A review of the implementation of the prevention of mother-to-child transmission program in the George sub-district, Western Cape

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Declaration:

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously submitted it, in its entirety or in part, at any University for a degree.

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Abstract

Introduction

The most common cause for HIV infection in children in developing countries is the vertical transmission of HIV from mother to child. Without any intervention the vertical transmission rate from mother to child will be between 15-50%, depending on a number of factors. An effective prevention of mother-to-child transmission (PMTCT) program can dramatically reduce this transmission rate to as low as 2-5%. There appears to be a gap between PMTCT policy guidelines and actual implementation, and while the reasons for this are multi-factorial, one facet may be local shortfalls in the program.

Aim: To review the implementation of the PMTCT program in the George sub-district for 2010.

Objectives: To assess whether the PMTCT program is being conducted according to established provincial protocol; to describe possible local shortfalls in the PMTCT program; to make recommendations to improve the identified shortfalls.

Methods

A retrospective descriptive study, based on a record review of patient files, the PMTCT register, and birth registers in the labour ward of George provincial hospital. Every HIV positive pregnant woman from the George sub-district who delivered at the George provincial hospital obstetric unit during 2010 was included. Missing files and medical records were excluded**.** Data was collected from each record in the registers according to set criteria, and entered into a Microsoft Excel data sheet.

Results

95% of women in the study had an HIV test at the clinic, and 93% had a CD4 count. This shows good initial uptake and acceptance of the program. However, 28% did not receive adequate antenatal PMTCT cover, 33% of patients who required highly active antiretroviral treatment (HAART) did not receive it, and 34% of women did not receive adequate PMTCT cover during labour. 86% of babies received their initial PMTCT medication within 72 hours of birth. The one month zidovudine treatment for babies (before October 2010) and six weeks nevirapine treatment (after October 2010) was not documented in 30% and 74% of cases respectively.

Discussion

While many aspects of the PMTCT program are being well applied in the George sub-district, there are significant shortfalls in the implementation of the program. These need to be addressed to ensure optimal prevention of HIV transmission from mother to child. Particular points which need to be focused on are improved record keeping, increasing the percentage of HIV positive women receiving adequate antenatal and intrapartum PMTCT, and increasing the percentage of HIV positive women receiving HAART.

Introduction

The HIV epidemic continues to be a key public health issue worldwide.[1] The prevention of mother-to-child transmission (PMTCT) of HIV remains one of the most vital aspects of HIV prevention, and is at the forefront in the campaign against this epidemic.[2] The PMTCT program forms part of the key priority areas of The HIV and AIDS and STI Strategic Plan for South Africa 2007-2011 [3]. It is also in line with the World Health Organisation (WHO) PMTCT strategic vision 2010-2015 [2] and the United Nations' Millennium Development Goals 4-6 to reduce child mortality, improve maternal health, and halt and begin to reverse the spread of HIV by 2015.[4] According to the WHO PMTCT strategic vision 2010-2015 [2] the number of pregnant women in South Africa living with HIV is over 200 000, with approximately 72% receiving antiretrovirals (ARVs) to reduce the risk of mother-to-child transmission of HIV.

The prevalence of HIV positive mothers attending antenatal clinics in the public sector in the Western Cape was estimated to be 15.1% in 2006 and 16.1% in 2008 according to The 2008 National Antenatal Sentinel HIV and Syphilis Prevalence Survey.[5] The prevalence of HIV positive mothers in the George sub-district of the Western Cape was 14% in 2008 and 15.4 % in 2009 (unpublished data, personal communication Dr Nel, head of department of Obstetrics, George Hospital).

It is well established that the most common (>90%) cause for HIV infection in children in developing countries is the vertical transmission from mother to child.[2,6.] Without any intervention the vertical transmission rate from mother to child will be between 15-50%, depending on a number of factors.[2,7-10] This transmission rate can be radically reduced by an effective PMTCT program, which includes ARV chemoprophylaxis and feeding advice, with or without feeding replacement scheme. [2,10,11] In patients on dual ARV chemoprophylaxis transmission is less than 2% in non-breastfeeding populations and less than 5% in breastfeeding populations. [2,11,12] Additionally, it has been proven that highly active antiretroviral treatment (HAART) should be given to those pregnant women who need it for their own health.[6, 13] This has reduced transmission rates in first world countries to 0.99%.[12]

