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Effect of Maternity Waiting Home Service Utilization on Perinatal Health Outcomes in Public Hospitals of West Arsi Zone, Oromia Region: Institution Based Prospective Cohort Study

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Abstract

Background: Maternity waiting homes (MWHs), also known as mother's shelters, are structures built near healthcare facilities. The use of MWHs has been linked to reductions in maternal mortality. However, due to a lack of strong evidence in this area, conclusive evidence has not been able to be reached indicating definitively that MWHs lead to fewer perinatal deaths.

Objective: The primary aim of this study was to assess the effect of maternity waiting home service utilization on perinatal health outcomes in public hospitals in West Arsi Zone, Oromia Region, from March 8 to June 1, 2022.

Methods: A prospective cohort study was conducted among 1606 mothers (803 maternity waiting home users and 803 non-users) who were admitted to public hospitals in the West Arsi Zone from March 8 to June 1, 2022. Simple random sampling methods were used to approach study participants. Epi-data version 3.1 and Stata version 16 were used for data entry and analysis, respectively. Both bivariable and multivariable generalized linear model analyses were done to identify associations between dependent and independent variables. Crude and adjusted relative risk with respective 95% confidence intervals were computed, and statistical significance was declared at p-value <0.05.

Result: There was a 39% reduced risk of developing perinatal complications in the exposed group when compared to the non-exposed group [RR = 0.61, 95% CL = 0.42, 0.88]. Multiparity [RR=1.42 95%Cl (1.17, 1.72), advanced maternal age [RR= 0.57 95%Cl (0.41, 0.97), and maternal complication [RR=1.59 95%Cl (1.34, 1.90)] were independent predictors for perinatal complications.

Conclusion and Recommendations: The present study found that maternity waiting home users had a reduced risk of developing perinatal complications when compared to non-users. Besides, advanced maternal age, multiparity, maternal complications, and transfer from another facility were independent predictors of perinatal complications. Strengthening maternity waiting home services is decisive to reducing perinatal complications.

Keywords: Maternity Waiting Home, Perinatal Health Outcome, Public Hospitals, West Arsi Zone

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Abbreviations:

ANC: Antenatal Care; APH: Antepartum Hemorrhage; C/S: Cesarean Section; EDHS: Ethiopian Demographic Health Survey; EPHI: Ethiopian Public Health Institute; MWHs: Maternity Waiting Homes; PNM: Perinatal Mortality; PROM: Premature Rupture of Membranes; PPH: Postpartum Hemorrhage; SDGs: Sustainable development Goals; WHO: World Health Organization; SVD: Spontaneous Vaginal Delivery

Introduction

Maternity waiting homes, also known as mother's shelters, are structures built near healthcare facilities to minimize the critical barrier of distance to accessing maternal health services. They function as one possible medical intervention included in a range of services for the health of expectant mothers and newborns [1].

Among deaths that happened in children and young adolescents worldwide in 2018, 85% occurred in the first five years of life, constituting 5.3 million deaths, of which 2.5 million occurred in the first month of life [2]. In Ethiopia, the maternal mortality ratio is estimated at 412 per 100,000 live births, infant mortality at 48 deaths per 1,000 live births, the under-five mortality rate at 67 per 1000 live births, and neonatal mortality at 29 deaths per 1000 live births [3].

Of the six observational studies that assessed the impact of waiting houses for mothers on perinatal outcomes, four revealed improved outcomes among users compared with non-users. A Cochrane review of maternity waiting houses identified no randomized controlled trials [4]. The third Sustainable Development Goal (SDG) aims to halt preventable newborn and under-five child deaths as well as lower the global maternal mortality ratio to less than 70 per 100,000 live births [5].

So one strategy to lower newborn mortality is to increase institutional births; one way to do this is by creating and utilizing mother-and-child waiting homes [6]. The first maternity waiting homes were constructed in Ethiopia in 1976 [7], and as of right now, the Amhara area has the highest coverage (72%), followed by the Oromia region (56%), the Southern Nations, Nationalities, and Peoples' area (SNNPR) (57%), and the Gambella region (8%) [8].

