

Effectiveness of maternity waiting homes in increasing utilization of facility-based delivery: A systematic review

Absa Secka¹, Samsriyaningsih Handayani²

¹Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

²Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

Article Info

Article history:

Received Mar 1, 2021

Revised Jun 5, 2021

Accepted Jun 23, 2021

Keywords:

Maternal healthcare utilization

Maternity waiting homes

Second delay

Skilled delivery attendance

Facility-based delivery

ABSTRACT

To reduce the second delay contributing to maternal mortality, maternity waiting homes have been recommended for implementation especially in remote areas to help improve access to facility-based skilled delivery. Evidence of its effectiveness, however, is limited. This systematic review, therefore, aims to assess the effectiveness of the Maternity waiting home strategy in increasing utilization of facility delivery. Search for relevant articles was conducted on PubMed, Scopus, Google Scholar, Ebscohost, and Science Direct from database inception to March 30, 2021. Two reviewers independently screened the articles and assessed the quality of the studies. The identified maternity waiting home interventions and their effectiveness in improving facility-based delivery uptake were narratively synthesized and reported following the preferred reporting items for systematic reviews and meta-analysis reporting guidelines. The search yielded 670 articles of which five studies fulfilled the inclusion criteria. The three of five studies revealed that there is a significant association between Maternity waiting home use and utilization of facility-based delivery. The quality of the Maternity waiting homes significantly improved facility-based delivery uptake. Maternity Waiting Homes appear to be promising in decreasing barriers to skilled delivery attendance however the quality of evidence is low. More interventional studies of robust design are needed to clearly demonstrate its effectiveness.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Samsriyaningsih Handayani,

Department of Public Health and Preventive Medicine

Faculty of Medicine, Universitas Airlangga

Campus A, Jl. Mayjen. Prof. Dr. Moestopo, Surabaya, 60131, Indonesia

Email: samsri.handayani@gmail.com

1. INTRODUCTION

Despite significant progress made in reducing maternal mortality between 2000 and 2017, global maternal mortality remains unacceptably high [1], [2]. Decreasing maternal deaths has been a top global health agenda for the past 20 years, and it is known that the majority of maternal deaths are preventable even in the circumstances of most developing countries [3], [4]. In 2017, 810 women died each day as a result of preventable causes related to pregnancy and delivery [2]. Inadequately managed pregnancies and deliveries as well, contribute to the nearly four million newborn deaths and millions of disabilities that occur in children every year [5].

About thirty years ago, following the initiation of the Safe Motherhood Initiative, maternal and neonatal health leaders have been advocating for improved access to skilled medical professionals during labor and delivery for it is a known fact that timely access to quality facility delivery by skilled health

providers remains the best available strategy to reduce maternal mortality [6], [7]. Facility-based delivery (FBD) has been shown to improve maternal survival rates in low and middle/income countries (LMICs). Notwithstanding global recognition of these benefits, however, ensuring universal access to safe facility delivery services continues to be a challenge in many LMICs particularly in rural areas of South Asia and Sub-Saharan Africa [7]. To attain sustainable development goal (SDG) 3.1 of reducing the global maternal mortality ratio to less than 70 per 100,000 live births by 2030, considerable efforts are required to improve maternal health and reduce maternal mortality.

Although antenatal care has been proven to improve maternal health [8], delivering in a health facility is a more vital factor [9]. The location of birth and the availability of health personnel have been proven essential to improving maternal delivery outcomes since the day of birth carries the highest risk of death for both mothers and their babies [10]. The reduction in maternal mortality rates (MMR) in cross-country studies has been associated with higher rates of skilled birth attendants (SBAs) [11]. For deliveries that occur outside health facilities, the risk of adverse delivery outcomes is comparable between traditional birth attendants (TBAs) and SBAs which indicates that the benefits of SBAs cannot be experienced unless labor occurs in an adequately resourced health facility, and such care is not reached too late [12]. Skilled care at delivery according to World Health Organization (WHO) is “a delivery service provided by an accredited health professional such as a midwife, doctor or nurse who have been educated and trained to proficiency in the skills needed to manage normal uncomplicated pregnancies, childbirth and the immediate postnatal period, and in the identification, management, and referral of complications in women and newborns [13]. An estimated 74% of maternal deaths could be prevented if all women had access to skilled delivery and emergency obstetric care services [14]. Several studies have identified factors such as long-distance [15]-[18] poor road networks [19], lack of vehicles [20]-[22], and transportation costs [23], [24] as barriers to emergency obstetric care for pregnant women. Increased distance to maternity care has an inverse relationship with maternal healthcare utilization especially among rural women [25]. These barriers necessitate the design of interventions to expedite the swift movement of women from home to health facilities. Among such interventions are maternity waiting homes (MWHs).

