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Women living in the region under an emergency command post are experiencing delays in reaching health facilities: a multi-center cross-sectional study

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Abstract

Introduction The time between seeking emergency care and receiving the first healthcare service is referred to as delays in reaching health facilities. Delay in reaching health facilities had three main sub-themes in different studies. These include (i). Availability of transportation and infrastructure, (ii). Distance from health facilities and (iii). Lack of finance for transportation. Although there are plenty of findings about maternal delays in reaching health facilities, studies do not address the delay situation of women in conflict zones all over the world. In Ethiopia, specifically, we saw women delayed in healthcare service due to restricted movement and closure of roads, even for ambulances, at night time.

Methods A multi-center cross-sectional study was conducted among mothers attending public health facilities in the south Gondar zone, Ethiopia from September 01/2023 to April 30/2024. The data was collected by four BSc degree-holder midwives, using structured questionnaires after training was given for a day in each hospital. A pretest using 5% of the sample size was conducted. Descriptive statistics, and multivariable logistic regression analyses were used to identify factors associated with delays in reaching health facilities. Variables having p-value ≤ 0.2 in the bi-variable analysis were fitted into multiple logistic regression models.

Result The prevalence of delay in reaching health facilities among women who are living in the region of emergency command post was 54.9% CI (42.04-59.87%). Living in rural areas, non-availability of public transport during the armed conflict, labor onset at nighttime, road closures by the armed forces, and non-availability of ambulances were the factors that contributed to the delay during the emergency command post.

Conclusion The magnitude of delay in reaching health facilities among women who are living in the region of emergency command post was high.

Keywords Delay, Command-post, Conflict, Ethiopia, Women

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Introduction

The time between seeking emergency care and receiving the first healthcare service is referred to as delays in reaching health facilities. The decision to seek care for pregnancy problems is reflected in the initial delays that occur within the family and community. The most frequent extreme in a remote place, the second delay, is the time it takes to get to medical facilities that offer emergency obstetric care. The delays that occur in receiving care after arriving at the medical facilities are referred to as the third delay [1–3].

According to a World Health Organization (WHO) assessment, obstetric complications endangered the lives of an estimated 303,000 women worldwide in 2015 [4]. Nearly two-thirds of maternal deaths worldwide occurred in sub-Saharan Africa, with the fact that most deaths occurred in developing nations [3]. Research has shown that 15% of women who are pregnant experience obstetric concerns at some point throughout their pregnancy and delivery process, thereby raising the risk of maternal death if early medical care is not offered [5]. Direct obstetric events, including hemorrhage, hypertension, obstructed labor, infection, and consequences from abortion, account for the greatest number of deaths among mothers [6, 7]. Despite the unpredictability of obstetric problems, there is evidence that suggests that maternal death can be averted [8–10]. Keeping pregnancy and childbirth safer and ensuring that women who experience obstetric problems have swift access to obstetric care are two ways to prevent maternal mortality. Emergency obstetric care is an evidence-based service that many women experience during pregnancy, childbirth, and the early postpartum period [10, 11].

Delay in reaching health facilities had three main sub-themes in different studies. These include (i). Availability of transportation and infrastructure, (ii). Distance from health facilities and (iii). Lack of finance for transportation [7, 12–16]. Different studies reported that the time to reach health facilities might be affected by several factors, including the distance required for travel [17–19], the scattered Emergency obstetric care health facilities (particularly in remote locations) [20, 21], the slowness of referrals [22, 23], the lack of transportation opportunities [12, 22, 23], the cost of transportation [24], and the hesitation of drivers to transport women [12]. Mothers who had no antenatal care, unplanned pregnancies, and distance from health facilities were also associated with delays in reaching health facilities [3, 25]. Studies also revealed younger age, illiteracy, lower income, unemployment, poor health service utilization, a lower level of assertiveness among women, inadequate knowledge about obstetric danger signs, and cultural beliefs. Poorly designed roads, lack of vehicles, transportation costs, and distance from facilities led to the second delay [7, 26–31].

Although there are plenty of findings about maternal delays in reaching health facilities, studies do not address the delay situation of women in conflict zones all over the world [31, 32]. In Ethiopia, specifically, we saw women delayed in healthcare service due to restricted movement and the closure of roads, even for ambulances, at night. Therefore, Women reach hospitals after they develop complications in the morning. Women were even restricted from health facilities by the time there was an active war. Therefore, our study explored women's delay in reaching health facilities during the armed conflict and emergency command post in the south Gondar zone.

