

# Assessing the Utilization and Implementation Challenges of Prevention of Mother-to-Child-Transmission of HIV Programme in a Secondary Care Hospital, Ghana

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## To cite this article:

Eric Osei, Williams Amankwaa Fosu, Joyce Der. Assessing the Utilization and Implementation Challenges of Prevention of Mother-To-Child-Transmission of HIV Programme in a Secondary Care Hospital, Ghana. *Central African Journal of Public Health*.

Vol. 2, No. 2, 2016, pp. 57-65. doi: 10.11648/j.cajph.20160202.13

**Received:** August 11, 2016; **Accepted:** September 23, 2016; **Published:** October 28, 2016

**Abstract:** *Background:* Mother-to-child transmission (MTCT) of HIV continues to be a major public health problem and accounts for a considerable share of new HIV infections among young children. Prevention of mother-to-child transmission (PMTCT) has been recognised as vital to reducing infant and child mortality associated with HIV infection. This study assessed the utilization and implementation challenges of PMTCT of HIV programme in a secondary care hospital in Ghana. *Methods:* We conducted an institution based cross-sectional survey in April 2015 using exit interviews with 135 pregnant women attending antenatal care (ANC) clinic of Bolgatanga Regional hospital of Upper East Region, Ghana. Pre-tested questionnaires were administered to collect data on socio-demographic characteristics, knowledge about MTCT of HIV, and HIV counselling and testing practice. Six in-depth interviews with service providers were conducted to assess PMTCT programme implementation challenges. Antenatal and PMTCT records were reviewed to evaluate PMTCT utilization. Stata version 11 was used to analyse quantitative data. Chi-square test was performed to test for differences between proportions for the cross tabulated variables. Level of significance was set at  $p < 0.05$ . *Results:* Fifty-six (41.5%) of participants made up to four or more ANC visits. The majority (62; 45.9%) were in the third trimester of gestation, 75 (56%) were primigravida and 12 (9%) ever had four or more pregnancies. About 96% (129) visited the health facility for ANC check-up. Only 3 (2.2%) visited the health facility for HIV counselling and testing. The majority (112; 83%) were aware of the PMTCT programme though, 12 (11%) of them were not aware of its benefits. Almost all (134; 99.3%) of them reported that they were tested for HIV in the current pregnancy, and 131 (97%) of them reported adequacy of privacy and confidentiality during counselling. Of the 1,283 pregnant women registered between January and December, 2013, 1,282 (99.9%) were tested for HIV. CD4 cell count was done for 12 (85%) out of 15 women who tested HIV positive, 14 (93%) of the 15 HIV-positive women received antiretroviral prophylaxis (including infant prophylaxis). Early infant diagnosis was universal (100%) for all HIV-exposed infants. Inadequately trained personnel coupled with high workload, erratic supply of logistics and low male involvement were mentioned as barriers to PMTCT implementation. *Conclusion:* PMTCT of HIV service up-take and knowledge regarding MTCT and PMTCT was quite high; however efforts should be made to address the barriers to successful implementation of PMTCT interventions.

**Keywords:** Utilization, Implementation Challenges, PMTCT Programme, Secondary Care Hospital, Ghana

## 1. Background

Mother-to-child transmission (MTCT) of HIV continues to be a major public health problem and accounts for a considerable share of new HIV infections among young children [1]. More than 90% of the children living with HIV

are infected through these routes: during pregnancy, around the time of birth, and through breastfeeding and without specific interventions, the rate of MTCT is estimated at between 15% and 30% without breastfeeding; with prolonged breastfeeding up to two years of life, the cumulative odds of infection can be as high as 45% [2].

