**Assessing the Emergency Response Capacity and Resource Availability in the Primary Healthcare Facilities of Ahafo Ano North District, Ghana**

**ABSTRACT**

**Introduction:** Primary healthcare (PHC) facilities play a critical role in delivering emergency medical care, particularly in rural areas where they often serve as the first—and sometimes only—point of contact for individuals experiencing medical emergencies. According to the World Health Organization (WHO), PHC facilities should be capable of stabilizing patients, administering life-saving interventions, and facilitating timely referrals when necessary. Emergency care involves the provision of prompt medical attention within minutes or hours to prevent death or serious harm.

**Objective:** This study aimed to assess the capacity of rural primary healthcare facilities in the Ahafo Ano North District to respond effectively to emergency medical situations.

**Methods:** A descriptive cross-sectional survey design was employed to collect quantitative data in the Ahafo Ano North District. A convenience sampling method was used to select 224 nursing professionals from a total population of 246. Data were collected through structured questionnaires and analyzed using IBM SPSS Statistics version 27.

**Results:** The ages of participants ranged from 18 to 45 years, with a mean age of 31.53 years. The study revealed significant gaps in the availability of essential emergency equipment, including automated external defibrillators (AEDs) (absent in 95.5% of facilities), stretchers (63% unavailable), oxygen (62.8% unavailable), suction devices (80.2% unavailable), first aid kits (70% unavailable), and blood products (93.7% unavailable). Regarding preparedness, 81.3% of respondents had not received formal emergency training. Additionally, 37.5% reported never practicing emergency skills, while 31.3% practiced occasionally and 25% rarely. Transportation and referral challenges were prevalent: 75.9% of respondents reported occasional delays in emergency transport, and 87.5% faced difficulties in referring patients to higher-level facilities. The other Key barriers identified were rated as follows: the lack of ambulance services was 1st (49.1), followed by long distances to referral hospitals (25%), and poor communication (13.4%) between facilities, and unspecified issues (12.5%) was the least among them.

**Conclusion:** The findings indicate significant systemic weaknesses in emergency preparedness and logistics within rural PHC settings. The study recommends targeted emergency training for nurses and midwives, development of standardized emergency response protocols, improved allocation of resources, and strengthened referral and communication systems to enhance emergency response capacity at the primary care level.

**Keywords**: Emergency Response Capacity, Resource Availability, Ahafo Ano North, and Primary Healthcare Facilities.

**INTRODUCTION**

Primary healthcare (PHC) Facilities are often the initial, and sometimes the only, point of contact for people in rural areas experiencing medical emergencies, and any successful healthcare system must include emergency medical care. According to the World Health Organization (WHO, 2010), these facilities must be able to stabilize patients, provide critical life-saving measures, and arrange prompt referrals when needed.

The provision of prompt medical attention within minutes or hours of circumstances necessitating quick action to prevent death or impairment is known as emergency care (1,2). Ailments that fall under the purview of emergency medical treatment include injuries, infectious and non-communicable diseases, acute decompensation of chronic illnesses, and pregnancy difficulties. These conditions necessitate prompt, high-quality care to prevent death or permanent impairment. Approximately 2.1 billion deaths and disability-adjusted life years occur worldwide each year as a result of these illnesses (3). In low- and middle-income countries (LMICs), where the burden of these conditions is largest and the results are disproportionately worse, the integration of emergency care systems into the broader health system has thus not lived up to its full potential, even though it is particularly life-saving (4).

The burden of medical, surgical, and traumatic emergency conditions is highest in LMICs worldwide (5). There is insufficient readiness to handle and treat emergencies when they arise because of deficiencies in organizational planning, human resource capabilities, and material resources (5–7). In Sub-Saharan Africa, 71% of the population reportedly resides within two hours of a hospital that may offer emergency medical services (EMS)(8). A highly effective emergency care service (ECS) can save more than half of all deaths in LMICs, according to Reynolds et al.(8).

However, most Sub-Saharan African nations lack these services, and those that do have inadequate funding. For instance, emergency rooms account for 10–15% of the 1.6 million documented deaths in Nigeria each year. In Ghana, according to the National Ambulance Service (NAS) report in 2022, the service has expanded to transport nearly 38,400 patients in 2022, with 356 ambulances and 3,473 EMTs covering all 261 districts—yet utilization in remote districts remains low, with only ~0.16–0.37 transports per 100,000 per day(9).

Despite global progress in emergency care, many low- and middle-income countries (LMICs), including Ghana, continue to face significant challenges in ensuring that PHC facilities are adequately prepared to respond to emergencies. In Ghana, emergency care is still underfunded despite its critical necessity. According to studies done by Zakariah et al, better emergency interventions might avert around half of avoidable deaths and one-third of impairments(10). Low health spending (~4% of GDP), inadequate staff

training, frequent shortages of necessary supplies, and inadequate infrastructure and energy

support is one of the main obstacles(10). Significant unmet emergency care needs in locations similar to Ahafo Ano North were indicated by the National Ambulance Services' response to over 2,000 emergency cases in the surrounding Ahafo/Bono regions in 2022(9).

Common constraints include a shortage of trained personnel, a lack of essential drugs and equipment, poor infrastructure, and weak referral systems (11). These limitations are particularly acute in rural areas, where health system resources are often stretched thin and distances to higher-level care are vast.

