Original Article

Maternity waiting Home-use and associated factors among mothers in northwest Ethiopia, The application of the integrated behavioral model

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Abstract

Background: Maternal mortality in Ethiopia is the highest in the world (412/100,000). Health facility delivery is the cornerstone in reducing maternal mortality. However, health facility delivery is low in Ethiopia, due to poor access and ill-equipped health facilities. Maternity waiting home (MWH) is one of the comprehensive packages of essential obstetric services, enabling women to access well-equipped health facilities. However, there are limited studies on maternal waiting home use in Ethiopia. This study aimed to use the integrated behavioral model, to assess maternal waiting home use and associated factors among mothers in the East Bellessa district, northwest Ethiopia.

Method: A community-based cross-sectional study was conducted from the 1-27 of March 2020. The multistage sampling technique was used to select a total of 624 mothers. Data was collected using the face-to-face interview technique. The reliability and validity of the items were checked using exploratory factor analysis. Multivariable logistic regressions were conducted to identify the factors associated with maternal waiting home use. Findings with a p-value <0.05 with a 95% confidence interval were considered statistically significant in the final model.

Result. Overall, 20.5% (95% CI=17.3-23.7) of mothers used maternity waiting homes for the index of childbirth. Husband educational status (AOR=3.78, CI =1.44-9.93), the knowledge on maternity waiting homes (AOR=3.97, CI=2.27-6.95), between 2 and 3 antenatal care follow ups (AOR=0.14 CI=0.06-0.31), experiential attitude (AOR=2.37, CI=1.64-3.44), descriptive norms (AOR=0.66, CI=0.47-0.94), perceived behavioral control (AOR=1.07, CI=1.02-1.13) and behavioral intention (AOR=1.37, CI=1.1-1.71) were associated with maternity waiting home use.

Conclusion: Maternity waiting home utilization was low. Husband's education status, antenatal care follow-up, knowledge on maternal waiting homes, experiential attitude, descriptive norms, perceived behavioral control and behavioral intention were positively significantly associated with MWH utilization. Therefore, strengthening the use antenatal care services, husbands' education, and developing a positive attitude towards MWH may improve the use of maternity waiting homes among women. [*Ethiop. J. Health Dev*. 2022; 36(2):000-000]

Keyword: Maternity waiting home, mothers, integrated behavioral model, Ethiopia

Introduction

Maternal mortality is a global public health problem; maternal deaths were set at 211 maternal deaths per 100, 000 live births in 2017. The maternal mortality rate (MMR) in Sub-Saharan Africa (SSA), is 415 per 100,000 live births, which is the highest in the world (1). Ethiopia is one of the Sub-Saharan African (SSA) countries with a high MMR, 412 maternal deaths per 100,000 live births (2). Institutional delivery is the cornerstone in reducing maternal mortality. However, it is low in Ethiopia, due to a delay in receiving emergency obstetric care, the distance involved when accessing services, and the consequent delay in the treatment of childbirth complications (1).

To avert this problem the government of Ethiopia recently adopted a new strategy called Maternal waiting homes (MWH), in order to improve institutional delivery for high-risk pregnancies and for those mothers who reside too far from health facilities (3). MWH is one component of a comprehensive package of essential obstetric services located near qualified medical facilities, where pregnant women can await their delivery and where they can be transferred to a nearby medical facility shortly before delivery or prior to having serious complications (4). MWH is a key element in a strategy to "bridge the geographical gap" in obstetric care between rural areas, with poor access to equipped facilities, and urban areas. MWH helps to address two delays, the first delay being the delay in deciding to seek care and the second delay being the delay to reach obstetric care when accessing emergency obstetric care (5, 6).

WHO endorsed MWH as one of the components of a comprehensive package to reduce maternal morbidity and mortality, Facilities called MWH by the WHO are also called maternity villages, maternal waiting shelters, and Ante-natal villages? Since the beginning of the 20th century, MWHs have been implemented in more than 18 countries around the world, including the United States, Canada, Cuba, India, Zimbabwe, Nigeria, Uganda, Ethiopia, and Malawi (4, 6).

