

The Role of Maternity Waiting Area in Improving Obstetric Outcomes: A Comparative Cross-sectional Study, Jinka Zonal Hospital, Southern Regional State

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Abstract

Background: Maternity Waiting Areas also called Maternity Waiting Homes are residential facilities, located near a recognized medical facility, where non-laboring pregnant women from remote areas stay awaiting their delivery and be transferred to the medical facility shortly before delivery. Research indicates that 99% of all maternal mortalities occur in the developing countries. Ethiopia is a major contributor to the world-wide death of mothers. Maternity Waiting Areas, an approach designed to improve access of rural mothers to comprehensive emergency obstetric care has been introduced three decades ago in Ethiopia.

Methods: Hospital-based comparative cross-sectional study was conducted.

Results: Only 16.7% of the total 516 mothers were admitted to the Maternity Waiting Areas of which 90.7% were from rural areas. Almost all mothers from the Maternity Waiting Areas (98.8%) delivered at the hospital with relatively reduced occurrence of the bad obstetric outcomes of interest when compared to the mothers from home. More than 53% of the mothers who reported late to labor ward were mothers from rural areas. Mothers from the Maternity Waiting Areas were 97% less likely to experience prolonged PROM when compared to the home group, AOR and 95% CI: 0.03 (0.01, 0.24). They had also 74% lesser odds of experiencing delay in admission to labor ward when in labor, AOR and 95% CI: 0.25 (0.15, 0.43). The collective bad obstetric outcomes were reduced by 27.5% from 61.2% prevalence in the home group to 33.7% in the Maternity Waiting Areas group, AOR and 95% CI: 0.32 (0.20, 0.53).

Conclusion: Mothers from the Maternity Waiting Areas had been protected from the risk of intrauterine infections and thereby from maternal and perinatal complications unlike mothers from home.

Keywords: Obstetric; Intrauterine infections; Risk factors; Cross-sectional study; Fetal cord

Abbreviations: ANC: Antenatal Care; CPD: Cephalopelvic Disproportion; HMIS: Health Management Information System; IUFD: Intrauterine Fetal Death; AOR: Adjusted Odds Ratio; CI: Confidence Interval

Introduction

Maternity Waiting Areas (MWAs) also called Maternity Waiting Homes are residential areas located near a recognized medical facility where women can await the time of delivery and be transferred to a nearby medical facility shortly before delivery, or earlier should complications arise. They are one strategy used for improving obstetric outcomes. This approach has been used worldwide for many years and is still part of the strategies for Asia and Africa. Ethiopia, as a country signed for the Millennium Development Goals (MDGs), is acting on the improvement of obstetric outcomes including reduction of maternal and neonatal mortality. The approach of maternity waiting

areas, as a strategy, started in Ethiopia three decades ago. However there still seem to be a need for strengthening the approach. Within the Southern Nations, Nationalities and Peoples Regional State (SNNPRS), relatively the best functioning MWA is based at Gidole Hospital. At Jinka Zonal Hospital, a MWA was established 10 years ago, however, it is still not well organized and its role in improving obstetric outcomes was not studied yet.

Over one third of global 10.8 million deaths of children under age 5 occurred in the neonatal period [1]. Uterine rupture accounted for about a quarter of total perinatal deaths, of which majorities were diagnosed from the outset at admission. More than 80% of maternal deaths worldwide were due to direct obstetric causes and obstructed labor without uterine rupture [2]. Ethiopia is a major contributor for the world-wide death of mothers with a maternal mortality ratio of 673 and 19,000 maternal deaths annually. Nearly 90% of delivering women are cared for by relatives, neighbors, traditional birth attendants and health extension workers while only 10% deliver in health facilities assisted by skilled birth attendants [3]. Every year, around 500,000 women die from complications of pregnancy and childbirth, and more

than 99% of these maternal mortality occurred in less developed countries [4].

MWAs are considered to play central role in the strategy to “bridge the geographical gap” in obstetric care. That means MWAs reduces the gap between rural areas with poor access to equipped facilities and urban areas where the services are available. As one component of a comprehensive package of essential obstetric services, maternity waiting homes offer a low-cost way to bring women closer to needed obstetric care. As a journal of Save the Children on stillbirth states, maternity waiting areas have been established in numerous contexts around the world as strategy to increase access to facility-based deliveries for women living in remote areas or for those who lack adequate transportation options [5].

