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Adverse Maternal Outcome and Associated Factors Among Teenage and Adult Mothers Who Gave Birth in West Gojjam Public Hospitals, North West Ethiopia, 2022

Nakachew, Wallie

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DEPARTMENT OF MIDWIFERY

ADVERSE MATERNAL OUTCOME AND ASSOCIATED FACTORS AMONG TEENAGE AND ADULT MOTHERS WHO GAVE BIRTH IN WEST GOJJAM PUBLIC HOSPITALS, NORTH WEST ETHIOPIA, 2022

BY: NAKACHEW WALLIE (BSC)

THESIS SUBMITTED TO BAHIR DAR UNIVERSITY, COLLEGE OF MEDICINE AND HEALTH SCIENCE, SCHOOL OF HEALTH SCIENCE, DEPARTMENT OF MIDWIFERY, IN PARTIAL FULFILLMENT FOR THE REQUIREMENT OF MASTER OF SCIENCE IN CLINICAL MIDWIFERY

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COLLEGE OF MEDICINE AND HEALTH SCIENCE
SCHOOL OF HEALTH SCIENCE
DEPARTMENT OF MIDWIFERY

Name and address of principal investigator	Nakachewwallie(BSc) Phone: +251918659722 Email: <u>Nakachewwallie385@gmail.com</u>
Name and address of Advisors	1. Amlaku M. (MSc, associate professor) Phone: 0910349281 Email:amlaku78@gmail.com 2. Shumiye S.(MSc, assistant professor) Phone:0918781137 Email:shumiye2007@gmail.com
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Abstract

Background: Teenage pregnancy is a pregnancy that occurs within the maternal age of 10-19 years. Adverse maternal outcomes caused by teenage pregnancy are major public health problems in developing countries. Teenage pregnancy increases the risk of adverse maternal outcomes compared to adult mothers. The Ethiopian Federal Ministry of Health developed a new national adolescent and youth health strategy to reduce teenage pregnancy by half. Despite these efforts, teenage pregnancy remains high in Ethiopia. Most studies conducted in Ethiopia only assess the magnitude of teenage pregnancy rather than address adverse maternal outcomes.

Objective: To assess adverse maternal outcomes and associated factors among teenage and adult mothers who gave birth in West Gojjam public hospitals, North West Ethiopia, 2022.

Methods: A facility-based comparative cross-sectional study was conducted in West Gojjam zone public hospitals from April 30 to June 30, 2022, among 785 mothers (386 teenage and 399 adult). A systematic random sampling was used to select study participants. Data were collected using an interview-administered questionnaire. Both data entry and analysis were made using Epi-data version 3.1 and statistical product and service solutions. Bivariate and multivariate logistic regression were used. Adjusted odds ratios with 95% CI were used to measure the strength of association between explanatory variables and outcome variables. P-values < 0.05 in multivariate logistic regression were considered statistically significant for adverse maternal outcomes.

Results: The proportion of adverse maternal outcomes among teenage and adult mothers was 33% (95% CI, 28.2 - 37.4) and 22.1% (95% CI, 18-26.2) respectively. Similarly, the proportion of preeclampsia, perineal tear, and anemia were significantly higher in teenage mothers. Rural residence [AOR: 1.761 (95% CI, 1.189, 2.609)], late initiation of antenatal follow-up [AOR: 1.749 (95% CI, 1.226, 2.495)] and not attending complete antenatal visits [AOR: 1.671 (95% CI, 1.040, 2.685)] were also factors significantly associated with adverse maternal outcomes.

Conclusion: Adverse maternal outcomes among teenage mothers were significantly higher when compared to adult mothers. Increasing access to skilled care for populations living in remote areas and promoting community-organized transport schemes and providing community mobilization activities to increase awareness of ANC follow-up were recommended.

Key word: Teenage pregnancy, adult pregnancy, adverse outcome, Ethiopia

Table of Contents

Acknowledgment	iii
Abstract	iv
List of Tables	vii
List of Figure.....	viii
Abbreviations	ix
1. Introduction.....	1
1.1 Background	1
1.2 Statement of the problem	2
1.3 significance of the study	4
2. Literature review	5
2.1. Adverse maternal outcome.....	5
2.3. Factors associated with adverse maternal outcomes among teenage and adult	6
2.3.2 Reproductive and Obstetric factors	6
2.4. Conceptual frame work	8
3. Objective.....	9
3.1 General objective.....	9
3.2 specific objectives	9
4. Methods and materials	10
4.1 study area.....	10
4.2. Study period	10
4.3 Study design	10
4.4 source population	10
4.5 study population	10
4.6 Eligibility criteria	10
4.6.1 Inclusion criteria.....	10
4.6.2 Exclusion criteria.....	10
4.7 Sample size determination	10

4.8 sampling procedure	13
4.8 Inclusion & Exclusion criteria.....	14
4.9 Study variables	15
4.10 Operational definition of variables.....	15
4.11. Data collection procedure and Data Quality control.....	15
4.12. Data processing and analysis.....	16
4.13. Ethical clearance	16
5. Result	17
6. Discussion.....	25
8. Conclusion and Recommendation	27
9. Reference	28
10. Annex	31

List of Tables

Table 1: Sample size calculation by Epi info version7.2 from different outcome variables based on their proportion for teenage and adult mothers in West Gojjam zone,North West Ethiopia,2022	12
Table 2: socio- demographic characters tics among teenage and adult mothers who gave birth at west Gojjam public hospitals, North West Ethiopia, 2022	18
Table 3: Reproductive and obstetrics characteristics among teenage and adult mothers who gave birth at west Gojjam zone public hospitals, North West Ethiopia, 2022	19
Table 4: Adverse maternal outcomes among teenage and adult mothers who gave birth at West Gojjam public hospitals, North West Ethiopia, 2022	20
Table 5: Bivariate and Multivariate analysis of factors associated with adverse maternal outcome among teenage and adult mothers who gave birth at West Gojjam public hospitals, North West Ethiopia, 2022	23

List of Figure

Figure 1: conceptual framework of study variables.....	8
Figure 2: Diagrammatic presentation of sampling procedure.....	14
Fig 4: Proportion of adverse maternal outcomes among teenage and adult mothers who gave birth at West Gojjam public hospitals, North West Ethiopia, 2022	21

Abbreviations

ANC	Ante natal care
AOR	Adjusted odd ratio
COR	Crude Odd Ratio
CI	Confidence interval
EDHS	Ethiopia Demographic and Health Survey
FMOH	Federal Ministry of Health
PPH	Post-partum Hemorrhage
SD	Standard Deviation
SRH	Sexual and reproductive Health
WHO	World Health Organization

1. Introduction

1.1 Background

Teenage pregnancy is a pregnancy occurs in the maternal age of 10-19 years(1).It is a worldwide problem which accounts 11% of all births worldwide and 90% occur in low and middle income countries(2).

Every year, an estimated 21 million girls aged 15-19 year in developing regions become pregnant and approximately 12 million of them give birth. At least 777,000 births occur to teenage girls younger than 15 years in developing countries(3).

According to the World Health Statistics 2014, the average global birth rate among 15–19 year olds was 49 per 1000 girls(2). In Africa teenage pregnancy was high than other world such as, Niger top one that accounts 203 births per 100,000 teenage women, followed by Mali with 175 (4).

