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REVIEW PAPER

Socio-Structural Factors Influencing the Prevention of Mother-to-Child Transmission of HIV in the Democratic Republic of the Congo: A Systematic Review

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Abstract
Introduction The Democratic Republic of the Congo (DRC) had the second-highest mother-to-child HIV transmission rate in Sub-Saharan Africa at 29% in 2013, however the uptake of preventive services for mother-to-child transmission of HIV (PMTCT) remains suboptimal. This systematic review explores socio-cultural and structural factors influencing PMTCT service uptake in the DRC. *Methods* We conducted a search of electronic databases. The PEN-3 model was used as a framework to synthesize factors influencing PMTCT service uptake into perceptions, enablers, and nurturers. *Results* Sixteen studies, 14 quantitative and two qualitative, were retained. Maternal, socio-economic, structural, and cultural factors were found to influence PMTCT service uptake in the DRC. Cost, accessibility, and quality of PMTCT services were key barriers to service uptake. Integration, male partner involvement, and evolving PMTCT policies improved PMTCT service delivery and uptake. This review also revealed several socio-cultural challenges in involving male partners in PMTCT programs. *Discussion* Findings highlight the need to address barriers and reinforce enablers of PMTCT uptake. Creating culturally appropriate, male-friendly, and family-oriented PMTCT programs will improve service uptake in the DRC.

Keywords Human Immunodeficiency Virus (HIV) · Prevention of mother-to-child transmission (PMTCT) · PEN-3 model · Democratic Republic of Congo · Male partner involvement

Significance

What is already known on this subject? The Democratic Republic of the Congo (DRC) had the second-highest mother-to-child HIV transmission rate in Sub-Saharan Africa in 2013. Uptake of preventive services for mother-to-child transmission of HIV (PMTCT) can improve maternal and child health outcomes if implemented as recommended. However, PMTCT uptake in the DRC remains suboptimal.

What this study adds? This review provides an overview of enablers and barriers found to influence PMTCT service uptake in the DRC. Structural factors along with socio-cultural challenges were found to play a crucial role in the improvement of PMTCT service delivery and uptake.

Introduction

The Human Immunodeficiency Virus (HIV) epidemic has been substantially curbed over the past 15 years, with a 35% decline in global HIV incidence and a 24% decline in HIV/

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AIDS-related mortality between 2000 and 2014 (World Health Organization (WHO) 2015). Declines in HIV incidence and related mortality are largely attributable to a global expansion of HIV preventive and treatment interventions. Following efforts to scale-up prevention of mother to child transmission of HIV (PMTCT), the number of newly infected children declined by 58% between 2000 and 2014 (WHO 2015). Despite these remarkable achievements, several countries in Sub-Saharan Africa (SSA) remain disproportionately affected, as evidenced by staggering rates of HIV incidence and mortality in adults and children (WHO 2016a).

The Democratic Republic of Congo (DRC) has a mother-to-child transmission rate of 29% and is among the 19 priority countries targeted by the UNAIDS Global Plan to eliminate mother-to-child transmission (MTCT) of HIV (United Nations AIDS (UNAIDS) Programme 2014; WHO 2016a). As of 2013, an estimated 230 000 women 15 years and older were living with HIV in the DRC (Joint United Nations Programme on HIV and AIDS n.d.), 26 000 of whom delivered in 2013 (UNAIDS Programme 2014). Unfortunately, treatment coverage and PMTCT uptake remain suboptimal, with only 33% of eligible women receiving antiretroviral therapy (ART) for PMTCT in 2013 HIV (UNAIDS Programme 2014; WHO 2016a), thus contributing to an increased pediatric HIV incidence (7400 new cases) (UNAIDS Programme 2014). Inadequate knowledge on vertical transmission of HIV and the underutilization of maternal and child health services (MCH) further contribute to an increased pediatric HIV incidence in SSA (Ministère du Plan et Suivi de la Mise en œuvre de la Révolution de la Modernité [MPSMRM], Ministère de la Santé Publique [MSP], and ICF International 2014; WHO 2016a). For instance, in the DRC, only 26% of women and 23% of men knew that HIV can be transmitted through breastfeeding and that mother-to-child transmission is preventable (MPSMRM, MSP, ICF International 2014). In addition, the 2013–2014 Demographic Health Survey (DHS) revealed that access to and uptake of essential MCH services in the DRC remains low (MPSMRM, MSP, and ICF International 2014). While 80% of women attended antenatal care (ANC) in 2013, only 17% had their first ANC in the first trimester of pregnancy and only about 50% completed at least four antenatal visits as recommended by the WHO (MPSMRM, MSP, and ICF International 2014). Postnatal care (PNC) services had low coverage, with only 44% of women receiving PNC within 2 days of delivery (MPSMRM, MSP, and ICF International 2014).