In Ghana, rural districts such as Ahafo Ano North in the Ashanti Region rely heavily on Community-based Health Planning and Services (CHPS) compounds and health centers for emergency care. However, anecdotal reports and district health reviews suggest these facilities may not be adequately resourced or staffed to handle emergencies effectively. In such contexts, delayed or ineffective emergency care can lead to avoidable morbidity and mortality(12) (Afriyie et al., 2022).

The capacity to respond to emergencies encompasses both tangible resources (for example, emergency drugs, equipment, and vehicles) and intangible aspects such as staff knowledge, clinical preparedness, and protocol adherence. Assessing this capacity is essential for identifying gaps, informing policy, and guiding investments in rural health system strengthening (13).

This study, therefore, seeks to assess the emergency response capacity and resource availability in rural PHC facilities in the Ahafo Ano North District, focusing on equipment, drugs, staff training, and system readiness.

 **Research Objectives**

**Primary Objective:**

* To investigate the capacity of rural primary healthcare facilities in Ahafo Ano North to respond to emergency medical cases.

**Specific Objectives:**

1. To determine the availability of emergency care resources (equipment, drugs, and personnel) in the PHC facilities in the Ahafo Ano North district.
2. To assess the training and preparedness of nurses and midwives in managing emergencies in the PHC facilities in the Ahafo Ano North district.
3. To recommend strategies to enhance emergency preparedness at rural PHC facilities in the Ahafo Ano North district.

**Methodology**

**Study Design**

A descriptive cross-sectional survey design was employed in the study to gather quantitative information on the emergency capacity of rural primary healthcare facilities in Ahafo Ano North, specifically in response to emergency medical cases and services.

**Study Area**

The study was carried out in Ghana's Ashanti Region in the Ahafo Ano North Municipality. This municipality comprises both rural and urban areas, and primary healthcare facilities provide the first line of treatment for medical crises. Ahafo Ano North Municipality is a predominantly rural district with a population of around 93,000–95,000 people. It features a municipal hospital supported by health centres, CHPS compounds, and private/maternity facilities. With a population of 92,742from the 2021 population census, with 107 communities and 6 sub-municipals: Tepa, Manfo, Anyinasuso, Betiako, Subriso, and Twabidi, with a distribution of rural–urban distribution of 71% rural and 29% urban. The Ahafo Ano North Municipality has 26 health facilities in total, with 1 Government-run municipal hospital located in Tepa, 8 Government health centres, 3 Mission/CHAG facilities, 9 Private clinics/hospitals, and 4 Maternity homes/clinics. The key facilities are Ahafo Ano North Municipal Hospital, in Anyinasuso, Betiako, Manfo, Subriso, and Twabidi, Akwasiase, and CHPS compounds: ~39 zones covering community-level primary care

**Study Population**

Primary healthcare nurses, midwives, community health nurses, and other nursing professionals employed in primary healthcare facilities located within the municipality comprise the research population. To acquire a deeper understanding of the systemic issues confronting the health sector, all categories of nurses in these facilities were asked to answer the questionnaire.

**Sampling Method and Size**

Nurses and midwives who provide primary care were chosen, using a convenient sampling technique. A sample size of **224 respondents from a total population of 246** represents approximately **91%** of the population. Although standard sampling formulas (Cochran et al, 2022) recommend a minimum of 150 respondents for a 95% confidence level with a 5% margin of error, a larger sample was chosen to enhance accuracy and generalizability(14). The high proportion of respondents approaching a census while remaining methodologically robust. At this high proportion, the **convenient sampling method was applied due to their readily accessible and available during the data collection period.** About 224 nursing professionals participated in the study; these were nurses and midwives who work at the primary healthcare centers. The target population consists of all **nurses and midwives (N = 246)** working in the Ahafo Ano North District. Census Sampling was considered to help in generalization, and 224 out of 246 is **91% of the population**. The selected individuals were contacted, and the purpose was explained, consent obtained, and we proceeded with data collection.

**Data Collection tool and procedure**

**Questionnaires:** Structured questionnaires were administered to nurses and midwives to assess the availability of emergency care resources (equipment, drugs, and personnel), to assess the training and preparedness of nurses and midwives in managing emergencies, and to provide possible recommendations to enhance emergency preparedness at rural PHC facilities

Data was collected at the primary health care facilities from September 2024 to January 2025. The assessment covered the health care facilities' preparedness capacity (equipment and medications) and EMS, focusing on the availability of emergency care resources (drugs and personnel). And to assess the training and preparedness of nurses and midwives in managing emergencies. The nurses' perception of the availability of emergency equipment at their various facilities.

Equipment and medications were all assessed and rated using the checklist by the Ministry of Health – Ghana (MoH) policy guideline document(13) (15). This was done by observation and rating the availability and adequacy of equipment and medications. The emergency equipment was assessed with selected items from the 63-item checklist focusing on airways, breathing, circulation, and disability. The emergency medications were assessed with a 52-item checklist (16).

**Data Analysis**

The quantitative data was studied using descriptive statistics.

