Effectiveness of the Prevention of HIV Mother-To-Child Transmission (PMTCT) Program via Early Infant Diagnosis (EID) data in Senegal

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ABSTRACT

Background: To improve the care and treatment of HIV-exposed children, early infant diagnosis (EID) using dried blood spot (DBS) sampling has been performed in Senegal since 2007, making molecular diagnosis accessible for patients living in decentralized settings. This study aimed to determine the evolution of the HIV transmission rate in children from 2008 to 2015 and to analyze associated factors, particularly the mother’s treatment status and/or child’s prophylaxis status and the feeding mode.

Methods: The data were analyzed using EID reports from the reference laboratory. Information related to sociodemographic characteristics, HIV profiles, the mother’s treatment status, the child’s prophylaxis status, and the feeding mode was included. Descriptive statistics were calculated, and bivariate and multivariate logistic regression analyses were performed.

Results: During the study period, a total of 5418 samples (5020 DBS and 398 buffy coat) from 168 primary prevention of HIV mother-to-child transmission (PMTCT) intervention sites in Senegal were tested. The samples were collected from 4443 children with a median age of 8 weeks (1-140 weeks) and a sex ratio (M/F) of 1.1 (2309/2095). One-third (35.2%; N = 1564) of the children were tested before 6 weeks of age. Twenty percent (N = 885) underwent molecular diagnostic testing more than once. An increased number of mothers receiving treatment (57.4%; N = 2550) and children receiving prophylaxis (52.1%; N = 2315) for protection against HIV infection during breastfeeding was found over the study period. The transmission rate decreased from 14.8% (95% confidence interval (CI): 11.6-18.7) in 2008 to 4.1% (95% CI: 2.7-6.2) in 2015 (p < 0.001).

Conclusion: This study demonstrates the effectiveness of PMTCT interventions in Senegal and indicates that increased effort should be continued to reduce the MTCT rate to less than 2%.