Since the adoption of MWH for the Ethiopian government, the national coverage was 70% and 73%

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in the Amhara region have health facilities equipped with MWH, however, despite this institutional delivery is still low (3). The Integrated Behavioral Model (IBM) is a behavioral model, which was developed in the 1990s for further extension of the Theory of Planned Behavior (TPB). For both models, the most important determinant of behavior is the intention to perform the behavior; however, IBM includes 3 other constructs that are not utilized within the TPB. According to IBM, in addition to behavioral intention, a particular behavior is most likely to occur if a person knows the behavior, there is no environmental constraint preventing performance, the person has performed the behavior previously.

The model also asserts direct determinants of an individuals' Behavioral Intention (BI) are their instrumental and experiential attitudes, injunctive and descriptive norms, self-efficacy, and perceived controls (7). There is a scarcity of documented data in Ethiopia on the utilization and predictors of maternal waiting homes. This study provides some important information on the use and predictors of maternal waiting homes, especially the application of the integrated behavioral model (IBM), which is the best predictor of behavior and has not been applied in Ethiopia with regards to women's utilization of MWH. Additional variables that are not addressed in other studies, including self-efficacy and descriptive norms which are immediate predictors of the intention of mothers to utilize MWH, were incorporated due to the application of IBM. Therefore, the objective of this study was to assess the use of MWH and its associated factors among mothers who gave birth in the last 12 months in East Bellessa district, Northwest Ethiopia, using IBM as a conceptual framework.

Method
Study design and Settings
A community-based cross-sectional study was conducted among mothers who gave birth in the last 12 months in the East Bellessa district from the 1-27 of March 2020. East Belesa District is found in the Central Gondar Zone, Amhara region, Northwest Ethiopia. The total population of the district is 154,815, out of this 35964 are women of a reproductive age group. There are five health centers, one primary hospital, and thirty-five health posts in the districts. All the health centers had maternal waiting homes. There are thirty-two kebeles in the district and the number of mothers who gave birth in the last 12 months was 4510 from January 2019 to December 2019 (8, 9).

Sample size, Study population, and sampling technique
The minimum sample size was calculated using a single population proportion formula by considering 43.5% as the (P) proportion of women's utilization of MWH from a study done in Angola (10), the assumption of a 95% confidence level and a 5% margin of error was considered.

Sample size calculation using single proportion formula:

$$n = \frac{(Z a/2)^2 \, p(1-p)}{d^2}$$

$$n = 378$$

Where, n= the minimum sample size, Z= the desired level of confidence interval 95% (1.96), P=proportion of women's utilization of MWH (43.5%), d= margin of error 5% (0.05).

Adding a 10% non-response rate and then multiplying it by 1.5 (design effect because the multistage sampling method will be used), the final minimum sample size calculated was 624.

The study populations for this study were mothers who gave birth in the last 12 months (from January 2019 to December 2019).

A multistage sampling technique was used to select the study participants. East Bellessa district has 32 kebeles and 10 kebeles were selected via the lottery method as a primary sampling frame.

The sample size was proportionally allocated to each of the kebeles based on the number of mothers who gave birth in the last 12 months. The List of women who gave birth in the last 12 months in each Kebele was used as a sampling frame and a simple random sampling technique using computer-generated random numbers was used for selecting each study participant in the selected kebele.

Data collection procedures
The study was conducted from the 1-27 of March 2020 using a face-to-face interviewer-administered questionnaire which was adapted from other similar studies (11). Furthermore, an elicitation study was conducted on 20 individuals from the target population two weeks prior to the actual data collection period, which was a critical step in applying IBM, using an open-ended interview guide to identify relevant behavioral beliefs, outcomes, referents, facilitators, and barriers for each behavior and the target population under investigation. The contents were analyzed by coding related items into similar constructs. Finally, based on the frequency of items IBM constructs were developed. The tool was prepared in English and translated to Amharic. One day of training was given to five data collectors who were clinical nurse professionals and two health officer supervisors on the quality of data and the procedures they should follow during data collection.

