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UTILIZATION OF HIV PREVENTION MEASURES FOR MOTHER-TO-CHILD TRANSMISSION AMONG PREGNANT WOMEN IN RIVERS STATE: A HOSPITAL-BASED STUDY

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Abstract: This study investigated the determinants of utilization of preventive measures against mother-tochild transmission of HIV among positive pregnant women in teaching hospitals in Rivers State, Nigeria. A cross-sectional research design was used for this study with a sample size of 238 which was selected using the simple random sampling technique. The instrument for data collection was a self-structured questionnaire with a reliability coefficient of 0.81. Data was analyzed using percentage, mean, standard deviation, and simple regression at 0.05 alpha level. The findings of this study shows that. The finding of the study also showed that the utilization of PMMTCT of HIV was determined by factors such as socio-economic status ($\bar{X}$ = 3.26±0.75), cultural belief ($\bar{X}$ = 3.17±0.69). There was a statistically significant high positive relationship between the utilization of PMMTCT and factors such as age (r = 0.953; p<0.05), educational level (r = 0.893; p<0.05), parity (r = 0.867; p<0.05). The study concluded that, the determinants of the utilization of PMMTCT of HIV was cultural belief, followed by others such as socio-economic status, age, educational level, and parity. It was recommended that, the health sector should incorporate community stakeholders in their effort to increase the utilization of PMMTCT, as they can assist in discouraging some of the cultural beliefs which are not favourable to PMMTCT

Keywords: HIV Prevention, PMTCT Utilization, Socio-demographic Factors

Introduction

Mother-To-Child-Transmission also referred to as vertical transmission is the transmission of the HIV virus from mother to the child. This transmission occurs at an estimated rate of 15 to 30% in developed countries and increases to 30 to 45% in developing countries representing as the major cause of AIDS in children (Lala & Merchant, 2010). The transmission can occur at three different times; Prepartum (in uterus), due to feto-maternal blood shunts within the placenta; Intrapartum (during delivery), when neonates pass through the birth canal and are exposed to infected maternal blood and genital secretions and Postpartum: during breastfeeding which accounts for up to 40% of infant infections because both cell-free and cell-associated viruses have been detected in breast milk. (Da Silva, 2013; Milligan & Overbaugh, 2014).

A breach in the maternal-infant blood barrier, otherwise known as placental micro transfusion is believed to facilitate MTCT. The exact cause of placental micro transfusions still remains unknown, they have been associated with contractions during the early stages of labor when membranes rupture and ultimately result in the

exchange of small amounts of maternal and fetal blood. This exchange may result in the transfer of HIV-infected cells from the mother to child, increasing infection risk for the infant. Furthermore, a majority of transmission events are believed to occur across infant mucosal surfaces, such as gastrointestinal tract and nasopharyngeal surfaces. Throughout gestation, delivery, and the breastfeeding these mucosal barriers are in constant contact with HIV-infected maternal fluids providing sufficient time and chance for transmission to occur. (Milligan & Overbaugh 2014.)

The risk of HIV transmission from mother to child is the highest at the end of pregnancy and the vast majority of infections are occurring during labour and delivery. Generally, the risk of infection in prepartum period is at 20%, during delivery is 45-50% and 30-35 % in the post-partum period. In industrialized nations the risk is at 15-25 % and that of developing countries is 25-45%. This difference is largely caused by transmission by breastfeeding by HIV positive women in the developing countries. (Weinberg 2000.) Sexually transmitted diseases can lead to vaginal ulceration which can increase the amount of HIV infected fluid in the birth canal. Maternal tuberculosis has also been shown to be associated with increased risk of mother to child transmission. Research undertaken in India showed an almost threefold increase in transmission rates between tuberculosis infected HIV positive mother and child (30%) relative to HIV-positive non-tuberculosis infected mother and child pairs (12%). (Gupta et al, 2011).