There are several stakeholders involved in combatting HIV in the DRC (US President's Emergency Plan for AIDS Relief (PEPFAR) 2014). The DRC Ministry of Health launched the National Multi-Sectorial Program for the Fight against AIDS (PNMLS) in 2004 to respond to the HIV epidemic using a coordinated multi-sectorial approach (PEPFAR 2014). The United States (US) government, through the US President's Emergency Plan for AIDS Relief, increased its program presence in DRC to reinforce national efforts to combat HIV/AIDS (PEPFAR 2014). Despite efforts to reduce mother-to-child transmission of HIV in DRC, there is a need to intensify current PMTCT efforts and explore factors influencing PMTCT in the country.

To our knowledge, this review is the first to synthesize evidence on factors influencing PMTCT in the DRC. This review explores socio-cultural and structural factors influencing PMTCT in the DRC.

Theoretical Framework: PEN-3 Model

Factors influencing PMTCT in the DRC are explored using the PEN-3 model designed by Airhihenbuwa (see Fig. 1) (Airhihenbuwa and Webster 2004; Iwelunmor et al. 2014a, b). This model has been used to explore health issues within the cultural context of several low-income African countries (Airhihenbuwa and Webster 2004; Iwelunmor et al. 2014a, b). This model highlights the central role of culture in shaping health beliefs, health behaviors, and health outcomes (Iwelunmor et al. 2014a, b). It comprises three domains: (1) cultural identity, (2) relationships and expectations, and (3) cultural empowerment. The *cultural identity* domain guides the identification of a point of entry of the intervention, which ranges from the individual level to the community level. The *relationships and expectations* domain examines the influence of perceptions, resources, and social networks on healthcare decision-making from a socio-cultural context. Lastly, the *cultural empowerment* domain identifies the positive, existential, and negative influences of culture on a specific health issue (Airhihenbuwa and Webster 2004).

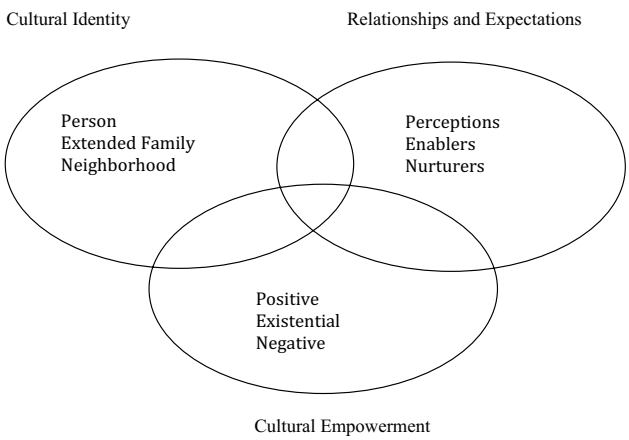

Fig. 1 PEN-3 Cultural Model (Airhihenbuwa and Webster 2004)

Methods

Search Method

An electronic search was conducted between November and December, 2015 on the following databases: PubMed, Cochrane Library, Embase, CINAHL, Web of Science, Google Scholar, and The Journal of the International AIDS Society. The search terms *'mother-to-child transmission of HIV in the Democratic Republic of Congo' OR 'vertical transmission of HIV in Congo'* and more broadly, *'HIV Congo'*, were used on all databases. The latter ('HIV Congo') was used because it generated a more comprehensive list of potentially relevant literature, supplementing the first two search terms which were more specific and limited. Eligible articles were those that examined PMTCT-related service delivery and uptake in the DRC. The search was restricted to peer-reviewed articles published in English and French between 2000 and 2015, initially yielding a total of 5920 articles. After removal of duplicates and initial review of titles for relevance, 42 articles remained. The abstracts of these 42 articles were reviewed independently by two authors for relevance. A total of 16 peer-reviewed articles were fully reviewed by two researchers. Figure 2 depicts the search selection processes.

