



Facilitators and barriers to retention in care under universal antiretroviral therapy (Option B+) for the Prevention of Mother to Child Transmission of HIV (PMTCT): A narrative review

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ABSTRACT

Background: Mother to child transmission remains the primary source of HIV in children. In 2013, The World Health Organisation (WHO), recommended Option B+ as prevention of mother to child transmission (PMTCT) strategy in Low and Middle-income Countries. With this strategy, all HIV positive pregnant and lactating women are initiated on lifelong antiretroviral therapy (ART) regardless of their clinical and immunological status. Despite, Option B+ contributing significantly to the reduction of new HIV infection in children, non-retention in care remains the primary bottleneck. The aim of the review was, therefore, to synthesise the evidence around facilitators and barriers to Option B+ retention by HIV positive mothers.

Methods: This review consisted of an online literature search in electronic databases including CINAHL, Medline, EMBASE, PsycINFO, BNI, Web of Science, Latin America and Caribbean Health Sciences Literature (LILAC) and PubMed. The Identified papers were critically appraised using the Mixed Method Appraisal Tool (MMAT). A narrative synthesis method was used to synthesize review results.

Results: The review included 37 papers, mostly published in sub-Saharan Africa. The review established that risk factors for non-retention in PMTCT include young age (15–24 years), initiating mothers on antiretroviral therapy on the same day as diagnosis, lack of disclosure, anticipated stigma, hospital factors, and concerns about side effects.

Conclusion and Recommendations: The review suggests that younger women are more susceptible to non-retention in PMTCT. Efforts should be made to develop interventions to retain young mothers in PMTCT to reach zero new infection in children and to protect the health of mothers.

1. Background

Mother to child transmission (MTCT) is the most significant sources of Human Immune Deficiency Virus (HIV) in children. The risk of HIV transmission from the mother to the child, during pregnancy, birthing and breastfeeding, ranges from 15 to 45% (World Health Organisation [WHO] 2018), but with prevention of mother to child transmission (PMTCT) services the risk of transmission can be reduced to 5% (WHO, 2017). In 2011, Malawi became the first country to use Option B+ in 2011 which later became the WHO recommendation for the prevention of mother to child transmission of HIV (PMTCT) in Low and Middle-income countries (WHO, 2013). With Option B+, all HIV positive

pregnant and lactating women are initiated on lifelong antiretroviral therapy (ART) regardless of their clinical and immunological status (WHO, 2013). Furthermore, all babies born or lactating from such mothers are said to be HIV exposed and are enrolled in an early infant diagnosis (EID) programme where they are followed up until they are two years old.

Some of the reasons for adopting these recommendations were to increase access to ART, reduce MTCT, prolong the life and sustain the health of the mother, and reduce HIV transmission to the spouse or sexual partner. Evidence suggests that the use of ART by pregnant and lactating mothers prevents MTCT and improves maternal health (Shapiro et al., 2010; Granich et al., 2010). This is true because ARTs

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suppress HIV viral replication thereby drastically lowering the HIV viral load in infected persons stopping the progression of HIV disease; consequently, HIV becomes untransmissible (Granich et al., 2010). Following the adoption of Option B+, there was substantial progress in pregnant mothers receiving ART. The UNAIDS (2017a), reported that 80% of pregnant mothers living with HIV were on ART in 2017, compared with 51% who had access in 2010.

Furthermore, results from the implementation of Option B+ accounted for a significant reduction of MTCT (Haas et al., 2017; Miller, Muyindike, Matthews, Kanyesigye, & Siedner, 2017; Ng'ambi et al., 2016; Ngemu et al., 2014; Phiri et al., 2017). For instance, a retrospective cohort study utilising routinely collected HIV exposed infant data from 2012 to 2014 at a large HIV centre in Lilongwe, Malawi found an MTCT rate of 6.2% for infants at 24 months (Ng'ambi et al., 2016). Similarly, another retrospective study found that only 5.3% of infants from 21 large health facilities in two regions of Malawi were HIV infected at the age of 30 months (Haas et al., 2017). Additionally, UNAIDS (2017a) reported that due to the implementation of sound PMTCT services, around 1.4 million HIV infections among children were prevented between 2010 and 2018. Such progress provides evidence that ART interrupts HIV transmission. For this reason, the need for providing universal lifelong ART to all HIV pregnant and breastfeeding mothers is undisputed. However, although the above studies show a significant decrease in the MTCT risks, these studies did not capture the risks of MTCT at different time points within the PMTCT programme. A more recent Malawi national-level analysis study found that overall, the risk of MTCT was as low as 4.7% with higher rates of 11.4% if mothers miss maternal ART, infant prophylaxis ARTs and infant testing (van Lettow et al., 2018). It can be argued, therefore, that the MTCT rate can only decrease if the mothers comply with all the steps in the PMTCT cascade. Nevertheless, lost to follow up (LTFU) has been the greatest challenge in the implementation of the Option B+ programme (Haas et al., 2016; Keehn & Karfakis, 2014; Nachega et al., 2016; Tenthanji et al., 2015), leaving many infants undiagnosed, significantly putting their lives at risk of dying. According to the UNAIDS (2014) gap report, only 42% of exposed infants get tested for HIV in the first two months of life. Moreover, despite getting tested, some do not receive their results, as such, they are not promptly treated (Bobrow et al., 2016).