MWHs are temporary lodgings or accommodation facilities located at or close to a health facility where pregnant women close to term reside and await delivery and can thereafter easily access the health facility for essential childbirth care or care for obstetric complications. This would help reduce access barriers to care such as distance, geography, seasonal barriers, time of the day, infrastructure, transportation, or communication between referrals [26]. They have been endorsed by the WHO since the 1950s as one component of a comprehensive package to reduce maternal morbidity and mortality [27]. A meta-analysis has shown that MWHs significantly reduced perinatal mortality by 82.5% in Africa [28] and MWH users have been reported to be 80% less likely to die than non-users with a 73% reduction in stillbirth among users [29].

Although MWHs have been shown to decrease maternal and perinatal mortality, its role in increasing utilization of institutional delivery, however, is inconclusive. In Zambia, the introduction of six MWHs in three rural districts led to improvements in the proportion of health facility deliveries in the intervention facilities versus the comparison facilities [30] whilst in Timor-Leste, the implementation of MWHs in two remote districts did not improve FBD uptake by women living in the study districts [31]. We searched on Google Scholar and PubMed with no language restrictions, for articles published up to Feb 28, 2021, using the terms "Maternity waiting Home" "Maternity waiting area" "facility-based delivery" and "systematic review" but found no systematic reviews assessing the effectiveness of the MWH strategy in increasing utilization of FBD. The aim of this systematic review, therefore, was a) to evaluate the effectiveness of MWHs in increasing utilization of Facility-based skilled delivery care and b) to assess the impact of the quality of MWHs in increasing utilization of FBD.

2. RESEARCH METHOD

To present study findings, the preferred reporting items for systematic reviews and meta-analyses (PRISMA) checklist [32] was used.

2.1. Data sources and search strategy

A systematic search was done using electronic databases including PubMed, Scopus, Google Scholar, Ebscohost, and Science Direct to obtain appropriate published articles on the impact of maternity waiting homes in increasing the utilization of skilled FBD, which is considered as childbirth that occurred in a healthcare facility such as a hospital, health center, or clinic attended by doctors, nurses, or midwives.

Articles were retrieved using appropriate Boolean operators. The last article search was performed in March 2021. The population, intervention, comparison, and outcomes (PICO) setting framework was

utilized to determine article eligibility. Participant (P) refers to pregnant women, the Intervention (I) was MWHs, the Comparison (C) was the absence of MWH and the Outcome (O) was the utilization of FBD.

The keywords used during the search for relevant articles in combination or separately were: "Pregnant Women", "Women", "Health Facilities", "community". For exploration on intervention, the keywords used were "Maternity waiting Home" and "Maternity waiting area". The keywords used for outcome were "facility-based delivery", "facility delivery", "hospital delivery", "institutional delivery", "skilled delivery", "skilled birth", and "health facility delivery". The search strategy employed is presented in Additional file 2.

2.2. Eligibility criteria

All articles which reported on the impact of MWHs on the utilization of FBD were included as well as those reporting on the impact of the quality of MWHs on utilization of FBD. Studies were included irrespective of study design or setting. There were no restrictions on the year of publication or language. The inclusion and exclusion criteria for papers are presented in Table 1.

Table 1. Inclusion and exclusion criteria for papers

Inclusion criteria	Exclusion criteria
- Population: Pregnant women	- Not primary research article
- Intervention: MWH	- Studies assessing determinants of MWH utilization or effectiveness on utilization of other maternal healthcare services besides facility-based delivery
- Main outcome measure: Facility-based delivery	- Papers relating to the economic analysis of MWH
- Publication years: Any	
- Location: Any	
- Language: Any	
- Study design: Any	

2.3. Exclusion criteria

Articles were excluded if they reported on the determinants of MWH utilization or its sustainability or impact on the utilization of other maternal health care services besides FBD. Short communications and commentaries were also excluded from this review.