Prevention of mother-to-child transmission (PMTCT) has

been recognised as vital to saving the lives of young children and reducing infant and child mortality associated with HIV infection through four-prong interventions: prevention of HIV among women of reproductive age, prevention of unintended pregnancies among women living with HIV, prevention of vertical transmission, and treatment [3]. The PMTCT cascade encompasses 18 months of care from the initial antenatal care (ANC) visit and HIV counselling and testing, through antiretroviral (ARV) treatment, intra-partum care, early infant diagnosis (EID), infant feeding education, and infant/mother treatment [4]. Mathematical models of the PMTCT cascade report that in order to reduce the number of infants infected with HIV and ensure mothers receive all life-saving interventions, each stage in the PMTCT cascade must be delivered and utilized with greater than 90% reliability [5, 6]. However, recent estimates of retention of pregnant women through the full PMTCT cascade are inadequate to eliminate transmission. For instance according to the Elizabeth Glaser Paediatric AIDS Foundation, 92% of pregnant women that attend antenatal clinic receive post-test counselling, 77% are tested for HIV and 69% receive test results [7]. Thus, these numbers fall short of the 90% retention rate necessary at each stage to reduce HIV transmission.

More recently, the Joint United Nations Programme on HIV/AIDS (UNAIDS) had called for the virtual elimination of MTCT of HIV by 2015 that could be achieved through attainment of a number of targets including; a 90% reduction in estimated number of new infections among infants and a transmission rate of under 5%, at least 90% of all infants born to women living with HIV alive and uninfected with HIV to the age of 2 years, and, at least 80% of eligible pregnant women living with HIV receive antiretroviral treatment for their own health [8].

Although there has been an increased coverage of the PMTCT programmes globally [9], there are many unresolved challenges including large proportions of home deliveries, shortages of personnel, erratic supplies of rapid test kits, lack of supplementary feeds for women who may opt for non-breast feeding for their infants, long waiting times at clinics, and logistical and social implications after testing HIV positive, such as a lack of partner support and in some cases violence that impede the successful implementation of PMTCT programmes, especially in resource poor countries [1-14].

In Ghana, the estimated HIV prevalence among pregnant women attending Antenatal care in 2014 was 1.6% [15]. As in most Sub-Saharan African countries, it is believed that HIV transmission during childbirth or breastfeeding is the second most common mode of transmission and most children are infected through this route in Ghana. This mode of transmission accounts for approximately 15% of all new infections in the country [16]. A comprehensive response to the spread of HIV in the country was initiated in 2003 including services for the prevention of mother-to-child transmission of HIV. However, availability, accessibility and uptake of these services in the country are not universal [16]. For example, of the 9,479 HIV-positive mothers detected through PMTCT programme in 2012 in the country, 18% did

not receive ARV to reduce the risk of transmission and only 17.9% of the exposed infants were tested [17].

Several studies have assessed utilization and barriers to PMTCT services in many African countries [18-21], information is however limited in Ghana and most especially, the study site. This study therefore assessed the utilization and implementation challenges of PMTCT services in Bolgatanga Regional hospital, Ghana.

## 2. Methods

### 2.1. Study Design and Setting

We conducted an institutional-based cross sectional study among pregnant women attending ANC clinic at Bolgatanga Regional Hospital. Bolgatanga Municipality is located in the central part of the Upper East Region of Ghana, and serves an estimated population of 137,979 accounting for 12.6% of the population of the Region with about 50% living in the rural areas. The municipality has a total fertility rate of 3.0 with crude birth rate of 23.5 per 1,000 population, higher than the regional average of 22.7. Women in reproductive age constitute about 23% of the total population while 4% of the population is estimated to be pregnant [22]. As a referral facility, the hospital serves clients from across the region and beyond and offers both clinical and public health services including reproductive and child health. It registers an average of about 75 new ANC attendees every month and provides free ANC and PMTCT services. Prevalence of HIV among pregnant women in the Municipality has been fluctuating over the years with the lowest being 1.6% in 2001 and highest 3.8% in 2010 [23].

### 2.2. Study Population

The study was conducted among pregnant women 18 years and above presenting to Bolgatanga Regional Hospital for ANC services during in April, 2015. Records of pregnant women from 1<sup>st</sup> January to 31<sup>st</sup> December, 2013 were reviewed to assess PMTCT utilization. Service providers were interviewed to elucidate information on the challenges to services implementation.

