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Assessment of the Challenges of Emergency Medical Response in Edo State Health Care Delivery

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Abstract

This article critically evaluates the challenges of Emergency Medical Services/Response within the Edo State healthcare system. The research is premised on the need for an effective Emergency Medical Response call centre and number. Despite the recent launch of an EMR service, public awareness of the existence of a call centre and its number remains unclear, highlighting the need for urgent action. The purpose of this research is to determine the presence of EMS response centres in the study area and also assess public awareness of a designated emergency call number in Edo State. The methodology employed both quantitative and qualitative approaches, using semi-structured questionnaires and in-depth key interviews. Five hundred and twenty-four respondents participated in the research. The study area encompassed the three senatorial districts of Edo State. A multistage sampling technique was applied, and SPSS was ultilized for data analysis. The results and challenges elicited are concerning and entail the following: the absence of an identifiable EMR call centre in the study area, as about four-fifths of the respondents stated they had no knowledge of any EMR team in their locality, and the unawareness of any designated medical emergency phone number; scarce availability of ambulance services and Automated External Defibrillators in the study communities, as over four-fifths of the respondents indicated a non availability of EMR ambulances. Therefore, the Government urgently needs to set up one EMS/ Response centre in every local Government and carry out mass sensitization to encourage use.

Keywords: *Challenges, Edo State, Emergency, Medical-Response.*

Introduction

Emergency medical services (EMS) are seen as a comprehensive system that provides the arrangement of personnel, facilities, and equipment for the effective, coordinated, and timely delivery of health and safety-sensitive services to victims of sudden illness or injury [1], thereby helping to prevent unwanted mortality and morbidity [2, 3].

Emergency Medical Response (EMR) describes the reactions and responses of institutional systems to medical emergencies. Every country has different capacities to deal with these emergent situations, whether developed or less developed. The notion, belief or experience is that developed nations are better equipped to deal with medical emergencies than developing nations [4]. The primary goal of EMR is to mitigate both short-term and long-term negative impacts on

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affected individuals and society. To this end, some notable scholars, including Blackwell and Kaulman, stipulated that those institutional systems always seek ways to improve operational performance on a continuum [5, 6].

In most developed and organized societies where there is an established EMS system, the occurrence of a medical emergency elicits a cascade of a system response which encompasses:

1. Prompt syndrome identification.
2. Immediate action by a bystander.
3. Call for help [7] via a designated, easy-to-remember telephone number. Notable examples include 911, 999, and 112, as coded by the International Telecommunication Union (ITU) helplines [8].
4. First aid by first responders.
5. Prompt transportation to the nearest health facility that can handle the emergent condition [9,10].

On the contrary, Nigeria's emergency response raises many questions, as it falls short of meeting these standards. First and foremost, assume a life-threatening incident occurs; are the bystanders or people in our immediate environment trained to identify it and respond appropriately and effectively? Next, is there any national designated telephone number to call with a standby team that would provide immediate response? Assume there is; what is the level of public awareness of such a number, and how fast is their response? Do we have integrated, effective, and efficient emergency communication centres/ hotlines that provide such services [11]? Furthermore, do we have ready ambulances/ other mobile emergency medical services with trained paramedics that could respond promptly? Next, are bystanders and first responders empowered to provide cardiopulmonary resuscitation (CPR), administer oxygen, use an automated external defibrillator (AED), and use other life support tools?

In Nigeria, the Lagos State Government has taken the lead in EMR compared to other states and the national Government, having established the Lagos State Emergency Medical Services (LASEMS) and Lagos State Ambulance Services (LASAMBUS) [12] since March 2001. They also established a dedicated hotline, 123, and set up 15 ambulance points with Mobile Intensive Care Units (MICU) operated by trained personnel.

Notably, in the same year, 2021, the Edo State Government failed to domesticate the State Emergency Management Agency due to a claimed lack of funds and inflation [13]**.** It is, therefore, doubtful if the state has an existing/ functional EMS or an emergency call number. This narrative, however, is marked by renewed hope, as ThisDay's report of November 30, 2023, reported a collaboration between the Edo state government and Emergency Response Africa (ERA) to launch a technologically driven EMS to foster health emergency response in the state. The project's primary focus is on tackling low public health trust, communication challenges, and inefficient data collection in the three most urban local government areas: Oredo, Egor, and Ikpoba Okhae [14].