2.4. Screening of articles

Results from the initial searches were stored in Mendeley reference manager. Duplicates were removed and the remaining articles were independently screened by title and abstract guided by the eligibility criteria. Article screening was conducted independently by the two reviewers (AS and SH) and the studies agreed upon were included in the full-text review. Disagreement between the two reviewers was handled by discussion. Independent full texts review of eligible papers was performed by the two reviewers and finally, analysis was done on the full texts of all relevant articles that met the inclusion criteria.

2.5. Quality appraisal

The Effective Public Health Practice Project (EPHPP) quality assessment tool for quantitative studies [33] was employed to assess the quality of included studies. The EPHPP is a standardized quality appraisal tool developed for use within the systematic review process to provide high-quality systematic reviews that would address the public health sector's need for evidence to support practice and has been used in previous studies [33]-[36]. Studies are rated strong, moderate, or weak based on the presence of selection bias, confounders, blinding, withdrawals and dropouts, the study design, method of data collection, the integrity of intervention, and the method of analysis. A reviewer's dictionary is provided to standardize results [37]. This assessment tool has an excellent inter-rater agreement and different study designs can be assessed easily within one tool. Two independent reviewers performed the quality assessment and disagreements were resolved by discussion. Appraisal results are presented in Additional file 1.

2.6. Data extraction

Data extraction was performed using Microsoft excel form consisting of the author, year, country of study, study setting, population, Comparator, main findings, and quality of the study as shown in Table 2.

Table 2. Data Extraction for included studies

Author/year /country	Study design	Study setting	Study population	Exposure/ Intervention	Comparator	Main outcome	Study strength
Lori <i>et al.</i> 2020 Zambia [38]	Quasi-experimental	Seven rural districts.	18,544 women in labor at 40 health facilities within 2 years.	20 community clusters received an MWH model while 20 control clusters did not.	Absence of MWHs	SBA increased at intervention facilities for all women living greater than 10km away (p=0.03).	Weak
Wild K <i>et al.</i> 2013 Timor-Leste [31]	Quasi-experimental	Two health centers in two districts.	1,986 Women in labor or postpartum	2 MWHs in two districts	No comparator	FBDs did not significantly increase in the two study districts (p=0.397), p=0.258) following implementation of the MWH.	Weak
Lory <i>et al.</i> 2013 Liberia [39]	Cohort	10 rural primary health centers (PHC).	Women in labor or postpartum at PHC	5 communities had an MWH and 5 did not.	Absence of MWH	Significant increase in team births at intervention communities from 10.8% at baseline to 95.2% post-intervention (p<0.001).	Weak
Kurji J <i>et al.</i> 2020 Ethiopia [40]	RCT	24 PHCs in three districts.	Women who had a pregnancy outcome 12 months before the survey	Upgraded MWH with local leader training Vs Local leader training only Vs Usual care	Vs Local leader training Vs Usual care	Higher odds of FBD in both intervention groups but not statistically significant (MWH ⁺ & leader OR: 1.09, 97.5% CI 0.67-1.75). Higher odds of FBD in communities with medium or high-quality MWH than those with low-quality MWH (OR: 1.95, 95% CI 1.76-2.16).	Strong
Henry <i>et al.</i> 2017 Zambia [41]	Cross-sectional	Household surveys in two districts.	Postpartum women	Quality MWHs	Poor quality/absent MWH		Weak

3. RESULTS AND DISCUSSION

Initial database search yielded 670 articles, PubMed (115), SCOPUS (185), Google Scholar (344), Science Direct (22), and Ebscohost (4). Following duplicate removal, and initial screening by title or abstract, a full-text review was performed on seven articles, out of which two did not meet the inclusion criteria. The final analysis was conducted for five studies [31], [38]-[41] as shown in the PRISMA flow chart Figure 1. Of the five included studies, one study each was from Ethiopia, Liberia, Timor-Leste, and two from Zambia. One cross-sectional [41], one cohort [39], one randomized controlled trial (RCT) [40], and two were quasi-experimental [31], [38]. The studies had a follow-up period ranging from 1 to 2 years. Three studies assessed the impact of the existence of MWH on utilization of FBD [31], [38], [39] one assessed the impact of the quality of MWHs on the utilization of FBD [41], and one assessed the impact of the combination of leadership training in addition to MWH on FBD uptake [40].