Study Variables
Dependent variable
- Utilization of maternity waiting homes for their index child (yes/no)

Independent variables
- IBM constructs: behavioral intention, experiential attitude, instrumental attitude, injunctive norms, descriptive norms, perceived behavioral control, and self-efficacy
- Socio-demographic characteristics: Age, occupation, religion, marital status,

educational level (women, husband), decision making participation, and knowledge of the mothers on MWH utilization

- Obstetric history: ANC follow-up, place of delivery, the experience of MWH, parity, and history of complications during pregnancy.
- Environmental factors: Distance and availability of transport

Measurement instruments
Maternal waiting home use: asking questions on the use of maternity waiting home for their index child (yes or no)

Intention: an indication of individual readiness/willingness/ to use MWH and how much of an effort they are planning to exert, to use MWH. Measured by using 4 items with a 5-point bipolar Likert scale, summing up the scores, which range from 4-20 and higher score would indicate a high intention to use MWH.

Experiential attitude: is defined as the individual's emotional response towards performing the recommended behavior. It is directly measured with a five-point semantic differential scale (SDS), using four items summed up to get scores which range from 4-20 and a higher score indicates favorable attitudes and it is also indirectly measured using behavioral belief items, by using a five-point Likert scale summing up the scores, which range from 4-20 and the higher score indicates a favorable attitude.

Instrumental attitude: based on a cognitive outcome evaluation of the target behavior. A direct measure of attitude toward performing the behavior was obtained using a five-point SD scale, with four items that were summed to obtain a score range from 4-20 and a higher score indicated a favorable attitude. Indirectly it was measured using five behavioral belief items, using a five-point Likert scale and then multiplied by corresponding outcome evaluation items. The score was computed by summing the products of beliefs and evaluations ranging from 25-625 and a higher score indicated a favorable attitude.

Injunctive norms: refer to social pressure from others that an individual feels. Directly it has a five-point Likert scale with three items, summed up to get a score range from 3-15 and a higher score implies "highly influential". An indirect measurement was obtained by having participants rate normative beliefs concerning whether different sources of influence approve the participants' use of MWH and the participants' motivation to comply with those sources. The scores were calculated by computing the totals of the four items measuring normative beliefs and the four items measuring motivation to comply and summing them up to get an overall score range from 4-400, the higher score indicates approval of the behavior.

Descriptive norm: refers to whether the referents perform the target behavior. Directly measured by looking at beliefs about whether most people perform the behavior by using a 5-point Likert scale, consisting of three items summated to get the score range of 3-15. A higher score indicates more willingness to utilization of MWH. Indirectly measured by using three normative belief items summed up to get the score range of 3-15 and a higher score indicates more use of MWH.

Perceived control: It is one's perception of the degree to which various environmental factors make it easy or difficult to carry out the behavior. Perceived control is directly measured by the overall measure of perceived control over the behavior, using a five-point SD scale containing five items, summed up to get a score range from 5-25 and a higher score indicates the factor was under control. It is indirectly measured using four control belief items multiplied by four perceived power items. The scores were computed by summing up the products of control belief and perceived power values ranging from 16-400 and a higher score indicates that the factor was under control.

Self-efficacy: is ones' degree of confidence in the ability to perform the behavior even in the face of various obstacles or challenges. Directly measured using a 5-point Likert scale containing four items and indirectly it is measured through perceived ability to overcome each facilitating and constraining condition. Four items are summed up to get the score range from 4-20 and a higher score indicates the confidence to use MWH.

Knowledge: responses of knowledge on MWH, 11 questions were summed up, a total score was obtained for each respondent and a high score indicates better knowledge.

Data management and analysis procedures
Data was entered into EPI data version 3.1 and exported into SPSS version 23 for analysis. A path analysis was done using STATA version 15 to check the causal effect of IBM constructs through the utilization of MWH. Descriptive statistical analysis was used to summarize the frequency, percentage, mean, and standard deviation of the variables. The correlations between each direct and indirect construct were checked using Pearson's correlation coefficient (r). Chi-square was used to check the association between IBM constructs, knowledge, environmental constraints, and socio-demographic factors with regards to MWH utilization.

