al., 2023; Sarkar et al., 2020). The term refers to the ability of public health and healthcare systems, communities, and individuals to prevent, protect against, respond to, and recover from health emergencies that may potentially exceed normal capabilities due to their scale, timing, or unpredictability (Augustynowicz et al., 2022; de Vries et al., 2020). The significance and complexity of public health emergency preparedness have increased recently due to the rise in disease outbreaks. The 9/11 attack in the United States, along with other public health epidemics, has led to a resurgence in the need for preparedness and mitigation (Mitchell et al., 2024; Noelte et al., 2023; Revere et al., 2011; Simental & Bynum, 2023). Health care partners at all levels are crucial to the effectiveness and success of public health preparedness and response. Individuals and communities anticipate that health facilities and services will remain available and accessible throughout any public health crisis, ensuring continuous access to high-quality healthcare.

Health institutions worldwide have achieved substantial advancements in readiness and measures to address public health crises. Despite governments' efforts to develop policies and guidelines, health institutions' preparedness strategies for public health emergencies remain inadequate, especially in developing countries such as Nigeria. The World Health Organisation (WHO) states that health institutions in African countries lack comprehensive disaster risk reduction and preparedness programmes that meet its minimum recommended elements, including policy and legislation, capacity building, and disaster risk analysis and mapping (WHO, 2010). The implementation of the Hyogo framework, which requires nations to evaluate the condition and enhance the resilience, risk management, and capacity of hospitals and other vital health infrastructures, has not started yet (Schorlemer & Maus, 2015). However, there are deficiencies and a lack of ability to uphold standards because of the absence of policies, procedures, and coordinating units (WHO, 2012).

Emergency preparation in the health sector is becoming a significant focus in worldwide health efforts. The 2005 revised International Health Regulations established a framework for member countries to enhance their populations' protection against public health threats. It emphasised the importance of emergency preparedness and response activities to fulfil their obligations. Nevertheless, enforcing these obligations remains difficult (Rose et al., 2017). Recurring violence and natural disasters in Africa have created a significant public health crisis, resulting in injuries, deaths, population relocation, damage of health facilities, and service disruptions. The World Health Organisation (WHO) published this information in 2010. African healthcare staff must enhance their competence via training to effectively respond to crises (Olu et al., 2018). The health system comprises six building blocks: health sector governance and leadership, health goods and technology, health workforce, health service funding, health information management, and health service delivery. The construction blocks are interconnected (Olu et al., 2018).

Research has shown difficulties in emergency treatment within the healthcare system in sub-Saharan Africa (Bijani & Khaleghi, 2019; Farah et al., 2023; Oleribe et al., 2019). The problems

include a lack of a comprehensive triage strategy, insufficient recording of the acute illness burden, and failure to identify crucial elements of emergency treatment (Bijani & Khaleghi, 2019; Farah et al., 2023; Mitchell et al., 2024). Developing nations with a high frequency of pandemic-prone disease outbreaks often have inadequately financed and understaffed health sectors, leading to a significant burden of illness. Developing nations have expanded their aid to disaster-preparation efforts for developed countries (Oleribe et al., 2019). The terrorist attacks on the World Trade Centre led the United States to assess the emergency response capabilities of its public health systems. This evaluation increased budget allocation, focusing on enhancing state, local, and hospital preparedness (Khan et al., 2018; Onwujekwe et al., 2023). This approach may enhance the health sector's ability to plan for and respond to emergencies in the African sub-region (Onwujekwe et al., 2023). Lack of readiness for catastrophes in the health sector threatens people's lives nationwide (Khan et al., 2018). While some studies indicate that nurses thoroughly comprehend emergency preparedness (Ayuba et al., 2015), it is insufficient for a nation's healthcare system to address emergencies or disasters effectively. All aspects of emergency preparedness must be sufficient for a country's health sector to respond adequately.

Key workplace preparedness activities include developing emergency evacuation plans, providing emergency information to employees, and outlining employees' roles in emergency response. Workplaces with over 10 employees must have written emergency plans that are continually reviewed, train employees in the plan's details, and designate emergency-response coordinators and their assigned roles. Specific principles in preparing businesses for emergencies include creating formal plans and assigning responsibilities, coordinating efforts, encouraging employee ownership of the plan, overcoming organizational resistance and reluctance, and adapting response in light of surprise challenges. Emergency preparedness plans aim to prevent infrastructure and inventory losses and to secure the continuity of business operations before and after a disaster. Emergency preparedness and business continuity plans should protect the firm from threats and outline recovery and resilience strategies (Cimellaro et.al., 2016). Poor emergency preparedness in the health sector leads to inadequate responses to emergencies and disasters, resulting in the loss of lives.

Coccia (2022) investigated countries' preparedness to address the COVID-19 pandemic, focusing on strategic positioning and factors supporting effective pandemic prevention strategies. The COVID-19 pandemic remains a severe threat to countries, with new virus mutations (SARS-CoV-2) producing socioeconomic concerns. Two fundamental indices were created to assess nations' capacity to deal with the crisis: Index r (resilience) and the Index p (preparedness and prevention). The Index r rates countries' success in reducing mortality and vaccination rates, whereas the Index p evaluates the best-performing countries that promote vaccinations to limit future risks and support socioeconomic recovery. The study used these indicators to examine a case study of European nations within a homogeneous socioeconomic region, indicating that all countries have flaws and that none is well prepared for a significant disease or pandemic. The best-performing countries have smaller populations and stronger public governance, which is associated with higher health-care spending. These indices can assist policymakers in developing effective methods to increase preparedness and prevention against future pandemic risks.

Alderwick, et al. (2021) examined whether pharmacy professionals had played a role in public health and emergency preparedness and response (EP&R) efforts, including preventive measures such as screening, vaccinations, testing, medical and pharmaceutical countermeasures, and ensuring medication safety during natural disasters and pandemics. They are now seen as critical partners in the ongoing COVID-19 epidemic, with community and hospital pharmacists extending services and hours to meet key needs. However, chemists should be more fully integrated into public health and safety programs. The goal is to create a Pharmacy Emergency Preparedness and Response (PEPR) Framework and suggestions for pharmacy professionals' paths to full integration with public health EP&R operations. This approach is based on the American Society of Health-System Pharmacists' 2003 Statement on the Role of Health-System Pharmacists and learning from prior and ongoing public health emergencies. The proposed PEPR framework contains data and suggestions from various organizations and educational institutions. Five primary priority areas have been identified: emergency preparedness and response, operations management, patient care and population health interventions, public health pharmacy education and continuing professional education, and evaluation, research, and dissemination of effects and outcomes. Despite their important role in responding to the COVID-19 pandemic, problems persist, including limited availability of personal protective equipment, a high risk of infectious exposures, and regulatory impediments that result in a lack of provider status and associated payments. Targeted training and education in critical framework areas and in policymaking are suggested to broaden the scope of pharmacy as a public health professional active in EP&R. Experts should collaborate with interdisciplinary public health teams and conduct more research and dissemination on the effects and outcomes of EP&R.

Garg et al. (2020) conducted a cross-sectional study to examine the preparedness of primary health care facilities to provide outpatient services during the COVID-19 pandemic in India. According to the report, primary health centres (PHCs) are the first rung of the Indian healthcare system, delivering critical outpatient services to rural, suburban, and remote communities. The COVID-19 pandemic has drastically restricted the accessibility and availability of these services, making it critical for PHCs to deliver safe, patient-centred treatment, meet current health requirements, and prevent further viral transmission. Research was done in India to examine the readiness of primary health care providers during the epidemic. 51 faculties participated in the study, with each medical college and institution overseeing an average of 2.94 PHCs. Infrastructural and infection control deficiencies were identified, including a lack of physical space, separate access and departure gates, insufficient ventilation, and ineffective airborne infection control methods. N95 masks were provided at 26 (50.9%) locations; however, infection prevention and control methods were unsatisfactory, with handwashing facilities lacking at 23.5% of sites and hand hygiene facilities lacking at 27.4% of sites. The pandemic greatly impacted outpatient services, particularly those connected to maternal and child health. In conclusion, current PHC facilities in India are limited in their ability to function during the COVID-19 pandemic due to inadequate infrastructure, resulting in unsatisfactory patient safety and infection control. Effective planning, communication, and collaboration between centralised health policymakers and health managers operating in PHC facilities are required to guarantee overall preparation during public health emergencies.

According to Khan et al. (2020), research was done to determine if the COVID-19 pandemic revealed the inadequacies of most nations' public health systems in preventing localised infectious disease outbreaks. National Public Health Institutes (NPHIs) must overcome barriers to accessing and using vital data to strengthen national preparedness. A situational study in Ethiopia, Nigeria, and Pakistan demonstrates that NPHIs must gather and analyse data from different sources that are not frequently shared with public health authorities. They must monitor key indicators and have the power to seek immediate data exchange from public and commercial sector organisations during health emergencies. Furthermore, rapid, open, and proper distribution of synthesised data will promote ongoing data exchange with other organisations. These activities will help ensure the availability of robust information systems that enable NPHIs to gather, share, and analyse data quickly to guide rapid local responses to future infectious disease outbreaks.