Another critical issue is the average emergency response time, from the time of the call to the initiation of rescue action. This is crucial because, for example, in a heart attack, every minute that passes reduces the chance of survival by 7-10% [15]. In the USA, the average arrival time of an EMS team is about seven minutes in urban areas and 14 minutes in rural settings [16, 17]. In Nigeria, institutionalization of a response system is still very primordial. In Edo State, in particular, the goal is to provide an EMR response time of 10 minutes, whereas in Lagos State it varies widely, ranging from 7 to 60 minutes [18]. The response time is influenced by several factors, including location, road traffic, and the initial delay before making emergency call. Other determinants include inadequate ambulances,

data shortages, unrest/ insecurity, gender discrimination, and communication failures [19].

Some barriers impede the implementation of a standardized EMS training programs, as EMS instructors are often in short supply. Another factor is the short duration of training compared to the voluminous information that requires applications in tense situations, which may be life-threatening. Additionally, most EMS training in Nigeria is conducted in person rather than in a more flexible virtual format. Inadequate funding, infrastructure decay, and a lack of a national policy for EMS training and regulation are all contributory factors [20, 21]. Some cultural beliefs negatively impact emergency response behaviour in several dimensions. First is the prevalent belief in alternative medicine in Nigeria, particularly in rural areas [21]. Also remarkable are the communal and extended family influences on decision-making, as well as women relying on their spouses for decisions, even in life-threatening situations. The perception of illness causation is yet another factor, as some hold a strong belief that spirits and supernatural forces cause specific ailments like seizures and mental disorders, and subsequently make them seek alternative medicine [22]. There is also a strong apathy toward the use of ambulances, as some have the notion that ambulances are mainly for transportation of the dead, except when critically ill [23].

The primary purpose of this article is to examine the challenges of emergency medical response in Edo State, with specific objectives to investigate the non-availability of EMS teams and the non-functioning of emergency call number/s.

Methodology

Study Area/ Population

The study was conducted in Edo state, with an estimated population of about five million people and Benin City as its capital. Edo State has a landmass of 19,187 km² and a population density of 168 persons/km². It has 18 Local Government Areas (LGA) with five major ethnic groups: Binis, Esan, Afemai, Etsako, and Owan**.** The state is divided into three senatorial districts: Edo South, Edo Central, and Edo North.

Figure 1. Map of Edo State showing the 18 Local Government Areas and their Capital

Figure 1 shows the map of Edo State, displaying the 18 Local Government Areas and their respective headquarters [24].

Research Design

Both quantitative and qualitative methods were used. In the quantitative method, a

descriptive cross-sectional study was conducted using a semi-structured questionnaire. In the qualitative method, Key Informant Interviews and focus group discussions were used to assess information from the participants.

Exclusion/ Inclusion Criteria

For the quantitative method, the participants were drawn from the general public and households, while in the qualitative method, key informants selected included health workers, ambulance drivers, accident emergency victims and representatives from selected institutions. However, hospital patients and individuals under 15 years of age were excluded from the study.

Sample Size

The sample size was determined by applying the formula:

N = Z2Pq/d2 since the estimated sample size is more than 10,000 [25]

N = desired sample size

Z = standard normal deviate (1.96) at 95% confidence level

P = proportion of target population

q = 1 - P

d = degree of accuracy, assume it is 0.05

N = 1.962x50%x0.5/0.052

N = 400

N = 440. Assume 10% would be void

Based on the above, the minimum number of questionnaires to be distributed is 440. However, 600 questionnaires were distributed.

Sampling Techniques

Multistage sampling methods were applied, with the three ecological zones—Edo North, Edo Central, and Edo South —used. After that, simple random sampling was applied to select the local government area of study, wards, communities, and eventually households using home numbering. About 200 questionnaires were distributed in each senatorial zone, for a total of 600.

Data Collection/ Analysis

This was through a semi-structured questionnaire and personal interviews with key/ group informants. Table tabulations were used for data presentation, and data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software version 26, the Excel package, and relevant statistical tests for associations. Pretesting and validation of the measurement tool were conducted before its field application.

Expected Output

The following expectations would be achieved at the end of the research:

1. It will bring to the fore the challenges/ drawbacks of Emergency Medical Response in the Edo state healthcare system.
2. We will have the needed information and data for advocacy on EMS.
3. It will help accelerate advocacy to the Government to promptly set up an EMR team and emergency call centres, institutionalize a designated national emergency call number, and ensure ambulances are given the needed priority.

