Determinants of Adverse Birth Outcomes in Public Hospitals of the Somali Region, Eastern Ethiopia: A Multicenter Unmatched Case-Control Study

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ABSTRACT

BACKGROUND: Pregnancy outcomes that differ from normal live births are known as adverse pregnancy outcomes. Adverse pregnancy outcomes also have significant effects on the infant's family and society. There is limited data on adverse outcomes in eastern Ethiopia, particularly in the Somali region.

OBJECTIVES: This study aimed to assess the determinants of adverse birth outcomes in the Somali Region Hospitals.

DESIGN: A hospital-based unmatched case-control study was conducted to conduct this study.

METHODS: A hospital-based unmatched case-control study was conducted between June and July 2021 in pregnant women who attended public hospitals in the Somali region. A total of 327 (109 cases and 218 controls) participants were included in this study. Women who gave birth with at least 1 adverse birth outcome were considered cases, and those who gave birth with normal birth outcomes were considered controls. Cases were recruited consecutively, and controls were selected using systematic sampling methods. Data was gathered using interviews, record reviews, using the pretested standard tools. The data were entered into EpiData version 3.1 and analyzed with SPSS version 22. Multivariable regression analysis with an adjusted odds ratio and a 95% confidence interval was used to identify the factors associated with adverse birth outcomes. Finally, *P*-values less than .05 were used to identify significantly associated predictors.

RESULTS: In the current study, rural residency [AOR = 2.80; 95%CI:(1.61-4.87)] lack of ANC follow-up [AOR = 3.27; 95%CI: (1.77-6.02)], pregnancy-induced hypertension [AOR = 3.28; 95%CI: (1.74-6.17)] being anemic mothers [AOR = 3.51; 95%CI: (2.02-6.07)] and *khat* chewing [AOR = 4.54; 95%CI: (2.12-9.70)] were identified as determinants of adverse birth outcome.

CONCLUSIONS: In the current study, rural residency, lack of ANC, being anemic in indexed pregnancies, pregnancy-induced hypertension, and *khat* chewing were determinants of adverse birth outcomes. Therefore, efforts should be made to enhance ANC follow-up, iron and folic acid supplementation, early treatments of pregnancy-induced hypertension, and information on the risk of chewing *khat*.

KEYWORDS: Neonatal death, pregnancy outcome, birth asphyxia, stillbirth, macrosomia

Introduction

Pregnancy outcomes that differ from normal live births are known as adverse pregnancy outcomes. Premature birth, stillbirth, and low birth weight are the most common adverse outcomes, and they are the leading causes of neonatal illness, death, and long-term physical and psychological problems.[1,2] Every Newborn Action Plan (ENAP) was approved by the World Health Assembly in 2014, with a global goal of 12 or fewer stillbirths per 1000 total births in every nation by 2030. By 2019, 128 countries, mostly high- and upper-middle-income countries, had achieved this goal, while many more had not.[3]

The magnitude of adverse birth outcomes, which are indices of health at birth, has substantially reduced during the last half-century. However, a significant gap still exists between under-developed and developed countries. Each year, over 15 million babies are born prematurely around the world, with Sub-Saharan Africa and South Asia accounting for more than 60%

of all preterm births. Globally, more than 2 million stillbirths occur, with 1 occurring every 16 seconds. Although low- and lower-middle-income countries account for around 84% of all stillbirths, rates of stillbirth can also be found in high-income countries among vulnerable populations and ethnic minorities. Around 20 million babies are born with low birth weight, with 15% of these babies born in Sub-Saharan Africa.[3,4]

Adverse pregnancy outcomes, especially LBW and preterm births, are at greater risk for mortality, morbidity, and several short-and long-term physicals developmental, and psychological problems. Also, it leads to significant direct and indirect emotional and economic effects on the infant's family and society.[5,6]

Evidence suggested that a history of past negative outcomes, maternal age, illiteracy, and multiparty were reported as factors associated with adverse birth outcomes.[7] Although there has been research on adverse birth outcomes in

Ethiopia, the majority of prior studies were cross-sectional, which appears they did not compare cases to controls and did not establish real associations. Furthermore, no evidence has been reported from the peripheral parts of Ethiopia, including the Somali regional state regarding the adverse birth outcomes. So the aim of this study was to determine factors that contributed to adverse birth outcomes among women who gave birth in the Somali region of eastern Ethiopia.

