

Improving Access to PMTCT Through the Involvement of Traditional Birth Attendants in Program Activities in the Far North Region of Cameroon: A Retrospective Cohort Study

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Background: Majority of deliveries occurring in the Cameroon part of the Lake Chad basin is assisted by traditional birth attendants (TBA). The aim of the present study was to assess if training and involving TBA in community-based Prevention of Mother to Child Transmission (PMTCT) interventions can contribute in improving targeted population access to these interventions.

Methods: This was a retrospective cohort study that assessed among mothers of children aged 0–24 months the effect of training and involving TBA in PMTCT activities. The exposed mother-child pairs were those inhabiting communities where TBA were trained and involved during the 24 previous months in PMTCT activities (exposed communities) while the non-exposed groups were those living in communities with no study intervention. Data were collected in households selected by stratified cluster random sampling from children's mothers or guardians using a face-to-face administered questionnaire (undocumented) and from antenatal booklets (documented) used in health facilities to record antenatal care.

Results: A total of 637 mothers-children couples were included, 416 (65.3%) in the exposed group and 221 (34.7%) in the control group. Exposed mother-child pairs had significantly higher documented access to mother antenatal HIV testing compared to the couples living in non-exposed communities with adjusted relative risk (ARR) of 4.20 (2.52–6.99). The mean number of antenatal consultations was significantly higher in the exposed group (Student *T*-test = 6.00, *p* = 0.000). However, this exposure to community with trained TBA increased but not significantly the proportion of pregnant women who benefit from antenatal consultations (ARR = 0.94 (0.70–1.25), *p* = 0.678) and those who withdraw their HIV test results ($X^2 = 0.271$, *p* = 0.786).

Conclusion: The training and involvement of TBA in delivering PMTCT interventions at the community level can improve population access to these interventions. The consistency of these findings should be tested in other communities in need and with other health care interventions.

Keywords: prevention of mother to child transmission of HIV, traditional birth attendants, antenatal care, HIV tests

Background

Despite the implementation of WHO guidelines on the Prevention of Mother to Child Transmission of HIV (PMCTC), the burden of HIV among children is still a concern.¹⁻³ In Cameroon, progress is being made to reduce this burden but national objectives are yet to be met to date.⁴⁻⁷

As reported by several studies, the main barriers limiting the access of targeted populations to PMTCT include: limited financial and geographical accessibility to care and lack of basic information on HIV prevention.^{6,8-10} Results of almost all demographic and health surveys conducted in the past 30 years in Cameroon highlight an overlapping of

limited access to antenatal care with low access to PMTCT. This particularly characterizes the Far North Region of Cameroon where the coverage of the limited number of interventions targeting pregnant women remains low compared to planned objectives.^{11–13} In this region, the 2018 demographic health survey and the 2017 Cameroon Population-based HIV Impact Assessment reported the prevalence of HIV at 1.1% and 1.5%, respectively, in the Far North region.^{11,14} Based on the 2020 PMTCT national report, only 63% of children exposed between 6 and 8 weeks of age are screened by Polymerase Chain Reaction (PCR) in the Far North region of Cameroon.¹⁵ It was also documented a 17.33% mother to child transmission in the same region.¹⁶

Several strategies have been implemented in view of improving access to PMTCT. Those using integration of multiple health interventions have been shown to significantly improve the coverage of patients attending health facilities. Similarly, the adaptation of the “Reaching Every District” (RED) approach has increased the coverage, access, and utilization of PMCTC services.^{17–20} The latter approach involves the detection and provision of care to targeted populations not covered by health facility-based care. In some rural areas of Cameroon where geographical, cultural and financial accessibility to care is limited, actions of traditional birth attendants (TBA) have been reported to improve the provision of prenatal, natal, and post-natal care.²¹ Collaboration between TBA and health personnel in the implementation of PMTCT interventions is thus expected to improve access to these interventions for target populations.

M.A. SANTE (Meilleur Accès aux Soins de Santé), a Cameroon based non-governmental organization (NGO) implemented from May 2018 to April 2020 an 18 months project to improve the access of targeted populations to PMTCT interventions in the Kousseri and Mada health districts based in the Far North region of Cameroon. This was done by training and involving TBA in identifying and referring pregnant women from community to health facilities for antenatal care and organizing community sessions to administer PMTCT interventions to the targeted population who could not attend health facility-based PMTCT interventions. These included community-based sensitization sessions to inform women on HIV prevention measures and importance of antenatal services. The aim of the present study was to assess if training and involving TBA in community-based Prevention of Mother to Child Transmission (PMTCT) interventions can contribute in improving targeted population access to these interventions.

