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ORIGINAL ARTICLE

Maternity Waiting Home Use by HIV-positive Pregnant Women in Zambia: Opportunity for Improved Prevention of Maternal to Child Transmission of HIV

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ABSTRACT

Background: Maternity waiting homes (MWHs), defined as residential lodging near health facilities, are an intervention to improve access to maternal care recommended by the World Health Organization. Little is known about utilization of MWHs by HIV-positive women. This paper describes: 1) maternal awareness and utilization of MWHs in rural Zambia among HIV-positive women, and 2) health outcomes for HIV-positive women and their infants with regards to utilization of MWHs.

Methods: Data were collected from recently delivered women (delivered after 35 weeks in the previous 12 months) living >9.5 km from 40 health facilities in rural Zambia. For our analysis, primary outcomes were compared between self-identified HIV-positive and HIV-negative women in the sample. Primary outcomes include: 1) awareness of MWHs and 2) utilization of MWHs. We summarized simple descriptive statistics, stratified by maternal self-reported HIV status. We conducted bivariate analyses using chi-square tests, t-tests and Wilcoxon rank sum test.

Results: Among 2,381 women, 50 (2.4%) self-identified as HIV-positive. HIV-positive women were older and had more pregnancies and children than HIV-negative women ($p<0.001$). There was no difference in awareness of MWHs, but HIV-positive women were more likely to use a MWH than HIV-negative women. There was no difference in receipt of infant antiretroviral prophylaxis between women who did or did not stay at a MWH.

Conclusion and Global Health Implications: Though HIV prevalence in this sample was lower than expected, MWHs may represent a useful strategy to improve prevention of mother to child transmission of HIV in high prevalence, low-resource settings.

Key words: Maternity waiting homes • HIV • PMTCT • Zambia

1. Introduction

1.1. Background of the Study

There has been progress in reducing maternal mortality globally, with an estimated maternal mortality ratio (MMR) decreasing from 385 deaths per 100,000 live births in 1990 to 216 deaths per 100,000 live births in 2015.[1] The majority of deaths due to obstetric complications could be prevented with appropriate intrapartum care.[2] While estimates of deaths attributed to HIV-related causes vary, HIV-infected pregnant women have approximately two to 10 times the risk of dying during pregnancy and postpartum compared to uninfected women.[3–5]

The World Health Organization (WHO) recommends access to skilled care and facilities with emergency obstetric and neonatal care capacity for every birth.[6] Skilled attendance during facility-based delivery prevents deaths and is also beneficial for prevention of maternal to child transmission (PMTCT) of HIV. Option B+, which is the current WHO recommendation for preventing PMTCT, includes HIV testing in all pregnancies, initiation and adherence to lifelong antiretroviral therapy (ART) for all positive women, safe obstetric practices, and early infant diagnosis.[7] Facility utilization for maternal care throughout the antenatal, intrapartum, and postpartum period is particularly important for effective PMTCT in the era of Option B+, when mothers initiate ART at diagnosis and infants commence prophylactic ART at birth.[7] Home delivery has been associated with poor ART adherence for mothers and infants.[8–10]

Though facility delivery is associated with improved maternal and infant health outcomes, barriers to facility utilization persist. Costs and distance to facilities have been identified as barriers in rural settings, and maternal factors such as education, socioeconomic status, and parity have also been identified.[11–14] In high prevalence settings, stigma surrounding HIV disclosure may contribute to decreased utilization of facilities for antenatal care (ANC) and deliveries.[15-17] However, work in high prevalence settings has found the proportion of facility deliveries among HIV-positive women was similar to facility deliveries among non-positive women,[18,19] and routine program data suggest that facility delivery for PMTCT participants is at least two times higher than for the general population.[20]

1.2. Objectives of the Study

Zambia, a high HIV prevalence country, has an HIV prevalence rate among pregnant women estimated at 12%; while prevalence is estimated at 10% among rural reproductive aged women (15-45 years),[21] Zambia has an estimated MMR of 398 per 100,000 live births, and approximately half of rural women deliver at a health facility.[21] Maternity waiting homes (MWHs), defined as residential lodging near a health facility, are an intervention to improve access to maternal care recommended by WHO.[22] While evidence regarding the effectiveness of MWHs with respect to facility utilization and maternal outcomes is still unclear,[23,24] data from Zambia suggests women are more likely to deliver at a facility with a MWH.[25] An improved MWH model is currently being evaluated for impact on facility delivery rates among remote women in rural Zambia.[26] Our objective here is to utilize baseline data from this impact evaluation to describe awareness of and utilization of MWHs by self-identified HIV-positive rural women.