Selection Process

Eligibility of manuscripts was independently assessed by two authors in three rounds: the first was based on the

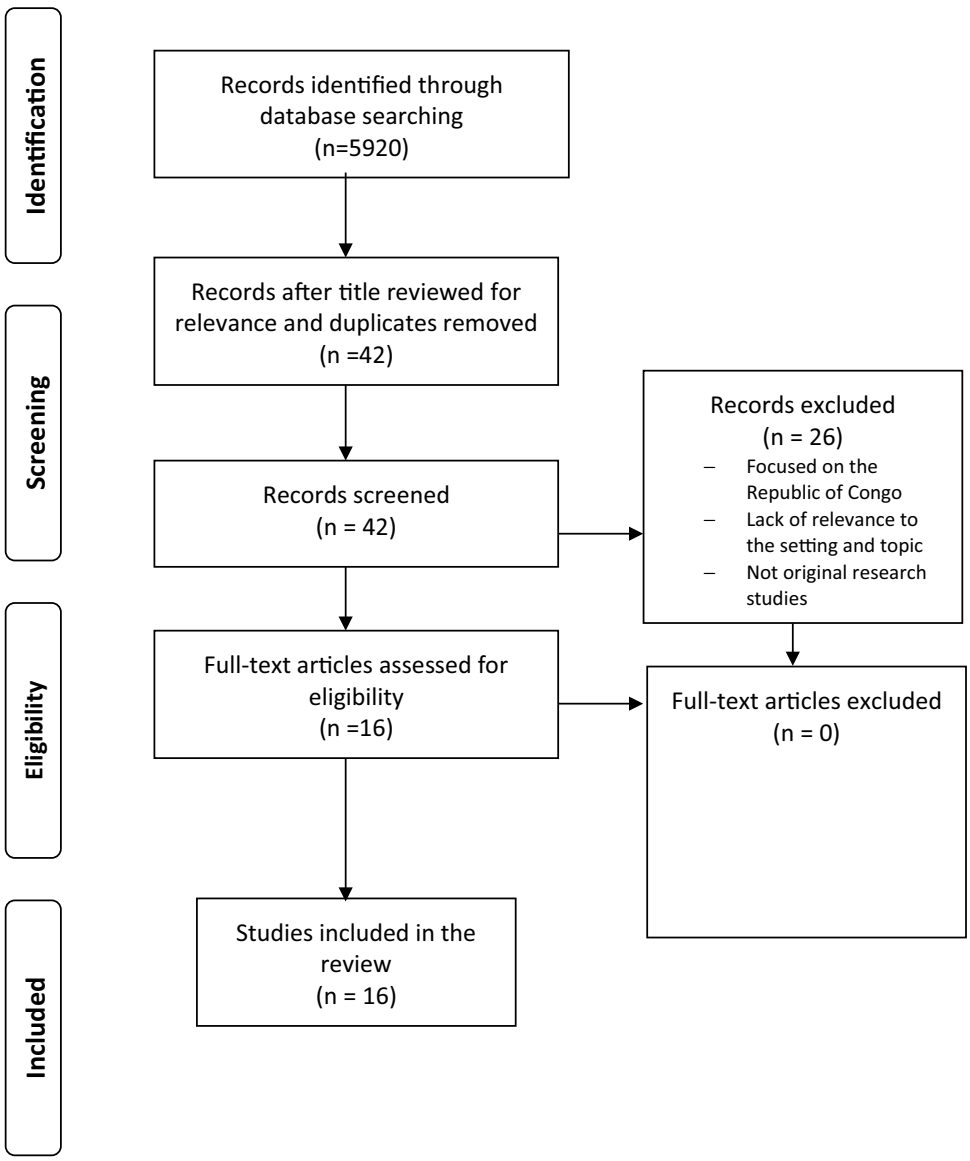

Fig. 2 Research process flow chart for PMTCT in the Democratic Republic of Congo. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (see http://www.prisma-statement.org/)