Martinez et al. (2019) reported that the Centers for Disease Control and Prevention (CDC) published Public Health Preparedness Capabilities: National Standards for State and Local Planning in 2011. These guidelines help state, municipal, tribal, and territorial public health authorities prepare for and respond to public health risks and crises. In 2017, a project team revised the 2011 competency standards, which were published in October 2018 and adjusted in January 2019. The basic framework of the 15 capability standards remained untouched. However, capacity functions, tasks, and resource aspects have been improved to reflect developments in public health emergency planning and response procedures since 2011. The bulk of modifications occurred at the task level. The competence standards offer a realistic framework for public health authorities to prioritise limited resources to improve disaster planning and response capacities.

Khan et al. (2018) conducted research that sought to characterize the critical components of a resilient public health system and how they interact as a complex adaptive system. The study employed a qualitative approach in six focus groups throughout Canada, including participants from public health and related fields. Data gathering yielded qualitative information on the critical components and their relationships for a robust public health system. The study employed qualitative content analysis and complexity theory to account for the complexities of public health emergency preparedness (PHEP). The study focused on local and regional public health agencies. The six focus groups had 130 individuals, with group sizes ranging from 15 to 33. The data revealed 11 important factors: 1 cross-cutting element (governance and leadership) and 10 unique yet interrelated elements. The key aspects establish a conceptual foundation for PHEP, which is subsequently modified to ensure practice- and policy-relevance for local and regional public health organizations. The paradigm is experimentally derived and theoretically informed, and it represents a complex adaptive systems approach to upstream PHEP preparedness

In a cross-sectional descriptive study conducted in Tanzania on disaster preparedness and response capacity of regional hospitals in Tanzania, the researchers found that of the 25 hospitals assessed, 92% of the hospitals had experienced a disaster, yet only 15 (60%) had a disaster emergency management committee, with only 5 (20%) having an emergency management plan. None of the hospitals assessed had all the components of surge capacity, but all have alternative electricity backup, with only 3 (12%) having a backup communication system (Koka et al., 2018)

Murthy et al. (2017), in their study on the progress of public health emergency preparedness in the United States, 2001-2016, reported that before 9/11, public health emergency preparedness capacity was limited. However, there has been considerable progress in 2016, with almost 200% established capacity functions in mitigation in 2014, but about 20% still reported underdeveloped coordination between the health system and public health agencies in 2016. Other challenges identified in the study include a lack of trained personnel, plans, and sustained resources.

Health institutions in Bayelsa State had been responding to public health emergencies, but not without challenges. Funds for response activities have always been a challenge; training on emergency preparedness was not conducted regularly, and these affected the efficiency and effectiveness of the response to emergencies, as seen during the Monkeypox outbreak of 2017, the Cholera outbreaks of 2018 and 2019 in Bayelsa state. Despite the state experiencing an infectious disease outbreak in the recent past, proper mitigation strategies for public health emergencies like triage and simple hand-washing materials and personal protective equipment in the health institutions were not adequate, as was seen in the outbreak of the novel coronavirus, which further exposed the inadequacies of the health sector in responding to large-scale emergencies. Hazard and vulnerability assessment to identify hazards to put control measures to prevent disasters and emergencies are rarely carried out across health facilities, making staff, patients and visitors to the health facilities prone to exposure to diverse forms of hazards.

The health sector plays a vital role during emergencies with a large number of victims, which it is expected to care for, and most times in an unsafe environment with inadequate preparedness and response structure in place, resulting in improper coordination with confusion over roles (Jefferson & Berrens, 2010). Furthermore, a previous study on emergency preparedness in tertiary and private hospitals in Bayelsa state showed a poor level of the key elements of hospital emergency preparedness (Ogoinja et al., 2020). There is no clear picture of the actual state of emergency preparedness and mitigation to public health emergencies in Bayelsa State, what mitigation strategies are put in place from lessons learnt from previous experience, and how compliant are the health institutions to these mitigation strategies need to be known and gaps identified, make comparison so that experiences can be shared across the different levels of health facilities in order to improve emergency preparedness, mitigation and response activities to assist the health sector in Bayelsa and Nigeria in general. Thus, assisting in effectively and efficiently responding to disasters and emergencies to save the lives of the populace, especially amid recent threats to security, the emergence and reemergence of infectious disease outbreaks, and other emergencies. Therefore, this study seeks to assess the emergency preparedness level of health institutions in Bayelsa state and the objectives are to; Identify the policy on public health emergency preparedness in the health institutions in Bayelsa State and also determine the level of emergency preparedness to public health emergencies in the health institutions across Bayelsa State.

2.0 MATERIALS AND METHODS

2.1 Research Design

This study used a descriptive comparative survey to assess emergency preparedness in the primary, secondary, and tertiary health institutions across Bayelsa State. A descriptive comparative survey was chosen to identify the characteristics of variables in preparedness response and mitigation strategies for public health emergencies clearly. It was used to compare the preparedness level of the different health system tiers. This provides an in-depth understanding of the preparedness status of public health emergencies in Bayelsa State. The study involved collecting information from key informants and health care personnel in the health facilities using a checklist and structured interview questionnaire.

2.2 Study Area

The study area of this research is focused on the Bayelsa State Health institutions. Bayelsa State is one of the States in the Niger Delta, which is biodiverse with mangroves and rainforest that provide sequestration of carbon, supporting the variety of plants and animal life found in the region. Bayelsa is a state in the Niger Delta region in the southern part of Nigeria. It lies between Delta and Rivers State, with its capital in Yenagoa. The Ijaw language is primarily spoken with dialects such as Kolukuma, Mein, Bomu, Epie-Atisa, Nembe, and Ogbia. The official language of Bayelsa State is English. General Sani Abacha's military government created the state out of the old Rivers State on the first of October, 1996. Its name was derived from the first few letters of the names of the major local government areas from which it was formed - Brass LGA (BALGA), Yenagoa (YELGA), and Sagbama (SALGA). Hence, BAYELSA was derived from the letter's BA + YEL + SA. Bayelsa State has one of Nigeria's largest crude oil and natural gas deposits. As a result, the state's petroleum production is extensive. However, most Bayelsans live in poverty. Bayelsa State lies in 9,415.8 square kilometres, and the Nigeria National Census of 2006 estimated the State population to be 1,704,515, accounting for 1.2% of the country's total population figure. Bayelsa State is located in a Latitude of 40 15' North to 5 o 23' South and a longitude of 05 o 22' West to 06 o 45' East. It is on longitude 6^0 degrees 05'' East and Latitude 4^o degrees 45'' North (Bayelsa State Overview, n.d.).Bayelsa State has three levels of health care as contained in the National health care system namely; Tertiary health care level with highly specialized care (Niger Delta University Teaching Hospital Okolobiri and Federal Medical Centre Yenagoa) all situated in Yenagoa Local Government Area of the State, Secondary Health care facilities spread across all the Local Government Areas and Primary Health care facilities distributed around all the wards in each of the local Government Areas with at least one functional health facility in each ward.