MWAs are part of the strategies utilized to improve access to hard-to-reach rural populations. They take many forms. Some are simple shelters where women must provide their own supplies while others have ANC services and medical staff available. A research published by Ethiopian Medical Journal and entitled “Maternity waiting homes in Ethiopia-three decade’s experience” notifies that there were indirect evidences that MWAs improved maternal health outcome. Access to Comprehensive Emergency Obstetrics and Newborn Care (CEmONC) is limited in Ethiopia but indirect evidence seems to show that if MWAs is standardized and institutionalized, it could improve maternal health outcomes, however, more research are needed [6].

Although a number of studies have been conducted in Ethiopia and other African countries on MWA, still there is insufficient evidence to determine their role in improving maternal and perinatal obstetric outcomes [6-8]. More attention should be given to the little publicized, but highly important MWAs approach to obstetric care at first referral level in rural hospitals, and the results should be evaluated and published [9,10]. Moreover, in spite of the existence of MWA for many years in Ethiopia, their role in reducing maternal and perinatal deaths has not been well studied in southern region of the country. The aim of this research is to assess the role of maternity waiting area in Jinka Zonal Hospital so as to help the hospital to determine on how to utilize it and to keep a reference which can be used as a baseline research and can reflect at least some pictures of the effects of other MWA of almost similar set-up in South Omo Zone.

Methods and Materials

Study area and period

South Omo Zone, with its capital Jinka town located 733 Km south of Addis Ababa, is one of the 10 Zones and 2 special woredas in Southern Region. Located 465 Km away from Hawassa City, the capital of the Southern Nations Nationalities and Peoples Regional State (SNNPRS), it is one of the most remote zone in the region. Majority of the zone is occupied by pastoralists living in the lowlands and semi-pastoralists and farmers in the highlands. Altogether 16 tribes are living in South Omo Zone divided in 8 woredas. The study period was from March 1, 2017 to March 15, 2014.

Study design and source population

Hospital-based comparative cross-sectional study was conducted. The source population was all pregnant mothers who delivered at Jinka Zonal Hospital. The study population was all Maternity Waiting area-admitted mothers as well as other pregnant mothers who were selected

by simple random sampling from sampling frame of pregnant women who were admitted to labor ward directly from own home.

Sample size and sampling procedures

A total of 516 mothers (86 from the MWA and 430 from home) who delivered at the hospital were studied. The sample size was determined by Epi Info with the assumption of: 95% CI, 95% power, P1=Prevalence of bad obstetric outcomes among mothers from home- 40% from literature [11], P2=Prevalence of bad obstetric outcomes among mothers from the MWA-20% as literature [12] states that MWA reduced bad obstetric outcomes by 50% (50% reduction in P1=20%), Proportion of non MWA-admitted to MWAs-admitted mothers was 5:1.

Data was first stratified into pregnant mothers from the MWA and those mothers from home. All mothers from the MWA were taken as study population while the desired number of comparison mothers from home was drawn from the sampling frame of the home group using simple random sampling technique.

Measurement and Study Variables

Independent variables

Independent variables here are the factors such as temporary residence (MWA vs. home), age, gravidity (number of pregnancies) and permanent residence (as Jinka Town, other small towns and rural villages) of the pregnant mothers who delivered in Jinka Zonal Hospital.

Dependent variables

The dependent variables were the different bad obstetric outcomes which are affected or which are at least modified by admission to the MWA. If a woman experienced at least one of the following bad obstetric outcomes of interest, she was categorized as experiencing bad outcome.

- Delay in admission to labor ward
- Prolonged PROM (>6 hours)
- Obstructed labor
- Uterine rupture
- Low Apgar score (<7 out of 10)
- IUFD/Stillbirth at admission to labor ward
- Maternal death

Operational definitions

Bad obstetric outcomes: Bad obstetric outcomes in this research mean the undesired events experienced by a pregnant mother during her pregnancy, childbirth and puerperal (6 weeks after delivery) periods. These are delay in admission to labor ward, prolonged PROM, obstructed labor, IUFD/stillbirth at admission, low Apgar score, uterine rupture and maternal death.

Collective bad obstetric outcomes: In this study, the term “collective bad obstetric outcomes” was used to refer to the computed overall bad obstetric outcome where a woman is categorized as having bad obstetric outcome if she experienced at least one of the following outcomes of interest (dependent variables)-prolonged PROM, delay in

admission to labor ward, obstructed labor, IUFD/stillbirth, low Apgar score, uterine rupture and maternal death.

