Review Article

UNDERSTANDING THE FACTORS PROMOTING MOTHER TO CHILD TRANSMISSION OF HIV/AIDS IN NIGERIA

Abstract

Mother-to-child transmission (MTCT) of HIV/AIDS remains a significant public health challenge in Nigeria. This review aimed to identify and understand key factors promoting MTCT and assess the effectiveness of current prevention interventions. A systematic literature search was conducted across multiple databases using relevant keywords and approximately 57 individual literatures was reviewed. Studies focusing on MTCT in Nigeria published after 2015 were included. Eligible studies were critically appraised for quality and relevance. Findings indicate significant knowledge gap (such as misconceptions about transmission routes, limited understanding of prevention methods, delay in seeking testing and care and inconsistent adherence to Antiretroviral therapy) among pregnant women regarding HIV transmission, persistent stigma and discrimination hindering access to PMTCT services, and challenges within the healthcare system such as geographical disparities and inadequate provider training. Cultural practices, including breastfeeding and postnatal rituals, further exacerbate MTCT risk. Male partner involvement emerges as a crucial yet often overlooked aspect of PMTCT.Existing interventions showed moderate effectiveness, highlighting the need for tailored approaches. Strengthening multi-level interventions addressing social, economic, and cultural determinants, alongside culturally sensitive approaches and increased male engagement, are crucial to address MTCT and improve maternal and child health outcomes in Nigeria. Future research should focus on developing and evaluating interventions tailored to specific contexts and populations.

Key words:*HIV/AIDS, Mother-to-child transmission (MTCT), Nigeria, Prevention interventions, Stigma and discrimination*

1.0 INTRODUCTION

The global health crisis brought about by the Human Immunodeficiency Virus (HIV) and its devastating manifestation, Acquired Immunodeficiency Syndrome (AIDS), persists [1]. Despite notable progress in antiretroviral therapy (ART), the transmission of HIV from mother to child remains a significant issue, particularly affecting hundreds of thousands of children each year [2][3]. This concern is particularly acute in regions with limited resources, where healthcare infrastructure and access to preventative measures are insufficient [4].

HIV spreads through unprotected sexual contact, exposure to contaminated blood products, and from mother to child during pregnancy, childbirth, and breastfeeding [5][6]. By compromising the immune system, HIV renders individuals susceptible to opportunistic infections and chronic illnesses. The virus replicates within host cells, gradually diminishing CD4+ T lymphocytes—the body's primary defense. This ongoing assault weakens the immune system, ultimately progressing to AIDS, characterized by severe infections and malignancies [7][8][9][10].

Mother-to-child transmission (MTCT) of HIV/AIDS, defined as the vertical transmission from an infected mother to her child during pregnancy, childbirth, or breastfeeding, deprives vulnerable newborns

of the opportunity for a healthy life [11]. Globally, an estimated 1.3 million women and girls living with HIV become pregnant each year and without intervention, the transmission risk can reach up to 15% to 45%. This unfortunate reality underscores the imperative need for effective MTCT prevention strategies, particularly in high-burden settings like Nigeria.[11][12].

Nigeria, with a population exceeding 200 million has the world's fourth-largest HIV epidemic, estimating 1.8 million HIV (2019 Spectrum estimate) people living with and an estimated 107,112 new HIV infections [13]. Tragically, it holds the top global ranking in the number of children acquiring HIV through MTCT [14]. Despite national Prevention of Mother-to-Child Transmission (PMTCT) programs initiated since 2001, rates persistently stand at 26.9%—a considerable distance from the World Health Organization's ambitious goal of eliminating MTCT by 2030 [15][16]. This failure necessitates a critical examination of the intricate factors perpetuating this grim reality.

This review transcends a simple description of the Mother-to-Child Transmission (MTCT) scenario in Nigeria, adopting a critical evaluative stance. It dissects the multifaceted factors contributing to the ongoing transmission of HIV from mothers to children. Beyond individual-level risk behaviors, the review scrutinizes the interplay of societal, economic, and healthcare system-related determinants. The objective is to reveal the limitations of current interventions, illuminate existing gaps, and pave the way for evidence-based recommendations, envisioning a future where no child is born with HIV in Nigeria.

1.1 Methodology

1.1.1 Systematic Search Strategy

A comprehensive literature search was conducted to identify relevant studies and reports addressing factors contributing to MTCT of HIV/AIDS in Nigeria. Electronic databases including PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar were systematically searched using combinations of keywords and Medical Subject Headings (MeSH) terms related to MTCT, HIV/AIDS, Nigeria, prevention, and associated factors. Additional sources were identified through manual searches of reference lists from relevant articles and reports.Approximately 57 individual literatures was used. This estimate includes citations from review texts, which reference specific studies, reports, and articles addressing various aspects of MTCT of HIV/AIDS in Nigeria.

