



Health Workers' Knowledge of Preventing Mother-To-Child Transmission of HIV in Benin City, Edo State, Nigeria

Ashipa T¹, Ofili A.N², Onakewhor J.U.E³, Adejumo A.O¹

¹Department of Community Medicine, Babcock University Teaching Hospital, Ilishan-Remo, Ogun State, Nigeria

²Department of Community Health, University of Benin Teaching Hospital, Benin City, Edo State

³Department of Obstetrics and Gynaecology, University of Benin Teaching Hospital, Benin City, Edo State, Nigeria

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ABSTRACT

Introduction: Health workers have important roles to play in reducing mother-to-child transmission of HIV. This study assessed health workers' knowledge of the national guidelines on preventing mother-to-child transmission of HIV in Benin City, Edo State, Nigeria

Methodology: The study design was a descriptive cross-sectional survey. The study population comprised health workers providing services for preventing mother-to-child transmission of HIV in Benin City, Edo State, Nigeria. Data was collected through self-administered questionnaires.

Results: Two hundred and seventy health workers participated in the study comprising doctors, nurses, pharmacists, laboratory scientists and counsellors. All the respondents had heard of preventing mother-to-child transmission of HIV. Ninety-two (34.1%) had received training on the national guidelines on preventing mother-to-child transmission of HIV. The proportion of health workers with poor, fair, and good knowledge of the national guidelines on PMTCT was 8.5%, 30.4% and 61.1% respectively. Knowledge of the national guidelines was significantly associated with the health workers' occupation, previous training on PMTCT and having a copy of the national guidelines.

Conclusion: This study highlighted important gaps in health workers knowledge of PMTCT. Training and retraining of health workers remains crucial to achieving the goal of reducing mother-to-child transmission of HIV. The study findings may guide the content of future training of health workers on PMTCT to ensure relevance and adequacy.

Correspondence to:

Ashipa, Temitope

Department of Community Medicine,

Babcock University Teaching Hospital, Ilishan-Remo, Ogun State

E-mail: topeashipa@yahoo.com,

P.O. Box 528 Oshodi, Lagos State, Nigeria

INTRODUCTION

Mother-to-child transmission of HIV remains a leading cause of morbidity and mortality among children below five years of age in Nigeria.¹ The rate of mother-to-child transmission of HIV can be reduced to less than 2% with the use of effective interventions such as HIV Counselling & Testing, safer obstetric practices and antiretroviral medications for HIV positive mothers and their infants.²⁻⁶

The national programme on preventing mother-to-child transmission of HIV (PMTCT) commenced in

Nigeria in the year 2002, with the goal of reducing mother-to-child transmission of HIV by 50% by the year 2010.⁴ Having exceeded the target year, the 2010-2015 National PMTCT scale up plan was instituted to improve the survival of mothers and children through the accelerated provision of comprehensive services for preventing mother-to-child transmission of HIV.^{4,6}

The national guidelines on preventing mother-to-child transmission (PMTCT) of HIV published by the Federal Ministry of Health outlines strategies for implementing the national PMTCT programme in the country. The guidelines also contain

recommendations for health workers caring for HIV positive women and their families.^{4,6}

Health workers have a crucial role to play in reducing mother-to-child transmission of HIV. However, insufficient knowledge of preventing mother-to-child of HIV has been reported among different groups of health workers in the country.⁷⁻¹² Previous studies indicate that knowledge of preventing mother-to-child of HIV among health workers is influenced by age, gender, occupation, duration of post-qualification experience, previous training on PMTCT and previous experience of managing a pregnant woman infected with HIV.^{7,8,10,11,13} Few studies in Nigeria have assessed health workers' knowledge of the national guidelines on preventing mother-to-child of HIV.¹¹

A poor knowledge of the national guidelines on PMTCT would impact negatively on health workers' practice of PMTCT thus negating the goals of the national PMTCT programme. Assessing health workers' knowledge of the national guidelines would help to identify training needs of the health workers and inform the content of future training programmes. This study assessed health workers' knowledge of the national guidelines on preventing mother-to-child transmission of HIV in Benin City, Edo State, Nigeria.

METHODOLOGY

This study was conducted in Benin City, Edo State, Nigeria with an estimated population of 1, 085, 676 persons.¹⁸ The study design was a descriptive cross-sectional survey conducted among health workers providing services for preventing mother-to-child transmission of HIV in Benin City, Edo State. Seven health facilities in Benin City provide comprehensive services for PMTCT of HIV including HIV counseling and testing, family planning, antenatal care, delivery services, post natal care and early infant diagnosis.¹⁹ These seven health facilities were included in this study.