Labor ward admission: Receiving pregnant mothers in true labor either from home or from the Maternity Waiting Area (MWA) to keep them in the delivery ward for follow-up on labor progress and for conduct of delivery by skilled personnel

Delay in admission to labor ward: Delay in admission in this case refers to the arrival of a laboring mother to labor ward after a cervical dilatation of 6 cm or more or/and after 6 hours of leakage of amniotic fluid. Note that the maximum cervical dilatation at which a woman can deliver is 10 cm but a woman should be admitted to labor ward early at 4 cm dilatation of the cervix but immediately if leakage of liquor.

Low Apgar score: Apgar score is the measurement of the assessment of the wellbeing of a neonate within 5 minutes of delivery based on its appearance, reflex to stimuli, heart rate, muscle tone and respiration. Based on Apgar score measurements, the WHO classifies neonatal asphyxia into severe asphyxia (Apgar score of 0-2), moderate asphyxia (Apgar score of 3-4), mild asphyxia (Apgar score of 5-7) and no asphyxia (Apgar score of 8-10). Therefore, low Apgar score is a score below 7 out of 10 during the 5th minutes of delivery.

Maternity Waiting Areas (MWAs)/ Maternity Waiting Homes (Interchangeably Used)

Residential areas located near a recognized medical facility where pregnant women with no labor can await the delivery of their baby and be transferred to a nearby medical facility immediately when labor initiates or if any complication arises.

MWA-admission: It is the process of receiving and keeping pregnant mothers near to term or at term irrespective of length of stay in the MWA which varies depending on when labor starts. Mothers with true labor are not admitted to the MWA.

Prolonged PROM: The term PROM (Pre-labor Rupture of Membranes) is the rupture of fetal membranes and leakage of amniotic fluid any time prior to initiation of true labor after 28 weeks of gestation from last menstrual period (LMP) or after 7 months of pregnancy in case of unknown last menstrual period. Prolonged PROM is PROM reported to the labor ward after more than 6 hours.

Temporary residence: Throughout this study, temporary residence applies for the place of stay of the pregnant women as to where they came from just before their admission to labor ward. This was used to classify the women into either coming from the MWA or directly from home.

Data collection and quality control

Review of 8 months document was made from March 1-15-2014 using pre-tested English version checklist which was developed in such a way that all the objectives and outcome variables were addressed. Data at the delivery ward from 8 months were reviewed. The record review was performed by one practicing health officer trained on Comprehensive Emergency Obstetrics and Newborn Care (CEmONC) and two midwives practicing in the obstetrics department for their training on Basic Emergency Obstetrics and Newborn Care (BEmONC).

Data quality was assured by proper training of the document reviewers, strict daily basis supervision by the principal investigator as

well as by pre-testing the record review checklist on MWA at Koibe Health Center in South Omo Zone with almost similar set-up to that at JZH. Since the current record keeping in the MWAs was not well organized, only the existing HMIS delivery register at the delivery ward was used with additional notes about from where the mothers came, that means checking whether the mothers were from the MWA or from home just prior to their admission to labor ward. The data was reviewed and the findings on the outcomes were analyzed so as to compare the bad obstetric outcomes (the dependent variables) between mothers from the MWA and those mothers from home both delivered at the hospital.

Data management and analysis procedures

The collected quantitative data were first checked for completeness and consistency and then were entered, coded, cleared and analyzed using SPSS version 16 computer software program. Frequency of selected variables was cross-tabulated and then the statistical significance was tested using binary and multiple logistic regressions as ORs and CIs. Chi-squared test was run for categorical portions. The scored quantitative parts were analyzed with independent samples t-test with p values. Fitness of the model was tested by Hosmer and Lemeshow goodness-of-fit test. Finally, findings were presented with texts, bar graphs as well as pie charts and tables.

Ethical issues

Support letter was obtained from Hawassa University after the proposal was approved by the ethical review committee for ethical clearance. Similarly, recognition and oral consent were then obtained from South Omo Zone Health Department and Jinka Zonal Hospital for the acceptance by labor and delivery ward. Since only records were reviewed, individual respondent consent forms were not filled in but the individual patient charts were handled with confidentiality.