Method and Materials

This study was conducted in public hospitals in Somali regional state, eastern Ethiopia. The Somali region has an estimated total population of 10 million (CSA, 2007), the rural population is 86% while 14% is urban population. About 85% of the total population led a pastoral-nomadic lifestyle. There are a total of 11 public hospitals in the region. The study was conducted at the Sheik Hassan Yabarre Referral Hospital, Karamara General Hospital, Godey General Hospital, and Degahbour General Hospital. This study was conducted from June to July 2021 at selected public hospitals in Somali regional state, Ethiopia.

Study design

Unmatched case control study was used. The source of population was all pregnant women who gave birth at public hospitals in the Somali region. The study population were all pregnant women who gave birth at selected public hospitals during the study period.

Cases were women who gave birth at a selected public hospital and had at least 1 adverse birth outcome with their current baby (stillbirth, preterm birth, low birth weight, macrosomia, birth asphyxia, congenital anomalies, and neonatal death; stillbirth; infant died in the womb or during the intrapartum period after 28 weeks of gestation, preterm birth; gestational age of less than 37 weeks, low birth weight; weight of <2500 g at birth, macrosomia birth weight of >4000 g). A newborn was considered to have had birth asphyxia when its fifth-minute APGAR score was <7. A neonate having 1 or more Congenital anomalies detected either by clinical examination or through investigation by the treating physician.

Controls were women who had normal live births (live birth, gestational age of 37-40 weeks, and birth weight of 2500-4000 g) in selected public hospitals.

Exclusion criteria for cases and controls. All women with an uncertain gestational age who were critically ill and who were referred to other health institutions immediately after delivery, were excluded from the study. Furthermore, moms who died shortly after giving birth were excluded from both the cases and controls.

Sample size determination

To determine the sample size for this particular study, an unmatched case-control study double population formula was used with the help of Open EPI INFO version 7 software. Among several exposure variables, selection of the appropriate exposure variables in controls was done based on the main interest variables of cases as determinants for adverse pregnancy outcomes. With the assumption of a 95% confidence interval, 5% marginal error, and 80% power, by considering the proportion of exposed controls at 12.73% and an OR of 2.37 taken from a study done in western Ethiopia.[8] With a 5% non-response rate taken into account, the final estimated sample size for this study was 329 (110 cases and 219 controls).

Sampling techniques and procedure

Of 11 public hospitals, 4 (Sheik Hassan Yabare Referral Hospital, Karamara General Hospital, Godey General Hospital, and Degahbour General Hospital) were selected using a simple random sampling technique. Then, the study participants were allocated proportionally to each selected hospital based on the number of pregnant women who gave birth monthly in each hospital. In this study, all eligible cases (mothers who had an adverse birth outcome) were recruited consecutively until the required number of cases was reached. Systematic random sampling was used to select the controls using the interval k ($k = N/n$). Where "N" was the monthly estimated total of women who gave normal birth (N = 1781) and n was the total number of controls (n = 219); interval size (k): $k = N/n = 1781/219 = 8.13 \approx 8$. Every eighth woman who meets the inclusion criteria for a control was included until the desired sample size for controls was reached. The first control, or starting point (j), was selected between 1 and k. Therefore, first control was chosen at random from the first 8 women who had normal live births using a lottery method.

Methods of data collection

A combination of chart review and interviewer-administered questionnaires was used for data collection, which has been modified after reviewing similar studies.[9,10] The questionnaires were prepared first in English, then translated to the local language (Somali). The data collection tool contains 3 parts: sociodemographic, obstetric, and medical characteristics. Data were collected by 8 trained Bachelor midwives (2 data collectors for each hospital, 1 assigned to collect data during the day and the other during the night). Moreover, 4 MSc midwives' supervisors were recruited to supervise the data collection process. In this study, an interview was conducted in a separate room after a woman had been stabilized. Aside from the interview, the fifth minute Apgar score and birth weight

were measured by data collectors, and maternal conditions, including maternal hemoglobin level and other maternal and neonatal complications, were reviewed from charts. The data collectors used a calibrated digital scale to weigh the baby within 30 minutes of delivery.

