Determinants of Ambulance Service Utilization among Pregnant Women in Mekelle City, Ethiopia: a Case-Control Study

Abrha Gebreegziabher[1], Araya Abrha Medhanyie[*1], Beyene Meressa[1], Mengistu Hagazi[1], Amanuel Gessessew[2]

[1]School of Public Health, College of Health Sciences, Mekelle University, Tigrai, Ethiopia

[2]Department of Gynecology and Obstetrics, College of Health Sciences, Mekelle University, Tigrai, Ethiopia

*Corresponding author

Abstract

Background: Evidence suggests that the use of ambulance can help to improve health facility deliveries. However, few studies have explored the motivators for and barriers to ambulance use.
An effective ambulance services system forms the link between home and health facility providing basic or comprehensive emergency obstetric care. Hence, the creation of a strong ambulance services network across the country based on evidences from local study is necessary for the improvement of ambulance service utilization among pregnant women.

Objective: To identify the determinants of ambulance service utilization among pregnant women in Mekelle town.
Methods: A facility based unmatched case control study was conducted among 358 mothers from Mekelle City. One referral hospital, two general hospitals and three health centers have participated in the study. Data were collected by trained data collectors via face to face interview using a pre-tested and structured questionnaire. Bivariate and multivariable logistic regression analyses and SPSS version 20 were used to analyze the data. Statistical significance was set at $p<0.05$ and the strength of statistical association was assessed by odds ratio (OR) with 95% confidence intervals.

Results: A total of 356 (118 cases and 238 controls) women with a response rate of 99.4% participated in the study. The mean age and standard deviation of the cases and controls was 16.4 ±5.8 and 18.8±5.7 years, respectively. Maternal education (AOR=2.49, 95% CI: 1.1, 5.7), maternal age (AOR= 2.14, 95% CI: 1.01, 4.55), travel distance to the health facilities (AOR = 3.3, 95% CI: 2.24, 4.74), prior knowledge of the Red Cross telephone number (AOR = 7.51, 95% CI: 3.64, 15.50), monthly income (AOR = 2.8, 95%CI: 2.18, 3.68), decision making process (AOR = 2.12, 95%CI: 1.82, 5.37) and prior knowledge of the availability of free ambulance services (AOR = 0.12, 95%CI: 0.28, 0.49) were found to have a significant effect on ambulance use by pregnant mothers in Mekelle city.

Conclusion and recommendation: The use of the ambulance service by pregnant mothers was far from optimal in Mekelle city. The use of ambulance services can be improved if mothers are informed well about the availability of the ambulance service, whom to contact when they need the service, creating opportunities for income generation and improving women involvement in decision making.

Keywords: Ambulance, pregnant women, health facility deliveries.

Background

Meeting the Sustainable Development Goals of reducing maternal mortality to fewer than 70 maternal deaths per 100,000 live births by 2030 [1] will remain as a significant challenge for Sub Saharan Africa. The majority of maternal deaths in Sub Saharan Africa are associated with birth complications related to lack of ambulance services [2]. It is estimated that 35% of all maternal mortality can be directly attributed to lack of ambulance and that in 75% of maternal mortality cases, ambulance is an influential factor [3] suggesting that ambulance services to transport pregnant women remains a challenge in the world particularly in developing counties. The use of ambulances reduced the occurrence of maternal mortality from 586 to 235 per 100,000 live births in three years in Malawi [4]. Pregnancy–related mortality in areas with above average ambulance utilization was 149 per 100 000 live–births compared with 350 per 100 000 in Tigrai, Ethiopia [5]. Studies have shown that transport and communication innovations in Tigrai, Ethiopia correlated with appreciably reduced pregnancy–related mortality [5]. However, in many low income countries, less than 1% of the population has access to conventional emergency ambulance services [6]. The lack of adequate and appropriate ambulance services has a complex impact on the ability of a country's health care providers to provide adequate maternal care to those in need [3] and in cases of complicated pregnancies, it would contribute to increased maternal death [7].