Methods and materials

Study design and setting

A multi-center cross-sectional study was conducted among mothers attending public health facilities in the south Gondar zone, Ethiopia from September 01/2023 to April 30/2024 at Debre Tabor Comprehensive Specialized Hospital, Nefas Mewcha Primary Hospital, Mekan-eyesus Primary Hospital, and Addis Zemen primary hospital. South Gondar zone is the one among the 10 administrative zones in Amhara region, Ethiopia. The town is found about 669 km northwest of Addis Ababa, the capital city of Ethiopia, and 97 km southwest of Bahir Dar, the capital city of the Amhara region and it has an elevation of 2706 m above sea level. Mothers who provided their agreement to participate and were personally presented at the research place for maternity health services during the data collecting time frame were included in the investigation.

Eligibility criteria

All mothers who gave birth in South Gondar Zones public hospitals were included in the study, while mothers who were severely sick and unable to respond during the data collection period were excluded.

Sample size and sampling procedure

The sample size was calculated using the single population proportion formula and the StatCal application of Epi-Info version 7.2.5. The required sample size for this study was determined using the following assumptions: desired precision (d)=5%, confidence level=95% ($Z_{\alpha/2}=\pm 1.96$ value), and the prevalence of mothers who experienced a delay during emergency obstetric care from a recent study by 2021 was 59.7%. Thus, the final calculated sample size with a 10% non-response rate was 407. The average source population of each hospital was taken by reviewing the previous year's similar monthly service report in the data collection period.

Operational definition

Delay in reaching health facilities refers to a mother being unable to arrive within 1 h of traveling to get to the health facility by any mode of transportation which is evidenced by the respondent's self-report [3, 33]. An emergency command post is a situation in which a designated location is under military headquarters from which a military commander controls and organizes the forces [34].

Data collection tool and procedures

The data was collected by four BSc degree-holder midwives, using structured questionnaires after training was given for a day in each hospital. The questionnaire was originally prepared in English and then translated into the local language, Amharic for data collection. Language experts translated it back to English again for consistency and accuracy. pretest was also done in two other primary hospitals with 5% of our total sample size. The tools were adapted from previously published works and some conflict impacts in the delays for reaching health facilities were included. Then, the validity and internal consistency was checked using cronbach alpha and tool were examined with pretest. After all, we have revised the tools before the data collection process was began. The

Table 1 Sociodemographic characteristics of women who gave birth in Amhara regional state, Northwest Ethiopia, during the emergency command post 2023/24. (N= 399)

Variables	Categories	Frequency	Percent
Age (years)	20–34	298	74.7
	≥ 35	101	25.3
Residence	Urban	177	44.4
	Rural	222	55.6
Ethnicity	Amhara	346	86.7
	Oromo	35	8.8
	Others*	18	4.5
Religion	Orthodox Christian	289	72.4
	Muslim	97	24.3
	Protestant	13	3.3
Marital status	Married	387	97.0
	Divorced	12	3.0
Maternal educational status	Had formal education	298	74.7
	No formal education	101	25.3
Husband education	had formal education	323	81.0
	No formal education	76	19.0
Maternal occupation	Housewife	134	33.7
	Government employee	97	24.3
	Merchant	92	23.0
Husband occupation	Daily laborer	76	19.0
	Farmer	157	39.3
	Government employee	103	25.8
	Merchant	95	23.8
	Non-government employee	44	11.1

*Gurage and Agew

questions are divided into four sections: transportation-related variables, obstetric-related factors, socio-demographic characteristics, and command post (conflict) related factors adapted from previously published works [3, 28].

Quality control measures

A pretest using 5% of the sample size was conducted, and the data-gathering tool was revised. In addition, the entire process of gathering data was overseen. Throughout the data collection period, the supervisors checked up on the process and double-checked each completed questionnaire for completeness. Finally, after entering the data, it was cleaned to ensure completeness.

Statistical analysis

Data were coded, cleaned, and entered by Epidata version 3.1 and analyzed using computer database software and exported to the SPSS version 23 statistical software. Descriptive statistics, and binary, and multivariable logistic regression analyses were used to identify factors associated with delays in reaching health facilities. Variables having p value ≤ 0.2 in the bi-variable analysis were fitted into multiple logistic regression models to control the effect of confounding. The crude and adjusted odds ratio with their 95% CI were calculated to determine the strength and presence of association. A p-value of ≤ 0.05 was considered to declare the level of significance.

Results

Socio-demographic characteristics of respondents

A total of 399 respondents were included in the study with a response rate of 98.0%. majority of the study participants were in the age group of between 20 and 34 years married, rural residents, Amhara in ethnicity, and housewives in occupation (Table 1).

Obstetric-related characteristics of respondents

The majority of the study participants were multigravida, had unplanned pregnancies, had more than four antenatal care visits, and had labor onset at night (Table 2).