Study variables

Dependent variable. Adverse birth outcome (yes/no)

Independent variables

> ➤ **Socio-demographic characters:** Age, Education, Occupation, and Residence of the participants.

> ➤ **Obstetric Characteristics:** Included factors like Parity, ANC utilization, Previous contraceptive usage, Birth interval, Initiation of labor, Anemia in current pregnancy, APH, Preeclampsia, and Gestational DM of the participants.

> ➤ **Medical Characteristics:** Preexisting medical condition (Diabetes mellitus, Hypertension, Cardiac disease HIV/AIDS), medication uses.

Data quality control and management

The questionnaire and checklist were prepared after reviewing different literature. Prior to the start of data collection, 1-day training was given to the data collectors about the study objectives and how to fill out the questionnaire. To test the reliability and consistency of the questionnaire, it was translated into Af-Somali, which is a local language. The pretest of the tools was conducted on 5% of the total sample at Kebribeyeh Primary Hospital before actual data collection. During data collection, close supervision was carried out by the supervisors and principal investigator.

Operational definition

Adverse pregnancy outcomes. It is considered when the pregnancy ends with at least 1 of the following pregnancy outcomes: (preterm birth, low birth weight, stillbirth, birth asphyxia, macrosomia, congenital anomalies, and neonatal death) which was finally diagnosed and confirmed by treating physicians.[11-13]

Stillbirth. When a fetus was delivered without fetal heart rate and/or respiratory rate at or after 28 weeks of gestational age.[14]

Low birth weight (LBW). Is considered when the baby's weight is less than 2500 g within the first hour of life after birth.[15]
Macrosomia: Macrosomia is defined as a birth weight greater than 4000 g irrespective of gestational age.[9]

Preterm. It is when a baby is born after 28 weeks of gestation but before 37 completed weeks.[16]

Khat. Khat refers to the leaves and young shoots of the plant *Catha edulis Forsk*, a species in the *Celastraceae* family. Khat contains a variety of compounds, including cathinon.[17-19]

Anemia. A pregnant woman was considered anemic if her hemoglobin level was indicated to be less than 11 g/dl during the current pregnancy and/or at arrival before childbirth.[20]

Pregnancy induced hypertension. A pregnant woman with high blood pressure (140/90 mmHg) that occurred after 20 weeks of gestation with a previously normal blood pressure that was measured 2 times at least 4 hours apart by health care providers and with or without proteinuria. The diagnosis of PIH was considered if the chart of women clearly indicated it was confirmed by the treating physician. Pregnancy-induced hypertension includes gestational hypertension, pre-eclampsia, superimposed preeclampsia, and eclampsia.[21]

Antenatal care (ANC) is a maternal healthcare service that is provided by skilled healthcare professionals to pregnant women and adolescent girls. It is provided throughout pregnancy to ensure the best health outcomes for both the mother and the newborn. A woman is considered to have had an ANC follow-up if her charts indicate that she had at least 1 ANC follow-up.[22]

Data processing and analysis

The data were entered into Epidata version 3.1 and then exported to SPSS version 22 for analysis. Descriptive statistics were computed and displayed. Moreover, multi-collinearity had been checked using the standard errors, variance inflation factor (VIF) each independent variable. The bivariate analysis was done to estimate the crude odds ratios. Then all variables were included in the multivariate logistic regression analysis using backward stepwise approach to select the final model. The final model of multivariable logistic regression analysis was used to estimate factors associated with adverse birth outcome adjusting for potential cofounders. The model adequacy was checked using Hosmer and Lemeshow goodness of fit tests, and the result was fitted to a multivariable logistic regression analysis model (chi-squared value of test = 10.17 and a $P = .120$). Adjusted Odds Ratios (AOR) along with the 95% CI were used to estimate the strength of the association and variables with a *P*-value of less than .05 were considered as an independent predictor of adverse birth outcomes.

Results

Sociodemographic characteristics

A total of 327 (109 cases and 218 controls) participants were included in this study, with a response rate of 99%. In this study, 60 (55%) of the cases, and 77 (35.3%) of the controls were from rural areas. The majority of the cases, 87 (79.8%) and 129, (59.2%) of the controls, had no formal education. The

Table1. Sociodemographic characteristics of mothers delivered in selected public hospitals of Somali region eastern Ethiopia, 2021.