### 2.3. Sample Size and Sampling Procedure

The sample size was calculated based on single population proportion formula using Epi Info Version 7. Assuming a proportion of pregnant women who attend ANC clinic to be 90% [26], 95% level of confidence, 5% margin of error, and estimated population of 1,045, the minimum sample size required for the study was 135 pregnant women. The selection of pregnant women for the interview was based on consecutive sampling until the sample size required for the study was obtained.

Records of pregnant women from 1<sup>st</sup> January to 31<sup>st</sup> December, 2013 were reviewed from ANC, PMTCT and Delivery registers to determine utilisation at various service delivery points.

## 2.4. Data Collection

All pregnant women 18 years and above attending the ANC clinic were invited to participate. A pre-tested structured questionnaire developed in English was used to collect data. The questionnaire mainly consisted of closed with some open-ended questions addressing socio-demographic characteristics, reproductive history, knowledge about the MTCT of HIV, ANC visit, waiting time at the health facility, HIV Counselling and Testing, privacy and confidentiality and satisfaction with the services. Interviewers received a day's training on the questionnaire, data collection procedures and sampling methods. Two trained nurses administered the questionnaire using face-to-face exit interviews in March 2015. Pregnant women who were seriously ill or in labour at the time of the study were excluded.

The following variables were collected through records review from ANC, PMTCT, and delivery registers at the hospital by the Principal Investigator: HIV counselling and testing, HIV status, place of delivery, ARV prophylaxis, and mother-baby pair on ARV to assess service utilization.

To assess barriers to implementation of PMTCT services, 6 in-depth interviews by the principal investigator with PMTCT service providers were conducted. Providers were purposively selected among those working with ANC and HIV-positive clients and included counsellors, midwives, pharmacists, and nurses. All in-depth interviews were done in English language and were audio-recorded after obtaining permission from the participants.

## 2.5. Data Analysis

Quantitative data were double entered and cleaned using SPSS Version 20. Analysis was performed using Stata Version 11 (Stata Corp, Collage Station). Proportions, means, medians, frequency tables or cross-tabulations of important variables were used to summarise and present results. Chi-square test was performed to test for statistical significance between proportions for the cross tabulated variables. Level of significance was set at  $p < 0.05$ .

All tape-recorded in-depth interviews were transcribed verbatim. The written translations were checked against the tapes, and transcripts were thematically analysed and interpreted.

## 2.6. Ethical Consideration

Ethical approval was obtained from the Ghana Health Services Ethical Review Committee. Permission was sought from the Hospital authorities before data collection. Data collection was done under strict confidentiality and after obtaining a written informed consent from participants.

# 3. Results

## 3.1. Demographic Characteristics of Respondents

Of the 135 pregnant women who participated in the study,

the majority (84; 62.2%) were between 25 and 34 years old. The mean and median ages of respondents were 27 (SD: 5.36) and 27.1 (IQR: 21-33) years old respectively. About two-third (89; 65.9%) resided in urban areas and the rest in the rural setting, 199 (88.1%) were married or currently living with a partner and 117 (86.7%) were literate. Fourteen (10.4%) were unemployed, 86 (63.7%) resided within 5km distance to the Bolgatanga Regional Hospital. Table 1 shows the demographic characteristics of respondents.

## 3.2. Obstetric Characteristics and Reason for Current ANC Visit

Fifty-six (41.5%) made up to four (4) ANC visits or more. The proportion of women who made four (4 plus) ANC visits was higher among urban women (44.9%) than rural women (34.8%), although the difference was not statistically significant ( $p=0.332$ ). The average gestational age of the current pregnancy was 24 weeks (27 weeks among urban women vs. 23 weeks for rural women). The majority (62; 45.9%) were in their last three months of pregnancy at the time of interviews, 75 (55.6%) were primigravida, and 12 (8.9%) ever had 4 or more pregnancies. Women from rural settings ever had more pregnancies compared with urban women ( $p=0.026$ ). The reason for the current ANC visit to the hospital was mainly for ANC check-up (129; 95.6%) (Table 2).