The study population comprised of health workers involved in providing PMTCT services in these hospitals. Only health workers practicing in government approved health facilities with at least six months experience of providing PMTCT

services were included in the study. Health workers who declined to participate in the study and those on administrative leave were excluded.

The sample size for this study was determined using the sample size formula for estimating the prevalence of a factor in a population and applying the finite population correction to the calculated sample size.^{20,21} A previous study indicated that 42.2% of health workers had previous experience of managing a pregnant woman infected with HIV.⁷ Using this prevalence and allowing for a non-response rate of 10%, a final sample size of 262 health workers was obtained for the study.

The health workers providing PMTCT services at the seven PMTCT sites were stratified according to their professions. Thereafter, proportionate sampling of health workers within each profession was performed to select the total number of 262 health workers across the sites. Data on health workers' knowledge of PMTCT of HIV was collected using a self-administered questionnaire adapted from the Family Health International (FHI) Baseline Assessment Tools for PMTCT.²² The study instrument also included questions derived from the 2010 national guidelines on PMTCT of HIV and the results of previous studies.^{4,6-9} A total of 52 questions were used to assess knowledge of the national guidelines on PMTCT. The questions covered several aspects of PMTCT including HIV counselling and testing, risk factors for PMTCT, use of antiretroviral medications for HIV positive pregnant women and their infants, family planning and standard precautions.

The questionnaire was pre-tested for clarity, appropriateness and ease of administration. Five final year medical students recruited from the University of Benin, Benin City were trained as research assistants for a period of three days on data collection techniques. The purpose of the training was to ensure uniformity in techniques of data collection and minimise inter-observer variations.

Data was analysed using the Statistical Package for the Social Sciences version 16.0 and presented as tables, frequencies and percentages. Descriptive statistics and inferential statistics were computed for

the key study variables. Logistic regression analysis was used to control for confounding variables and identify predictors of good knowledge of the national guidelines on PMTCT of HIV. All statistical calculations were performed at 5% level of significance.

Scoring system

One mark was awarded for each question answered correctly. No mark was awarded for wrong responses or questions left unanswered. The minimum score on knowledge of the guidelines was zero while the maximum score was 52 marks. Total and percentage scores on knowledge of the guidelines were computed for each respondent. Respondents with percentage scores on knowledge below 40% were classified as having poor knowledge of the guidelines. Those with percentage scores on knowledge of between 40% and 69.9% were classified as having fair knowledge of the guidelines, while respondents with percentage scores of 70% and above were classified as having good knowledge of the guidelines.

Ethical Considerations

Approval for the study was obtained from the Ethical Committee of the University of Benin Teaching Hospital. Ethical approval was also obtained from the Ethical Clearance Committee of the Edo State Ministry of Health. Institutional assent was obtained from heads of the health facilities involved in this study. Informed consent was obtained from all the health workers that participated in the study.

RESULTS

A total of 270 health workers participated in the study comprising doctors, nurses, pharmacists, laboratory scientists and counsellors. The socio-demographic characteristics of the respondents are presented in Table I.

The respondents comprised 88 males (32.6%) and 182 females (67.4%). The age of the health workers ranged from 20 years to 62 years with a mean age of 37.3 years \pm 8.97. Two hundred and five health workers (75.9%) had been involved in providing PMTCT services for between one year and five years.

Table I: Socio-demographic characteristics of health workers (N=270)

Socio-demographic Characteristic	No. of Health workers	%
Gender:		
Male	88	32.6
Female	182	67.4
Age Group (years):		
20-29	49	18.2
30-39	127	47.0
40-49	57	21.1
50-59	36	13.3
60-69	1	0.4
Marital Status		
Single	68	25.2
Married	193	71.5
Widowed	5	1.9
Separated	3	1.1
Divorced	1	0.4
Occupation		
Doctor	89	33.0
Nurse/Midwife	122	45.2
Counsellor	10	3.7
Laboratory Scientist	29	10.7
Pharmacist	20	7.4
Duration of post-qualification experience (years)		
1-5	98	36.3
6-10	69	25.6
11-15	31	11.5
16-20	22	8.1
21-25	15	5.6
26-30	21	7.8
31-35	14	5.2
Duration of practice of PMTCT(years)		
<1	31	11.5
1-5	205	75.9
6-10	32	11.9
>10	2	0.7

All the health workers (n=270, 100.0%) had heard of “prevention of mother-to-child transmission of HIV.” Eighty percent of the respondents (n=216) were aware of the national guidelines on PMTCT. One hundred and fifty-seven health workers (58.1%) had received training on PMTCT of HIV. Ninety-two health workers (34.1%) had received training on the National PMTCT Guidelines and 91 health workers (33.7%) possessed a copy of the guidelines. Two hundred and fifty-eight health workers (95.6%) desired further training on the national guidelines on PMTCT of HIV.