Several studies have been conducted on LTFU from PMTCT (Bwirire et al., 2008; Kinuthia et al., 2011; Muchedzi et al., 2010; Nachega et al., 2012), but reasons for non-retention in the era of universal ART for PMTCT have not been comprehensively synthesised. For instance, a systematic review that assessed the reasons for low rates of access, initiation, and adherence to ARV drugs by mothers and HIV exposed infants in sub-Saharan Africa, identified and grouped facilitators and barriers to PMTCT as individual, partner, community and health care factors (Gourlay et al., 2015). However, this review included studies that were published between the year 2000 to 2012, (Gourlay et al., 2015) a period before the universal test and treat ART recommendation. Similarly, another systematic review examined health system barriers to and enablers of initiation, retention, and adherence of pregnant and postpartum women from 42 studies globally (Colvin et al., 2014). However, although this review was conducted in the era of Option B+, most of the studies that were included considered barriers and enablers under option A and B (Options where women were only started on lifelong ART if their CD4 count was below 350cells/mm³) and included only two papers on option B+ (Colvin et al., 2014). Recently, a mixed method review synthesised data on retention in care and identified factors associated with retention in care in the era of Option B+ (Knettel et al., 2017). The review included 22 papers on retention rates and 25 papers for factors associated with retention. The review identified younger age, initiating ART during pregnancy versus breastfeeding and initiating late in pregnancy as risk factors associated with retention (Knettel et al., 2017). They further reported that retention was compromised by stigma, fear of disclosure and lack of social support (Knettel et al., 2017). However, despite providing explicit data on Option B+ retention rates,

the facilitators and barriers to option B+ uptake were not explicitly synthesised. While existing studies and reviews have considered LTFU under universal life-long ART for the PMTCT, the evidence has not been comprehensively synthesised. Therefore, a narrative synthesis of evidence surrounding retention in care under the universal life-long ART for the PMTCT was conducted to build on the above literature.

2. Methods

2.1. Review design

This was a narrative review of the literature. Narrative reviews draw evidence from multiple sources to provide a scholarly overview of a topic (Cook et al., 1995; Norman and Griffiths, 2013). Despite criticisms that narrative reviews cannot provide a scientific basis for decisions, they contribute enormously to the body of knowledge in healthcare (Cronin et al., 2008; Norman and Griffiths, 2013). Additionally, as stated by Cronin et al. (2008) narrative reviews can identify research gaps, hence are useful in identifying research questions or hypothesis. Mays, Pope, & Popay (2005) suggested that narrative reviews are flexible and can allow the inclusion of both quantitative and qualitative sources. Moreover, the narrative review can still follow a rigorous and systematic processes (Norman and Griffiths, 2013).

2.2. Review question

When formulating the question for the review, the acronym PICO (Population, Intervention, Comparison/context and Outcomes) was adopted (Methley et al., 2014) to guide search terms. Thus, the question was formulated as follows: What are the facilitators and barriers to retention and ART adherence among HIV positive mothers and HIV exposed infants under the Option B+ programme? Using PICO, therefore, the key terms within the questions included: Population- HIV positive mothers, PMTCT mothers, HIV lactating/breastfeeding mothers, and exposed infants/children; Intervention- Option B+, Prevention of mother to child transmission, Life-long ART, universal ARTs, early infant diagnosis; Context- settings that adopted Option B+; Outcomes – Loss to follow-up, Retention in care, ART adherence, facilitators and barriers. This review was registered in the international database of prospectively registered systematic reviews (PROSPERO), registration number: CRD42018116457.

2.3. Search strategy

The search aimed to generate a comprehensive list of relevant primary studies (Bettany-Saltikov, 2010). Several scoping searches were undertaken to establish whether such a review had ever been conducted. The first search was conducted in the Cochrane Database for Systematic Reviews (CDSR), the JBI Library of Systematic Reviews (JBILSR) and internet search engines such as Google and Google Scholar. This search provided insight into what elements have been reviewed and helped to refine the review question. A comprehensive search was then conducted in electronic databases including the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, EMBASE, PsycINFO, British Nursing Index (BNI), Web of Science, Latin America and Caribbean Health Sciences Literature (LILAC) and PubMed. To aid the search, the terms were expanded by synonyms, which helped to develop search strings by combining the Boolean operators OR and AND. All references were imported into reference manager EndNote that helped to manage and sort the papers. Further searches were conducted in the Malawi Medical Journal, International Journal of STD & AIDS, AIDS and Behaviour, AIDS Care, International AIDS Society, and AIDS patient care. Additionally, theses.com and open grey websites were searched for grey literature. Electronic searches of different databases were first conducted in February 2018 and updated in March 2020.

2.4. Study selection

Studies were included if they: explored barriers and facilitators to retention in care, uptake or loss to follow up of HIV exposed infants in Option B+ programme, early infant diagnosis and or maternal adherence to ART, examined risk factors associated with retention in care in Option B+ programmes. The review also included both qualitative and quantitative papers published in English in the era of Option B+; thus, papers published from 2012 to March 2020 at a time when the electronic search was last updated. Studies were included if they were conducted in countries implementing Option B+. Papers were excluded if they explored facilitators or barriers to retention, uptake adherence and initiation in any other population apart from pregnant and lactating women and infants. Papers were also excluded if they were published following the adoption of Option B+ but were reporting on Option A or B.

2.5. Critical appraisal

To identify an appropriate appraisal tool, several were considered for their suitability, taking into account the need for a tool suitable for appraising qualitative and quantitative papers. One such tool is the mixed method appraisal tool (MMAT) (Crowe & Sheppard, 2011; Pace et al., 2011; Pluye, 2013; Pluye, Gagnon, Griffiths, & Johnson-Lafleur, 2009). Therefore, MMAT-Version 2011 was used to appraise the papers deemed eligible for the review. The authors of some papers were contacted for more information during the appraisal. To rate the quality of the papers, there were four categories: high, moderate, low and very low. A score of 100% indicated that the paper was of high quality, 75% being of moderate quality, 50% low quality and 25% indicating very low quality. Notwithstanding, no study was excluded based on quality. (See additional file 1 for critical appraisal of the included papers)

2.6. Data extraction

Data extraction was done concurrently with critical appraisal. As suggested by Popay (Popay et al., 2006), decisions about the type of data to extract were guided by the review question; thus, data extraction was done using a standardised template. Data were extracted into tables and for each paper the key data that was extracted included, the author, the year of publication, the country where the study was done, the purpose of the study, the study design, the methods used for data collection, and key findings (see additional information 1 for overview of included studies and scores for quality assessment). To ensure completeness and consistency in the recording of the information, two reviewers critically appraised the papers, and they read each study twice before extracting data. The extracted data were then cross-checked by all authors for completeness.