Materials and Methods

Study Design

This was a retrospective cohort study that assessed among mothers of children aged 0–24 months the effect of training and involving TBA in PMTCT activities. The exposed mother-child pairs were those inhabiting communities where TBA were trained and involved during the 24 previous months in PMTCT activities (exposed communities). The non-exposed group was made of mother-child pairs inhabiting communities bordering exposed ones where no TBA was formally involved in PMTCT activities during the same period. Data were collected in households selected by stratified cluster random sampling from children’s mothers or guardians using a face-to-face administered questionnaire (undocumented) and from antenatal booklets (documented) used in health facilities to record antenatal care.

Activities of TBA in Exposed Communities

In exposed communities, TBA were trained to be involved in the following activities: referral of pregnant women from community to health facilities for antenatal care consultation and services, identification of high-risk pregnancies and referral of these cases to health facilities, organization (in collaboration of the team in charge of PMTCT in the territorially competent health center) of HIV testing sessions and monthly community discussions targeting pregnant women and women of child bearing age on the benefits of ANC and HIV testing, HIV prevention measures, assisted delivery and pregnancy services. For confidential reasons, the results of HIV testing were not delivered in the community but in the health center. They were also trained in HIV prevention during the management of pregnancies in the community via the transmission of blood and body fluids.

Study Settings and Period

The survey was conducted in November 2020. The study was implemented in the health districts of Mada and Kousseri located in the Cameroonian zone of the Lake Chad in the Far North region. These districts are characterized by their location in a conflict zone (where Boko Haram terrorism is rampant), and by a limited geographical and seasonal access to care. The zone is also characterized by the very limited coverage of pregnant women by prenatal care.¹¹ In these districts, as in the rest of Cameroon, PMTCT interventions are offered in health centers (first level of health facilities closest to the population and in charge of delivering the minimum package of care) and in district hospitals (where health centers refer cases) under the supervision of District Medical Offices.

Between May 2018 and April 2020, 37 villages (19 in Kousseri and 18 in Mada health district) benefited from a project aiming at improving the access of targeted populations to PMTCT interventions by training and involving 60 TBA (30 TBA in each district) in the organization and delivery of community-based PMTCT care. Final data collection was collected 6 months after completion of the intervention implementation.

Sampling

Communities in which TBA were involved in PMTCT activities were sources of eligible exposed mother-child pairs (exposed communities). Neighboring communities in which TBA were not involved in PMTCT were sources of eligible non exposed mother-child pairs (non-exposed communities). Communities with either poor security conditions or impassable roads (data were collected during the rainy season characterized by poor road conditions and flooding in some hard-to-reach villages) were excluded.

Each selected community was divided into quarters with an approximate number of 07 households (clusters). The communities were classified in alphabetic order with its clusters randomly ranked. Clusters to be included were selected by systematic random sampling. Every household in the selected clusters was visited and those inhabited by children aged 0–24 months were invited to be part of the study. One non-exposed was matched to two exposed.

Outcome Assessment

The primary outcome was mothers' HIV testing during the index pregnancy and recorded in the antenatal care booklet. Secondary outcomes were: the number of HIV tests done during the index pregnancy and recorded in antenatal care booklet, the number and access to antenatal consultations collected from booklets and from administered questionnaire, the place of delivery, access to antiretroviral treatment for HIV positive mothers, access to HIV prophylaxis for children born from HIV-positive mothers.

Data Collection Tools and Variables

The data collection form was developed on an electronic support by the study team, local health personnel involved in PMTCT care and local community volunteers. It was pretested in 20 households in the Kousseri Health District.

Key variables collected were mother HIV testing during pregnancy, number of HIV tests during pregnancy, result of HIV test during pregnancy, access to antiretroviral therapy for HIV positive mothers, access to HIV prophylaxis during delivery and to HIV prophylaxis for children born to HIV-positive mothers, access to antenatal care, mother or guardian religion, level of education, marital status, duration of stay in the (exposed or non-exposed) community.