## 3.3. Knowledge of Respondents about MTCT and PMTCT of HIV Programme

The majority of pregnant women knew about MTCT of HIV as 120 (89%) (95%CI: 82.5%-93.2%) responded in affirmative when asked whether a mother with HIV can transmit the virus to her child and this knowledge was not different for urban and rural women (88.8% vs. 89.1%) ( $p=0.538$ ). However, 9 (6.7%) did not think that mother can pass on HIV to her child and 7 (4.4%) did not know whether or not HIV can be transmitted from mother-to-child. Most (96; 80%) women cited breastfeeding as the time mother can pass HIV to child, followed by during pregnancy (84; 70%). With regard to PMTCT knowledge, the majority (83%; 95% CI: 75.7%-88.4%) were aware of the PMTCT programme while the rest were not. Awareness level was slightly higher among the urban women (84.3%) compared with 80.3% among rural women, though this was not statistically significant ( $p=0.574$ ). Health workers were the main source of PMTCT information (63.3%). The majority (86.5%) of rural women had their information from health workers compared with 52% for urban women. Conversely, only 10.8% of the rural women had their information from radio compared with 37.3% for urban women ( $p=0.005$ ). However, 12 (11%) of pregnant women who were aware of PMTCT did not know its' benefits. Prevention of HIV transmission from mother-to-child was commonly cited by most respondents as benefits of PMTCT (78; 69.6%), followed by prevent new HIV infection (12; 10.7%) as indicated in Table 3.

**Table 1.** Demographic characteristics of study participants by residential status.

Characteristic	Residential status			P-value
	Urban (n=89) n (%)	Rural (n=46) n (%)	All (N=135) N (%)	
<i>Age group (years)</i>				
< 25	31 (34.8)	9 (19.6)	40 (29.6)	0.094
25 – 34	53 (59.6)	31 (67.4)	84 (62.2)	
35 +	5 (5.6)	6 (13.0)	11 (8.1)	
<i>Educational Level</i>				
None	11 (12.3)	7 (15.2)	18 (13.3)	0.701
Basic	32 (36.0)	14 (30.4)	46 (34.1)	
Senior Secondary	15 (16.9)	11 (23.9)	26 (19.3)	
Tertiary	31 (34.8)	14 (30.4)	45 (33.3)	
<i>Occupation</i>				
Unemployed	7 (7.9)	7 (15.2)	14 (10.4)	0.782
Trader	23 (25.8)	12 (26.1)	35 (25.9)	
Farmer	3 (3.4)	1 (2.2)	4 (3.0)	
Artisans	12 (13.5)	6 (13.0)	18 (13.3)	
Students	15 (16.9)	5 (10.9)	20 (14.8)	
<i>Marital status</i>				
Currently married	76 (88.8)	43 (93.5)	119 (88.1)	0.356
Never married	13 (11.2)	3 (6.5)	16 (11.9)	
<i>Distance to health facility</i>				
Less than 5 km	84 (94.4)	2 (4.3)	86 (63.7)	0.001
5km to 8km	5 (5.6)	28 (60.9)	33 (24.4)	
More than 8km	0 (0)	16 (34.8)	16 (11.9)	

**Table 2.** Obstetric characteristics and reason for visiting ANC clinic by pregnant women.

Variable	Residential status						P-value
	Urban n (%)		Rural n (%)		All N (%)		
	89	(65.9)	46	(34.1)	135	(100)	
<i>Number of ANC Visits</i>							
1	25	(28.1)	18	(39.2)	43	(31.9)	0.332
2	7	(7.9)	6	(13.0)	13	(9.6)	
3	17	(19.1)	6	(13.0)	23	(17.0)	
4 plus	40	(44.9)	16	(34.8)	56	(41.5)	
<i>Gestational age</i>							
1 <sup>st</sup> Trimester	19	(21.3)	13	(28.3)	32	(23.7)	0.063
2 <sup>nd</sup> Trimester	27	(30.3)	14	(30.4)	41	(30.3)	
3 <sup>rd</sup> Trimester	43	(48.3)	19	(41.3)	62	(45.9)	
<i>No. of pregnancies ever had</i>							
1	53	(59.6)	22	(47.8)	75	(55.6)	0.026
2	27	(30.3)	10	(21.8)	37	(27.4)	
3	5	(5.6)	6	(13.0)	11	(8.1)	
4 plus	4	(4.5)	8	(17.4)	12	(8.9)	
<i>Reason For ANC Visit</i>							
ANC check up	87	(97.8)	42	(91.4)	129	(95.6)	0.115
HIV testing	2	(2.2)	2	(4.3)	4	(2.9)	
ARV prophylaxis	0	(0.0)	2	(4.3)	2	(1.5)	