According to the World Health Organization (2016), the pandemic of acquired immune deficiency syndrome (AIDS) is caused by the human immunodeficiency virus type 1 (HIV-1). There are two main strains of HIV: HIV-1 which is the more common type and has caused the majority of infections and AIDS cases and is what is usually implied when mention of HIV is made generally. HIV-2 is a rarer form of the virus and is concentrated in selected countries mainly in West Africa. Given the simplicity of the virus, they mutate much more easily than more complex forms of life and hence have been known to differ from individual to individual and even to mutate within an individual over the course of the disease. There are other more obscure forms of the virus in humans and primates but these two are responsible for the global epidemic. AIDS represents one of the most serious health crises in the world; there are 34 million people infected worldwide, with more than 15.4 million about half of the population being women (WHO, 2014). In 1991, the Federal Ministry of Health (FMOH) (2003) conducted the first sentinel zero-prevalence survey in Nigeria. In this survey, and in subsequent surveys conducted in 1993, 1999, and 2001, pregnant women attending antenatal clinics (ANCs), patients with sexually transmitted infections (STIs), patients with Tuberculosis, and female commercial sex workers (FCSWs) provided the population for the HIV sero-prevalence estimates.

Worldwide, approximately 2.2 million women and 600,000 infants are infected with HIV each year (UNAIDS, 2010). Since the first pediatric AIDS case was documented in 1985, the number of infected children has increased markedly, and the health care for these children is becoming an increasing burden on the public health system. As a result, preventive measures against mother-to-child-transmission (PMTCT) programme was initiated. PMTCT exist in different parts of the world including Nigeria. The services which include voluntary counseling and testing (VCT), HIV testing, ART, obstetric intervention (cesarean section) and safer infant feeding which are available in different parts of the world. This successful implementation of PMTCT programme for a larger number of women is feasible if the health system has adequate resources and personnel. This makes preventive measures among these groups of persons, particularly the pregnant women non-negligible in the effort to curb this pandemic in a developing country like Nigeria. However, it is the availability and adequate utilization of the services will reduce or eliminate the risk of MTCT of HIV. Unfortunately, literature has shown that several factors impede the availability and utilization of PMTCT. Thus, this study investigated the determinants of utilization of preventive measures against mother-to-child transmission of HIV among positive pregnant women in teaching hospitals in Rivers State, Nigeria.

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Research Questions

1. What is the extent to which socio-economy status of respondents determine the utilization of preventive measures against mother-to-child transmission of HIV?
2. What is the extent to which cultural belief determine the utilization of preventive measures against mother-to-child transmission of HIV?
3. What is the extent to which age of positive pregnant women affect utilization of preventive measures against mother-to-child transmission of HIV?
4. What is the extent to which the level of education of positive pregnant women affect utilization of preventive measures against mother-to-child transmission of HIV?
5. What is the extent to which number of children affect the utilization of preventive measures against mother-to-child transmission of HIV?

Hypotheses

The following hypotheses postulated were tested at 0.5 alpha level:

1. There is no significant relationship between socio-economic level and utilization of preventive measures against mother to child transmission of HIV among respondents.
2. There is no significant relationship between cultural belief and utilization of preventive measures against mother-to child transmission of HIV among respondents.
3. There is no significant relationship between age and utilization of preventive measures against mother to child transmission of HIV among respondents.
4. There is no significant relationship between educational level and utilization of preventive measures against mother to child transmission of HIV among respondents.
5. There is no significant relationship between number of children and utilization of preventive measures of mother-to-child transmission of HIV among respondents.

Methodology

The methods and procedure used in the study are described below:

Study Design: This study adopted the cross-sectional design. A cross- sectional study design is a type of observational study that analyzes data from a population, or a representative subset, at a specific point in time without manipulating any variable. This study examined the determinants of utilization of preventive measures against mother-to-child transmission of HIV among positive pregnant women in teaching hospitals in Rivers State, Nigeria without manipulating any variable or carrying out any intervention. Thus, the design was considered appropriate for use in this study.