The health workers' responses to questions on the national guidelines on PMTCT are presented below. The strategy for PMTCT most frequently identified by the health workers was preventing transmission of HIV from an infected mother to her infant (n=256, 94.3%). The Rapid HIV test was the most frequently identified investigation for the diagnosis of HIV in adults (n=232, 85.9%). The HIV antibody test at 18 months of age was the most frequently identified investigation for the diagnosis of HIV infection in children (n=196, 72.6%). Zidovudine and Nevirapine were the most frequently identified drugs used for antiretroviral prophylaxis in pregnant women infected with HIV (n=215, 79.6%), each. Nevirapine suspension (n=214, 79.3%) and Zidovudine suspension (n=169, 62.6%) were the two most frequently identified drugs for antiretroviral prophylaxis in HIV-exposed infants.

The most frequently identified risk factors for mother-to-child transmission of HIV were prolonged rupture of membranes (n=214, 79.3%), episiotomy and vaginal lacerations (n=208, 77%) and instrumental deliveries (n=200, 74.1%). Barrier methods of contraception (n=250, 92.6%) were most frequently identified as suitable contraceptive methods for HIV positive women. Similarly, the most frequently identified standard precautions were safe handling and disposal of sharps (n=261, 96.7%) and the safe decontamination of instruments (n=252, 93.3%). Hand washing was the standard precaution least frequently identified (n=246, 91.1%).

An overall score was computed for each respondent based on their answers to questions on the national

guidelines on PMTCT. The score ranged from 5.0 marks to 51.0 marks with a mean score of 36.9 marks (SD=9.86). The median overall score on respondents' knowledge of the guidelines was 40.0 marks while the modal score was 42.0 marks. The median score on knowledge of PMTCT for doctors, nurses/midwives, pharmacists, laboratory scientists and counselors were 44.0 marks, 35.0 marks, 38.5 marks, 38.0 marks and 36.5 marks, respectively. There was a statistically significant difference between the median knowledge score of the doctors and the median knowledge score of the other health professionals (Kruskal Wallis test = 57.79, df = 4, p < 0.001). Table II shows the median score on knowledge of the national guidelines on PMTCT among the different health professionals.

Table II: (Overall score on) knowledge of the guidelines by occupation

Overall score on knowledge of the 2010 National PMTCT Guidelines				
Occupation	Mean	(95% CI)	Median	Range
Doctor	42.7	(41.6-43.8)	44.0	25.0-51.0
Nurse/Midwife	33.1	(31.2-35.0)	35.0	5.0-50.0
Pharmacist	38.3	(35.4-41.2)	38.5	27.0-48.0
Laboratory Scientist	34.5	(30.1-38.8)	38.0	14.0-50.0
Counsellor	35.3	(29.6-41.0)	36.5	22.0-50.0

(Kruskal Wallis test = 57.79, df = 4, p = 0.000)

Percentage scores were computed for each health worker and classified as poor, fair and good knowledge. Twenty-three health workers (8.5%) had poor knowledge of the national guidelines on PMTCT, eighty-two health workers (30.4%) had fair knowledge of the guidelines and one hundred and sixty-five health workers (61.1%) had good knowledge of the guidelines.

Factors significantly associated with good knowledge of the national guidelines were occupation of the health worker, place of practice, previous training on PMTCT of HIV. Others were previous training on the national guidelines on PMTCT and duration of practice post-qualification. Table III depicts the factors that influenced the health workers' knowledge of the national guidelines.