Data Collection

Data were collected by trained and supervised surveyors on ODK (Open Data Kit) forms in smartphones. The questionnaire was administered face-to-face to heads of households and mothers or caregivers (undocumented) of children aged 0–24 months present at the first, second or third visit made in a 7-day period spent in each selected community. Those who were absent during these three visits were considered absent. Data were also collected from antenatal care booklet (documented) using a grid. Data collected were verified at daily basis in the field and errors corrected before uploading in the secured central server before the send phase of data cleaning. Data collection was monitored and cleaned in MS-Excel 2013.

Sample Size

The minimal sample size estimated was 195 participants for each group. This was obtained assuming: a 52% probability of access to antenatal HIV test as estimated in the Far North Region in 2018;¹¹ an anticipated Odds Ratio between exposed and non-exposed of 2, a power of the study of 80%, a value alpha of 0.05, a correlation of exposure between exposed and non-exposed of 30%, and a number of matched exposed per non-exposed of one and planning for two-sided tests. The minimum size obtained was 195 in each group.¹¹ The sample size was estimated using the software stata/ IC 16.1. (StataCorp. 2019 Stata Statistical Software: Release 16.1 College Station, TX: StataCorpLLC).

Data Analysis

Characteristics of mothers and children were compared among the exposed and the non-exposed groups using student *t*-test and chi square statistics depending on the variable. As a primary outcome, the association between being exposed to a community where TBA have been trained and involved in PMTCT activities and antenatal HIV testing was assessed by estimating unadjusted and adjusted relative risks (RR). The adjustment was done using poisson regression random effect model. The adjustment was done taking into account characteristics that were significantly different between exposed and non-exposed groups.

As a secondary outcome, the mean number of HIV tests in antenatal period, access and number of antenatal cares and place of birth were compared between the groups and adjusted using linear regression. Access to treatment was also compared per study group for mothers tested HIV positive and children born to HIV positive mothers. Data were analyzed with 95% confidence interval using the Stata version 16.1 IC. (Stata Corp. 2019 Stata Statistical Software: Release 16.1 College Station, TX: Stata Corp LLC).

Ethical Considerations

This study aimed at evaluating the effect of involving TBA in PMTCT activities on PMTCT care outcomes. It involved interacting with households, mothers or guardian of children for a collection of information on the antenatal period. All local health, administrative and traditional authorities of the study area gave their executive clearances prior to the implementation. Written informed consent was obtained from heads of households prior to reaching eligible participants. Mothers or children guardians were fully informed and only those who consented were enrolled in the study. Protection of confidentiality was maximized by employing surveyors who could not identify participants after the study and by avoiding collection of data that could be used to identify participants. All methods related to the study were performed in accordance with the Declaration of Helsinki. The protocol was approved by the Cameroon national ethics review committee under the reference 2020/10/1303/CE/CNERSH/SP.

Results

Characteristics of Study Population

A total of 637 mothers-children couples were included, 416 (65.3%) in the exposed group and 221 (34.7%) in the control group. [Table 1](#) provides the distribution of mothers and children characteristics in both study groups. The proportion of Muslims were significantly different in both study groups. The mean age of mothers in the exposed group was 27.3 years and 28.2 years in the non-exposed group. The mean age of children was 9.3 and 10.3 months in the exposed and non-exposed groups, respectively.

Association Between Exposed Mother-Child Pairs and PMTCT Outcomes

As indicated in [Table 2](#), exposed mother-child pairs had significantly higher access to mother antenatal HIV testing compared to those living in non-exposed communities. It was the case for documented and undocumented HIV testing. Exposure to a community with TBA involved in antenatal care was not associated to higher probability of having access to antenatal care compared to the non-exposed group. As indicated in [Table 3](#), the mean number of antenatal consultations was not significantly higher in the exposed group whereas the mean number of HIV tests received by the mothers in the exposed communities during the antenatal life of these children was significantly higher.

Table 1 Characteristics of Mother/Guardians-Children Couples

Variables	Exposed group		Non-Exposed group		X ² (Chi-Square)	P-value
	n/N	(%)	n/N	(%)		
Mother-related characteristics						
Married mothers	404/416	97.1	216/221	97.7	0.215	0.643
Polygamic households	156/404*	38.6	68/216*	31.5	3.324	0.190
Level of education ≥ secondary school	47/416	11.3	12/221	5.4	5.914	0.015
Muslim mothers	322/416	77.4	204/221	92.3	22.280	0.000
Residence in the Mada health district (with more serious security concerns)	106/416	25.5	63/221	28.5	0.678	0.410
Children-related characteristics						
Birth in health facility	223/416	53.6	113/221	51.1	0.355	0.552
Female	206/416	49.5	103/221	46.6	0.490	0.484
Available antenatal consultation booklet	228/416	54.8	121/221	54.8	0.0002	0.9891

Note: *Only for married mothers.