1.1.2 Selection Criteria

Studies and reports were included if they met the following criteria: Published in peer-reviewed journals, government reports, or reputable organizational reports. Written in English, addressed factors influencing MTCT of HIV/AIDS in Nigeria. Provided empirical data, qualitative analyses, or program evaluations relevant to the review's objectives. Covered the period from 2015 to 2023.

1.1.3 Data Extraction and Synthesis

Two independent reviewers screened the titles and abstracts of identified records to assess eligibility for full-text review. Discrepancies were resolved through consensus or consultation with a third reviewer. Full-text articles and reports meeting the inclusion criteria underwent data extraction using a standardized form. Extracted data included study characteristics (e.g., author(s), year of publication), study design, participant characteristics, key findings, and conclusions.

Data synthesis involved thematic analysis to identify common themes and patterns across studies. Themes were organized according to individual-level, health system, and societal factors contributing to MTCT of HIV/AIDS in Nigeria. The synthesis process involved iterative review and discussion among the research team to ensure comprehensive coverage of relevant literature and accurate representation of findings

1.1.4 Ethical Considerations

This review involved the analysis of existing literature and did not involve human subjects or data collection. Ethical approval was therefore not required.

2.0 FACTORS PROMOTING MOTHER TO CHILD TRANSMISSION OF HIV/AIDS IN NIGERIA – A REVIEW

2.1 Individual-Level Factors

Individual-level factors refer to the characteristics, behaviors, and attitudes of pregnant women and their partners that influence their vulnerability to HIV infection and their access to and utilization of PMTCT services. These factors include knowledge and awareness, stigma and discrimination, poverty and education, gender inequality, and risky sexual behaviors [17][18].

2.1.1 Knowledge and awareness

Limited knowledge and persistent misconceptions about HIV transmission, prevention, and treatment options present formidable challenges to MTCT prevention in Nigeria [19[1][5]. Studies like Ogunbosi *et al.* [20] and Ukaegbu *et al.* [21] reveal worrying knowledge gaps: only 54.7% of pregnant women understood breastfeeding can transmit HIV, and just 28.6% possessed comprehensive HIV prevention knowledge. These deficiencies translate to delay testing, missed prenatal visits, and inconsistent ART adherence, jeopardizing MTCT prevention efforts. Targeted educational interventions are crucial to overcome these obstacles. Moving beyond mere information dissemination, localized programs tailored to diverse sociocultural contexts can foster critical thinking and active knowledge construction around MTCT [11][12].. Participatory learning and action approaches, as demonstrated by Allaham *et al* [22], have proven effective in improving knowledge, attitudes, and practices of pregnant women regarding PMTCT.

2.1.2 Stigma and discrimination

Stigma and discrimination remain major roadblocks to accessing and utilizing PMTCT services in Nigeria. These deeply ingrained societal attitudes discourage women from seeking essential services, hindering early diagnosis, timely ART initiation, and disclosure of HIV status to partners – all critical components of MTCT prevention. Stigma manifests in various forms, including social ostracization, blame, violence, and denial of rights and opportunities, as documented by reports from organizations like the National Agency for the Control of AIDS and World Health Organization. [14, 15].

Research by Turan *et al*. [23] further confirms this association, highlighting lower uptake of HIV testing, lower retention in PMTCT care, and lower adherence to ART among pregnant women facing stigma and discrimination. Simply raising awareness isn't enough to dismantle this formidable barrier. Initiatives like community engagement programs, social mobilization campaigns, and policy reforms championed by non-governmental organizations (NGOs) like ActionAid and Civil Society for HIV in Nigeria (CIHSN) can play a crucial role in dismantling the stigma barrier [24,25]. Empowering communities to challenge

harmful beliefs, fostering acceptance and compassion through initiatives like HIV/AIDS education workshops and support groups, and holding institutions accountable for discriminatory practices are key steps towards creating a more enabling environment for pregnant women living with HIV.