manuscript's title, the second on selection and review of abstracts and PICOTS categories (Population, Intervention, Comparators, Outcomes, Timing and Setting) (Table 1); and the third after accessing and reading the full text. Final manuscript selection required author agreement. If two reviewers did not agree on including a manuscript, a third independent reviewer was invited. A total of 26 articles were excluded for the following reasons: (1) lack of relevance to the setting of interest (DRC), owing to the use of broader search terms (e.g. 'HIV Congo') which also yielded studies on PMTCT in the Republic of Congo in addition to the Democratic Republic of Congo (DRC); (2) lack of relevance to the subject of interest—factors influencing PMTCT uptake and service delivery in DRC; (3) not original research studies—they summarized data from original studies that were already included in this review.

Quality Assessment

The Quality Assessment Tool for Quantitative Studies was used to assess the quality of selected manuscripts (Armijo-Olivo et al. 2012). The reviewers rated each selected manuscript on six predefined criteria: selection bias, study design, confounders, blinding, data collection method, and withdrawals and dropouts. To ensure that selected manuscripts satisfied these criteria, reviewers were required to reach a consensus after using the assessment tool. Overall, the quality of manuscripts was rated as strong or weak with regards to meeting the aforementioned criteria.

Results

Sixteen studies, 14 quantitative and two qualitative, explored multiple facets of PMTCT in the DRC and were included in this review. These studies were published between 2006 and 2015. Majority recruited HIV-positive pregnant women and/or mother-infant pairs attending maternity units and antenatal clinics in rural, semi-rural, peri-urban, and urban settings in the DRC. Table 1 provides a description of studies included in this review.

Data Synthesis

Factors influencing PMTCT in the DRC were classified into two domains of the PEN-3 model: *Relationship and Expectations domain* and *Cultural Empowerment domain*. Components of these two domains were cross-tabulated as depicted in Table 2, generating the following overarching themes: *positive and negative perceptions, enablers*, and *nurturers of PMTCT in DRC*. None of the studies in our review reported on the existential component (it was therefore not included). According to Airhinhenbuwa and Webster (2004), the domain of *Cultural Identity* serves as a point of entry for interventions to promote health and/or improve people's lives. However, before identifying the point of entry for interventions, it is crucial to understand and delineate the two domains of *Relationship and Expectations* and *Cultural Empowerment*. The present review used only these two domains as bedrock for shedding light on PMTCT in the DRC.

Perceptions of PMTCT in DRC

Findings revealed both positive and negative perceptions towards PMTCT in DRC. Despite a relatively high acceptance of HIV testing among women (up to 95.6%) (Behets et al. 2010), participants' lack of HIV knowledge was noted (Feinstein et al. 2013; Maman et al. 2012). More specifically, women had limited understanding of the mechanisms through which feeding practices influenced vertical transmission of HIV (Maman et al. 2012). Additionally, 21% of participants in one study lacked awareness on the availability and locations of HIV testing services (Feinstein et al. 2013).

Perceptions of privacy and confidentiality further influenced the uptake of PMTCT services. Thirty-four percent of participants in one study did not believe it was possible to get a confidential HIV test (Feinstein et al. 2013). This was particularly a concern for HIV tests offered within an ANC facility (Kabamba Mulongo et al. 2011). Women were more likely than their male partners to accept an HIV test offered within an ANC facility (Kabamba Mulongo et al. 2014), especially when they perceived that their privacy was respected (Feinstein et al. 2013).

Lastly, women's perceptions of healthcare providers influenced their utilization of MCH and PMTCT services. Women who felt respected by healthcare providers and those who believed providers demonstrated interest in their concerns, were more likely to initiate ANC earlier than those who had negative perceptions towards healthcare providers (Feinstein et al. 2013).

Enablers of PMTCT in the DRC

Multiple socio-economic and structural factors were identified as either enabling or hindering PMTCT service delivery and uptake in the DRC. Cost and lack of transportation negatively influenced access to PMTCT-related services. ANC services in both public and private healthcare facilities cost on average $3.10 to $6.70, with additional costs for virological tests (Behets et al. 2006, 2009). The lack of transportation was also cited, with 72% of pregnant women walking to healthcare facilities during ANC visits (Van Rompaey et al. 2011).