2.7. Data synthesis

This review utilised narrative synthesis framework, which is a systematic approach that integrates findings from multiple studies and uses words and texts to explain relationships within and between studies (CRD, 2009; Popay et al., 2006). This framework provides guidance on systematically combining findings to enhance the transparency and trustworthiness of the review (CRD, 2009), and it is different from traditional narrative reviews that are criticised for their subjectivity as they are prone to bias (Egger et al. 2013). To successfully synthesize the findings, key steps and tools in the narrative synthesis framework were used. The first step in this review was the development of a preliminary synthesis of the findings from the included studies. To do this, grouping studies to explore relationships within and between studies was achieved using textual description, tabulation, vote counting, and thematic analysis. This resulted in the generation of themes and overarching themes. However, it should be noted that the process was iterative, and

as such, identified themes were further refined as the process went on. The next step was to explore the relationships in the data using qualitative case descriptions. The final phase of the synthesis involved assessing evidence quality and the extent to which the findings can be generalised. To do this, it was decided at the beginning that Best Evidence Synthesis (BES) would be used. Therefore, a deliberate effort was made to ensure methodological quality by (i) including only studies that met the minimum standard of methodological adequacy, and (ii) conducting data extraction in a standard fashion and (iii) systematically appraising all the papers.

3. Results

The search yielded 3734 sources. After removing duplicates, titles and abstracts of 1944 sources were assessed and the remaining 94 papers were screened using the predetermined inclusion and exclusion criteria by one reviewer (TEMM). Fifty-seven papers were excluded due to publication lag (considered barriers to ART uptake and adherence for Option A or Option B but published from 2011), while 37 papers were included. Two reviewers (TEMM, RMDs) appraised thirty-seven papers that met the inclusion criteria for methodological quality using the MMAT. No papers were excluded based on quality. Fig. 1 presents the PRISMA flow diagram of the processes followed. We included studies that were conducted in the sub-Saharan region, predominately African studies. Sixteen studies in the current review were conducted in Malawi. This was the case because option B+ was first adopted in Malawi in July 2011 before the WHO recommendation in 2013. The other studies were conducted in Zimbabwe (4), Uganda (3), Ethiopia (3), South Africa (2), Kenya (2), Mozambique (2), Cameroon (1), Rwanda (1), Haiti (1) and two studies were done in multiple countries. One of the two multinational qualitative studies was done in Malawi, Tanzania and Uganda while the other was done in Malawi and Uganda.

This review included both quantitative (n = 22) (Atanga et al., 2017; Chan et al., 2016; Cromwell et al., 2015; Decker et al., 2017; Dzangare et al., 2016; Ebuy, Yebyo, & Alemayehu, 2015; Erlwanger et al., 2017; Ford et al., 2017; Girma et al., 2017; Goggin et al., 2016; Hoffman et al., 2017; Landes et al., 2016; Llenas-Garcia et al., 2016; Mitiku, Arefayne, Mesfin, & Gizaw, 2016; Musomba et al., 2017; Mwapasa, Joseph, Tchereni, Jousset, & Gunda, 2017; Napua et al., 2016; Ng'ambi et al., 2016; Price et al., 2014; Puttkammer et al., 2017; Tenthani et al., 2014; Tweya et al., 2014) and qualitative studies (n = 15) (Adeniyi, Thomson, Ter Goon, & Ajayi, 2015; Bobrow et al., 2016; Buregyeya et al., 2017; Cataldo et al., 2017; Chadambuka et al., 2017; Clouse et al., 2014; Elwell, 2016; Flax et al., 2017a; Flax et al., 2017b; Gill et al., 2017; Gugsu et al., 2017; Helova et al., 2017; Katirayi et al., 2016; Kim et al., 2016; McLean et al., 2017). Most of the quantitative studies were either retrospective (Chan et al., 2016; Dzangare et al., 2016; Ford et al., 2017; Landes et al., 2016; Llenas-Garcia et al., 2016; Mitiku et al., 2016; Ng'ambi et al., 2016; Price et al., 2014; Puttkammer et al., 2017; Tenthani et al., 2014; Tweya et al., 2014), or prospective (Atanga et al., 2017; Cromwell et al., 2015; Decker et al., 2017; Girma et al., 2017), and they used routinely collected data in health care facilities to ascertain the predictors or risk factors to non-retention. Three of the quantitative studies were RCTs (Erlwanger et al., 2017; Mwapasa et al., 2017; Napua et al., 2016), one case-control (Hoffman et al., 2017), and one study utilised a survey (Ford et al., 2017) design. It is important to note that most of these quantitative studies were limited because of missing data (Chan et al., 2016; Dzangare et al., 2016; Erlwanger et al., 2017; Ford et al., 2017; Landes et al., 2016; Mitiku et al., 2016; Ng'ambi et al., 2016; Puttkammer et al., 2017; Tenthani et al., 2014; Tweya et al., 2014) and others were limited by the use of self-report of questionnaire (Atanga et al., 2017; Cromwell et al., 2015; Girma et al., 2017; Goggin et al., 2016; Hoffman et al., 2017; Tweya et al., 2014). Additionally, some studies were not explicit on the measurement tools they used (Goggin et al., 2016; Price et al., 2014; Tweya et al., 2014), had small sample size (Atanga et al., 2017; Cromwell et al., 2015; Decker et al., 2017;