Right from the registry to the write-up of research findings, the research process was based on the real data without any attempt of falsification and fictitious processing of data and findings for the sake of drawing the correct conclusion. Confidentiality was ensured in such a way that secrets of individual cases were not disclosed; rather the findings were concluded as groups of MWA-admitted and home groups of mothers in general.

Results

Demographic findings

From the delivery register of labor ward at Jinka Zonal Hospital (JZH), data from 516 selectively complete charts which were registered from July 2013 to February 2014 had been reviewed. The mean and median ages of the study population were 24.73 years and 25 years respectively with standard deviation of 5.53 years. Based on the data review, 49.6% of the 516 pregnant women who delivered at the hospital came from rural areas where health posts are the only available health facilities. Out of these 256 rural women, 57 (22.3%) were admitted to the MWA while the remaining 199 (77.7%) came from their own home.

Out of 163 women who were from Jinka Town, only 4.9% (8 women) were MWA-admitted while 95.1% of them (155 women) came to labor ward directly from their own home (great majority of mothers from Jinka Town were non MWA-admitted). Of the total 516 pregnant

mothers, 97 were from small towns outside Jinka Town. Among these women from small towns where health centers are the highest facilities, 21 (21.6%) came from the MWA and the remaining 76 (78.4%) were admitted to labor ward directly from home. Tables 1 and 2 give summary of the demographic findings of the study population. Only 86 (16.7%) of the total 516 mothers were admitted to the Maternity Waiting Area (MWA) before their deliveries in the hospital while 430 (83.3%) were directly admitted to labor ward from their home. Great majority (90.7%) of the MWA-admitted pregnant women was from rural villages and from other small towns outside Jinka Town- only 8 (9.3%) women from Jinka Town were admitted to the MWA. Figure 1 below shows the temporary residence as to “MWA” and “Home” of mothers delivered at JZH.

outcomes is significantly different between the two comparison groups lower in the MWA-admitted mothers as compared to the home counterparts, (t=5.912, df=285, p-value<0.001).

Multivariate analysis showed that the higher the number of gravidity, the higher was the possibility of an operative delivery. Multi-gravid and grand multi-gravid mothers had more than two times higher odds of sustaining operative deliveries; AOR and 95% CI: 2.49 (1.35, 4.59) for multi-gravid women and AOR and 95% CI: 2.42 (1.13, 5.16) for grand multi-gravid women. Chi-scored test on the ordinal category of the bad obstetric outcomes showed the pattern of occurrence of the bad obstetric outcomes. As it can be clearly seen below (Figures 2 and 3; Tables 3 and 4).

Comparison of findings between mothers from the MWAs and those from home

The independent samples t-test on scored quantitative form of the bad obstetric outcomes showed that the mean number of bad obstetric

Independent Variables		Temporary Residence		
		MWA Counts (% of MWA)	Home Counts (% of Home)	Total Counts (% of Total)
Permanent Residence	Jinka Town (Hospital)	8 (9.3%)	155 (36.0%)	163 (31.6%)
	Other towns (Health Centers)	21 (24.4%)	76 (17.7%)	97 (18.8%)
	Rural Villages (Health Post)	57 (66.3%)	199 (46.3%)	256 (49.6%)
Gravidity	Premi-gravid (Only 1 st pregnancy)	25 (29.1)	175 (40.7%)	200 (38.8%)
	Multi-gravid (2-4 pregnancies)	30 (34.9%)	190 (44.2%)	220 (42.6%)
	Grand multi-gravid (≥ 5 pregnancies)	31 (36.0%)	65 (15.1%)	96 (18.6%)
Age Groups	15-19 years	8 (9.3%)	69 (16.0%)	77 (14.9%)
	20-34 years	66 (76.7%)	332 (77.2%)	398 (77.1%)
	35-49 years	12 (14.0%)	29 (6.7%)	41 (7.9%)

Table 1: Association between temporary residence of mothers and other independent variables at delivery ward, JZH, July 2013-February 2014 (n=516).