CHARACTERISTICS	CATEGORIES	CASES N = 109	CONTROLS N = 218	TOTAL/N = 327
		N (%)	N (%)	N (%)
Residence	Urban	49 (45.0)	141 (64.7)	190 (58.1)
	Rural	60 (55)	77 (35.3)	137 (41.9)
Age (years)	<20	10 (9.2)	6 (2.8)	16 (4.9)
	20-29	46 (42.2)	129 (59.2)	175 (53.3)
	30-34	19 (17.4)	48 (22.0)	67 (20.5)
	>34	34 (31.2)	35 (16.1)	69 (21.1)
Current marital status	Married	101 (92.7)	199 (91.3)	300 (91.7)
	Widowed and divorced	8 (7.3)	19 (8.7)	27 (7.3)
Occupation	Unemployed	6 (5.5)	8 (3.7)	14 (4.3)
	Housewife	83 (76.1)	142 (65.1)	225 (68.8)
	Student	5 (4.6)	20 (9.2)	25 (7.6)
	Merchant	11 (10.9)	28 (12.8)	39 (11.9)
	Others	4 (3.7)	20 (9.2)	24 (7.3)
Education	Non-formal education	87 (79.8)	129 (59.2)	216 (66.1)
	primary education	8 (7.3)	32 (14.7)	40 (12.2)
	Secondary education	8 (7.3)	17 (7.8)	25 (7.6)
	College or university	6 (5.5)	40 (18.3)	46 (14.1)

cases had a mean age of 29.17 (SD ± 6.61) years, while the controls had a mean age of 28.10 (SD ± 5.21) years. Forty-six (42.2%) of cases and 129 (59.2%) of controls were within the age group of 20 to 29 years. (Table 1)

Obstetrics and preexisting medical illness of mothers

In this study, about 43 (39.4%) of cases and 34 (16.1%) of control mothers did not have ANC follow-up. In regard to previous adverse pregnancy outcomes, 37 (33.9%) of cases and 54 (24.8%) of controls had a history of adverse pregnancy outcomes. Regarding pregnancy-induced hypertension, 41 (36.7%) of cases and 27 (12.4%) of controls had pregnancy induced hypertension in their current pregnancy. Moreover, of those women who participated in this study, 75 (68.8%) cases and 73 (33.5%) of the control women had anemia in their current pregnancy. Of the study participants, more than two-thirds of cases and controls gave birth vaginally. Moreover, mothers who chew khat during pregnancy were about 26 (23.9%) of the cases and 15 (6.9%) of the controls. More than two-thirds of cases and controls give birth vaginally. It was also reported that 91 (83.5%) of cases and 163 (74.8%) of controls drank coffee and tea daily (Table 2).

Determinants of adverse birth outcome

After all variables included in multivariate logistic regression analysis, the residence, ANC follow up, being anemic in current pregnancy, having pregnancy induced hypertension, and khat chewers were identified as a significantly associated predictors of adverse birth outcomes.

The odds of developing an adverse pregnancy outcome were 2.80 times higher [AOR = 2.80; 95%CI: (1.61-4.87)] among those women from rural areas than among mothers from urban areas. Those women who had no ANC follow-up were 3.27 times more likely [AOR = 3.27; 95%CI: (1.77-6.02)] to develop adverse pregnancy outcomes as compared with those women who attended ANC. The odds of developing an adverse pregnancy outcome were 3.28 times higher [AOR = 3.28; 95%CI: (1.74-6.17)] among women who developed pregnancy induced hypertension during their pregnancy than their counterparts. The odds of developing an adverse pregnancy outcome were 3.51 times [AOR = 3.51; 95%CI: (2.02-6.07)] higher among anemic mothers than non-anemic mothers. This study also shows that mothers who chewed khat during indexed pregnancy had about 5 times [AOR = 4.54; 95%CI: (2.12-9.70)] greater risk of experiencing an adverse birth outcome than their counterparts (Table 3).

Table 2. Obstetrics and medical characteristics of mothers delivered at the delivery area of selected public hospitals of Somali region eastern Ethiopia 2021.

