Assessing The Effectiveness and Sustainability of Emergency Communication Centres in Disaster Management in Abuja, Nigeria

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ABSTRACT

Emergency Communication Centres (ECCs) play a critical role in disaster management by serving as the first point of contact between households and emergency response agencies. This study assesses the effectiveness and sustainability of Emergency Communication Centres in disaster management in Abuja, Nigeria, with a specific focus on operational performance and household satisfaction. A quantitative cross-sectional survey design was adopted, and data were collected from 384 households across Abuja Municipal Area Council using structured questionnaires. Descriptive statistics were employed to evaluate key dimensions of operational effectiveness, while binary logistic regression analysis was used to examine factors associated with household satisfaction. The findings reveal that ECCs in Abuja demonstrate moderate to moderately high operational performance, particularly in professionalism of call-takers, clarity of guidance, and coordination with response agencies. However, response speed at the initial contact stage, especially time to answer calls, emerged as a key area of concern. Overall household satisfaction was moderate, with just over half of respondents reporting satisfaction with ECC services. Regression results indicate that operational performance indicators did not significantly predict satisfaction, while educational attainment emerged as the only significant predictor, suggesting that user expectations play an important role in satisfaction assessments. The study concludes that while Emergency Communication Centres in Abuja are operationally functional, gaps at the first point of contact and inconsistencies in service experience limit their sustainability. Enhancing call-handling efficiency, strengthening communication consistency, and managing user expectations are essential for improving household satisfaction and reinforcing the long-term effectiveness of emergency communication systems in urban disaster management.

Keywords: Emergency communication centres; Disaster management; Operational effectiveness; Household satisfaction; Urban emergencies; Service sustainability

INTRODUCTION

Disasters and emergencies continue to pose significant threats to human security, livelihoods, and sustainable development, particularly in rapidly urbanising regions of the Global South. Climate change, population growth, and infrastructural stress have increased both the frequency and complexity of emergencies, ranging from floods and fires to road traffic accidents and public health crises. In this context, effective disaster management increasingly depends on the availability of reliable emergency communication systems that can facilitate timely reporting, coordinated response, and efficient allocation of emergency resources (Khan et al., 2023). Communication failures during emergencies have been repeatedly identified as a critical factor contributing to avoidable loss of life and property, underscoring the central role of emergency communication centres in contemporary disaster governance (Karaman et al., 2024).

Globally, Emergency Communication Centres function as the primary interface between affected populations and first responder agencies. Through centralised call handling, incident triage, and coordinated dispatch, these centres enable rapid mobilisation of police, fire, medical, and disaster management services. International experience demonstrates that the effectiveness of such centres is closely tied to response timeliness, inter-agency

coordination, and the professionalism of call handling and dispatch processes (Sienkiewicz-Małyjurek & Owczarek, 2020). Effective collaboration and coordination across agencies further strengthen emergency response capacity, particularly where communication systems support shared situational awareness (Simona et al., 2021). Equally important is public satisfaction with emergency services, as awareness and utilisation patterns strongly influence trust and long-term engagement with emergency systems (Nto et al., 2024). Consequently, operational effectiveness and user satisfaction are now widely recognised as core performance indicators for emergency communication infrastructure.

In Nigeria, the institutional framework for emergency communication is anchored by the Nigerian Communications Commission, which oversees the establishment and operation of Emergency Communication Centres operating the national toll-free emergency number 112 (NCC, 2025). These centres are designed to provide round-the-clock access to emergency assistance and to coordinate responses across multiple agencies, including the police, fire service, health authorities, and the National Emergency Management Agency (NEMA), which plays a central role in national disaster preparedness and response (Anthony et al., 2019). Abuja, as the Federal Capital Territory and one of the most densely populated and administratively significant urban areas in the country, hosts a flagship Emergency Communication Centre that serves a diverse population and handles a wide range of emergency incidents. The performance of this centre therefore has important implications not only for public safety in Abuja but also for national policy and practice in emergency communication, particularly given the city's growing reliance on ICT-enabled emergency management systems (Paul et al., 2025).

Despite this institutional architecture, concerns persist regarding the operational performance and sustainability of Emergency Communication Centres in Nigeria. Empirical evidence from recent disasters and emergency incidents suggests that delays in call response, misdirected dispatches, and weak inter-agency coordination continue to undermine effective emergency response in urban areas, including Abuja (Paul et al., 2025; Bang & Fanama, 2024). These operational shortcomings are particularly problematic in time-sensitive emergencies, where even short delays can significantly increase mortality and damage. Moreover, inconsistent service performance has been shown to erode public confidence, leading households to rely on informal communication channels or alternative coping mechanisms rather than formal emergency systems (Modeyin, 2025).

Household satisfaction with emergency communication services is therefore a critical yet under-examined dimension of disaster management in Nigeria. Satisfaction reflects users' perceptions of response speed, clarity of instructions, professionalism of call handlers, and the perceived effectiveness of dispatched services. Studies in public service delivery consistently demonstrate that dissatisfaction with frontline services reduces trust in institutions and discourages repeated engagement, thereby weakening system sustainability (Lahusen, 2024). In the Nigerian context, limited awareness and low utilisation of emergency services, despite their availability, highlight gaps in public confidence and satisfaction with emergency response mechanisms (Nto et al., 2024). In the context of emergency communication, dissatisfaction may translate into delayed reporting of incidents, non-compliance with emergency instructions, or complete avoidance of official channels during crises, patterns also reflected in broader assessments of Nigeria's emergency care system (Usoro et al., 2021). Such outcomes fundamentally undermine the objectives of centralised emergency response systems.