The use of MWHs has been linked to reductions in perinatal mortality in Ethiopia, Ivory Coast, Liberia, and Zimbabwe [9]. However, due to a lack of strong evidence in this area, conclusive evidence has not been able to be reached indicating definitively that MWHs lead to fewer perinatal deaths. Furthermore, there is limited data on the effect of MWHs on perinatal outcomes in Ethiopia. Therefore, the aim of this study is to assess the effect of maternity waiting homes on perinatal outcomes in public health facilities in the West Arsi Zone, Oromia Region.

This study will provide valuable information for respective health institutions to improve the quality of MWHs and their expansion to other health facilities where the service has not been launched yet. Besides, this study will contribute to the existing body of knowledge and articulate the basis for other research on the effectiveness of MWH utilization, which will further play a role in averting maternal and childhood morbidity and mortality due to pregnancy-related complications (Figure 1).

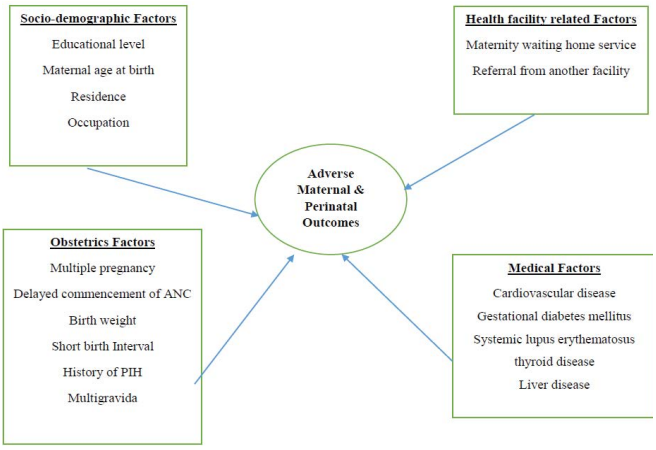

Figure 1: Conceptual framework developed after thorough reviewing literature.

Methods and Materials

Study area & period

The study was carried out in public hospitals in the West Arsi Zone. The zone is found in Oromia regional state, Ethiopia. In the zone, there are seven government hospitals: Shashemene Referral Hospital, Melka Oda General Hospital, Dodola General Hospital, Negele Arsi Primary Hospital, Kokosa Primary Hospital, Gambo Primary Hospital, and Loke Primary Hospital. There are three private hospitals (Negele Arsi General Hospital, Feya Primary Hospital, and Madda Walabu General Hospital). Additionally, there are 84 functional health centers, 351 functional health posts, 179 private clinics, 1 NGO clinic, and 95 pharmacy/drug shops. The study was conducted from March 8 to June 1, 2022.

Study design

An institutional-based prospective cohort study design was employed.

Source population

All mothers are admitted to public health facilities in the West Arsi Zone.

Study Population

Exposed: All randomly selected mothers who were admitted through MWHs of public hospitals in West Arsi Zone.

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Non-exposed: All randomly selected mothers were admitted to the labor ward of public hospitals in the West Arsi Zone after being admitted directly to the labor ward without MWHs.

Inclusion and Exclusion Criteria

Inclusion criteria

Exposed: Mothers who were admitted through MWHs of public health facilities in the West Arsi Zone will be included in this study.

Non-exposed: Mothers who were admitted to the labor ward of public health facilities in West Arsi Zone after being admitted directly to the labor ward without MWHs will be included in this study.

Exclusion criteria

Mothers who were referred to other hospitals and don't have any feedback later about their health status will be excluded, both exposed and non-exposed.