Sub-Saharan Africa countries had the highest prevalence of teenage pregnancy in the world which accounted for more than half of all the births, an estimate of 101 births per 1,000 women aged 15–19 in 2013(4). In East Africa, one out of five teenager start child bearing which account magnitude of 21.5%(4).

According to EDHS 2019, Prevalence of teenage pregnancy in Ethiopia was 13%(5). It varies depending on residence, urban 5%, and rural 15%. Moreover, disparities are seen across regions, with the highest 23%inAfar, 8% in Amhara and lowest3%inAddis Ababa(5).

Currently about 17% of the adolescents between 15 and 19 years in Ethiopia are married and the median age of women at first sexual intercourse is 17 years. In addition, 20.5% of female adolescents 15-19 years face unmet needs for family planning(5).

Different literature showed that employment status ,poverty ,marital status , type of occupation, culture, peer pressure, early marriage, forced marriage and rape were factors associated with teenage pregnancy(2-4).

Complication during pregnancy and child birth was the most common cause of morbidity and mortality among women aged 15-19 years in developing countries(6).

The adverse pregnancy outcomes caused by teenage pregnancy are major public health problems with significant social impact.Compared with the pregnancy of adult women, the pregnancy of adolescent women usually increases the risk of adverse pregnancy outcomes(7).

1.2 Statement of the problem

Teenage pregnancy was a high risk problem that leads adverse maternal outcomes(7). Teenage mothers face substantially higher adverse maternal outcome compared with adult aged mothers(8, 9). It is the leading cause of death in developing countries with teenage mothers being twice as likely to die from pregnancy-related complications(10).

Every year more than 70,000 teenage mothers were died in developing countries due to childbirth complications(11). By impacting education, employment and economic opportunities, pregnancy during teenage can also have lasting socio-economic consequences, which, in turn, contribute to poorer health outcomes, gender inequity and poverty of teenage mothers and their families and communities(12). It results from different factors like early marriage, rural residence, not attending school, no maternal and paternal education, lack of parent to adolescent communication on SRH issues, premarital sexual intercourse and no contraceptive access(4, 13).

Even though Ethiopia has achieved the Millennium Development Goal targets for child health set for 2015 by the international community, maternal deaths were still high, 412 per 100,000 live births in 2016(14). Reducing the rate of teenage pregnancy and maternal mortality is one of the key Sustainable Development Goals 3 (SDG) target 3.7(by 2030, ensure universal access to sexual and reproductive health care services including for family planning, information and education and the integration of reproductive health in to national strategies and programs(15). Ethiopian Federal Ministry of Health developed new national adolescent and youth health strategy for the aim of reducing teenage pregnancy from 13 % to 7% and raise median age at first marriage from 17 to 18 years(16). Some of the efforts done, teenage pregnancy remains high in Ethiopia. In general prevention of teenage pregnancy is key strategies to improve women's education, social and economic development of one's country(17).

The results of studies on adverse maternal outcome among adolescent mothers are controversial. For example; A study conducted in Iran, reported that the risk of poor pregnancy outcome is not higher in teenage when compared to adults age 20-35 years(18). Another study done in Nepal showed that, teenage mothers have an equally good outcome with adults if give good obstetric care and encourage institutional delivery(19). Another study conducted in Thailand showed that teenage mothers were less likely to develop adverse maternal outcomes compared with adult aged 20-34(20).

Another study conducted in France showed that teenage mothers had lower proportion of preeclampsia and post-partum hemorrhage (PPH) than adult mothers (21). A study conducted in North West Ethiopia revealed that adolescents are significantly associated only with postpartum depression and had no association with preeclampsia and PPH(13).

On the contrary, a study done in Pakistan showed that teenage mothers had a high percentage of anemia, preterm delivery and preeclampsia compared with adult mothers(22). Another WHO multi country study conducted in low- and middle-income countries showed that teenage mothers had higher proportion of adverse maternal outcomes compared to adult aged mothers(23). Another study done in Zambia showed that teenage mothers had higher proportion of eclampsia and anemia compared to adult aged mothers(24). A study conducted in Tigray region of Ethiopia revealed that teenage mothers had higher proportion of preeclampsia, and anemia when compared to adult mothers(25).

Most of the studies conducted in Ethiopia were aimed on the prevalence of teenage pregnancy. However, there are limited studies conducted to assess adverse maternal outcomes among teenage mothers in Ethiopia. But all have limitation. For example a study conducted in Tigray region variable like economical and educational were not included(25). Similarly study conducted in North West Ethiopia reported that teenage mothers had no association with PPH and preeclampsia and also recommended to conduct in a large scale area(13).

Therefore the aim of conducted this study was to assess adverse maternal outcome and associated factors among teenage and adult mothers who gave birth in West Gojjam public hospitals, North West Ethiopia, 2022.

1.3 significance of the study

FMOH developed different policies and strategies, like national adolescent and youth reproductive health strategy and national health care quality strategy to reduce teenage pregnancy. Even though, different policy and strategy done teenage pregnancy still high in Ethiopia. In the study area there were a large number of teenage women married before 18 years due to culture and majority of them drop out and absent from school and unwanted pregnancy happened.

Therefore Assessing adverse maternal outcome among teenage mothers and its associated factors is important for effective implementation of maternal health programs. The finding of this study will help health care providers to have an insight about adverse maternal outcomes among teenage mothers.

2. Literature review

2.1. Adverse maternal outcome

A study conducted in Thailand showed that proportion of perineal tear was higher in teenage mothers compared to adult aged mothers (16.2% vs. 5.5%) respectively. It also reported that adult mothers had higher proportion of PPH compared to teenage mothers(20). Another study done in Korea showed that teenage mothers were 2.47 times more likely to have perineal laceration compared to adult mothers(26).

Similar study conducted in Rome, Cameroon and Tigray region of Ethiopia revealed that teenage mothers had higher proportion of perineal tear when compared with adult aged mothers(25, 27, 28). On the opposite, a study conducted in Asmara revealed that teenage had lower proportion of perineal tear compared with adult mothers(29).

A study conducted in Indonesia, India, Pakistan, Saudi Arabiya, Cameroon and Tigray revealed that teenage mothers have higher proportion of preeclampsia when compared to adult aged mothers(22, 25, 27, 30-32). On the contrary, a study conducted in Iran, Thailand, Asmara and North West Ethiopia revealed that teenage mothers have lower proportion of preeclampsia compared with adult aged mothers(13, 18, 20, 29).

A study conducted in Macedonia, southern India, Saudi Arabiya, Pakistan, Nigeria, Asmara and Tigray region reported that higher prevalence of anemia were found in teenage mothers than adult mothers(9, 22, 25, 29, 31-33). A study conducted in Iraq, Zambia, Asmara and North West Ethiopia reported that teenage mothers had lower proportion of eclampsia when compared to adult aged mothers(13, 24, 29, 34).

A study conducted in India, Pakistan and Tigray revealed that higher prevalence of PPH were found in teenage mothers than adult aged mothers (22, 25, 31). On the contrary, a study conducted in North West Ethiopia revealed that teenage mothers had lower proportion of PPH compared to adult mothers.