Operational effectiveness and user satisfaction are also closely linked to the broader question of sustainability in disaster management. Sustainable emergency communication systems are not defined solely by their physical infrastructure or technological sophistication, but by their ability to deliver consistent, high-quality services that maintain public trust over time (Bonfanti et al., 2024). As UNDRR (2023) emphasises, resilience in disaster management requires systems that function reliably under stress, adapt to changing risk environments, and remain socially legitimate in the eyes of the populations they serve (Atkinson, 2023). Emergency Communication Centres that fail to meet performance expectations risk becoming symbolic rather than functional components of disaster governance, particularly where resilience and reliability are weakly institutionalised (Demchak, Nicholls & Minnick, 2023).

In Abuja, these challenges are compounded by rapid urban growth, increasing traffic density, informal settlements, and rising exposure to climate-related hazards such as flooding (Umaru et al., 2025). The growing demand for emergency services places significant pressure on existing communication and response infrastructure, making rigorous evaluation of ECC performance both timely and necessary (Mac, Kroeger &

Airiohuodion, 2019). While national policy documents highlight the strategic importance of the 112 emergency number, there remains limited empirical evidence assessing how effectively Emergency Communication Centres respond to household emergencies and how satisfied users are with the services provided. This gap is particularly notable given the centrality of households as the first point of contact in most emergency situations (Ni et al., 2025).

Against this backdrop, this study examines the effectiveness and sustainability of Emergency Communication Centres in disaster management in Abuja, Nigeria, with particular attention to operational performance and household satisfaction. It provides empirical, performance-oriented evidence on how effectively Emergency Communication Centres respond to household emergencies and how users assess the quality of services received. By focusing on these two interrelated dimensions, the study responds directly to growing calls in the disaster management literature for rigorous evaluations of emergency communication systems in developing country contexts (Karaman et al., 2024; WHO, 2017). Using quantitative household survey data, the analysis demonstrates how operational processes and service experiences influence the long-term sustainability, credibility, and policy relevance of emergency communication infrastructure. The findings offer practical insights for strengthening emergency communication governance in Nigeria, particularly for the Nigerian Communications Commission and collaborating response agencies, while contributing to broader academic debates on service effectiveness, user satisfaction, and sustainable disaster management in rapidly urbanising African cities.

LITERATURE REVIEW

Operational performance of emergency communication centres

Operational performance refers to the ability of Emergency Communication Centres to deliver timely, accurate, and coordinated emergency dispatch services, thereby shaping outcomes for pre-hospital response and patient care. Recent research highlights that the first stage of the emergency response chain begins when emergency calls are received and prioritised by trained dispatch staff, who determine the urgency of the incident and allocate resources accordingly (Nicoletta et al., 2025). Effective performance at this stage is critical because delayed, inaccurate, or inappropriate dispatch decisions can compromise response outcomes and patient survival, particularly in time-sensitive emergencies. Studies consistently emphasise that dispatch accuracy and prioritisation are foundational to emergency medical systems, as dispatchers serve as the first point of care and influence downstream clinical and operational outcomes (Gardett et al., 2013; Larribau, 2024).

Conceptually, operational performance in emergency communication encompasses several interrelated dimensions. These include call accessibility and answer time, accuracy of incident triage, speed and appropriateness of dispatch, and the effectiveness of coordination across multiple response agencies. Studies of urban emergency response systems show that failures at the communication and dispatch stage often cascade into delayed interventions, misallocation of resources, and preventable losses, even when response agencies themselves are adequately equipped (CISA, 2024; Basnawi, 2024). As such, performance is increasingly understood as a system-level outcome shaped by human decision-making, organisational protocols, and interagency interoperability, rather than technology alone.

In rapidly growing cities, operational performance is further shaped by demand pressure. High call volumes, traffic congestion, and overlapping jurisdictions place significant strain on emergency communication centres, making consistency and reliability key indicators of effectiveness. International evaluations of emergency call centres demonstrate that sustained performance under stress is a defining characteristic of resilient emergency systems, particularly as centres must manage both routine and crisis-level surges in demand (Petitdemange et al., 2019). Research on emergency dispatch environments also shows that stress-inducing conditions—such as caller distress, high workload, and complex urban dynamics—can impair decision-making and slow response processes unless systems are designed for robustness and adaptability (Sinha et al., 2025). Within this framework, operational effectiveness becomes a central criterion for judging whether emergency communication centres can support disaster management objectives in complex urban environments such as Abuja.

Service quality and responsiveness in emergency response

While operational performance captures technical and organisational efficiency, service quality and responsiveness reflect how emergency communication services are experienced by users. In public service delivery, service quality is commonly conceptualised as the degree to which service encounters meet or exceed user expectations, particularly in terms of responsiveness, clarity, professionalism, and reliability. Recent research using the SERVQUAL framework shows that responsiveness, clarity of communication, and reliability strongly shape user satisfaction in emergency-related services (Xie & Ma, 2023). In emergency contexts, these dimensions take on heightened importance due to the emotional intensity and time sensitivity of service interactions, where users depend on clear, calm, and effective communication to navigate high-stress situations (Arphan, 2024).

Responsiveness is a particularly critical element of service quality in emergency communication. It refers not only to speed of response but also to the appropriateness and clarity of actions taken once contact is established. Empirical studies show that users judge emergency services not solely by how quickly calls are answered, but by whether call handlers provide clear instructions, demonstrate competence and empathy, and facilitate effective on-ground response (Xie & Ma, 2023; Simbo, 2024). Qualitative evidence from emergency call centres indicates that callers value being listened to, taken seriously, and guided clearly - factors that strongly shape satisfaction and trust in the system (Spjeldnæs et al., 2023). Similarly, research on emergency call-handling practices highlights that empathy, calm communication, and personalised guidance significantly improve caller confidence and perceived effectiveness. Poor responsiveness, even in technically functional systems, has been shown to undermine confidence and perceived effectiveness (Regehr & LeBlanc, 2017).