Ethical Consideration

The participants were assured of absolute confidentiality. Ethical approval was obtained from the Edo State Ministry of Health Ethical Board. Consent was obtained from the local government authorities and the participants. Verbal consent was also obtained from traditional institutions where necessary.

Results

Table 1 indicates that 524 respondents participated in this study. The largest proportion of respondents, 194 (37.0%), came from the Edo South Senatorial zone. Most respondents live in rural areas (206, 39.3%). Regarding the Local Government Area, the highest proportion of respondents came from Esan North East LGA, with 137 (26.2%),

followed by Akoko-Edo with 92 (17.6%), Ikpoba-Okha with 77 (14.7%), and Orhionmwon with 73 (13.9%). The mean age of respondents was 39.27 ± (11.45) years. The highest proportions of respondents were female (59.5%), married (70.6%), and tertiary educated (71.2%). The highest proportion of respondents, by ethnic group was Esan, at 151 (28.9%), followed by Bini, at 127 (24.2%). The highest proportion of respondents was civil servants, 155 (29.6%).

Table 1. Socio-demographic Characteristics of Respondents (N=524)

Variable	Frequency	Percentage
Senatorial zone		
Edo South	194	37.0
Edo Central	179	34.2
Edo north	151	28.8
Type of Community		
Urban	104	19.8
Semi-urban	214	40.8
Rural	206	39.3
Local Government Area		
Ikpoba-Okha	77	14.7
Esan North East	137	26.2
Oredo	19	3.6
Orhionmwon	73	13.9
Egor	14	2.7
Akoko edo	92	17.6
Esan central	64	12.2
Etsako west	14	2.7
*Others	34	6.4
Age		
15 – 30	125	23.9
31 – 45	253	48.3
46 – 60	137	26.1
61 – 75	8	1.5
≥ 76	1	0.2
Mean age = 39.27 ± (11.45)		
Sex		
Male	212	40.5
Female	312	59.5
Marital Status		
Single	143	27.3
Married	370	70.6
Separated/Divorced	8	1.5
Widow/Widower	3	0.6
Level of Education		
No formal education	6	1.1
Primary	25	4.8

Secondary	120	22.9
Tertiary	373	71.2
Tribe		
Bini	127	24.2
Esan	151	28.9
Etsako	26	4.9
Urhobo	17	3.2
Igbanke	11	2.1
Akoko edo	17	3.2
Igarua	8	1.5
Ekpe	3	0.5
Edo	19	3.6
Ishan	49	9.4
Owan	11	2.1
Afemai	18	3.4
Igbo	7	1.3
Others	60	11.5
Occupation		
Civil servant	155	29.6
Health worker	85	16.2
Doctor/nurse	31	5.9
Self-employed	124	23.7
Student	82	15.6
Teacher	23	4.4
Unemployed	5	1.0
Engineer	5	1.0
Accountant	1	0.2
Electrician	1	0.2
Others	12	2.3

Figure 2 shows that 110 (21%) of the participants reported knowing a phone number to call in the event of a medical emergency. In comparison, 414 (79%) stated they did not know of any medical emergency number to call. This indicates a low level of awareness and utilization of a designated medical emergency number in the study area.