A study done in Iraq, Yaoundé, Cameroon and North West Ethiopia reported that teenage mothers had higher proportion of episiotomy compared to adult mothers(13, 34, 35). Similarly a study done in Tigray region of Ethiopia showed that teenage mothers had significantly higher proportion of episiotomy as compared to adults(25).

2.3. Factors associated with adverse maternal outcomes among teenage and adult

2.3.1 Socio demographic factors

A study conducted in rural India revealed that rural residence, illiteracy (both respondent and partner), family size greater than 4 and low socioeconomic status were significantly associated with adverse maternal outcome(31). Another study conducted in Gujarat state, India reported that socioeconomic status and no education were significantly associated with adverse maternal outcome(36).

A study done in Yaoundé, Cameroon showed that, the level of education and occupational status were significantly associated with adverse maternal outcome(35).

A systematic review done in Africa reported that rural residence, no maternal education, no partner education and lack of parent to adolescent communication on SRH issues were factors associated with adverse maternal outcome(4).

A study conducted in North East Ethiopia reported that rural residence, contraceptive nonuse and parental marital status (divorce) were significantly associated with adverse maternal outcome(37). Another study conducted in North West Ethiopia showed that age, rural residence and parental marital status (divorce) were factors associated with adverse maternal outcome(13).

2.3.2 Reproductive and Obstetric factors

A study conducted in low and middle income countries (Kenya, Zambia, India, Pakistan, Guatemala and Argentina) reported that frequency of ANC visits was significantly associated with adverse maternal outcome(38).

A study done in Hyderabad, North East India reported that teenage mothers who had late initiation of antenatal follow up were more likely to develop adverse maternal outcome compared with mothers who had early follow up(39). Similarly a study conducted in Pakistan showed that late initiation of ANC follow up was significantly associated with adverse maternal outcome(22).

A study conducted in Thailand reported that not attending complete ANC visit were significantly associated with adverse maternal outcome(20). A study done in Iraq showed that Iron –folic supplementation was higher in adult as compared with teenage mothers(34).

A study conducted in Zambia revealed that teenage mothers who attend less than 4 antenatal visits during their pregnancy were two times more likely to developed adverse maternal outcome compared to the counterpart (24).Another study conducted in Tigray region of Ethiopia revealed that more than three-quarters of the study populations had at least one antenatal care (ANC) visits during their current pregnancy time, and teenage mothers had lower ANC follow-up than adults mothers(25).

A study done in North East Ethiopia showed that higher proportion of teenage mothers was married before 18 years compared to adult mothers. In addition to this higher proportion of teenage mothers start antenatal care after 16 weeks of gestation(13).

2.4. Conceptual frame work

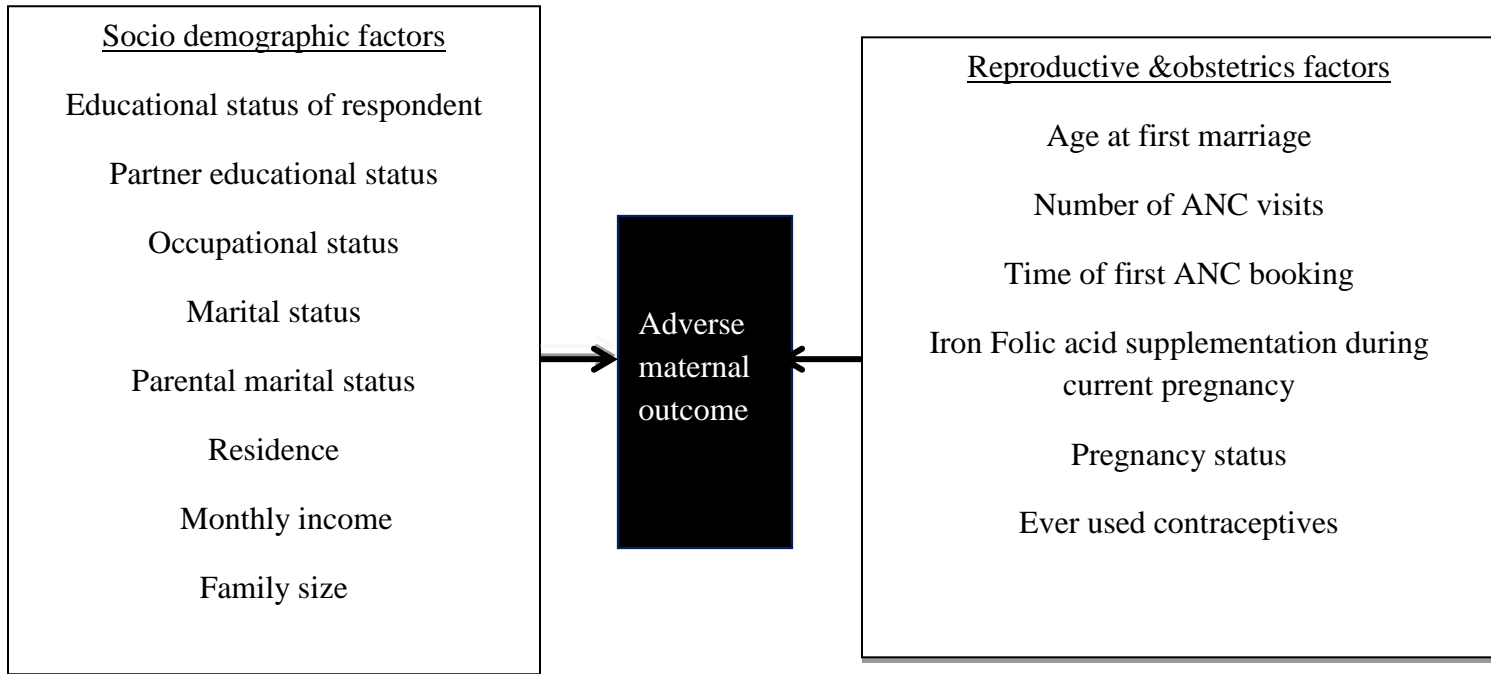


Figure 1: conceptual framework of study variables

Adapted and modified based on reviewing of related literature

3. Objective

3.1 General objective

- To assess adverse maternal outcome and associated factors among teenage and adult mothers who gave birth in West Gojjamzone public hospitals, North West Ethiopia, 2022

3.2 specific objectives

- To compare proportion of adverse maternal outcome among teenage and adult mothers
- To identify factors associated with adverse maternal outcome among teenage and adult mothers

4. Methods and materials

4.1 study area

The study was conducted at West Gojjamzone. W/Gojjamzone is one of the zones found in Amhara Regional State of Ethiopia. Finote Selam is the capital of the zone. According to the 2007 Central Statistical Agency of Ethiopia report, the zone has a total population of 2,758,698, of whom 1,355,461 are men and 1,403,237 women. According to West Gojjam zone health office 2013 E.C annual report there are 7 Public hospitals, 108 health centers and 404 health posts. According to Zonal Health office 2013 E.C report 312,653 women were reproductive age group (15-49 years) and there are 17,433 total deliveries in 7 public hospitals.