Sample Size determination

The sample size was calculated using the double proportion formula through Open Epi Info version 7.

$$n = \frac{(Z_{\alpha} + Z_{2\beta})^2 \{p_1(1-p_1) + p_2(1-p_2)\}}{(p_1 - p_2)^2}$$

Parameters:

n - Size of sample in each group

P1, P2–estimated population prevalence in the comparison groups

β = 1- Power; a power of 80% is used

Using the first objective and considering the following assumptions: 95% Cl, 80% power, 21.7% complicated perinatal outcomes among ANC users, 59.0 complicated perinatal outcomes among those who didn't have ANC [10], an AHR of 0.61, and exposure to a non-exposed ratio of 1:1. The sample size calculated is 552 (exposed = 276 and non-exposed = 276).

Using the second objective and considering the following assumptions: 95% Cl, 80% power, 9.7% complicated maternal outcome among urban and 90.3% complicated maternal outcome among rural [10], an AHR of 1.79, and exposure to a non-exposed ratio of 1:1. The total sample size calculated is 1460 (730 exposed) and 730 (730 non-exposed).

Finally, the larger sample size was taken (the sample size was calculated using the second objective). Therefore, the total sample size in this study, after adding 10% for lost follow-up was 1,606 (803 exposed and 803 non-exposed).

Sampling procedure

Firstly, out of seven public hospitals in the zone, five hospitals, namely Shashemene Referral Hospital, Melka Oda General Hospital, Dodola General Hospital, Negele Arsi Primary Hospital, and Gambo General Hospital, were selected using a simple random sampling technique. The four-month average number of women admitted through MWHs and directly to labor at each public hospital was identified. Considering the client flow per four months in the respective health institutions, the total sample size determined (1606) was distributed to each public hospital through probability proportional to size allocation. Finally, study participants were selected using a systematic random sampling technique (Figure 2).

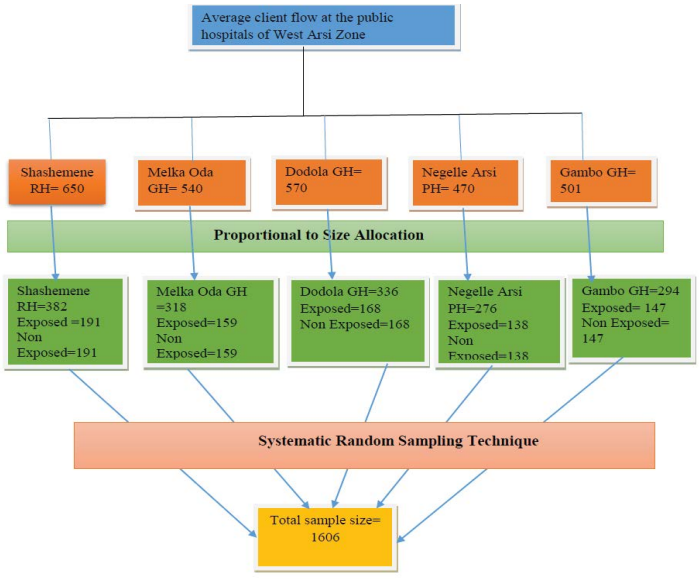

Figure 2: Sampling procedure for the study on Effect of Maternity Waiting Home Service Utilization on Maternal Health Outcomes in Public Hospitals of West Arsi Zone.

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Data collection tool and procedure

Data was collected using a combination of a pretested structured questionnaire through a face-to-face interview and a paired mother and neonatal chart review, which was used to retrieve medical information that could not be captured by the interview. The questionnaire was developed from related literature. The data was collected by five data collectors and supervised by three supervisors.

Data quality control

Two days of training were given to data collectors on the objectives of the study, sampling, and data extraction procedures. A test was conducted among 5% of the total sample size to check the validity and reliability of the instrument. Data collection was supervised daily by the supervisor and investigators to check consistency, clarity, and completeness.

Study variables

Dependent Variable

Perinatal health outcomes (stillbirth or neonates who are diagnosed with one or more of the following complications; asphyxia, pneumonia, perinatal sepsis, or early neonatal death).

Independent Variables

Socio-demographic Factors: Educational level, maternal age at birth, residence, and occupation.

Medical Factors: cardiovascular disease, gestational diabetes mellitus, systemic lupus erythematosus, thyroid disease, and liver disease.