CHARACTERISTICS	CATEGORIES	CASES = 109	CONTROLS (N = 218)	TOTAL (N = 327)
		N (%)	N (%)	N (%)
Parity	<3	36 (33.0)	67 (30.7)	103 (31.5)
	3-5	45 (41.3)	111 (50.9)	156 (47.7)
	>5	28 (25.7)	40 (18.3)	68 (20.8)
Contraceptive usage before pregnancy	Yes	21 (19.3)	45 (20.6)	66 (20.2)
	No	88 (80.7)	173 (79.4)	261 (79.8)
ANC follow up	Yes	66 (60.6)	183 (83.9)	249 (76.1)
	No	43 (39.4)	35 (16.1)	78 (23.9)
History of adverse pregnancy outcome	Yes	37 (33.9)	54 (24.8)	91 (27.8)
	No	72 (66.1)	164 (75.2)	236 (72.2)
Labor initiated by	Induced	36 (33.0)	46 (21.1)	82 (25.1)
	Spontaneous	73 (67.0)	172 (78.9)	245 (74.9)
Mode of delivery	Vaginally	92 (84.4)	177 (81.2)	269 (82.3)
	Vacuum	7 (6.4)	13 (6.0)	20 (6.1)
	CS	10 (9.2)	28 (12.8)	38 (11.6)
Premature rupture of membrane	Yes	15 (13.8)	27 (12.4)	42 (12.8)
	No	94 (86.2)	191 (87.6)	285 (87.2)
Delivery assisted by	Physician	22 (20.2)	57 (26.1)	79 (24.2)
	Midwives	87 (79.8)	161 (73.9)	248 (75.8)
Pregnancy-induced hypertension	Yes	41 (37.6)	27 (12.4)	68 (20.8)
	No	68 (62.4)	191 (87.6)	259 (79.2)
Anemia in the current pregnancy	Yes	75 (68.8)	73 (33.5)	148 (45.3)
	No	34 (31.2)	145 (66.5)	179 (54.7)
Khat chewing	Yes	26 (23.9)	15 (6.9)	41 (12.5)
	No	83 (76.1)	203 (93.1)	286 (87.5)
Daily drink tea	Yes	91 (83.5)	163 (74.8)	254 (77.7)
	No	18 (16.5)	55 (25.2)	73 (22.3)
Pre pregnancy hypertensive	Yes	14 (12.8)	3 (1.4)	17 (5.2)
	No	95 (87.2)	215 (98.6)	310 (94.8)
Pre pregnancy diabetics mellitus	Yes	5 (4.6)	9 (4.1)	14 (4.3)%
	No	104 (95.4)	209 (95.9)	313 (95.7)

Discussion

This study aimed to assess adverse pregnancy outcomes in the Somali region of eastern Ethiopia. There was a statistically significant association between rural residency, lack of ANC follow-up, being anemic in current pregnancy, having pregnancy induced hypertension, and chewing khat during pregnancy and adverse pregnancy outcomes.

In this study, women from rural residency were more likely to have an adverse birth outcome. Similar findings were reported in studies in Ethiopia and the Amhara region.[10,23]

Table 3. Multivariable logistic regression of determinants of adverse pregnancy outcome of selected public hospitals of Somali region eastern Ethiopia, 2021.

VARIABLE	CATEGORIES	CASES N (%)	CONTROLS N (%)	COR, [95% CI]	AOR% [95% CI]
Residency	Urban	49 (45.0)	141 (64.7)	1	1
	Rural	60 (55)	77 (35.3)	2.24 [1.40-3.58]	2.80 [1.61-4.87]
ANC follow up	Yes	66 (60.6)	183 (83.9)	1	1
	No	43 (39.4)	35 (16.1)	3.41 [2.01-5.77]	3.27 [1.77-6.02]*
Pregnancy-induced hypertension	Yes	41 (37.6)	27 (12.4)	4.27 [2.44-7.46]	3.28 [1.74-6.17]*
	No	68 (62.4)	191 (87.6)	1	1
Anemia status in the current pregnancy	Yes	75 (68.8)	73 (33.5)	4.38 [2.68-7.18]	3.51 [2.03-6.07]*
	No	34 (31.2)	145 (66.5)	1	1
Khat chewers	Yes	26 (23.9)	15 (6.9)	4.24 [2.14-8.41]	4.54 [2.12-9.70]*
	No	83 (76.1)	203 (93.1)	1	1

Abbreviations: AOR, adjust odds ratio; COR, crude odds ratio; ANC, antenatal care.