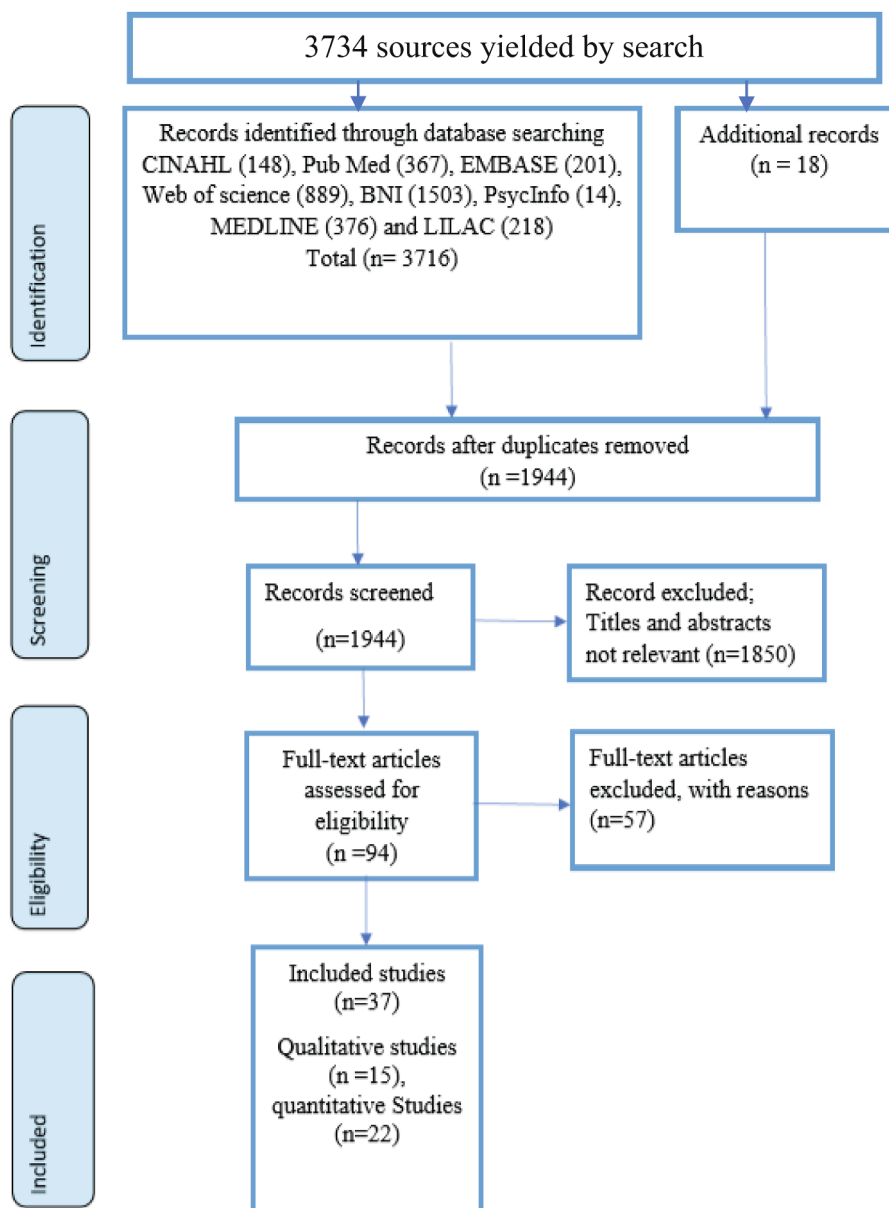


Fig. 1. PRISMA Flow diagram of the search strategy.

Dzangare et al., 2016) and one study had performance bias (Mwapasa et al., 2017). Generally, most studies were small and rated moderate quality. All the qualitative studies included in this review were descriptive, but none acknowledged the researchers' influence on data analysis. Study participants included HIV-infected pregnant mothers on PMTCT and postpartum women, Health care providers working in the antenatal care (ANC), ART clinic and those working with PMTCT mothers. A few studies included HIV-Infected mothers who were lost to follow-up (Elwell, 2016; Kim et al., 2016; Flax et al., 2017b; Flax et al., 2017a; Gugsu et al., 2017), men (Flax et al., 2017b), community leaders (Elwell, 2016) and other stakeholders (Flax et al., 2017b).

3.1. Overview of the facilitators and challenges to Option B+ retention

The review findings were synthesised into four main themes, namely, (i) knowledge and belief, (ii) social and cultural factors, (iii) individual factors and (iv) health care-related factors. There were overlaps of the facilitators and barriers across the main themes, and some themes had both facilitators and barriers to engagement. The main facilitators

included wanting to protect the baby, knowledge of the benefits of ART and PMTCT, and disclosure and social support. The main barriers were beliefs and misconceptions, fear of stigma, fear of disclosure and social support, age at ART counselling, experiencing side effects, timing of ART initiation, inadequate counselling and hospital practices. Table 1 presents the summary of the facilitators and barriers to Option B+ retention against each theme.

4. Facilitators to retention in Option B+

4.1. Knowledge and belief

4.1.1. Wanting to protect the child

Several studies identified women wanting to protect their infants as the facilitator to retention in Option B+ programmes (Bobrow et al., 2016; Buregyeya et al., 2017; Chadambuka et al., 2017; Cromwell et al., 2015; Elwell, 2016; Flax et al., 2017b; Kim et al., 2016; McLean et al., 2017). Most of the above studies cited the need to have a healthy and an HIV free baby, as the reasons why mothers retained in care. Hence,

Table 1

Summary of the facilitators and barriers to retention in care in Option B+ of the PMTCT programme.

Theme	Sub-themes	
	Facilitators	Barriers
Knowledge and belief	<ul style="list-style-type: none"> Wanting to protect the baby Knowledge of the health benefits of ARTs 	<ul style="list-style-type: none"> Beliefs and misconceptions
Social and cultural factors	<ul style="list-style-type: none"> Disclosure and social support 	<ul style="list-style-type: none"> Fear of Stigma Fear of disclosure and lack of social support
Individual factors		<ul style="list-style-type: none"> Age at ART initiation Experiencing side effects Lack of commitment to lifelong treatment
Health care related factors		<ul style="list-style-type: none"> Time to ART initiation (Same day ART initiation) Hospital practices

mothers who are worried about caring for an HIV infected child are less likely to miss services for early infant diagnosis (Cromwell et al., 2015) in the hope that the child would be found negative. These are commendable findings indicating that the mothers are aware of one of the priority goals of option B+ of reducing HIV transmission to the baby. However, it was noted in a Malawian study that once the child is protected, maternal motivation to remain in care is reduced (McLean et al., 2017).