### 3.4. Routine HIV Counselling and Testing Practice

Of the 135 participants, 123 (91.1%) received pre-test counselling. However, 134 (99.3%) of them were tested for HIV, thus, 11 (8.2%) mothers were tested without receiving pre-test counselling. Of those counselled, about 12% were counselled with other person(s) beside the counsellor in the counselling room. Counselling was done behind closed doors for 131 (97%) of women counselled. There was an almost complete coverage of assurance of confidentiality of information: 130 (96.3%) of the mothers counselled were

assured of confidentiality of information collected. Nearly 95% of the counselling and testing sessions lasted less than 30 minutes. The majority (110; 81.5%) of the women saw the time spent for the counselling and testing as just right. Among the health education messages given to pregnant women during post-test counselling, most women cited leading healthy lifestyle (58; 43%), followed by follow up test at 34<sup>th</sup> week (30; 22.2%). Ninety-eight percent were satisfied with the overall PMTCT services provided.

In the sub-group analysis, we did not find any significant difference between the urban and rural antenatal attendees with regards to PMTCT practices (Table 4).

**Table 3.** Respondents' knowledge about MTCT and PMTCT programme.

Variable	Urban (n=89)		Rural (n=46)		All (N=135)		p-value
	n	(%)	n	(%)	N	(%)	
<i>HIV can be transmitted from mother to her child</i>							
Yes	79	(88.8)	41	(89.1)	120	88.9	0.538
No	7	(7.9)	2	(4.4)	9	6.7	
Don't know	3	(3.4)	3	(6.5)	6	4.4	
<i>Time of MTCT of HIV</i>							
During pregnancy	40	(50.6)	12	(29.3)	52	(43.3)	0.233
During delivery	54	(68.4)	30	(73.2)	84	(70.0)	
During breastfeeding	62	(78.5)	34	(82.3)	96	(80.0)	
Others	2	(2.5)	2	(4.9)	4	(3.3)	
Don't Know	0	0	4	(9.8)	4	(3.3)	
<i>Aware of PMTCT programme</i>							
Aware	75	(84.3)	37	(80.4)	112	(83.0)	0.574
Not aware	14	15.7	9	(19.6)	23	(17.0)	
<i>Sources of information</i>							
Health worker	39	(52.0)	32	(86.5)	71	(63.3)	0.005
Radio	28	(37.3)	4	(10.8)	32	(28.6)	
Friend	3	(4.0)	0	(0.0)	3	(2.7)	
Other	5	(6.7)	1	(2.7)	6	(5.4)	
<i>Benefits of PMTCT</i>							
Don't know	7	(9.3)	5	(13.5)	12	(10.7)	0.928
Prevent unwanted pregnancy	3	(4.0)	1	(2.7)	4	(3.6)	
Prevent new HIV infection	9	(12.0)	3	(8.1)	12	(10.7)	
Prevent MTCT of HIV	52	(69.3)	26	(70.3)	78	(69.6)	
Treat HIV positive mothers	4	(5.3)	2	(5.4)	6	(5.4)	