This could be attributed to a lack of quality pregnancy-related care in rural areas, such as medical services, health information, and nutritional awareness.

Lack of ANC was another significant determinant of adverse birth outcomes. Similar studies were reported from studies conducted in medical centers in south Ethiopia and Pakistan.[11,24] This could be explained by the fact that mothers who attend ANC visits have access to maternal nutrition information, which can help prevent anemia and other complications. This finding suggests that increasing maternal use of ANC services may help to reduce negative birth outcomes. This suggests that all pregnant women are encouraged to attend ANC as soon as they become pregnant in order to avoid adverse birth outcomes.

Anemia in a current pregnancy shows an association with adverse pregnancy outcomes. It was also reported in many studies conducted in Ethiopia and Ghana.[8,25,26] Anemia can reduce blood supply to the placenta, resulting in preterm labor, preterm birth, and other adverse birth outcomes. Furthermore, anemia-induced hypoxia can cause fetal stress and corticotropin-releasing hormone (CRH) activation, which can lead to preterm labor. According to these results, iron-folic acid supplementation and anemia preventative measures should be given top priority in prenatal care, with a special focus on anemic mothers who are vulnerable to have adverse birth outcomes. Furthermore, this finding implies that all pregnant women should be screened for anemia and treated as soon as possible to reduce the risk of adverse birth outcomes.

The prevalence of pregnancy induced hypertension among cases was 37.6%, which was high compared with previous study. The odds of having an adverse birth outcome were more than 3 times higher in women with pregnancy induced hypertension in their current pregnancy than in their counterparts. This result was in line with earlier research reported from Gondar, Hawasa in Ethiopia, and Ghana.[27-29] Pregnancy-induced hypertension has been identified as a known risk factor for an adverse birth outcome.[30] Moreover, the PIH has been linked to placental ischemia and decreased utero-placental blood flow, which affects blood flow to the fetus and can result in stillbirth, low birth weight, preterm delivery, and neonatal death.[31]

Khat chewing during pregnancy was associated with an adverse pregnancy outcome. According to the WHO Expert Committee on Drug Dependence (ECDD) critical review results and other similar studies, *khat* chewing during pregnancy may have various obstetric effects such as low birth weight, stillbirths, and the effect of *khat* chewing during pregnancy increases with increased frequency and duration of use.[32-34] This finding implies that all pregnant women should be informed about the dangers of using *khat* or any other drug during pregnancy. Therefore, the importance of not chewing *khat* should be well discussed during ANC follow-ups.

Strength and limitation of the study

The study employed 2 data collectors, 1 assigned to collect data during the day and the other during the night at each hospital, to ensure that those who gave birth at night were not ignored. Furthermore, the data collection process was well supervised and organized. Recall biases may emerge during data collection from study participants, as is commonly asserted in case-control study designs.

Conclusion and Recommendations

In the current study, rural residency, lack of ANC follow-up, being anemic, pregnancy-induced hypertension, and *khat* chewing were significantly associated determinants of adverse birth outcomes. Efforts should be made to strengthen the

educational possibilities available to women. Furthermore, it should be a high priority to develop and extend existing programs to enhance ANC follow-up. Additionally, taking iron and folic acid supplements during pregnancy is an important and effective strategy that should be sustained to avoid anemia. Pregnancy-induced hypertension should be screened and treated earlier. Improving and maintaining multi-sectoral initiatives should also be implemented to overcome khat chewing during pregnancy.