4.2. Study period

The study was conducted from April 30-June 30, 2022

4.3 Study design

Facility based comparative cross sectional study design was conducted

4.4 source population

All teenage and adult women who gave birth at West Gojjam public hospitals within one year

4.5 study population

All teenage mothers aged 10-19 and all adult mothers aged 20-34 who gave birth at West Gojjam public hospitals during study period

4.6 Eligibility criteria

4.6.1 Inclusion criteria

All teenage mothers aged 10-19 and all adult mothers aged 20-34 who gave birth at 28 weeks of gestation or greater in West Gojjam zone public hospitals during study period were included

4.6.2 Exclusion criteria

Teenage mothers aged 10-19 and adult mothers aged 20-34 who had known medical disorder before pregnancy were excluded

4.7 Sample size determination

Sample size was calculated using double population proportion formula using Epi-info version 7.2(40). Then the following assumptions were considered: 95% two sided level of confidence interval, a power of 80%, 1 to 1

ratio of teenage and adultmothers and 5% non-response rate. The proportion of adverse maternal outcome among teenage and adult mothers in previous study wasnot known. Therefore it was assumed that 10% difference in the proportion of adverse maternal outcome between teenage (P1= 50%) and adult (P2=40%).

$$n_1 = \frac{\left[Z_{\frac{\alpha}{2}} \sqrt{\left(1 + \frac{1}{r}\right) P(1-P)} + Z_{\beta} \sqrt{P_1(1-P_1) + \frac{P_2(1-P_2)}{r}} \right]^2}{(P_1 - P_2)^2}$$

n1- desired sample size

$Z_{\alpha/2}$ - 1.96, at $\alpha=0.05$

r - Ratio of teenage to adult (1to 1)

p- Average proportion of adverse maternal outcomes= proportion of adverse maternal out come in teenage mother + proportion adverse maternal out come in adult mothers divide by 2 (45%)

Z_{β} –Standard normal variant for power (for power of 80% it is 0.84)

P1- proportion of adverse maternal outcome in teenage mothers (50%)

P2- Proportion of adverse maternal outcome in adult mothers (40%)

Then calculated sample size was 774. By considering 5% nonresponse rate, the final sample size was **812**(406 for teenage and 406 for adult).

Sample size calculation by associated factors

The proportion of adverse maternal outcome among teenage and adult mothers based on the study conducted in Tigray region was used (25).

Table 1: Sample size calculation by Epi info version 7.2 from different outcome variables based on their proportion for teenage and adult mothers in West Gojjam zone, North West Ethiopia, 2022

Variables	Proportion of outcome in exposed (teenage)	Proportion of outcome in non-exposed (Adult)	AOR	Power	CI	Sample size (with adding 5% non-response rate)
Cesarean delivery	40.8	59.2	0.57	80	95	452 Teenage= 226 Adult= 226
Episiotomy	72	28	2.01	80	95	326 Teenage=163 Adult= 163

Sample size by adverse maternal outcome was smaller than the first one. Therefore the final sample size to conduct this study was **812** (406 for teenage and 406 for adult).

4.8 sampling procedure

Seven public hospitals were found in West Gojjam zone(Finotselam general hospital, Burie primary hospital, Ferese bet primary hospital, Adet primary hospital, Merawi primary hospital, Dure bête primary hospital and Liben primary hospital) was included in the study. The previous year delivery report of two months (April and May) of each hospital with similar season was used to proportionally allocate the required sample size and getting sampling fraction (k-value) (calculated using population size divide by sample size i.e. the calculated k-value was 2 for teenage and 4 for adult mothers). The first mother was selected by simple random sampling technique (from delivery register) among mothers who gave birth on the day of data collection. Finally, systematic random sampling technique was employed till the required sample size for each facility was saturated.

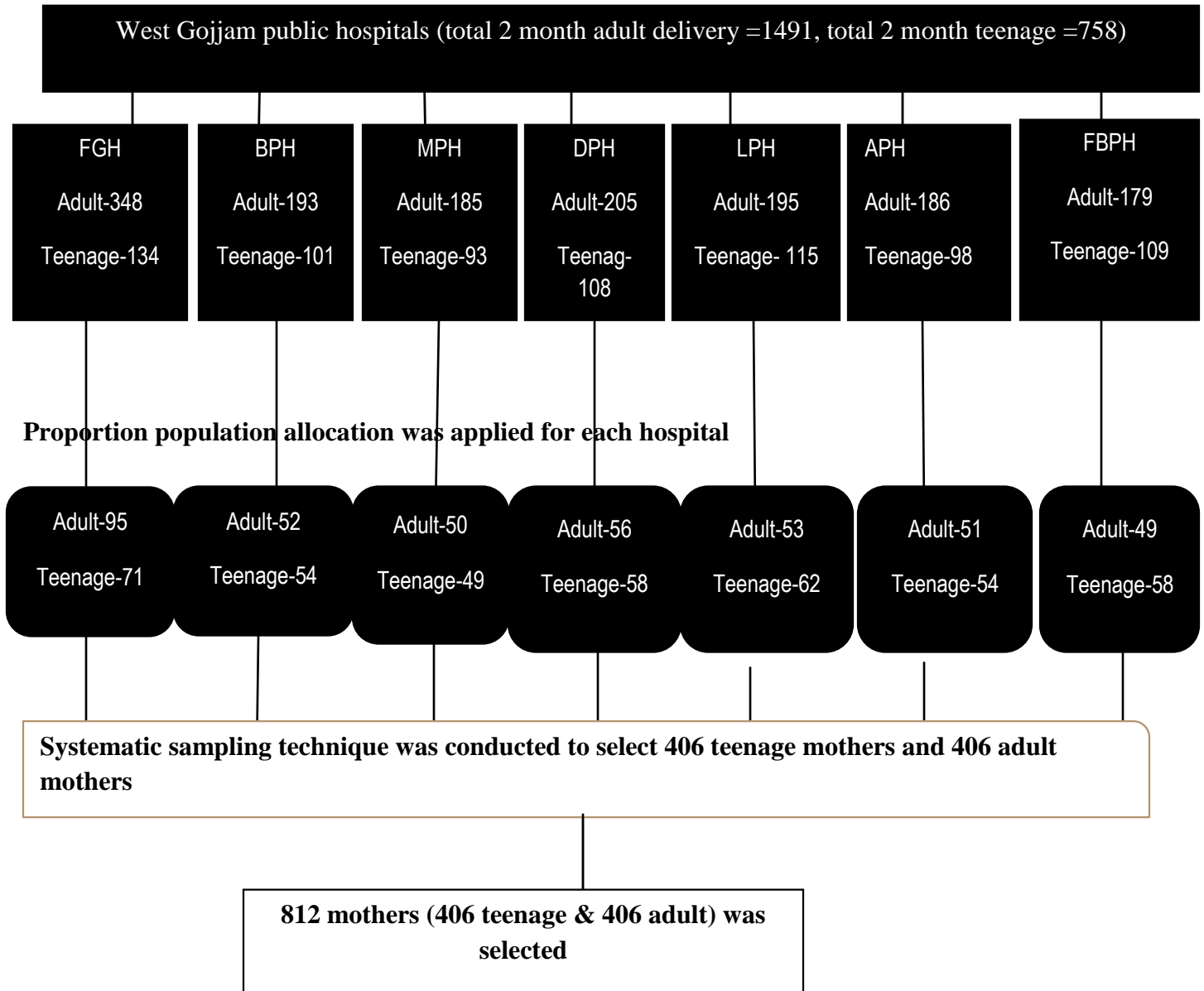


Figure 2: Diagrammatic presentation of sampling procedure

4.9 Study variables

4.9.1 Dependent variable

Adverse maternal outcome

4.9.2 Independent variable

Socio demographic characteristics include: marital status of respondent, parental marital status, educational status of respondent, partner educational status, occupational status, residence, monthly income and family size

Reproductive & Obstetric characteristics include: age at first marriage, number of ANC visits, GA at time of first ANC follow up, iron folic acid supplementation during pregnancy, pregnancy status and ever used contraceptive.