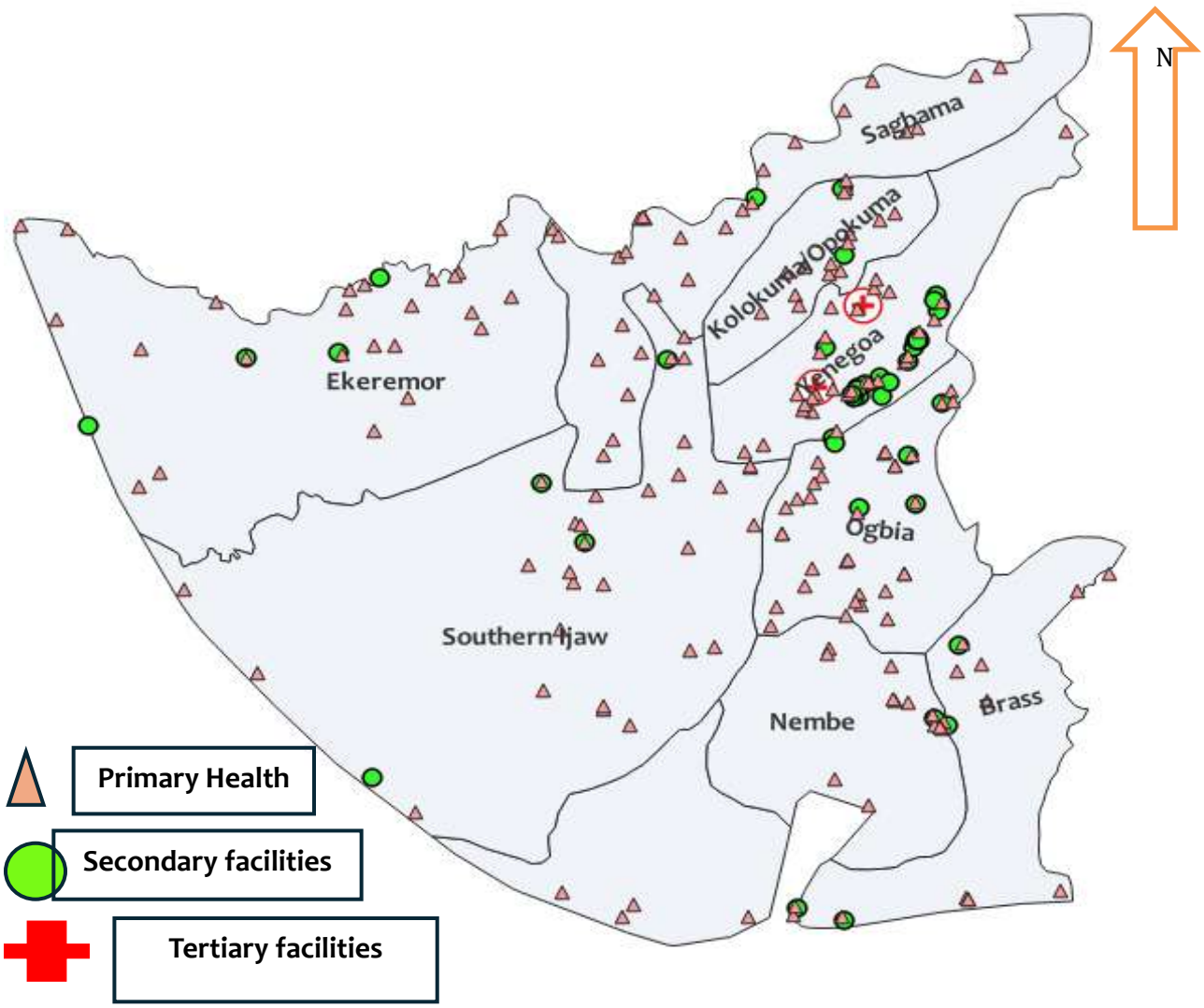

Figure 1 Map of Bayelsa State showing the distribution of health facilities.

2.3 Population for the Study

The target population of this study consists of key health personnel from the tertiary, secondary, and primary health facilities in Bayelsa State. The estimated population of the study is 5,086. An actual figure could not be obtained, hence an estimated figure from the assessment done before the Bayelsa Health summit of 2021 was used (Table 1). Health facilities listed in the study were selected from 189 viable tertiary, secondary and 105 functional primary health facilities in the eight local government areas of Bayelsa State (Table 2)

Table 1: Estimated Distribution of different healthcare professionals in Bayelsa State

S/N	Cadre of Health Care Personnel	Population
1	Doctors	730
2	Nurses/Midwives	1116
3	Pharmacists	30
4	Pharmacy Technicians	39
5	Lab. Scientists	35
6	Medical Laboratory Technicians	20
7	Lab. Assistants	42
8	CHOs	28
9	CHEWs	244
10	JCHEWs	155
11	Dental Technicians	12
12	Others	135
	Total for State-Owned Facilities	2,586
13	Estimated Total for FMC Yenagoa	2,500
	Grand Total	**5,086**

Source: Corona management, Bayelsa State Ministry of Health Pre-Health Summit Situation Analysis (2021)

Table 2: Distribution of public health facilities in Bayelsa State.

S/N	LGA	Primary	Secondary	Tertiary	Total
1	Brass	11	2	0	13
2	Ekeremor	24	5	0	29
3	Yenagoa	24	6	2	32
4	Nembe	18	3	0	21
5	Ogbia	20	4	0	24
6	Sagbama	23	3	0	26
7	Kolokuma-Opokuma	8	3	0	11
8	Southern Ijaw	29	4	0	33
	Total	**157**	**30**	**2**	**189**

2.4 Sample Size Determination

The sample size for this study was calculated using the formula for estimating a simple proportion in a population, given below:

$$n = \frac{Z^2 \, X \, P \, X \, Q}{d^2} \qquad (2.1)$$

where n is the minimum sample size needed in this study, Z is the standard normal deviate at 95% confidence interval, which is given as 1.96, and P is the prevalence of the disease or health event of interest in the population. For this study, a prevalence of 50% (0.5), which is expected to give a minimum sample size, is assumed while Q is the complementary prevalence given as 1 – P (1 – 0.5 = 0.5) and d is the margin of error allowable in the study (level of precision) taken as 5% (0.05). Substitution is shown below:

$$n = \frac{1.96^2\ X\ 0.5\ X\ 0.5}{0.05^2}$$

$$n = n = 384$$

Hence, a minimum sample size of 384 persons at the primary and secondary levels of care is needed for this study. Adjusting the sample size for non-response, using a non-response rate of 10% further increases the sample size to 422, that is, the summation of 10% of 384 (38) and the minimum sample size. However, the total population of health workers in this study, is a finite population of less than 10,000 persons, the formula for adjusting a finite population less than 10,000 was also applied as shown below:

$$n_f = \frac{n}{1+\frac{n}{N}} \qquad (2.2)$$

n_f is the new sample size for the finite population, n is the calculated sample size (422) and N is the total population size (2,586 for the primary/secondary levels and 2500 for tertiary level of care).

For the primary/secondary level

$$n_f = \frac{422}{1 + \frac{422}{2584}}$$

$$n_f = 362\ persons$$

For the tertiary level of care

$$n_f = \frac{422}{1 + \frac{422}{2500}}$$

$$n_f = 360\ presons$$

Hence, the study involved 362 health workers at the primary/secondary level of care and 360 health workers at the tertiary level of care in the State.

2.6. Sample and Sampling Techniques

A multistage sampling technique was adopted for the selection of participants this study. The study was conducted in all the Local government areas of the State, to ensure a good representation of the State's health emergency preparedness and mitigation strategies at all levels of care delivery.

Stage I: Selection of Wards/health facilities at the Local Government Area (LGA) level; Five wards were selected from each LGA by simple random sampling (balloting), making a total of 40 wards to be included in the study out of the 105 administrative wards in the State. This amounts to 38% of the total primary health facilities in the State which is considered representative enough. The functional public health facilities in each of the selected wards in the local government area of the State would be drafted into the study. Two secondary health facilities each would be selected from the 8 LGAs of the state by simple random sampling. The two tertiary public health facilities in the state will also be drafted into the study.

Stage II: **Selection of participants from the health facilities for the study;** There are 362 participants recruited from 40 primary health care centres and 16 secondary health centres. A proportionate allocation of participants was adopted to recruit participants at the primary and secondary levels of care. The total includes 56 primary and secondary health facilities. number to be recruited from the primary level by proportionate allocation is as shown below:

$$Subgroup\ sample\ size = \frac{Number\ in\ subgroup}{Total\ numebr\ of\ group}\ X\ sample\ size \quad (2.3)$$

For the primary level of care

$$Subgroup\ sample\ size = \frac{40}{56}\ X362$$

$$Subgroup\ sample\ size = 258.6$$

Approximately 259 health workers were recruited from the 40 public primary health facilities that would be recruited for the study.

For the secondary level of care

$$Subgroup\ sample\ size = \frac{16}{56}\ X362$$

$$Subgroup\ sample\ size = 103.4$$

Approximately 103 health workers were recruited from the 16 secondary public health facilities for the study. Stratified random sampling was adopted in the health facilities to ensure that all cadres of health care providers, including doctors, nurses, pharmacists, medical laboratory scientists, health attendants, and other relevant health care workers, were involved in the study.

For the tertiary centres, participants from the Federal Medical Centre (FMC) and the Niger Delta University Teaching Hospital (NDUTH) were recruited proportionately to the population of health workers in each centre. The selection of participants from the centres was done using the stratified sampling technique to ensure that all cadres of health care providers were recruited in the study.

2.7. Methods and Instrument of data collection

Eight research assistants were recruited for the data collection, each representing the focal person in the eight LGAs of Bayelsa state during the Study. They were trained on the study's objectives, purpose and benefits to participants and the entire health system in Bayelsa state. The training includes obtaining informed consent and ensuring that other medical research ethics principles are upheld. The selection technique was reviewed, and the number of participants recruited from each LGA and at the three levels of health care delivery would be communicated. The research assistants also review the questionnaire and checklist during the training to understand the responses to each question in the study tools. Role-plays were conducted between the research assistants to ensure that the procedures for administering the questionnaire were well understood. The role-play also allowed the research assistants to be corrected in any area where there might be errors in data collection.