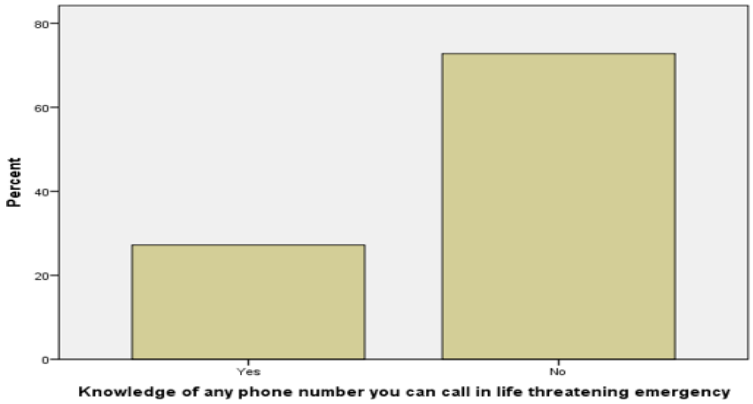

Figure 2. Knowledge of Phone Number to Call during a Medical Emergency

Table 2 depicts respondents' previous experiences with emergency services. Less than half of the respondents, 250 (47.7%), had observed or experienced a sickness that required urgent attention. The highest proportion of respondents went to the hospital when they were sick (207, 39.5%), followed by the health centre (188, 35.9%) and then the Patent Medicine Store (64, 12.2%). Of the 250 respondents who needed urgent medical attention, 207 (82.8%) met health workers and received prompt attention; the proportion of self-reported times of a health facility's response to emergencies was 81 (32.4%), with 81 (32.4%) being immediate and 5-10 minutes. Most respondents, 452 (89.5%), had not heard of any emergency response team in the locality. 414 (79.0%) and do not know any phone number to call in an emergency. Of the 73 respondents aware of an ambulance service in their locality, 44 (60.3%) were privately owned, with the majority of the ambulance types being buses (49, 67.1%). The highest proportion of respondents, 25 (34.3%), reported that the response time of the EMR team was between 10 and 15 minutes. Just 18 (3.4%) respondents had ever been taken to the hospital by ambulance.

Table 2. Previous Experiences of Emergency Services

Variable	Frequency	Percentage
Observed or experienced severe unexpected sickness requiring urgent attention		
Yes	250	47.7
No	274	52.3
During sickness, where do you/your relation go for care?		
Health centre	188	35.9
Hospital	207	39.5
Medicine store	64	12.2
Call the emergency number	3	0.6
Nil	62	11.8
Who called the emergency number (n = 3)		
A friend/relative	3	100.0
Encounter when You observed or experienced a severe, unexpected sickness requiring urgent attention (n = 250)		
Met a health worker, received quick attention	207	82.8
Met a health worker, but did not receive quick attention	26	4.9
Met a health worker, the patient was sent away	2	0.4
Health centre/hospital locked	6	1.2
No response	9	54.0
How quickly the health facility responded to an emergency (n = 207)		
Immediately	81	39.1
Between 5 to 10 minutes	81	39.1
10 to 30 minutes	24	11.6
More than 30 minutes	14	6.8
Can’t recall	7	3.4

Knowledge of any Emergency Medical Response team in the locality?		
Yes	55	10.5
No	452	89.5
State the time to get to you from their location (n = 55)		
1 – 10 minutes	3	5.5
11 – 20 minutes	12	21.8
21 – 30 minutes	10	18.2
Above 30 minutes	30	54.5
Knowledge of any phone number you can call in case of any life-threatening emergency		
Yes	110	21.0
No	414	79.0
Emergency numbers called		
Stated various private GSM nos	77	47.5
Nurse/Doctor/Health worker	78	48.2
Family member/relation	7	4.3
Can you give a cardiopulmonary resuscitation?		
Yes	187	35.7
No	337	64.3
Had any formal training in cardiopulmonary resuscitation (n = 187)		
Yes	143	76.5
No	44	23.5
Can anyone in your house perform CPR (n = 337)		
Yes	26	7.7
No	311	92.3
*** Response in times of sudden collapse**		
Carry out CPR	124	23.7
Rush to the hospital/health centre	205	39.1
Call for help/medical personnel	52	9.9
Increase ventilation	47	9.0
BLS	1	0.2
Prayer	1	0.2
Pour water on the body	26	5.0
Availability of medical ambulance in case of medical emergency		
Yes	71	13.5
No	453	86.5
Contact/phone no. (n = 71)		
Stated various private GSM nos	60	84.5
Do not have the number	11	15.5
Means of transportation to a health facility in case of emergency		
Walking	17	3.2
Bicycle	2	0.4

Motorcycle	172	32.8
Private vehicle	170	32.4
Commercial vehicle	125	23.9
Government ambulance	4	0.8
No response	34	6.8
Availability of Emergency medical response ambulance service in the locality		
Yes	73	13.9
No	451	86.1
Ownership of ambulance (n = 73)		
Government-owned	29	39.7
Private owned	44	60.3
Type of ambulance (n = 73)		
Bus	49	67.1
Keke	14	19.2
Others	10	13.7
How early does the EMR team respond to your emergency call (n = 73)		
Immediately (less than 10 minutes)	6	8.2
10 to 15 minutes	25	34.3
15 to 30 minutes	21	28.8
More than 30 minutes	15	20.5
Can't recall	6	8.2
***Equipment contained in the ambulance (n = 73)**		
Oxygen supply	31	42.5
PPE	53	72.6
Trained driver	31	42.5
At least one trained medical personnel	19	26.0
AED	5	6.8
EMS guide book	6	8.2
Portable stretcher	33	45.2
Splints	7	9.6
Radio communication system member	3	4.1
Automotive safety belt	10	13.7
Have you ever been taken to the hospital in an Ambulance?		
Yes	18	3.4
No	506	96.6
How clean was the ambulance? (n = 18)		
Very clean	2	11.1
Fairly clean	12	66.7
Not very clean	3	16.7
Don't know/can't remember	1	5.6
Did the ambulance come in a crew? (n = 18)		