4.10 Operational definition of variables

Adverse maternal outcome: the presence of at least one or more of the following: Preeclampsia, eclampsia, post-partum hemorrhage, Episiotomy, perineal tear and anemia (13, 25, 27, 41, 42).

Teenage (Adolescent) pregnancy: defined as pregnancy occurs in the maternal age of 10-19 years (1).

4.11. Data collection procedure and Data Quality control

Data was collected by interviewer administered questionnaire and by chart review. The questionnaire was prepared after reviewing several related research articles and modified in to local context and Ethiopia min DHS 2019 (13, 25, 27, 29, 37). The questionnaire has questions of socio-demographic characteristics, reproductive and obstetric characteristics and adverse maternal outcome. Before data collection questionnaire was translated to Amharic and then back to English to check its consistency. Finally, Amharic version was used. Data was collected by seven diploma midwife, supervised by seven BSc midwife (one data collector and one supervisor in each hospital) and by the principal investigator. Data collectors and supervisors trained for one day and pre-test of questionnaire was done in Dangela primary hospital with 5% of the sample size.

4.12. Data processing and analysis

Collected data checked for completeness and consistency by the investigator. Then collected data was cleaned, coded and entered into **Epi data** version **3.1** and then exported in to **SPSS** Version **23** for analysis. Descriptive statistics like frequency and summary statistics (mean, standard deviation and percentage) were used to describe characteristics of the study population. Chi square and independent t-test was used to compare categorical and continuous variables between teenage and adult mothers. Binary logistic regression model was used to identify the association between explanatory variable and outcome variable. Adjusted Odds ratio (OR) with 95% CI used to measure the strength of association between predictors and outcome variable. The model fitness was checked using Hosmer and Lemeshow goodness of fit ($P = 0.533$). A p-value < 0.25 at bivariate analysis was further analyzed for multivariable logistic regression analysis to control confounding factors.

A variable with a p-value of < 0.05 at multivariate logistic regression analysis was declared as statistically significant with adverse maternal outcome.

4.13. Ethical clearance

Ethical clearance was obtained from Institutional review board of College of medicine and health Science, Bahir Dar University (study protocol number-381/2022). Then, letter from Institutional review board was submitted to Amhara Public health institute. Then a letter of permission was obtained from APHI and administrative bodies of the each hospital. Before enrolling any of eligible study participants, the purpose, benefits and confidential nature of the study was described and discussed for each participant. Only those consented and provided their willingness to take part in the study was enrolled and interviewed.

4.14. Dissemination of research finding

Finding of the study will be submitted to Bahir Dar University, college of medicine and health science, Amhara regional Health bureau, West Gojjam zonal health department and those hospitals included in the study. Finding of the study will be presented in various seminars, workshops and will be published in a scientific journal.

5. Result

5.1. Socio-demographic characteristics of respondents

A total of 785(386 teenage and 399 adult) mothers were participated in the study with a response rate of 96.6%.The mean age \pm standard deviation (SD) of teenage and adult mothers was 18.33(\pm 0.675) years and 27.94(\pm 3.576) years respectively. Majority of teenage mothers 232(60.1%) were lived in rural area when compared to 220(55.1%) adult aged mothers. Around 35% of both teenage and adult mothers were have no formal education (Table 2).

Table 2: socio- demographic characters tics among teenage and adult mothers who gave birth at west Gojjam public hospitals, North West Ethiopia, 2022

Variable	categories	Teenage(15-19) n=386	Adult(20-34) n=399	Total n=785
		Frequency (%)	Frequency (%)	Frequency (%)
Marital status of respondent	Single	12(3.1%)	10(2.5%)	22(2.8)
	Married	313(81.1%)	335(84%)	648(82.5)
	Divorced	42(10.9%)	42(10.5%)	84(10.7)
	Widowed	19(4.9%)	12(3%)	31(4%)
Parental marital status	Single	12(3.1%)	0	12(1.5)
	Married	304(78.8%)	320(80.2%)	624(79.5)
	Divorced	51(13.2%)	64(16%)	115(15%)
	Widowed	19(4.9%)	15(3.8%)	34(4%)
Occupational status	Government employee	54(13.9%)	60(15%)	114(14.5%)
	Merchant	81(20.9%)	107(27%)	188(24)
	House wife	103(26.7%)	125(31.3%)	228(29%)
	Farmer	115(30%)	93(23.2%)	208(26.5%)
	Student	33(8.5%)	14(3.5%)	47(6%)
Residence	Urban	154(39.9%)	179(44.9%)	333(42.4)
	Rural	232(60.1%)	220(55.1%)	452(57.6)
Educational status of respondent	No formal education	134(34.8%)	137(34.4%)	271(34.5)
	Primary(1-8)	109(28.2%)	105(26.3%)	214(27.3)
	Secondary(9-12)	87(22.5%)	84(21)	171(21.8)
	College and above	56(14.5%)	73(18.3%)	129(16.4)
Parental educational status	No formal education	109(28.2%)	122(30.6%)	231(29.4)
	Primary(1-8)	113(29.3%)	96(24%)	209(26.6)
	Secondary(9-12)	72(18.7%)	98(24.6%)	170(21.7)
	College and above	92(23.8%)	83(20.8%)	175(22.3%)
Monthly Income (ETB)	≤1000	183(47.5%)	111(27.8%)	294(37.5%)
	1001-3000	151(39%)	156(39.1%)	307(39.5%)
	3001-10,000	50(13%)	132(33.1%)	182(23.2%)
	≥10,000	2(0.5%)	0	2(0.3%)
Family size	< 4 family	386(100%)	307(76.9%)	693(88.3)
	≥ 4 family	0	92(23.1%)	92(11.7)

5.2. Reproductive and obstetrics characteristics

The mean of age at first marriage among teenage and adult mothers were 15.97 (± 1.153) years and 18.66 (± 2.702) years respectively. Majority, 375 (97.2%) of teenage mothers were married before 18 years when compared to 117 (29.3%) adult aged mothers. According to antenatal visit, only 24 (6.2%) of teenage mothers had four visit compared to 164 (41.1%) of adult mothers. The mean of frequency of antenatal visit in teenage and adult mothers was 2.58 (± 1.244) visits and 3.33 (± 1.249) visits respectively (Table 3).