Population for the study: The population for the study comprised of all positive pregnant women attending Antenatal Clinic in Rivers State Teaching Hospital and university of Port Harcourt Teaching Hospital. One of the inclusion criteria is that the woman must be booked at early gestation (4-6weeks).

Sample and Sampling technique: The sample size for this study was 238 which was determined using Fisher's Formula: $n = z^2 pq/e^2$ where n = Sample size; z = confidence level taken as 95% = 1.96; p = proportion of the population with desired characteristics taken as 17% (Okoye & TobinWest, 2011); q = proportion of the population without the desired characteristics = I – p; and e^2 = Degree of precision taken as 5% (0.05). Adding 10% attrition rate, n = 238. The convenient sampling technique was adopted to select the respondents for the study.

Instrument for Data Collection: A semi-structured questionnaire which was drafted by the researcher was used for data collection. The questionnaire was developed from information available in the literature on factors affecting utilization of preventive measures against motherto-child transmission of HIV. Section A elicited

response on the **s**ocio-demographic characteristics of the respondents while section B was focused on the determinants of utilization of preventive measures against mother-to-child transmission of HIV.

Validity of instrument: The instrument was constructed based on the variables of interest in the specific objectives and literature review. Furthermore, the instrument was given to two experts in the field of study for corrections. Finally, the instrument was given to the research supervisors for approval. Suggestion made was used to modify the instrument.

Reliability of instrument: A test-retest procedure was used. The answers were collected, and analysed using the Pearson Product Moment Correlation. The reliability coefficient of the instrument was 0.81. This certifies the instrument to be reliable for use in this study.

Data Collection Procedure: The researcher visited the study sites before the research date and early on the days of data collection to introduce herself and seek the consent of the positive pregnant women to participate in the study. Questionnaires were distributed and administered to the positive pregnant women at the teaching hospitals. The contents of the questionnaire were explained to the respondents in the language they understood to enable them respond appropriately. The questionnaires were retrieved at a spot immediately after completion. **Method of data Analysis:** Completed questionnaires were collected, coded and entered into the computer using the Statistical Package for Social Science (SPSS) version 25.0. Statistical tools used include: percentage, mean, standard deviation and inferential statistics such as simple regression at 0.05 alpha level. The results were presented in charts and tables.

Results: The results of the study are presented in table 1-5 below:

Table 1: Regression analysis showing the relationship between socio-economic level and utilization of preventive measures against mother to child transmission of HIV among respondents

Model R	R square	Adjusted R square	B	P	Decision
Socio-economic status	0.973	0.946	0.946	1.085	0.000 Rejected

Table 1 shows the regression analysis of the relationship between socio-economic level and utilization of PMMTCT. The result shows a significant high positive relationship between socioeconomic level and the utilization of PMMTCT ($r = 0.973$; $p<0.05$). Therefore, the null hypothesis which states that there is no significant relationship between socio-economic level and utilization of PMMTCT of HIV among positive pregnant women in Rivers State is rejected.

Table 2: Regression analysis showing the relationship between cultural belief and utilization of preventive measures against mother to child transmission of HIV among respondents

Model R	R square	Adjusted R square	B	P	Decision
Culture	0.966	0.934	0.934	1.037	0.000 Rejected

Table 2 shows the regression analysis of the relationship between cultural belief and utilization of PMMTCT. The result shows a significant high positive relationship between cultural belief and the utilization of PMMTCT ($r = 0.966$; $p<0.05$). Therefore, the null hypothesis which states that there is no significant relationship between cultural belief and utilization of PMMTCT of HIV among positive pregnant women in Rivers State is rejected.

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Table 3: Regression analysis showing the relationship between age and utilization of preventive measures against mother to child transmission of HIV among respondents

Model	R	R square	Adjusted R square	B	P	Decision
Age	0.953	0.909	0.909	0.104	0.000	Ho Rejected

Table 3 shows the regression analysis of the relationship between age and utilization of PMMTCT. The result shows a significant high positive relationship between age and the utilization of PMMTCT ($r = 0.953$; $p<0.05$). Therefore, the null hypothesis which states that there is no significant relationship between age and utilization of PMMTCT of HIV among positive pregnant women in Rivers State is rejected.