Temporary Residence						
Dependent Variables	MWA Counts	% of MWA	Home Counts	% of non MWA	Total Counts	% of Total
Delay in admission to labor ward	25	29.1	246	57.2	271	52.5
Prolonged PROM	1	1.2	87	20.2	88	17.1
CPD/Obstructed labor	0	0	9	2.1	9	1.7
IUFD/Stillbirth	1	1.2	25	5.8	26	5
Low Apgar score	3	3.5	43	10	46	8.9
Uterine rupture	0	0	8	1.9	8	1.6
Maternal death	0	0	1	0.2	1	0.2
Collective outcomes*	29	33.7**	263	61.2**	292	56.6
Modes of delivery						

Spontaneous vertex vaginal	58	67.4	339	78.8	397	76.9
Spontaneous breech vaginal	1	1.2	2	0.5	3	0.6
Instrument assisted vaginal	2	2.3	21	4.9	23	4.4
Destructive vaginal	0	0	6	1.4	6	1.2
Caesarian (C/S)	25	29.1	55	12.8	80	15.5
Laparotomy (uterine rupture)	0	0	7	1.6	7	1.6
*Collective outcome is a dichotomized bad outcome in which the mother has at least one of the bad obstetric outcomes listed as dependent variables						
**MWA improved the overall maternal and neonatal obstetric outcome by 27.5% from 61.2% in the home group to 33.7% in the MWA-admitted group						

Table 2: Distribution of dependent variables in relation to temporary residence of mothers at delivery ward, JZH, July 2013-February 2014 [n=516].

Socio-demographic Factors		Collective* Bad Obstetric Outcome		COR and 95% CI	AOR and 95% CI
		Yes	No		
Age groups (Years)	15-19	35	42	1.00	
	20-34	234	164	1.71 (1.05, 2.80)**	2.07 (1.19, 3.61)**
	35-49	23	18	1.53 (0.72, 3.29)	1.75 (0.71, 4.32)
Temporary Residence	Home	263	167	1.00	
	MWA	29	57	0.32 (0.20, 0.53)**	0.24 (0.14, 0.41)**
Permanent Residence	Jinka Town	84	79	1.00	
	Other small towns	48	49	0.92 (0.56, 1.52)	1.05 (0.62, 1.78)
	Rural villages	160	96	1.57 (1.05, 2.33)**	1.80 (1.17, 2.77)**
Gravidity	Premi-gravid	116	84	1.00	
	Multi-gravid	116	104	0.80 (0.55, 1.19)	0.65 (0.42, 1.01)
	Grand multi-gravid	60	36	1.21 (0.73, 1.99)	1.17 (0.63, 2.17)
*Collective outcome is a dichotomized outcome in which the mother had at least one of the bad obstetric outcomes of the listed dependent variables					
**Statistically significant					

Table 3: Association between independent variables and collective* bad obstetric outcome at delivery ward, JZH.

Categorized Bad obstetric outcomes	Temporary Residence		Proportion of home-to-MWA mothers per each outcome category	Chi- Squared Test and p-value	
	MWA Count (% from MWA)	Home Count (%from home)			
No bad obstetric outcomes	Yes	52 (60.5%)	289 (67.2%)	5:1	X ² =1.454, p=0.23
	No	34 (39.5%)		4:1	
1-2 bad obstetric outcomes	Yes	52 (60.5%)	244 (56.7%)	5:1	X ² =0.406, p=0.52
	No	34 (39.5%)		5:1	
>2 bad obstetric outcomes	Yes	0 (0%)	45 (10.5%)	NA	X ² =9.860, p= 0.002*
	No	86 (100%)		4:1	

NA=Not applicable *Statistically significant

Table 4: Pattern of categorized bad obstetric outcomes with Chi-square test and p-values in mothers from the MWA and mothers from home who delivered at JZH, July 2013-February 2014 (n=516).

Mothers who came directly from home experienced three or more (3-7) bad obstetric outcomes at a time while the mothers from the MWA had a maximum of only two bad obstetric outcomes occurring at a time on a single mother. As compared to mothers from the MWA none of whom developed more than two bad obstetric outcomes at a time, 37 (8.6%) mothers from home experienced more than two multiple bad obstetric outcomes at a time and 8 (1.9%) of them had more than five bad obstetric outcomes at once. All the 8 mothers who experienced more than five bad obstetric outcomes at a time were those who had uterine rupture. Prolonged PROM, delay in admission to labor ward, IUFD or stillbirth, uterine rupture and collective outcomes were cross-tabulated and compared between the two groups of mothers who delivered in the hospital. It was found that MWA-admitted mothers were 97% less likely of having prolonged PROM when compared to the mothers from home, AOR and 95% CI: 0.03 (0.01, 0.24).