Table 3: Reproductive and obstetrics characteristics among teenage and adult mothers who gave birth at west Gojjam zone public hospitals, North West Ethiopia, 2022

Variables	category	Teenage(15-19)	Adult(20-34)	Total
		Frequency (%)	Frequency (%)	Frequency (%)
Age during first marriage	< 18 years	375(97.2%)	117(29.3%)	492(62.7%)
	≥ 18 years	11(2.8%)	282(70.7%)	293(37.3%)
Antenatal visit	< 4 visit	362(93.8%)	235(58.9%)	597(76.1)
	≥ 4 visit	24(6.2%)	164(41.1%)	188(23.9)
GA during first followup	Before 16 weeks	170(44%)	152(38%)	322(41%)
	16weeks and above	216(56%)	247(62%)	463(59 %)
Iron folic acid supplementation during pregnancy	Yes	202(52.3%)	298(74.7%)	500(63.7)
	No	184(47.7%)	101(25.3%)	285(36.3)
Wanted pregnancy	Yes	297(77%)	332(83.2%)	629(80.1)
	No	89(23%)	67(16.8%)	156(19.9)
Ever used contraceptive	Yes	278(72%)	302(75.7%)	580(73.9)
	No	108(28%)	97(24.3%)	205(26.1)

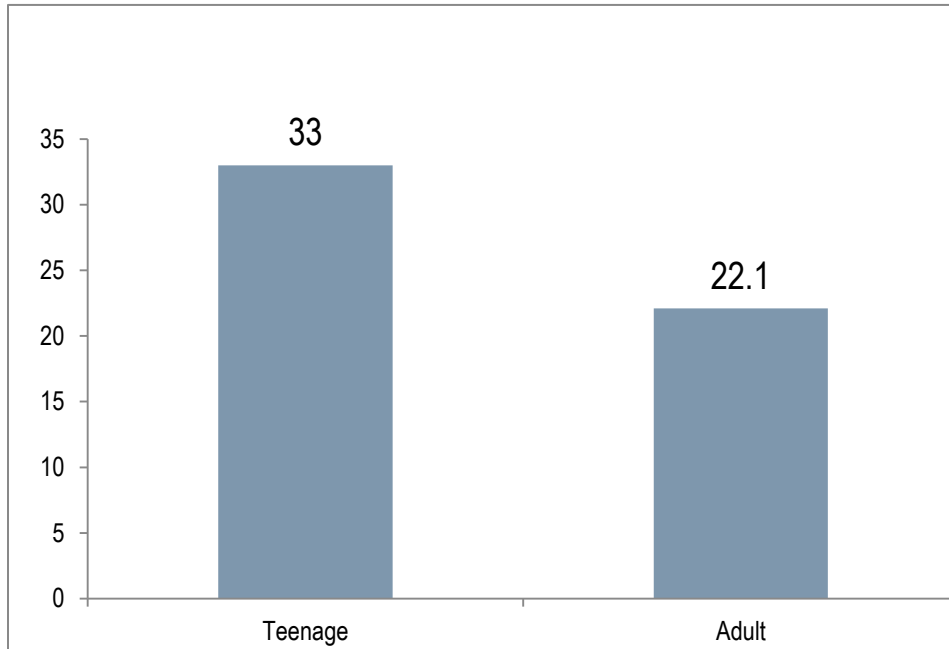
5.3. Proportion of adverse maternal outcome among teenage and adult mothers

The proportion of adverse maternal outcome among teenage mothers was 33 % (95% CI, 28.2 - 37.4) and among adult aged mothers was 22.1 % (95% CI, 18-26.2). Regarding to specific outcome, the proportion of preeclampsia among teenage mothers (12.7%) was significantly higher when compared to (2.5%) adult aged mothers ($p < 0.001$). Similarly, the proportion of perineal tear among teenage mothers (10.1%) was significantly higher as compared to adult (1.5%) aged mothers ($p < 0.001$) (Table 4).

Table 4: Adverse maternal outcomes among teenage and adult mothers who gave birth at West Gojjam public hospitals, North West Ethiopia, 2022

Adverse maternal outcome	category	Teenage(15-19)	Adult(20-34)	Total(n=785)	p-value
		n=386	n=399		
		Frequency (%)	Frequency (%)		
Preeclampsia	No	337(87.3%)	389(97.5%)	726(92.5%)	< 0.001
	Yes	49(12.7%)	10(2.5%)	59(7.5%)	
Eclampsia	No	383(99.2%)	395(99%)	778(99.1%)	0.737
	Yes	3(0.8%)	4(1%)	7(0.9%)	
Perineal tear	No	347(89.9%)	393(98.5%)	740(94.3%)	< 0.001
	Yes	39(10.1%)	6(1.5%)	45(5.7%)	
Episiotomy	No	352(91.2%)	383(96%)	735(93.6%)	0.006
	Yes	34(8.8%)	16(4%)	50(6.4%)	
PPH	No	366(94.8%)	393(98.5%)	759(96.7%)	0.007
	Yes	20(5.2%)	6(1.5%)	26(3.3%)	
Anemia	No	349(90.4%)	385(96.5%)	734(93.5%)	0.001
	Yes	37(9.5%)	14(3.5%)	51(6.5%)	

Proportion of adverse maternal outcome among teenage and adult aged mothers



Adverse maternal outcome

Fig 4: Proportion of adverse maternal outcomes among teenage and adult mothers who gave birth at West Gojjam public hospitals, North West Ethiopia, 2022

5.4. Factors associated with adverse maternal outcome among teenage and adult mothers

In bivariate logistic regression analysis variables like occupational status, residence, educational status of respondent, partner educational status, GA during first antenatal follow up, Iron folic acid supplementation during pregnancy, wanted pregnancy, age at first marriage and frequency of antenatal visit were entered into multivariate logistic regression analysis.

After multivariate logistic regression analysis variables like maternal age, residence (rural), GA during first antenatal follow up and frequency of antenatal visit were statistically significant with adverse maternal outcome.

The odds of adverse maternal outcome among teenage aged mothers were 1.57 times higher when compared to adult aged women. The likelihood of adverse maternal outcome among mothers lived in rural area were 1.761 times higher when compared with mothers lived in urban. Similarly, women who had late initiation of antenatal follow up (after 16 weeks) were 1.749 times more likely to have adverse maternal outcome when compared with their counterparts. More over women who had below 4 visits during pregnancy were 1.671 times more likely to develop adverse maternal outcome when compared with women who had 4 and more visit (Table 5).

Table 5: Bivariate and Multivariate analysis of factors associated with adverse maternal outcome among teenage and adult mothers who gave birth at West Gojjam public hospitals, North West Ethiopia, 2022