3.1. Impact of MWHs on FBD utilization

The effectiveness of MWHs in increasing utilization of FBD showed contradictory results. Three out of five studies showed a positive association between MWHs and utilization of FBD. In Liberia, a mid-program evaluation found an 84.4% increase in the proportion of institutional births assisted by traditional midwives together with SBAs (team births) (p<0.001) in 10 rural communities with an MWH compared to 10 communities without [39]. Similarly, in Zambia, Jody *et al* [38] found a significant increase in the percentage of deliveries following the introduction of a core MWH model for all women living > 10km away from the intervention facilities. On the other hand, in Timor-Leste, Wild *et al* [31] found no significant increase in the number of FBDs among rural women following the implementation of two MWHs in two districts; distance had no impact on utilization.

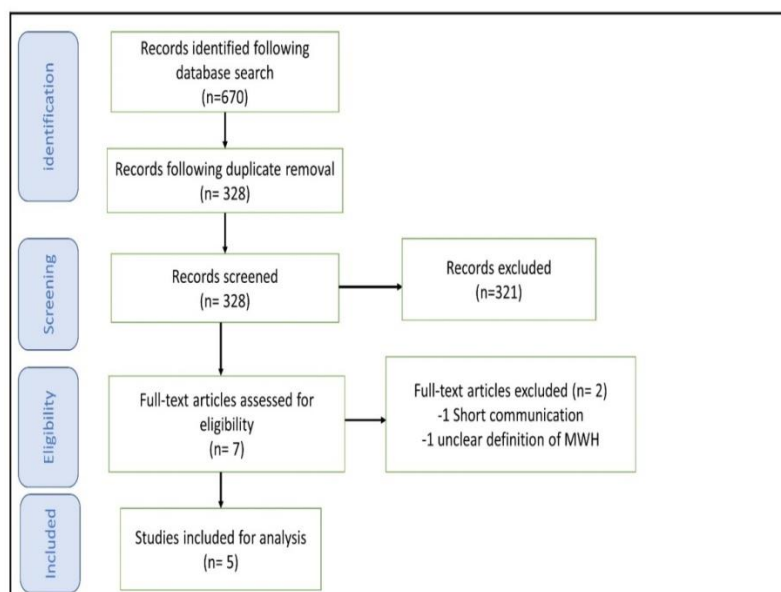


Figure 1. PRISMA flowchart showing study selection

3.2. Impact of upgraded/quality MWHs on FBD

Improvement in the standard of MWHs may potentially improve FBD attendance by pregnant women. Two studies reported on the impact of upgraded/quality MWHs on SBA. In Zambia, 17,200 total deliveries captured within two years in 40 health facilities, revealed a higher proportion of deliveries took place in facilities where there was an MWH or Maternity waiting space, compared to facilities without an MWH or maternity waiting space (60.7% versus 55.9%, $p < 0.001$). There was a 95% increase in the odds of facility delivery in study catchment areas that had MWHs rated as medium or high quality than those rated to be of poor quality [41].

A cluster randomized controlled trial (RCT) in Ethiopia [40] evaluated the effectiveness of upgraded MWHs together with community engagement in the form of training of local religious and community leaders to help create a suitable environment where women and their families can access MWHs and obstetric care. The authors found higher odds of institutional births in the two intervention groups compared with usual care but this was not statistically significant.

The review aimed to evaluate the effectiveness of the MWH strategy in increasing FBD attendance by pregnant women. It is a real-time formative evaluation of output. Effective program evaluation is a systematic method of improving and accounting for public health actions by involving procedures that are useful, feasible, ethical, and accurate [42].