At the commencement of data collection in each facility, the most recent staff nominal roll serve as the sampling frame. The professional cadres are the strata from which a simple random sampling technique on each research day selected participants. After the selection, each eligible participant was briefed on the study objectives, benefits, and procedure to obtain informed consent. 794 copies of the study instruments (398 for primary/secondary healthcare facilities, and 396 for tertiary healthcare facilities) were distributed. Each trained research assistant distributed copies of research instrument (65-100 copies) according to number of health facility his/her apportion LGA. Eligible participants were allowed to ask questions and seek clarifications, after which written informed consent was obtained from those willing to participate, thus recruiting them for the study. Thereafter, the study questionnaire was administered to the recruited health workers. The checklist on emergency preparedness and mitigation was administered in each facility by the research assistant in the presence of key informants (administrators) of the health facilities in the hospital incident command centre, emergency department and/or the public health unit of the health facility, as applicable. In all, a total of 794 copies of the study instruments that were distributed, a total of 761 were successfully retrieved, of which only 735 (primary facility=243; secondary facility=127, tertiary facility=365) were correctly filled, hence, valid for computation of the study results.

The instruments for data collection in this study were a structured questionnaire and a health facility checklist. The study questionnaire is made up of 2 sections. Section A contains sociodemographic information of respondents, while Section B contains items on policy on health sector emergency preparedness and response. The responses to items on the questionnaire are a 5-point Likert scale response, namely strongly agree–5; Agree–4; disagree–2, strongly disagree–1, and undecided–3.

The checklist is based on the WHO emergency readiness checklist and has 10 sections and 49 items. It assesses the degree of disaster preparedness in the chosen health institutions. The checklist examines key indicators of hospital preparedness strategies, including governance, communication, safety and security, triage, logistics and supply management, human resources, operational capabilities, training and education, surge capacity, monitoring and evaluation, and surveillance functions. The checklist also includes a four-point Likert scale answer structure that is graded as follows: available = 4, somewhat available = 3, not available = 2, and undetermined = 1. Following validation and reliability testing of the questionnaire and checklist, the two research instruments were translated to an open data kit (ODK) format and utilised for data collection on an Android smartphone.

2.8 Validation and Reliability testing of the study Instrument

The two instruments for data collection were adapted from the WHO emergency preparedness and mitigation strategy documents. Validation and reliability testing were done through expert and peer reviews and pretesting of the adapted study questionnaire and checklist. Pretesting was done in 2 primary health facilities in Ahoada West LGA of Rivers state, a suburban LGA close to Bayelsa state. Responses were evaluated from the pretesting and expert/peer review, and based on suggestions and observations, the questionnaire and Checklist were further modified to improve their validity and reliability in data collection. Reliability of the instrument was ensured by accurate and careful phrasing of each question to avoid ambiguity and leading respondents to an answer. Pearson’s Product-Moment Correlation (PPMC) analysis was done, and a reliability coefficient of 0.86 would be considered acceptable. Cronbach's Alpha, a measure of internal consistency, was carried out; a Cronbach's alpha of 0.7 would be considered acceptable. The study tool was subjected to expert/peer review to ensure the content and face validity. The questionnaire and checklist were given to peers and supervisors for content validity. Content validity ensures that it is sufficiently comprehensive in seeking the proper range of responses, it is appropriate in terms of space and length, flow of questions, and whether the questions are consistent with the study's objectives.

2.9 Data Analysis

Data collected by the research assistants was uploaded to the ODK cloud and aggregated. The ODK form used for the data collection allows real-time data collection monitoring, and submitted forms were easily viewed, and corrections were easily-made in the field where necessary. After ensuring complete and accurate data collection, aggregated data were downloaded from the server into the principal researcher’s personal computer for data cleaning and analysis. Data cleaning was done on Microsoft EXCEL software, and a clean dataset was exported into the Statistical Package Social Sciences (SPSS) software version 25 for data analysis. Univariate analysis was carried out by summarising categorical variables using frequencies and percentages and continuous variables using mean and standard deviation or median and interquartile range as appropriate. The frequency of facilities with clearly written emergency preparedness and response policy was determined from the checklist and the proportion was calculated to determine the prevalence of facilities with a well-written emergency preparedness policy in Bayelsa state. Items on the Checklist were scored according to the 10 domains in the checklist: governance,

communication, safety and security, triage, logistics and supply management, human resources, operational capabilities, training and education, surge capacity, monitoring/evaluation and Surveillance functions. Thereafter, the total scale score for the checklist would be calculated by the summation of all domain scores. The total scale score for each facility was graded as poor, fair and reasonable level of emergency preparedness. The maximum achievable score for each item in the Checklist is 4, while the minimum is 1with 60 items on the Checklist, there is a total score of 240 points achievable points by each health facility assessed in this study. Facilities with total score of ≥180 points would be rated as good level of preparedness, 120 – 179 points would be rated as fair level of preparedness while facilities with <120 points would categorize as poor level of preparedness. The frequency and proportion of facilities with low, fair and good level of preparedness was calculated to determine the level of preparedness of health facilities for health emergencies in Bayelsa state. The difference in the emergency preparedness across the three levels of health care delivery was assessed using the Chi-square test of proportion. The level of significance is set at p-value < 0.05. A criterion means of 3 was calculated from the five-point Likert scale used in the questionnaire which was used to compute the weighted mean of each question in the questionnaire and the entire items in each set of questionnaires, the grading of level of preparedness is shown in Table 3

Table 3. Grading for facilities Preparedness among health care providers.

Study tool/Domain	Number of items	Range of scores		
		Poor	Fair	Good
Checklist				
Level of emergency preparedness	60	60 – 119 points	120 – 179 points	≥ 180 points

3.0 RESULTS AND DISCUSSIONS

3.1 Policy on emergency preparedness and mitigation strategy of public health emergencies in health institutions in Bayelsa State

Table 4 describes the response pattern to questions investigating the policy on emergency preparedness and mitigation strategy for public health emergencies. The responses showed that 124 (16.4%) 'Strongly agree' there is a policy on emergency preparedness and response in the institution, with 339 (46.1%) stating that they agree. In comparison, 73 (9.9%) disagree, 89 (12.1%) strongly disagree, and 110 (5.0%) are undecided about the presence of an emergency preparedness and response policy in their respective health facilities. Regarding whether the emergency preparedness and response policy is visible and clearly understood by facility workers,54 (7.3) agree that the policy is reviewed annually, and 284 (38.6) strongly agree with its annual review. On the other hand, 169 (23.0%) disagree, 115 (15.6%) strongly disagree, and 113 (15.4%) are undecided.

Responses on full implementation of emergency preparedness policy in the facility are strongly agree 62 (8.4%), agree 274 (37.3%), undecided 108 (14.7%), disagree 183 (24.9%), and strongly disagree 108 (14.7%). However, regarding the statement on Emergency preparedness policy, which addresses all components of emergency preparedness and response, 7.9% strongly agree, 36.3% agreed, and a quarter (25.4%) were undecided, and 20.8% disagree, with 9.5% strongly disagreeing that the components of emergency preparedness policy address all the components of preparedness and response. The weighted mean score for emergency preparedness and response policy implementation among health workers was 3.1, which is at an acceptable level.

Table 5 shows that a 'good' level of implementation of emergency preparedness and response policy was seen among 17.7%, 15.9%, and 9.4% of health workers at the primary, tertiary, and secondary levels of health care delivery, respectively. In addition, 63.8% of health workers at the secondary level of care rated preparedness and response to health emergencies 'poorly' at that level of care. The difference in the proportions of ratings on preparedness and response, however, was not statistically significant across levels of care in Bayelsa state ($\chi 2 = 8.60$; $p = 0.072$). In contrast, there was a significant difference ($\chi^2 = 162.66$; $p = 0.001$) in perceptions of preparedness and responses to public health emergencies among health workers across the different local government areas of the State. In Ogbia LGA, 34.7%, 38.8% and 26.5% rated the policy practice as 'good', 'fair' and 'poor' respectively (Table 5); while in Southern Ijaw LGA, all health workers (100.0%) categorized the policy practice as 'poor'. Other LGAs with high proportion of health workers indicating 'poor' policy practice includes Kolokuma/Opokuma LGA (93.9%), Sagbama (76.9%), and Ekeremor (73.2%).

These findings are in line with previous studies conducted by Olu et al. (2016) and Albis et al. (2020) that identified underlying challenges for the integration and implementation of emergency preparedness policies, and that institutional and strategic gaps exist, which will be counterproductive to disaster risk reduction and invariably affect public health emergency response. It is therefore necessary for health institutions to take proactive steps to implement public health emergency preparedness policies. Similarly, Ogoinja et al. (2020) reported suboptimal levels of emergency preparedness in tertiary and private hospitals in Bayelsa, indicating that while policies may exist, their effectiveness depends on practical implementation and regular review. These discrepancies suggest that policies are foundational, but their operationalization remains challenging.