Obstetrics factors: multiple pregnancies, delayed commencement of ANC, birth weight, short birth interval, history of PIH, and multigravida.

Health Facility Related Factors: Maternity Waiting Home Service and Referral from Another Facility.

Operational & Term definition

MWH Utilizers: pregnant mothers who were admitted to the MWH service and waited until the start of labor.

Perinatal health outcomes: neonates who were diagnosed with either asphyxia, perinatal sepsis, stillbirth, or early neonatal death.

Data Management and analysis

Data Management

All the questionnaires were checked manually for completeness and will be cleaned, coded, and entered into Epi-data 3.1. Then, the data was exported to and analyzed using Stata version 16.

Data Analysis

Descriptive statistics such as frequencies, proportions, inter-quartile range, mean, median, and standard deviation were calculated to describe socio-demographic and other related variables of the study population and displayed using Tables, Figures, and Graphs.

A generalized linear model (GLM) for binary outcomes was applied for the regression analysis, as this will provide the proper effect size measure (RR) for relatively common outcomes. Both bivariable and multivariable generalized linear model analyses were used to determine the association of each independent variable with the dependent variable. Initially, variables with $p < 0.25$ in the bivariable generalized linear model were taken into the multivariable logistic regression model. Both crude and adjusted odds ratios with respective 95% confidence intervals and p values <0.05 will be used to measure the strength of the association between dependent and independent variables.

The analysis was done for perinatal health outcomes; those who developed perinatal complications were coded "1," and those with no complications were coded "0".

Multicollinearity between the independent variables was assessed using the variance inflation factor (VIF). The maximum VIF value was 1.11 for the perinatal health outcome model, which is close to 1 or less than 10, suggesting there was no multicollinearity problem. Hosmer and Lemeshow goodness of fit statistics were done for each model, and it was found to be a good fit ($P = 0.06$). The results were interpreted using RR as an effect measure.

Expected outcome

This study will provide valuable information for respective health institutions in the zone and zonal health departments to improve the quality of MWHs and its expansion to other health facilities where the service has not been launched yet. Besides, this study will contribute to the existing body of knowledge and articulate the basis for other research on the effectiveness of MWH utilization.

Result

Background characteristics of the study participants

In the current study, a total of 1606,803 maternity waiting home users (exposed) and 803 maternity waiting home non-users (non-exposed) were included. The median age of the respondents was 26 (IQR 24, 30). The age ranges from 15 to 38 years. Nearly one-fourth of study participants in the exposed group had no formal education. 179 (22.29%) and 154 (19.18%) study subjects in the non-exposed group had no formal education. Almost three-fourths of study subjects in the exposed group were housewives (596, 74.22%), and more than half of study subjects in the non-exposed group

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were housewives (553, 68.87%). 785 (97.76%) respondents in the exposed group were married, and 770 (95.89%) study subjects in the non-exposed group were married. All study subjects in the exposed group resided in the rural area 803 (100.0%) (Table 1).

Reproductive and medical characteristics of respondents

Two hundred forty-one (30.01%) were primigravida in the exposed group, and nearly half of the study subjects in the non-exposed group were primigravida 330 (41.10%). Nearly one-quarter of the study subjects in the exposed group were in Paragraph 4 and above. 201 (25.03%) and 123 (15.31%) study participants in the non-exposed group were in para 4 and above. 60 (7.47) study participants in the exposed group had no ANC follow-up, 60 (69.77%), and 26 (3.24) study subjects in the non-exposed group had no ANC follow-up, 26 (30.23%) (Table 2).

Nearly one-fourth of the study subjects had experienced obstetric complications; previously, 188 (23.41%) and 98 (12.20%) study subjects in the non-exposed group had experienced obstetric complications. 27 (4.68%) study subjects in the exposed group had C/S previously; 27 (40.30%) and 40 (7.87%) study subjects in the non-exposed group had C/S previously (Table 2).

Table 1: Socio-demographic characteristics of maternity waiting home users and non-users in the public hospitals of West Arsi Zone, 2022.