Similarly, in Uganda, some HIV positive mothers stopped taking ART when their babies died or when they stopped breastfeeding (Buregyeya et al., 2017). South African mothers who remained in PMTCT attributed the non-retention in care postnatally by those LTFU mothers, as not caring for their health because what they wanted most was to have a baby (Clouse et al., 2014). Similarly, a Zimbabwean study that assessed the acceptability of the lifelong ARTs after the adoption of Options B+ reported that most mothers had fears of committing to lifelong medications and were afraid of being lost from care especially after cessation of breastfeeding (Chadambuka et al., 2017).

These findings reflect inadequate knowledge of the mothers on the overall benefit of the Option B+. For instance, a qualitative study to acquire a more in-depth understanding of factors affecting women's treatment-related decision during pregnancy and lactation found that mothers on PMTCT programme were only aware of some of the benefits of option B+ and that hospital counselling was mostly centred on protecting the baby (Gugsa et al., 2017). Lack of understanding was also seen in a study conducted in the central region of Malawi which found that fear of transmitting HIV did not motivate LTFU women, although they were worried that they might transmit the virus to the child (Flax et al., 2017a). Despite these concerns the study found that mothers who were LTFU continued to breastfeed their infants because they considered breast milk to be the best food for the baby (Flax et al., 2017a). With the goal of protecting children nutritionally, women who were LTFU breastfed their babies for longer than is typically the case. For mothers who had chosen to breastfeed, the entrenched knowledge that "breast-milk is best" often outweighed the perceived risk of HIV transmission through breast milk. These studies raise questions about whether mothers are adequately prepared to understand their HIV status, the vulnerability of the child, the importance of the life-long ARTs to their own health and services provided in the PMTCT cascade and the significance of life-long engagement.

4.1.2. Knowledge of the health benefits of ARTs

Studies demonstrated that mothers were motivated to retain in the PMTCT programme by the perceived benefit of participating in the programme (Flax et al., 2017a; Gugsa et al., 2017; Kim et al., 2016), the realization that they were not the only ones on ART (Gugsa et al., 2017), and also because of the health of other individuals who were on ART

(Buregyeya et al., 2017; Chadambuka et al., 2017; Elwell, 2016; Gill et al., 2017; Gugsa et al., 2017). However, consistent with other qualitative studies in Uganda (Buregyeya et al., 2017), Malawi (Flax et al., 2017a), Zimbabwe (Chadambuka et al., 2017) and Rwanda (Gill et al., 2017) sentiments of such motivations came from women who were still in care. These findings suggest that women may be retained in the PMTCT programme if they are aware of the health benefits associated with lifelong ART.

4.2. Social and cultural factors

4.2.1. Disclosure and social support

A considerable amount of literature has been published on HIV disclosure and non-retention in care. The evidence from our review demonstrates that disclosure can either be a facilitator or a barrier to retention in Option B+ programme. A few studies in this review reported a link between disclosure and non-retention in care (Ebuy et al., 2015; Gugsa et al., 2017; Hoffman et al., 2017). In Ethiopia, a cross-sectional study to identify levels of adherence and factors associated with adherence among HIV positive women found that disclosing HIV status to partner was associated with good adherence (aOR4.2, 95% CI 1.07–16.33) (Ebuy et al., 2015). Similar findings have been reported in Malawi where odds of retention were significantly higher with partner awareness of the status (Hoffman et al., 2017) and having disclosed to significant others was also cited as a facilitator to retention in care (Gugsa et al., 2017). Some women who disclose their status receive a positive response, especially support (Flax et al., 2017a). Individuals with one or more form of support while taking ART are more likely to engage in care (Buregyeya et al., 2017; Hoffman et al., 2017). Disclosure can be made in a variety of relationships including spouse, siblings, and friends as well as neighbours (Flax et al., 2017a; Flax et al., 2017b), who are the primary source of support. Partners support women by reminding them to go to the clinic to get the drugs (Flax et al., 2017a; Kim et al., 2016). Contrary to the above findings, one study reported that some mothers with partner support did not honour clinic visits despite receiving financial support from their spouses (Kim et al., 2016). Consistently, in a study that assessed risk factors associated with mother's failure to bring their children for early infant diagnosis found that women who reported that their spouses were aware of their child was being tested were also more likely to fail to return to obtain the results (aRR: 1.97; 95%CI: 1.0, 3.8) (Cromwell et al., 2015).

5. The barrier to Option B+ Engagement

5.1. Social and cultural factors

5.1.1. Fear of disclosure and lack of social support

In this review, nondisclosure was the most cited reason for non-retention in care (Bobrow et al., 2016; Buregyeya et al., 2017; Cataldo et al., 2017; Elwell, 2016; Flax et al., 2017a; Gill et al., 2017; Kim et al., 2016; Price et al., 2014; Tweya et al., 2014) and or delayed ART initiation (Gugsa et al., 2017). Many women in the studies mentioned fear of abandonment (Buregyeya et al., 2017), stigmatisation (Gill et al., 2017), and divorce (Elwell, 2016; Girma et al., 2017; Kim et al., 2016) as the reason for nondisclosure of HIV status to spouses as well as significant others. For many women, an HIV-positive diagnosis leads to marital conflict and divorce (Elwell, 2016; Kim et al., 2016). Women fear divorce because they are overly dependent on their male partners (Elwell, 2016; Gugsa et al., 2017). Consequently, the lack of disclosure can have significant economic implication for mothers. If the woman hides her status from the husband, she may not receive economic support (Clouse et al., 2014). Consequently, women may lack finances (Clouse et al., 2014; Girma et al., 2017) to cater for their transportation to the clinic thereby they are lost from care (Cromwell et al., 2015; Ng'ambi et al., 2016). Moreover, the lack of any form of support (Cataldo et al., 2017; Flax et al., 2017a; Flax et al., 2017b; Gugsa et al., 2017;