Following a bi-variable regression, variables with a p-value <0.20 were entered into Multivariable logistic regressions analyses to determine factors associated with utilization of MWH. An odds ratio of 95% CI was used to interpret the strength of association between an independent variable and MWH utilization at p-value<0.05. Model fitness was checked using Hosmer and Lemeshow goodness of fit test at p-value 0.996 which revealed the model was fitted.

Result and Discussion
Reliability and validity of IBM constructs

A reliability analysis was conducted to check the internal consistency of IBM constructs using Cronbach alpha (α). Based on the analysis, a reliability score of BI (α=0.98) was the highest followed by IN (α=0.96) after dropping one item, and PC (α=0.70) was the lowest (Table1).

Table 1. Internal consistency of constructs of the integrated behavioral model

Construct	Cronbach alpha
Experiential attitude	0.93
Instrumental attitude	0.94
Injunctive norm	0.96
Descriptive norm	0.87
perceived behavioral control	0.70
Self –efficacy	0.92
Intention	0.98

Construct validity was checked using exploratory factor analysis (EFA) using a principal component analysis as the extraction method and Promax rotation, based on the observation of a scree plot and initial eigenvalues greater than one determined the number of components. For direct construct associate with the IBM, there were two components with total variance explained 72.6 %, KMO=0.95, shows sample adequacy, Bartlett's test of sphericity chi-square =17813.88, df=253, sig=0.000 significant relationship, factor loading > 0.4 retained and to avoid cross-loading lowest factor loading items were dropped until no item was a cross load at two components.

Finally, for each of the sales these were the number of items validated: direct experiential attitude 4 items, direct instrumental attitude 4 items, direct injunctive norm 3 items, direct descriptive norm 2 items, direct perceived behavioral control 4 items, and direct self - efficacy 4 items were validated.

For indirect constructs of IBM, total variance explained 75.52% with 6 components, KMO value=0.95 indicates sample adequacy, Bartlett's test of sphericity chi-square=30777.25, DF=780, sig= 0.000, indicative of a significant relationship. Finally validated constructs were for all the scales were as follows: intention 4 items, indirect experiential attitude 4 items, indirect instrumental attitude 8 items, indirect injunctive norm 8 items, indirect descriptive norm 3 items, indirect perceived behavioral control 5 items, and indirect self - efficacy 4 items.

Correlation of direct and indirect constructs of IBM
There was a strong correlation between the direct and indirect constructs of IBM. Direct and indirect descriptive norm had the strongest correlation (r=0.94, p<0.01) from all (Table 2).

Table 2. Correlation between direct and indirect constructs of the integrated behavioral model

Construct	DIA	IIA	DEA	IEA	DIN	IIN	DDN	IDN	DPBC	IPBC	DSE	ISE	INT
DIA	1												
IIA	.800	1											
DEA	.851	.802	1										
IEA	.851	.802	.901	1									
DIN	.814	.785	.829	.829	1								
IIN	.823	.809	.847	.847	.891	1							
DDN	.759	.695	.776	.776	.831	.843	1						
IDN	.751	.692	.778	.778	.838	.836	.941	1					
DPBC	.783	.753	.838	.838	.809	.839	.780	.799	1				
IPBC	.789	.769	.803	.803	.877	.877	.849	.856	.820	1			
DSE	.797	.760	.794	.794	.790	.819	.764	.762	.845	.794	1		
ISE	.806	.773	.807	.807	.810	.825	.790	.801	.841	.827	.918	1	
INT	.758	.732	.754	.754	.757	.760	.724	.734	.814	.748	.867	.875	1

The correlation was significant at the P< 0.01 level (2-tailed) for all.

Socio-demographic characteristics of study participant
619 mothers who gave birth in the last 12 months participated in the study, resulting in a 99.2% response rate. The mean (+SD) age of the respondent was 28.8 +5.7years. Most of the study participants were orthodox religion followers 611(98.7%) and 609 (98.4%) of them were of Amharic ethnicity. 513 (82.9%) of the study participants had no formal education. 560 (90.5%) of the participants were married and 551 (89%) were housewives (Table 3).