Logistic regression analyses identified predictors of

Table III: Factors affecting knowledge of the National PMTCT Guidelines (No. of health workers=270)

Factors affecting knowledge of the National PMTCT Guidelines	Level of Knowledge of the National PMTCT Guidelines			
	Poor N (%)	Fair N (%)	Good N (%)	Total N (%)
Occupation				
Medical Doctors	0 (0.0)	9 (10.1)	80 (89.9)	89 (100.0)
*Other health Professionals	23 (12.7)	73 (40.3)	85 (47.0)	181 (100.0)
χ^2 test = 47.24, df = 1, p < 0.0001				
Place of practice				
Public Secondary	6 (7.2)	28 (33.7)	49 (59.0)	83 (100.0)
Public Tertiary	3 (3.2)	26 (27.7)	65 (69.1)	94 (100.0)
χ^2 test = 10.15, df = 4, p = 0.038				
Previous training on PMTCT				
Yes	8 (5.1)	41 (26.1)	108 (68.8)	157 (100.0)
No	15 (13.3)	41 (36.3)	57 (50.4)	113 (100.0)
χ^2 test = 11.02, df = 2, p = 0.004				
Previous training on the National PMTCT Guidelines				
Yes	3 (3.3)	21 (22.8)	68 (73.9)	2 (100.0)
No	20 (11.2)	61 (34.3)	97 (54.5)	178 (100.0)
χ^2 test = 10.89, df = 2, p = 0.004				
Possessing a copy of the National PMTCT Guidelines				
Yes	1 (1.1)	20 (22.0)	70 (76.9)	91 (100.0)
No	22 (12.3)	62 (34.6)	95 (53.1)	179 (100.0)
χ^2 test = 17.67, df = 2, p < 0.001				
Duration of Practice Post-qualification (years)				
1-5	9 (9.2)	32 (32.7)	57 (58.2)	98 (100.0)
6-10	2 (2.9)	14 (20.3)	53 (76.8)	69 (100.0)
>10	12 (11.7)	36 (35.0)	55 (53.4)	103 (100.0)
χ^2 = 10.91, df = 4, p = 0.028				
Duration of Practice of PMTCT (years)				
< 1	3 (9.7)	12 (38.7)	16 (51.6)	31 (100.0)
1-5	19 (9.3)	61 (29.8)	125 (61.0)	205 (100.0)
> 5	1 (2.9)	9 (26.5)	24 (70.6)	34 (100.0)

Fisher's Exact test = 0.53

Table IV: Predictors of respondents' knowledge of the National PMTCT guidelines

Factors	B	S.E	Wald	df	p value	Exp (B)	95%CI for Exp (B)
Occupation (medical doctor)	-2.26	0.40	32.84	1	0.00	0.11	0.05 -0.23
Previous training on PMTCT	-0.37	0.34	1.24	1	0.27	0.69	0.36 -1.33
Previous training on the national PMTCT guidelines	-0.29	0.41	0.49	1	0.48	0.75	0.33 -1.68
Possessing a copy of the national PMTCT guidelines	-0.55	0.39	1.93	1	0.17	0.58	0.27 -1.30
Place of practice (Private/Public health facility)	-0.09	0.31	0.09	1	0.76	0.91	0.50 -1.67
Duration of post-qualification experience (≤ 5 years, > 5years)	-0.06	0.32	0.04	1	0.84	0.94	0.51 -1.74
Duration of practice of PMTCT (≤ 5 years, > 5years)	0.37	0.47	0.62	1	0.43	1.44	0.58 -3.62
Constant	6.20	1.26	24.24	1	0.00	493.56	

poor knowledge of the national guidelines. Several factors were entered into the logistic regression model including occupation, previous training on PMTCT, previous training on the national guidelines on PMTCT and possessing a copy of the guidelines.

Only one variable remained significantly associated with knowledge of the National PMTCT Guidelines in the multivariate logistic regression analyses i.e. occupation (medical doctor): ($p < 0.001$; regression co-efficient = -2.26, odds ratio=0.11). Doctors were nine times less likely to have poor knowledge of the national guidelines on PMTCT compared to other health professionals. The results of the logistic regression analyses are shown in Table IV.

DISCUSSION

All the health workers in this study had heard of preventing mother-to-child transmission of HIV. High levels of awareness of PMTCT of HIV have previously been reported among health workers in Nigeria.^{7,9} About one-third of the respondents possessed a copy of the national guidelines on PMTCT of HIV. A similar study conducted among private general medical practitioners in Port Harcourt, Nigeria reported that 50% of the respondents had read the national guidelines on PMTCT of HIV. Possessing a copy of the national guidelines on PMTCT of HIV and reading same would help to ensure that the health workers have ready access to vital information on PMTCT of HIV at all times. This would impact positively on the quality of care provided for HIV positive mothers and their infants.