Table 4: Regression analysis showing the relationship between educational level and utilization of preventive measures against mother to child transmission of HIV among respondents

Model R R square	R square	Adjusted	B	P	Decision
Education	0.893	0.893	0.892	.996	0.000	Rejected

Table 4 shows the regression analysis of the relationship between educational level and utilization of PMMTCT. The result shows a significant high positive relationship between educational level and the utilization of PMMTCT ($r = 0.893$; $p<0.05$). Therefore, the null hypothesis which states that there is no significant relationship between educational level and utilization of PMMTCT of HIV among positive pregnant women in Rivers State is rejected.

Table 5: Regression analysis showing the relationship between number of children and utilization of preventive measures against mother to child transmission of HIV among respondents

Model R R square	R square	Adjusted	B	P	Decision
Parity	0.867	0.752	0.751	1.264	0.000	Rejected

Table 5 shows the regression analysis of the relationship between number of children and utilization of PMMTCT. The result shows a significant high positive relationship between number of children and the utilization of PMMTCT ($r = 0.867$; $p<0.05$). Therefore, the null hypothesis which states that there is no significant relationship between number of children and utilization of PMMTCT of HIV among positive pregnant women in Rivers State is rejected.

Discussion of Findings

The findings of the study are discussed below:

The result shows that extent to which socio-economy status of respondents determine the utilization PMMTCT of HIV was high as the grand mean = 3.26±0.75 was greater than the criterion mean of 2.5. The finding of this study is in line with that of Igbal et al (2019) on the determinants of overall knowledge of and attitudes towards HIV/AIDS transmission among ever-married women in Pakistan which showed that women belonging to the richest wealth quintile had high overall knowledge and positive attitudes which aid the utilization of preventive measures for HIV/AIDS. The tested hypothesis shows a significant high positive relationship between socioeconomic level and the utilization of PMMTCT ($r = 0.973$; $p<0.05$). This finding is in line with that of

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Mustapha et al (2018) whose finding from a study on the utilization of prevention of motherto-child transmission of HIV services by mothers in Uganda showed that financial constraint was reported as a barrier to mothers' utilization of PMTCT services.

The findings of this study shows that the extent to which the cultural belief of respondents determines the utilization PMMTCT of HIV was high as the grand mean = 3.17±0.69 is greater than the criterion mean of 2.5. The result also shows a significant high positive relationship between cultural belief and the utilization of PMMTCT ($r = 0.966$; $p<0.05$). The finding of this study is also in support of the study of Dzah, Tarkang and Lutala (2019) carried out in Ghana on the knowledge, attitudes and practices regarding HIV/AIDS in Sekondi-Takoradi metropolis whose finding emphasize the need for culturally adapted and age-oriented basic HIV information on misconceptions about HIV transmission as well as the risky practices of students regarding HIV. This finding is in line with that of Mustapha et al (2018) whose finding from a study on the utilization of prevention of mother-to-child transmission of HIV services by mothers in Uganda showed that stigma in a cultural setting was found to be a key demotivating factor for adolescent and young mothers' utilization of PMTCT services.

