








# Do Women Enrolled in PMTCT Understand the Recommendations: A Case Study from Kilimanjaro

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**Introduction:** Prevention of mother-to-child transmission (PMTCT) remains a cornerstone of HIV prevention and control efforts. It is vital that the beneficiaries of PMTCT programs understand PMTCT recommendations, especially since their adherence to recommendations is key to successful PMTCT. There have been several major changes in PMTCT recommendations, and many women have encountered different recommendations. It is plausible that confusion has arisen as to what is currently recommended for successful PMTCT. This confusion can affect adherence to recommendations and hinder PMTCT efforts. However, little is known about how women enrolled in PMTCT understand the recommendations in the context of these frequent changes.

**Aim:** In this paper, we present our findings regarding how HIV-positive women enrolled in PMTCT in Kilimanjaro understand PMTCT recommendations pertinent to them.

**Methods:** From August 2019 to April 2020, we surveyed 521 mothers enrolled in PMTCT in seven districts in the Kilimanjaro region, Northern Tanzania. A pretested questionnaire was administered to consenting mothers. The questionnaire collected information on mothers' demographic characteristics, previous encounters with PMTCT, and knowledge of various PMTCT program elements, including medication duration, breastfeeding recommendations and infant HIV testing schedule. A logistic regression model was used to determine factors associated with good PMTCT knowledge among mothers.

**Results:** A total of 521 women were enrolled, the median score for the 19 items used to assess knowledge was 57.9%, and 64.9% scored above the median. Counselling on ART (OR=2.17, 95% CI 1.08–4.36) and counselling on breastfeeding during the ANC visits (OR=2.38, 95% CI 1.38–4.11) were the only factors that we found to be significantly associated with higher odds of good knowledge of PMTCT.

**Conclusion:** Even amongst mothers enrolled in PMTCT, poor understanding regarding key PMTCT recommendations prevails. There is a need to reassess the training modalities and look at ways to reinforce PMTCT messages to mothers.

**Keywords:** PMTCT knowledge, PMTCT recommendations, mother's knowledge, understanding PMTCT

## Introduction

The World Health Organization launched option B+ in 2012 as a new approach in the prevention of mother-to-child transmission (PMTCT) of Human Immunodeficiency Virus (HIV). The main aim of this new approach was simplification and harmonization of treatment.<sup>1,2</sup> Prior to Option B+, there have been a number of PMTCT guidelines from

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WHO, and these have included wildly varying information. This can be exemplified by the initial recommendations emphasizing breastfeeding avoidance, where option B+ emphasizes breastfeeding support for at least one year.

Tanzania adopted Option B+ in September 2013, and it has since been the main approach to PMTCT.<sup>3</sup> It helped Tanzania be one of the 22 countries in the Global Plan, aiming to eliminate new infections in children and protect mothers.<sup>4</sup> Although the Global Plan had great successes, Tanzania's target of having <5% mother-to-child transmission (MTCT) by 2020 was not achieved. By 2019, MTCT of HIV in Tanzania was at 10.7%.<sup>5,6</sup>

Amongst the lessons that were hailed as essential to be carried on from the Global Plan was the participation and involvement of HIV-positive mothers in all matters pertaining to the response to the HIV epidemic. This was seen as one of the key elements behind the Global Plan's success in lowering MTCT.<sup>5</sup> The inadequate number of healthcare personnel in most developing countries has led to insufficient interaction of mothers and providers. This detracts from the PMTCT experiences of mothers.<sup>7</sup>

With the interaction gap between mothers and health workers in PMTCT, HIV-positive mothers, whether peers in the clinic or expert patients remain a crucial source of information and influencer of practice, particularly amongst newly diagnosed HIV positive mothers.<sup>8,9</sup> It is important that these influencers, particularly mothers enrolled in PMTCT, have knowledge that is current as according to the health belief model, this will likely favor their adherence.<sup>10,11</sup> The health belief model proposes that people will take action toward health goals if they are aware of the benefits, requirements and perceived control.<sup>12</sup> Applied to PMTCT, if mothers are aware of the benefits of the various steps in PMTCT, they are more likely to take steps towards adherence to the PMTCT recommendations.