2.1.3 Poverty, education & gender inequality

Poverty, limited education, and gender inequality are interrelated factors that further complicate the web of vulnerability for pregnant women and their children [26]. Poverty restricts access to essential resources crucial for maternal health and immune function, such as nutritious food, clean water, and transportation [27]. Poverty also forces women to engage in transactional sex or other risky behaviors to survive, increasing their exposure to HIV infection [26][27]. Limited education impedes comprehension of MTCT risks and prevention methods, and reduces women's ability to make informed decisions about their health [28]. Gender inequality leaves women without control over their sexual health or healthcare decisions, as they are often dependent on their male partners or family members for financial and emotional support [29]. These factors also affect the uptake and adherence to PMTCT services, as women may face barriers such as cost, distance, or lack of consent from their partners. While existing programs like conditional cash transfers and microfinance initiatives show promise, broader economic strengthening measures are essential [30]. Improved access to education, particularly for girls, is imperative for empowering women to make informed decisions. Gender-sensitive interventions addressing unequal power dynamics within families and communities have been proven to be indispensable tools necessary to ensure women have a voice in their healthcare choices [31].

2.1.4 Risky sexual behaviors

Risky sexual behaviors, such as having multiple partners or inconsistent condom use, contribute to elevated HIV transmission risk [17][32]. Factors like early sexual debut, transactional sex, and limited access to sexual health education exacerbate this vulnerability. According to a report, 23.8% of pregnant women reported having more than one sexual partner in the past year, and only 13.6% reported consistent condom use [33]. Another study by Udigwe et al. [34] found that 16.4% of pregnant women reported having transactional sex in the past year, and only 8.5% reported using condoms during these encounters. These behaviors not only increase the risk of acquiring HIV, but also of transmitting it to their partners or children. Comprehensive sexual health education focusing on responsible decision-making, safe practices, and access to contraception is crucial [35][36]. Addressing the root causes of risky behaviors, including poverty, gender inequality, and lack of economic opportunities, is essential for mitigating this risk factor.

2.2 Health System Factors

Health system factors refer to the availability, accessibility, quality, and effectiveness of healthcare services and resources that influence the delivery and utilization of PMTCT interventions. These factors include geographical disparities, service availability, counseling and support, resource allocation and provider training [37].

2.2.1 Geographical disparities

Despite national PMTCT programs, geographical disparities and service availability discrepancies persist. Rural areas face limited access to healthcare facilities, qualified personnel, and essential resources,

translating into missed opportunities for early HIV diagnosis and increased MTCT risk [38]. Rural women are less likely to access PMTCT services than urban women as distance to the nearest health facility is a significant predictor of PMTCT uptake [37]. Moreover, inadequate provider training, inconsistent adherence to protocols, and limited counseling and support services compromise the effectiveness of interventions [40]. Thus, expanding healthcare infrastructure in rural areas, deploying mobile clinics, and investing in community health workers are crucial for improving access. Streamlined referral systems and efficient logistics ensuring availability of testing kits and ART medications are essential. Even when accessed, the quality of antenatal care and PMTCT prevention interventions can vary significantly. Consequently, robust training programs for healthcare personnel on PMTCT prevention, standardized clinical protocols, and quality assurance mechanisms are essential. Comprehensive counseling and support services addressing emotional needs, concerns about infant feeding, and adherence challenges are crucial for improving intervention effectiveness [41].

2.2.2 Provider training

Provider training is a key factor influencing the quality and effectiveness of PMTCT services, as it equips healthcare personnel with the necessary knowledge, skills, and attitudes to deliver optimal care [42]. However, many healthcare providers in Nigeria lack adequate training on PMTCT protocols, best practices, and emerging developments. These gaps affect the quality of care and the outcomes of PMTCT interventions, as providers may fail to follow the recommended procedures, provide inaccurate information, or exhibit negative behaviors towards HIV-positive mothers. Addressing healthcare provider knowledge gaps through continuous training, education on PMTCT protocols, and best practices is vital. Building empathy and reducing stigma through sensitivity training and community interaction programs foster positive attitudes towards HIV-positive mothers. Implementing accountability measures and monitoring provider adherence to established guidelines are crucial for ensuring quality care [42][43].

2.2.3 Resource allocation

The Nigerian healthcare system faces chronic underfunding, shortages of qualified personnel, and inadequate distribution of resources. Overcrowded facilities, limited equipment, and inconsistent availability of essential medications and supplies hinder the quality and effectiveness of PMTCT services. Increased healthcare system funding, improved resource allocation strategies, and investment in infrastructure development in underserved areas are necessary. Innovative approaches like task-shifting to leverage community health workers and telemedicine services can address personnel shortages and improve access to care [44][45].

2.3 Societal and Cultural Factors

Societal and cultural factors refer to the norms, values, and practices of communities and families that influence the perception and behavior of pregnant women and their partners regarding HIV and PMTCT. These factors include breastfeeding and postnatal practices, and social support networks.