Table 3. socio-demographic characteristics mothers in East Belesa district, northwest Ethiopia 2020

Variable	Category	Frequency	Percent
Age		Mean=28.85, SD=5.74	
Religion	Orthodox	611	98.7
	Muslim	8	1.3
Ethnicity	Amhara	609	98.4
	Other (Awi, Tigre)	10	1.6
The educational level of women	No formal education	513	82.9
	primary education	96	15.5
	Secondary and above	10	1.6
The educational level of the husband	No formal education	416	74.3
	Primary education	108	19.3
	Secondary and above	36	6.4
Marital status	Married	560	90.5
	Never married	2	0.3
	Divorced	37	6
	Windowed	20	3.2
Occupation status	housewife	551	89
	Farmer	49	7.9
	Merchant	14	2.3
	Gov. employee	5	0.8

Knowledge on maternity waiting home
All the study participants had heard about MWH. The mean (+ SD) score of knowledge on maternal waiting homes was 7.5 with + 2.65 SD.

Maternal waiting home utilization
The proportion of Maternal waiting home use among mothers who gave birth in the last 12 months was 20.5% (95% CI=17.3-23.7) during index child. Of those mothers who used MWH two-third (66.14%) of them stayed at MWH for less than 15 days. 279 (45.1%) of the mothers had made a joint decision with their spouses, regarding the use of MWH.

More than half (51.7%) of the mothers had given birth 2-4 times prior to their current pregnancy. 262 (42.3%) mothers had between 2 and 3 ANC follow-ups during index child pregnancy. Almost half of (48.6%) the mothers didn't get support from their husbands during ANC follow-up. 342 (55.3%) of the participants gave birth at a health institution for their current child. 85 (13.7%) mothers experienced a pregnancy-related complication during the pregnancy index of a child.

Factors associated with utilization of MWH
Following the bivariate analysis, factors with a p-value of less than 0.2 were entered into a multivariate logistic regression to identify independent factors associated with MWH utilization. In this knowledge model of MWH, the presence of complications during pregnancy, number of ANC follow ups, husband's education and experiential attitude, descriptive norms, perceived behavioral control, and intention from IBM constructs were identified as significant factors associated with the use of MWH. 89.5% (Nagelkerke pseudo R^2=0.895) of the variance collectively explained.

Mothers whose husband's had primary education were 3.78 times more likely to use MWH, as compared to those who had no formal education (AOR=3.78 CI=1.44-9.93). For a unit increase in the total score of knowledge the odds of using maternal waiting homes increased by 3.97(AOR=3.97 CI=2.27-6.95).

Mothers who had 2-3 ANC follow-ups were 86% less likely to use MWH as compared to those who had four and above ANC follow-ups (AOR=0.14 CI=0.06-0.31).

Mothers who had a complication during pregnancy were 2.74 times more likely to use MWH as compared to those who had no complications (AOR=2.74 CI=1.16-6.47). For a unit increase in the total score of experiential attitudes, the odds of MWH utilization will increase by 2.37(AOR=2.37, CI=1.64-3.44). For a unit decrease in the total score of descriptive norms, the odds of MWH utilization will increase by 33.2% (AOR=0.668, CI=0.47-0.94). For a unit increase in the total score of perceived control, the odds of MWH utilization will increase by 7.5% (AOR=1.075, CI=1.02-1.13). For a unit increase in the total score of intention, the odds of MWH utilization will increase by 37.5% (AOR=1.375, CI=1.1-1.72) (Table 4).