Health facility and command-post-related characteristics of respondents

The majority of study participants had a walking distance from home taking greater than an hour, lack public transportation means, and road to the health facility during the armed conflict or emergency command post (Table 3).

Predictors of delay in reaching health facilities during the regional emergency command post

In this study, living in rural areas, non-availability of public transport during the armed conflict, labor onset at

Table 2 Obstetric-related characteristics of women who gave birth in Amhara regional state, Northwest Ethiopia, during the emergency command post 2023/24 (N = 399)

Variables	Categories	Frequency	Percentage
Gravidity	Primigravida	106	26.6
	Multigravida	197	49.4
	Grand-Multigravida	96	24.0
Parity (n = 309)	1	102	33.0
	2–4	123	39.8
	≥ 5	84	27.2
Number of ANC* visits	No visit	18	4.5
	1–3 visits	126	31.6
	≥ 4 visits	255	63.9
Planned Pregnancy	Yes	147	36.8
	No	252	63.2
Pregnancy outcome	Live-birth	367	92.0
	Stillbirth	32	8.0
Maternal near-miss	Yes	84	21.1
	No	315	78.9
Complications after delivery	Yes	98	24.6
	No	301	75.4
Time of onset of labor	Day	187	46.9
	Night	212	53.1

*ANC Antenatal Care

Table 3 Health facility and command-post-related factors of women who gave birth in Amhara regional state, Northwest Ethiopia, during the emergency command post 2023/24 (N = 399)

Variables	Factors	Frequency	Percentage
Walking time from home to health facility	< 1 h	65	16.3
	≥ 1 h	334	83.7
Readiness to health facilities	Yes	369	92.5
	No	30	7.5
Availability of public transport	Yes	135	33.8
	No	264	66.2
The distance from home to health institution	< 5 km	268	67.2
	≥ 5 km	131	32.8
Active war in the community	Yes	245	61.4
	No	154	38.6
Road access for reaching health facilities (day and night)	Yes	134	33.6
	No	265	66.4
Ambulance availability	Yes	179	44.9
	No	220	55.1

nighttime, road closures by the armed forces, and non-availability of ambulances were the factors that contributed to the delay in reaching health facilities during the emergency command post (Table 4).

Discussion

The study's primary finding was determining the magnitude of delay in reaching health facilities and its determinants among laboring women living in a region of emergency command post. The prevalence of delay in

reaching health facilities among laboring women living in an emergency command post region was 54.9% CI (42.04–59.87%). This finding is comparable with a previous study conducted in south Gondar zone [25]. The possible reason for the similarity could be the similarity in study area and study design. The result of this finding is higher than the findings conducted in Bale zones and Bahir Dar [21, 28]. The possible reason for the higher prevalence in this study is due to the presence of armed conflict which restricts public transport and ambulances during the emergency command post [32].

In this study, being a rural resident 1.1(1.05–4.09) increases the odds of delay in reaching health facilities by 10% than women in urban areas. The possible reason for this association could be due to the fact that the majority of the health institutions are located in town and the distance from home in rural areas is long taking a lot of time [13, 15]. In addition, women living in rural areas faces difficulty in getting transportation to reach health institutions. Moreover, the majority of the active armed conflicts were held in rural areas which restrict any form of movement out of the home. Some available studies support this association [3, 15].

Our study also reported that the non-availability of public transport during the emergency command post 1.9(1.21–3.56) increases the odds of being delayed from reaching health facilities by 90% than those who had transport availability. The possible justification for this association could be due to the restriction of vehicles to transport patients to health facilities after the statement of emergency command post especially at night. Going on foot would again increase the time required to reach health facilities than the use of other transportation options. The finding of the study was also similar to findings reported in other studies [1, 3, 28, 29].

Women whose initial labor onset was reported at night 1.5(1.1–4.32) also increased the odds of delay in reaching health facilities by 50% than those women who started labor at day time. Despite the lack of studies regarding this association, the possible justification for this association with the outcome variable might be due to the total restriction of any ambulation and transportation in the nighttime during the emergency command post. Hence, when labor started at night, the women should wait until the morning to access any form of transportation to including ambulances.