Variable	Category	Exposed	Non exposed	Total n=1606 (%)
		No. (%)	No. (%)	
Maternal age	<20	15 (1.87)	46 (5.73)	61 (3.79)
	20-35	763 (95.02)	719 (89.54)	1482 (92.28)
	>=35	25 (3.11)	38 (4.73)	63 (3.92)
Marital status	Married	785 (97.76)	770 (95.89)	1555 (96.82)
	Single	6 (0.75)	4 (0.50)	10 (0.62)
	Divorced	12 (1.49)	18 (2.24)	30 (1.87)
	Widowed	0	11 (1.37)	11(0.68)
Mother's educational level	No formal education	179 (22.29)	154 (19.18)	333 (20.73)
	Read & write	131 (16.31)	103 (12.83)	234 (14.57)
	Primary education	263 (32.75)	242 (30.14)	505 (31.44)
	Secondary education	98 (12.20)	223 (27.77)	321 (19.99)
	Diploma and more	132 (16.44)	81 (10.09)	213(13.26)
Husband's educational level	No formal education	147 (18.31)	141 (12.45)	288 (17.93)
	Read & write	100 (14.82)	119 (54.34)	219 (13.64)
	Primary education	185 (18.68)	150 (23.04)	335 (20.86)
	Secondary education	163 (24.91)	200 (20.30)	363 (22.60)
	Diploma and more	208 (24.03)	193 (48.13)	401 (24.97)
Mother's Occupation	Government employee	64 (7.35)	59 (7.97)	123 (7.66)
	Merchant	64 (7.97)	86 (10.71)	150 (9.34)
	Farmer	54 (6.72)	47 (5.85)	101(6.29)
	Housewife	596 (74.22)	553 (68.87)	1,149 (71.54)
	Daily laborers	14 (1.74)	48 (5.98)	62 (3.86)
	Self employed	16 (1.99)	5 (1.31)	21 (1.31)
Place of residence	Urban	0	429 (100.0)	429 (26.71)
	rural	803 (68.32)	374 (31.78)	1,177 (73.29)

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Table 2: Reproductive and medical characteristics of maternity waiting home users and non-users in the public hospitals of West Arsi Zone, 2022.

Variable	Category	Exposed No. (%)	Non exposed No. (%)	Total n=1606 (%)
Gravidity	1	241 (30.01)	330 (41.10)	571 (35.55)
	45750	356 (44.33)	355 (44.21)	711 (44.27)
	>=5	206 (25.65)	118 (14.69)	324 (20.17)
Parity	0	243 (30.26)	334 (41.59)	577 (35.93)
	45717	359 (44.71)	346 (43.09)	705 (43.89)
	>=4	201 (25.03)	123 (15.32)	324 (20.17)
ANC visit	0	60 (7.47)	26 (3.24)	86 (5.35)
	45717	479 (59.65)	468 (58.28)	947 (58.97)
	>=4	264 (32.88)	309 (38.48)	573 (35.68)
History of C/S	Yes	27 (4.68)	40 (7.87)	67 (4.17)
	No	550 (95.32)	468 (92.13)	1018 (63.38)
Previous obstetrics complication	Yes	188 (23.41)	98 (12.20)	286 (17.80)
	No	389 (48.44)	410 (51.06)	799 (49.75)
Medical disease during pregnancy	Yes	16 (1.99)	58 (7.22)	74 (4.60)
	No	787 (98.01)	747 (92.78)	1534 (95.51)
Planned current pregnancy	Yes	708 (88.17)	656 (81.69)	242 (15.09)
	No	95 (11.83)	147 (18.31)	1364 (84.93)

Health service related characteristics of respondents

Seven hundred sixty-four (95.14%) study subjects in the exposed group had traveled 1-2 hours to reach the health facility, and more than three-fourths of the study participants in the non-exposed group had traveled 1-2 hours to reach the health facility (611, 76.09%). More than half of the study participants in the exposed group were transferred from other facilities, 431 (53.67%), and similarly, more than half of the study participants in the non-exposed group were transferred from another facility, 443 (55.17%).