Tanzania has developed guidelines for PMTCT that outline the services and counselling steps mothers should receive from healthcare workers.<sup>13</sup> However, the evolution of PMTCT recommendations over the years, particularly regarding breastfeeding, has led to misconceptions amongst mothers, which has bred distrust of the recommendations and non-adherence to them.<sup>14</sup> The level of knowledge regarding various elements of PMTCT is low in many countries, including Tanzania.<sup>15–17</sup> Some elements, such as points of transmission, appear to be well known to mothers, but others, such as prevention methods, time of child testing, and optimal infant feeding practices, had eluded mothers even before the option B+ era.<sup>18–21</sup>

We sought to assess the knowledge mothers have regarding the current PMTCT recommendations as understanding the recommendations is the first step towards adhering to them.

## Methods

### Study Design

This cross-sectional study targeted women enrolled in and attending PMTCT clinics with children less than two years of age. The study was conducted between August 2019 – April 2020. The aim was to gauge the understanding of these women regarding the PMTCT recommendations as they form an important source of information for each other and the community. Their understanding is also a surrogate representation of how well the PMTCT messages are communicated to the beneficiaries. By employing a cross-sectional design, we were able to capture a large number of women who are beneficiaries of the PMTCT program and capture their understanding of the program in an unrehearsed setting.

### Study Site and PMTCT Program

The study was conducted in the Kilimanjaro region, Northern Tanzania. The region has seven districts: Siha, Hai, Moshi district council, Moshi municipality, Rombo, Mwanaga, and Same. In collaboration with the district medical officer of each of the seven districts in the region, we identified the clinics with the highest PMTCT client load in each district. Participants were then recruited from 37 clinics during their routine clinic visits.

The PMTCT clinics handle pre-natal and post-natal clients and provide PMTCT education to the clients, counselling and testing, and medication to both mothers and children. They also collect blood samples (dry blood spots (DBS) for infant testing using DNA PCR. In the clinics, mothers are meant to be counselled on HIV transmission, prevention of transferring the infection to the child, ART use for the mother and the child, infant feeding, and infant testing schedule.<sup>13</sup>

In most of the identified clinics, PMTCT clinic operates once a week though some with lower patient load, run once a month and some with a higher patient load run daily. The districts deliberately attempt to synchronize the clinics to run on the same day to facilitate the collection of samples for early infant HIV testing, which is run by zonal laboratories. Though most conduct them on Wednesdays, there are variations due to local influences such as market

days. We visited each of the clinics on all their clinic days for one month to ensure we captured as many mothers as possible as most have monthly PMTCT visits. A marker was put on all the patient's files that had been enrolled to avoid repetition.

## Study Population

The information was collected from 521 HIV positive mothers who had children aged below two years, and the children were currently enrolled in PMTCT at any of the selected clinics. We chose post-natal mothers as they would have more exposure to the program and have first-hand experience of more aspects of PMTCT than pre-natal women. Their understanding of PMTCT recommendations could thus serve as a surrogate for whether they have the correct knowledge to communicate to other mothers. All women attending the selected clinics between August 2019 and April 2020 participated in the study.

## Study Tool, Users and Content

We developed a questionnaire consisting of seven sections covering socio-demographic characteristics, birth history, HIV history, previous use of antiretroviral therapy (ART) and PMTCT, antenatal care (ANC) and PMTCT attendance in relation to reference child, counselling, and teaching received in PMTCT clinics, and knowledge of key aspects of PMTCT. The resulting English version was translated into Kiswahili and back-translated into English to ensure fidelity. Testing and pretesting was conducted on a sample of 30 women from non-participating clinics until the final tool was approved.

During data collection, the questionnaire was electronically administered in Kiswahili (participant's national/native language) by trained research assistants using Survey-CTO™ installed on password-secured tablets.

## Data Analysis

Data analysis was performed using STATA version 15.1. Numeric variables were summarized using median and categorical variables using frequencies and percentages. Mother's level of knowledge on PMTCT was assessed using their response to 19 questions. The questions assessed appropriate feeding duration for exclusive breastfeeding and continued breastfeeding, whether a mother can transmit to a child, when transmission occurs, methods for preventing mother-to-child transmission, duration of nevirapine prophylaxis for a new-born child, and frequency of testing for the child. To be classified as being

knowledgeable on PMTCT, a mother had to have scored above the median. Comparison of the proportion of mother's knowledge on PMTCT by participants characteristics was made using Chi-square test. Akaike information criteria (AIC) was used to select the best fitting model, where the model with the lowest AIC was considered the best. The logistic regression model was used to estimate odds ratios (OR) and the corresponding 95% confidence intervals (CI) for factors associated with knowledge on PMTCT.