**Table 4. Factors affecting utilization of MWH among mothers in East Belesa district, Northwest Ethiopia, 2020**

Variable		MWH utilization		COR (95%%CI)	AOR (95% CI)
		YES	**NO**		
Husband's educational status	No formal education	55	361	1	
	primary education	52	56	6.095(3.80-9.77)	3.78(1.44-9.93) **
	Secondary & Above	18	18	6.56(3.22-13.38)	1.28(0.40-4.07)
Number of ANC	Less than two	1	205	0.002(0.00-0.015)	0.153(0.015-1.583)
	Two up to three	20	242	0.035(0.02-0.062)	0.142(0.062- 0.32) **
	Four and above	106	45	1	
Complication during pregnancy	Yes	27	58	3.137(8.590-24.39)	2.74(1.16-6.47) **
	No	69	465	1	
Knowledge on MWH				6.11(3.82-9.78)	3.97(2.27-6.95) **
Instrumental attitude				1.130(1.107-1.153)	1.00(0.96-1.04)
Experiential attitude				3.482(2.674-4.534)	2.37(1.641-3.44) **
Injunctive norm				1.186(1.152-1.222)	1.01(0.94-1.08)
Descriptive norm				2.53(2.20-2.92)	.668(0.471-0.94) **
Perceived control				1.16(1.139-1.19)	1.075(1.02-1.13) **
Self –efficacy				2.383(2.00-2.84)	1.14(0.85-1.54)
Intention				2.906(2.301-3.67)	1.37(1.10-1.71) **

** shows significance at $p < 0.05$

Path analysis

MWH utilization as an endogenous variable and behavioral intention, knowledge, instrumental attitude, experiential attitude, injunctive norms, descriptive norms, perceived behavioral control, self-efficacy, and environmental constraints as an exogenous variable were used to predict the utilization of MWH. Behavioral intention, experiential attitude, descriptive norms, perceived behavioral control and knowledge were statically significant ($p < 0.05$) with path coefficients 0.006, 0.017, 0.015, 0.007and 0.005 respectively. The model accounted for 79.8% of the variance ($R^2 = 0.798$). Generally, the Bentler's comparative fit index (CFI) (0.98), Tucker Lewis's index (TLI) 0.96, and root mean square error of approximation (RMSEA) of 0.164 90% CI (0.11-0.21), and the standardized root mean square of residual (SRMR) 0.01. The model fit indices indicated that the data fits at an acceptable range (figure 1).
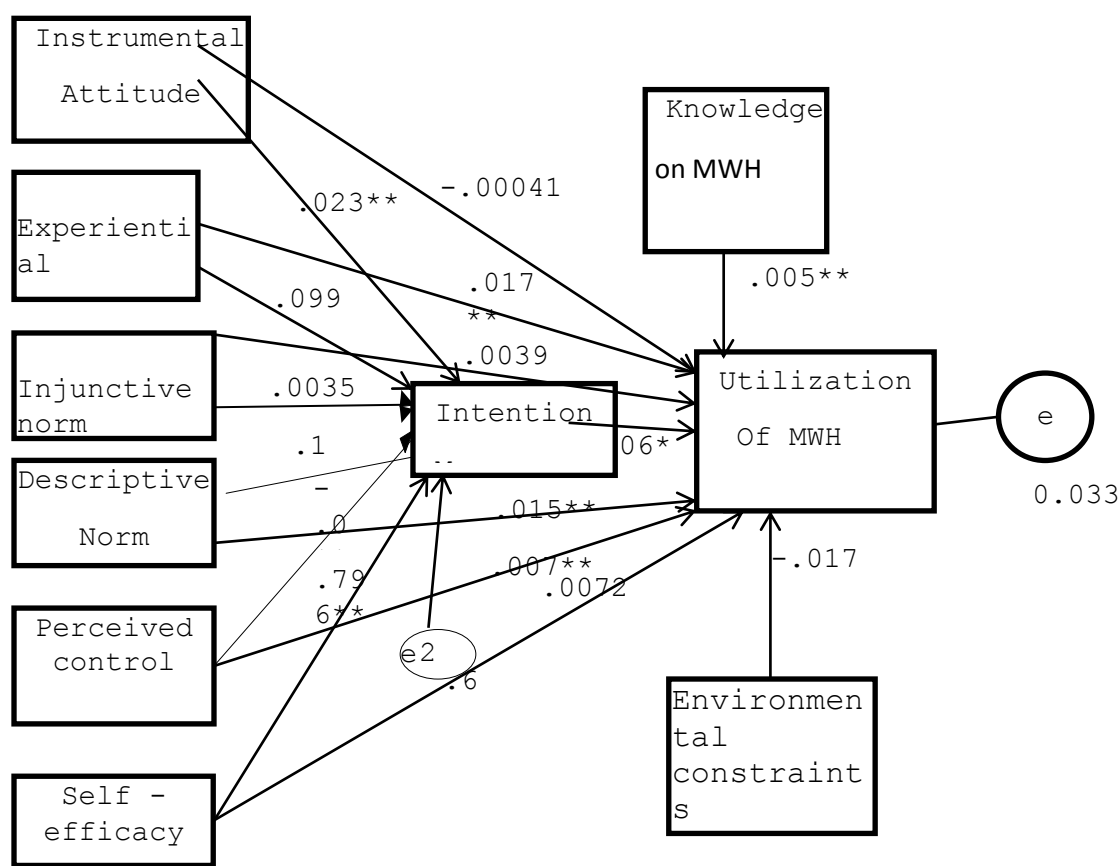
** show significance at p<0.05.
Figure 1. Path model on utilization of MWH among mothers in East Bellessa district