Perinatal characteristics and perinatal complication

Slightly more than half of study subjects had given birth to female neonates (416, 51.81%), and similarly, more than half of study subjects had given birth to female neonates (477, 59.70%). 49 (6.10%) perinatal complications were developed by exposed groups, and 74 (9.2%) perinatal complications were developed by non-exposed groups. Birth asphyxia was the major complication identified among exposed groups 39 (79.59%), whereas neonatal sepsis was the major complication identified among non-exposed groups 37 (50.0%) (Figure 3).

Maternity Waiting Homes Services

The median duration of stay at maternity waiting homes was 6 (IQR 4, 9). Almost all of the respondents in the exposed group had received health services. The most common health services given were health education, food, physical examinations, laboratory tests, and antibiotics (18.80%).

Bi-variable and Multi-Variable Generalized Linear Model Analysis of Perinatal health outcomes

Perinatal Health Outcomes

Maternity waiting home utilization, maternal complications, maternal age, type of birth, parity, and sex of the newborn were factors that had p-values less than 0.20 during the bi-variable generalized linear model analysis. After controlling for possible confounders in the multivariable generalized linear model, maternity waiting home utilization, maternal complications, maternal age, and parity were statistically significantly associated with perinatal health outcomes at a p-value <0.05.

Maternity waiting home utilization was an independent risk for perinatal health outcomes. There was a 39% reduced risk of developing perinatal complications in the exposed group when compared to the non-exposed group [RR = 0.61, 95% CL = 0.42, 0.88]. Mothers who developed obstetric complications had a 1.96 times higher risk of developing perinatal complications than those who didn't develop complications [RR = 1.96, 95% CL (1.39, 2.75)].

Mothers whose ages were 20–35 had a 54% reduced risk

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of developing perinatal complications compared to those whose ages were greater than 35 years [RR = 0.46, 95% CL (0.26, 0.82). Nulliparous women had an 88% reduced risk of developing perinatal complications compared to those who were para 4 and above [RR = 0.22, 95% CL = 0.12, 0.43%] (Table 3).

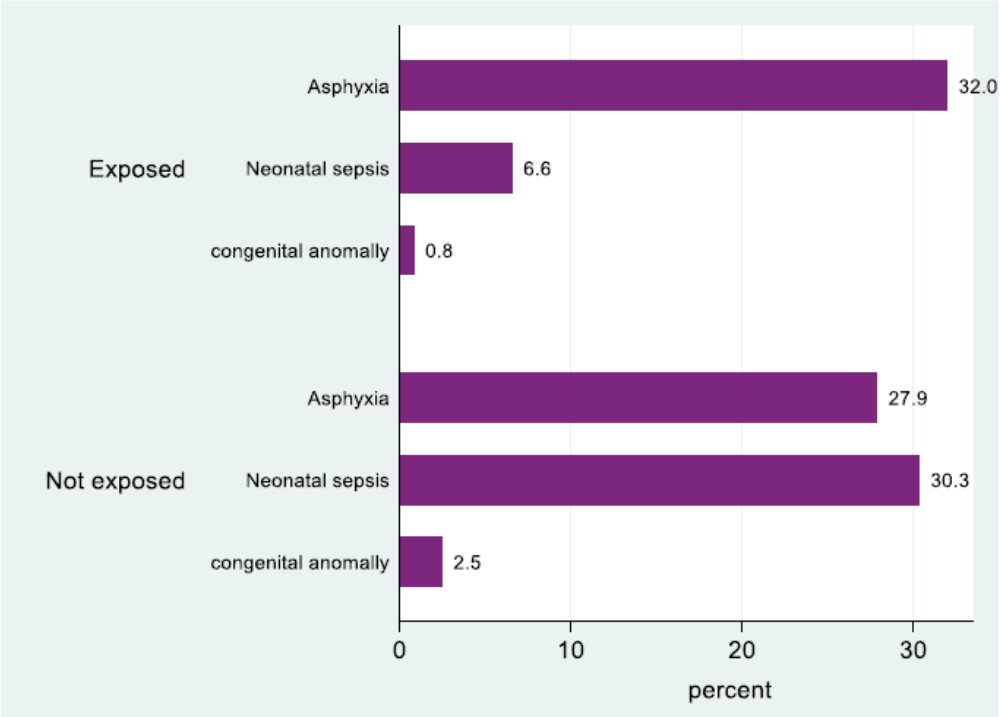

Figure 3: Perinatal complications among maternity waiting home users and non-users in the public hospitals of West Arsi Zone, 2022.