Ambulance services affect access to both preventative and childbirth care, playing a key role in the survival of women and their newborns, as complications in birth may rapidly become life-threatening. In low income countries, particularly rural areas, considerable time is spent by women and their families waiting for transportation, and travelling to health facilities. Adding to this is poor roads, too few Ambulances and high transportation costs, all of which are major causes of delay in decisions to seek and reach emergency obstetric and postnatal care [8]. Utilization of ambulance services is affected by multitudes of factors including distance, inadequate ambulance access, cost and quality of service, lack of information, educational level, decision making power, income and cultural/traditional health beliefs [2, 9, 10]. For instance, in Tanzania, 61% of women could not deliver in a facility because of distance and 44% of women indicated that they had no means to reach a facility. In rural Zimbabwe, 28% of all maternal deaths were attributed to an inability to access ambulance during delivery. Among the indigenous communities of Cambodia, lack of transportation was cited as the second most important barrier (after lack of money) to accessing care at health centers [11].

Poor utilization of the ambulance services can pose significant problem to laboring women in need of skilled care. Even in densely populated urban environments, transportation problems remain acute, despite the ubiquity of vehicles [12]. However, there is paucity of data with regard to the factors affecting the utilization of ambulance services among pregnant women living within the catchment area of

p-ISSN: 2664-0775, e-ISSN: 2664-0783

the health facilities in Mekelle. Thus, this study was conducted to fill the knowledge gap on the factors influencing the optimum uptake of the ambulance services during pregnancy and childbirth in Mekelle City, Northern Ethiopia.

Methods

Study setting: The study was conducted in Mekelle city, Northern Ethiopia. Mekelle is the capital city of the Tigrai Regional State and is located in the Northern part of Ethiopia, at 783 km from the capital city, Addis Ababa. Mekelle with weyna-dega climatic condition, is administratively divided into seven sub cities and 33 Kebelles. A toll-free number '0344413176' is used by the beneficiaries to call an ambulance for referral. Ambulances are then dispatched from the nearest available station point. Mekelle is considered to have relatively good access to public and private health facilities. There are one referral public hospital, three general public hospitals and nine public health centers. However, the health facilities are not evenly distributed among the sub cities, which might affect equitable access to the available health facilities and services.

Study design: Facility based un-matched case control study design was conducted to explore the factors associated with poor utilization of ambulance services during pregnancy and childbirth.

Population

Source population: Women who gave birth within the last 12 months in the public health institutions of Mekelle city.

Study population: Women who delivered in the selected health facilities in Mekelle City.

Eligibility criteria

Inclusion criteria: Women of reproductive age (15–49 years) admitted to the emergency department and the maternity wards during the study period irrespective of the status of birth outcome (live birth or stillbirth) were included in the study.

Exclusion criteria: Women who were severely ill and mentally ill were excluded from the study.

Sampling size determination and sampling procedure: Double population proportion formula was used to determine the sample size for un-matched case control study. Stat Calc Epi-info7 was employed to calculate the sample size with the following assumptions: 95% confidence level, 80% power, 30.0% of the level of exposure to failure to use ambulance services (the main exposure variable of the study) in the case group [13], an odds ratio of 2.0, the ratio of case to control of 1:2 and an additional of 5% for non-response rate. The minimum total sample size was calculated to be 358 postpartum women. The health facilities were stratified into referral hospital, general hospitals and health centers. One referral hospital, two general hospitals and three health centers were randomly selected. A sampling frame of 864 eligible women was developed by listing all women who gave childbirth from 10th of February 2016 to the 09th of April 2016 in the selected health facilities. Out of this, 285 did not use ambulance services and 579 of the women

p-ISSN: 2664-0775, e-ISSN: 2664-0783

used ambulances to go to the health facilities for childbirth. The sampling frame was used to randomly select the study subjects. A total of 119 cases and 239 controls were randomly selected and included in the study.

Data collection: Data were collected by trained data collectors via face to face interview and pre-tested structured questionnaire was used to collect data on different variables.

Operational definitions

Cases: Women who did not use ambulance to give childbirth in a health facility in the previous 12 months.

Controls: Women who did use ambulance services to give childbirth in a health facility in the previous 12 months.

Data management: The quality of the data was ensured through training of the enumerators and supervisors and pretesting of the tools in communities with similar setting to the study communities. Supervisors also checked questionnaires for completeness and consistency and rectified any detected errors during subsequent fieldwork. Prior to the collection of completed questionnaires by the enumerators, consultants supervised the data entry process and verified the electronic data for completeness and correctness.