A highly controversial aspect of PMTCT is the choice of infant feeding, and is often the weakest aspect in the PMTCT counselling.[14] Transmission of HIV from mother to child

through breast milk ingestion contributes a significant proportion of HIV infections.[9,13] It is therefore a logical progression that exclusive formula feeding reduces the risk of HIV transmission (to as low as 4% in some studies compared to 16% in exclusive breastfeeding group[15]). However, the benefit of exclusive formula feeding is possibly outweighed by the risk of malnutrition and contracting other infectious diseases (diarrhoea and respiratory illnesses), and the risk of it not being properly prepared. Therefore while the WHO had previously encouraged formula feeding where it was acceptable, affordable, feasible, safe and sustainable,[16] they now advocate breastfeeding (with ARV coverage) above formula feeding, in their latest recommendations.[17]

If the PMTCT program is optimally implemented it should prevent many children from being burdened with the morbidity and mortality associated with HIV/AIDS,[8] and by advocating appropriate introduction of HAART it will improve maternal survival. The positive outcomes not only include saving lives, but also reduced morbidity and health expenditure.

While evidence proves that implementation of PMTCT is expanding and progressing, there is still much room for improvement.[1] There are many potential barriers which exist to prevent successful PMTCT programs and all of these need to be addressed to ensure a successful outcome.[13,14,18-21] These barriers include health system barriers: delay in various aspects of service delivery in the care continuum, health care and counselling staff shortages, supply shortages, impaired health access due to clinic quota systems, staff not adequately trained, poor integration of ANC and HIV services. Patient centered barriers include: fear of stigma and community isolation, lack of partner and community support, non-disclosure of HIV status, mental health issues, economic constraints, cultural issues, language barriers, incomplete understanding of their disease and treatment regimes.

Work done in KwaZulu-Natal, South Africa, showed promising results in implementation of the PMTCT program, but identified particular local barriers to a successful program.[22] These barriers included long waiting times for pre and post test counselling, and in the counselling sessions preparing patients for the HAART program as well as a delay in receiving CD4 results, leading to a delay in referral to HAART clinic. One study showed only 76% of women attending an antenatal care (ANC) clinic had an HIV test.[23] Another study showed that 66% and 88% of HIV positive women received antenatal zidovudine (AZT), while 14%

and 10% were started on HAART, and 14% and 2% received no intervention.[18] 61% and 86% reported adherence to PMTCT medication.[18]

In Cape Town, 73% of HIV positive pregnant women were started on HAART, 20% received antenatal AZT and 8% had no intervention.[24] A similar study in Cape Town showed that 77% of HIV positive women received PMTCT intervention, but 33% had less than four weeks of antenatal AZT coverage while 3% received no intervention. [25]

In Soweto, South Africa, 93% attended an ANC clinic, while 7% were unbooked. 51% had CD4 counts greater than 200, while 22% had CD4 counts lower than 200, and 27% of CD4 counts were unknown.[20] 60% of the women requiring HAART did not receive it. 31% of infants received inadequate PMTCT regimes, and 4% received no treatment at all. 84% of women chose to formula feed.[20]

In Johannesburg, 6% of women were unbooked.[26] Babies born before arrival (BBA) to a delivery unit was the commonest cause for not receiving PMTCT treatment in labour. More than 95% of infants received PMTCT medication. 60% of the HIV positive women chose to formula feed, while 38% did not have their choice documented, and only 1.3% of women chose to breastfeed.[26]

The evidence suggests that opportunities are being missed in providing optimal PMTCT care. While the reasons for this are multi-factorial, one facet may be due to local shortfalls in the program.

While working in Obstetrics at George provincial hospital, the researcher noticed that some HIV positive patients were not receiving adequate antenatal and intra-partum PMTCT coverage. The Researcher discussed this with both the head of department and the head of nursing of obstetrics and gynaecology. Together it was decided that this would be an important area of study.

Aim: To review the implementation of the PMTCT program in the George sub-district for the year 2010.

Objectives: To assess whether the PMTCT program is being conducted according to established provincial protocol, to describe possible local shortfalls in the PMTCT program, and to make recommendations to improve the identified shortfalls.

Methods

Setting:

Maternity ward, George provincial hospital, George sub-district, Western Cape.
George Municipality population figures amounted to 136 540 people in 2007 according to Stats SA. According to the Municipality the population was estimated at ±190 000 in 2009. The population is diversified across race groups and cultures and is characterised by varying levels of socio-economic status and levels of education.

To serve this population there are a number of health facilities. There is one level 2 hospital, namely George Provincial hospital. There are no district hospitals, and no mobile obstetric units (MOU's). There are a total of 14 primary health care (PHC) facilities: seven clinics, four mobile clinic units, two community health centres and one satellite clinic. The total antenatal visit for these clinics during 2010 were 11 275, of which 2719 (24%) occurred at Thembalethu clinic. Antenatal care and PMTCT is offered at all of these PHC facilities, but HAART is only available at two sites. There is also one private hospital.