McLean et al., 2017; Napua et al., 2016), has been identified as a barrier to the successful implementation of PMTCT programmes. Women, in some instances, do not start the ART because they want to consult their partners first (Dzangare et al., 2016; Katirayi et al., 2016; Kim et al., 2016; Napua et al., 2016). Women are afraid to disclose, or they delay disclosure to the spouses. Unfortunately, there is a dearth of information on how disclosure can be facilitated. Some authors support the notion that male involvement in PMTCT programmes would promote better utilisation of PMTCT services (Cataldo et al., 2017; Flax et al., 2017b; Gugsu et al., 2017; Kim et al., 2016; Napua et al., 2016). However, Flax et al., (2017b) found that men considered the PMTCT clinics as female spaces and would feel uncomfortable being seen going to clinics. Moreover, women are the ones who normally go to the hospital where they may gain information about HIV which men do not have (Chadambuka et al., 2017). As such, it becomes difficult for men to understand and accept the status of their wives (Chadambuka et al., 2017).

5.1.2. Fear of stigma

Stigma has always been associated with HIV and AIDS. Women are not retained in Option B+ care due to their fear of revealing their HIV status to the community, which leads to discrimination (Atanga et al., 2017; Buregyeya et al., 2017; Flax et al., 2017a). Mostly, mothers fear community stigma (Cataldo et al., 2017; Elwell, 2016; Gill et al., 2017; Napua et al., 2016). Community stigma emanates from their visibility at the PMTCT and ART clinics in the health facilities. Health structures have been reported to contribute to the breach of confidentiality and privacy (Cataldo et al., 2017). Women are identified to be HIV positive when they are seen at the clinic, entering a room designated for PMTCT, carrying medical charts marked with their diagnosis, and carrying ARV medication (Elwell, 2016). Being seen participating in any PMTCT practices attracts community gossip and stigma (Flax et al., 2017b). This causes mothers to hide their medication and sometimes to throw them away so that people would not see (Buregyeya et al., 2017). Besides, frequenting the hospital in the postnatal period signifies that the mother is HIV positive since mothers have no reason to visit the hospital after the baby is born (Clouse et al., 2014). Stigma may also result from disclosing HIV status (Adeniyi et al., 2015). Nonetheless, in some settings, the evidence seems to suggest that universal life-long ART reduces some form of stigma. This is the case because women who start ART under the universal life-long for PMTCT, live healthy lives, and they can breastfeed just like any other woman (Chadambuka et al., 2017; Kim et al., 2016).

5.2. Individual factors

5.2.1. Age at ART initiation

Several retrospective and prospective cohort studies have demonstrated a consistent association between age and non-retention in PMTCT. Several studies have shown a higher risk of non-retention in care for young mothers aged under 25 years (Atanga et al., 2017; Decker et al., 2017; Dzangare et al., 2016; Erlwanger et al., 2017; Ford et al., 2017; Hoffman et al., 2017; Mitiku et al., 2016; Musomba et al., 2017; Mwapasa et al., 2017; Puttkammer et al., 2017; Tweya et al., 2014). A prospective study that extracted data for two years since the adoption of option B+ in Malawi found that young mothers (13–25 years) were more likely to be LTFU than those 25 years and above (aRR = 1.29 95%CI 1.09–1.52) (Tweya et al., 2014). Similar findings have been reported in Uganda (Musomba et al., 2017), Zimbabwe (Erlwanger et al., 2017) and Ethiopia (Mitiku et al., 2016), with the Ethiopian study reporting higher LTFU among younger age (18 to 24) at ART initiation (n = 33 57.9% p = 0.042) (aHR 18 to 24 years/30 to 40 years: 2.3; 95% CI: 1.2 to 4.5) (Mitiku et al., 2016). Moreover, a qualitative study found that health care workers reported that young mothers have more difficulties in accepting the condition; consequently, they do not remain in care (McLean et al., 2017). Others have suggested that unlike older women, young mothers lack settled lives and may not understand the reasons

why they should be on life-long medications (Hoffman et al., 2017; Mitiku et al., 2016; Tweya et al., 2014).

5.2.2. Lack of commitment to lifelong treatment

Our review also observed that mothers do not engage in PMTCT because they refuse to accept their HIV sero-status (Atanga et al., 2017; Bobrow et al., 2016; Dzangare et al., 2016; Flax et al., 2017a; Gugsu et al., 2017; Katirayi et al., 2016; Llenas-Garcia et al., 2016). Furthermore, other studies reported that some mothers are not ready for life-long ART (Buregyeya et al., 2017; Gugsu et al., 2017; Katirayi et al., 2016; Napua et al., 2016). Presumably mothers display a lack of acceptance as well as a failure to commit to lifelong treatment because physically they are well (Kim et al., 2016), and they do not see the need for ART. For example, a study that ascertained the characteristic differences among women initiating ART during pregnancy and those initiating during breastfeeding in Malawi found that mothers who initiate ART while in WHO stages 3 or 4, have a lower risk of non-retention than those in stages 1 and 2 (Landes et al., 2016). Similar findings have been reported in Malawi where mothers who initiated ART during pregnancy with a CD4 count > 350 were found to be more at risk of LTFU, than those with CD4 Count of ≤ 350 cells (OR 5.0, 95CI 4.2–6.1) (Tenthani et al., 2014). However, retention may also be compromised for those with extremely low CD4 counts (Girma et al., 2017) or when patients are too sick to go to the hospital (Tweya et al., 2014).

5.2.3. Experiencing side effects

Some studies found that mothers may not be retained in care because of side effects (Buregyeya et al., 2017; Flax et al., 2017a; Flax et al., 2017b; Gugsu et al., 2017; Hoffman et al., 2017; Kim et al., 2016; Tweya et al., 2014). Although Kim et al. (2016) particularly identified side effects as the main reason mothers stopped ART, other studies noted that side effects impacted few women. In some settings, the experience of side effects was exacerbated with lack of enough food (Kim et al., 2016). However, side effects are reported to be more prevalent during the first two weeks of ART initiation (Kim et al., 2016).