Data analysis: The data were cleaned, coded and entered into the computer using statistical package (SPSS) windows version 20. Frequency distributions were run and further cleaning and missing values and errors were checked. Bivariate and multivariable logistic regression models were used to determine the independent predictors of the inability or failure to use the ambulance services. Adjusted Odds Ratios and 95% confidence intervals were computed for each explanatory variable to determine the strength of the association of independent predictors of not utilizing the ambulance services while controlling the effect of potential confounders.

Ethical consideration: Ethical approval was secured from designate Institutional Review Board (IRB) of the College of Health Sciences of Mekelle University. Letter of support to carry out the study was obtained from Tigrai Regional Health Bureau. The objective and purpose of the study was explained to the study participants prior to the start of the data collection. Informed verbal consent was obtained from all participants and the information from participants is kept confidential.

Result

From a total of 358 mothers, 356 mothers (118 cases and 238 controls) participated in the study yielding a total response rate of 99.4% (99.2% for cases and 99.6% for controls).

Socio-demographic characteristics

The mean (SD) age of the study participants was 15.9 (4.9) and 17.6 (4.2) years for the cases and controls, respectively. Christianity was the dominant religion of the study participants. Surprisingly, significant number of men and women from Mekelle City had no formal education. Similarly, quite a sizable proportion of mothers from Mekelle City had no monthly income and more than half of the non users of

ambulance services had no source of health information (Table 1).

Table 1: Socio demographic characteristics of the study participants from Mekelle city, Tigrai, Northern Ethiopia, 2016 (N = 356).

Variables		Nonuse of ambulance services	
		Yes (Cases)	No (Controls)
Age, years	15-29	80(67.8%)	116(48.7%)
	>=30	38(32.2%)	122(51.3%)
Religion	Orthodox	82(69.5%)	143(60.1%)
	Muslim	36(30.5%)	79(33.2%)
	Protestant	0(0.0%)	16(6.7%)
Marital status	Married	99(83.9%)	220(92.4%)
	Single	19(16.1%)	18(7.6%)
Maternal educational level	No formal education	77(65.3%)	29(12.2%)
	Read and write	18(15.3%)	23(9.7%)
	Primary	5(4.2%)	24(10.1%)
	Secondary and above	18(15.3%)	162(68.1%)
Husband educational level (n=327)	No formal education	52(44.1%)	35(14.7%)
	Read and write	9(7.6%)	23(9.7%)
	Primary	8(6.8 %)	26(10.9)
	Secondary and above	49(41.5%)	154(64.7%)
Maternal occupation	Housewife	98(83.1%)	45(18.9%)
	Employed	11(9.3%)	96(40.3%)
	Merchants	9(7.6%)	97(40.8%)
Husband occupation	Farming	26(22.0%)	46(19.3%)
	Government employee	42(35.6%)	95(39.9%)
	Merchant	50(42.3%)	97(40.8%)
Monthly income, ETB	None	61(51.7%)	22(9.2%)
	Poor (<= 500)	19(16.1%)	41(17.2%)
	Medium (501-999)	20(16.1%)	91(38.2%)
	Rich (>=1000)	18(15.3%)	84(35.3%)
Family size	< 5	85(72.0%)	163(68.5%)
	>= 5	33(28.0%)	75(31.5%)
Source of health information	None	64(54.2%)	17(7.1%)
	Radio	36(30.5%)	157(66.0%)
	Television	18(15.3%)	64(26.9%)
Availability of Telephone	No	54(45.8%)	15(6.3%)
	Yes	64(54.2%)	223(93.7%)
Travel distance to nearest health facility	<= 30 minutes	27(22.9%)	195(81.9%)
	>30 minutes	91(77.1%)	43(18.1%)
Decision making power to get services	Self (woman)	18(15.3%)	85(35.7%)
	Husbands	49(41.5%)	36(15.1%)
	Both	51(43.2%)	117(49.2%)

p-ISSN: 2664-0775, e-ISSN: 2664-0783

http://www.mu.edu.et/eajhs

Knowledge regarding the availability of ambulance services

The majority of the respondents were aware of the availability of ambulance services in Mekelle City. Their main source of information regarding the availability of ambulance services in the city was Television, 50(55.0%) for cases and 80(35.6%) for controls. The ambulances administered by the Red Cross, 173(72.7%), were preferable to the ambulances from the health facilities, 65 (27.3%). The women who knew the phone number of the Red Cross Ambulances optimally utilized the ambulances services in the city (Table 2).