Table 3: Bivariable & Multivariable generalized linear model for the effect of maternity waiting home utilization on perinatal health outcomes, 2022 (n=1606).

Variable	Category	Complicated No. (%)	Uncomplicated No. (%)	CRR (95% CI)	ARR (95% CI)	P-value
Maternity home utilization	Utilized (Exposed)	49 (6.10)	754 (93.90)	0.66 (0.47, 0.93)	0.61 (0.42, 0.88) *	0..008*
	Not utilized (non-exposed)	74 (9.22)	729 (90.78)	1	1	1
Maternal complication	Yes	52 (12.53)	363 (87.47)	2.10 (1.49, 2.95)	1.96 (1.39, 2.75)*	0.000*
	No	71 (5.96)	1,120 (94.04)	1	1	1
Maternal age	<20	6 (9.84)	55 (90.16)	0.44 (0.18, 1.07)	1.39 (0.47, 4.08)	0.55
	20-35	103 (6.95)	1,379 (93.05)	0.31 (0.19, 0.51)	0.46 (0.26, 0.82)*	0.008*
	>35	14 (22.22)	49 (78.78)	1	1	1
Type of birth	Singleton	118 (7.63)	1,429 (92.37)	0.90 (0.38, 2.12)	0.62 (0.26, 1.50)	0.294
	Twin	5 (8.47)	54 (91.53)	1	1	1
Parity	0	19 (3.29)	558 (96.71)	0.27 (0.16, 0.46)	0.22 (0.12, 0.43)*	0.000*
	45717	65 (9.22)	640 (90.78)	0.76 (0.53, 1.11)	0.84 (0.54, 1.30)	0.439
	≥4	39 (12.04)	285 (87.96)	1	1	1
Sex of newborn	Male	64 (7.17)	829 (92.83)	1.15 (0.82, 1.62)	0.88 (0.62, 1.25)	0.481
	Female	59 (8.27)	654 (91.73)	1	1	1

RR-adjusted for maternal complication, maternal age, type of birth, parity and sex of newborn
RR -Relative Risk CI- Confidence Interval
**Significant with multiple logistic regression at p-value ≤0.05*

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Discussion

The primary aim of the current study was to determine the effect of maternity waiting home utilization on perinatal health outcomes. According to the present study, maternity waiting home users had a 39% reduced risk of developing a perinatal complication when compared to non-users. This finding is supported by a study done at the national level, which found that the direct obstetric complication rate was 49% lower at hospitals with maternity waiting homes compared to hospitals without maternity waiting homes [11].

The present study revealed that maternity waiting home users had a reduced risk of developing perinatal complications when compared to non-users. A similar finding was found in a study conducted in Yetebon, Ethiopia, in which MWH use was associated with a 77% lower risk of childbirth complications and a 94% lower risk of fetal and newborn complications [12]. Similarly, a study done in health facilities in Gurage Zone revealed that MWH users had lower odds of having delivery complications, which is consistent with the present study [13].

Likewise, a study carried out in the Tigray region revealed a similar finding to the present study, in which the incidence rates of perinatal death and complications were significantly lower among the maternal waiting home users than non-users [10]. The present study is also in line with a nested case-control study conducted at St. Luke Hospital in Wolisso, which showed the protective effect of maternity waiting home utilization on perinatal mortality and a more protective effect after adjusting for confounders. [14].