1.3. Specific Aims and Hypothesis

While MWHs are hypothesized to improve access to facility delivery and health outcomes[23], there is currently no literature regarding the association between maternal HIV status and MWH utilization. In addition to improving access to facility delivery, MWHs may provide opportunities to augment PMTCT practices in rural high HIV-prevalence areas, including facilitating uptake of and adherence to maternal ART and infant ART prophylaxis. Because stigma may reduce utilization of facilities by HIV-positive women, it is possible that stigma may decrease utilization of MWHs by HIV-positive women. Given that HIV-positive women may be more likely than the general population to deliver at facilities,[20] they may also be more likely to use MWHs. Here, we describe the awareness of and utilization of MWHs in rural Zambia among women self-reporting HIV status, as well as differences in health outcomes for HV-positive women and HIV-exposed infants with respect to utilization of MWHs.

2. Methods

2.1. Study Variables

2.1.1. Cohort description

This was a cross-sectional household survey (HHS) conducted in the catchment areas of 40 health facilities from March to May 2016 during baseline procedures for an impact evaluation of a MWH intervention in seven districts in rural Zambia.[26] At time of data collection, the MWH intervention being evaluated had not commenced, and all MWHs referenced were standard existing MWHs or designated spaces where expecting mothers could wait; they varied widely in standards and quality.[25,27–29] The survey was administered to households with a recently-delivered woman (delivered after 35 weeks' gestation in the previous 12 months, regardless of maternal or infant death) living >9.5 km or more from health facilities with existing MWHs. Multi-stage random sampling procedures were used. After geocoding all villages in the health facility catchment areas (HFCAs), villages with a travel distance of >10 km were included in the sample frame and randomly chosen for inclusion in the study, with likeliness of inclusion proportional to population size. Eligible households within each selected village were identified and approached in random order, and respondent-eligibility confirmed. A proxy respondent >18 years could respond if the recently-delivered woman was deceased. The survey captured demographics of the recently delivered woman, location of most recent delivery, MWH awareness and utilization, HIV status, and health outcomes. More detailed procedures for the HHS sampling and data collection, and the MWH intervention, have been published separately.[26]

2.1.2. Study variables

Primary outcomes for this analysis were: (1) awareness of MWHs, defined as having heard of MWHs before the day of the survey; (2) utilization of a MWH, defined as having stayed at a MWH for at least one night at any time during last pregnancy (either an antenatal visit, awaiting delivery, or postpartum visit); and (3) delivery at any health facility, including the catchment area health facility or any other health facility, including referral hospitals.

2.2. Statistical Analysis

Our analytic sample is limited only to those women who reported being tested for HIV during most recent pregnancy. The sample excludes: 1) those with missing data; 2) those who reported no HIV test during last pregnancy, preferred not to answer, or did not know if they were tested; and 3) those who preferred not to answer, reported they did not know, or had a missing response when asked about the HIV test result during last pregnancy. In supplementary analyses, we conducted sensitivity analyses assuming those who preferred not to answer regarding testing or HIV status were indeed HIV-positive.

Descriptive characteristics were summarized with simple descriptive statistics and stratified by self-reported HIV status. We conducted bivariate analyses using chi-square tests, t-tests and Wilcoxon rank sum test. Statistical analyses were performed using SAS v9.4 (SAS, Cary, NC).

2.3. Ethical Approval

The Boston University Institutional Review Board (IRB), University of Michigan IRB (for a de-identified dataset only), and the ERES Converge IRB, a local IRB in Zambia, provided ethical approval and oversight for this study. Approval was also obtained from the Zambia National Health Research Authority, responsible for oversight of all research conducted in Zambia. The Ministry of Health at National, Provincial, and District levels also granted permission. All respondents provided written informed consent before proceeding with the HHS. If a respondent was <18 years, she provided written assent first and her designated legal guardian >18 years provided written consent only if she had first agreed to participate. If a guardian >18 years could not be located, then the respondent was excluded. HIV-status was self-reported. No biological samples were taken.