Discussion

This study revealed that the proportion of MWH use was 20.5% (95% CI=17.3-23.7), which was higher than a study done in Jinka hospital and Jimma zone 16.7% and 7% respectively (12, 13). The difference might be due to the difference in the study period 2014 and 2016. Furthermore, there was on going health education on MWH as one component of ANC since the formalization of a national guideline on MWH in 2015 and through the promotion of MWH by health extension workers (14).

The results of this study are lower than a study conducted in Indonesia, Angola, Tanzania, Zambia, Jimma town, and Mettu district Ethiopia which was 26.9%, 43.5%, 31.3%, 33.3%, 38.7%, and 29.8% respectively (10, 11, 15-18). The difference with a study done in Indonesia, Angola Tanzania, and Zambia may be the study setting which was facility-based while this study was community-based and had different socio-demographic characteristics, culture, and differences in health policy.

The difference with a study done in Jimma town may be due to study facility-based settings, study subjects (all participants had ANC follow up), different socio-demographic characteristics like education 72.2% had primary education and above compared to only 17.1%

in this study (11). The difference with a study done in Mettu district may be the difference in socio-demographic characteristics like educational status, 58.8% had primary education and health services utilization was better in Mettu district, where 50.6 % had three or more ANC follow - ups (18).

The presence of complications during pregnancy was significantly associated with the utilization of MWH. A mother who had a complication during pregnancy was more likely to use MWH as compared to a mother who has not experienced any complications. This is congruent with studies conducted in Butajira southern Ethiopia, Zambia, and Malawi (17, 19, 20). The reason might be due to understanding the consequences of obstetric complications and the fear of consequences due to complications may facilitate the utilization of MWH.

Husband education was significantly associated with the use of MWH. Mothers whose husbands had a primary educational level were more likely to use MWH as compared to mothers whose husband had no formal education. This finding was consistent with a study conducted in southern Ethiopia, rural Zambia, Malawi, and Nepal (17, 19-21). This implies that educated husbands have a better understanding of obstetric complications during pregnancy and childbirth and that they will support their women

during ANC follow-ups, childbirth and that they help them to decide on the use of MWH.

ANC follow-up is significantly associated with the use of MWH. Mothers who had 2-3 ANC follow-ups were less likely to use MWH as compared to mothers who had 4 or above ANC follow-ups, which was in agreement with the studies conducted in Jimma town, Butajira Ethiopia, rural Zambia, Malawi, and low and middle-income countries (11, 19, 20, 22-24).

Knowledge was significantly associated with the utilization of MWH, which is in agreement with studies conducted in low and middle-income countries, Nepal, Zambia, and SSA (21, 22, 24, 25). This might be explained by the fact that knowledge is an important precursor, or it is necessary for the performance of a given behavior though it is not sufficient.