At the same time, they were 75% less likely to experience delay in admission to labor ward when in labor in comparison to the mothers from own home, AOR and 95% CI: 0.25 (0.15, 0.42). Only 9.2% of delays in admission to labor ward with cervical dilatation of 5 cm or more were accounted by the MWA-admitted mothers while 90.8% were accounted by the home counterparts. Only minority of them (1.2%) had history of prolonged PROM when compared to the mothers from home 20.2% of whom experienced prolonged PROM.

The bivariate analysis showed that MWA increased likelihood of operative delivery when compared to the home group, COR and 95% CI: 2.18 (1.28, 3.72). However, after confounding factors were controlled with other predictors such as age, permanent residence and number of gravidity by multivariate analysis, it was showed that this was statistically insignificant, AOR and 95% CI: 1.74 (0.99, 3.07). MWA-admission had strong protective association with all of the bad obstetric outcomes, that is, mothers who came to labor ward from the MWA had significantly lower odds of experiencing individual and collective bad obstetric outcomes as compared to those mothers who came to labor ward directly from their home. The prevalence of bad obstetric outcomes among mothers from home and those mothers from the MWA had been shown to be 61.2% and 33.7% respectively. This shows the improvement of overall obstetric outcomes by 27.5% with admission to the MWA. On the contrast, rural-dwelling and being in the midFdle age group (20-34 years) increased the chance of the occurrence of bad obstetric outcomes both in the MWA and the home groups (Table 3).

Discussion

This research showed that 90.7% of mothers who came to labor ward from the Maternity Waiting Area (MWA) at Jinka Zonal Hospital (JZH) were those pregnant women who were admitted to the MWA from rural areas at term or near term. More than 98% of mothers admitted to the MWA at the hospital had given birth in the hospital. Mothers from rural areas had significantly higher odds of experiencing individual and collective bad obstetric outcomes than those mothers from the urban Jinka Town. It also revealed that the prevalence of

collective maternal and perinatal bad obstetric outcomes among mothers from home and those mothers from the MWA were 61.2% and 33.7% respectively. This shows that the overall maternal and perinatal obstetric outcome was improved by 27.5% due to the admission of rural mothers to the MWA. It was shown by this study that the occurrence of multiple bad obstetric outcomes at a time on a single mother was lesser in the mothers from the MWA; and no more than two multiple bad obstetric outcomes were experienced in this group at a time on a single mother. The study has also revealed that the higher the number of gravidity, the more was the chance of developing both individual and collective maternal and perinatal bad obstetric outcomes.

The possible explanation for the increased chance of operative delivery in multi-gravid and grand multi-gravid mothers is their lax uterus which is a risk factor for multiple pregnancies and fetal mal-presentations in these women. This in turn increases the risks of Caesarian delivery. The likelihood of craniotomy (destructive delivery) increases due to fetal demises (IUFDs) because of the complications of multiple pregnancies and fetal mal-presentations which are common among multi-gravid and grand multi-gravid women. On the other hand, pre-labor rupture of fetal membranes (PROM) which are more common among these women can result in fetal cord prolapse and IUFD. These last events (prolapsed cord and IUFD) can increase the possibility of either Caesarian (C/S) or destructive deliveries. The third explanation is that almost all laparotomies for uterine rupture were performed on multi- and grand multi-gravid women due to their thin uterine walls which are prone to rupture easily. However, more research should be conducted on operative deliveries for further explanation on their association with number of gravidity.

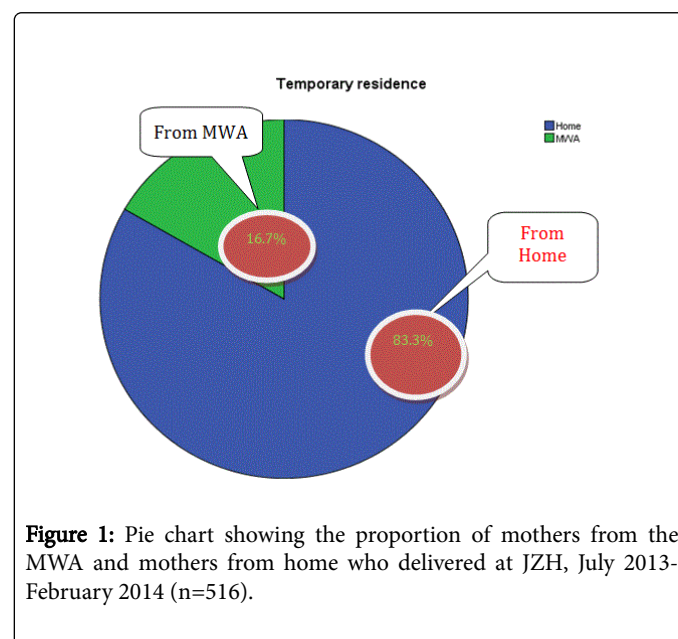


Figure 1: Pie chart showing the proportion of mothers from the MWA and mothers from home who delivered at JZH, July 2013-February 2014 (n=516).