Table 2: Knowledge on the availability of ambulance services and Red Cross Telephone numbers among women in Mekelle City, Tigrai, Northern Ethiopia, 2016 (n = 356).

Variables		Nonuse of ambulance services	
		Yes (Cases)	No (Controls)
Knowledge on the availability of Ambulance services in Mekelle City	No	27(22.9%)	13(5.5%)
	Yes	91(77.1%)	225(94.5%)
Source of ambulance information	Radio	21(17.8%)	46(19.1%)
	Television	56(47.5%)	76(32.2%)
	Health professionals	21(17.7%)	95(39.9%)
Knowledge on the Red Cross phone number in Mekelle City	No	82(69.5%)	26(10.9%)
	Yes	36(30.5%)	212(89.1%)
Time of health facility arrival after serious labor	Within 1 hr	32(27.1%)	161(67.6%)
	1 – 3 hrs	3(2.5%)	61(25.6%)
	3 hrs and above	5(4.2%)	13(5.5%)
	Do not know	78(66.1%)	3(1.3%)
Need for more ambulances	No	17(14.4%)	40(16.8%)
	Yes	101(85.6%)	198(83.2%)
Need for training of ambulance professionals	No	1(0.8%)	7(2.9%)
	Yes	117(99.2%)	231(97.1%)

Factors associated with the non-use of ambulances during labor in Mekelle City

Maternal education, maternal age, decision making process at the household level, travel distance to the nearest health facility to get ambulance access, prior knowledge of the Red Cross telephone number, monthly income of the mother, source of ambulance information and prior knowledge of the availability of free ambulance transport service were the independent predictors that determine the nonuse of ambulance services. Respondents who can read and write were more likely to use ambulance services than those mothers without formal education (AOR=2.49, 95% CI: 1.1, 5.7). Respondents of >=30age were less likely to use the ambulance service compared to their younger counterparts, 15-29 years (AOR= 2.14, 95% CI: 1.01, 4.55). Respondents who could access health facility services within 30 minutes travel were 3.3 times more likely to use the ambulance services than mothers who travel for more 30 minutes (AOR = 3.3, 95% CI: 2.24, 4.74). Mothers who knew the Red Cross telephone number were 7.5 times more likely to use ambulance services compared to the mothers who did not know the Red Cross telephone number (AOR = 7.51, 95% CI: 3.64, 15.50). Mothers with better monthly income were 2.8 time more likely to use the ambulance services compared to those without monthly income (AOR = 2.8, 95%CI: 2.18, 3.68). Women from households where the decision making process to utilize ambulance services is made by husbands were 2 time more likely to use the ambulance services compared to the households where the decision is made by both the wife and the husband (AOR = 2.12, 95%CI: 1.82, 5.37) (Table 3).

p-ISSN: 2664-0775, e-ISSN: 2664-0783

http://www.mu.edu.et/eajhs

Table 3: Bivariate and multivariable logistic analysis of factors associated with non-use of ambulance services among women from Mekelle city, Tigrai, Northern Ethiopia, 2016 (n = 356).

Variable		Nonuse of ambulance services		COR(95% CI)	AOR(95%CI)
		Cases (Yes)	Controls (No)		
Age. Yrs	15-29	80	116	2.21(1.40, 3.515)	**2.14(1.01,4.55)**
	>=30	38	122	1	1
Maternal education	No formal education	77	29	1	1
	Read and write	18	23	2.6(1.1, 6.0)	**2.49(1.1, 5.7)**
	Primary	5	24	2.4(1.1, 5.3)	1.67(0.49, 5.62)
	Secondary and above	18	2	11.10(6.3, 19.73)	1.04(0.33, 3.32)
Time spent to nearest HF	<=30 minutes	27	195	1	1
	>30 minutes	91	43	15.3(8.9, 26.3)	**3.3(2.24, 4.74)**
Decision making process to get services	Self	18	85	0.49(0.27, 0.890)	**0.66(0.48, 0.92)**
	Husband	49	36	3.12(1.82, 5.37)	**2.12(1.82, 5.37)**
	Both	51	117	1	1
Monthly income	None	61	22	13.0(6.40, 26.18)	**2.8(2.18, 3.68)**
	Poor	19	41	2.2(1.03, 4.56)	**1.16(1.03, 3.56)**
	Medium	20	91	1.03(0.51, 2.07)	1.03(0.51, 2.07)
	Rich	18	84	1	1
Knowledge of the Red Cross phone number	No	82	26	5.47(3.38, 8.86)	**7.51(3.64, 15.50)**
	Yes	36	212	1	1
Knowledge of the availability of Ambulance services in Mekelle City	No	27	13	5.14(2.54, 10.39)	**0.116(0.49, 0.28)**
	Yes	91	225	1	1
Source of ambulance information	Radio	21	46	2.63(1.37, 5.047)	**1.59(1.250, 2.021)**
	Television	56	76	3.65(2.04, 6.51)	**2.65(1.04, 5.51)**
	Health professionals	21	95	1	1