This review found evidence that MWHs could potentially improve access to institutional delivery uptake except for one before-after study from Timor-Leste which did not find any significant difference in uptake of FBD following the establishment of an MWH in two districts [31]. The failure of the MWH strategy in this study to increase FBD uptake could be a result of the low utilization of the MWHs themselves due to the small capacity and low quality. Only two structures consisting of just eight and five beds each were available in a population with annual expected births of about 5,070. There was also the absence of space or kitchen for family use; therefore, limiting the time that family members could spend with women occupying the facilities. Another possible contributing factor could be the lack of community mobilization and engagement before and during the establishment of the facilities which as reported by other studies, is vital to the success of these facilities [43], [44]. There was also an absence of a control group in this study further limiting the evidence. To know the true impact that these structures have on FBD uptake, it would be important to undertake a community mobilization and participatory approach to understand the existing barriers within the communities which might affect the success of the program to be implemented and obtain community perspectives on how best to overcome these barriers. As reported by Fontanet *et al.* [45], perception of ownership by community members was associated with their use of the MWH and feeling a sense of responsibility towards its success. This approach has been used in other studies [39], [46] and is an important step that would go a long way towards ensuring the success and sustainability of any public health program which requires community uptake to be successful.

The quality of MWHs also determines whether women would choose to use them or not. This review found a significant positive impact of MWH as quality improves. However, this finding was provided by one low-quality evidence study alone [41]. A second cluster RCT found an improvement in FBD with an upgraded MWH combined with community engagement however this finding did not reach statistical significance [40]. As reported by several studies, some of the factors which deter women from utilizing MWHs include poor infrastructure [47], [48], lack of food supplies [43], [48], [49], unavailability of kitchens or cooking utensils [50], [51] Lack of privacy [48], unavailability of space for a family member to stay [44] and so on. To increase FBD uptake through the use of these structures, it is imperative to make them comfortable and inviting for women to be willing to stay in.

3.3. Strengths and limitations

This study attempted to collate the evidence on the impact that recommended temporary lodging facilities for pregnant women have on institutional delivery uptake. To our knowledge, this is the first systematic review evaluating the effectiveness of MWHs on FBD attendance. Article screening was performed by independent authors and agreement made among authors on exclusion and inclusion. Notable limitations from the study were the limited number of evaluation studies into MWHs with just one RCT and as such, observational studies were also included in the review. Only one study had a strong quality of evidence.

4. CONCLUSION

MWHs, more so good quality MWHs, appear to be promising in increasing FBD uptake especially for pregnant women living in remote areas. However, the evidence is still very much lacking due to the limited number of available high-quality intervention studies. More RCTs are needed to clearly demonstrate the potential of MWHs as a strategy to decrease barriers in access to skilled delivery care and resources need to be allocated to improving the quality of these structures to increase their effectiveness.

REFERENCES

- [1] Unicef, "Maternal mortality rates and statistics - UNICEF DATA," 2019. [Online]. Available: <https://data.unicef.org/topic/maternal-health/maternal-mortality/>
- [2] World Health Organization, "Maternal mortality," 2019. [Online]. [Available: <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>]
- [3] A. S. Nyamtema, D. P. Urassa, and J. van Roosmalen, "Maternal health interventions in resource limited countries: A systematic review of packages, impacts and factors for change," *BMC Pregnancy Childbirth*, vol. 11, no. 1, p. 30, 2011, doi: 10.1186/1471-2393-11-30.
- [4] D. Chou, B. Daelmans, R. R. Jolivet, M. Kinney, and L. Say, "Ending preventable maternal and newborn mortality and stillbirths," *BMJ*, vol. 351, pp. 19-22, 2015, doi: 10.1136/bmj.h4255.
- [5] World Health Organization, *Research on reproductive health at WHO: biennial report 2000-2001*. Geneva: World Health Organization, 2002.
- [6] J. R. Lori, A. C. Wadsworth, M. L. Munro, and S. Rominski, "Promoting Access: The Use of Maternity Waiting Homes to Achieve Safe Motherhood," *Midwifery*, vol. 29, no. 10, pp. 1095-1102, 2013, doi: 10.1016/j.midw.2013.07.020.Promoting.
- [7] O. M. R. Campbell and W. J. Graham, "Strategies for reducing maternal mortality: getting on with what works," *Lancet*, vol. 368, no. 9543, pp. 1284-1299, 2006, doi: 10.1016/S0140-6736(06)69381-1.
- [8] Tunçalp *et al.*, "WHO recommendations on antenatal care for a positive pregnancy experience—going beyond survival," *BJOG An Int. J. Obstet. Gynaecol.*, vol. 124, no. 6, pp. 860-862, 2017, doi: 10.1111/1471-0528.14599.
- [9] K. Oyerinde, "Can Antenatal Care Result in Significant Maternal Mortality Reduction in Developing Countries?," *J. Community Med. Health Educ.*, vol. 03, no. 01, 2013, doi: 10.4172/2161-0711.1000e116.
- [10] N. Roos and S. R. von Xylander, "Why do maternal and newborn deaths continue to occur?," *Best Practice and Research: Clinical Obstetrics and Gynaecology*, vol. 36. Bailliere Tindall Ltd, pp. 30-44, Oct. 01, 2016, doi: 10.1016/j.bpobgyn.2016.06.002.
- [11] S. Scott and C. Ronsmans, "The relationship between birth with a health professional and maternal mortality in observational studies: a review of the literature," *Trop. Med. Int. Heal.*, vol. 14, no. 12, pp. 1523-1533, Dec. 2009, doi: 10.1111/j.1365-3156.2009.02402.x.
- [12] T. A. Baequni, "Skilled Versus Unskilled Assistance in Home Delivery: Maternal Complications, Stillbirth and Neonatal Death in Indonesia," *J. Nurs. Care*, vol. 03, no. 05, 2014, doi: 10.4172/2167-1168.1000198.
- [13] World Health Organization, *Making pregnancy safer: the critical role of skilled attendant. Joint Statement by WHO, ICM and FIGO*. Geneva: World Health Organization, 2004.
- [14] M. G. Negero, Y. B. Mitike, A. G. Worku, and T. L. Abota, "Skilled delivery service utilization and its association with the establishment of Women's Health Development Army in Yeky district, South West Ethiopia: A multilevel analysis," *BMC Res. Notes*, vol. 11, no. 1, pp. 1-9, 2018, doi: 10.1186/s13104-018-3140-0.
- [15] S. Gabrysch, S. Cousens, J. Cox, and O. M. R. Campbell, "The Influence of Distance and Level of Care on