5.3. Knowledge and belief

5.3.1. Beliefs and misconceptions

Option B+ is challenged in some settings because of beliefs and misconceptions women hold. The most cited influence on retention is religious belief (Atanga et al., 2017; Flax et al., 2017b; Gugsu et al., 2017; Kim et al., 2016). Additionally, there are patterns of beliefs and misinformation in different settings such as starting ART at a young age will lead to complications (Bobrow et al., 2016), ARTs are dangerous (Buregyeya et al., 2017; Napua et al., 2016), that pregnancy is a proof of being HIV negative (Napua et al., 2016) and that you die after stopping ARTs (Buregyeya et al., 2017). However, the extent to which these beliefs and misconceptions were reported was low.

5.4. Health care related factors

5.4.1. Time to ART initiation (Same day ART initiation)

Evidence further suggests that non-retention in Option B+ is closely related to same-day ART initiation (Cataldo et al., 2017; Chan et al., 2016; Helova et al., 2017; Katirayi et al., 2016; Kim et al., 2016; Mitiku et al., 2016; Puttkammer et al., 2017; Tenthani et al., 2014). In Malawi, a retrospective cohort study examined whether models of care based on service integration influenced non-retention in Option B+ care, at a time when Option B+ had just been adopted in Malawi. The study found that model 1 sites (fully integrated HTC and ART initiation at ANC), had significantly lower retention rates compared to model 2 (HTC only in ANC) sites (79%vs. 87%; p 0.02), suggesting that same day HIV diagnosis and ART initiation, affects retention in option B+ (Chan et al., 2016). Additionally, another study in Malawi found that LTFU was

highest in pregnant women who started ART under Option B+ on the same day at large clinics (Tenthani et al., 2014). Some qualitative studies have also reported similar findings. One study found that the immediacy of ART initiation was the main reason why women refused ART (Kim et al., 2016). However, in other qualitative studies, sentiments about challenges with same-day ART initiation came from the health care workers. In Malawi, health care workers stated that mothers have difficulties understanding why they are initiated on ART immediately after testing (Cataldo et al., 2017). Consistently, in Kenya, health care workers considered same-day initiation of ART as a challenge to Option B+ (Helova et al., 2017).

Although most studies reported on same day initiation as a challenge, other studies have found an association between starting ART during pregnancy (Goggin et al., 2016; Landes et al., 2016; Tenthani et al., 2014; Tweya et al., 2014), during breastfeeding (Llenas-Garcia et al., 2016), during delivery (Cataldo et al., 2017; Girma et al., 2017), late in gestation (Erlwanger et al., 2017; Hoffman et al., 2017; Mwapasa et al., 2017; Puttkammer et al., 2017) and those that are newly diagnosed (Erlwanger et al., 2017; Musomba et al., 2017; Mwapasa et al., 2017), as factors that lead to non-retention in option B+ care. Additionally, women are uncomfortable about starting ART before getting permission from their spouses (Katirayi et al., 2016; Kim et al., 2016; Napua et al., 2016).

5.4.2. Hospital practices

Several factors related to health care practices have been identified as either barriers or facilitators in different settings. These include resource constraints (mostly space (Colvin et al., 2014; Helova et al., 2017), lack of client-friendly services (Clouse et al., 2014; Helova et al., 2017), long waiting times on the queue (Helova et al., 2017; Napua et al., 2016), and poor interactions with health care workers (Clouse et al., 2014; Elwell, 2016; Flax et al., 2017b; Gugsu et al., 2017; Helova et al., 2017; Hoffman et al., 2017). The most compelling challenge is health care workers' attitude. Poor attitudes have been reported to discourage women from continuing with lifelong medication. For example, women who travel for various reasons such as going to nurse a sick relative, attending funerals (Flax et al., 2017b; Hoffman et al., 2017) may not be available (Ng'ambi et al., 2016) to attend ART clinic on their appointment dates to collect their medication or to have the child tested for HIV. Those that miss their appointments because of such gender roles have been shouted at by health care workers. In some instances, women are sent home without medications (Flax et al., 2017b; Gugsu et al., 2017). Women are also refused treatment due to lack of transfer letters if they try to get their medication at a clinic closer to where they travelled (Flax et al., 2017b; Gugsu et al., 2017).

Although in some settings mothers reported receiving counselling as a facilitator to retention in care (Gugsu et al., 2017; Kim et al., 2016); some women reported having short consultations (Napua et al., 2016) and receiving poor counselling (Katirayi et al., 2016; Napua et al., 2016) as reasons for non-retention. To this effect, some researchers have reported that health care workers use persuasive techniques without giving a woman an opportunity to voice her concerns during ART initiation (McLean et al., 2017). Subsequently, women do not remain in the PMTCT programme. It may be possible that health care workers in PMTCT clinics do not have enough time to counsel the mother regarding PMTCT appropriately. However, one study in Kenya observed that some health care workers are not trained in Option B+ while others were unconvinced of the benefits of Option B+ (Helova et al., 2017).

6. Discussion

The review identified young age, time to ART initiation (same-day ART Initiation), knowledge and beliefs, lack of commitment to lifelong ART, social and cultural factors (fear of disclosure and lack of support, fear stigma), hospital practices and side effects as the significant factors compromising retention in Option B+ programmes. Our findings

resonate with previous systematic review findings (Colvin et al., 2014; Gourlay et al., 2015; Knettel et al., 2017); however, our review is unique in that it highlights factors that are specific to the universal ART programme in PMTCT. For instance, our review exposes that mothers remain in care to protect the child but are at risk of being lost to care during the postnatal period. This exposes lack of knowledge and inadequacies in counselling that is offered to mothers in the programme about the importance of ART to maintain their own health. Some studies included in the review identified poor counselling as a reason why young mothers fail to remain in Option B+ (Katirayi et al., 2016; Napua et al., 2016; Buregyeya et al., 2017). However, these studies did not identify the specific challenges with the pre-ART counselling that could undermine PMTCT engagement. For instance, in the Katirayi et al. (2016) study, the perception of both the mothers and health workers was that mothers need time to understand the treatment and the counselling on the day of their ART commencement might not be enough. Equally, a study by Buregyeya et al. (2017) found that mothers felt the health workers main goal was to initiate mothers on ART without putting much effort into health education and counselling. However, a few studies also highlight the general quality of PMTCT and identified limited counselling time and omitting crucial topics as reducing counselling effectiveness. For instance, in Kenya Delva et al. (2006) assessed the quality and quantity of the HIV counselling in the PMTCT programme and they found that the frequency and duration of the counselling were low. Additionally, the study found that the counselling sessions missed some crucial topic, or some topics were covered haphazardly (Delva et al., 2006). These shortfalls suggest that PMTCT counselling is mostly suboptimal.