EXTERNAL LINK

Short title: Effectiveness of Senegalese PMTCT Program

THIS DOCUMENT ACCOMPANIES THE FOLLOWING PUBLICATION

1- UNAIDS (2014) UNAIDS Gap report on the global AIDS epidemic. UNAIDS, New York, NY. Available: http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Gap_report_en.pdf
2- World Health Organization (2013) Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection. Recommendations for a public health approach. June 2013. WHO. Geneva, Switzerland. Available: http://apps.who.int/iris/bitstream/10665/85321/1/9789241505727_eng.pdf
3- Mangwiro AZ, Makomva K, Bhattacharya A, Bhattacharya G, Gotora T, Owen M, et al. (2014) Does provision of point-of-care CD4 technology and early knowledge of CD4 levels affect early initiation and retention on antiretroviral treatment in HIV-positive pregnant women in the context of Option B+ for PMTCT? J Acquir Immune Defic Syndr, 67 Suppl 2:S139-44.
4- Mwapasa V, Pro G, Chinkhumba J, Mukaka M, Kobayashi E, Stuart A, et al. (2014) Mother-Infant Pair Clinic and SMS Messaging as Innovative Strategies for Improving Access to and Retention in eMTCT Care and Option B+ in Malawi: A Cluster Randomized Control Trial (The PRIME Study). J Acquir Immune Defic Syndr, 67 Suppl 2:S120-4.
5- Sherman GG, Stevens G, Jones SA, Horsfield P, Stevens WS (2005) Dried blood spots improve access to HIV diagnosis and care for infants in low-resource settings. J. Acquir. Immune Defic. Syndr, 38(5):615–17.
6- World Health Organization (2010a) Recommendations on the diagnosis of HIV infection in infants and children. WHO. Geneva, Switzerland. Available: http://www.who.int/hiv/pub/paediatric/diagnosis/en/
(2000) Prevention of mother-to-child HIV transmission in resource-poor countries: translating research into policy and practice. JAMA, 283 (9):1175-82. 8- World Health Organization (2009) Towards universal access on HIV/AIDS, scaling up HIV health sector priority interventions. WHO, Geneva, Switzerland. Available: http://www.unaidsrstesa.org/resources/reports/towards-universal-access-scaling-priority-hiv-aids-interventions-health-sector 9- UNICEF (2013) Towards an AIDS-free Generation. Children and AIDS Sixth Stocktaking Report. Available: http://www.childrenandaids.org/files/str6_full_report_29-11-2013.pdf 10- Division de Lutte contre le Sida et les IST (DLSI) (2009) Rapport Annuel 2009. Available: http://www.divisionsida-ist.sn/RapportAnnuel2009.pdf 11- Division de Lutte contre le Sida et les IST (DLSI) (2014) Rapport Annuel 2014. Available: http://www.divisionsida-ist.sn/RAPPORT_ANNUEL_2014.pdf 12- UNAIDS (2011) Global Plan towards the Elimination of New HIV Infections among Children by 2015 and Keeping Their Mothers Alive: 2011–2015. Geneva: UNAIDS. Available: http://www.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2011/20110609_jc2137_global-plan-elimination-hiv-children_en.pdf 13- World Health Organization (2010b) Antiretroviral drugs for treating pregnant women and preventing HIV infection in infants: Recommendations for a public health approach. WHO, Geneva. Available: http://www.who.int/hiv/pub/mtct/antiretroviral2010/en/ 14- Kim MH, Ahmed S, Buck WC, Preidis GA, Hosseinipour MC, Bhakalia A, et al. (2012) The Tingathe programme: a pilot intervention using community health workers to create a continuum of care in the prevention of mother to child transmission of HIV (PMTCT) cascade of services in Malawi. J Int AIDS Soc, 15 Suppl 2:17389. 15- Ramkissoon A, Coovadia H (2013) Charting a path along the continuum of PMTCT of HIV-1, to elimination, and finally to eradication. S Afr Med J, 104 (1):18-20. 16- Sherman GG, Lilian RR, Bhardwaj S, Candy S, Barron P (2014) Laboratory information system data demonstrate successful implementation of the prevention of mother-to-child transmission programme in South Africa. S Afr Med J, 104(3 Suppl 1):235-8. 17- UNAIDS (2016) On the Fast-Track to an AIDS-free generation. UNAIDS, New York, NY. Available: http://www.unaids.org/sites/default/files/media_asset/GlobalPlan2016_en.pdf 18- World Health Organisation (2015) WHO validates elimination of mother-to-child transmission of HIV and syphilis in Cuba. WHO, Geneva, Switzerland. Available: http://www.who.int/mediacentre/news/releases/2015/mtct-hiv-cuba/en/ 19- World Health Organization (2016) WHO validates countries' elimination of mother-to-child transmission of HIV and syphilis. WHO, Geneva, Switzerland. Available: http://www.who.int/mediacentre/news/statements/2016/mother-child-hiv-syphilis/en/ 20- Ishikawa N, Newman L, Taylor M, Essajee S, Pendse R, Ghidinelli M. (2016) Elimination of mother-to-child transmission of HIV and syphilis in Cuba and Thailand. Bull World Health Organ, 94(11):787-787A. 21- Lilian RR, Kalk E, Technau KG, Sherman GG (2013) Birth diagnosis of HIV infection in infants to reduce infant mortality and monitor for elimination of mother-to-child transmission. Pediatr Infect Dis J, 32(10):1080-5. 