- Delivery Place in Rural Zambia: A Study of Linked National Data in a Geographic Information System," *PloS Med.*, vol. 8, no. 1, 2011, doi: 10.1371/journal.pmed.1000394.
- [16] J. Niyitegeka *et al.*, "Longer travel time to district hospital worsens neonatal outcomes: a retrospective cross-sectional study of the effect of delays in receiving emergency cesarean section in Rwanda," *BMC Pregnancy Childbirth*, vol. 17, no. 1, pp. 1-10, 2017, doi: 10.1186/s12884-017-1426-1.
- [17] R. Newell, I. Spillman, and M. L. Newell, "The use of facilities for labor and delivery: The views of women in rural Uganda," *J. Public Health Africa*, vol. 8, no. 1, pp. 89-97, 2017, doi: 10.4081/jphia.2017.592.
- [18] M. A. Bohren, E. C. Hunter, H. M. Munthe-Kaas, J. P. Souza, J. P. Vogel, and A. M. Gülmezoglu, "Facilitators and barriers to facility-based delivery in low- and middle-income countries: A qualitative evidence synthesis," *Reprod. Health*, vol. 11, no. 1, pp. 1-17, 2014, doi: 10.1186/1742-4755-11-71.
- [19] A. Jammeh, J. Sundby, and S. Vangen, "Barriers to Emergency Obstetric Care Services in Perinatal Deaths in Rural Gambia: A Qualitative In-Depth Interview Study," *Int. Sch. Res. Netw.*, vol. 2011, pp. 1-10, 2011, doi: 10.5402/2011/981096.
- [20] A. Higgins-Steele *et al.*, "Barriers associated with care-seeking for institutional delivery among rural women in three provinces in Afghanistan," *BMC Pregnancy Childbirth*, vol. 18, no. 1, pp. 1-9, 2018, doi: 10.1186/s12884-018-1890-2.
- [21] R. P. P. Soma-Pillay, "Barriers to obstetric care among maternal near-misses," *South African Med. J.*, vol. 106, no. 11, pp. 1110-1113, 2016, doi: 10.7196/SAMJ.2016.v106i11.10726.
- [22] A. Austin *et al.*, "Barriers to providing quality emergency obstetric care in Addis Ababa, Ethiopia: Healthcare providers' perspectives on training, referrals and supervision, a mixed methods study," *BMC Pregnancy Childbirth*, vol. 15, no. 1, pp. 1-10, 2015, doi: 10.1186/s12884-015-0493-4.
- [23] M. Raymondville *et al.*, "Barriers and facilitators influencing facility-based childbirth in rural Haiti: A mixed method study with a convergent design," *BMJ Glob. Heal.*, vol. 5, no. 8, pp. 1-10, 2020, doi: 10.1136/bmjgh-2020-002526.
- [24] M. Boah *et al.*, "I couldn't buy the items so I didn't go to deliver at the health facility' Home delivery among rural women in northern Ghana: A mixed-method analysis," *PLoS One*, vol. 15, no. 3, pp. 1-17, 2020, doi: 10.1371/journal.pone.0230341.
- [25] K. L. M. Wong, L. Benova, and O. M. R. Campbell, "A look back on how far to walk: Systematic review and meta-analysis of physical access to skilled care for childbirth in Sub-Saharan Africa," *PLoS One*, vol. 12, no. 9, pp. 1-20, 2017.
- [26] World Health Organization, *WHO recommendations on health promotion interventions for maternal and newborn health*. Geneva: World Health Organization, 2015.