All analyses were restricted to women who had ever attended ANC during their index pregnancy.

Significant association between explanatory variables and knowledge on PMTCT were evaluated at  $p < 0.05$ . The variables included in the adjusted analysis were all found to be associated with PMTCT knowledge in previous literature hence were included as potential confounders.

## Results

### Socio-Demographic and Clinical Characteristics of Study Participants

A total of 521 mothers with children less than 24 months of age enrolled in PMTCT services were included in the study. The women came from a total of 38 clinics across the seven districts of Kilimanjaro region. The mean age of the women was 31.7 years (SD 6.6). Most of the 521 women had primary education (66.2%) and had 1–2 previous pregnancies (92%) while HIV-positive. All women had attended antenatal clinic during their pregnancy with the reference child, and 87.3% reported to have at least four visits as recommended. Of the mothers interviewed, 86.4% reported having received counselling on breastfeeding during their PMTCT visits and 92.1% reported to have been counselled on ART (Table 1).

### Mothers Knowledge of PMTCT

Of the 19 knowledge items that were used to assess mothers' knowledge; questions pertaining to ART use in prevention of mother-to-child transmission, testing for early infant diagnosis, alternative feeds for prevention of transmission and the lower risk of transmission in caesarean delivery seem to elude the mothers' knowledge the most. The median score for knowledge was 57.9%. Overall, 64.9% of mothers scored above the median and were regarded as having good PMTCT knowledge. Only one mother was able to answer all 19 questions correctly (Table 2).

**Table 1** Socio-Demographic and Clinical Characteristics of Study Participants (N = 521)

	Characteristic	Frequency	%
Mothers age (years)	≤ 24	94	18.0
	≥ 25	427	82.0
Maternal education level	Primary education	345	66.2
	Secondary education/higher	176	33.8
Total number of pregnancies	1–4	451	86.6
	5 or more	70	13.4
Years since diagnosis with HIV	≤ 5 years	370	71.0
	> 5 years	151	30.0
Number of pregnancies while HIV positive	1–2	479	92.0
	> 2	42	8.0
Years on ART	1–2	278	53.4
	> 2	243	46.6
Used ART in previous pregnancy	No	348	66.8
	Yes	173	33.2
Number of ANC visits before delivery	< 4	66	12.7
	4 or more	455	87.3
Gestation trimester at first booking for ANC	1st trimester	233	44.7
	2nd trimester	266	56.1
	3rd trimester	22	4.2
Counselled on breastfeeding	No	71	13.6
	Yes	450	86.4
Counselled on ART	No	41	7.9
	Yes	480	92.1
Childs age category (months)	≤ 6 months	190	36.5
	> 6 months	331	63.5
Level of facility receiving PMTCT care	Dispensary	49	9.4
	Health Centre	249	47.8
	Hospital	223	42.8

## Factors Associated with Mothers' Knowledge on PMTCT

The factors associated with mother's knowledge on PMTCT are shown in Table 3. Several factors appeared to increase mothers' odds to have better PMTCT knowledge in the crude/unadjusted logistic regression analysis. These included being counselled on breastfeeding (OR=2.96, 95% CI 1.78–4.94) and ART (OR=2.56, 95% CI 1.34–4.87) compared to those who were not. There was also a marginal association between mothers having children aged <6 months (OR=1.45, 95% CI 1.00–2.09) with higher odds of PMTCT knowledge compared to those with children aged ≤6 months and the older (≥25 years) (OR=1.55, 95% CI 0.99–2.45) compared to the younger (<25 years) mothers.

After adjusting for the background and clinical characteristics of study participants, only receiving counselling on breastfeeding (OR=2.38, 95% CI 1.38–4.11) and on ART (OR=2.17, 95% CI 1.08–4.36) during PMTCT visits remained significantly associated with higher odds of better PMTCT knowledge than women who were not counselled (Table 3).