Data was collected on paper forms and with KoboTool and analyzed using Microsoft Excel (version 14) and SPSS. The data was cleaned under various objectives, and the demographics of the respondents were considered. On the Availability of Emergency Equipment in the Health Institutions, the variables were evaluated on a scale of 1-5 based on their availability and adequacy (*Availability & Adequacy*: 1 – Very Poor (Absent); 2 – Poor (Inadequate (available to less than half of those who need it); 3 – Moderate (Partially adequate (available to more than half, but not to most who need it); 4 – Good (Adequate (present and readily available to almost everyone in need and used when needed) 5- Very Good (Very adequate and availiable with extra in stock) (17)

Emergency Preparedness and Challenges among nurses and midwives were assessed with questions on their confidence in handling cases with the ABCDE assessment tool, no training on emergencies, how easily emergency cases can be accessed, and how often drills or simulations execeis that are performed.

Finally, on recommending strategies to enhance emergency preparedness at rural PHC facilities, respondents were allowed to select suggested options (More medical equipment and supplies, regular training for healthcare staff, better referral system and transportation, increased staffing, improved communicated system) and make individual suggestions that will help to improve emergency case management in Primary Health Care.

**RESULTS**

**Descriptive Analysis of Participants’ Age**

A total of 224 participants took part in the study, and their ages were examined to understand the sample's demographic profile. The participants' ages ranged from 18 to 45 years, with an average age of 31.53 years. The **standard deviation** was **6.696**, indicating **a moderate level of variability** in participants' ages. Most of the participants' ages were within approximately **±6.7 years** of the mean, implying that the majority were between **approximately 25 and 38 years old.** The **variance**, which represents the spread of the age data, was calculated as **44.833**.

The **skewness value was -0.082** (standard error = 0.163), indicating a very slight negative skew. However, this value is close to zero, suggesting that the age distribution was **approximately symmetrical**. Likewise, the **kurtosis value was -0.152** (standard error = 0.324), suggesting a **slightly platykurtic distribution**, meaning the distribution is slightly flatter than a normal curve. However, like skewness, the kurtosis value is also very close to zero, reinforcing that the age data was **approximately normally distributed**.

Table 1: Descriptive Statistics for Age

| **Statistic** | **Value** |
| --- | --- |
| **N (Valid)** | 224 |
| **Minimum Age** | 18 |
| **Maximum Age** | 45 |
| **Mean Age** | 31.53 |
| **Standard Deviation** | 6.696 |
| **Variance** | 44.833 |
| **Skewness** | -0.082 |
| **Skewness Std. Error** | 0.163 |
| **Kurtosis** | -0.152 |
| **Kurtosis Std. Error** | 0.324 |

**Correlational Analysis among the demographics of Participants and key Variables.**

**Table 2: Pearson Correlations among Key Variables (N = 224)**

| **Variables** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| 1. Confidence level | .71\*\*\* | — |  |  |  |  |  |
| 2. Participation in emergency drills | .47\*\*\* | .41\*\*\* | — |  |  |  |  |
| 3. Formal emergency training (past 2 years) | .35\*\*\* | .48\*\*\* | .07 | — |  |  |  |
| 4. Frequency of emergency case exposure | –.52\*\*\* | –.34\*\*\* | –.54\*\*\* | –.03 | — |  |  |
| 5. Educational level | .47\*\*\* | .19\*\* | .58\*\*\* | –.13 | –.46\*\*\* | — |  |
| 6. Confidence in assessing ABCs | .00 | .28\*\*\* | .18\*\* | .26\*\*\* | –.11 | –.32\*\*\* | — |

**Note**: *p* < .05\*, **p** < .01\*\*, ***p*** < .001 (2-tailed).

**Correlational Analysis**

A Pearson product-moment correlation coefficient was computed to examine the relationships between demographic factors, emergency-related training and exposure, and the participants' confidence levels in managing emergency cases. The results showed several significant associations, as outlined as stated above and explained below.

**Confidence Level**

Confidence level was also positively and strongly associated with participation in emergency drills, *r* (222) = .41, *p* < .001, and formal emergency training within the past two years, *r* (222) = .48, *p* < .001. Confidence in assessing airway, breathing, and circulation (ABCs) had a significant positive relationship with overall confidence level, *r* (222) = .28, *p* < .001.

Confidence level was moderately correlated with knowledge, *r* (222) = .71, *p* < .001, and frequency of emergency skill practice, *r* (222) = –.50, *p* < .001 (note: this negative correlation may require contextual interpretation or checking for reverse-coded items). Age had a negative correlation with confidence level, *r* (222) = –.24, *p* < .001, indicating that older participants tended to report lower confidence levels.

**Additional Relationships**

Educational level was positively correlated with participation in emergency drills, *r* (222) = .58, p < .001, and the frequency of emergency skill practice, r(222) = –.42, *p* < .001. Gender showed strong associations with several variables, including a negative correlation with educational level, *r* (222) = –.49, *p* < .001, and a positive correlation with frequency of emergency cases, *r* (222) = .48, *p* < .001.

Taken together, the results indicate that training exposure, educational background, and institutional factors have a significant influence on confidence in emergency management. These findings underscore the importance of structured emergency training and regular practice in enhancing preparedness among healthcare professionals.