The findings of this study shows that the extent to which the age of respondents determines the utilization PMMTCT of HIV was high. The tested hypothesis shows a significant high positive relationship between age and the utilization of PMMTCT ($r = 0.953$; $p<0.05$). This finding is in line with that of Mustapha et al (2018) whose finding from a study on the utilization of prevention of mother-to-child transmission of HIV services by mothers in Uganda showed that age was significantly associated with optimal utilization of PMTCT services at bivariate analysis and higher proportion of mothers aged 20–24 years (32.5%), regardless of HIV status, had optimally utilized the services compared to only 19.7% of mothers aged 15–19 years (OR 1.9 (95% CI: 1.1– 3.6)). The finding of this study is also in support of the study of Dzah, Tarkang and Lutala (2019) carried out in Ghana on the knowledge, attitudes and practices regarding HIV/AIDS in SekondiTakoradi metropolis which showed that bad practices were associated with ages 15–19 years (aOR = 1.72[1.41–2.11]; $p = 0.08$). The finding of this study corroborates that of Kifle and Dube (2016) whose study in Ethiopia on the utilization of Prevention of Mother-to-Child Transmission of HIV Services and Associated Factors showed that there was a significant relationship between age and utilization of PMMTCT.

The findings of this study shows that the extent to which the level of education of respondents determines the utilization PMMTCT of HIV was high. The tested hypothesis shows a significant high positive relationship between educational level and the utilization of PMMTCT ($r = 0.893$; $p<0.05$). This finding is expected thus not surprising because education exposes an individual to vast information about life that enables one to make informed decision about health including the utilization of preventive measure against MTCT of HIV. The finding of this study corroborates that of Wanyenze et al (2018) whose study on the utilization of prevention of mother-to-child transmission (PMTCT) services among pregnant women in HIV care in Uganda showed that, 40.2% had secondary education among which majority (81.1%) received ART during pregnancy. The finding of this study is in line with that of Igbal et al (2019) on the determinants of overall knowledge of and attitudes towards HIV/AIDS transmission among ever-married women in Pakistan which showed that women having at least secondary-level education had high overall knowledge and positive attitudes which aid the utilization of preventive measures for HIV/AIDS. This finding is in line with that of Mustapha et al (2018) whose finding from a study on the utilization of prevention of mother-to-child transmission of HIV services by mothers in Uganda showed that418 participants had a secondary education (62.0%) among which 30% had optimal utilization of PMTCT services. The finding of this study also corroborates that of Kifle and Dube (2016) whose study in Ethiopia on the utilization of Prevention of Mother-to-Child Transmission of HIV Services and Associated Factors showed half (50.3%) of the women had attended grade 7 and above among which the PMTCT service

utilization among ANC attendees was found to be 86.9%. The similarity found between the previous studies and the present one might be due to the homogeneity of the study respondents.

The findings of this study shows that the extent to which the parity of respondents determines the utilization PMMTCT of HIV was high. The result of the tested hypothesis shows a significant high positive relationship between number of children and the utilization of PMMTCT ($r = 0.867$; $p<0.05$). Parity has been found to influence several health phenomena including PMMTCT. The finding of this study corroborates that of Wanyenze et al (2018) whose study on the utilization of prevention of mother-to-child transmission (PMTCT) services among pregnant women in HIV care in Uganda showed that, majority had at least two children among which 103 (81.1%) received ART during pregnancy. The finding of this study corroborates that of Kifle and Dube (2016) whose study in Ethiopia on the utilization of Prevention of Mother-to-Child Transmission of HIV Services and Associated Factors showed about 45% of the respondents had one or more parities of which the PMTCT service utilization among ANC attendees was found to be 86.9%. This similarity found might be due to the fact that the both studies were carried out among pregnant women attending antenatal clinics. This finding is at variance with that of Mustapha et al (2018) whose finding from a study on the utilization of prevention of mother-to-child transmission of HIV services by mothers in Uganda showed that almost all the respondents had children but the optimal utilization of PMTCT services among the respondents was low. This variation might be due to the fact that the previous study included both HIV positive and negative mothers whereas the present study is focused on HIV positive mothers alone.

Conclusion: Based on the findings of the study, it was concluded that the most common determinant of the utilization of PMMTCT of HIV among HIV positive mothers in Rivers State was cultural belief, followed by others such as socio-economic status, age, educational level and parity,

Recommendations

The following recommendations were made based on the findings of the study.