Yes	14	77.8
No	4	22.2
***Members of the crew (n = 14)**		
Doctor	1	7.1
Nurse	7	50.0
Paramedics	14	100.0
Driver	1	7.1
Treated with respect and dignity by the crew? (n = 14)		
Yes, definitely	3	21.4
Yes, to some extent	7	50.0
Don't know/can't recall	4	28.6
Rate the care you received from the ambulance (n = 18)		
Very good	5	27.8
Good	7	38.9
Fair	6	33.3

** Multiple response type*

Table 3 shows the knowledge/previous training on Emergency Care among respondents. The highest proportion, 277 (52.9%), had previously participated in First Aid training. In comparison, 112 (21.4%) had participated in cardiopulmonary resuscitation, and among the 112 respondents who self-reported CPR training, 73 (65.2%) had received training within the last five years. Only 59 (11.3%) respondents had ever heard of an external defibrillator, and 49 (83.1%) reported that no AED was available in their locality.

Table 3. Knowledge/Previous Training on Emergency Care

Variable	**Frequency**	**Percentage**
***Training you have participated in:**		
First aid	277	52.9
CPR	112	21.4
Basic Life Support	59	11.3
Had training on Cardiopulmonary resuscitation?		
Yes	112	21.4
No	412	78.6
Date of last CPR training (n = 112)		
1 – 2 years	22	19.6
3 – 4 years	17	16.1
> 5 years	73	65.2
Have you heard of an Automated external defibrillator?		
Yes	59	11.3
No	465	88.7
State the nearest location to you: (n = 59)		
3 – 5 minutes away	10	16.9
None available around the location	49	83.1

** Multiple response type*

Focus Group Discussion/ Key Informant Interview Method

Sampling

Focus group discussions were conducted in each of the senatorial regions, and three key informant interviews were held with health workers, ambulance drivers, and selected community leaders to gather critical information on emergency medical services within their respective domains. I recorded the interviews with the participants' permission. For the FGD, participants were drawn from different communities: the Ovbioge community in Benin, Edo South; Irrua and Ubiaja from Edo Central; and Agbede from the Edo North senatorial region.

Specific Objectives of the Qualitative Study

These were similar to those of the quantitative research. The questions were, however, presented informally to allow for robust contributions and a free flow of interaction. The discussions were focused on the specific objectives earlier stipulated.

Quality Assurance

For the FGD, we ensured that each session had no more than ten people, and participants were selected through a simple ballot. A serene environment was used during the session, and the participants put their devices on silent mode to prevent unnecessary interruptions. We also ensured that sessions were moderated to last no more than one hour and avoided deviations from the research objectives.

Problem Encountered/ Limitations

1. Some participants dominated the discussions, especially the more educated ones.
2. Some of the participants kept making requests for monetary compensation before participating in the research.
3. Some participants opted out due to the audio recording.

Findings of the Qualitative Method

EMS Centres in the Study Area

There were no identifiable EMR centres in the study area. None of the participants indicated awareness of any EMR call centre in their community. They stipulated that the first point of care for most persons in their communities was the medicine/ nursing home. However, for communities around tertiary institutions like ISTH, people tend to go straight to the teaching hospital during medical emergencies, usually by private or public transportation, as ambulances are rarely available.

Public awareness of the EMR call number/s: Very few participants had heard of the designated 112 emergency number, and general awareness in their respective communities is limited. In one of the sessions, only two people out of eight knew the 112 call number or other designated emergency numbers. Some of the participants, however, stated they call the private GSM numbers of the health workers they are familiar with in their locality.

Other gaps: The participants identified some other factors leading to delayed medical attention, which are highlighted below:

1. Some of the identified challenges included the common issue of women waiting for their spouses' approval before seeking help, traffic congestion in cities, and poor road conditions.
2. Few ambulances were available, and the majority were privately owned. Most of the 'keke NAPEP' ambulances were moribund and non-functional. Moreover, most PHC centres and other health institutions close to the people are dilapidated and lack basic medical services and human resources.
3. The participants maintained that EMS is currently not in top form due to several factors, including inadequate funding, a lack of political will, and insufficient

budgetary allocation to health from the three levels of Government: federal, state, and local. Other reasons adduced were untrained medical personnel, poor resource management, and the poor attitude of health staff toward their clients.