## Discussion

In our study, there was a total of 521 mothers with children less than 24 months of age enrolled in PMTCT services. Of the socio-demographic and clinical characteristics of the study participants: mean age of the women was 31.7 years, 87.3% had at least four visits with the reference

**Table 2** Mothers Responses to PMTCT Knowledge Questions (N = 521)

PMTCT Knowledge Items	No (%)	Yes (%)
Can mother transmit HIV to child?	52 (10.0)	469 (90.0)
Is it possible to prevent MTCT of HIV?	28 (5.4)	493 (94.6)
Correctly identifies duration of BF for HIV-positive mothers	149 (28.6)	372 (71.4)
Correctly identifies duration of exclusive breastfeeding (EBF)	19 (3.6)	502 (96.4)
Correctly identifies duration of BF for HIV-negative mothers	118 (22.6)	403 (77.4)
Correctly identifies duration or infant ART prophylaxis	281 (53.9)	240 (46.1)
Correctly identifies number of times exposed infant should be tested	241 (46.3)	280 (53.7)
ART for mother can prevent MTCT?	36 (6.9)	485 (93.1)
ART for child can prevent MTCT?	49 (9.4)	472 (90.6)
Can HIV-positive mother safely breastfeed?	13 (2.5)	508 (97.5)
Can ART use during pregnancy prevent MTCT?	321 (61.6)	200 (38.4)
Can ART use during breastfeeding prevent MTCT?	128 (24.6)	393 (75.4)
Can caesarean delivery prevent MTCT?	502 (96.4)	19 (3.6)
Can EBF prevent MTCT?	375 (72.0)	146 (28.0)
Can formula feeding prevent MTCT?	451 (86.6)	70 (13.4)
Can avoidance of mixed feeding prevent MTCT?	494 (94.8)	27 (5.2)
Can MTCT occur during pregnancy?	342 (65.6)	179 (34.4)
Can MTCT occur during labor and delivery?	299 (57.4)	222 (42.6)
Can MTCT occur during breastfeeding?	107 (20.5)	414 (79.5)
Mother has good knowledge (scored above median)	183 (35.1)	338 (64.9)

**Abbreviations:** MTCT, mother-to-child transmission; ART, antiretroviral therapy; BF, breastfeeding; EBF, exclusive breastfeeding; HIV, human immunodeficiency virus; MTCT, mother-to-child transmission; PMTCT, prevention of mother-to-child transmission.

child, 86.4% received counselling on breastfeeding, and 92.1% were on ART during PMTCT visits. Amongst the 19 knowledge items used to assess mothers' knowledge, 64.9% of mothers scored above the median. Despite several of the factors assessed showing to increase the odds of mothers having better PMTCT knowledge, only counselling on ART and breastfeeding during the PMTCT visits was significantly associated with good knowledge.

In our study, mothers showed varying levels of knowledge regarding different components of PMTCT. In our study, 1 in 5 mothers did not recognize that transmission can occur during the breastfeeding period despite being enrolled in PMTCT. Even higher proportions did not realize that transmission can occur during pregnancy and delivery. Compared to data from the Tanzania HIV Malaria Indicator Survey, our mothers have lower knowledge of transmission during pregnancy and breastfeeding.<sup>15</sup> Even though knowledge that transmission can occur during breastfeeding seems to have increased compared to an older study from Kilimanjaro,<sup>19</sup> it is still much lower than in Lesotho, where 94% of the mothers recognized the transmission risk in the breastfeeding period.<sup>22</sup> In Eswatini, levels of knowledge regarding transmission during breastfeeding were reported to be similar to ours. Still, the Eswatini study respondents

seem to be more knowledgeable about the possibility of transmission during pregnancy and delivery.<sup>17</sup> It is plausible to think that the failure to recognize the very real risk of transmission during breastfeeding might lead some mothers not to adhere to the recommendations.

Apart from lack of knowledge on time of transmission, nearly a third of HIV-positive women in this setting also had sub-optimal knowledge on the preventive role of ART during pregnancy and breastfeeding, the duration of ART prophylaxis for infants, and the testing schedule for exposed infants. This should be a cause for great concern at the program level. Low uptake of early infant diagnosis (EID) has been linked with low maternal knowledge of PMTCT and EID.<sup>23–25</sup> Compounded with these other knowledge gaps, the effect is likely to be more defaulting from the PMTCT cascade and hindrance of the success of the PMTCT program.