This study also reported closure of roads due to armed conflict in area 1.6(1.31–4.07) increased the odds of delay in reaching health facilities by 60% than those who had road access. Despite lacking evidence regarding this association, the possible reason could be the repeated generalized closure of roads by both conflicting parties during the armed war even for pregnant women. Therefore,

Table 4 Multivariate logistic regression of factors associated with delay in reaching health facilities in Amhara regional state, Northwest Ethiopia, during the emergency command post 2023/24 (n = 399)

Variables	Delay in reaching health facilities					
		Yes (n=)	No (n=)	COR(CI)	AOR(CI)	P value
		Number(%)	Number(%)			
Residence	Urban	90	82	Ref	Ref	Ref
	Rural	129	93	1.3(1.19–3.05)	1.1(1.05–4.09)	0.03
Availability of public transport	Yes	45	90	Ref	Ref	Ref
	No	174	90	3.9(1.91–5.01)	1.9(1.21–3.56)	0.001
Time of onset of labor	Day	89	98	Ref	Ref	Ref
	Night	130	82	1.7(1.31–3.88)	1.5(1.1–4.32)	0.04
Active war in the community	Yes	145	100	1.6(1.22–4.04)	1.3(0.91.06–3.55)	0.07
	No	74	80	Ref	Ref	Ref
Road access for reaching health facilities	Yes	91	43	2.3(1.34–5.12)	1.6(1.31–4.07)	0.01
	No	128	137	Ref	Ref	Ref
Availability of ambulance	Yes	43	136	Ref	Ref	Ref
	No	176	44	12.6(5.13–14.49)	5.2(3.07–7.91)	0.00

Key_ *COR*Crude odds ratio, *AOR*adjusted odds ratio, *CI*Confidence interval, Bold numbers- significant association

women might delay reaching health facilities due to fear of armed conflict.

This study also revealed that the odds of delay in reaching health facilities were 5.2 times higher among women who cannot get ambulances 5.2(3.07–7.91) during the time of emergency command post than women who access ambulances to reach health institutions. The possible research justification for this association might be because of most of the laboring women reach the health facilities using free, easily accessed, and time-saving ambulances in the health care system of Ethiopia. But when ambulances stopped giving such services due to fear of the armed forces, women would be delayed in reaching health facilities. Despite the novelty of the study to discuss the impact of armed conflict with the client's delay in reaching health institutions, the finding of this was also supported by studies that revealed the contribution of lack of transportation to delay in reaching health facilities [16, 19, 31].

Conclusion

The overall prevalence of delay in reaching health facilities among women who are living in the region of emergency command post was higher than previous findings. Living in rural areas, non-availability of public transport during the armed conflict, labor onset at nighttime, road closures by the armed forces, and non-availability of ambulances were the factors that contributed to the delay in reaching health facilities during the emergency command post.

Strength and limitations

The study is the first of its nature to report maternal delays due to armed conflicts and emergency command posts in Ethiopia. The cross-sectional nature of the study might impede the cause-and-effect relationship of the

factors with the outcome variable. The self-reporting bias from the participants and the facility-based nature of the study might also have some under-reporting of the magnitude.

Recommendation

In every form of armed conflict and emergency command posts, the armed forces should keep the international agreements and allow clients to easily reach health facilities without delay before they are exposed to further complications. Ambulances and public transportation should not stop working in helping clients to reach health facilities timely. We also recommend that national policymakers and health system stakeholders to intervene reduce the health impacts of armed conflicts to achieve the national standards of quality healthcare. Further burdens of armed conflict on maternal health are better to be studied.

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Authors' contributions

1.Besfat Berihun Erega- The corresponding author participated in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, data entry, and revision. 2.Abebaye Adigo Zeru- is coauthor and involved in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, and revision. 3.Begizew Yimenu Mekuriaw- is coauthor and involved in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, and revision. 4.Rahel Birhanu Arage- is coauthor and involved in investigation, supervision, methodology, writing, reviewing, analysis, data entry, and revision. 5.Yitayal Ayalew Goshu- is coauthor and involved in design, investigation, resource, supervision, methodology, reviewing, analysis, data entry, and revision. 6.Wassie Yazie Ferede- is coauthor and involved in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, data entry, and revision. 7.Mulat Ayele _is coauthor and involved in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, and revision. 8.Gizachew Yilak - is coauthor and involved in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, data entry, and revision. 9.Befkad Derese Tilahun - is coauthor and involved in

design, investigation, resource, supervision, methodology, writing, reviewing, analysis, and revision.10.Habtam Desse Alemayehu- is coauthor and involved in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, data entry, and revision.11.Eyob Shitie Lake- is coauthor and involved in design, investigation, resource, supervision, methodology, writing, reviewing, analysis, data entry, and revision.

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Data availability

All data included in this manuscript can be accessed from the corresponding author upon request through the email address.

Declarations

Ethics approval and consent to participate

Ethics approval was obtained from the College Health Science Ethical Review Board of Debre Tabor University with reference number *DTU/1081/23*. Informed consent was obtained from all study subjects and health providers. Those who were unwilling to participate in the study were excluded. Names and other identifying information were not included in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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