**Table 4.** Routine HIV counselling and testing practice.

Variable	Urban (n=89)		Rural (n=46)		Total (N=135)		P-value
	No.	%	No	%	No.	%	
<i>Received HIV Counselling</i>							
Yes	80	89.9	43	93.5	123	91.1	0.487
No	9	10.1	3	6.5	12	8.9	
<i>HIV Tested</i>							
Yes	89	100	45	97.8	134	99.3	0.163
No	0	0	1	2.2	1	0.7	
<i>Counselled Behind closed door</i>							
Yes	85	95.5	46	100	131	97.0	0.144
No	4	4.5	0	0	4	3.0	
<i>Confidentiality Assured</i>							
Assured	84	94.4	46	100	130	96.3	0.101
Not assured	5	5.6	0	0	5	3.7	
<i>Counselling time</i>							
Less than 30 min	88	98.9	40	87.0	128	94.8	0.245
More than 30 min	1	1.1	6	13.0	7	5.2	
<i>Views on counselling time</i>							
Too long	10	11.2	4	8.7	14	10.4	0.154
Just right	69	77.6	41	89.1	110	81.5	
Too short	10	11.2	1	2.2	11	8.1	
<i>Overall Service Satisfaction</i>							
Satisfied	87	97.8	46	100	133	98.5	
Not satisfied	2	2.2	0	0	2	1.5	

### 3.5. PMTCT Service Uptake (PMTCT Cascade)

Retrospective data between 1<sup>st</sup> January and 31<sup>st</sup> December, 2013 was reviewed to assess PMTCT uptake. Out of the 1,283 women registered for ANC services during the period, almost all (99.9%) received pre-test counselling and 100% of

those counselled received testing and test result. CD4 cell count was done for 12 (85%) out of 15 women who tested HIV-positive, 14 (93%) of the positive women including their infants received Antiretroviral (ARV) prophylaxis. All the HIV-positive mothers delivered at the hospital. Early Infant Diagnosis (EID) rate was 100% and MTCT rate was 0%. Table 5 shows PMTCT uptake and dropout by service

delivery points.

**Table 5.** PMTCT service uptake (PMTCT cascade), Jan-Dec, 2013.

Variable	Category	No.	%
ANC registrants	Service output	1,283	100
Pre-test counselling	Service output	1,282	99.9
	Dropout	1	0.1
HIV tested	Service output	1,282	100
	Dropout	0	0
Receiving post test results	Service output	1,282	100
	Dropout	0	0
HIV results	HIV positive	15	1.2
	HIV negative	1267	98.8
Receiving ARV prophylaxis	Service output	14	93.3
	Dropout	1	6.7
HIV-Positive women delivered at Hospital	Service output	14	93.3
	Dropout	1	6.7
HIV-positive women receiving CD4 cell count	Service output	12	85.7
	Dropout	2	14.3
Mother baby pair receiving ARV	Service output	14	100
	Dropout	0	0
Early Infant Diagnosis	Service output	14	100
	Dropout	0	0

### 3.6. Challenges to PMTCT Implementation

In-depth interviews were conducted with service providers to assess barriers to successful implementation of PMTCT services at the health facility. Inadequate trained personnel, work overload, inadequate supply of logistics and medicines, and lack of male involvement were among the barriers cited by service providers.

*“The work is too much for me. I am the only trained counsellor here and at times all other workers close from work leaving me alone to attend to my clients. I sometimes also make follow ups to clients who miss appointment and this is too much for me”* (Counsellor).

The story was not different from the Highly Active Anti-retroviral Therapy (HAART) clinic. The clinic attends to an average of 60 clients each day with only five technical staff. As described by a HAART clinic staff who cited increasing workload among staff as resulting in delays at the facility:

*“I am the only technical staff here with my boss (pharmacist) and when he is absent, I have to supply medication to clients and enter data as well. At times I leave the clinic around 8:00 pm and for the past four years I have never taken my full annual leave”* (HAART clinic staff).

Service providers also cited the difficulty in getting logistics (consumable and non-consumable) for service delivery as a barrier to PMTCT implementation. A counsellor narrated what she goes through before getting logistics for service delivery:

*“I go through a lot of hell before getting test kits from the laboratory. They (laboratory staff) always supply me in fewer quantities (100 or 200 kits) which get finished in no time. At times when you go for re-supply they tell you the*

*test kits are finished. When it happens like this you (counsellor) have to book re-appointment with the client to come back for the test and at times they don't show up again”* (Counsellor).