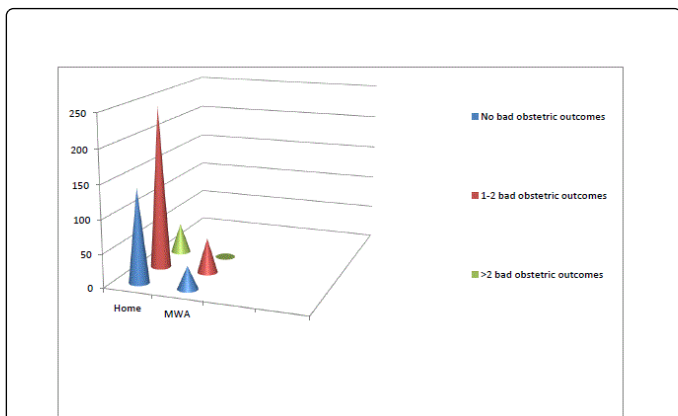


Figure 2: Bar graph showing the pattern of ordinal category of bad obstetric outcomes in mothers from the MWA and mothers from home delivered at JZH, July 2013-February 2014, [n=516] (MWA-86 and non MWA-430).

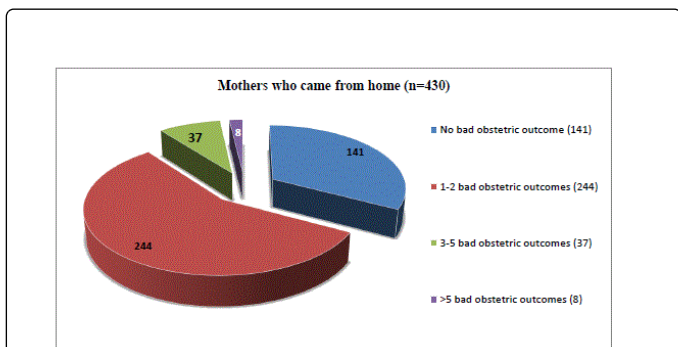


Figure 3: Pie chart showing categorized bad obstetric outcomes among mothers from home who gave birth at JZH, July 2013-February 2014, (n=430).

Discussion on comparative findings between MWA and home groups

Mothers from rural areas were more likely of experiencing individual and collective bad obstetric outcomes. This is possibly caused by the lack of transportation access in the rural settings causing referrals in emergency situations to be a great challenge. This finding was comparable with that of a study on maternal mortality trend in Ethiopia which indicated that the outcome of pregnancy is most adversely affected by delayed treatment [13]. This is also in line with a journal of Save the Children which states that MWAs were one of the strategies to increase access to facility-based deliveries for women living in remote areas or for those who lack adequate knowledge and transportation options. That means the MWA at Jinka Zonal Hospital has bridged the geographical gap. It was also similar with the findings of other researches in Ethiopia, Kenya and Uganda which revealed place of residence as a statistically significant variable for the use of skilled obstetric care [14].

The improvement of overall maternal and perinatal obstetric outcomes by 27.5% by the admission to the MWA at the hospital compound is due to easy and early access of institutional care by this

group of mothers. This goes with a study on maternity waiting homes in Ethiopia in 2012 which mentioned that MWAs are part of the strategies utilized in Ethiopia to improve access to hard-to-reach rural populations and which showed that MWAs improve access to comprehensive emergency care if they are standardized [15]. However, the findings of my research on the prevalence of collective maternal and perinatal bad obstetric outcomes of 61.2% and 33.7% among mothers coming directly from home and those coming from the MWA respectively are higher than that in other studies. The 61.2% prevalence rate of bad obstetric outcomes among the mothers from home group is 21.2% higher than that was stated by a study on maternal mortality trend in Ethiopia in 2014 as an estimated 40% of pregnant women experience pregnancy-related health problems [16]. The 33.7% prevalence rate of bad obstetric outcomes among mothers of the MWA group is 13.7% higher than the one mentioned by a study in Zimbabwe, in fact this difference could be because of the difference in the setup and the follow-up in the MWAs in Ethiopia and Zimbabwe [17].