Table 2 Association Between Mother-Child Pairs Inhabiting in Community with TBA Involved in PMTCT Activities and Some PMTCT Outcomes

Variables	Exposed Group	Non Exposed Group	Unadjusted Analyses		Adjusted Analyses	
	n (%)	n (%)	RR (95% CI)	P-value	RR (95% CI)	P-value
Documented access to HIV test (Yes/No)*	212 (92.9)	54 (44.6)	4.13 (2.48–6.87)	0.000	4.20 (2.52–6.99)	0.000
Undocumented access to HIV test (Yes/No) ^z	133 (70.7)	64 (64.0)	1.11 (0.81–1.52)	0.490	1.11 (0.57–1.18)	0.515
Exposure to antenatal care-documented or not (Yes/No)	363 (87.2)	198 (89.5)	0.92 (0.695–1.23)	0.611	0.94 (0.70–1.25)	0.678

Notes: *Women with a medical booklet with pregnancy follow up information. ^zWomen with no medical booklet for pregnancy follow-up (information based on declarations).

Table 3 Comparison of Means of Antenatal Cares and HIV Testing in Study Groups

	Non-Exposed Group (n=416)	Exposed Group (n=221)	T-test	P-value
Mean number of antenatal cares done	4.00	3.00	6.00	0.000
Mean number of HIV tests	1.00	1.00	0.000	0.50

Comparing Other Key Elements of PMTCT Cascade Between Study Groups

As presented in Table 4, the proportion of mothers who retrieved their HIV test results in the exposed group was not significantly higher compared to the proportion in the non-exposed group. There was no significant difference between the proportion of sexual partners tested for HIV, the proportion of mothers tested positive for HIV and the proportion of deliveries done at health facility between the study groups.

Table 4 Comparing Elements of the PMTC Cascade Between Study Groups

	Exposed group		Unexposed Group		Statistical Test (value)	P-value
	Proportion	%	Proportion	%		
Proportion of children's mothers who withdrew their HIV test results	319/345	92.5	113/118	95.8	1.2326	0.2177
Proportion of sexual partner tested	41/416	9.9	8/207	3.9	-2.6294	0.0086
Proportion of HIV+ mothers	3/319	0.09	1/113	0.9	-0.0981	0.9218
Proportion of HIV+ mothers under treatment	2/3	66.7	1/1	100.0	–	–
Proportion of children of HIV+ mothers tested	1/3	0.3	0/1	0.0	–	–
Proportion of children who were administered HIV prophylaxis (Nevirapine)	0/3	0.0	1/1	100.0	–	–
Proportion of HIV exposed new born under exclusive breastfeeding	3/3	100.0	0/1	0.0	–	–

Note: *For indicators with less than 5 individuals per group, no comparison was conducted.

Discussion

The aim of the present was to assess if training and involving TBA in community based PMTCT interventions can contribute in improving targeted population access to these interventions. Results of this study show that training and involving TBA in educating the target populations of their communities on HIV prevention and screening, and PMTCT increased the rate of pregnant women tested for HIV (adjusted RR= 4.20 (2.52–6.99) p=000) and the mean number of antenatal screenings among pregnant women (Student *T* test =6.00, p= 0.000). However, this intervention increased but not significantly the proportion of pregnant women who benefit from antenatal consultations (Adjusted RR=0.94 (0.70–1.25), p=0.678) and did not change the proportion of those who retrieved their HIV test results from health facilities ($X^2 = 0.271$, p=0.786).