3. Results

3.1. Sociodemographic Characterisitcs

There was a total of 2,381 survey respondents (Table 1). Seven (0.29%) were excluded from further analyses because they had missing data on whether they were tested for HIV during most recent pregnancy. Another 182 (7.6%) were excluded

Table I: Maternal demographics by HIV test status and HIV status

	No response to HIV testing question (n=7)	Did not have an HIV test at last pregnancy (n=164)	Did not know HIV status (n=23)	Preferred not disclose HIV test (n=15) or HIV status (n=14): (n=29)	HIV positive (n=50)	HIV negative (n=2108)
Age (years), mean (SD)	23.8 (4.55)	25.6 (7.52)	25.9 (1.70)	26.8 (7.55)	32.6 (6.47) ***	26.0 (6.85)
Marital status, n (%)						
Married	6 (100)	134 (81.7)^	19 (82.6%)	28 (96.5%)	42 (84.0%)**	1863 (88.5%)
Divorced/separated/ widowed	0 (0.0)	16 (9.8)^	3 (13.0%)	1 (3.6%)	7 (14.0%)**	100 (4.8%)
Single	0 (0.0)	14 (8.5)^	1 (4.4%)	0 (0.0%)	1 (2.0%)**	141 (6.7%)
Highest education completed, n (%)						
None	0 (0.0)	34 (20.7)**	7 (30.4%)^	6 (21.4%)	9 (18.0%)	306 (14.5%)
Primary	4 (66.7)	105 (65.6)**	14 (60.9%)^	17 (60.7%)	26 (52.0%)	1275 (60.6%)
More than primary	2 (33.3)	22 (13.4)**	2 (8.7%)^	5 (17.9%)	15 (30.0%)	522 (24.8%)
Primagravida (first pregnancy), n (%)	1 (16.7)	46 (28.0)^	6 (26.1%)	6 (20.7%)	2 (4.0%)**	447 (21.2%)
Gravida, median (IQR)	4.5 (2-5)	3 (1-5)	3 (1-6)	3 (2-5)	5 (4-6)***	3 (2-5)
Parity, median (IQR)	2.5 (2-5)	3 (1-5)	4 (1-6)	3 (2-5)	5 (4-7)***	3 (2-6)
Household size, median (IQR)	7 (4-7)	6 (5-8)	5 (3-8)	6.0 (4-11)	7 (5-9)^	6 (4-9)
Wealth index, n (%)		***				
1 (lowest)	3 (60.0)	56 (36.4)	5 (27.8)	7 (25.9)	10 (21.7)	468 (23.8)
2	0 (0.0)	50 (32.5)	4 (22.2)	7 (25.9)	11 (23.9)	488 (24.8)
3	1 (20.0)	32 (20.8)	4 (22.2)	7 (25.9)	12 (26.1)	499 (25.4)
4 (highest)	1 (20.0)	16 (10.4)	5 (72.8)	6 (22.2)	13 (28.3)	513 (26.1)
Number of ANC visits, n (%)						
Zero times	0 (0.0)	8 (4.9)***	1 (4.3%)***	1 (3.6%)***	0 (0.0%)	4 (0.2%)
One time	0 (0.0)	8 (4.9)***	0 (0.0%)***	0 (0.0%)***	3 (6.0%)	60 (2.9%)
Two times	0 (0.0)	20 (12.2)***	0 (0.0%)***	0 (0.0%)***	4 (8.0%)	193 (9.2%)
Three times	0 (0.0)	52 (31.7)***	7 (30.4%)***	16 (55.2%)***	9 (18.0%)	596 (28.3%)
Four+times	2 (100)	76 (46.3)***	15 (65.2%)***	12 (41.3%)***	34 (68.0%)	1253 (59.5%)
Delivered at a health facility, n (%)	2 (28.6)***	122 (74.4)^	22 (95.6%)	22 (75.9%)	43 (86.0%)	1720 (81.6%)

*Significance of difference against the HIV negative women: ^P value is significant at 0.05; **P value is significant at 0.01; ***P value is significant at <0.001*

because they reported they did not have an HIV test at last pregnancy (n=164), did not know their status (n=23), preferred not disclose if tested (n=15), or preferred not to disclose HIV status (n=14). The final sample thus included 2,158 women; there were no proxy respondents. Fifty (2.4%) women self-identified as HIV- positive, and lived in 25 HFCAs (of 40 HFCAs in the sample).