About 70% of the health workers in this study could correctly identify the four strategies for PMTCT of HIV. This was to be expected as the respondents were frontline health workers involved in providing PMTCT services at their respective health facilities. However, this proportion was higher than that reported in a similar study conducted among nurses/midwives in Owerri, Imo State, Nigeria where about 50% of the respondents were able to correctly state the four strategies for PMTCT.⁷ The

fact that almost a third of the respondents in this study were unable to correctly identify the four strategies for PMTCT from a list of options provided is worrying. This further indicates the need for training and re-training of health workers involved in the PMTCT programme.

About 48% of respondents in this study correctly identified more than one contraceptive method suitable for HIV positive mothers. The most frequently identified contraceptive method was the barrier method of contraception e.g. the male condom ($n=250$, 92.6%). This observation may be explained by on-going media campaigns promoting the use of the male/female condoms for the prevention of sexually transmitted infections including HIV/AIDS. However, the high failure rate of barrier methods of contraception makes them highly unsuitable as the sole contraceptive method for HIV positive women. Hence the need for dual methods of contraception to prevent pregnancy and reduce the spread of HIV and other sexually transmitted infections. The health workers' relatively poor knowledge of suitable methods of contraception for HIV positive women is a cause for concern given that the prevention of unintended pregnancies among HIV positive women is an important strategy for preventing mother-to-child transmission of HIV.⁴

An unexpected finding was the fact that barely one-quarter of the respondents could identify the different laboratory investigations used for the diagnosis of HIV infection in adults and children. A similar finding was reported in a previous study among nurses/midwives in Nigeria where only 19% of the respondents correctly identified Western Blot as a confirmatory test for HIV.⁷ This further illustrates the need for training and re-training of health workers involved in the PMTCT programme on all aspects of care and treatment of persons living with HIV/AIDS.

Over 70% of the respondents in this study correctly identified risk factors for mother-to-child transmission of HIV. The most commonly identified risk factors were artificial rupture of

membranes, episiotomy, vaginal lacerations and instrumental deliveries. Similar findings were reported in a previous study.⁷ Among nurses/midwives in Owerri, Nigeria over 50% of respondents correctly identified vaginal delivery and perineal trauma as risk factors for mother-to-child transmission of HIV.⁷ In contrast, only 36.6% of private general medical practitioners studied in Port Harcourt, Nigeria could name two or more risk factors for mother-to-child transmission of HIV.

Concerning the drugs used for PMTCT in HIV positive mothers, Nevirapine and Zidovudine were most frequently identified drugs by the health workers in this study. Similar findings have been reported in a previous study in Owerri, Nigeria where Nevirapine was the most frequently identified drug for PMTCT among the nurses/midwives surveyed.⁷ However, only about a quarter of the health workers were able to correctly identify four drugs used for antiretroviral prophylaxis in pregnant HIV positive women. In a previous study conducted among health workers in Cameroon, the correct answers to questions on PMTCT drug regimens varied between 25% and 56%.¹⁰ Similarly, in a study conducted among doctors and nurses in Tshwane District, South Africa, only 35% of the respondents knew the correct drug combinations for preventing mother-to-child transmission of HIV among HIV positive mothers.¹⁴ In a previous study conducted among health workers providing PMTCT services in Lusaka, Zambia 50.7% of the respondents could mention the correct drug combination for preventing mother-to-child transmission of HIV among HIV positive mothers.¹⁶

With regards to drugs used for antiretroviral prophylaxis among babies born to HIV positive mothers, most of the respondents (79.3%) correctly identified Nevirapine suspension as a drug used for this purpose. In a similar study conducted among general medical practitioners in Port Harcourt, Nigeria, 78.3% of the respondents could mention at least one drug given to infants to prevent mother-to-child transmission of HIV.¹¹

Regarding the infant feeding options for babies born to HIV positive mothers, the health workers gave

several options for infant feeding including exclusive breastfeeding, exclusive formula feeding and wet nursing among others. This is at variance with the recommendations on infant feeding for babies born to HIV positive mothers as contained in the national guidelines on PMTCT which strongly recommends exclusive breastfeeding of infants from birth to six months, with the introduction of complementary foods at six months while continue breastfeeding until the infant reaches 12 months of age.⁴ Insufficient knowledge of the infant feeding options for babies of HIV positive mothers has been reported among different groups of health workers in the literature.^{8,9,17} In a study conducted among traditional birth attendants in Lagos State, Nigeria, only 55.6% of the traditional birth attendants studied were of the infant feeding options for babies born to HIV positive mothers with formula feeding and native concoction listed as possible infant feeding options to prevent mother-to-child transmission of HIV.⁸