Lack of male involvement and difficulty in disclosing result to partners by HIV-positive women were also mentioned by service providers and according to them, this result in late initiation of ARV.

*“Most mothers fear to be tested without their partners' consent. Our attempts to get partners accompanying their wives for PMTCT services have proved futile. Some of the mothers who even accept the test fear to disclose their sero-status to their partners due to fear of mistrust and divorce. This is something related to women's economic dependence on their male partners. As a result, they are reluctant to take the ARVs at all or take it secretly and sometimes they do not adhere to treatment”* (counsellor).

Lastly, lack of women autonomy was mentioned as one challenging barrier to successful implementation of PMTCT programme.

*“Some of the mothers will not agree to be tested until their husbands or in-laws agree and give them the go ahead. Some women even attest to the fact that, they want to do the test but traditionally it is not right for you (woman) to disobey your husband and in-laws, because if they find out, you will be divorced”* (Service provider).

This was actually confirmed by an ANC user who was also interviewed about barriers to utilization of the PMTCT services.

*“My husband will kill me if he even hears that, I have offered myself for this HIV test, let alone being HIV-positive, if I am lucky and I am not killed, I will not be allowed to come to the hospital again”* (ANC client).

## 4. Discussion

### 4.1. Utilization of PMTCT Services

This study demonstrated high (99.9%) PMTCT services utilization. This result is similar to what Deressa *et al.* found in their study in Ethiopia, where 94% of pregnant women who attend ANC were counselled and tested for HIV [24]. Other similar studies conducted in Tanzania [25] and Southern Ethiopia [26] found as high as 100% utilization of testing and counselling services. High PMTCT utilization could be attributed to high number of ANC follow-ups. Demissie *et al.* established that, women who attended two or more ANC follow-ups were about three times more likely to accept HIV Testing and Counselling than those with fewer follow-up visits [27]. According to them, such frequent visits provide an opportunity for educating mothers about MTCT and identifying HIV-infected women for prompt PMTCT interventions. The high utilization can also be attributed to the routine offer of counselling service to mothers during ANC. This helps mothers to improve their knowledge on the benefits of PMTCT as demonstrated in this study and as such influence their choice of utilizing the services.

However, the results from this study contradicts what was found in Ethiopia where utilization of PMTCT services was low, as 33.4% were counselled and tested with only 9.3% of infants born to HIV positive mothers receiving ARV prophylaxis [28]. In southwest Ethiopia, 55% HIV exposed mother-infant pairs did not receive any ARV prophylaxis during ANC and after delivery [29]. In another study in southern Ethiopia [20], only three (4.1%) of 74 HIV positive mothers had skilled delivery with an alarming rate of lost to follow up of mothers. Most of the factors associated with utilization are different at different environments. Most of the studies that have shown low utilization were in settings where they used the voluntary opt-out strategy with low education, especially in rural areas where radio and television coverage is poor and distance to healthcare facility is far [30].

#### **4.2. Challenges of PMTCT Implementation**

Several studies have shown that there are challenges to implementation of PMTCT services and this study was not different. Health workers interviewed in this study cited lack of adequately trained personnel and high workload as some of the challenges to successful implementation of PMTCT. This was similar to a study in Ethiopia on barriers to effectiveness of interventions to PMTCT where health workers mentioned inadequate human resource capacity leading to high workload [20]. The reason for lack of staff in this study could be due to high attrition rate of staff. Mostly when staff are trained for the PMTCT program, after working for some time, the young ones leave for further studies and the elderly ones retire from active service when they attain 60 years, however the rate of recruitment of staff is not commensurate to the rate of staff leaving, therefore there is always a deficit of staff and this translates to the heavy workload since the few who are available overwork themselves.