Maternal demographics

HIV-positive women were older (mean age: 32.6 vs. 26.0 years) than their negative peers (p-value <0.001) (Table 1). HIV-positive women had more prior pregnancies and children than HIV-negative women (median gravida 5, median parity 5 (G5P5) for positive women; median gravida 3, median parity 3 (G3P3) for negative women (p-value <0.001)).

There were no differences in marital status, maternal education levels, household size, or wealth index scores. Proportions of women attending the WHO-recommended four ANC visits were similar, and there was no difference between proportions of women delivering at any health facility with respect to HIV status. We compared baseline characteristics of women excluded from analyses given lack of information regarding HIV status to both self-reported negative women (Table 1) and self-reported positive women (Supplementary Table 1). HIV-positive women were older than women excluded for any reason. Those excluded for any reason were more likely to have fewer children compared to HIV-positive women (Supplementary Table 1).

3.2. Awareness and Utilization of MWH

Similar proportions of positive and negative women reported prior awareness of MWHs (Table II). The source of MWH knowledge was similar regardless of HIV status, with most women obtaining information about MWHs from healthcare workers, traditional birth attendants and safe motherhood action group members (SMAGs, maternal and child health-focused community health workers).[30,31] There was no difference in utilization of MWHs, or duration of stay at MWHs, by HIV status.

3.3. Other Study Variables

There were no differences in the mean ages between HIV-positive women who did or did not stay at a MWH (Table III). The majority of HIV-positive women who stayed at a MWH reported taking ART during pregnancy (94.4%), while fewer women who did not stay in a MWH reported taking ART during pregnancy (81.3%). All women who utilized a MWH delivered at a facility (100%); significantly fewer women who did not utilize a MWH delivered at a facility (78%) (p <0.05). There was no difference in provision of infant prophylaxis between women who stayed at a MWH and those who did not. Women who utilized the MWH were more likely to have their infant tested for HIV (76.5%) than those who did not (59.4%). The mean age of the infants at time of testing was 10.6 weeks (SD 6.3) for those infants whose mothers utilized the MWH, older than mean age for those infants whose mothers did not utilize the MWH (5.26 (SD 5.0) weeks) (p-value <0.05). In this small sample, two women who did not utilize the MWH reported an HIV-positive test result for

Table II: Maternity waiting home awareness and utilization stratified by self-reported maternal HIV status of women that live >9.5 km away from a health facility

Characteristic	HIV positive women (n=50)	HIV negative women (n=2108)
Knowledge of MWH prior to HHS	39 (78.0)	1709 (81.2)
Source of MWH knowledge, n (%)		
Traditional leadership	4 (8.0)	160 (7.6)
Healthcare worker	32 (82.1)	1280 (74.9)
TBA/SMAG	14 (28.0)	697 (33.1)
Family	10 (25.6)	347 (20.3)
Community members	14 (28.0)	500 (23.7)
Radio	4 (10.3)	100 (5.9)
Utilization of MWH among those who self-reported knowledge of MWH, n (%) (n=39, 1709)	18 (46.1)	671 (39.3)
Duration of MWH stay (days), mean (sd)	4.60 (10.5)	3.62 (9.1)
Reason for utilizing MWH, n (%)		
ANC	-	4 (0.6)
Delivery	15 (83.3)	531 (81.7)
PNC	1 (5.6)	14 (2.2)
More than 1 reason	2 (11.1)	101 (15.5)

***No values were statistically significant at P value <0.05; TBA=Traditional birth attendant; SMAG=Safe Motherhood Action Group member*

Table III: Characteristics of self-reported HIV-positive women and HIV-exposed infants stratified by utilization of a MWH