Similarly, a study conducted at the national level found a similar finding with the present study, in which perinatal mortality was 47% lower in hospitals with maternity waiting homes than those without maternity waiting homes [11].

A systematic review done in Africa found that utilizing MWHs has a significant effect on reducing PNM by 82.5%, which is consistent with the current study [15]. Another systematic review done in developing countries found that there was 73% less occurrence of stillbirth among users, which contributes to the reduction of 83% of stillbirths compared to non-users, which is also in line with the present study [16].

The present study showed that mothers whose ages were 20–35 had a 54% reduced risk of developing perinatal complications compared to mothers whose ages were greater than 35 years. This might be due to the fact that as women get older, the risk of getting chronic illnesses is high, and these diseases might expose the mother to developing obstetric complications.

This finding is consistent with the study carried out in Debre Tabor town, Ethiopia, which found that a mother's age was associated with adverse pregnancy outcomes [17]. Similarly, a study conducted in North-West Ethiopia found a consistent finding with the present study, in which the odds of composite adverse perinatal outcomes were higher among advanced maternal-age women when compared to adults [18]. Similarly, a study carried out in China found a consistent finding: maternal age of 35 years or older was found to be significantly associated with at least one adverse outcome [19].

The present study also found that mothers who developed obstetric complications had a 1.96 times higher risk of developing perinatal complications than those who didn't develop complications. This could be due to the fact that any complications for the mother will have a direct and significant effect on the fetus and newborn, as the fetus is solely dependent on maternal circulation for nutrition, gas exchange, and other physiological processes. This finding is supported by a study conducted in Northwest Ethiopia, which found that complications during pregnancy were also factors significantly associated with adverse perinatal outcomes. This finding is also in line with a study done in Gurage Zone, which revealed that women who did not use MWH were more likely to develop delivery complications, and women with delivery complications had higher odds of undergoing cesarean delivery and neonatal death [18].

The current study also found that nulliparous women had an 88% reduced risk of developing perinatal complications compared to those who were para 4 and above. This might be due to the fact that obstetric complications are likely to repeat themselves and are also related to advanced age.

A similar finding was found in a study carried out in the Sidama region, in which women with grand multiparity gave birth to babies with a higher risk of stillbirth and preterm birth [20]. This finding is also in line with a study carried out in Northern Tanzania, which found that grand multiparous women had increased odds of prelabour rupture of membranes, stillbirth, and preterm birth delivery as compared to women in the lower parity group [21]. Similarly, in a study carried out in China, multigravida was found to be significantly associated with at least one adverse outcome, which is consistent with the present study [19,22-39].

Strength and Limitations

Strengths

Use of a relatively large sample size with strong power.

Use of a prospective cohort study design that is strong at elucidating temporal relationships.

Employment of a generalized linear model to estimate relative risk as this is the proper effect size measure for relatively common outcomes.

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Limitations

The incidence rate was not determined as the date and time of admission and complications are not clearly written in the women and neonates chart.

Conclusion

The present study found that maternity waiting home users had a reduced risk of developing perinatal complications when compared to non-users. Besides, advanced maternal age, multiparity, and maternal complications were independent predictors of perinatal complications. Moreover, maternity waiting home utilization had an evident impact on reducing perinatal complications.

Declarations

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Availability of data and materials

The data sets used and/or analysed during the current study available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Before commencing data collection, the Ethical Review Committee of Madda Walabu University, Shashemane Campus provided approval. A letter of authorization was also received from the West Arsi Zone Health Office. In addition, verbal consent was obtained from study participants to confirm their willingness to participate after explaining the objective of the study. Respondents were notified about their right to refuse or terminate at any point of the interview. The information provided by each respondent was kept confidential.

Competing interests

The authors declared that there were no conflicts of interest.

Consent for publication

Not Applicable.

Strobe checklist

Not Applicable.

Authors' contributions

NG, AE and MAH conceptualized the idea, analyzed the data and drafted the manuscript. AU and DY improved the drafted manuscript and significantly revised the manuscript for methodological and scholarly essence. All authors have read and approved the final manuscript.

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