Service quality in emergency communication therefore operates at the intersection of operational processes and human interaction. Call handlers act as both information processors and service providers, translating distress signals into actionable decisions while simultaneously shaping user perceptions of institutional competence. Research shows that the interactional behaviour of call handlers, including clarity, professionalism, and communicative competence, strongly influences how callers evaluate the effectiveness and trustworthiness of emergency services (Møller et al., 2021). In this sense, service quality mediates the relationship between operational performance and user outcomes, as the quality of communication affects caller reassurance, compliance, and perceived legitimacy of the response system (Aslam et al., 2022). Emergency communication centres that perform well operationally but fail to deliver responsive, professional service risk being perceived as ineffective, highlighting the importance of integrating service quality considerations into performance evaluations (Dash et al., 2022).

THEORETICAL FRAMEWORK

This study is anchored in Systems Theory, which provides a useful framework for understanding the functioning and sustainability of Emergency Communication Centres within complex disaster management environments. Systems Theory, advanced by Ludwig von Bertalanffy, conceptualises organisations as open systems composed of interrelated and interdependent components that interact continuously with their internal and external environments (von Bertalanffy, 1968). The theory emphasises that system outcomes are shaped not by the performance of isolated elements, but by the quality of interactions among subsystems, feedback mechanisms, and the system's capacity to adapt to changing conditions.

A central tenet of Systems Theory is that effectiveness emerges from coordination, integration, and balance among system components. In emergency management, these components typically include communication infrastructure, human operators, institutional protocols, and multiple response agencies. Emergency Communication Centres function as integrative hubs that receive inputs in the form of emergency calls, process information through call handling and triage, and generate outputs in the form of coordinated emergency responses. Breakdowns at any point in this process, such as delayed call handling, poor dispatch decisions, or weak inter-agency coordination, can undermine overall system effectiveness even when individual agencies are adequately resourced (Comfort et al., 2010; UNDRR, 2023).

Systems Theory also highlights the importance of feedback and adaptability for sustainability. Open systems rely on feedback from users and the operating environment to adjust processes, correct inefficiencies, and maintain performance over time. In the context of Emergency Communication Centres, household experiences and satisfaction represent critical feedback signals that reflect how well the system is functioning from the user's

perspective. Persistent dissatisfaction indicates system imbalance or dysfunction and threatens long-term viability, while positive service experiences reinforce system legitimacy and continued use (OECD, 2021).

Applied to this study, Systems Theory provides a coherent framework for examining how the operational performance of Emergency Communication Centres in Abuja influences household satisfaction and, by extension, system sustainability. By viewing emergency communication as an interconnected service system rather than a standalone technical facility, the theory supports a performance-oriented evaluation that links coordination, service delivery, and user outcomes within Nigeria's urban disaster management context.

METHODOLOGY

This study adopted a quantitative cross-sectional survey design to evaluate the operational effectiveness of Emergency Communication Centres and household satisfaction with emergency communication services in Abuja Municipal Area Council (AMAC), Federal Capital Territory, Nigeria. The design enabled the collection of data from households at a single point in time, allowing for systematic measurement of service performance and user perceptions across a heterogeneous urban population. AMAC was selected as the study area because it serves as the administrative and commercial core of the Federal Capital Territory and hosts a flagship Emergency Communication Centre, making it a strategic context for assessing emergency communication performance in a high-demand urban setting. The study population comprised household heads or responsible adult household members aged 18 years and above, as they are most likely to have direct experience with emergency incidents and interactions with emergency communication services.

A multi-stage sampling technique was employed to ensure representative coverage of the study area. All twelve wards in AMAC were included to enhance spatial representativeness. One enumeration area was selected from each ward using official administrative coverage frames, after which households were selected through systematic random sampling. From each selected household, one eligible adult respondent was chosen to participate in the survey. A minimum sample size of 384 respondents was determined using Cochran's formula for large populations at a 95 percent confidence level, with an assumed population proportion of 0.5 and a margin of error of 0.05. Data were collected through face-to-face administration of structured questionnaires by trained research assistants to maximise response rates and ensure clarity of responses. The questionnaire captured respondents' socio-demographic characteristics and assessed perceptions of operational effectiveness and household satisfaction using five-point Likert-scale items. The instrument was subjected to expert review to establish content validity, and a pilot test confirmed internal consistency, with Cronbach's alpha values exceeding the accepted threshold of 0.70 for the effectiveness and satisfaction scales.

Quantitative data were analysed using the Statistical Package for the Social Sciences. Descriptive statistics, including frequencies, means, and standard deviations, were used to summarise household perceptions of Emergency Communication Centre operational performance and levels of satisfaction. Inferential analysis focused on examining the relationship between operational effectiveness indicators and household satisfaction using multiple regression analysis, with satisfaction specified as the dependent variable and effectiveness measures such as call responsiveness, professionalism of call handlers, clarity of instructions, and coordination with responders entered as predictors. All statistical tests were conducted at a 5 percent level of significance. Ethical standards were observed throughout the study, including informed consent, voluntary participation, confidentiality of responses, and secure handling of data for academic purposes only.

FINDINGS

Socio-Demographic Distribution of Respondents

Fig. 1 presents the age distribution of respondents in the study. The largest proportion falls within the 25–34 years age bracket, representing 28.3% of the sample, followed by those aged 35–44 years (20.4%) and 18–24 years (18.1%). Middle-aged adults aged 45–54 years account for 15.6%, while older respondents in the 55–64 years and 65 years and above categories constitute 8.5% and 9.1%, respectively. This distribution suggests that the sample is relatively youthful, with a significant concentration of respondents in the economically active

population, which may influence patterns of awareness, access, and utilisation of Emergency Communication Centre services.