4. Furthermore, the participants' awareness of AEDs was almost non-existent, except for a few, who were most often senior health workers.

These findings were heartbreaking, as the participants unanimously agreed that the Edo state healthcare system is bewildered by numerous challenges.

Discussion

The study revealed that over three-quarters of the respondents were unaware of any emergency medical response team in their locality. This was significantly higher than a previous study conducted in Abuja, which found that 57.8% of FCT residents were aware of EMS operations and their utilization. In comparison, 42.2% of respondents were unaware of such services in the FCT, Nigeria [26]. In the same vein, a similar proportion of the respondents do not know any phone number to call in the event of a medical emergency. Over three-quarters of the respondents stated there were no medical ambulance services in their communities. The few available ambulances were under-equipped, lacking essential emergency medical supplies and state-of-the-art equipment. To this end, they render little or no medical assistance, including resuscitation and first aid treatment, before conveying the individual to the hospital. It was observed that more than one-third of the respondents patronize either the secondary or tertiary level of healthcare without first visiting the Primary Health Care (PHC) centres. This could be attributed to the fact that most PHC centres are understaffed and lack essential equipment.

Respondents reported no specially designated phone number. All the stated emergency numbers were private GSM numbers of healthcare workers and individuals in their communities. Specifically, no respondents mentioned the 112 emergency number [8]. This indicated that there were no coordinated EMS call centres/ call numbers in the study area. If there are, there is near-zero public awareness regarding their functionality. Therefore, there is an urgent need for the Government to establish an EMS/response centre in every local Government and to equally embark on mass sensitization and mobilization through community engagement, awareness walks, and regular radio and television engagements.

The EMS response time was also a significant concern, as the research revealed that fewer than 1 in 10 people reported an EMS response time of less than 10 minutes, which is a known survival indicator, especially in myocardial infarction (heart attack) [16]. This is similar to previous studies on EMS response time in Nigeria [18]. Furthermore, it was noted that there were no efficient radio communication systems in the ambulances. They instead use their personal GSM phones, which are often unreliable, as stated earlier. Therefore, there is a need for the Government to collaborate with other telecommunication stakeholders to institutionalize a nationally designated, easy-to-remember, and functional EMR call number. The challenges identified in this study align equally with those in similar studies in Africa. Studies carried out in Uganda and some other African countries highlighted similar challenges, which lead to a national dialogue, and subsequently lead to creation of ems department, regulatory impact assessment, improved data indications, creation of ambulance association involving both private and public providers, incorporation of Emergency Care Services (ECS) with National Health Insurance Services for sustainability, and development of an ECS training curriculum for nurses and medical technicians [27]. There is a need to ensure every household is within 5

km of a health facility or an EMS centre. There is also an equal need to strengthen and scale up health insurance, as well as to implement a policy promoting regular training of Community-Based First Responders [28].

Only one-tenth of respondents were aware of AED, and about three-quarters of those who knew stated that none was available in their locality. This is concerning, as previous studies have shown that combining CPR with AED can significantly improve survival during a heart attack [29].

Conclusion/ Recommendation

The highlights of the research are enumerated below:

Over three-quarters of the respondents reported having no information about any existing emergency medical response team in their locality. As a result of this revelation, it is recommended that the Government promptly establish an EMS/ response centre in every local Government in Edo state.

Approximately four-fifths of the respondents stated they were unaware of any designated emergency phone number to call in an emergency. The remaining respondents provided private GSM numbers of health workers or close relatives as emergency numbers. Based on this finding, conducting a public awareness campaign is crucial to inform and educate people about 112 and other emergency call numbers. This is significant, as only 0.6% of respondents call EMR numbers during medical emergencies, indicating very low utilization of the EMR call number.

The possible barriers to implementing recommendations include a lack of political will, particularly regarding PHC and EMS funding, as well as the non-prioritization of emergency care in emergency rooms. We still have emergency centres requesting ID cards and police reports before treatment. Moreover, some cultural beliefs are difficult to change. These, however, can be addressed through continuous community education that utilizes best practices and emerging scientific knowledge, as well as through public-private partnerships for EMS funding.

Conflict of Interest

I, Charles Okpere, hereby state that there was no conflict of interest while conducting this research.

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