Table 4 Response of respondents on the policy on emergency preparedness and mitigation strategy for public health emergencies in health institutions in Bayelsa state

Statement	Responses – Frequency N = 735 (%)						
	SA	A	U	D	SD	WM	Remark
There is a policy on emergency preparedness and response in the institution	124 (16.9%)	339 (46.1%)	110 (15.0%)	73 (9.9%)	89 (12.1%)	3.5	Accepted

The Emergency preparedness and response policy is visible and clearly understood by workers in the facility	54 (7.3%)	284 (38.6%)	113 (15.4%)	169 (23.0%)	115 (15.6%)	3.0	Accepted
There is a full implementation of emergency preparedness policy in the facility	62 (8.4%)	274 (37.3%)	108 (14.7%)	183 (24.9%)	108 (14.7%)	3.0	Accepted
The Emergency preparedness policy addresses all the components of emergency preparedness and response.	58 (7.9%)	267 (36.3%)	187 (25.4%)	153 (20.8%)	70 (9.5%)	3.1	Accepted
Emergency preparedness and response policy is reviewed annually in this facility.	37 (5.0%)	242 (33.0%)	150 (20.4%)	200 (27.2%)	106 (14.4%)	2.9	Disagree
Emergency preparedness and response policy is reviewed as the situation demands in this facility	54 (7.3%)	336 (45.7%)	145 (19.1%)	128 (17.4%)	72 (9.8%)	3.2	Accepted
Emergency response is evaluated based on the emergency preparedness and response policy.	65 (8.8%)	318 (43.3%)	140 (19.0%)	149 (20.3%)	63 (8.6%)	3.2	Accepted
Weighted Mean						**3.1**	Accepted

Table 5: Level of Policy Implementation on Emergency preparedness and mitigation at the different levels of care and LGAs in Bayelsa state

Characteristics		Level of Policy Implementation			Chi-square test (pValue)
	Total N=735	Poor N=399 (%)	Fair N=22(%)	Good N=113 (%)	
Level of Care					
Primary level	243	132 (54.3%)	68 (28.0%)	43 (17.7%)	8.60
Secondary level	127	81 (63.8%)	34 (26.8%)	12 (9.4%)	(0.072)
Tertiary Level	365	186 (51.0%)	121 (33.1%)	58 (15.9%)	
Local Government Area	**N =370**	**N =213 (%)**	**N=102(%)**	**N=55(%)**	
Brass	32	3 (9.4%)	21 (65.6%)	8 (25.0%)	162.66
Ekeremor	56	41 (73.2%)	8 (14.3%)	7 (12.5%)	(0.001)
Kolokuma/Opokuma	49	46 (93.9%)	2 (4.1%)	1 (2.0%)	
Nembe	44	10 (22.7%)	31 (70.5%)	3 (6.8%)	
Ogbia	49	13 (26.5%)	19 (38.8%)	17 (34.7%)	
Sagbama	52	40 (76.9%)	7 (13.5%)	5 (9.6%)	
Southern Ijaw	30	30 (100.0%)	0 (0.0%)	0 (0.0%)	
Yenagoa	58	30 (51.7%)	14 (24.1%)	14 (24.1%)	

3.2 Level of emergency preparedness to public health emergencies in the health institutions across Bayelsa State

Table 7 reports the observations about the Leadership/Governance and Triage dimensions of emergency preparedness and responses in public health facilities in Bayelsa. Only about a quarter of health facilities visited (23.2%) have a designated focal person who ensures appropriate management and coordination of emergency response activities and applies basic principles and strategies in the planning and designing action plans for emergency preparedness and response (Table 7). Furthermore, Table 7 reveals that about 4 out of every 5 health facilities do not have 'a separate entry for contaminated or infectious patients into the emergency department' (80.4%), and decontamination areas do not have hot and cold water with runoffs, isolated ventilated areas, or devices for decontamination (85.7%).

Table 8 showed Checklist Observations in public health facilities in Bayelsa state (Communication, Safety, and Security domains). The observations about the Communication dimension in Table 8 shows that 24 health facilities of the 56 visited (42.9%) have clear definition of the communication systems to be deployed in case of emergencies and where the normal systems are overloaded, there are alternative communication channels during emergency situations; 20 facilities (35.7%) have organized messenger system as backup alternative plan during public health emergencies (Table 8). Forty-eight health facilities (85.7%) have not arranged with local telecommunication companies to ensure the provision of uninterrupted communications during public health emergencies (Table 8). Also, in the communication dimension, only 16 facilities (28.6%) indicated how health workers in the facilities would be

notified in times of public health disaster. With respect to Safety/Security dimension, 22 public health facilities (39.3%) had details of personal protective equipment available when there is outbreak of infectious diseases and precautionary measures to be employed when victims need to be decontaminated (Table 4.13). Emergency plan in 14 facilities (25.0%) detailed strategies for staff identification during public health emergencies. About 3 out of every 4 facilities (76.8%), do not have in place competent security teams working with the incident command groups (ICG) and no plan detailing pedestrian and vehicular traffic control during emergencies (Table 8).

Table 9 on Checklist Observation in public health facilities in Bayelsa state (Logistic/Supply, Health workforce and operational capacity domains) showed that stockpiling of drugs and clinical equipment for use during emergencies is available in 21 health institutions (37.5%) meanwhile in 48 facilities (85.7%) catering services, supply of clinical and non-clinical equipment was not included in the emergency preparedness plan. In the health workforce dimension, almost half of the facilities (48.2%) update staff contact lists regularly (Table 9). Adequate shift rotation and self-care for clinical staff to support morale and reduce medical errors were available in 23 facilities (41.1%), while an established staff sick-leave policy during emergencies was available in only 21 health facilities (37.5%). With regards to the operational capabilities testing dimension, about a quarter of emergency plans in the health facilities indicated a need for formal training of staff in emergency situations (23.2%), revealed how health workers would be familiarized with their roles in emergencies (25.0%), and how health facilities would conduct training to support awareness among staff.

Table 10 highlights the Checklist Observation in public health facilities in Bayelsa state (Surge capacity domain). The surge capacity dimension reported in Table 10, shows that 27 health facilities (48.2%) have contingency plan for inter-facility transfer of patients in case the traditional methods of transportation are no longer available; 21 facilities (37.5%) adapt hospital admission and discharge criteria and prioritize clinical interventions according to available treatment capacity and demand; and 20 facilities (35.7%) can increase capacity by outsourcing the care of non-critical patients to appropriate alternative treatment sites. However, designated care areas for patient overflow do not exist in 28 health facilities (50.0%), no identified means of expanding hospital inpatient capacity in 29 facilities (51.8%) and no demonstrable collaboration between the health ministry and health facilities for managing increased demand of health services in 34 facilities (60.7%) during a public health emergency (Table 10).

Table 11 shows the domain scores of the Emergency preparedness and response checklist for public health facilities in Bayelsa state. The dimensions with the highest mean scores were the health workforce (47.3% ± 31.9%), surge capacity (40.1% ± 29.9%), and epidemiological function (38.4% ± 25.9%). With mean scores of 19.4% ± 27.2% and 19.0% ± 30.6%, triage and monitoring/evaluation have the lowest scores among the 10 dimensions of the health facility public health emergency preparedness checklist (Table 11). The total scale has a mean score of 32.7% ± 25.5% (Table 11).

Table 12 on the level of preparedness of health facilities to public health emergencies according to the different levels and by local government areas showed that the majority of the primary health care level had 32 (80%) of the facilities assessed were poorly prepared, with only 7 (17.5)

fairly prepared, and only 1(2.5%) facility was well prepared. On the other hand, secondary facilities showed 7 (50.0) as poorly prepared, 4 (28.6) were fairly prepared, with 3(21.4) were well prepared. The 2 (100%) tertiary health facilities visited showed that they are well prepared for public health emergencies. Furthermore, Table 12 shows that the difference in proportion of health facility preparedness at the different levels of care was statistically significant ($\chi 2 = 22.74$; $p < 0.001$). The LGAs with well-prepared health facilities included Brass (33.3%), Ogbia (28.6%), and Yenagoa (22.2%). The LGAs were also significantly different ($\chi^2 = 25.44$; $p < 0.001$) for public health emergency preparedness in their health facilities (Table 12).

Figure 4 showing the level of preparedness of health facilities to public health emergencies showed that 39 out of the 56 health facilities assessed representing 69.6% were poorly prepared. While 11 (19.6%) indicated fairly prepared for public health emergencies, only 6 (10.7%) were fully prepared.