22- World Health Organization (2008) Report of the WHO Technical Reference Group, Paediatric HIV/ART Care Guideline Group Meeting WHO Headquarters. Geneva, Switzerland. Available: http://www.who.int/hiv/pub/paediaetic/WHO-Paediatric_ART_guideline_rev_mreport_2008.pdf 23- Stevens W, Erasmus L, Moloi M, Taleng T, Sarang S. (2008) Performance of a novel human immunodeficiency virus (HIV) type 1 total nucleic acid-based real-time PCR assay using whole blood and dried blood spots for diagnosis of HIV in infants. J Clin Microbiol, 46(12):3941-5. 24- Violari MF, Cotton MF, Gibb DM, Babiker AG, Steyn J, Madhi SA, et al. (2008) Early antiretroviral therapy and mortality among HIV-infected infants. N Engl J Med, 359 (21):2233-44. 25- Collins IJ, Jourdain G, Hansudewechakur R, Kanjanavanit S, Hongsinwong S, Ngampiyasakul C, et al. (2010) Long-term survival of HIV-infected children receiving antiretroviral therapy in Thailand: a 5-year observational cohort study. Clin Infect Dis, 51(12): 1449–57. 26- Kurewa NE, Gumbo FZ, Mapungure PM, Munjoma MW, Chirenje MZ, Rusakaniko S, et al. (2012) Predictors of Attrition among Children Born in a PMTCT Programme in Zimbabwe Followed up over 5 Years. J Trop Pediatr, 58(5), 360–9. 27- Mugumbi ML, Deo S, Kektiniwa A, Kiycya C, Singer ME (2013) Do diagnosis delays impact receipt of test results? Evidence from the HIV early infant diagnosis program in Uganda. PLoS One, 8(11):e78981. 28- Mwendo EM, Muty TB, Renju J, Rutherford GW, Mondi J, Sichalwe AW, et al. (2014) Effectiveness of prevention of mother-to-child HIV transmission programmes in Kilimanjaro region, northern Tanzania. Trop Med Int Health, 19 (3): 267–74. 29- Prendergast AJ, Essajee S, Penazzato M. (2015) HIV and the millenium development goals. Arch Dis Child, 100:S48—52. 30- UNAIDS (2016) On the Fast-Track to an AIDS-free generation. Available: http://www.who.int/mediacentre/news/releases/2016/mtct-hiv-cuba/en/ 31- Kim MH, Ahmed S, Buck WC, Preidis GA, Hosseinipour MC, Bhakalia A, et al. (2012) The Tingathe programme: a pilot intervention using community health workers to create a continuum of care in the prevention of mother to child transmission of HIV (PMTCT) cascade of services in Malawi. J Int AIDS Soc, 15 Suppl 2:17389. 32- Torpey K, Mandala J, Kasonde P, Bryan-Mofya G, Bweupe Taleng T, Sarang S. (2008) Performance of a novel human immunodeficiency virus (HIV) type 1 total nucleic acid-based real-time PCR assay using whole blood and dried blood spots for diagnosis of HIV in infants. J Clin Microbiol, 46(12):3941-5. 33- Lussiana C, Clemente SV, Ghelardi A, Lonardi M, Pulido Tarquino IA, Floridia M (2012) Effectiveness of a program in south-south region of Nigeria. 34- Bailey H, Townsend CL, Semenenko I, Malyuta R, Cortina-Borja M, Thorne C, et al. (2013) Charting a path along the continuum of PMTCT of HIV-1, to elimination, and finally to eradication. S Afr Med J, 104 (1):18-20. 35- Buchanan AM, Dow DE, Massambu CG, Nyombi B, Shayo A, Taleng T, Sarang S. (2008) Performance of a novel human immunodeficiency virus (HIV) type 1 total nucleic acid-based real-time PCR assay using whole blood and dried blood spots for diagnosis of HIV in infants. J Clin Microbiol, 46(12):3941-5. 36- Collins IJ, Jourdain G, Hansudewechakur R, Kanjanavanit S, Hongsinwong S, Ngampiyasakul C, et al. (2010) Long-term survival of HIV-infected children receiving antiretroviral therapy in Thailand: a 5-year observational cohort study. Clin Infect Dis, 51(12): 1449–57. 37- Afe AJ, Adewum N, Emokpa A, Fagorala T, Disu AE, Ganikale I, et al. (2011) Outcome of PMTCT services and factors affecting vertical transmission of HIV infection in Lagos, Nigeria. HIV & AIDS Review, 10(1):14–18. 38- Koye DN, Zeleke BM (2013) Mother-to-child transmission of HIV and its predictors among HIV-exposed infants at a PMTCT clinic in northwest Ethiopia. BMC Public Health, 13:398. 39- Noubiap JJ, Bongoe A, Demanou SA (2013) Mother-to-child transmission of HIV:
findings from an Early Infant Diagnosis program in Bertoua, Eastern Cameroon. Pan Afr Med J, 15:65. 40- De Schacht C, Mabunda N, Ferreira OC, Ismael N, Calu N, Santos I, et al. (2014) High HIV incidence in the postpartum period sustains vertical transmission in settings with generalized epidemics: a cohort study in Southern Mozambique. J Int AIDS Soc, 17:18808.