The behavioral intention had a positive significant association with utilization of MWH which was congruent with studies done in the USA and Iran (26-28).

Experiential attitude is positively associated with the utilization of MWH. This is comparable with studies conducted in rural Zambia and USA, where women had a positive experiential attitude towards staying at MWH(17, 25). This result is also comparable with a study conducted in Kalomo district Zambia, Malawi, and the thematic analysis conducted in low- and middle-income countries found a negative attitude towards midwives and inappropriate cultural care, which results in negative attitudes towards the utilization of MWH (22, 23, 29). The reason might be due to the health workers' approach to the clients, which is sometimes not compassionate and cultural perspectives affect their attitude towards service utilization and women might have a misconception about the services delivered at MWH and towards midwives in general.

Descriptive norms were significantly associated with the utilization of MWH. This indicated that the important referents' (their mothers, aunts, and neighbor's) use of MWH influences mothers' utilization, which approves the assumption of the integrated behavioral model, and it is also in agreement with a study done in the USA (30).

Perceived behavioral control was significantly associated with the utilization of MWH. This result is comparable with a study done in Jimma town, Mettu district, USA, and Iran (11, 18, 31, 32).

The path analysis revealed that behavioral intention, experiential attitude, descriptive norms, perceived control, and knowledge had a statically significant association with utilization of MWH which was also like the findings of the logistic regression analysis. This finding is supported by the study done in USA and Taiwan (26, 33, 34).

IBM explained 89.5% of the variance for utilization of MWH in the regression analysis. This is consistent with a systematic review which was conducted in SSA, which found that 26-90% for the behavior variable (35). Path analysis revealed 79.8% was explained by the behavior variable which was higher than a study conducted in the USA, where 26% was for the behavior (33). The reason for the difference might be a difference in the target population and their behavior.

The study had several limitations. First, cause and effect relationships could not be identified because of the cross-sectional nature of the study and also provided poor prediction and understanding of behavior, since the time order of having an attitude, beliefs, perceived norms, perceived behavioral control, self-efficacy, intention, and the behavior cannot be discerned at one time. The prospective study design is recommended when IBM is used as a conceptual framework to measure the attitude, subjective norms, perceived control, self-efficacy, intention to behavior, and behavioral performance at two separate points in time, but due to a lack of time and resources the current study did not employ a prospective study, so a future study should utilize an analytical prospective study design.

Conclusion
In this study, maternity waiting home utilization was low. This indicates that more than three fourth of mothers were not using maternity waiting homes, which is a big concern since it has a great public health impact on maternal morbidity and mortality. Husband's education status, complications during pregnancy, ANC follow up, knowledge of MWH, experiential attitude, descriptive norms, perceived behavioral control, and the behavioral intention was positively associated with the utilization of MWH. Therefore, strengthening antenatal care follow-up, improving knowledge on MWH and husbands' education, identifying complications during pregnancy, and developing a positive attitude towards MWH may improve the utilization of maternal waiting homes.

Abbreviations
BI: behavioral intention, DN: descriptive norm, IN: injunctive norm EA: experiential attitude. IA: instrumental attitude, PC: perceived control, SE: self-efficacy, OR: odds ratio, IBM: integrated behavioral model, MWH: maternal waiting home, SSA: Sub Saharan Africa, SPSS: Statical package for social science.

Availability of data: The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Authors' contribution
TFA conceived and designed the study. TFA YD and MBA participated in the collection, analysis, and interpretation of the data. TFA and YD drafted the manuscript. MBA, YD. YW & EKB critically reviewed the manuscript and contributed more to writing the manuscript. All authors read and approved the final manuscript.

Ethical approval and consent

Ethical clearance was obtained from Bahir Dar University College of medicine and health science institutional review Board (IRB no. 0066/2020). A letter of permission was obtained from the Amhara public health institute with a grant from the East Belesa District Health office. Informed verbal consent was obtained from each study participant after they were informed about the purpose, benefit, and confidentiality of the research. Participants were informed about their right to withdraw at any time of the interview.

Consent for publication: Not applicable

Competing interest: All authors declared that they have no competing interests

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