2.3.1 Breastfeeding and postnatal practices

Breastfeeding is a major route of MTCT, especially in settings where exclusive breastfeeding is not practiced or feasible. However, breastfeeding is also a deeply ingrained cultural practice and a symbol of

motherhood and bonding in many Nigerian communities. Studies reveal that many women face pressure from their families and communities to breastfeed their infants, regardless of their HIV status or knowledge of the risks. Interestingly, Umeobieri *et al* [46] reported that breastfeeding remains a common trend among HIV positive women and it is associated with economic independence of women and social support . Moreover, some communities have postnatal rituals and infant cleansing practices that involve the use of unsterilized instruments or substances that could transmit HIV. Communities have been reported to practice traditional infant cleansing methods, such as cutting the umbilical cord with a razor blade or applying cow dung to the wound. These practices inadvertently increase MTCT risk and undermine PMTCT efforts [47]. Culturally sensitive interventions engaging communities to discuss harmful practices and promote safe alternatives are crucial. Empowering traditional birth attendants and community leaders to disseminate accurate information about MTCT while respecting cultural values can bridge the gap between tradition and evidence-based practices.

2.3.3 Social support networks

The strength and quality of social support networks significantly impact women's ability to access healthcare and adhere to treatment regimens [48]. Social support networks can provide emotional, informational, and material assistance to HIV-positive mothers, enhancing their coping and resilience. However, many women in Nigeria lack adequate social support networks, due to stigma, discrimination, isolation, or lack of disclosure [49]. Strengthening social support networks through community-based support groups, peer counseling programs, and partnerships with civil society organizations provides invaluable assistance to HIV-positive mothers. Addressing stigma within communities and fostering an environment of acceptance and compassion builds strong social support systems that empower women to prioritize their health and their children's well-being.

2.3.4 Male Partner Involvement

Traditionally overlooked in the fight against Mother-to-Child Transmission (MTCT) of HIV/AIDS, fathers play a crucial, yet often neglected, role in prevention. A renewed focus on enhancing male involvement in PMTCT promises significant strides towards eliminating vertical transmission [50]. This requires emphasizing the multifaceted contributions men can make, while simultaneously addressing the barriers that limit their participation.

Firstly, promoting partner testing and counseling empowers men to understand their HIV status and make informed decisions about family planning and preventing onward transmission. Research by Bhushan *et al* [51] highlights the importance of couple-based counseling in increasing male HIV testing rates and facilitating open communication about reproductive health. Studies like this amplifies the value of encouraging joint testing and counseling as a cornerstone of PMTCT interventions.

Secondly, actively encouraging men to accompany their partners to prenatal care and PMTCT services fosters shared responsibility and strengthens maternal support. A study by Audet *et al* [52] revealed that male partner involvement in antenatal care led to improved maternal adherence to ART, highlighting the tangible benefits of male presence in the journey towards a healthy birth. Integrating partner education and support systems within existing prenatal care structures can bridge the gap and encourage male participation.

Thirdly, showcasing positive male role models actively engaged in PMTCT can dismantle harmful stereotypes and empower other men to follow suit. Lyatuu*et al* [53] emphasizes the effectiveness of community-based interventions featuring men who champion responsible fatherhood and actively support their HIV-positive partners. Sharing such stories through community outreach programs and media campaigns can shift harmful norms and inspire broader male engagement.

However, recognizing the barriers hindering male involvement is equally crucial. Culturally sensitive awareness campaigns tailored to local beliefs and perspectives on male roles in reproductive health are essential. As Pulerwitz *et al* [54] points out, addressing cultural misconceptions about masculinity and HIV can pave the way for more receptive communities and encourage open dialogues about male participation. Furthermore, tackling economic anxieties surrounding HIV testing and PMTCT participation can incentivize male involvement.

Finally, creating safe spaces for open discussions about HIV, fatherhood, and shared responsibility through men's groups and community forums fosters engagement and understanding. Studies like that of Sun *et al,* Morfaw *et al* and Rao *et al* [55][56][57] demonstrate the effectiveness of peer-led interventions in breaking down stigma and providing men with platforms to discuss their concerns and challenges. Such avenues for open dialogue can empower men to overcome fears and misconceptions, ultimately leading to greater participation in PMTCT programs.