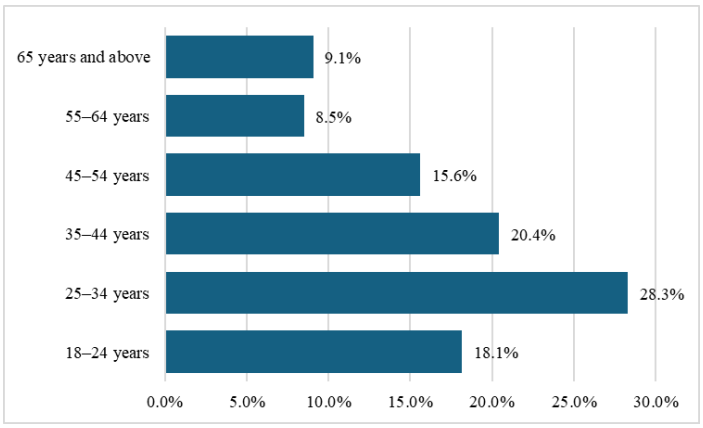

Fig. 1 - Age of Respondents

Fig. 2 shows the gender distribution of respondents. Females constitute a slightly higher proportion of the sample at 51%, compared to 49% for males. This near-equal representation indicates a balanced gender composition, allowing for a more comprehensive analysis of potential gender-based differences in awareness, access, utilisation, and satisfaction with Emergency Communication Centre services.

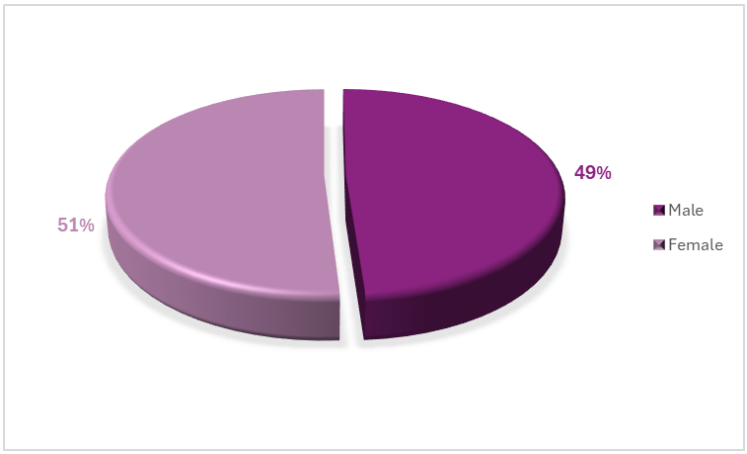

Fig. 2 - Gender

Fig. 3 presents the marital status distribution of respondents. A majority, 57.8%, are married or cohabiting, followed by 31.7% who are single. Smaller proportions include 6.2% who are divorced or separated and 4.2% who are widowed. This distribution suggests that most respondents belong to household structures that may influence emergency communication needs and utilisation patterns.

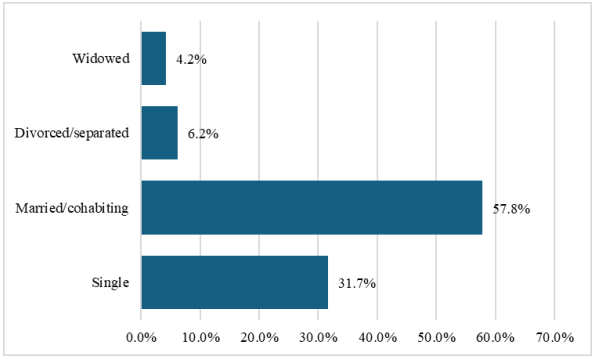

Fig. 3 - Marital Status

Fig. 4 shows the distribution of respondents by highest educational qualification. The largest proportion, 33.7%, hold a bachelor's degree, followed by 27.5% with senior secondary education and 16.7% with tertiary-level qualifications such as ND or NCE. Smaller segments include 8.5% with postgraduate education, 7.4% with junior secondary, 5.7% with primary education, and only 0.6% with no formal education. This indicates a relatively high overall educational attainment among respondents, which could influence awareness and engagement with Emergency Communication Centres (ECCs).

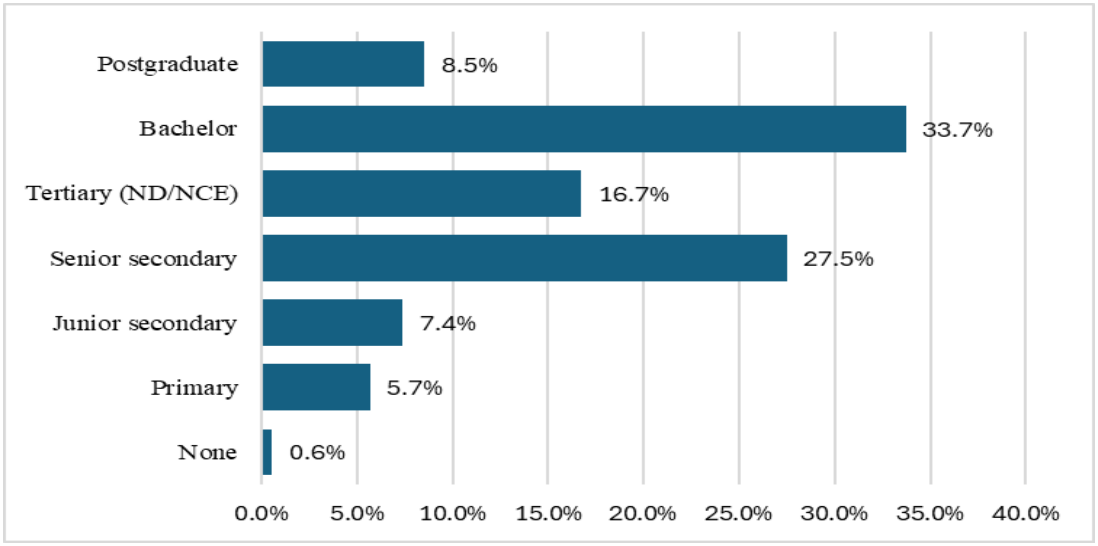

Fig. 4 - Highest Education Completed

Fig. 5 presents the distribution of respondents by main occupation. The largest share work in the private sector (29.2%), closely followed by those in the public sector (26.6%) and self-employed individuals (26.3%). Smaller proportions include students (9.1%), unemployed persons (6.5%), and retirees (2.3%). This diverse occupational spread suggests that the study sample captures perspectives from both formal and informal economic participants, which may shape utilisation patterns of Emergency Communication Centres (ECCs).