- [27] World Health Organization, *Maternity waiting homes: A review of experiences*. Geneva: World Health Organization, 1996.
- [28] B. B. Bekele, T. L. Dadi, and T. Tesfaye, "The significant association between maternity waiting homes utilization and perinatal mortality in Africa: systematic review and meta-analysis," *BMC Heal. Serv. Res.*, vol. 18, no. 1, pp. 1-10, 2019, doi: 10.1186/s13104-019-4056-z.
- [29] T. L. Dadi, B. Begashaw Bekele, H. K. Kasaye, and T. Nigussie, "Role of maternity waiting homes in the reduction of maternal death and stillbirth in developing countries and its contribution for maternal death reduction in Ethiopia: a systematic review and meta-analysis," *BMC Health Serv. Res.*, vol. 18, no. 1, pp. 1-10, 2018, doi: 10.1186/s12913-018-3559-y.
- [30] J. E. Perosky, M. L. Munro-Kramer, N. Lockhart, G. K. Musonda, A. Naggayi, and J. R. Lori, "Maternity waiting homes as an intervention to increase facility delivery in rural Zambia," *Int. J. Gynecol. Obstet.*, vol. 146, no. 2, pp. 266-267, 2019, doi: 10.1002/ijgo.12864.
- [31] K. Wild, L. Barclay, P. Kelly, and N. Martins, "The tyranny of distance: Maternity waiting homes and access to birthing facilities in rural Timor-Leste," *Bull. World Health Organ.*, vol. 90, no. 2, pp. 97-103, 2012, doi: 10.2471/BLT.11.088955.
- [32] A. Liberati *et al.*, "The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration," *J. Clin. Epidemiol.*, vol. 62, no. 10, pp. e1-e34, 2009, doi: 10.1371/journal.pmed.1000100.
- [33] "Effective Public Health Practice Project. Quality assessment tool for quantitative studies," 2009. [Online]. Available: https://merst.ca/wp-content/uploads/2018/02/quality-assessment-tool_2010.pdf
- [34] K. A. Bisset and P. Paterson, "Strategies for increasing uptake of vaccination in pregnancy in high-income countries: A systematic review," *Vaccine*, vol. 36, no. 20, pp. 2751-2759, 2018, doi: 10.1016/j.vaccine.2018.04.013.
- [35] R. Sutan *et al.*, "A Systematic Review on Health Interventions Used in Enhancing Vaccination Uptake Clinics in Mother and Child Health," *Clin. Mother Child Heal.*, vol. 14, no. 264, 2017, doi: 10.4172/2090-7214.1000264.
- [36] E. Hurlley, T. Dietrich, and S. Rundle-Thiele, "A systematic review of parent based programs to prevent or reduce alcohol consumption in adolescents," *BMC Public Health*, vol. 19, no. 1, pp. 1-14, Nov. 04, 2019, doi: 10.1186/s12889-019-7733-x.
- [37] "Effective Public Health Practice Project. Quality Assessment Tool for Quantitative Studies Dictionary," 2009. [Online]. Available: https://merst.ca/wp-content/uploads/2018/02/quality-assessment-dictionary_2017.pdf (accessed Jan. 25, 2021).
- [38] J. R. Lori *et al.*, "Increasing access to reproductive health services through maternity waiting homes for women living farthest from a health facility in rural Zambia: a quasi-experimental study," *Authorea Prepr.*, 2020.
- [39] J. R. Lori *et al.*, "Maternity waiting homes and traditional midwives in rural Liberia," *Int J Gynaecol Obs.*, vol.