2.4 Conclusion

The challenge at hand in addressing mother-to-child transmission (MTCT) of HIV/AIDS in Nigeria is substantial, yet the potential rewards are profound. A multi-level, intersectoral approach is essential, extending beyond healthcare interventions to encompass the intricate social, economic, and cultural determinants influencing MTCT. This comprehensive strategy aims to envision a future where no child in Nigeria is born with HIV, necessitating unwavering commitment, collaborative efforts, and a steadfast belief in a healthier, brighter future for mothers and children nationwide.

This transformative journey requires addressing not only healthcare aspects but also the underlying factors perpetuating MTCT. From individual-level challenges like knowledge gaps, stigma, and socioeconomic disparities to health system complexities such as geographical disparities and resource allocation, each facet demands targeted interventions. Recommendations drawn from both qualitative and quantitative evidence provide a practical roadmap for action.

Importantly, the approach must extend beyond healthcare institutions to challenge societal norms, empower women through economic opportunities, and foster gender equality. Culturally sensitive interventions, collaboration with traditional birth attendants and community leaders, and encouragement of male partner involvement form integral components of this comprehensive strategy. Strengthening legal frameworks and optimizing data management further reinforce the collective response.

While acknowledging the limitations of existing literature, this review emphasizes the ongoing need for research and evaluation. Despite the substantial nature of the challenge, success lies in unwavering commitment, collaborative efforts, and a steadfast belief in the potential for a healthier, brighter future for mothers and children nationwide. Through this concerted, multi-dimensional effort, the aspiration is to

eliminate MTCT of HIV/AIDS in Nigeria and contribute to broader global advancements in preventing and eradicating this pervasive health threat.

REFERENCES

1. World Health Organization. HIV and AIDS [Internet]. Geneva: World Health Organization; 2023 [cited 2024 Jan 24]. Available from: https://www.who.int/news-room/fact-sheets/detail/hiv-aids
2. Brainard D, Cihlar T, Geleziunas R, SenGupta D, Reynolds SJ, Lynen L, et al. HIV: Progress and future challenges in treatment, prevention and cure [Internet]. Nature; 2018 [cited 2024 Jan 24]. Available from: https://www.nature.com/articles/d42473-018-00280-0
3. UNICEF. Elimination of mother-to-child transmission [Internet]. New York: UNICEF; 2023 [cited 2024 Jan 24]. Available from: https://data.unicef.org/topic/hivaids/emtct/
4. Rural Health Information Hub. Barriers to HIV/AIDS Care in Rural Communities [Internet]. Grand Forks, ND: Rural Health Information Hub; 2023 [cited 2024 Jan 24]. Available from: https://www.ruralhealthinfo.org/toolkits/hiv-aids/1/rural-barriers
5. HIV.gov. How Is HIV Transmitted? [Internet]. Washington, DC: HIV.gov; 2022 [cited 2024 Jan 24]. Available from: https://www.hiv.gov/hiv-basics/overview/about-hiv-and-aids/how-is-hiv-transmitted/
6. Centers for Disease Control and Prevention. Ways HIV Can Be Transmitted [Internet]. Atlanta, GA: CDC; 2023 [cited 2024 Jan 24]. Available from: https://www.cdc.gov/hiv/basics/hiv-transmission/ways-people-get-hiv.html
7. Healthline. The Effects of HIV on the Body: Immune System and More [Internet]. San Francisco, CA: Healthline; 2023 [cited 2024 Jan 24]. Available from: https://www.healthline.com/health/hiv-aids/effects-on-body
8. Aidsmap. HIV and the immune system [Internet]. London, UK: Aidsmap; 2020 [cited 2024 Jan 24]. Available from: https://www.aidsmap.com/about-hiv/basics/hiv-and-immune-system
9. National Institute of Allergy and Infectious Diseases. HIV Replication Cycle [Internet]. Bethesda, MD: NIAID; 2018 [cited 2024 Jan 24]. Available from: https://www.niaid.nih.gov/diseases-conditions/hiv-replication-cycle
10. HIVinfo. The HIV Life Cycle [Internet]. Bethesda, MD: NIH; 2021 [cited 2024 Jan 24]. Available from: https://hivinfo.nih.gov/understanding-hiv/fact-sheets/hiv-life-cycle
11. World Health Organization. Mother-to-child transmission of HIV [Internet]. Geneva: World Health Organization; 2023 [cited 2024 Jan 24]. Available from: https://www.who.int/teams/global-hiv-hepatitis-and-stis-programmes/hiv/prevention/mother-to-child-transmission-of-hiv
12. UNICEF. Elimination of mother-to-child transmission [Internet]. New York: UNICEF; 2023 [cited 2024 Jan 24]. Available from: https://data.unicef.org/topic/hivaids/emtct/