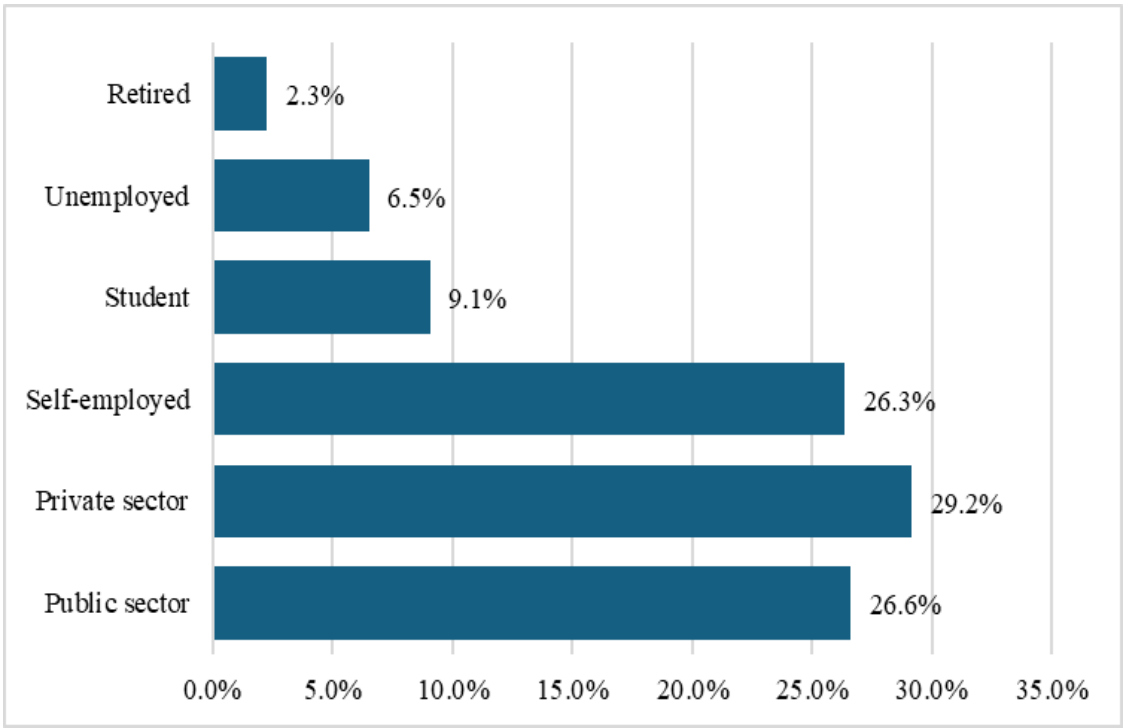

Fig. 5 - Main Occupation

Fig. 6 shows the monthly household income distribution of respondents. The largest proportion earn ₦100,000 – < ₦300,000 (32.9%), followed closely by those earning less than ₦100,000 (30.6%). About 19.0% report monthly incomes between ₦300,000 and < ₦600,000, while 11.9% earn ₦600,000 or more. A small fraction (5.7%) chose not to disclose their household income. This pattern reflects a predominantly low- to middleincome demographic, which may influence both awareness and accessibility of ECC services.

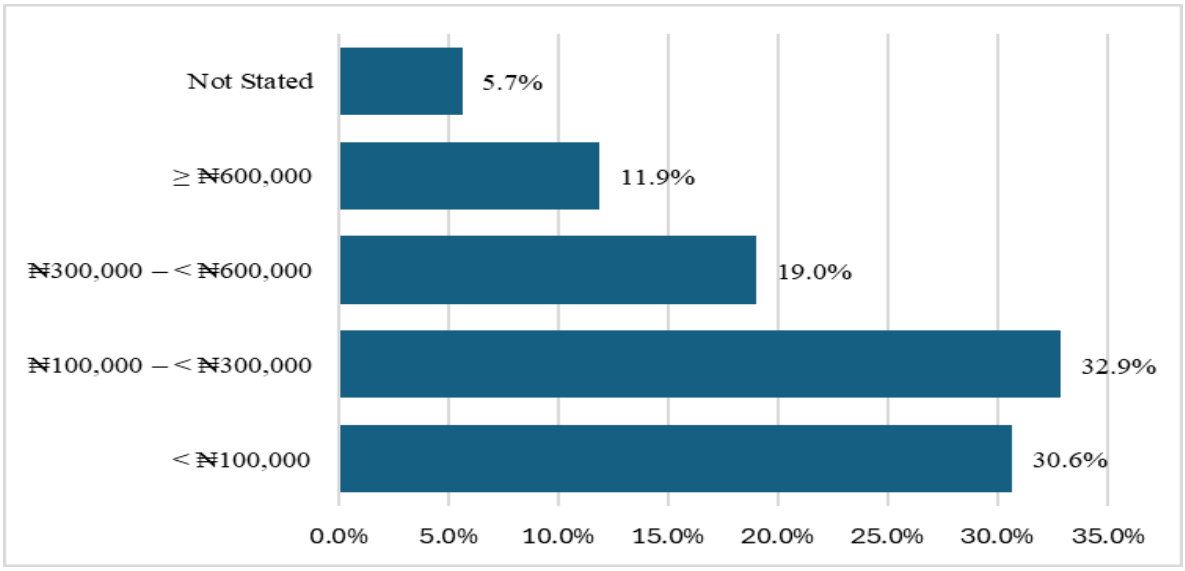

Fig. 6 – Monthly Household Income

Fig. 7 presents the distribution of respondents by type of residential area. Nearly half (49.3%) reside in urban core areas such as Wuse, Garki, or Maitama, while 30.9% live in peri-urban locations. The remaining 19.8% are situated in semi-rural areas. This distribution reflects the predominantly urban character of Abuja Municipal Area Council, with significant representation from peri-urban and semi-rural communities, allowing for comparative analysis of ECC accessibility across different settlement types.