In rare situations where breastfeeding is not feasible, HIV positive mothers may opt for replacement feeding of their infants provided that the replacement feeding is acceptable, feasible, affordable, sustainable and safe.⁴ The health workers in this study had good knowledge of the criteria for replacement feeding of infants born to HIV positive mothers. Majority of the health workers (70.4%) correctly identified the five criteria for replacement feeding of HIV-exposed infants. This may be the results of frequent training programmes organised for health workers involved in providing PMTCT services across the sites.

Majority of the respondents (86.7%) were able to correctly identify the four standard precautions for reducing the spread of infection within the hospitals. This observed phenomenon may be the effect of continuous training of health workers on infection control practices and the use of standard precautions within the hospitals. Hand washing, however was the least frequently identified standard precaution by health workers in this study. This finding was unexpected considering the fact that hand washing is an effective tool for reducing the spread of infections within a health-care setting.

Overall about 61% of the health workers in this study had good knowledge of the national guidelines on preventing mother-to-child of HIV based on the percentage scores of 70% and above. There was a significant difference between the knowledge score of the medical doctors and other health professionals in this study. Previous studies have reported that occupation is significantly associated with knowledge of PMTCT of HIV. In particular, medical doctors have been found to have significantly higher levels of knowledge of PMTCT of HIV compared to other health professionals.^{10,15,16} This may be explained by the long duration of training of the medical doctors as well as several opportunities available to them for continuous professional development even after qualifying as medical doctors.

The proportion of health workers in this study with good knowledge of the national guidelines on PMTCT (about 61%) was similar to the findings from a previous study conducted among nurses and doctors in Tshwane District, South Africa where the mean score on the knowledge of PMTCT among the respondents was 60.8%.¹⁵ The study findings are however at variance with the results of a previous study conducted among nurses/midwives in Imo State, Nigeria where the nurses/midwives studied were reported to have moderate knowledge of PMTCT of HIV.⁷ Similarly, only 8% of traditional birth attendants in a previous study conducted in Lagos State, Nigeria had good knowledge of PMTCT.⁸

Knowledge of the national guidelines among respondents in this study was significantly associated with occupation, place of practice, previous training on PMTCT and previous training on the national guidelines on PMTCT. Previous studies have demonstrated an association between previous training on PMTCT of HIV and knowledge of PMTCT.^{11,14} Other studies have reported significant associations between knowledge of PMTCT and several other factors including age, occupation, duration of post-qualification experience, previous experience of managing a pregnant woman living with HIV, religion as well as gender.^{7,8,10,11,13,15,16}

In the study among nurses/midwives in Owerri, Nigeria, knowledge of PMTCT was associated with previous experience of having managed a pregnant woman infected with HIV.⁷ Among the traditional birth attendants in Lagos State, there was an association between gender and knowledge of PMTCT with the female traditional birth attendants having significantly better knowledge of PMTCT than their male counterparts.⁸ In contrast, no similar association between gender and knowledge of PMTCT was observed among health workers in this study. The fact that majority of the respondents in this study desired further training on PMTCT is a welcome development. The recent advances in HIV/AIDS and care of pregnant women living with HIV makes it imperative for health workers to remain up-to-date with the latest developments in this rapidly changing field of study. Similar findings have been reported in other studies.^{11,17}

This study assessed health workers on the national guidelines on PMTCT and covered various aspects of PMTCT including family planning, risk factors for mother-to-child transmission of HIV, antiretroviral prophylaxis for HIV positive mothers and their infants as well as infant feeding options for babies born to HIV positive mothers. The study highlighted the knowledge gaps and specific training needs among health workers providing PMTCT services in Benin City, Edo State, Nigeria as well as recommendations to address these deficiencies.

CONCLUSION

Less than two-third of the health workers had good knowledge of the national guidelines on PMTCT in this study. The factors significantly associated with good knowledge of the guidelines among the health workers were occupation, previous training on PMTCT and having a copy of the guidelines. The results indicate a need for further training of health workers if the goals of reducing mother-to-child transmission of HIV and improving the childhood survival are to be achieved. The study findings may inform the content of future PMTCT training programmes for health workers nationwide to ensure relevance and adequacy.

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