**3.2 To determine the availability of emergency care resources (equipment, drugs, and personnel).**

Figure1

**The Availability of Emergency Equipment in the Health Institutions**

Source of Data: Field

The above figue 1, illustrates the nurses' perception of the availability of emergency equipment at their various facilities. Two hundred and twenty-four (224) nurses rated the availability of key emergency equipment across their respective health facilities.

Firstly, it was observed that First Aid Kits have the largest proportion of nurses (70%) who rated it as nonavailable. A smaller percentage (30%) rated as available (good). Secondly, regarding Automated External Defibrillators (AEDs), 95% of participants indicated (*very poor)* nonavailable, making it the equipment with the highest negative response.

For Stretchers, 63% of respondents rated nonavailable (as *very poor)*, while 37% indicated it was available. In terms of Oxygen Supplies, 37.2% of the nurses rated their availability (as *good)*. A notable 62.8% of respondents rated oxygen supply as nonavailable (as *poor)*.

Regarding Suction Devices, more than half of the participants (80.2%) reported nonavailable (*very poor),* and 19.8% reported as available.

These findings highlight differing levels of emergency equipment availability across PHC facilities. While oxygen supplies showed relatively better availability, equipment such as AEDs and suction devices were most frequently reported as being *very poorly* available.

**Figure 2**

**Availability of essential emergency supplies**

Source: Field Data, 2025

**Analysis of Emergency Supply Availability Based on Nurses’ Responses**

As part of a broader look into the readiness of health institutions to handle emergencies, nurses were asked to share their experiences regarding the availability of key clinical medical supplies.

Starting with **IV Fluids**, only 27 nurses (about 12%) said these were always available, while a concerning 197 nurses (88%) stated they were never available. This suggests that although some facilities are reliably stocked, a significant number are not, which could delay or compromise patient care during fluid resuscitation or emergencies.

Responses about **IV Equipment** showed a slightly different pattern. Only 56 nurses (25.2%) indicated it was always available, while 168 others (74.8%) said it was never available. These findings imply that inconsistency in IV equipment access is a widespread issue, affecting nurses' ability to start or maintain IV therapy efficiently.

Regarding **Oxygen Supplies**, the availability picture was not different from the others. Seventy nurses (31%) reported always having access to oxygen, while 154 (69%) said it was never available. This response may reflect poor supply levels across various departments or facilities, with some institutions better equipped than others.

On the availability of **Blood Products**, where a majority—210 nurses (93.7%)—reported that they were unavailable. Only 14 nurses each (6.3%) said blood products were sometimes or rarely available. This suggests that there is a major challenge in the areas, most facilities seem to have no access to blood for transfusion, which is critical in trauma, surgery, and obstetric care.

 **To assess the training and preparedness of nurses and midwives in managing emergencies.**

The results of respondents' obtain on emergency preparedness and challenges among nurses and midwives are presented in the tables below.

Table 3.On Training and preparedness of nurses and midwives, their Demographic and other variablesTraining. (N=224)

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Response Category** | **Frequency** | **Percent (%)** |
| Gender of Participants | Male | 182 | 81.3 |
| Female (or other) | 42 | 18.8 |
| Educational Level | Bachelor’s Degree | 28 | 12.5 |
| Certificate | 84 | 37.5 |
| Diploma | 112 | 50.0 |
| Working Experience | 1–5 years | 112 | 50.0 |
| 6–10 years | 28 | 12.5 |
| Less than 1 year | 14 | 6.3 |
| More than 10 years | 70 | 31.3 |
| Level of Health Institution | Community Health Post | 28 | 12.5 |
| Health Center | 196 | 87.5 |
| Emergency Training Participation | No | 182 | 81.3 |
| Yes | 42 | 18.7 |
|  |  |  |  |
| Patients’ View of Confidence Level | Confident | 70 | 31.2 |
| Not confident | 2 | 0.8 |
| Neutral | 40 | 18 |
| Very Confident | 112 | 50 |
| Ability to evaluate with ABCDE | Confident | 67 | 30 |
| Not confident | 14 | 6.3 |
| Neutral | 100 | 44.6 |
| Very Confident | 43 | 19.1 |

Source: Field Data, 2025.

As shown in Table 3, the demographic profile of the study respondents reveals that the majority were female (81.3%), with males representing only 18.8%. This gender distribution is reflective of the broader composition of the healthcare workforce in many primary care settings, where women predominantly serve in frontline roles. Regarding educational qualifications, half of the respondents (50%) possessed diploma-level training, 37.5% held certificates, and only 12.5% had attained a bachelor’s degree.

In terms of work experience, half of the participants (50%) had been in service for 1 to 5 years. A notable 31.3% had more than 10 years of experience, while 12.5% had worked for 6 to 10 years, and only 6.3% had less than one year of experience. These figures suggest a reasonably experienced workforce, which may contribute positively to emergency care delivery, although continued professional development remains essential.

Concerning the level of health facilities, a significant majority (87.5%) worked at health centers, while 12.5% were stationed at community health posts. Daily encounters with emergency cases were reported by more than half of the respondents (55.4%), with 32.1% managing emergencies weekly and 12.5% rarely involved in such cases.