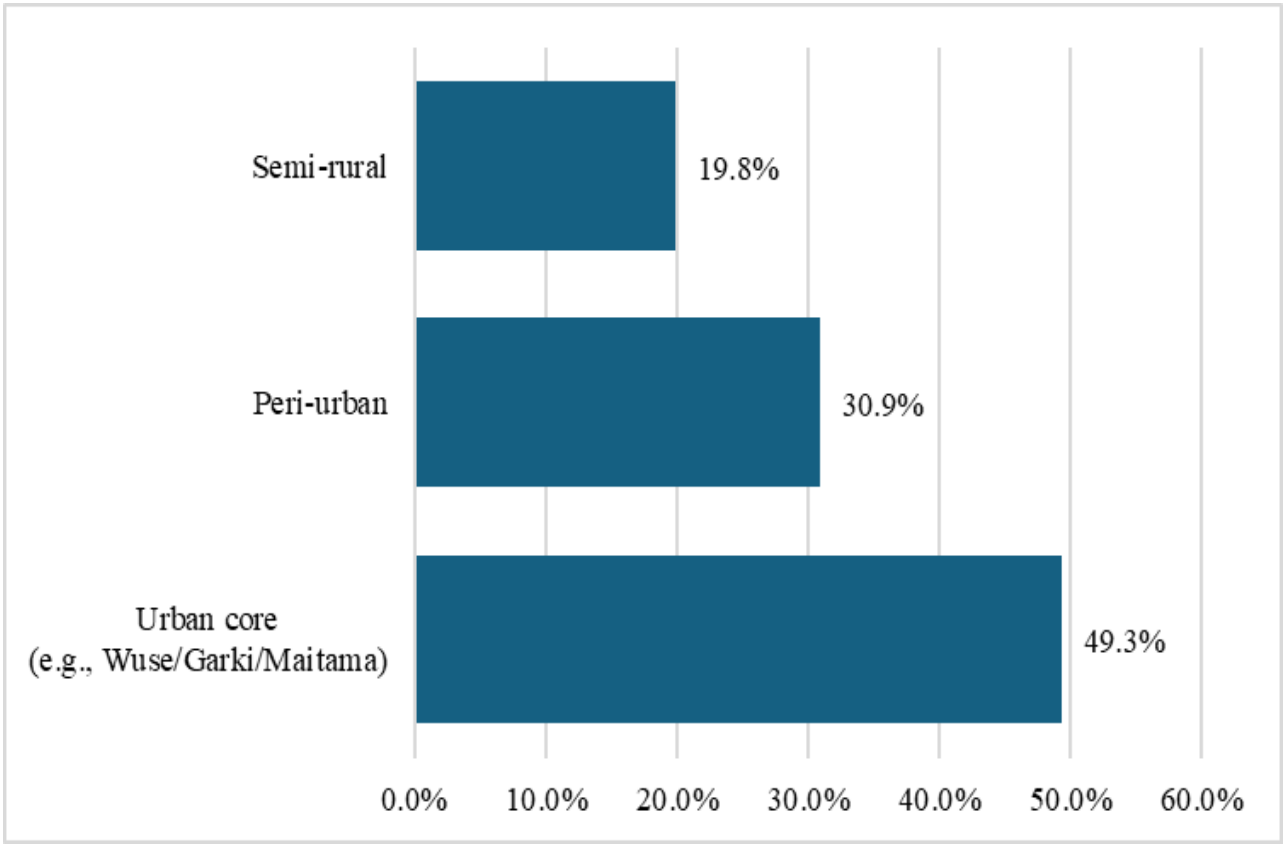

Fig. 7 - Type of Area

Fig. 8 shows respondents' mobile phone ownership status. A vast majority (75.1%) own a smartphone, while 21.8% have a basic phone. Only 3.1% reported having no mobile phone. This high level of mobile phone penetration, particularly smartphones, suggests a strong potential for leveraging mobile-based platforms, including ECC toll-free numbers and digital communication channels, for emergency response and public awareness.

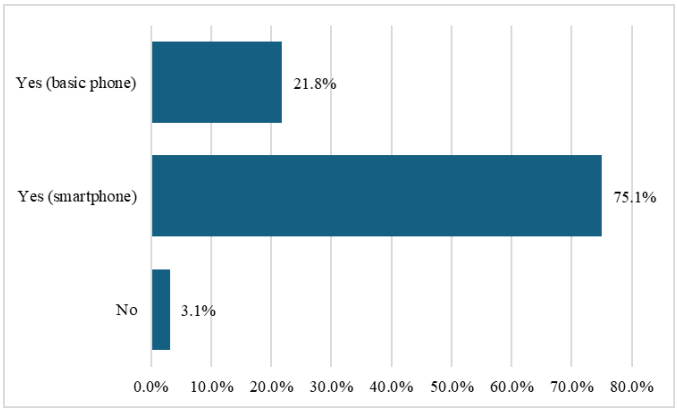

Fig. 8 - Mobile Phone Ownership

Fig. 9 presents the distribution of respondents' internet access within their households. A majority (60.9%) reported having regular internet access, while 26.6% indicated they have access sometimes. Only 12.5% of respondents reported having no internet access. This pattern suggests that most households can potentially receive ECC-related awareness messages and updates through online channels, though a notable minority remain digitally excluded.