The quality and performance of PMTCT programs are both crucial in improving service uptake (Kirere Mathe

Table 1 Characteristics of studies included in this review

Author	Setting	Sample	Study Types	Objectives
Feinstein et al. (2013)	Urban/Peri-urban	1221 pregnant women ≥ 18 years old	Cross-sectional survey	To understand how women access reproductive health services in Kinshasa in order to inform the scale-up of PMTCT
Edmonds et al. (2015)	Urban	1482 HIV positive mothers and their infants	Cohort study	To assess the population-level impact of decentralization on the PMTCT
Kirere-Mathe et al. (2008)	Rural	94 HIV positive pregnant women	Evaluation study	To evaluate the implementation of the HIV NET 012 Protocol (single dose-Nevirapine to HIV infected pregnant women in labor and the exposed newborn) in a rural setting
Diketemena et al. (2015)	Urban	309 HIV positive mothers and their- infant	Retrospective analysis	To identify factors associated with health outcomes of HIV exposed infants in a PMTCT program in the DRC
Behets et al. (2010)	Urban/Peri-urban	220 006 women at maternity units	Trend analysis	To provide insight on HIV prevalence trends among pregnant women receiving antenatal care in Kinshasa
Feinstein et al. (2015)	Urban	1318 infants and their mothers	Cohort study	To assess the effects of combination antiretroviral therapy (cART) provided to HIV-infected mothers to loss to follow-up of exposed infants
Van Rompaey et al. (2011)	Semi-Rural	505 PLWHA 6451 adults tested for HIV	Operational assessment	To identify the barriers to access of ARV
Behets et al. (2006)	Urban	18 antenatal clinics	Cross-sectional survey	To assess the content and delivery of essential antenatal services before implementation of PMTCT programs
Behets e al. (2009)	Urban	21 government and faith-based antenatal clinics	Cross-sectional survey	To describe the approaches, challenges and results of the integration of PMTCT programs into antenatal clinics
Feinstein et al. (2014)	Urban	1707 infants and their mothers	Cohort study	To describe temporal changes in outcomes of HIV exposed infants enrolled in a family centered HIV prevention, treatment and care program
Maman et al. (2012)	Urban	40 HIV positive pregnant and postpartum women	In-depth interviews	To describe factors that influence the breastfeeding practices of HIV positive mothers
Kabamba-Mulongo et al. (2010)	Lubumbashi health district	143 pregnant women	Cross-sectional survey	To examine how women's attitudes influence acceptance of HIV-1 testing in the context of antenatal care
Kabamba-Mulongo et al. (2011)	Lubumbashi health district	143 pregnant women and their partners	In-depth interviews	To examine couples' attitudes towards HIV testing for pregnant women and their male partners
Ngwej et al. (2015)	Lubumbashi	157 HIV mother-infant pairs in12 health care facilities	Prospective study	To examine risk factors for mother-to-child transmission of HIV under the Option A strategy
Mwembo-Tambwe et al. (2013)	Lubumbashi	474 pregnant women	Intervention study	To determine the acceptability of rapid HIV testing among pregnant women in the labor room and to identify factors associated with its acceptability

Table 1 (continued)

Author	Setting	Sample	Study Types	Objectives
Mathe & Lepage (2007)	Rural northeastern DRC	94 HIV positive pregnant women	Intervention study	To describe challenges encountered in the implementation of HIV NET 012 protocol (i.e. a single dose of nevirapine to mother and baby)

et al. 2008). While women selected ANC facilities based on their reputation, accessibility, and availability of comprehensive services (Feinstein et al. 2013), comprehensive ANC services were not consistently present in these facilities (Behets et al. 2006). A majority of ANC facilities and maternity units did not provide onsite HIV testing, counseling services, and treatment (Behets et al. 2006; Feinstein et al. 2014). This was compounded by frequent stockouts of HIV testing supplies at the national laboratory in Kinshasa (Feinstein et al. 2014). Moreover, the presence of physicians at ANC facilities on scheduled ANC days was not confirmed (Behets et al. 2006).