Despite frequent encounters with emergencies, only 18.8% of respondents reported having received any form of emergency care training. A concerning 81.3% had not undergone formal emergency training. Nevertheless, half of the respondents (50%) described themselves as very confident in handling emergencies, while 31.3% were somewhat confident, and 18.8% remained neutral. There was a disconnect between high confidence and low training coverage, raising concerns about overestimation of capabilities or informal learning without structured support.

When assessed on their ability to evaluate airway, breathing, and circulation (ABCs), 49.2% reported to be confident or very confident. However, 44.6% remained neutral, and 6.3% indicated a lack of confidence.

Table 4. Training and preparedness of nurses and midwives on ABCDE, protocols, training, and frequency of managing emergency (N=224)

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Response Category** | **Frequency** | **Percent (%)** |
| Familiarity with ABCDE in Emergency | Familiar | 100 | 44.6 |
| Somewhat Familiar | 84 | 37.5 |
| Very Familiar | 40 | 17.9 |
| Availability of emergency care guidelines and protocols | Available |  | 44.6 |
| Uncertain |  | 12.5 |
| Unavailable |  | 42.9 |
| Training within Last Two Years | No | 56 | 25.0 |
| Not Sure | 28 | 12.5 |
| Yes | 140 | 62.5 |
| Frequency of Emergency Assessment by Members | Rarely | 56 | 25.0 |
| Daily | 70 | 31.3 |
| Monthly | 30 | 13.4 |
| Weekly | 68 | 30.4 |

Source: Field Data, 2025.

On the familiarity with the ABCDEs of emergency care, as shown in Table 4, it was reported by 62.5% of respondents, while 37.5% were only somewhat familiar. These figures suggest that while general awareness of emergency procedures exists, there are significant gaps in depth of knowledge and consistent application.

Availability of emergency care guidelines and protocols was inconsistent. While 44.6% confirmed the presence of such resources, 42.9% indicated they were unavailable, and 12.5% were uncertain. This lack of clarity and accessibility may contribute to variability in emergency care practices. The practice of emergency skills was infrequent, with only 6.3% reporting regular (at least monthly) practice. More than one-third (37.5%) never practiced emergency skills, 31.3% did so occasionally, and 25% rarely. Limited hands-on practice opportunities may hinder healthcare workers' ability to respond effectively during real emergencies.

Emergency assessments were conducted daily by 31.3% of respondents and weekly by 30.4%, while 25% reported rare assessments and 13.4% assessed emergencies monthly. Although a majority appeared to conduct assessments regularly, one-quarter rarely engaged in this critical activity.

Table 5. Training and preparedness of nurses and midwives on the variables, support from stakeholders, resources such as transport, referring system, and skills practice. (N=224)

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Response Category** | **Frequency** | **Percent (%)** |
| Available support and resources during emergencies | very satisfied | 28 | 12.6 |
| satisfied | 58 | 25.8 |
| Neutral | 138 | 61.6 |
| Transportation challenges during emergencies | Frequent delays | 54 | 24.1 |
| Occasional delays | 142 | 63.4 |
| Rarely delays | 28 | 12.5 |
| Frequency of Emergency Skill Practice | Occasionally (Few times/year) | 70 | 31.3 |
| Rarely | 56 | 25.0 |
| Frequently (Monthly) | 14 | 6.3 |
| Never | 84 | 37.5 |

Source: Field Data, 2025.

In table 5, it shows results regarding satisfaction with available support and resources during emergencies, the largest proportion (61.6%) expressed neutrality. Only 25.9% were satisfied or very satisfied, while 12.6% reported dissatisfaction. These findings highlight a general sense of inadequacy or uncertainty regarding emergency response infrastructure.

Transportation challenges during emergencies were common. Approximately 63.4% of respondents noted occasional delays, while 24.1% reported frequent delays. Only 12.5% experienced such delays rarely. Furthermore, an overwhelming 87.5% of respondents reported facing challenges when referring patients to higher-level facilities. On Frequency of Emergency Skills Practice (31.3%), respondents reported they have had practice a few times, and 37.5% have never had skills practice.

Figure 3. Challenges when referring

Figure 3 explains the key challenges identified, including a lack of ambulance services (49.1%), distance to referral hospitals (25%), poor communication between facilities (13.4%), and other unspecified issues (12.5%).

**To recommend strategies to enhance emergency preparedness at rural PHC facilities**

Analysis of Emergency Care Management: Recommendations, Challenges, and Types of Emergencies Managed

**To obtain appropriate information on** strategies to enhance emergency preparedness at rural PHC facilities, respondents were asked questions on the types of Emergencies Commonly Managed, Barriers Faced in Managing Emergencies, and participants' opinions on Key Factors for Improving Emergency Care.

**Types of Emergencies Commonly Managed**

Participants reported managing a variety of emergencies. As shown in Figure 3, the most frequent were **trauma-related accidents**, cited by 208 participants, reflecting the high incidence of injuries likely related to road traffic accidents and workplace incidents. **Obstetric emergencies**, particularly labor complications, were also common (154 respondents), as were **pediatric emergencies** (126) and **cardiac emergencies** (84). An additional 30 participants noted managing other types of emergencies not specifically listed. This distribution of cases highlights the broad scope of emergency care responsibilities at the primary healthcare level.