13. Joint United Nations Programme on HIV/AIDS. Country progress report - Nigeria [Internet]. Geneva: UNAIDS; 2020 [cited 2024 Jan 24]. Available from: https://www.unaids.org/sites/default/files/country/documents/NGA_2020_countryreport.pdf

14. National Agency for the Control of AIDS. FACT SHEET: Prevention of Mother to Child Transmission (PMTCT), 2016 [Internet]. Abuja: NACA; 2016 [cited 2024 Jan 24]. Available from: https://naca.gov.ng/fact-sheet-prevention-of-mother-to-child-transmission-pmtct-2016/

15. World Health Organization. PREVENTION OF MOTHER-TO-CHILD TRANSMISSION TECHNICAL UPDATE [Internet]. Geneva: WHO; 2018 [cited 2024 Jan 24]. Available from: https://www.afro.who.int/sites/default/files/2018-06/Prevention%20of%20mother-to-child%20transmission%20-%20Technical%20update.pdf

16. World Health Organization. The road map targets for 2030 [Internet]. Geneva: WHO; 2021 [cited 2024 Jan 24]. Available from: https://www.who.int/teams/control-of-neglected-tropical-diseases/ending-ntds-together-towards-2030/targets

17. Centers for Disease Control and Prevention. Factors Increasing HIV Risk [Internet]. Atlanta: CDC; 2022 [cited 2024 Jan 24]. Available from: https://www.cdc.gov/hiv/risk/estimates/riskfactors.html

18. World Health Organization. Vulnerable groups and key populations at increased risk of HIV [Internet]. Geneva: WHO; 2023 [cited 2024 Jan 24]. Available from: https://www.emro.who.int/asd/health-topics/vulnerable-groups-and-key-populations-at-increased-risk-of-hiv.html

19. Zhang T, Miao Y, Li L, Bian Y. Awareness of HIV/AIDS and its routes of transmission as well as access to health knowledge among rural residents in Western China: a cross-sectional study [Internet]. BMC Public Health; 2019 [cited 2024 Jan 24]. Available from:https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7992-6

20. Ogunbosi BO, et al. Missed Opportunities for Prevention of Mother-to-Child Transmission of HIV (PMTCT) in Ibadan, Southwest Nigeria. World Journal of AIDS; 2014 [cited 2024 Jan 24]. Available from: https://www.researchgate.net/publication/266560025_Missed_Opportunities_for_Prevention_of_Mother-to-Child_Transmission_of_HIV_PMTCT_in_Ibadan_Southwest_Nigeria

21. Ukaegbu E, Alibekova R, Ali S, et al. Trends of HIV/AIDS knowledge and attitudes among Nigerian women between 2007 and 2017 using Multiple Indicator Cluster Survey data. BMC Public Health. 2022;22:440. https://doi.org/10.1186/s12889-022-12865-y

22. Allaham S, Kumar A, Morriss F, Lakhanpaul M, Wilson E, Sikorski C, Martin J, Costello A, Manikam L, Heys M. Participatory learning and action (PLA) to improve health outcomes in high-income settings: a systematic review protocol [Internet]. BMJ Open; 2023 [cited 2024 Jan 24]. Available from: https://bmjopen.bmj.com/content/12/2/e050784

23. Turan JM, Nyblade L. HIV-related stigma as a barrier to achievement of global PMTCT and maternal health goals: a review of the evidence [Internet]. AIDS and Behavior; 2013 [cited 2024

Jan 24]. Available from: https://www.hsph.harvard.edu/wp-content/uploads/sites/2413/2014/05/Janet-Turan.pdf

24. Gronholm PC, et al. Toward a multi-level strategy to reduce stigma in global mental health: overview protocol of the Indigo Partnership to develop and test interventions in low- and middle-income countries [Internet]. International Journal of Mental Health Systems; 2023 [cited 2024 Jan 24]. Available from: https://www.wvi.org/sites/default/files/cPMTCT%20World%20Vision%20Integrated%20Approach_FINAL.pdf

25. Health Policy Project. Stigma and Discrimination [Internet]. Washington, D.C.: Health Policy Project; 2024 [cited 2024 Jan 24]. Available from: https://academic.oup.com/book/1031/chapter-abstract/137934828?redirectedFrom=fulltext

26. UNESCO. (2022). Available from: https://unesdoc.unesco.org/ark:/48223/pf0000245698.

27. O'Hara M, et al. Economic and social factors are some of the most common barriers preventing women from accessing maternal and newborn child health (MNCH) and prevention of mother-to-child transmission (PMTCT) services: A literature review. AIDS Behav. 2014;18(S5):516–530. Available from: https://doi.org/10.1007/s10461-014-0756-5.