Structural factors such as the integration of PMTCT programs affected their performance and quality. As of 2010, PMTCT services in DRC were still largely delivered through specialized HIV care and treatment centers (Edmonds et al. 2015). Flaws in referral systems between HIV testing sites, HIV care programs, and PMTCT programs were found (Van Rompaey 2011). An intervention study demonstrated that integrating PMTCT services into ANC and labor and delivery (L&D) facilities significantly improved service uptake among pregnant women and infants (Edmonds et al. 2015). Another study found high uptake of voluntary rapid HIV testing and counseling in labor rooms (Mwembo-Tambwe 2013). As PMTCT guidelines evolved, the uptake and delivery of PMTCT services in routine care settings improved substantially (Feinstein et al. 2014).

Moreover, inadequate training of healthcare personnel coupled by high personnel turnover negatively influenced the quality of PMTCT programs in DRC (Feinstein et al. 2013; Kirere Mathe et al. 2008). New and untrained staff missed at least 9% of opportunities to treat HIV-positive mothers and failed to document treatment provided to 3.4% of mothers (Kirere Mathe et al. 2008). Healthcare personnel further missed opportunities to educate women. For instance, 44% of participants in one study did not receive any information on HIV/AIDS during their ANC visit (Feinstein et al. 2013).

Evidence suggests that the follow-up of HIV-positive mothers and their infants is critical for the effectiveness of PMTCT programs since it enables education, early diagnosis, and early treatment (Ditekemena et al. 2015). High loss to follow-up of mother-infant pairs commonly occurred within the first 6 months of enrollment into PMTCT programs and was observed in nearly half of the studies reviewed (Edmonds et al. 2015; Feinstein et al. 2014, 2015). Young mothers, mothers who lacked awareness of their health status, and those who did not utilize ANC and PNC were more likely than their counterparts to be lost to follow-up (Feinstein et al. 2015; Van Rompaey et al. 2011). Providing HIV-positive mothers with combination antiretroviral therapy (cART) improved the retention of mother-infant pairs (Feinstein et al. 2015).

Table 2 Synthesis of findings on PMTCT in DRC using the PEN-3 Model: Cross tabulation of *relationships and expectations* domain and *cultural empowerment* domain

Dimensions	Positive	Negative
Perceptions	Acceptance of HIV testing Perceived privacy Perceived respect from healthcare workers Perceived attention from healthcare workers	Lack of knowledge on HIV Lack of awareness on availability of HIV testing and resources Perceived lack of confidentiality
Enablers	Decentralization of PMTCT Optimal antenatal care and postnatal care utilization Accessibility of facilities Good reputation Availability of comprehensive services	Cost Lack of transportation Poor delivery of HIV-related information High loss to follow-up Poor coverage of PMTCT Poor quality of PMTCT and Maternal & Child Health Poor referral system High personnel turn-over Inadequate training of healthcare workers
Nurturers	Health education from healthcare staff Male partner involvement Partner's acceptance of woman's HIV status	Cultural constraints for partner involvement Male partner's negative reaction towards HIV test results Fear of disclosure of HIV status Family pressure to comply with local feeding practices Mixed feeding culturally encouraged Delaying arrival at maternity unity (until fully dilated)

Nurturers of PMTCT in the DRC

Several studies included in this review revealed socio-cultural factors that positively and negatively influenced the uptake of PMTCT services among men and women in the DRC. Local norms, medical staff, and family members, and peers influenced infant feeding practices of women with HIV (Maman et al. 2012; Ngwej et al. 2015), despite the cultural norms encouraged mixed feeding, which was found to be significantly associated with HIV transmission ($p < 0.05$) (Maman et al. 2012; Ngwej et al. 2015). However, healthcare providers played a significant role in motivating HIV-positive women to practice exclusive breastfeeding for the first six months (Maman et al. 2010). Additionally, local norms were shown to hinder the timely delivery of PMTCT interventions. While local PMTCT guidelines recommended the administration of single dose Nevirapine (sdNVP) to HIV-positive women at the onset of labor, sdNVP administration was frequently delayed or withheld since majority of pregnant women presented to the health care facility when fully dilated (Kirere Mathe et al. 2008; Mathe and Lepage 2007; Ngwej et al. 2015). One study found a mean delay of 11 h in sdNVP administration among 40.7% of women (Mathe and Lepage 2007).