Variables	category	Adverse maternal outcome		COR(95%CI)	AOR(95% CI)	P-value
		Yes	No			
Maternal age	Teenage15-19	127	259	1.733(1.261,2.382)	1.570(1.096, 2.249)*	0.014
	Adult(20-34)	88	311	1	1	
Occupational status	Merchant	47	140	1.201(0.696,2.073)	1.388(0.747,2.580)	0.3
	House wife	59	166	1.271(0.751,2.153)	0.991(0.524, 1.874)	0.978
	Farmer	68	140	1.737(1.030,2.930)	0.839(0.427,1.648)	0.610
	Student	15	32	1.731(0.814,3.680)	1.141(0.487, 2.676)	0.761
	Government employee	26	93	1	1	
Residence	Rural	153	299	2.237(1.596,3.135)	1.761(1.189, 2.609)*	0.005
	Urban	62	271	1	1	
Educational status	No education	80	112	2.094(1.384,3.166)	0.999(0.622, 1.604)	0.998
	Primary	41	153	0.785(0.498,1.239)	0.446(0.273, 0.730)	0.001
	Secondary	36	135	0.782(0.487,1.255)	0.620(0.374, 1.028)	0.064
	College & above	58	170	1	1	
Partner educational status	No education	84	147	1.929(1.238,3.004)	1.043 (0.569,1.910)	0.892
	Primary	53	156	1.147(0.716,1.836)	0.751(0.428, 1.320)	0.320
	Secondary	38	132	0.972(0.587,1.609)	0.849(0.481, 1.497)	0.571
	College& above	40	135	1	1	
GA during first ANC	After 16 wks	150	313	1.895(1.356,2.648)	1.749(1.226, 2.495)*	0.002
	Before 16 wks	65	257	1	1	
Iron folic acid supplement	No	94	191	1.542(1.119,2.124)	0.961 (0.663, 1.395)	0.836
	Yes	121	379	1	1	

Wanted pregnancy	No	57	99	1.716(1.183,2.491)	1.208(0.806,1.811)	0.360
	Yes	158	471	1	1	
Age at first marriage	<18 year	152	319	1.898(1.355, 2.659)	1.155(0.739, 1.804)	0.527
	≥18 year	63	251	1	1	
Frequency of ANC visit	<4 visit	181	416	1.971(1.307,2.971)	1.671(1.040, 2.685)*	0.034
	≥4 visit	34	154	1	1	

NB: * significant (P value < 0.05), COR= Crude odd ratio, AOR= Adjusted odd ratio,

CI= Confidence interval, 1= reference

6. Discussion

The proportion of adverse maternal outcome among teenage mothers was 33 % (95% CI, 28.2 - 37.4) compared to 22.1 % (95% CI, 18-26.2) adult aged mothers. This finding was in line with study conducted in Oman (28.7% vs 19.5 %) (43). On the contrary, this finding was lower with study conducted in Cameroon (43.2% vs 34.2%) (27). The reason for higher proportion of adverse maternal outcomes in Cameroon might be due to type of health facility conducted (both hospital and health center) and follow delivered mother for 48 hours.

Regarding to specific adverse maternal outcome, teenage mothers have higher proportion of preeclampsia (12.7%) when compared to adult (2.5%) aged mothers. This finding was similar with studies conducted in India, Pakistan and Tigray (22, 25, 39). This could be due to the fact that women age less than 20 years are the possible risk factors for the development of preeclampsia (44). In addition, teenage mothers have an increased risk of inadequate nutrient intake including calcium, zinc and Vitamins (45). In contrast this finding was inconsistent with a study conducted in Asmara and North West Ethiopia (13, 29). The possible reason for lower proportion preeclampsia done in Asmara might be that all mothers were 100% attended ANC visits which in turn important for early identification and early treatment of preeclampsia. In addition a study conducted in North West Ethiopia participated only mothers who attended in ANC clinic.

Teenage mothers had higher proportion of perineal tear when compared to adult aged women (10.1% vs 1.5%) respectively. This finding was comparable with a study conducted in Cameroon and Tigray (25, 27). This might be associated with tight perineum (ridged), big baby, and labor induction (44).

There was significantly higher proportion of anemia among teenage mothers (9.6%) compared to adult (3.5%) aged mothers. This result was in line with result of studies conducted in Iraq, Nigeria and Asmara (29, 33, 34). This might be due to the evidence that during rapid growth and pregnancy there is higher iron demand need and competing with developing fetus for nutrients (46, 47).

The proportion of PPH among teenage mothers were significantly higher compared to adult aged mothers (5% vs 1.6%) respectively. This finding was inconsistent with result of studies conducted in Pakistan, Thailand and Tigray (20, 22, 25). The difference might be related to variation in socio-cultural, study setting and period.

Regarding to episiotomy, teenage mothers had higher proportion when compared with adult mothers (8.8% vs 4%) respectively. This finding was in line with studies conducted in Cameroon, Tigray and North West Ethiopia (13, 25, 27). This might be associated with tight perineum and fetal size.

Teenage mothers were more likely to have adverse maternal outcome compared to adult aged mothers. This finding was in line with studies conducted in North East India, Korea, Thailand, Macedonia, Saudi Arabia, Cameroon, Asmara and Tigray (9, 20, 25-27, 29, 32, 39). This is due to the evidence that teenage aged mothers is associated with a range of obstetrical complications and medical comorbidities which in turn predispose to different adverse maternal outcomes (44, 50).

Teenage mothers who lived in rural area were significantly associated with adverse maternal outcomes when compared to mothers lived in urban. This result similar with a study conducted in Rural India and Zambia (24, 31). The reason might be due to lack of accessibility of health facility and lack of transport access to reach health facility. Similarly late initiation of ante natal follow up also significantly associated with adverse maternal outcome. This finding was in line with study conducted in India, Pakistan and North West Ethiopia (13, 22, 36). This might be due to late initiation of antenatal follow up leads to no early identification and detection of disease and complication which in turn leads to increased risk of developing adverse maternal outcomes.

Teenage mothers who had less than 4 ante natal visits were significantly associated with adverse maternal outcome when compared with mothers who had 4 and above visits. This result was in line with studies conducted in Thailand, Zambia and Tigray (20, 24, 25). This might be associated with no early identification and detection of disease and complication increase risk of developing adverse maternal outcome.

7. Limitation of the Study

This study does not assessed adverse maternal outcomes after discharge to home

8. Conclusion and Recommendation

8.1. Conclusion

Adverse maternal outcome among teenage mothers were significantly higher when compared to adult aged mothers. Teenage mothers have significantly higher proportion of preeclampsia, perinial tear, anemia, episiotomy, PPH and have lower proportion of eclampsia compared to adult aged mothers. Rural residence, late initiation of ANC follow up and no attend complete antenatal visit were factors associated with adverse maternal outcome.

8.2. Recommendation

To FMOH

Ethiopia federal ministry of health should be increase access to skilled care for populations living in remote areas and also should be promoted the mobilization of communities (community-organized transport schemes) particularly for obstetric complication in settings where other sources of transport are less sustainable and not reliable.

To health care providers

Health care providers should be provided community mobilization activities to increase awareness on ANC follow up and mass media campaigns with ANC messages.

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10. Annex

Annex I: English version Information sheet and Consent form

Name of principal investigator: Nakachewwalliewondale

Name of organization: Bahir Dar University College of medicine and health science department of Midwifery. **Title of study:** adverse maternal outcome and associated factors among teenage and adult mothers in West Gojjam public hospitals, North West Ethiopia, 2022.

Purpose of the study: This study is aim to assess adverse maternal outcome and associated factors among teenage and adult mothers in West Gojjam public hospitals, North West Ethiopia, 2022.

Risk: The study will be carried out by asking your permission with already prepared and structured questionnaire. There will no physical or psychological harm during the procedure. Besides, you have full right to stop any time you wish and you won't be obliged to give any information which you don't want to answer.

Benefits: For being involved in this study, there is no payment you will be granted with and no special privilege is also given to you. Perhaps, participating and giving information for the questions being asked plays a vital role. **Confidentiality:** Any information you give will be kept confidential and won't be accessible to any third party. Your name no mentions anywhere. Information you give only use for research purpose.