The findings from the facility-level checklist revealed that health institutions in Bayelsa State generally demonstrated moderate to high preparedness for public health emergencies. The presence of documented emergency preparedness and response policies in most facilities indicates that institutional frameworks are in place to guide actions during health crises. This aligns with the **World Health Organization's (2019)** Health Emergency and Disaster Risk Management Framework, which emphasizes the importance of governance structures and policy frameworks in ensuring coordinated emergency responses. Similarly, **Murthy et al. (2017)** found that hospitals with structured preparedness policies tend to perform better in crises, as such frameworks enhance decision-making and reduce response time. However, the degree of implementation and regular updating of these policies remains a concern. Olu **et al. (2018)** argued that written plans alone do not guarantee operational readiness unless supported by continuous evaluation and capacity building.

The checklist analysis also revealed that facilities scored well in the leadership and governance domains, suggesting that most institutions have designated response committees and assigned roles for emergency management. This finding corresponds with Koka et al. (2018)**,** who reported that strong administrative structures and clear leadership hierarchies are essential to institutional resilience during disasters. Nonetheless, while leadership roles were defined, the degree of engagement and frequency of review meetings appeared inconsistent across facilities. Similar patterns were observed by Paganini et al. (2016) in Italian hospitals, where leadership structures existed but were not always functionally integrated into daily operations, thereby In terms of communication and coordination, most facilities demonstrated internal communication mechanisms and linkages with local health authorities, though inter-facility coordination remained weak. This mirrors the findings of Farley et al. (2017) and Leinhos et al. (2014), who noted that effective communication systems are critical to emergency response but remain a persistent gap in many low- and middle-income countries. The lack of standardized communication channels across healthcare levels in Bayelsa State may therefore hinder timely information flow and resource mobilization during emergencies.

Regarding logistics, supplies, and surge capacity, the checklist revealed moderate preparedness, as most facilities had stockpiles of essential medical supplies but limited surge capacity for large-scale emergencies. This is consistent with **Berhanu et al. (2016),** who found that hospitals in resource-limited settings often lack the capacity to rapidly expand services in response to sudden surges in patient numbers. Similarly, **Ahayalimudin et al (2016)** emphasized that adequate stockpiling, infrastructure readiness, and staff training are crucial for effective surge management. The limited surge capacity observed at Bayelsa State facilities underscores the need for improved contingency planning and infrastructure investment.

Table 7: Checklist Observation in public health facilities in Bayelsa state (Leadership/Governance and Triage domains)

Domains/Items	Observation – Frequency, N = 56 (%)			
	A	S/A	U	NA
.The facility has a designated emergency operations or hospital command Centre, i.e., a specific location prepared to convene and coordinate public health or hospital-wide emergency response activities and equipped with effective means of communication.	9 (16.1%)	7 (12.5%)	1 (1.8%)	39 (69.6%)
There is a designated individual (focal person) to ensure the appropriate management and coordination of related response activities.	13 (23.2%)	7 (12.5%)	0 (0.0%)	36 (64.3%)
The health facility consult core internal and external documents (e.g., publications of the Federal Ministry of health and WHO) related to emergency management to ensure the application of the basic principles and accepted strategies related to planning and implementing an incident action plan.	13 (23.2%)	11 (19.6%)	1 (1.8%)	31 (55.4%)
Job action sheets that briefly list the essential qualifications, duties and resources required of EOC members, hospital managers and staff for emergency-response activities in the health facility are	8 (14.3%)	10 (17.9%)	1 (1.8%)	37 (66.1%)

developed and implemented				
Triage				
The health facility has an experienced triage officer to oversee all triage operations (e.g., a trauma or emergency physician or a well-trained emergency nurse in a supervisory position).	8 (14.3%)	7 (12.5%)	1 (1.8%)	40 (71.4%)
Key areas have been identified and selected for triage purposes in the case health emergencies	15 (26.8%)	6 (10.7%)	0 (0.0%)	35 (62.5%)

Table 8*:* Checklist Observations in public health facilities in Bayelsa state (Communication, Safety, and Security domains)

Domains/Items	**Observation – Frequency, N = 56 (%)**			
	Available	**Somewhat Available**	**Undecided**	**Not Available**
Communication				
There is a clear indication of what communication systems are to be used during emergencies.	24 (42.9%)	11 (19.6%)	2 (3.6%)	19 (33.9%)
An alternative communication system is provided in the event that the normal systems (for example telephone, and cell phones) are overloaded and are unserviceable in emergency situations.	24 (42.9%)	9 (16.1%)	1 (1.8%)	21 (37.5%)

The alternative plan utilizes an organized runner or messenger system as backup during disasters.	20 (35.7%)	13 (23.2%)	0 (0.0%)	23 (41.1%)
There is a detailed plan on what forms of communication systems to be used. Arrangements with local telecommunications companies exist for the provision of adequate uninterrupted communication systems during emergencies in the event of a power outage.	8 (14.3%)	8 (14.3%)	0 (0.0%)	40 (71.4%)
Arrangements with local telecommunications companies exist for the provision of adequate uninterrupted communication systems during emergencies	3 (5.4%)	5 (8.9%)	0 (0.0%)	48 (85.7%)
There are Standardized messages for alerting staff with descriptions of each stage.	9 (16.1%)	9 7 (16.1%)	1 (1.8%)	37 (66.1%)
The Emergency response plan specifies who is responsible for the activation of the plan.	8 (14.3%)	10 (17.9%)	0 (0.0%)	38 (67.9%)
There are specifications of circumstances under which the plan can be activated.	11 (19.6%)	8 (14.3%)	3 (5.4%)	34 (60.7%)
The plan specifies how staff members of the health facility will be notified.	16 (28.6%)	4 (7.1%)	1 (1.8%)	35 (62.5%)
Safety and Security				
There is a competent hospital security team to ensure safety and security in collaboration with the hospital Incident command group (ICG) that identifies areas where increased vulnerability is anticipated (e.g. entry/exits, food/water access points,	10 (17.9%)	2 (3.6%)	1 (1.8%)	43 (76.8%)

pharmaceutical stockpiles.				
A detailed plan on how pedestrians and vehicular traffic will be controlled is in place.	9 (16.1)	4 (7.1%)	0 (0.0%)	43 (76.8%)
The plan shows how staff will be identified during emergencies.	14 (25.0%)	3(5.4%)	2 (3.6%)	37 (66.1%)
There are details of personal protective equipment and precautions to be taken in the event of a possible infectious disease or when victims need decontamination.	22 (39.3%)	14 (25.0%)	0 (0.0%)	20 (35.7%)
The plan shows how healthcare workers from outside the hospital will be identified and registered to facilitate safe and qualified patient care.	9 (16.1%)	12 (21.4%)	0 (0.00%)	34 (60.7%)

Table 9*:* Checklist Observations in public health facilities in Bayelsa state (logistics/supply, health workforce, and operational capacity domains)

Domain/Items	Available	Somewhat Available	Undecided	Not Available
Logistics and Supply				
Stockpiling of drugs and other clinical equipment for use during emergencies is available.	21(37.5%)	17(30.4%)	0(0.0%)	18(32.1%)
There is an adequate supply of Personal Protective Equipment for staff members in the health facility	10(17.9%)	27(48.2%)	0(0.0%)	19(33.9%)
The emergency preparedness plan includes catering services and clinical and non-clinical equipment supply.	4(7.1%)	3(5.4%)	1(1.8%)	48(85.7%)
The Ministry or hospital evaluates supply and equipment	9(16.1%)	19(33.9%)	3(5.4%)	25(44.6%)

levels available during normal times.				
Expert, fully staffed workforce				
Management Updates the health facility staff contact list regularly	27(48.2%)	15(26.8%)	0(0.0%)	14(25.0%)
There is an established, clear staff sick-leave policy, including contingencies for ill or injured family members or dependents of staff.	21(37.5%)	16(28.6%)	0(0.0%)	19(33.9%)
An Established system of rapidly providing healthcare workers (e.g. voluntary medical personnel) with necessary credentials in an emergency situation, in accordance with the policy of the hospital and health authority.	8(14.3%)	6(10.7%)	3(5.4%)	39(69.6%)
There is an adequate shift rotation and self-care for clinical staff to support the morale and reduce medical errors	23(41.1%)	17(30.4%)	0(0.0%)	16(28.6%)
Testing of Operational Capabilities				
There is a clear indication of a responsible person for training and educating staff in the Emergency plan.	12(21.4%)	36(64.3%)	8(14.3%)	0(0.0%)
The plan shows how hospital staff will be familiarized with their roles during emergencies.	14(25.0%)	38(67.9%)	3(5.4%)	0(0.0%)
The plan indicates the need for formal training of staff in emergency situation.	13(23.2%)	38(67.9%)	4(7.1%)	1(1.8%)
The health facility conducts workshops to facilitate staff awareness	15(26.8%)	33(58.9%)	8 (14.3%)	0 (0.0%)

Table 10: Checklist Observation in public health facilities in Bayelsa state (Surge capacity domain)