Involving male partners in HIV testing improves the uptake and acceptability of PMTCT services (Kabamba Mulongo et al. 2010, 2011). Men who accepted their partners' HIV status were observed to participate in PMTCT programs (Kirere Mathe et al. 2008). However, there were several challenges in involving male partners in PMTCT programs (Feinstein et al. 2013; Kabamba Mulongo et al. 2011; Kirere Mathe et al. 2008). While men usually provided financial support for women's health expenditures (Feinstein et al. 2013), it was not common practice in the local culture for men to accompany women during routine medical visits (Kabamba Mulongo et al. 2011). In addition to culture, time constraints and men's negative reactions towards HIV test results hindered their participation in women's prenatal visits (Kabamba Mulongo et al. 2011; Kirere Mathe et al. 2008). Majority of male partners feared discovering their HIV status and therefore avoided getting tested for HIV (Kabamba Mulongo et al. 2011). Similarly, they discouraged women from getting tested for HIV citing that this potentially informed them of their own HIV status (Kabamba Mulongo et al. 2011). While 57% of women thought it was not necessary to obtain their partner's permission for HIV screening (Kabamba Mulongo et al. 2011), a significant number of women did not get tested for HIV out of fear of being blamed for infecting their partners (Kabamba Mulongo et al. 2011; Kirere Mathe et al. 2008). Additionally, one study reported that pregnant women had difficulty encouraging their partners to use condoms for HIV prevention (Kabamba Mulongo et al. 2011).

Discussion

Findings indicate that socio-economic, structural, and socio-cultural factors influence PMTCT service uptake and delivery in DRC. These factors were classified into three themes based on the PEN-3 Cultural Model: perceptions, enablers, and nurturers. First, perceptions of privacy, confidentiality,

and healthcare providers' attitudes were found to influence women's utilization of PMTCT services. These findings are consistent with previous reports that negative staff attitudes such as scolding, stigma, and breach of confidentiality deterred women from returning to healthcare facilities for NVP or cART (Gourlay et al. 2013). However, healthcare providers have also been reported to encourage women's utilization of PMTCT interventions and to assist them in dealing with HIV-related stigma (Gourlay et al. 2013).

Second, this review revealed that socio-economic and structural factors including cost, transportation, and quality of services enabled or hindered PMTCT service uptake in DRC. Cost and lack of transportation were commonly cited barriers to PMTCT service uptake in the DRC. Previous studies in SSA have identified socio-economic factors such as service fees and transportation costs as the greatest barriers to access to PMTCT services (Gourlay et al. 2013; Hlarlaithe et al. 2014; Okoli and Lansdown 2014). Furthermore, factors pertaining to the quality of PMTCT services such as the lack of on-site comprehensive services, poor referral systems, inadequate training of healthcare personnel, and frequent stock-outs of supplies negatively influence PMTCT service uptake in DRC. Poor quality PMTCT services have been reported in other countries in SSA (Betancourt et al. 2010; Gourlay et al. 2013; Okoli and Lansdown 2014). Additionally, the poor integration of PMTCT programs into MCH facilities is associated with high loss-to follow-up and low uptake of PMTCT services (Gourlay et al. 2013; Okoli and Lansdown 2014).

Lastly, this review revealed that socio-cultural factors influence PMTCT uptake among men and women in the DRC. While this review demonstrated that male partner involvement in HIV testing improved the uptake and acceptability of PMTCT services (Kabamba Mulongo 2011), there were several challenges in involving male partners in PMTCT programs. The lack of male partner involvement in PMTCT programs has been well documented (Gourlay et al. 2013; Okoli and Lansdown 2014). Several studies have demonstrated that women fear violent reactions from male partners in the event of an HIV positive result (Betancourt et al. 2010; Gourlay et al. 2013; Iwelunmor et al. 2014a, b; Morfaw et al. 2013; Okoli and Lansdown 2014). Negative reactions from men were associated with the belief that women's HIV status informed men of their own, which they were reluctant to discover (Morfaw et al. 2013). Consistent with our findings, low male involvement in PMTCT programs in Sub-Saharan African has also been attributed to cultural beliefs that reproductive health is a woman's matter, thus excluding men from participating (Morfaw et al. 2013; Okoli and Lansdown 2014). Additional barriers to male involvement in PMTCT include low literacy and conflict between PMTCT operating hours and men's work schedules (Dunlap et al. 2014; Morfaw et al. 2013; Okoli and Lansdown 2014).