Characteristic	Mothers utilized MWH N=18	Mothers did not utilize MWH N=32
Women's age, mean (SD)	33.22 (5.88)	32.22 (6.85)
Infant age, mean (SD)		
Weeks	30.39 (16.03)	23.97 (15.16)
Months	7.06 (3.69)	5.53 (3.45)
ANC Visits, n (%)		
1	0 (0)	3 (9.4)
2	1 (5.6)	3 (9.4)
3	4 (22.2)	5 (15.6)
≥4	13 (72.2)	21 (65.6)
Maternal ART during pregnancy, n (%)	17 (94.4)	26 (81.3)
Delivered at a health facility, n (%)^	18 (100.0)	25 (78.1)
Infant completed 6 weeks of ART prophylaxis, n (%)		
Yes	12 (70.6)	22 (68.8)
Currently taking*	1 (5.9)	2 (6.3)
No	4 (23.5)	8 (25)
Infant tested for HIV, n (%)		
Yes	13 (76.5)	19 (59.4)
No	4 (23.5)	12 (37.5)
Don't know	0 (0)	1 (3.1)
Age at testing (weeks), mean (SD)^	10.6 (6.30)	5.26 (5.0)
Infant HIV Status, among those tested		
Infected	0 (0)	2 (10.5)
Not infected	9 (69.2)	8 (42.1)
Don't know	4 (30.8)	9 (47.4)

*^p-value is significant at 0.05; *Infant <6 weeks at time of HHS*

their infant; no infants were reported to be positive among women who stayed at a MWH.

4. Discussion

4.1. Discussion

To our knowledge, this is the first study describing awareness and utilization of MWHs among self-identified HIV-infected pregnant women in rural Zambia. Evidence regarding the impact of MWHs on health outcomes is still being generated, but the potential for MWHs to improve PMTCT practices in low-resource, rural settings with high HIV prevalence may also contribute to improved maternal (and infant) outcomes specifically related to HIV.

HIV-positive women were older and had more children compared to HIV-negative women, which has been observed in similar settings.[20] Indicating the relatively homogenous population of rural Zambia, there were no differences in household size, marital status, maternal education, or asset scores between positive and negative women, all factors that are known to impact facility-based ANC and facility deliveries.[11-16] While previous literature has suggested stigma may be a barrier to facility-based ANC, we found no difference in ANC attendance between positive and negative women.[17] There was also no difference in facility delivery with respect to HIV status; relatively high proportions of positive and negative women delivered at a facility in this rural setting, larger than has been previously been reported.[21]

There was no difference in awareness of MWHs among women with respect to HIV status. Most

women disclosed that information about MWHs came from a healthcare worker at a facility, consistent with the similar rates of ANC attendance between positive and negative women. However, there was a trend that positive women were more likely to utilize a MWH if they were aware of MWHs compared to negative women.

For all positive women in this sample, those that stayed at a MWH were slightly more likely to have taken ART at any point during pregnancy. We do not have qualitative data to further assess whether ART use continued while staying at a MWH, in the setting of close quarters with others to whom HIV status may not have been disclosed. All positive women who stayed at a MWH preceding delivery had a facility delivery (as expected), but only 78% of positive women who did not stay at MWH delivered at a health facility. There was no difference in receipt of ART prophylaxis for HIV-exposed infants with respect to MWH utilization. There is no information about time to initiation of infant ART prophylaxis, but it's possible that infants not delivered at a facility experienced delayed initiation. Infants born to women who stayed at a MWH were more likely to have received an HIV test than infants of positive women who did not stay at a MWH. Given the limitations of this study, it is possible that those women who stayed at a MWH were more likely to engage with all aspects of PMTCT, including delivery at a health facility and early infant diagnosis.

4.2. Limitations

There are several limitations to this study. This is a descriptive study of a small sample which demonstrates trends, and it is not possible to infer causality or associations. It is cross-sectional, limiting the ability to assess change over time, and is not powered to detect differences stratified by HIV status. We do not have sufficient qualitative data to better understand perceptions of HIV-positive women regarding MWH use or facility delivery. In general, these data were collected from women well after delivery (mean age of infants was 6 months), and answers regarding awareness and utilization of MWHs may also be subject to recall bias. Of note, we observed lower than expected HIV-prevalence in this sample. We posit several reasons for this. All results are based on self-report of HIV status in the context of a household survey subject to risk of social desirability bias. While all surveys were conducted in a private location to preserve confidentiality of respondents, risk of a social desirability bias remains as respondents could have reported what they believed is the most acceptable response or feared breach of confidentiality. This could result in misclassification bias, as HIV-positive women may have systematically reported negative status. If maternal self-report was incorrect (and likely systematically, with HIV-positive women reporting negative status), this would bias results to the null, and may result in an underestimation of trends reported here. Additionally, given the order of questions on the survey, which first asked women if they were tested for HIV in their last pregnancy before proceeding to assessment of HIV status, it is possible but unlikely that women who may have had previously known HIV-positive status but had not been tested during most recent pregnancy were excluded from this analysis. This analysis does not include any responses from proxy respondents, and all women were alive at the time of survey; therefore, we are not concerned about selection bias due to deaths.