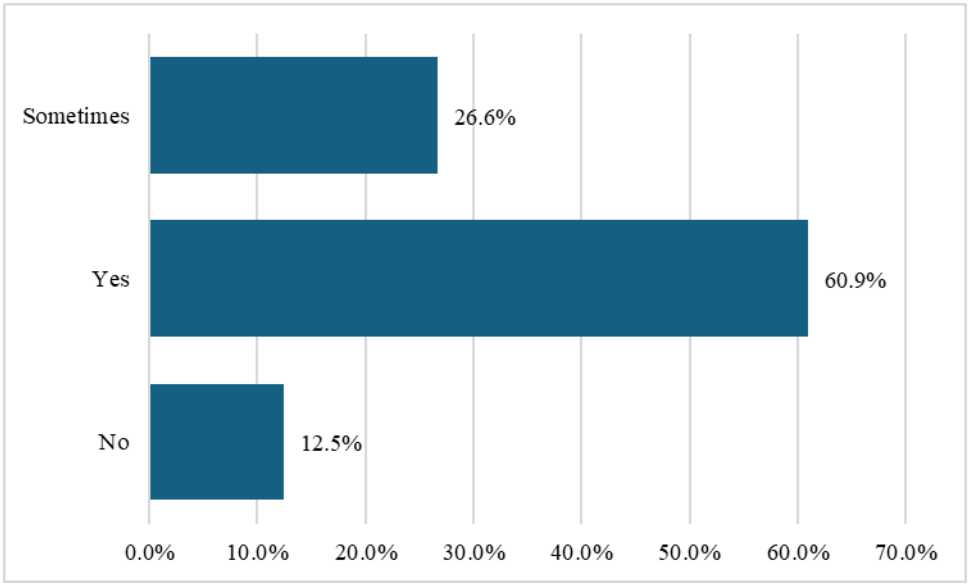

Fig. 4.9 – Internet Access

Operational effectiveness of Emergency Communication Centres

The operational effectiveness of Emergency Communication Centres (ECCs) in Abuja Municipal Area Council reveals a pattern of generally moderate performance with notable variability across key service indicators. As shown in Table 1, call connectivity and professionalism of call-takers received relatively favourable ratings, with over 30 percent of respondents describing these aspects as "good" or "very good," and fewer than 5 percent rating them as "very poor." This suggests that the basic functionality of call handling and the conduct of ECC personnel meet acceptable standards for a majority of users.

Response speed, however, emerged as a comparatively weaker area of performance. Nearly one-fifth of respondents (19.2 percent) perceived the time taken to answer calls as "slow" or "very slow," indicating persistent efficiency constraints at the call intake stage. This finding is significant given the time-sensitive nature of emergency communication, where delays at the initial contact point can have cascading effects on response outcomes. Similarly, while clarity of guidance and coordination with responders were rated positively by approximately 59 percent of respondents, a small but non-negligible proportion reported poor experiences, highlighting inconsistencies in communication quality and inter-agency collaboration.

Field-level response indicators further underscore uneven performance. Response time to the scene and outcome appropriateness attracted relatively high proportions of "not applicable" responses, reflecting that not all reported emergencies resulted in physical intervention by responders. Among households that did receive on-site assistance, between 42.5 and 44.4 percent rated performance as "good" or "very good," yet around one-fifth perceived response speed or outcomes as poor. These disparities suggest that operational effectiveness varies by incident type, location, and response conditions, rather than being uniformly experienced across households.

Mean score analysis in Table 2 reinforces these patterns. Most operational indicators recorded mean values between 3.42 and 3.60 on a five-point scale, indicating average to moderately high effectiveness. Coordination with responders recorded the highest mean score (3.60), while time to answer recorded the lowest (3.42), confirming response speed as a critical area for improvement. Response time to the scene and outcome appropriateness recorded higher mean values but were accompanied by large standard deviations, reflecting substantial variation in user experiences. Overall, these findings indicate that while ECCs in AMAC demonstrate functional operational capacity, improvements in response timeliness, communication consistency, and service reliability are necessary to enhance performance robustness.

Table 1 - Operational Effectiveness and Satisfaction Ratings for ECC Services

Indicator	Very Poor / Very Slow / Not Clear (%)	Poor / Somewhat Clear (%)	Moderate (%)	Good / Clear / Fast (%)	Very Good / Very Clear / Very Fast (%)
Call connectivity	4.1	13	31.4	31.7	19.8
Time to answer	4.8	14.4	33.2	29.5	18.1
Professionalism / courtesy of call-taker	3.7	17.6	23.8	34.5	20.4
Clarity of guidance / instructions	5.4	15	25.2	35.1	19.3
Coordination with responders	5.4	12.2	23.7	34.6	24.1
Response time to scene	16.4	16.4	24.7	23.5	19
Outcome appropriateness	15.9	16.7	23	28	16.4

Household satisfaction with Emergency Communication Centre services

Household satisfaction with ECC services reflects a generally positive but qualified assessment of service experience. As shown in Table 2, over half of respondents (56.3 percent) reported being satisfied or very satisfied

with ECC services, while 26.9 percent expressed moderate satisfaction. However, a notable minority (16.7 percent) reported dissatisfaction, indicating that a significant segment of households experienced service encounters that did not meet expectations. The overall mean satisfaction score of 3.57 suggests moderate satisfaction rather than strong approval, pointing to scope for service improvement.

To further explore factors associated with satisfaction, a binary logistic regression model was estimated with overall satisfaction coded as a dichotomous outcome. The model, presented in Table 3, was not statistically significant and demonstrated low explanatory power, accounting for less than 5 percent of the variance in satisfaction. None of the operational effectiveness indicators, including call connectivity, response speed, professionalism, clarity of guidance, coordination with responders, response time to the scene, or outcome appropriateness, emerged as significant predictors of satisfaction in the adjusted model. Awareness-related variables, perceived accessibility, trust in ECC services, and most socio-demographic characteristics were also non-significant.

The only variable that significantly predicted satisfaction was educational attainment, with higher levels of education associated with lower odds of reporting satisfaction. This finding suggests that more educated respondents may apply higher evaluative standards when assessing emergency communication services, leading to greater criticality of service performance. Importantly, the absence of significant effects for operational indicators does not imply that service performance is irrelevant to satisfaction. Rather, it indicates that satisfaction may be shaped by factors not fully captured by the measured operational variables, such as prior experiences, expectations, comparative benchmarks, or broader perceptions of public service delivery.