Domains/Items	**Observation – Frequency, N = 56 (%)**			
	Available	**Somewhat**	**Undecided**	**Not**

		Available		Available
Surge Capacity				
There has been a review of Calculated maximal capacity requirement for patient admission and care based not only on the total number of beds required but also on the availability of human and essential resources and the adaptability of facility space for critical care.	13(23.2%)	7 (12.5%)	1(1.8%)	35(62.5%)
The Ministry in collaboration with the hospitals estimates the increase in demand for hospital services, using available planning assumptions and tools.	6 (10.7%)	12(21.4%)	4 (7.1%)	34(60.7%)
There is an Identified method of expanding hospital inpatient capacity (taking physical space, staff, supplies and processes into consideration).	12(21.4%)	14(25.0%)	1 (1.8%)	29(51.8%)
Designated care areas for patient overflow (e.g. auditorium, lobby) exist in the health facilities.	15(26.8%)	12(21.4%)	1 (1.8%)	28(50.0%)
The health facility can increase capacity by outsourcing the care of non-critical patients to appropriate alternative treatment sites (e.g. outpatient departments adapted for inpatient use, home care for low-severity illness, and chronic-care facilities for long-term patients.	20(35.7%)	8 (14.3%)	1 (1.8%)	27(48.2%)
There is a contingency plan for inter-facility patient transfer should traditional methods of transportation become unavailable	27(48.2%)	8(14.3%)	2(3.6%)	19(33.9%)
The health facility identify potential gaps in the provision of medical care, with emphasis on critical and emergent surgical care.	18(32.1%)	15(26.8%)	3 (5.4%)	20(35.7%)
The health facility addresses these gaps in coordination with the authorities and neighboring and network hospitals.	18(32.1%)	10(17.9%)	2(3.6%)	26(46.4%)
The health institutions adapt hospital admission and discharge criteria and	21(37.5%)	18(32.1%)	2 (3.6%)	15(26.8%)

prioritize clinical interventions according to available treatment capacity and demand.

Table 12: Domain Scores of the Emergency preparedness and response checklist for public health facilities in Bayelsa state

Domains	No of items	Achievable Scores	Domain Scores – Mean ± SD	Transformed Scores – Mean ± SD
Leadership and Governance	4	0 – 8	2.2 ± 2.7	27.0 ± 34.4
Communication	9	0 – 18	5.8 ± 5.2	32.0 ± 29.1
Safety and security	5	0 – 10	2.9 ± 3.2	29.1 ± 31.8
Triage	4	0 – 8	1.6 ± 2.2	19.4 ± 27.2
Logistics and supply management	4	0 – 8	2.8 ± 2.1	34.4 ± 25.7
Expert, fully staffed workforce	4	0 – 8	3.8 ± 2.5	47.3 ± 31.9
Testing of operational capabilities	4	0 – 8	2.3 ± 3.2	29.2 ± 39.7
Surge capacity	9	0 – 18	7.2 ± 5.3	40.1 ± 29.9
Total scale	43	0 – 100	32.7 ± 25.5	32.7 ± 25.5

Table 13 Levels of emergency preparedness of public health facilities at the different levels of care and LGAs in Bayelsa state.

Characteristics	**Total N = 56**	**Level of Preparedness**			**Chi-square test (pValue)**
		Poorly Prepared N=39 (%)	**Fairly Prepared N=11 (%)**	**Well prepared N=6 (%)**	
Level of Care					
Primary level	40	32 (80.0%)	7 (17.5%)	1 (2.5%)	22.74 (0.001*)
Secondary level	14	7 (50.0%)	4 (28.6%)	3 (21.4%)	
Tertiary Level	2	0 (0.0%)	0 (0.0%)	2 (100.0%)	
Local Government Area					
Brass	6	2 (33.3%)	2 (33.3%)	2 (33.3%)	25.44 (0.030*)
Ekeremor	7	7 (100.0%)	0 (0.0%)	0 (0.0%)	
Kolokuma/Opoku	6	5 (83.3%)	1	0	

ma			(16.7%)	(0.0%)
Nembe	8	8 (100.0%)	0 (0.0%)	0 (0.0%)
Ogbia	7	1 (14.3%)	4 (57.1%)	2 (28.6%)
Sagbama	7	5 (71.4%)	2 (28.6%)	0 (0.0%)
Southern Ijaw	6	5 (83.3%)	1 (16.7%)	0 (0.0%)
Yenagoa	9	6 (66.7%)	1 (11.1%)	2 (22.2%)

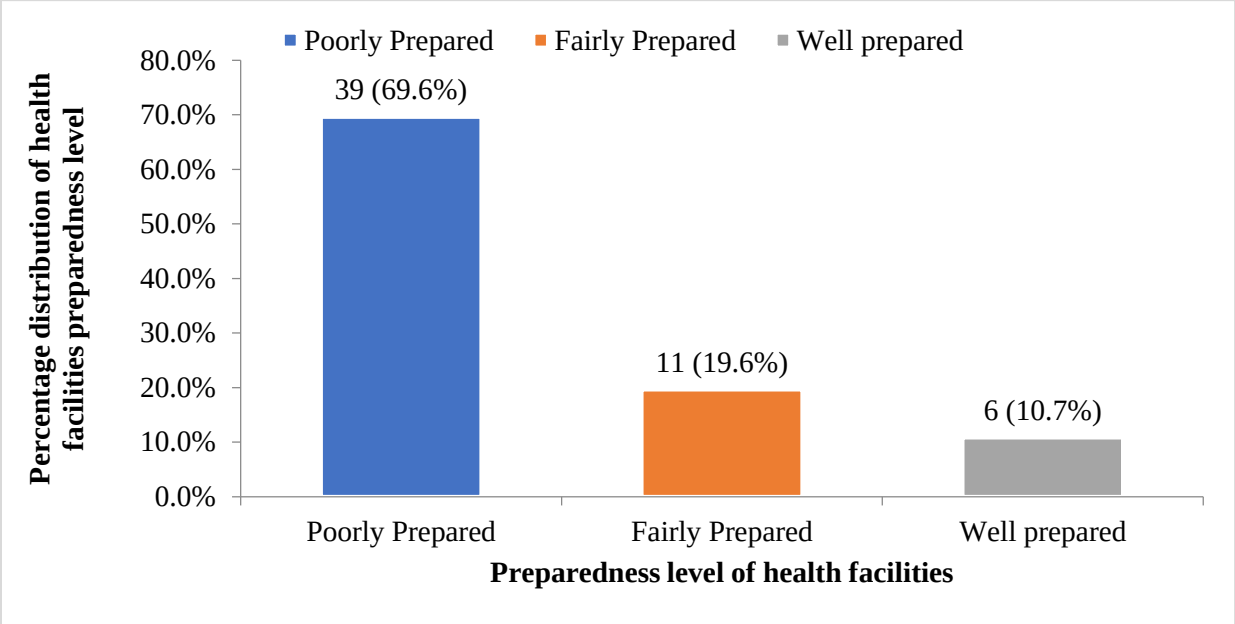

Figure 4: Level of emergency preparedness and response in public health facilities in Bayelsa State

4.0 CONCLUSION

Based on the findings of the study, it was concluded that; there is a 'good' level of policy implementation for emergency preparedness and response across primary, secondary, and tertiary healthcare levels. However, no statistically significant differences were observed in preparedness and response levels among these healthcare tiers within the state. In contrast, the level of preparedness and response to public health emergencies differed significantly across local government areas. It was also concluded that Bayelsa's healthcare providers are generally well-prepared for public health emergencies, further efforts are needed to sustain and enhance this readiness. Continuous training, regular drills, and equitable resource distribution across all levels of health institutions are crucial to maintaining high preparedness standards. Addressing any

residual training gaps and ensuring all healthcare providers, regardless of location or institutional level, have the necessary resources will strengthen Bayelsa State's overall emergency response capacity

REFERENCES

Ahayalimudin, L., Black, R. E., Boerma, J. T., Collins, G. S., Ezzati, M., & Welch, V. (2016). Guidelines for accurate and transparent reporting of health estimates: The GATHER statement. *The Lancet, 388*(10062), 19–23.