**Barriers Faced in Managing Emergencies**

As shown in Figure 4, the most significant challenge identified was **staff shortages**, reported by 196 participants. This was followed by **inadequate medical equipment in hospitals** (182 respondents) and a **lack of training** (128). **Communication issues** (72) and **delayed access to specialist care** (114) were also noted.

**Participants’ Opinions on Key Factors for Improving Emergency Care**

Consistent with the recommendations, participants expressed strong opinions about what is needed to improve emergency services. As shown in Figure 5, again, additional training and education topped the list with 210 endorsements, as did increased staffing and better access to emergency equipment, each also cited by 210 participants. Improving communication systems was mentioned by 142 respondents, and regular emergency drills received support from 168 participants.

**Recommendations to Improve Emergency Management**

Respondents offered several key recommendations aimed at enhancing emergency care delivery. As shown in Figure 6, the most frequently cited suggestion was the provision of more medical equipment and supplies, indicated by 210 participants. This was closely followed by the need for regular training of nurses and midwives (184 responses) and the establishment of better referral systems and transportation networks (182 responses). Increased staffing was also highlighted by 170 participants as a critical requirement, while improved communication systems were mentioned by 86 respondents. These recommendations point to systemic gaps in emergency preparedness, infrastructure, and workforce support.

**Figure 4**

Source: Field Data, 2025

**Figure 5.**

Source: Field Data, 2025

**Figure 6**

Source: Field Data, 2025

**Figure 7**

Source: Field Data, 2025

**Discussion**

**Assessing the Emergency Response Capacity and Resource Availability in Rural Primary Healthcare Facilities in Ahafo Ano North**

The primary objective of this study was to evaluate the ability of resources at rural primary healthcare facilities in the Ahafo Ano North District to effectively manage emergency medical situations. A critical aspect of this assessment involved determining the availability of emergency care resources, including equipment, essential medications, and adequately trained personnel. The interpretation of participants' demographic characteristics, particularly age, provides essential context for understanding the distribution and experiences of the healthcare workforce engaged in emergency response in these rural settings. Hence, the discussion of participants' demographics was done as fellows.

**Descriptive Analysis of Participants’ Age**

The age distribution of the 224 study participants offered valuable insights into the workforce profile within the assessed rural healthcare facilities. The mean age of 31.53 years, with a standard deviation of 6.696, indicates a relatively young workforce, predominantly in their early thirties. A study conducted by Asamani et al (2021) with participants’ ages ranging from 20–60 years, with an average of 33 years (±7.02 years). The majority of the health professionals (*n* = 267, 53%) were between the ages of 30–39 years, which is similar to the study findings(18). This demographic feature may have implications for both the physical and cognitive readiness of staff to respond to emergencies. Young adult healthcare workers are typically in a phase of their professional lives where energy levels and the ability to adapt to fast-paced, high-pressure environments, such as emergencies, are high (19).

The statistical measures of skewness (-0.082) and kurtosis (-0.152), on ages which are close to zero, confirm that the age distribution of the sample is approximately normal. A symmetrical age distribution between the older and the young, which can also reflect a stable employment pattern and retention strategy within these rural health facilities, which may indirectly influence the availability and sustainability of emergency care services (20).

Previous research has shown that younger health workers often dominate rural postings due to transfer patterns and mandatory national service, findings that align with the current study (Lehmann, Dieleman, & Martineau, 2008).

**Availability of Essential Emergency Supplies (**equipment**) in Rural Primary Healthcare Facilities**

The findings from this study offer a revealing picture of the challenges faced by primary healthcare facilities in Ahafo Ano North in responding to emergency medical cases. The data shows considerable gaps in the availability of critical emergency tools such as Automated External Defibrillators (AEDs), suction devices, and even basic items like first aid kits, all of which are essential for initial stabilization of critically ill or injured patients. These are further discussed as follows:

**First Aid Kits**

The finding that **70%** of participants rated the nonavailable of first aid kits as *very poor* raises significant concerns. First aid kits are the most basic form of emergency readiness, containing essential supplies for controlling bleeding, preventing infection, and stabilizing minor injuries before definitive care. The absence of such a fundamental resource could delay timely interventions and compromise patient outcomes(21) fact that only **30%** of respondents considered their availability as *very good* underlines the uneven distribution of basic emergency care tools in rural settings.

**Automated External Defibrillators (AEDs)**

AEDs had the highest percentage (**95.5%**) of *very poor* ratings, highlighting a particularly stark inadequacy. This study confirms other research work by Doku et al (2023) across the primary level of health facilities assessed (such as CHPS compounds and health centres). On average, only one functional sphygmomanometer was available to serve clients, with no electrocardiograms or defibrillators present(22). AEDs are life-saving devices in cases of sudden cardiac arrest, and their absence significantly diminishes a facility's capacity to manage cardiovascular emergencies(23).

**Stretchers**

While **37%** of respondents reported availability of stretchers, high percentages of 63%of nonavailable. Inadequate access to stretchers may not only delay care but also increase the risk of further injury during patient handling (24).

**Oxygen Supplies**

Interestingly, oxygen supplies showed relatively better availability among the equipment elevated, with **37.2%** rated as available (*very good),* although lower than 50%. This may reflect recent national or donor-supported initiatives to improve oxygen infrastructure, especially in the wake of COVID-19, which exposed critical gaps in respiratory care readiness. However, **62.8%** of participants still rated oxygen as nonavailable (*very poor)*, suggesting that while some progress has been made, supply chain inconsistencies or equipment maintenance issues remain problematic.