Inadequate supply of logistics and medicines was mentioned as one of the challenges to implementation of PMTCT in this study. Logistics and medicines for PMTCT are supplied by the National AIDS Control Program (NACP) and there are a lot of procedures to follow before these are supplied and the timeliness of supply by the control program could account for some of the shortages. Also most of these logistics are procured through donor support such as Global Fund. It therefore becomes a challenge to procure these logistics when there is dwindling donor support, thereby leading to shortages. Findings from a similar study in Kumasi Metropolis of Ghana also had health workers reporting that shortage of logistics was a challenge [31]. This only confirms the reasons for the inadequate logistics in our study since the NACP is responsible for the supply of logistics for PMTCT services all over the country.

Low male involvement was also one of the challenges stated by the service providers as a barrier to implementation of PMTCT services. In this study setting, a household head, who is usually a husband, greatly influences the woman's ability to seek health care, and implement health practices and interventions. Therefore their involvement is crucial to

successful implementation of health programmes. Studies in Nigeria [32] and Malawi [33] have also shown low male involvement as a barrier to uptake of PMTCT services and several reasons are attributable to this challenge. These reasons include inadequate knowledge of men on PMTCT and their role in the service. It is believed that if men are informed about the importance of PMTCT and given a clear definition on their role in the service then they will be willing to be part of it as well as allowing their wives to access the service. Another reason for the low male involvement could be the fear of knowing their HIV status either directly or indirectly. This is because men know that they will be tested for HIV if they involve themselves and on the other hand too they believe that if they allow their wives to be part of the service, her HIV status becomes a proxy for his status. Therefore, they will not want their wives or themselves to access PMTCT services. Moreover, in this study setting where care for pregnancy is seen as the duty of women, it becomes awkward for a man to be seen accompanying his wife to the clinic and this amounts to lowering his status as a man and for this reason he will be reluctant to visit a health facility with his pregnant wife to be part of PMTCT services so as not to be a laughing stock among his peers.

There is the need to solve these challenges in order to improve uptake of PMTCT services in our study setting. To address these challenges, the health services should implement a system of recruitment that will ensure that personnel who go on study leave and retirement are replaced as soon as possible. As we advocate for more women to take up the service, the skilled human resource required should be provided to reduce the workload on the few staff available. Also the system of distribution of logistics should be streamlined with clear guidelines and the National Control Program should seek sustainable funding to procure these logistics and ensure their availability for use. Educational messages on PMTCT should not be given only at the ANC clinics but also at the outpatients department (OPD) of health facilities where men are in attendance for them to understand the importance of the service and their role to ensure successful implementation. There could also be an award scheme for couples who access PMTCT services to motivate other males to take up PMTCT and give their wives the opportunity to benefit from the services.

The study was a health facility based and the pregnant women do not represent the general populations of the study site because only women seeking ANC at the health facility were eligible for the study, making it difficult to make inferences. Secondary, nurses working in the health facilities administered the questionnaires and this may have led to social desirability bias. Despite these limitations, the study identified a number of barriers that can hinder successful implementation of PMTCT services at the study site.

## **5. Conclusions**

This study established that there was high utilization of PMTCT services in the study setting however, there were

some implementation challenges and these include inadequate trained personnel coupled with high workload, inadequate supply of logistics and low male involvement. There is the need to sustain the high utilization of the service by providing quality care to clients and addressing the challenges to implementation of PMTCT services by ensuring the human resource requirements are met, adequate logistics supplied to health facilities and males educated on the importance of PMTCT with their roles clearly defined to improve their involvement in the delivery of PMTCT services in Bolgatanga municipality.

## Author's Contributions

WAF designed the study and reviewed literature. EO contributed substantially to the design, analysed data, and wrote the first draft of the manuscript. JD contributed in the first draft and critically reviewed the subsequent versions. All authors reviewed and approved the final version of the manuscript.

## Acknowledgement

We are grateful to the Hospital authorities who granted us permission to carry out and publish this study. We thank Mrs. Lucy Otu, Ms. Everlove Djanduh, Ms. Asana A. Iddisah and Ms. Sara Awonfine for collecting data.

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