- 123, no. 2, pp. 114-118, 2013, doi: 10.1016/j.ijgo.2013.05.024.
- [40] J. Kurji *et al.*, “Effectiveness of upgraded maternity waiting homes and local leader training on improving institutional births : a cluster- randomized controlled trial in Jimma , Ethiopia,” *BMC Public Health*, vol. 20, no. 1, pp. 1-15, 2020, doi: 10.1186/s12889-020-09692-4.
- [41] E. G. Henry *et al.*, “The influence of quality maternity waiting homes on utilization of facilities for delivery in rural Zambia,” *Reprod. Health*, vol. 14, no. 1, pp. 1-10, 2017, doi: 10.1186/s12978-017-0328-z.
- [42] CDC, “Framework for Program Evaluation,” 2017. [Online]. Available: <https://www.cdc.gov/eval/framework/index.htm>
- [43] D. W. Selbana, M. Derese, E. S. Endalew, and B. T. Gashaw, “A culturally sensitive and supportive maternity care service increases the uptake of maternity waiting homes in ethiopia,” *Int. J. Womens. Health*, vol. 12, pp. 813-821, 2020, doi: 10.2147/IJWH.S268245.
- [44] L. Penn-Kekana *et al.*, “Understanding the implementation of maternity waiting homes in low- and middle-income countries: a qualitative thematic synthesis,” *BMC Pregnancy Childbirth*, vol. 17, no. 1, pp. 1-2, 2017, doi: 10.1186/s12884-017-1444-z.
- [45] C. P. Fontanet *et al.*, “A Qualitative Exploration of Community Ownership of a Maternity Waiting Home Model in Rural Zambia,” *Glob. Heal. Sci. Pract.*, vol. 8, no. 3, pp. 344-357, Oct. 2020, doi: 10.9745/GHSP-D-20-00136.
- [46] M. M. Schmitz *et al.*, “Did saving mothers, giving life expand timely access to lifesaving care in Uganda? A spatial district-level analysis of travel time to emergency obstetric and newborn care,” *Glob. Heal. Sci. Pract.*, vol. 7, pp. S151-S167, 2019, doi: 10.9745/GHSP-D-18-00366.
- [47] N. A. Scott *et al.*, “Listening to the community: Using formative research to strengthen maternity waiting homes in Zambia,” *PLoS One*, vol. 13, no. 3, 2018, doi: 10.1371/journal.pone.0194535.
- [48] P. S. Chibuye, E. S. Bazant, M. Wallon, N. Rao, and T. Fruhauf, “Experiences with and expectations of maternity waiting homes in Luapula Province, Zambia: A mixed-methods, cross-sectional study with women, community groups and stakeholders,” *BMC Pregnancy Childbirth*, vol. 18, no. 1, pp. 1-10, 2018, doi: 10.1186/s12884-017-1649-1.
- [49] L. C. Suwedi-kapesa and A. L. Nyondo-mipando, “Assessment of the quality of care in Maternity Waiting Homes (MWHs) in Mulanje District , Malawi,” *Malawi Med. J.*, vol. 30, no. 2, pp. 103-110, 2018.
- [50] C. Sialubanje, K. Massar, M. S. G. Van Der Pijl, E. M. Kirch, D. H. Hamer, and R. A. C. Ruiters, “Improving access to skilled facility-based delivery services: Women’s beliefs on facilitators and barriers to the utilisation of maternity waiting homes in rural Zambia,” *Reprod. Health*, vol. 12, no. 1, pp. 1-13, 2015, doi: 10.1186/s12978-015-0051-6.
- [51] T. Vermeiden *et al.*, “Facilitators for maternity waiting home utilisation at Attat Hospital: a mixed-methods study based on 45 years of experience,” *Trop. Med. Int. Heal.*, vol. 23, no. 12, pp. 1332–1341, 2018, doi: 10.1111/tmi.13158.