HIV testing is recommended during pregnancy to detect and prevent HIV transmission from infected mothers to fetus and to the child.³ For a number of reasons linked to the supply and/or demand for care, a significant number of children go through their foetal and infant lives without benefiting from detection of and response to the risk of mother to child HIV infection. This situation has prevailed in Cameroon for the last ten years, particularly in the Far North of the country where this study was conducted.^{11,12} Some of these reasons include poor knowledge about MTCT, low maternal education level, fear, stigma, poor access to health services, and socio-cultural barriers.^{22,23} The present study explored the contribution of trained TBA in improving mothers access to HIV during pregnancy and revealed that the training and involvement of traditional birth attendants in the community education of women on PMTCT significantly improved access of pregnant women to HIV testing as well as the average number of tests and but not the rate of retrieval of results. These findings can be explained by the TBA activities in this project, contributing to provide HIV screening in the community for pregnant women and to referring pregnant women to the health center for antenatal care. The consistency of these findings is observed in a study conducted in another context and settings where TBAs were involved in referring pregnant women for HIV testing.²⁴ The beneficial contribution of TBA is linked to the fact that they are part of the communities where they live and have acquired local notoriety and trust due to their contribution in the wellbeing of pregnant women and thus are more trustworthy from the community perspective. The present study involved the combination of various interventions models that included TBA's activities carried out on a monthly basis crowned by community-based sensitization sessions attended by health care personnel, HIV testing and result delivery. The combination of these interventions contributed to reduce geographical and cultural barriers that have been identified by previous studies to limit pregnant women's access to PMTCT interventions.²⁵ The consistency of this contribution of TBA in improving mothers access to HIV should be verified in different contexts where pregnant women's access to antenatal consultations and pregnancy interventions are hampered by barriers to the supply of and demand for care.

Antenatal consultations are recommended to assess the normal course of pregnancy, identify and prevent risks that may increase maternal and infant morbidity and mortality.^{26,27} These involve the integrated provision of a number of

recommended health interventions among which those offered by PMTCT.²⁸ Other key interventions include the fetal growth monitoring, administration of tetanus vaccination and Intermittent Preventive Treatment. PMTCT allows the detection of the risk of HIV transmission throughout the pregnancy and the organization of the prevention of HIV transmission when this risk is proven.²⁹ In Cameroon, as in many other countries, antenatal care is available in health facilities. But for a number of reasons, including cultural, geographical, financial and cultural barriers and lack of resources, some pregnant women do not benefit from it. In the present study, TBAs contributed in educating pregnant women in their communities on the importance of antenatal care and encouraged them to seek for antenatal consultations in health facilities. This exposure contributed so significantly increasing the mean number of antenatal consultations but not the proportion of women requesting antenatal consultations compared with the control group. This suggests that the activities of the TBAs have not made it possible to enrol new pregnant women (not attending parental consultations) in these consultations.

Access to antenatal consultations is often influenced by knowledge of the existence and importance of the consultations by targeted women.^{6,30} As part of the present study interventions, TBAs also contributed in educating pregnant women in their communities on the importance of antenatal care and encouraged them to seek for antenatal consultations in health facilities. No difference in the number of antenatal visits was detected between women exposed to TBA education and those that were not. Available study investigated the contribution of TBAs in offering some antenatal services like counselling and education but the effect of these on the attendance of antenatal care where not assessed.³¹ Studies should be conducted to explore other community or hospital-based approaches to improve pregnant women's access to antenatal care assisted by trained health personnel.

This study had some limitations. It was not possible to collect data to assess the benefit of exposure of pregnant women to ART activities, on all the elements of the PMTCT cascade, in particular on the proportion of exposed children accessing preventive treatment, HIV testing and the proportion of children tested positive. This is because the source of the data, which was the prenatal and perinatal monitoring booklet for pregnant women and children, did not contain these data. Also, no data were collected to document mothers already living with HIV.

Conclusions

This study reveals that the training and involvement of traditional birth attendants in educating the population on the importance of some key interventions of the prevention of mother-to-child transmission of HIV and organizing HIV testing among the target populations contributes to a significant increase in the proportion of women whose risk of HIV transmission is assessed by HIV testing. The same is true for the proportion of pregnant women who withdrew their test results. However, the involvement of the TBAs described above did not help to improve the proportion of pregnant women who received prenatal consultations in health facilities. In communities where the coverage of target populations with PMTCT interventions is insufficient, we recommend on the one hand, to prepare and involve actors who have moral authority over women and families, such as TBAs, and on the other hand, set up a process of collaboration with them to organize and introduce PMTCT services such as screening and health education to the target populations in their communities. Studies should be conducted to identify interventions that can help improve access to prenatal consultations for pregnant women.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

The protocol was approved by the Cameroon National ethics committee. All participants provided their written consent prior to participation.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no competing interests.

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