Discussion

Maternal education, maternal age, travel distance to the health facilities, prior knowledge of the Red Cross telephone number, monthly income, decision making process and prior knowledge of the availability of free ambulance services were the independent predictors of the uptake of ambulance services among pregnant mothers from Mekelle city, Tigrai, Northern Ethiopia.

The educational status of mothers was one of the important predictors in determining ambulance services utilization among pregnant women in Mekelle City. Women who can read and write were better to use ambulance services than the mothers without formal education. This finding was consistent with studies from developing countries including Brazil, India and South Africa [14, 15]. Education is key to improve ambulance service utilization. But, it would continue to challenge the health systems of countries like Ethiopia, where more than half of the women (51%) had no formal education [16]. Education is likely to enhance female autonomy so that mothers develop greater confidence and capabilities to make decisions regarding their own health. The reason why educated women prefer using ambulance services than women with no formal education might be due to the fact that educated women has access to get more information through discussion with educated friends, reading different literatures, books and brochures.

Joint decision making was found to be an independent predictor of the optimal utilization of ambulance services in the study communities. Those mothers who decide jointly with their husbands show significant association with ambulance service utilization consistent with the research done in North Gondar [17]. In sharp contrast to our findings, study conducted in Uganda revealed that decision made by women had a strong association with the use of ambulance services [18]. If women are encouraged by husbands, they would also get financial and other family or social supports to optimally utilize the ambulance services for health provider assisted delivery.

The current study revealed that younger mothers were more likely to use the ambulance service than older mothers. Studies in Brazil, South Africa and India have reported similar findings, suggesting that younger women tend to utilize ambulance services much more than older women [19, 20]. It is likely that younger women are more confident and less ashamed to use ambulances than older women who may have preferred to use other means of transport.

Mother's prior knowledge of the Red Cross telephone number was also found to be an important factor that determines the uptake of ambulance services of women. Mothers who knew the phone number of the Red Cross ambulance services were more likely to use ambulance services, which was in line with the study conducted in Addis Ababa [19]. The knowledge of the phone number of the Red Cross can be considered as one of the birth preparedness and complication readiness strategies of the mothers for the uptake of the ambulance services.

Mothers who knew that free ambulance services are available for all pregnant mothers in labor and those who faced problems related to their pregnancy were more likely to use ambulance services than those who did not know the availability of free ambulance services. This finding was in line with the study findings from Addis Ababa, Ethiopia [20]. The prior knowledge of the available free of charge ambulance services might have solved the transport related barriers to the uptake of skilled delivery services [13].

The study also revealed that the average time of travel to the nearest health facility during labor was found to be an important independent predictor determining the use of the freely available ambulance services which was consistent with studies done elsewhere [5]. Delay in the call for the ambulance services would make it very difficult to undergo transfer to a health facility once complications become evident, and hence the call for the service before complications arise may avoid potentially life–threatening transport delays due to long average time of travel to the nearest health facility [5].

Conclusions and recommendations

Educational level of the mothers, age of mothers, travel distance to the nearest health facilities, prior knowledge of the Red Cross telephone number, monthly income, decision making process and prior knowledge of the availability of free ambulance services were the independent predictors of the uptake of ambulance services among pregnant mothers from Mekelle city, Tigrai, Northern Ethiopia. Counseling on the importance of freely available ambulance services, early contact of the ambulance personnel, provision of the cell phone of the ambulances during the ANC visits and inclusion of the need and importance of ambulance services as a talking point during the pregnancy forums in connection with women's obstetric needs are recommended.

Authors' contributions

AG carried out the conception of the research idea, design the methodology, performed data analysis and interpretation and AAM carried out the questionnaire design, data collection and analysis and reviewed the draft manuscript, BM was involved in the preparation of the manuscript, in protocol development and MH and AG participated in the protocol development, and edition.