There is no universal way for assessing PMTCT knowledge, and there are variations in the questionnaires used in different studies, but we found 64.9% of our mothers had good knowledge. This is similar to a study in Ethiopia which found 61% of mothers had good knowledge using a similar cut off (although with fewer questions).<sup>26</sup> Studies from Malawi, Ghana, Uganda and elsewhere in Tanzania have reported lower levels of knowledge (25–35%). This

**Table 3** Factors Associated with Mothers' Good Knowledge of PMTCT

Variable	N	Yes* n (%)	COR (95% CI)	P-value	AOR (95% CI)	P-value
Mothers age category						
24 and below	94	53 (56.4)	I		I	
Above 24	427	285 (66.7)	1.55 (0.99–2.45)	0.06	1.55 (0.93–2.57)	0.09
Childs age category						
≤ 6 Months	190	113 (59.5)	I		I	
> 6 months	331	225 (68.0)	1.45 (1.00–2.09)	0.05	1.25 (0.84–1.85)	0.27
Mothers education category						
Primary and below	345	223 (64.6)	I		I	
Post-primary	176	115 (65.3)	1.83 (0.70–1.51)	0.87	1.20 (0.79–1.84)	0.39
Number of pregnancies mother has had						
1–4	451	291 (64.5)	I		I	
5 or more	70	47 (67.1)	1.12 (0.66–1.92)	0.67	1.72 (0.26–11.47)	0.58
Total births woman has had						
1–4	446	288 (64.6)	I		I	
5 or more	75	50 (66.7)	1.10 (0.65–1.84)	0.73	0.52 (0.08–3.32)	0.49
Years since diagnosis						
≤ 5 years	370	236 (63.8)	I		I	
> 5 years	151	102 (67.5)	1.18 (0.79–1.77)	0.41	1.12 (0.65–1.94)	0.68
Number of pregnancies while HIV positive						
1–2	479	307 (64.1)	I		I	
>2	42	42 (73.8)	1.58 (0.77–3.22)	0.21	1.46 (0.64–3.33)	0.36
Years on ART						
1–2	278	176 (63.3)	I		I	
>2	243	162 (66.7)	1.16 (0.81–1.66)	0.42	0.88 (0.52–1.45)	0.59
Used ART in a previous pregnancy						
No	348	216 (62.1)	I		I	
Yes	173	122 (70.5)	1.46 (0.99–2.16)	0.06	1.25 (0.75–2.08)	0.39
ANC visits before delivery						
Less than 4	66	37 (56.1)	I		I	
4 or more	455	301 (66.2)	1.53 (0.91–2.59)	0.11	1.34 (0.68–2.62)	0.40
Booking trimester						
1st Trimester	233	158 (67.8)	I		I	
2nd Trimester	266	168 (63.2)	0.81 (0.56–1.18)	0.28	0.90 (0.60–1.34)	0.60
3rd Trimester	22	12 (54.5)	0.57 (0.24–1.38)	0.21	0.82 (0.26–2.55)	0.73
Counselled on breastfeeding						
No	71	30 (42.3)	I		I	
Yes	450	308 (68.4)	2.96 (1.78–4.94)	<0.01	2.38(1.38–4.11)	<0.001
Counselled on ART						
No	41	18 (43.9)	I		I	
Yes	480	320 (66.7)	2.56 (1.34–4.87)	<0.01	2.17 (1.08–4.36)	0.03
Level of ANC facility						
Dispensary	49	31 (63.3)	I		I	
Health center	249	166 (66.7)	1.16 (0.61–2.20)	0.65	1.04 (0.53–2.03)	0.92
Hospital	223	141 (63.2)	1.00 (0.53–1.90)	1.00	0.82 (0.41–1.62)	0.57

**Note:** \*Mothers have good knowledge of PMTCT.

**Abbreviations:** COR, crude odds ratio; AOR, adjusted odds ratio; ANC, antenatal clinic; ART, antiretroviral therapy; CI, confidence interval; HIV, human immunodeficiency virus; PMTCT, prevention of mother-to-child transmission.

discrepancy could likely be due to the spread of PMTCT messages with time, perhaps more than the differences in assessment methods.<sup>18,19,27,28</sup>

Compared to a previous study from Dar-es-Salaam, we found a higher proportion of mothers recognized infant prophylaxis as a means for PMTCT (90.6% vs 42.7%).<sup>20</sup> However, fewer mothers in our study thought caesarean delivery could be a means for PMTCT (3.6% vs 12.5%). This could be a reflection of the emphasis that has been put on infant prophylaxis in the Option B+ era.