Consent: Your participation in this study will be totally be on the basis of your willingness. You can stop anywhere you wish to stop participation, even from the very beginning. No one will force you to give information you don't want to give.

Finally, I duly acknowledge your participation and either response.

Name _____ sing _____ date _____

Principal investigator: Nakachewwallie, _____, _____. Address: Bahir Dar,

Phone: +251918659722, E-mail: Nakachewwallie385@gmail.com

Consent form

Hello! My name is _____. Here, at Bahirdar University, college medicine and Health Science, department of midwifery; I will be undertaking research aimto assess maternal outcome and associated factors among teenage and adult mothers in West Gojjam public hospitals, North West Ethiopia, 2022. Therefore, you are kindly request to participate in this study and provide the information require. Your participation in this study is completely on voluntary bases and you have a right to refuse, to take part or to stop the giving information at any time. For your participation in the study, no payment will be granted or has no any special privilege to you. Besides, you're not obligate to answer any question which you do not wish to answer. If you fill discomfort to respond to any of the questions, please feel free to drop it any time you wish to do so. I assure you that your name will not be mentions in anywhere. Filling the questionnaire will take about 30 minutes. The information that you give me will be kept confidential and not be accessible to a third party; only be used for the research purpose. Can I have your permission to continue?

1. Yes
2. No. Stop and thank the respondent.

Investigator name _Nakachewwallie_____

Data collector name _____ signature _____ date _____ phone _____

Supervisor name _____ signature _____ Date _____

Annex II: English version Questionnaire

Part one: Socio-Demographic Characteristics

NO	QUESTION	CATEGORY/ANSWER	
101	How old are you?	_____ Complete Year	
102	What is your Marital status?	1.Single 2.. Married 3.. Divorced 4.. Widowed	
103	What is your parental marital status?	1. Single 2. Married 3.. Divorced 4.. Widowed	
104	What is your occupation?	1. Governmental employee 2.Merchant 3 .House wife 4. Farmer 5. Student 6. Others specify.....	
105	Where is your residence?	1.Urban 2.ural	

106	What is your educational level?	1. No education 2. Primary 3. Secondary 4.college and above	
107	What is your partner educational status	1. No education 2. Primary 3. Secondary 4.college and above	
108	How much is your monthly income?	_____ ETB	
109	How many families do live in the house?	_____	

Part two: Reproductive and Obstetric characteristics

NO	QUESTION	CATEGORY/ANSWER	
201	What is your age at first marriage?	_____ Complete year	
202	How many ANC visit attend for current pregnancy?	_____visit	
203	What is your GA during first time of ANC follow up?	1. <16wks 2. >16WKS	
204	Did you take Iron folic supplementation during current pregnancy	1. yes 2. No	
205	Is your current pregnancy wanted?	1 yes 2. No	
206	Did you use contraceptive?	1. yes 2 . No	

Part three: adverse maternal outcomes (by review maternal chart)

NO	QUESTION	CATEGORY/ANSWER	Remark
301	Pre eclampsia	1. No 2. yes	
302	Eclampsia	1. No 2. yes	
303	PPH	1. No 2. yes	
304	Perineal tear	1. No 2. yes	
305	Episiotomy	1. No 2. yes	
306	Anemia	1. No 2. yes	

ክፍል አንድ፡ ማህበራዊና ህዝብዊ ጥያቄዎች

ተ.ቁ	ጥያቄዎች	መልስ	አሰራር
101	አድማዎችን ክፍት	----- ዓመት	
102	የጋብቻ ሆኖ	1. ያላገባ 2. ያገባ 3. አግባብ አይደለም 4. ባልሆነበት	
103	የቤተሰብ ጥያቄዎች	1. ያላገባ 2. ያገባ 3. አግባብ አይደለም 4. ባልሆነበት	
104	የስራ ሆኖ	1. የማይገባ 2. ጎጂ 3. የቤት ጥያቄ 4. ገቢ 5. ተሞልቶ 6. ለሌሎች ጥያቄ	
105	የሚከተሉት ጥያቄዎች	1. ከተማ 2. ገቢ	
106	የትምህርት ጥያቄዎች	1. ያልተሟላ 2. ከ1-8 3. ከ9-12 4. ከ12 በላይ	
107	የባለስልጣን ጥያቄዎች	1. ያልተሟላ 2. ከ1-8 3. ከ9-12 4. ከ12 በላይ	

108	ወርሃዊገቢ	----- -ብር	
109	በበጎትጥምያህልበትሰብዓራ	-----	

ክፍልሁለት: የስነ-ተዋልዶእናየወላደሚጃ

ተ.ቁ	ጥያቄ	ሜሪት	አሚና
201	የሚገኝበት የገቢዎች ሰነድ	-----ዓመት	
202	የገቢዎች ሰነድ ላይ ያለው ገቢ	-----ጊዜ	
203	የሚገኝበት የገቢዎች ሰነድ ላይ ያለው ገቢ	1. ከ16 ሳምንት በፊት 2. ከ16 ሳምንት በኋላ	
204	በእርግጠኛነት ላይ ያለው ገቢ	1. አዎ 2. የለም	
205	የአሁኑን እርግጠኛነት ሰነድ ላይ	1. አዎ 2. የለም	
206	የበጎት ጥምያ ላይ ያለው ገቢ?	1. አዎ 2. የለም	

ክፍልሦስት: በእናንድ የወላደት የተከሰተ ስርዓት (የእናንድ የገቢዎች ሰነድ)

ተ.ቁ	ጥያቄ	ሜሪት	አሚና
301	Pre-eclampsia	1. የለም 2. አዎ	

302	Eclampsia	1. የለም 2. አዎ	
303	Perineal tear	1. የለም 2. አዎ	
304	Episiotomy	1. የለም 2. አዎ	
305	PPH	1. የለም 2. አዎ	
306	Anemia	1. የለም 2. አዎ	

Declaration

I the undersigned declare that this thesis is my original work in partial fulfillment of the requirement for Master of Science in clinical midwifery.

Name: Nakachewwallie Wondale

Mobile: 0918659722

Email: Nakachewwallie385@gmail.com

Signature----------

Place of submission: Bahir Dar University, college of medicine and health science, school of health science department of midwifery

Date of Submission:-----09/12/14-----


Advisors:

Name

signature

Date


1. Amlaku M. (MSc, Associate professor)



09/12/2014

2. Shumiye (MSc, Assistant professor)





 09/12/2014

APPROVAL Sheet

I hereby certify that I have supervised, read, and evaluated this thesis titled "adverse maternal outcome and associated factors among teenage and adult mothers in West Gojjam public hospitals, North West, Ethiopia, 2022 " by Nakachew Wallie prepared under my Guidance. I recommend the thesis to be submitted.


Advisors:

Name	signature	Date
1. Amlaku M. (MSc, Associate professor)		<u>09/12/2014</u>
2. Shumiye (MSc, Assistant professor)		<u>09/12/14</u>

Eternal Examiner

Name	signature	date
1. Genet Degu .(MSc, Associate professor)	-----	-----

Internal Examiner

Name	signature	date
2. Simachew A.(MSc, Assistant professor)		<u>9/12/2014</u>