Albis, K., Lauta, K. C., & Raju, E. (2020). Disaster knowledge gaps: Exploring the interface between science and policy for disaster risk reduction in Europe. *International Journal of Disaster Risk Science, 11*(1), 45–52. https://doi.org/10.1007/s13753-020-00250-5

Alderwick, H., Hutchings, A., Briggs, A., et al. (2021). The impacts of collaboration between local health care and non-health care organizations and factors shaping how they work: A systematic review of reviews. *BMC Public Health, 21*, 31. https://doi.org/10.1186/s12889-021-10630-1

Augustynowicz, A., Opolski, J., & Waszkiewicz, M. (2022). Resilient Health and the Healthcare System. A Few Introductory Remarks in Times of the COVID-19 Pandemic. *International journal of environmental research and public health*, *19*(6), 3603. *268–284.* https://doi.org/10.3390/ijerph19063603

Ayuba, S. B., Danjuma, A., Nassa, Y. G., Joseph, I., Matthew, A. W., & Micheal, S. N. (2015). Role of the nurse in emergency preparedness: A survey of secondary health facilities in Northern Nigeria. *World Journal of Preventive Medicine, 3*(3), 54–60. https://doi.org/10.12691/jpm-3-3-2

Barhanu, N., Abrha, H., Ejigu, Y., & Woldemichael, K. (2016). Knowledge, experiences and training needs of health professionals about disaster preparedness and response in southwest Ethiopia: A cross-sectional study. *Ethiopian Journal of Health Sciences, 26*(5), 415–421. https://doi.org/10.4314/ejhs.v26i5.3

Bijani, M., & Khaleghi, A. A. (2019). Challenges and barriers affecting the quality of triage in emergency departments: A qualitative study. *Galen Medical Journal, 8*(1), 61–82. https://doi.org/10.31661/gmj.v8i.1619

Cimellaro, G. P., Renschler, C., Reinhorn, A. M., & Arendt, L. (2016). PEOPLES: A framework for evaluating resilience. *Journal of Structural Engineering, 142*(10), 84–91. https://doi.org/10.1061/(ASCE)ST.1943-541X.0001514

Coccia, M. (2022). Preparedness of countries to face COVID-19 pandemic crisis: Strategic positioning and underlying structural factors. *Environmental Research, 203*, 111678. https://doi.org/10.1016/j.envres.2021.111678

De Vries, M., Liesbeth C. & Wierik, M. (2020). Emerging infectious diseases. *International* data of surficial sediment from Indiana Harbor and Ship Canal, Indiana, USA. *PANGAEA, 12(32), 158-175. https://doi.org/10.1594/PANGAEA.899149,*

Farah, R., Al-Hawari, H., Albtoush, A., Nofal, A., Hyasat, T., Jabeh, R. A., Suboh, L. T., Toubasi, A. A., Eqrai, T. F., & Abufaraj, M. (2023). Prevalence and risk factors of COVID-19 infection, mortality, and post-infection lung fibrosis in patients with type 2 diabetes: A cross-sectional study. *Journal of International Medical Research, 51*(9), 1–15. https://doi.org/10.1177/03000605231198413

Farley, J. M., Suraweera, I., Perera, W. L. S. P., Hess, J., & Ebi, K. L. (2017). Evaluation of flood preparedness in government healthcare facilities in Eastern Province, Sri Lanka. *Global Health Action, 10*(1), 1331539. https://doi.org/10.1080/16549716.2017.1331539

Garg, M., Stawicki, S. P., Jeanmonod, R., Miller, A. C., Paladino, L., Gaieski, D. F., & Yaffee, A. Q. (2020). The 2019–2020 novel coronavirus pandemic: A multidisciplinary consensus paper. *Journal of Global Infectious Diseases, 12*(2), 47–93.

Hess, J. J., Errett, N. A., McGregor, G., Isaksen, T. B., Wettstein, Z. S., Wheat, S. K., & Ebi, K. L. (2023). Public health preparedness for extreme heat events. *Annual Review of Public Health, 44*, 301–321. https://doi.org/10.1146/annurev-publhealth-071421-025508

Jefferson, A. L., & Berrens, R. P. (2010). On-site sampling and the estimation of demand systems: A multivariate Poisson-log normal approach. *Journal of Environmental Economics and Management, 138*(1), 234–249.

Khan, A., Zaman, K., & Rehman, M. (2018). The impact of selection processes on organizational effectiveness: Evidence from developing nations. *Journal of Human Resources Management, 7*(12), 50–56.

Khan, M., Khan, H., Khan, S., & Nawaz, M. (2020). Epidemiological and clinical characteristics of coronavirus disease cases at a screening clinic during the early outbreak period: A single-centre study. *Journal of Medical Microbiology, 69*(8), 1114–1123.

Koka, P. M., Sawe, H. R., Mbaya, K. R., Kilindimo, S. S., Mfinanga, J. A., Mwafongo, V. G., & Reynolds, T. A. (2018). Disaster preparedness and response capacity of regional hospitals in Tanzania: A descriptive cross-sectional study. *BMC Health Services Research, 18*, 909. https://doi.org/10.1186/s12913-018-3609-5

Leinhos, M., Qari, S. H., & Williams-Johnson, M. (2014). Preparedness and emergency response research centers: Using a public health systems approach to improve all-hazards preparedness and response. *Public Health Reports, 129*(4), 8–18.

Martinez, A., Norström, K., Wang, K., &Keri, C. H . (2019). Polychlorinated biphenyl cogeneration Public Health Preparedness Capabilities: National Standards for State and Local Planning in 2011

Mitchell, C., Burdick, K., & Yocum, A. (2024). Predictors of functional impairment in bipolar disorder. *Journal of Bipolar Disorders, 24*(7), 709–719.

Mitchell, C., Burdick, K., & Yocum, A. (2024). Predictors of functional impairment in bipolar disorder. *Journal of Bipolar Disorders, 24*(7), 709–719.

Murthy, S. B., Gupta, A., Merkler, A. E., Navi, B. B., Mandava, P., Iadecola, C., & Kamel, H. (2017). Restarting anticoagulant therapy after intracranial hemorrhage: A systematic review and meta-analysis. *Stroke, 48*(6), 1594–1600.

Noelte, C., Kosmos, C., & McWhorter, A. (2023). New challenges, evolved approach: The public health response readiness framework. *Journal of Health Secur,21(1), 89-94.*

Ogoinja, A., Bernard, B. B., Omosivie, M., & Ezeokoro, C. (2020). Emergency preparedness and response in tertiary and private hospitals in Yenagoa metropolis. *Current Journal of Applied Science and Technology, 39*(20), 6–22.

Oleribe, O., Osita-Oleribe, P., Salako, B., Ishola, T., Fertleman, M., & Taylor-Robinson, S. D. (2019). COVID-19 experience: Taking the right steps at the right time to prevent avoidable morbidity and mortality in Nigeria and other nations. *International Journal of General Medicine, 12*, 491–495. https://doi.org/10.2147/IJGM.S261256

Olu, O. O., Lako, R., Bunga, S., Berta, K., Kol, M., Ramadan, P. O., Ryan, C., Udenweze, I., Guyo, A. G., Conteh, I., Huda, Q., Gai, M., Saulo, D., Papowitz, H., Gray, H. J., Chimbaru, A., Wangdi, K., Grube, S. M., Barr, B. T., Wamala, J. F. (2018). Analyses of the performance of the Ebola virus disease alert management system in South Sudan: August 2018 to November 2019. PLoS Neglected Tropical Diseases, 14(11), 416–432. https://doi.org/10.1371/journal.pntd.0008872

Onwujekwe, O., Agwu, P., Roy, P., et al (2023). The promise of grassroots approaches to solving absenteeism in primary health-care facilities in Nigeria: Evidence from a qualitative study. *Health Systems & Reform, 9*(1), 21–37.

Paganini, M., Borrelli, F., Cattani, J., Ragazzoni, L., Djalali, A., Carenzo, L., Corte, F., Frederick, M., Burkle, F., & Luigi, P. (2016). European master in disaster medicine: A scoping review. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 24*(33), 101–116.

Revere, D., Nelson, K., Thiede, H., Duchin, J., Stergachis, A., & Baseman, J. (2011). Public health emergency preparedness and response communications with health care providers. *BMC Public Health, 11*, 337.

Rose, A. J., Glick, G. C., Smith, R. L., Schwartz-Mette, R. A., & Borowski, S. K. (2017). Co-rumination exacerbates stress generation among adolescents with depressive symptoms. *Journal of Abnormal Child Psychology, 45*(5), 985–995.

Sarkar, A., et al. (2020). Prevalence of SARS-CoV-2 infection in India. *Indian Journal of Medical Research, 157*(2), 54–67.

Schorlemer, S. & Maus, S. (2015). Climate change as a threat to peace: Impacts on cultural preparedness and response 2018 national snapshot. R*etrieved July 5, 2019, from https://www.cdc.gov/cpr/pubslinks/2018/documents/2018_Preparedness_Report.pdf*

Simental, J.& Bynum, T. (2023). The role of public health in emergency management: Perception of occupational risk to reduce the accident phenomenon: an analysis of the variables. Journal of Advanced Health Care, 9(16), 64-79. DOI:10.36017/JAHC2012-007

World Health Organization. (2010). *Global recommendations on physical activity for health.* Geneva: Author.

World Health Organization. (2012). *Toolkit for assessing health-system capacity for crisis management (Part 2: Assessment form).*

World Health Organization. (2019). *Health emergency and disaster risk management framework.*