**Suction Devices**

Suction devices, essential for clearing airways in patients with obstructed breathing or excessive secretions, were reported by **80.2%** of respondents as *very poorly* available. This finding is particularly troubling because the inability to maintain a patent airway can lead to rapid deterioration, especially in pediatric emergencies or cases of trauma.  Previous literature supports these findings, pointing to structural inequalities in rural health systems, lack of consistent funding, and poor maintenance cultures as contributing factors (13,25).

**Availability of Essential Clinical Medical Supplies in Rural Primary Healthcare Facilities**

The findings of this study reveal significant disparities and inconsistencies in the availability of key medical supplies such as IV fluids, IV equipment, oxygen, and blood products. These disparities have direct implications for timely and effective patient care, particularly in emergencies where every minute counts.

**Intravenous (IV) Fluids**

The availability of IV fluids—a cornerstone in emergency resuscitation, dehydration management, and shock treatment—was concerning. Only **12%** of nurses reported that IV fluids were always available, while a larger proportion (**88%**) indicated they were never available. This gap is alarming, as IV fluid therapy is often the first-line intervention in many emergency scenarios. According to the(26)Ensuring uninterrupted access to essential emergency supplies, including IV fluids, is a basic requirement for effective emergency care systems, particularly in rural settings where referral delays are common.

**IV Equipment**

A similar trend of inconsistency was noted with IV equipment, such as cannulas, giving sets, and infusion lines. Only **25.2%** of respondents stated that this equipment was always available, while 74.8**%** reported it was never available. These findings reflect operational vulnerabilities in supply chain management and inventory control. Studies by Aderaw and Getinet (2023) have emphasized that the unavailability of basic medical tools in rural African facilities is a major barrier to achieving universal health coverage and emergency responsiveness(27).

**Oxygen Supplies**

Oxygen therapy is vital in managing respiratory distress, cardiac arrest, trauma, and neonatal emergencies. The results showed that **31%** of nurses had consistent access to oxygen supplies, while **69%** reported no access at all. The persistent gap in access underlines the need for further investment in oxygen concentrators, cylinder supplies, and maintenance systems. According to the *Lancet Global Health Commission on High-Quality Health Systems* (13) consistent oxygen availability is a critical quality metric for any emergency-capable facility.

**Blood Products**

Blood products showed a non-availability of 93.7% response, and 6.3% of respondents indicated availability. As shown by Lowalekar and Ravichandran (2017), even modest gaps in blood availability can lead to preventable deaths in emergencies, especially in low-resource settings(28).

The irregular access to IV fluids and equipment, in particular, suggests a fragile emergency care foundation. This compromises patient stabilization at the primary care level, increasing the risk of deterioration during referrals or transit.

**To assess the training and preparedness of nurses and midwives in managing emergencies.**

Regarding the preparedness of PHC, 81.3% had not undergone formal emergency training. More than one-third (37.5%) never practiced emergency skills, 31.3% did so occasionally, and 25% rarely. Transportation challenges during emergencies were common. Approximately 63.4% of respondents noted occasional delays, and an overwhelming 87.5% of respondents reported facing challenges when referring patients to higher-level facilities. Some key challenges identified included a lack of ambulance services (49.1%), distance to referral hospitals (25%), as well as poor communication between facilities (13.4%).

The findings above is similar a survey conducted in the last quarter of 2015 among a cross section of healthcare workers in Ghana to assess their level of preparedness to handle cases of Ebola Virus Diease (EVD) which was seen as emergency response, for each ten(10) respondents about nine(9) thought they were not adequately trained to handle a potential emergency response; one in every four of them thought their health facilities were ill-equipped to respond to emergency response (29). This observation calls for the World Health Organization’s *Emergency Care Systems Framework* (2019), which recommends integrating emergency preparedness into primary care systems, especially in rural and resource-limited contexts, as part of broader health systems strengthening.

**Strategies to Enhance Emergency Preparedness in Rural Primary Healthcare Facilities**

The recommendations and opinions shared by nurses and midwives are particularly insightful for informing future interventions and policy.

Provision of Medical Equipment and Supplies

The most widely recommended strategy was the **provision of more medical equipment and supplies**, cited by **210 participants**. This aligns with earlier findings from the study that revealed severe deficits in emergency equipment such as Automated External Defibrillators (AEDs), suction machines, IV fluids, and oxygen. Without adequate tools, healthcare workers are unable to provide basic life-saving interventions. The World Health Organization (WHO, 2021) identifies equipment readiness as one of the key pillars of emergency care capacity, particularly in resource-limited settings. Bridging these gaps would require strengthened procurement systems, routine inventory audits, and preventive maintenance protocols(26).

Regular Training and Emergency Drills

The need for **continuous professional development and emergency training** was emphasized by **210 respondents**, with **168** also advocating for **regular emergency drills**. As noted by Boateng-Osei et al (2023), training builds resilience, fosters clinical decision-making in high-pressure environments, and enhances teamwork during emergencies(8).