1. The health sector should incorporate community stakeholders in their effort to increase the utilization of PMMTCT, as they can assist in discouraging some of the cultural beliefs which are not favourable to PMMTCT.
2. The positive mothers should also make conscious effort to ensure to improve on their level of utilization and compliance to PMMTCT because it is for their own good.
3. The government should sustain their effort in providing the ART for positive pregnant women.

References

Da Silva, R.C., Bedin, E., Mangano, A., Aulicino, P., Pontillo, A., Brandão, L., Guimarães, R., Arraes, L.C., Sen, L. & Crovella, S. (2013). HIV mother-to-child transmission: A complex genetic puzzle tackled by Brazil and Argentina research teams. *Infection, Genetics and Evolution,* 19, 312-322.

Dzah, S.M., Tarkang, E.E. & Lutala, P.M. (2019). Knowledge, attitudes and practices regarding HIV/AIDS among senior high school students in Sekondi-Takoradi metropolis, Ghana.

African Journal of Primary Health Care and Family Medicine, 11(1), 1875-1899.

Federal Ministry of Health (2003). *Sentinel zero-prevalence survey in Nigeria*. Abuja: FMOH.

Gupta, A., Bhosale, R., Kinikar, A., Gupte, N., Bharadwaj, R., Kagal, A., Joshi, S., Khandekar, M., Karmarkar, A., Kulkarni, V., Sastry, J., Mave, V., Suryavanshi, N., Thakar, M., Kulkarni, S., Tripathy, S., Sambarey, P., Patil, S., Paranjape, R. & Bollinger, R.C. (2011). Maternal tuberculosis: a risk factor for mother-to-child transmission of human immunodeficiency virus. *Journal of Infectious Diseases,* 203(3), 358-363.

Original Article

Igbal, S., Maqsood, S., Zafar, A., Zakar, R., Zakar, M.Z. & Fischer, F. (2019). Determinants of overall knowledge of and attitudes towards HIV/AIDS transmission among ever-married women in Pakistan: evidence from the Demographic and Health Survey 2012–13. *BioMedical Central on Public Health,* 19, 793.

Kifle, W. & Dube, L. (2016). Utilization of Prevention of Mother-to-Child Transmission of HIV

Services and Associated Factors among Antenatal Care Attending Mothers in Sebeta

Town, Central Ethiopia. *Advances in Public Health*, https://doi.org/10.1155/2016/6250898

Lala, M.M. & Merchant, R.H. (2010). Vertical Transmission of HIV-An Update. *Indian Journal of Pediatrics*, 77(11), 1270-1276.

Milligan, C. & Overbaugh, J. (2014). The role of cell-associated virus in mother-to-child HIV transmission. *Journal of Infectious Diseases*, 210, S631-640.

Mustapha, M., Musiime, V., Bakeera-Kitaka, S., Rujumba, J. & Nabukeera-Barungi, N. (2018). Utilization of prevention of mother-to-child transmission of HIV services by adolescent and young mothers in Mulago Hospital, Uganda. *BioMedical Central on Infectious Diseases, 18, 566,* *https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-018-* UNAIDS (2010). *Global report: global AIDS epidemics*. Geneva: UNAID.

Wanyenze, R.K., Goggin, K., Finocchario-Kessler, S., Beyeza-Kashesya, J., Mindry, D., Birungi, J., Woldetsadik, M. & Wagner, G.J. (2018). Utilization of prevention of mother-to-child transmission (PMTCT) services among pregnant women in HIV care in Uganda: a 24 month cohort of women from pre-conception to post-delivery. *Biomedical Central Research Notes*, doi: 10.1186/s13104-018-3304-y.

Weinberg, G.A. (2000). The dilemma of postnatal mother-to-child transmission of HIV: to breastfeed or not? *Issues in Perinatal Care*, 27(3), 199-205.

World Health Organization (2014). *WHO report on HIV/AIDS*. Geneva: WHO.

World Health Organization (2016). *HIV/AIDS*. Retrieved from

http://www.who.int/hiv/abouthiv/en/