Funding

All the expenses of the data collection and related expenses for the research were covered by the first author (AG).

Acknowledgements

We would like to thank all the study participants, data collectors and supervisors who participated in the study.

Competing interests

The authors declare that there is no financial or non-financial competing interest in this article.

References

1. World Health Organization. Strategies toward ending preventable maternal mortality (EPMM). WHO: Geneva, 2015. Available:

http://apps.who.int/iris/bitstream/10665/153544/1/9789241508483_eng.pdf. Accessed: December 2018.

2. Bhopal S, Halpin S, Gerein N. Emergency obstetric referral in rural Sierra Leone: what Can motorbike ambulances contribute? a mixed-methods study. Matern Child Health J. 2013; 17(6):1038–43.

3. UKAID Linking Rural Communities with Health Services: Assessing the Effectiveness of the Ambulance Services in Meeting the Needs of Rural Communities in West Africa prepared for the Africa Community Access Programmed (AFCAP) By Tran said 15th April, 2013.

4. Lungu L, Kamfose V, Chilwa B, Hussein J, Ashwood-Smith H. Are bicycles ambulances and community transport plans effective. Malawi Med J. 2001; 12(2):16–8.

5. Hagos Godefay, John Kinsman, Kesetebirhan Admasu, Peter Byass. Can innovative ambulance transport avert pregnancy–related deaths? One–year operational assessment in Ethiopia. Journal of Global Health. 2016:6(1);010410.**doi: 10.7189/jogh.06.010410)**.

6. Nai-Peng Tey and Siow-li Lai Correlates of and Barriers to the Utilization of Health Services for Delivery in South Asia and Sub-Saharan Africa Hindawi Publishing Corporation. The Scientific World Journal Volume 2013, http://dx.doi.org/10.1155/2013/423403.

7. Babinard, J. and Roberts, "Maternal and Child Mortality Development Goals: What Can the Transport Sector Do?" Retrieved September 8, 2014.

8. Hussein J, Bell J, Nazzar A, Abbey M, Adjei S, Graham W. The skilled attendance index: proposal for a new measure of skilled attendance at delivery. Reprod Health Matters. 2004; 12(24):160–70.

9. UNICEF, Motorcycle Ambulances for Pregnant Women in South Sudan. 2013. Retrieved from: http://www.unicef.org/mdg/sudan_57194.html.

10. Babinard J, Roberts P. Maternal and Child Mortality Development Goals: What Can the Transport Sector Do? Washington, DC: World Bank; 2006.

11. FK Mwangome, PA Holding, KM Songola, GK Bomu Barriers to hospital delivery in a rural setting in Coast Province, Kenya: community attitude and behaviors Rural and Remote Health 12: 1852. (Online) 2012 Available: http://www.rrh.org.au.

12. USAID a low-cost ambulance network to improve access to maternity services in dhaka, Bangladesh.

13. Alemayehu T, Fekadu A, Solomon W. Institutional delivery service utilization and associated factors in

Sekela District, North West of Ethiopia. BMC Pregnancy and Childbirth. 2012.

14. Burgard S. Race and pregnancy-related care in Brazil and South Africa. Soc Sci Med. 2004.

15. Navaneetham K, Dharmalingam A. Utilization of maternal health care services in Southern India. Soc Sci Med. 2002.

16. Central Statistical Agency. Ethiopia Demographic and Health Survey 2011. Central Statistical Agency, Addis Ababa, Ethiopia and MEASURE DHS, ICF Macro Calverton, Maryland, USA.

17. Shimazaki A, Honda S, Dulnuan MM, Chunanon JB, and Matsuyama Factors associated with facility-based delivery in Mayoyao, Ifugao Province, Philippines. Asia Pacific Family Medicine (2013).

18. Srivastava A, Mahmood S, Mishra P, Shrotriya V. Correlates of maternal health care utilization in rohilkhand region, India. Ann Med Health Sci Res. 2014.

19. Asmamaw Abebe. Assessment of knowledge attitude and practice of residents about pre hospital care in Addis Ababa, June 2014.

20. Semere Sileshi Belda. Birth preparedness, complication readiness and other determinants of place of delivery; the case of Goba Wereda, Bale zone, South East Ethiopia, June 2014.