It is possible that misclassification bias resulted in a lower HIV prevalence than expected in this random sample. The percentage of HIV-positive women in this sample was 2.4%, lower than the most recent national estimate of a 12% HIV prevalence in pregnant women, and lower than the recent national estimate of 10% in rural reproductive-aged women.[21] There were significant differences in age and primigravida between women who did not respond or disclose HIV status compared to self-reported HIV-positive women. However, if we assumed that respondents excluded because of unknown status or because they preferred not to disclose (n=223) were HIV-infected, then HIV prevalence in this sample is 11.5%, closer to national estimates, but higher than the expected 10% prevalence in rural areas (Supplementary Table 1).[21] Given that there are some differences between those women who self-report HIV-positive status and those who do not, this assumption may not be

entirely plausible. Because there is overall a lower prevalence of HIV in rural areas, and this sample was drawn from those living >10 km from already-rural health centers, this 2.4% prevalence rate may in fact best represent HIV prevalence in the most remote, rural areas of Zambia.

4.3. Recommendation for Further Studies

Despite the aforementioned limitations, this study contributes important data to the evidence regarding MWHs. Maternal HIV status may impact utilization of MWHs and may positively impact uptake of the full scope of PMTCT practices, including facility delivery and infant HIV testing. In areas with high HIV prevalence, MWH present a unique opportunity for resident women anticipating delivery to obtain late-term rapid HIV tests (whether previously tested earlier in pregnancy or not) and access immediate initiation of ART, helping decrease the risk of intrapartum transmission. It is well-documented that there is high uptake of HIV testing and PMTCT services under Option B+, but retention and loss-to-follow-up remain problematic in many settings.[32] MWHs may be an under-explored strategy to improve PMTCT practices. Further research is needed to investigate the experience of HIV stigma with respect to MWHs and better understand potential facilitators and barriers of MWH utilization for HIV-positive women.

5. Conclusion and Global Health Implications

HIV remains an important contributor to maternal mortality, particularly in rural and low-resource settings that have not seen the expected improvements in maternal mortality given worldwide trends. MWHs, especially in low-resource, rural, high HIV-prevalence settings such as Zambia, represent an opportunity to improve PMTCT care for HIV-positive women, in addition to any general potential impact on improved maternal mortality overall.

Compliance with Ethical Standards

Conflicts of Interest: *The authors declare that they have no conflicts of interest.* ***Financial Disclosure:*** *The authors declare that they have financial disclosures.* ***Funding/Support:*** *This program was developed and is being implemented in collaboration with Merck for Mothers, Merck's 10-year, $500 million initiative to help create a world where no woman dies giving life. Merck for Mothers is known as MSD for Mothers outside the United States and Canada (MRK 1846-06500.COL).The development of this article was additionally supported in part by the Bill & Melinda Gates Foundation (OPP1130329) https://www.gatesfoundation.org/How-We-Work/Quick-Links/Grants-Database/Grants/2015/07/OPP1130329 and The ELMA Foundation (ELMA-15-F0017) http://www.elmaphilanthropies.org/the-elma-foundation/. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. The content is solely the responsibility of the authors and does not necessarily reflect positions or policies of Merck, the Bill & Melinda Gates Foundation, or The ELMA Foundation.* ***Ethics Approval:*** *The Boston University Institutional Review Board (IRB), University of Michigan IRB (for a de-identified dataset only), and the ERES Converge IRB, a local IRB in Zambia, provided ethical approval and oversight for this study. Approval was also obtained from the Zambia National Health Research Authority, responsible for oversight of all research conducted in Zambia. The Ministry of Health at National, Provincial, and District levels also granted permission.*

Key Messages

- A maternity waiting home (MWH) is an intervention intended to improve access to maternal care.
- There may be additional health benefits for HIV-positive women accessing maternity waiting homes.
- These data suggest that if HIV-positive women are aware of maternity waiting homes, they may be more likely than non-HIV positive Women to use them.

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