The 2009 Policy and Guidelines for the Prevention of Mother-to-Child Transmission of HIV, of the Department of Health of the Western Cape were being used in the George sub-district in 2010.[27] A revision of these guidelines occurred in 2010, but was only implemented in October 2010, as stated in a Western Cape Department of Health circular no. 147/2010.

The specific variables in the PMTCT program which were focused on in this study include:

- Did the patient have an HIV test (Voluntary Counselling and Testing (VCT))?
- Did the patient have a CD_4 count?
- Did the patient receive adequate antenatal PMTCT drugs according to the protocol?
- If appropriate was HAART started?
- Did the patient receive adequate PMTCT medication during labour?
- Did the baby receive PMTCT medication?
- Was the mother counselled about choice of feeding method?

The revised Western Cape Provincial PMTCT guidelines for 2010, implemented from October 2010 did not influence these variables, due to the broadness of the stated variables. The fact that the 2009 guidelines were amended has been allowed for in the data collection.

Study design:

A retrospective descriptive study, based on a record review of patient files and the PMTCT and birth registers.

Study population:

Every HIV positive pregnant woman from the George sub-district who delivered at the George Provincial Hospital Obstetric unit during 2010.

Study sample:

All HIV positive patients from the George sub-district who were entered in the birth register during 2010.

Sample size: 410 patients

Inclusion criteria:

Every HIV positive pregnant woman from the George sub-district, who delivered at the George Provincial Hospital Obstetric unit during 2010.

Exclusion criteria:

Patients from areas outside the George sub-district, who were referred to George Provincial Hospital. Patients where files and medical records were missing were also excluded.

Data collection

For each patient entry data was taken from the birth register, the PMTCT register and the patient's medical records. This data was assessed according to the chosen variables in the PMTCT program (see appendix A) and entered into a predesigned data capturing sheet in MS Excel (see appendix B).

The data was checked manually and prepared for analysis by the researcher. After all data was checked the file numbers were removed from the data sheet to remove any identifying factors and so ensure patient confidentiality.

Analysis

STATISTICA version 10 was used to analyse the data. The primary nature of the project was descriptive. As such, descriptive techniques were used to address the primary objectives of the study. Most of the collected data was binary (categorical data) and as such frequency counts and proportions are presented. All data is visually presented using histograms, bar charts and pie charts.

Ethical aspects

Ethics approval was obtained from the University of Stellenbosch Ethics Committee, reference N11/07/213. Permission for the study was obtained from the Western Cape Department of Health, reference RP 130/2011.

Data was obtained from hospital registers and files. Patient names were not reflected in the data collection or analysis and were only used to draw patient files. Patient file numbers were removed from the data sheet once data capturing was complete, to remove any identifying factors. This ensured anonymity and respect for each person's confidentiality.
A waiver of informed consent was granted for these reasons.

Results

433 HIV positive patients were identified from the labour ward birth register and the PMTCT register. 13 of these patients were excluded because they were referred in from outlying district hospitals. A further 10 patients were excluded as their files and adequate documentation could not be found, due to filing errors. This left a total of 410 eligible patient entries.

The mean age was 26.7 years, with the minimum age 13 years and the maximum 43 years. The age groups 20-30 years made up 61%. The mean parity (number of children excluding the current pregnancy) was one, with a maximum parity of six. More than 78% delivered at

term. 158 (39%) of women delivered between 36-38 weeks gestation, 150 (37%) between 38 to 40 weeks, and 14 (3%) delivered between 40 and 42 weeks of gestation. 111 (27%) had caesarean sections, while 299 (73%) delivered vaginally. 390 (95%) women had an HIV test and 381 (93%) had a CD4 count done at the clinic.

289 (70%) of HIV positive pregnant women were from Thembalethu residential area. (See fig. 1.)