Our review also highlights findings that show that initiating ARTs on the same day of diagnosis contributes to non-retention in the universal ART programme. Reasons why same-day ART initiation is considered a challenge are not conclusive. It may be that the historical policy of introducing ART in WHO stages 3 or 4 or when the CD4 count is low, has influenced non-retention. Additionally, it is possible that women are not adequately prepared and may not have come to terms with the HIV diagnosis (Kim et al., 2016; Tenthani et al., 2014). Ideally, ART is started immediately to reduce the HIV viral load in women, thereby reducing the risk of HIV transmission during pregnancy. Nevertheless, Kim et al. (2016) argue that there should be a balance between allowing women to have time for them to feel ready and initiating a mother on ART (Kim et al., 2016). Some authors have also suggested that women should be given more time for them to come to terms with the diagnosis, and to receive appropriate individualized counselling (McLean et al., 2017; Mitiku et al., 2016). Nevertheless, evidence suggesting the effect of delaying treatment is limited. Therefore, as countries have migrated to the test and treat programmes for all clients found HIV positive (World Health Organization, 2015), more efforts should be put in sensitising the communities to accept the policy changes, and helping people understand the benefits of early treatment in maintaining health.

Consistent with recent review findings (Knettel et al., 2017), we also found that young mothers are consistently more at risk of non-retention than older women; the reasons for this are not fully understood. Similarly, studies that have assessed uptake of PMTCT services among adolescents have reported reduced retention rates of young mothers in PMTCT programmes, especially in the African region (Birungi et al., 2011; Ronen et al., 2017). It is important to remember that while significant advances are being made to eliminate HIV, young people, especially girls, continue to be disproportionately affected by HIV especially in high HIV prevalence communities (UNAIDS, 2017b; Kharsany & Karim, 2016). Nonetheless, many experts have highlighted that the unique needs of young mothers in sub-Saharan Africa remain poorly understood and unaddressed (Dahourou et al., 2017; Mark et al., 2017; Groves et al., 2018). The effect of non-retention among such an important age group, therefore, is higher rates of MTCT observed among younger mothers than among adult mothers (Horwood et al., 2013; Fatti et al., 2014; Ramraj et al., 2018). Thus, if challenges that young women

face are not well understood and tackled, the effort being directed at eliminating new infections in children will not be achieved; suggesting an impeccable need to scale up progress towards young women' health.

The review further confirms that non-disclosure and stigma remain the most significant reasons why mothers fail to remain in the PMTCT programmes. Although some mothers disclosed their HIV status, other mothers found it difficult to do so. Nondisclosure was significantly associated with poor adherence to PMTCT recommendations, increasing the risk that the woman would transfer HIV to her partner and/or her child as well as endangering her own health (Sendo et al., 2013; Ebuy et al., 2015). However, the current review found that mothers mostly fear the consequences of disclosure, even though some men may respond supportively. Women fear abandonment and societal reprisal following an HIV diagnosis and often lack power to communicate their HIV status to their husband. It has been demonstrated that male involvement promotes couple communication in HIV and AIDS issues (Desgrées-du-Loû & Orne-Gliemann, 2008) and constructive retention of men in the programme yields positive results for the families (WHO, 2012). However, this is only achieved if both partners are available for the counselling and testing (Conkling et al., 2010; Osofi, Han, Kinuthia, & Farquhar, 2014; O. A. Osofi et al., 2014), suggesting that couple HIV testing is vital at reducing the burden of HIV disclosure.

6.1. Strengths and limitation of the review

This literature review followed a systematic and transparent approach in identifying, appraising and synthesizing relevant papers included. A comprehensive search in several databases, and grey literature yielded both published and unpublished papers, thereby reducing publication bias (Egger, Davey-Smith, & Altman, 2013; Parahoo, 2014). However, the search was limited to papers published in English language only. This might have introduced language bias as some relevant research studies might have been omitted.

7. Conclusion and recommendations

The review considered facilitators and barriers to retention in Option B+ programme of the PMTCT. The review highlights suggest that PMTCT counselling is suboptimal, hence; we suggest that there should be deliberate efforts to formulate programmes that would ensure mothers receive comprehensive information about the programme. Again, we suggest that mothers should be supported in the postnatal period and beyond for them to remain committed to lifelong medications.

The review suggests that younger women are more susceptible to non-retention from PMTCT. Efforts should be made to develop interventions to retain young mothers to Option B+ programmes if zero new infection in children is to be achieved. Therefore, there is a need to conduct more studies to explore the experiences of young mothers who are LTFU in PMTCT, so that appropriate interventions that respond to such mothers can be designed, piloted and implemented.

Lastly, the review confirms that fear of disclosure remains one of the critical challenges in PMTCT. Therefore, there is a need to find interventions that can facilitate disclosure of maternal HIV status to significant others if mothers are to engage in the programme successfully. Therefore, we recommend couple testing, to ease disclosure burden on the woman. We further suggest that models of male involvement that successfully engage men in the PMTCT programme should be explored and tested.

CRedit authorship contribution statement

Tiwonge Munkhondya: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Rebecca MD Smyth:** Methodology, Validation, Supervision, Writing – review & editing. **Dame Tina Lavender:** Methodology, Validation, Supervision, Writing –

review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

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