Misconceptions regarding infant feeding durations have also been reported in other studies. Our study found that though most mothers understood the duration of EBF, the total duration of breastfeeding for either HIV-exposed or non-exposed infants eluded them. Chaponda et al in South Africa also found mothers to be lacking in knowledge of the appropriate duration for breastfeeding.<sup>20</sup> Dunkley et al attributed the misunderstanding of the feeding recommendations to the changing recommendations over the years.<sup>14</sup> Though we did not assess the effect of changing recommendations on child feeding practices, it is possible that it also has a role to play in our setting.

We found counselling on breastfeeding and ART to be significantly associated with having good PMTCT knowledge. This is also affirmed by an older study from Kilimanjaro, which had reported 2.3 higher odds for poor PMTCT knowledge amongst mothers who had not been counselled on breastfeeding.<sup>19</sup> Unlike the study by Falnes however, our study did not find any significant association between PMTCT knowledge and maternal age or ANC booking.<sup>19</sup>

Overall, the level of knowledge regarding PMTCT was low, with most categories having less than 75% of mothers showing low knowledge regarding PMTCT. This is not a unique situation to our setting as low knowledge of PMTCT has previously been reported in mothers enrolled in PMTCT elsewhere.<sup>21,30</sup> Liyeh et al in Ethiopia found that women who attended ANC were more likely to be more knowledgeable on PMTCT.<sup>21</sup> Our study has gone further to show that it is the counselling that these women receive during their visits that makes the difference in knowledge. We found that though 87.3% of mothers in our study had attended ANC more than four times during their reference pregnancies. However, not all of them had received counselling on ART and breastfeeding, the two factors that showed to be significantly associated with knowledge.

The lack of information on breastfeeding during clinic visits does not seem to be a problem that is unique to our study setting. It has also been reported in Zambia and South Africa amongst other places.<sup>29,30</sup> Where enhanced counselling and mentorship on breastfeeding has been tried, overall adherence and knowledge on PMTCT seem to benefit; hence this might be an avenue to explore for our clinics, especially since the link between knowledge and practice is well established.<sup>8,31</sup> A study in Cameroon by Egbe et al contrasted our study in that over 98% of their participant had good knowledge on PMTCT, which they attributed to the emphasis on counselling, particularly during the first ANC visit.<sup>32</sup>

Our study was limited by not looking at how long the mothers had been in PMTCT or who provided them with the counselling during their ANC visits. However, this does not detract from the problem that our findings highlight: mothers enrolled in PMTCT still lack knowledge in key areas of PMTCT, which can lead to non-adherence to the guidelines and influence others to deviate from the guidelines. Those with children older than six months are more likely to have had more exposure to the program, but only 68% could be classified as knowledgeable on PMTCT. This leaves many questions about the mothers' degree of exposure to health education and counselling in the program.

## Conclusions

It is now 20 years since Tanzania started PMTCT services,<sup>33</sup> and seven years since we adopted option B+ in PMTCT. Knowledge of mothers regarding PMTCT is still not universal even amongst those in the program, who serve as ambassadors of the program and a source of information for others. This knowledge deficit involves some fundamentals of the program, such as the very real possibility of mother-to-child transmission and the need for ART during pregnancy. These could pose a threat to the success of the PMTCT program. We recommend that counselling be compulsory for all mothers, and perhaps a checklist for counselling be developed to ensure that all mothers have covered pertinent topics for PMTCT during their ANC visits. The rationale of PMTCT and participation of the mothers cannot be overemphasized in this counselling.

## Abbreviations

ART, antiretroviral therapy; ANC, antenatal care; DBS, dry blood spots; EID, early infant diagnosis; HIV, human immunodeficiency virus; MTCT, mother-to-child transmission; PMTCT, prevention of mother-to-child transmission.

## Data Sharing Statement

Data can be obtained by request from the authors.

## Ethics

The study was conducted in accordance to the Helsinki declaration. Permission to conduct this study was obtained from the Kilimanjaro Christian Medical University College Research Ethics Committee (certificate number 2434) and the regional medical officer for Kilimanjaro, and the district medical officer for each of the seven districts. The heads of all the chosen clinics also provided their approval. During their routine clinic visits, the research assistants approached the mothers and asked them to participate in the study. A written informed consent was signed by those who agreed to participate in the study. The interviews were conducted in the privacy of consultation rooms at the clinics.

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## Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

## Disclosure

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