28. Yeshaneh, A. et al. (2023) 'Knowledge, attitude, and practice towards prevention of mother-to-child transmission of HIV among antenatal care attendees in Ethiopia, 2020', PLOS ONE. Edited by S. Kumar, 18(2), p. e0277178. Available at: https://doi.org/10.1371/journal.pone.0277178.

29. Villines Z. Gender bias in healthcare: Examples and consequences. Medical News Today. 2021. Available from: https://www.medicalnewstoday.com/articles/gender-bias-in-healthcare.

30. Ndimande-Khoza MN, Scorgie F, Delany-Moretlwe S, et al. The impact of conditional cash transfers for HIV prevention on peer relationships: perspectives from female recipients and non-recipients in HPTN 068. BMC Public Health. 2022;22:2230. https://doi.org/10.1186/s12889-022-14529-3

31. Alcalde-Rubio L, Hernández-Aguado I, Parker LA, et al. Gender disparities in clinical practice: are there any solutions? Scoping review of interventions to overcome or reduce gender bias in clinical practice. Int J Equity Health. 2020;19:166. https://doi.org/10.1186/s12939-020-01283-4

32. How to Prevent The Sexual Transmission of HIV? (2023) HIV.gov. Available at: https://www.hiv.gov/hiv-basics/hiv-prevention/reducing-sexual-risk/preventing-sexual-transmission-of-hiv/.

33. Atewogbola GO, Olufemi BT, Babawale AA, Taiwo MA, Tadese SA, Olaniyan AA, Sule WF. Multiple Sexual Partners as Major Predictor of Human Immunodeficiency Virus Seropositivity Among Pregnant Women, Osun State, Nigeria. Viral Immunol. 2022 Nov;34(9):632-638. doi: 10.1089/vim.2021.0029. Epub 2021 Aug 17. PMID: 34403606.

34. Udigwe G, Mbachu I, Onyegbule O, Oguaka V. Use of Condoms among Human Immunodeficiency Virus Positive Women Attending Antenatal Clinic in Nnewi, South East

Nigeria. Ann Med Health Sci Res. 2023 Sep;4(5):687-91. doi: 10.4103/2141-9248.141503. PMID: 25328775; PMCID: PMC4199156.

35. United Nations Educational, Scientific and Cultural Organization. Comprehensive sexuality education: For healthy, informed and empowered learners [Internet]. Paris: UNESCO; 2023 [cited 2024 Jan 24]. Available from: https://www.unesco.org/en/health-education/cse

36. World Health Organization. Comprehensive sexuality education [Internet]. Geneva: WHO; 2023 [cited 2024 Jan 24]. Available from: https://www.who.int/news-room/questions-and-answers/item/comprehensive-sexuality-education

37. Sherr K, Gimbel S, Rustagi A, et al. Systems analysis and improvement to optimize pMTCT (SAIA): a cluster randomized trial. Implementation Sci. 2014;9:55. https://doi.org/10.1186/1748-5908-9-55

38. Nduati EW, Hassan AS, Knight MG, et al. Outcomes of prevention of mother to child transmission of the human immunodeficiency virus-1 in rural Kenya—a cohort study. BMC Public Health. 2015;15:1008. https://doi.org/10.1186/s12889-015-2355-4

39. Darak S, Panditrao M, Parchure R, et al. Systematic review of public health research on prevention of mother-to-child transmission of HIV in India with focus on provision and utilization of cascade of PMTCT services. BMC Public Health. 2012;12:320. https://doi.org/10.1186/1471-2458-12-320

40. Asefa A, Mitike G. Prevention of Mother-to-Child Transmission (PMTCT) of HIV services in Adama town, Ethiopia: clients' satisfaction and challenges experienced by service providers. BMC Pregnancy Childbirth. 2014;14:57. https://doi.org/10.1186/1471-2393-14-57

41. USAID. Prevention of Mother to Child Transmission (PMTCT). 2022. Available from: https://www.usaid.gov/global-health/health-areas/hiv-and-aids/technical-areas/pmtct.