Strengths and Limitations

Our findings should be interpreted in light of several limitations. First, there is a scarcity of peer-reviewed studies on PMTCT in DRC. As such, our evidence-base for this review was limited to 16 articles. However, our comprehensive search strategy enabled us to capture preliminary evidence on key factors influencing PMTCT from both quantitative and qualitative studies, thus enabling triangulation. Second, over half of the studies included in this review were conducted prior to the release of the most recent (Option B+) PMTCT guidelines, and may have failed to capture the current context of PMTCT. Between 2006 and 2015, the WHO issued several updates on PMTCT guidelines, with the most recent (Option B+) recommending a universal use, earlier initiation (during pregnancy), and lifelong use of ART among women living with HIV (WHO 2016b).

Implications

This review has practical implications for public health programming, policies, and research. Improving PMTCT access and uptake will require multifaceted interventions targeted at individual, community, health system, and policy levels.

At the individual level, measures to mitigate socio-economic barriers such as providing clients with transportation vouchers, reimbursements or discounts may improve access to PMTCT services.

At the community level, our review supports the active involvement of male partners and other family members in PMTCT programs to address socio-cultural barriers to uptake. Establishing male-friendly PMTCT services can improve PMTCT uptake among both men and women (Dunlap et al. 2014; Morfaw et al. 2013). Such measures include offering couple-centered and/or family-centered PMTCT services and accommodating men's work schedules by extending operating hours (Dunlap et al. 2014; Morfaw et al. 2013). Additionally, sending men personal invitation letters through their spouses or influential community members has been shown to improve male participation in PMTCT services (Dunlap et al. 2014; Morfaw et al. 2013). This approach can be adopted in the DRC.

Health systems measures such as the integration of PMTCT programs into existing MCH services and improving health care staff competency are promising interventions to enhance PMTCT service uptake. Our findings indicate the need to provide regular in-service training to healthcare staff, with a special focus on ethical considerations in reproductive health services such as maintaining confidentiality. Structural changes in reporting, record-keeping protocols, and the physical set-up may help improve confidentiality and privacy in health care facilities.

Finally, up-to-date national and local policies are required to ensure the sustainability of PMTCT interventions and to ultimately eliminate mother-to-child transmission of HIV in DRC. Fully integrating PMTCT into existing MCH facilities appears promising in improving PMTCT service uptake and retention of mother-infant pairs (Betancourt et al. 2010; Gourlay et al. 2013; Okoli and Lansdown 2014).

Further research is needed to explore factors influencing PMCT uptake in the context of the most recent PMTCT guidelines. While integration was shown to improve access to PMTCT, more research is needed on its impacts on PMTCT service delivery and uptake among women and their male partners.

Conclusions

Despite the global decline in rates of mother-to-child-transmission of HIV, sub-Saharan African countries such as the DRC are disproportionately burdened. PMTCT services in the DRC remain under-utilized given several socio-economic, structural and cultural challenges highlighted using the PEN-3 model. This review further underscored enablers that, if reinforced, could significantly enhance the uptake of PMTCT and retention of women in these programs. This review sheds light on the role of the male partner, who is often left out of the equation. Creating culturally appropriate, male-friendly and family-oriented PMTCT programs is a promising strategy to improve PMTCT service uptake in the DRC. There is still substantial progress to be made on educating both women and their male partners on the importance and effectiveness of PMTCT. Furthermore, interventions should address socio-economic and structural barriers to PMTCT uptake. Findings from this review will guide the development of culturally appropriate interventions and policies to accelerate the elimination of mother-to-child transmission of HIV in the DRC.

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