Table 2 – Descriptive Statistics of Operational Effectiveness and Satisfaction Indicators for ECC Services

	N	**Mean**		**Std. Deviation**
	Statistic	**Statistic**	**Std. Error**	**Statistic**
Call connectivity (network/answering)	353	3.50	.057	1.072
Time to answer	353	3.42	.058	1.089
Professionalism/courtesy of call-taker	353	3.50	.059	1.111
Clarity of guidance/instructions provided	353	3.48	.060	1.123
Coordination with responders (police/ambulance/fire)	353	3.60	.061	1.137
Response time to scene	353	4.05	.112	2.107
Outcome appropriateness (did the help match the need?)	353	3.99	.109	2.055
Overall satisfaction with ECC services	353	3.57	.055	1.032
Valid N (listwise)	353			

Table 3 – Binary Logistic Regression Results Predicting Satisfaction with ECC Services

Predictor Variable	B	S.E.	Wald χ^2	df	p-value	Exp(B)	95% CI for Exp(B) (Lower–Upper)
Call connectivity	-0.015	0.106	0.021	1	0.885	0.985	0.800 – 1.212
Time to answer	-0.021	0.106	0.039	1	0.844	0.979	0.794 – 1.207
Professionalism / courtesy	-0.03	0.104	0.083	1	0.773	0.97	0.790 – 1.189
Clarity of guidance	-0.1	0.102	0.961	1	0.327	0.905	0.739 – 1.108
Coordination with responders	0.014	0.102	0.019	1	0.89	1.014	0.828 – 1.240
Response time to scene	-0.017	0.055	0.1	1	0.752	0.983	0.882 – 1.096
Outcome appropriateness	-0.058	0.058	1.015	1	0.314	0.944	0.844 – 1.056
Trust in ECC	-0.062	0.098	0.393	1	0.531	0.94	0.776 – 1.138
Dialled ECC during last emergency	0.207	0.314	0.436	1	0.509	1.23	0.665 – 2.272
Perceived accessibility	0.01	0.104	0.01	1	0.92	1.011	0.826 – 1.237
Heard of ECC before	-0.014	0.29	0.002	1	0.962	0.986	0.556 – 1.748
Knows ECC toll-free number	0.117	0.284	0.17	1	0.681	1.124	0.641 – 1.969
ECC campaign exposure (No vs Ref)	0.331	0.446	0.549	1	0.459	1.392	0.579 – 3.343
ECC campaign exposure (Not sure vs Ref)	0.412	0.432	0.906	1	0.341	1.509	0.648 – 3.512
Highest education completed	-0.182	0.086	4.478	1	0.034	0.834	0.707 – 0.984
Monthly household income	-0.102	0.067	2.329	1	0.127	0.903	0.791 – 1.030
Type of area (Urban vs Ref)	-0.129	0.31	0.174	1	0.677	0.879	0.479 – 1.613
Type of area (Periurban vs Ref)	0.14	0.33	0.179	1	0.672	1.15	0.602 – 2.197
Constant	**0.965**	**1.231**	**0.614**	**1**	**0.433**	**2.625**	**—**

Model Statistics:

- −2 Log Likelihood = 454.251
- Cox & Snell $R^2 = 0.035$
- Nagelkerke $R^2 = 0.047$
- Hosmer–Lemeshow χ^2 (df=24) = 12.428, p = 0.975
- Overall Classification Accuracy = 65.2%

From a systems perspective, these results highlight the complexity of translating operational performance into positive user evaluations. While ECCs in AMAC demonstrate moderate effectiveness across key indicators, household satisfaction appears to be influenced by subjective and contextual factors beyond immediate service encounters. This perception–performance gap has important implications for sustainability, as it suggests that technical improvements alone may be insufficient to strengthen public confidence without parallel efforts to manage expectations, improve communication consistency, and enhance overall service experience.

CONCLUSION

This study examined the effectiveness and sustainability of Emergency Communication Centres in disaster management in Abuja Municipal Area Council, with specific emphasis on operational performance and household satisfaction. Using quantitative household survey data, the analysis assessed key dimensions of emergency communication service delivery, including call handling, response coordination, field response, and overall user experience. The findings indicate that the ECC system in AMAC is broadly functional, with moderate-to-high performance ratings across most operational indicators, particularly in professionalism of calltakers, clarity of guidance, and coordination with response agencies. These strengths suggest that the institutional and human components of emergency communication are largely in place and capable of supporting disaster response objectives in an urban setting.

However, the results also reveal important performance gaps that have implications for user confidence and system sustainability. Indicators related to the earliest stages of emergency response, especially time to answer and call connectivity, recorded comparatively lower ratings, highlighting initial contact as a critical vulnerability point. Although response time to scene and outcome appropriateness were rated more positively among cases that received field intervention, the variability in experiences suggests uneven service delivery across incident types and locations. Household satisfaction levels were moderate rather than strong, with a sizeable proportion of respondents expressing neutrality or dissatisfaction. The regression analysis further showed that satisfaction was not significantly explained by measured operational indicators, with education level emerging as the only significant predictor. This finding points to a perception–performance gap, where user expectations, prior experiences, and evaluative standards shape satisfaction alongside, and sometimes independently of, observable service performance.

Taken together, these findings suggest that strengthening the sustainability of Emergency Communication Centres in Abuja requires a dual focus on technical efficiency and experiential quality. Policy and operational efforts should prioritise reducing delays at first contact, improving consistency in call handling during peak demand, and reinforcing communication protocols that manage user expectations during emergencies. Targeted training for call-takers, investment in call-handling capacity, and continuous monitoring of response-time benchmarks could enhance perceived reliability. Additionally, incorporating user feedback mechanisms beyond quantitative metrics may help capture contextual and experiential factors influencing satisfaction. By addressing both operational performance and perception-driven dimensions of service experience, Emergency Communication Centres can strengthen public trust, improve household satisfaction, and enhance their longterm role in sustainable urban disaster management.

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