Improved Referral and Transportation Systems

The call for **better referral systems and transportation networks** by **182 participants** reflects the operational realities of rural care. As Kruk et al. (2018) assert, an integrated emergency referral system—including mobile communication tools and well-coordinated transport—is essential to achieving equitable emergency care(13).

Increased Staffing and Human Resource Support

**Staff shortages** emerged both as a barrier (identified by **196 participants**) and as a recommendation (**170 responses** calling for increased staffing). In rural Ghana, nurse-to-patient ratios are often stretched, and limited numbers of clinical staff are expected to manage a wide range of emergency scenarios. The WHO (2020) notes that sufficient and well-distributed human resources are critical to achieving Universal Health Coverage (UHC) goals.

Enhanced Communication and Coordination

**Improved communication systems** were recommended by **86 participants** and identified as a barrier by **72** others. Incorporating reliable mobile health (mHealth) solutions, two-way radios, or simple hotline systems could significantly enhance coordination during emergencies. As suggested by recent innovations in rural health delivery (Roberts et al., 2016), digital tools can bridge geographic and logistical divides, especially in low-resource areas(30).

Diverse Emergency Case Profiles and Implications

Participants reported encountering a broad spectrum of emergencies: **trauma cases** (208), **obstetric emergencies** (154), **pediatric cases** (126), and **cardiac emergencies** (84). This diversity in caseloads illustrates that rural PHC facilities are not limited to treating minor illnesses; rather, they serve as the first line of defense for critical and often life-threatening conditions.

**CONCLUSION AND RECOMMENDATION**

**CONCLUSION**

The study sample exhibits a youthful age profile with a relatively normal distribution. This raises questions about mentorship, supervision, and continuous training in emergency care for relatively inexperienced staff. These findings collectively indicate a systemic weakness in emergency preparedness at the rural primary healthcare level. Despite the role these facilities play as frontline responders, they appear significantly under-resourced, which compromises their ability to manage acute medical events effectively.

These findings highlight non-availability of blood products, oxygen supply, suction devices, AED, poor access to IV fluids and equipment, suggesting a fragile emergency care foundation. This compromises patient stabilization at the primary care level, increasing the risk of deterioration during referrals or transit.

The study was clear, while many healthcare workers frequently encounter emergency cases and express confidence in their ability to manage them, the lack of formal training, limited practical application, and inadequate infrastructure, especially in transportation and referral systems, pose significant threats to effective emergency care delivery.

Participants’ recommendations for improving emergency care—such as enhanced training, better referral mechanisms, and increased resources—should inform policy decisions and capacity-building initiatives. Addressing these systemic issues is essential to ensuring timely, efficient, and effective emergency responses, ultimately improving patient outcomes at all levels of care.

The findings demonstrate that enhancing emergency preparedness in rural PHC facilities requires a holistic approach—combining improved infrastructure, continuous staff training, functional referral systems, and adequate human resources. These priorities are not only echoed by the data but are consistent with international frameworks such as the WHO’s Emergency Care Systems Assessment Tool and the Lancet Global Health Commission on high-quality health systems.

**Recommendation to enhance emergency preparedness at rural PHC facilities**

**Recommendation to the Municipal Health Directorate**

**Training of staff:** As the study sample exhibits a youthful age profile with a relatively normal distribution, it underscores the need for ongoing investment in skills development.

**Proper Referral system**: Strengthened referral systems are essential for improving outcomes in emergency health situations.

**Supportive Work Environment:** Ensure adequate staffing, functional equipment, and emotional support systems to reduce burnout.

**Recognition and Motivation:** Establish recognition programs to reward dedication and excellence in rural service

**Supervision:** Adequate supervision and retention strategies to enhance the emergency care capacity of rural healthcare facilities

**Further Research**: To investigate how to integrate age demographics with variables such as qualification level, years of service, and emergency-specific training to better understand the true readiness of the rural health workforce. It is crucial to consider complementary data on the training, years of experience, and continuous professional development of staff, which, together with age, will offer a fuller picture of emergency response capacity.

**Ghana Health Service**

**Availability of equipment:** The need to ensure fair distribution of equipment, which is based on the needs assessment of the PHC facilities

**Policy development**: Policies and standardized protocols aimed at strengthening rural healthcare systems

**Career Development:** Provide continuous professional development, increasing quota for emergency care training, and opportunities for specialization.

**Ministry of Health**

**Improving infrastructure**: To ensure that emergency care kits, oxygen systems, and basic life-support tools are made available, accessible, and functional.

**Increased resource allocation:** To build resilience in rural emergency care, targeted investment by the central government is important, with essential medical equipment.

**Incentive Packages:** Offer rural hardship allowances, housing support, and performance-based bonuses.

**A multi-faceted approach,** which involves improved supply chain logistics, strengthened facility-level inventory management, and policy support for equitable resource allocation. As the World Health Organization’s *Emergency Care Systems Framework* (2019) recommends.

**Summary:**

A holistic approach is needed to combine an improved infrastructure with continuous staff training, functional referral systems, and adequate human resources.
**Ethical Approval and consent**

The Ghana Health Service of the Ahafo Ano North Municipal Health Directorate was consulted to obtain approval for the study. All volunteers were given their informed consent before beginning the study, and participation was entirely voluntary. Anonymity and confidentiality were closely upheld during the entire research procedure.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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