Declarations

Ethics Approval and Consent to Participate

The study was carried out after receiving ethical approval. The ethical clearance for this study was obtained from Jigjiga University's Health Research Ethical Review Committee (HRERC) of the College of Medicine and Health Sciences (Ref. No. = JJU-CMHS-HRERC:0056/2021). The study participants were clearly informed about the purpose and aim of the study, risks and benefits, and the rights of participants to withdraw at any time. The confidentiality of the information was well addressed. Informed, voluntary, written, and signed consent had been obtained from each study participant. Furthermore, names or other personally identifiable information about the study participants was not obtained. Finally, the declaration of informed voluntary consent was undertaken to assure the full acceptance of consent by study participants. Consent has been obtained from a guardian or a legally authorized representative (LAR) for participants who are unable to offer informed consents (minors or no education). Furthermore, assent was obtained from those participants, together with their guardians' consents.

Consent for Publication

Not applicable.

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ANNEXES

Annex C Questionnaires (English Version)

Questionnaire for the study on **Determinants of adverse birth outcomes in public hospitals of the Somali region,** **eastern Ethiopia Multicenter unmatched cases control study**.

Classification
1 cases
2 controls

Part I Sociodemographic data.

Q.NO	QUESTION	OPTION	SKIP
1	Age in year		
2	Residence	1. Urban 2. Rural	
3	What is the occupation of your husband?	1. Un employed 2. "Private employee" 3. "Government employ" 4. Marchant 5. Farmer 6. Daily labor 7. Others	
4	What is your Marital status	1. Single 2. Married 3. Widowed 4. Divorced	
5	What is your Occupation	1. Un employed 2. House wife 3. Student 4. Merchant 5. Others	
6	What is Educational Status	1. Cannot read and write 2. Can read and write 3. Primary education 4. Secondary education 5. Collage \university	

(Continued)

Part II Obstetric related factors.

Q.NO	QUESTION	OPTION	SKIP
7	Age at first birth		
8	Gestation at birth		
9	What was the weight of the baby at birth?		
10	What was the outcome of your last delivery?	1. Normal live birth 2. Still birth 3. Preterm birth 4. Low birth weight 5. neonatal death 6. macrosomia	
11	Number of Pregnancy (gravidity)	1---------------	
z12	Number of birth (parity)	1. ----------	
13	What is your exact birth interval between this and the previous one	-------months	
14	What was the mode of recent delivery	1. SVD 2. Assisted Vacuum delivery 3. Caesarean Section	
15	Who assisted you during delivery	1. Nurse/Midwife 2. doctor	
16	Any complication during labour	1. yes 2. No	
17	If complications, what was the nature?	If yes Specify	
18	Initiation of labor	1. spontaneous 2. induced	
19	Did the womwn havv PROM	1. yes 2. No	
20	Previous history contraceptives usage	1. yes 2. No	
21	If yes which ones	1. Pills 2. Implants 3. Injectable 4. IUCD 5. Other specify	
22	If no why	1. Cultural factors 2. Lack of partner 's consent 3. Fear side effects 4. Un available 5. Other specify	
23	Did you have PIH	1. Yes 2. No	
24.1	If yes which one	1. eclampsia 2. preclampsia 3. gestational hypertension 4. Superimposed preclampsia	
25	Did you have any obstetric emergencies	1. Yes 2. No	
26	If yes which ones	1. APH 2. PIH 3. Abortion 4. obstructed labour	
27	Hemoglobin level before delivery or during pregnny ?	-------------g/dl	

(Continued)

Part III Health facility factor.

Q.NO	QUESTIONS	OPTIONS	RESPONSE	SKIP
28	Did you attend ANC follow up?	1. Yes 2. No		
29	How many visits you go	1. One visit 2. Two visit 3. Three visit 4. 4 or above four		
30	What services were you going for?	1. TT 2. IRON supplementation 3. Deworming 4. Others		
31	Did you receive all the services you were looking f	1. Yes 2. No		
32	What is the distance from your home to the heath facility			

Part IV Pre-exsisting medical conditions.

Q.NO	QUESTION	OPTION	SKIP
33	Did you have any pre-existing medical conditions before pregnancy?	1. Yes 2. No	
34	If yes, which one	1. Diabetes mellitus 2. Hypertension 3. Cardiac disease 4. Anemia	
35	Do you take medications	1. Yes 2. No	
36	If yes, for how long?		
37	Did you chew chat dduring current px	1. Yes 2. No	
38	Did you drink coffeand tea during px	1. Yes 2. No	

Name of data collector _____ signature _____

Name of supervisor _____ signature _____

Thank you very much