42. Mutabazi JC, Zarowsky C, Trottier H. The impact of programs for prevention of mother-to-child transmission of HIV on health care services and systems in sub-Saharan Africa - A review. Public Health Rev. 2017;38:28. https://doi.org/10.1186/s40985-017-0072-5

43. Measurement of mother-to-child transmission of HIV in countries with high HIV prevalence in women of reproductive age. Technical Brief. Available from: https://www.childrenandaids.org/sites/default/files/2022-01/EMTCT%20early%20and%20late%20measurement%20technical%20brief_14%20Jan%202022.pdf

44. The challenge of funding healthcare in Nigeria." No date. Stears. Available at: https://www.stears.co/article/the-challenge-of-funding-healthcare-in-nigeria/

45. Onwujekwe O, Ezumah N, Mbachu C, et al. Exploring effectiveness of different health financing mechanisms in Nigeria; what needs to change and how can it happen? BMC Health Serv Res. 2019;19:661. doi:10.1186/s12913-019-4512-4.

46. Umeobieri AK, Mbachu C, Uzochukwu BSC, et al. Perception and practice of breastfeeding among HIV positive mothers receiving care for prevention of mother to child transmission in South-East, Nigeria. Int Breastfeed J. 2018;13:50. doi:10.1186/s13006-018-0191-8.

47. Abegunde D, Orobaton N, Beal K, Bassi A, Bamidele M, Akomolafe T, Ohanyido F, Umar-Farouk O, Danladi S. Trends in newborn umbilical cord care practices in Sokoto and Bauchi States of Nigeria: the where, who, how, what and the ubiquitous role of traditional birth attendants: a lot quality assurance sampling survey. BMC Pregnancy Childbirth. 2017 Nov 9;17(1):368. doi: 10.1186/s12884-017-1551-x. PMID: 29121870; PMCID: PMC5680596

48. Shushtari ZJ, et al. Effect of Social Support Interventions on Adherence to Antiretroviral Therapy Among People Living with HIV: A Systematic Review and Meta-Analysis. AIDS Behav [Preprint]. 2022. Available at: https://doi.org/10.1007/s10461-022-03894-0.

49. Odiachi A, Erekaha S, Cornelius LJ, et al. HIV status disclosure to male partners among rural Nigerian women along the prevention of mother-to-child transmission of HIV cascade: a mixed methods study. Reprod Health. 2018;15:36. https://doi.org/10.1186/s12978-018-0474-y.

50. Zewude SB, Dagne AH, Ajebe TM. Importance of male partner's involvement in prevention of mother to child transmission of HIV/AIDS in Ethiopia: a systematic review and meta analysis until June 2021. Arch Public Health. 2022;80:223. https://doi.org/10.1186/s13690-022-00971-7.

51. Bhushan NL, Golin CE, McGrath N, et al. The impact of HIV couple testing and counseling on social support among pregnant women and their partners in Lilongwe, Malawi: an observational study. AIDS Care. 2019 Feb;31(2):199-206. doi: 10.1080/09540121.2018.1510102. Epub 2018 Sep 5. PMID: 30182730; PMCID: PMC6322660.

52. Audet CM, Sack DE, Ndlovu GH, et al. Women want male partner engagement in antenatal care services: A qualitative study of pregnant women from rural South Africa. PLoS One. 2023 Apr 3;18(4):e0283789. doi: 10.1371/journal.pone.0283789. PMID: 37011063; PMCID: PMC10069782.

53. Lyatuu G, Tarimo EAM, Dee J, et al. Engaging community leaders to improve male partner participation in the prevention of mother-to-child transmission of HIV in Dar es Salaam, Tanzania. PLOS ONE. 2018;13(12):e0207986. Available at: https://doi.org/10.1371/journal.pone.0207986.

54. Pulerwitz J, Michaelis A, Verma R, Weiss E. Addressing gender dynamics and engaging men in HIV programs: lessons learned from Horizons research. Public Health Rep. 2010 Mar-Apr;125(2):282-92. doi: 10.1177/003335491012500219. PMID: 20297757; PMCID: PMC2821858.

55. Sun J, et al. Stigma and Peer-Led Interventions: A Systematic Review and Meta-Analysis. Front Psychiatry. 2022;13. Available at: https://doi.org/10.3389/fpsyt.2022.915617.

56. Morfaw, F.L., Thabane, L., Mbuagbaw, L.C. et al. Male participation in prevention programmes of mother to child transmission of HIV: a protocol for a systematic review to identify barriers, facilitators and reported interventions. Syst Rev 1, 13 (2012). https://doi.org/10.1186/2046-4053-1-13

57. Rao D, Elshafei A, Nguyen M, et al. A systematic review of multi-level stigma interventions: state of the science and future directions. BMC Med. 2019;17:41. https://doi.org/10.1186/s12916-018-1244-y.