This study showed that almost all the MWA-admitted mothers (98.9%) delivered at the hospital with relatively reduced chance of occurrence of the bad obstetric outcomes of interest when compared to the home group. The reason for this could be many things. One possible explanation could be the counseling on early signs of pregnancy related complications by the healthcare providers in the MWA, in obstetric department and at ANC clinic since the MWA-admitted women are at easy access. These findings were consistent with a study in Ethiopia on the role of MWAs in 2010 which showed that the substantial decrease in maternal mortality and stillbirth was partly due to the timely and appropriate obstetric management of women using the MWAs. The findings were also similar to that of a study conducted in Atat Hospital, Ethiopia, on the role of MWA which stated that MWA facilitated institutional delivery where 94% of MWA-admitted mothers gave birth in that hospital with less complications. They also match with a WHO bulletin in 2011 which mentioned that more women from remote areas would access birthing facilities if they could wait for the onset of labor in a maternity waiting home.

This study showed the MWA at Jinka Zonal Hospital compound has significantly decreased the delay to reach health facility and thereby reduced the morbidities and mortalities related to pregnancy, labor and childbirth among the MWA-admitted rural mothers who could otherwise suffer from the poor transportation access. This can be explained by the occurrence of delayed admission to labor ward, which is the most common bad obstetric outcome, differently in the two comparison groups. This could also be explained by the relatively lower chances of developing other obstetric complications in MWA-admitted group than in the home group. The commonest complications in this study were prolonged PROM and delay in admission to labor ward during labor which often are causing other complications to arise. These complications were relatively minimized in the MWA-admitted mothers. This finding was comparable with that of related studies in Ethiopia and other African countries stating delay as a cause of intra-partum deaths. Perinatal mortality was significantly lower among the MWA-admitted group when compared to that among the home group. This study found that the rate of intrauterine fetal death (IUFD) or stillbirth was much lower in the MWA-admitted mothers. This result is in line with that of a study on the role of MWA in Ethiopia which states that maternal mortality and stillbirth rates were substantially lower in women admitted to MWA.

The findings on the reduced odds of mothers from the MWA to experience prolonged pre-labor rupture of membranes (prolonged PROM) is mainly due to the early admission to labor ward during labor and by timely reporting for pre-labor rupture of membranes (PROM) by the mothers from the MWA. In doing so, they were protected from the risk of developing intrauterine infections and thereby maternal and perinatal complications. This can be explained by the information from a publication in the University of California which states that timely and accurate diagnosis of PROM is critical to optimize pregnancy outcome.

Conclusion

The aim of the research was to assess the role of the MWA at JZH in improving the overall maternal and perinatal obstetric outcomes. The individual and collective bad obstetric outcomes of interest had been compared between pregnant mothers who came to labor ward from the MWA and those who came directly from own home during the study period. Based on the comparative analysis, the following major results have been found.

- Majority of the mothers who came to labor ward via the MWA were pregnant women who live in rural areas.
- The prevalence of bad obstetric outcomes among mothers from home and those mothers from the MWA had been shown to be 61.2% and 33.7% respectively. This shows that the overall obstetric outcome was improved by 27.5% due to admission to the MWA.
- Pregnant mothers from rural areas had statistically significant higher odds of experiencing individual and collective bad obstetric outcomes when compared to urban counterparts.

The implication of the findings listed above is that the MWA has improved the overall maternal and perinatal obstetric outcomes. This was mainly due to the early admission to labor ward and by timely reporting for pre-labor rupture of membranes (PROM) by the MWA group when compared to the mothers who came directly from home. In doing so, the MWA-admitted mothers were protected from the risk of developing intrauterine infections and thereby from other maternal and perinatal complications unlike the home group of mothers.

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Authors' Contributions

Bezawork Meshesha wrote the proposal, participated in data collection, analyzed the data and drafted the paper. Gebeyehu Dejene assisted in the design of the study, conducted critical review. Tesfahun Hailemariam participated in the preparation of the manuscript and approved the final manuscript with some revisions.

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