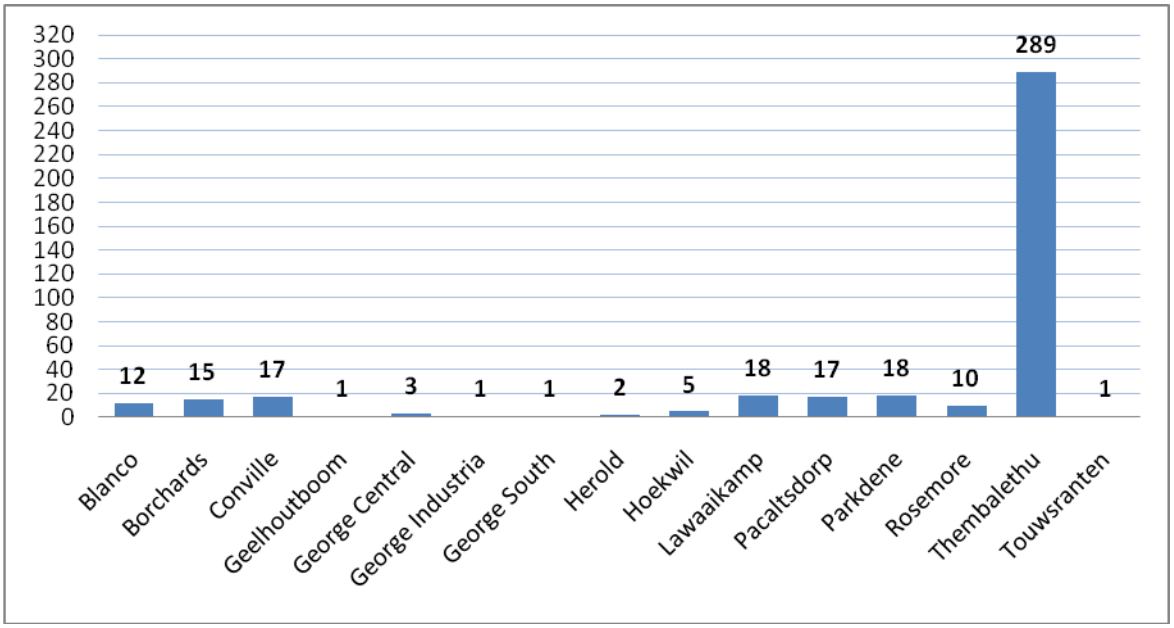

Fig.1 Patients according to residential areas (n=410).

Thembalethu clinic was attended by 229 (56%) of HIV positive pregnant women. The clinic with the second highest number of attendees was Lawaaikamp with 37 (9%) (See fig. 2).

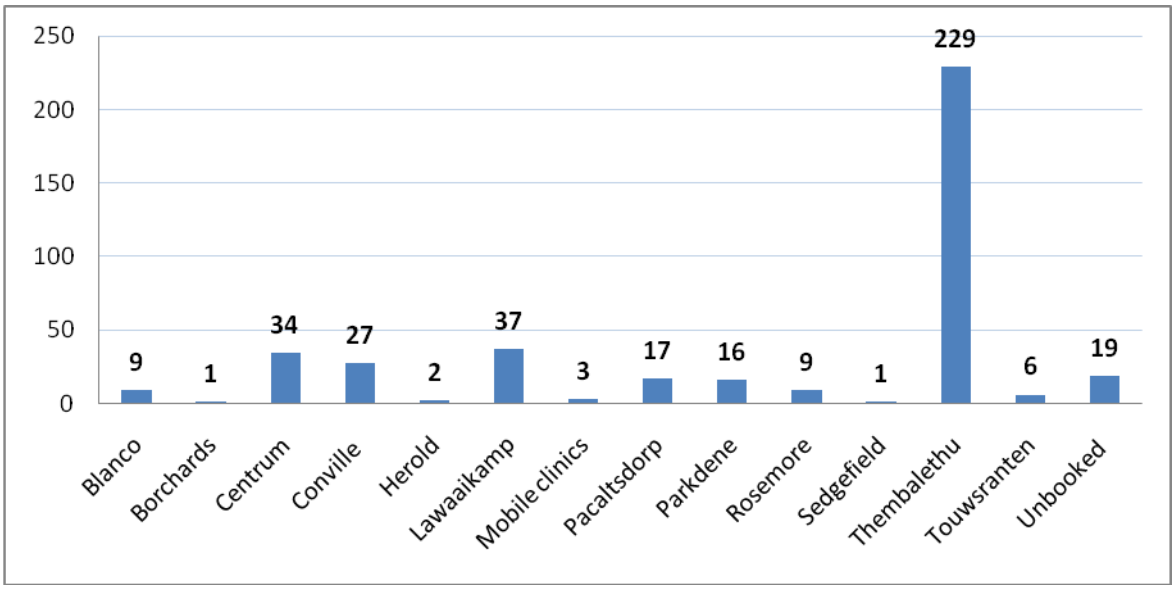

Fig.2 Patients according to clinics attended (n=410).

Figure 3 shows the distribution of the CD4 results. The majority of CD4 counts were in the 200-400 range.

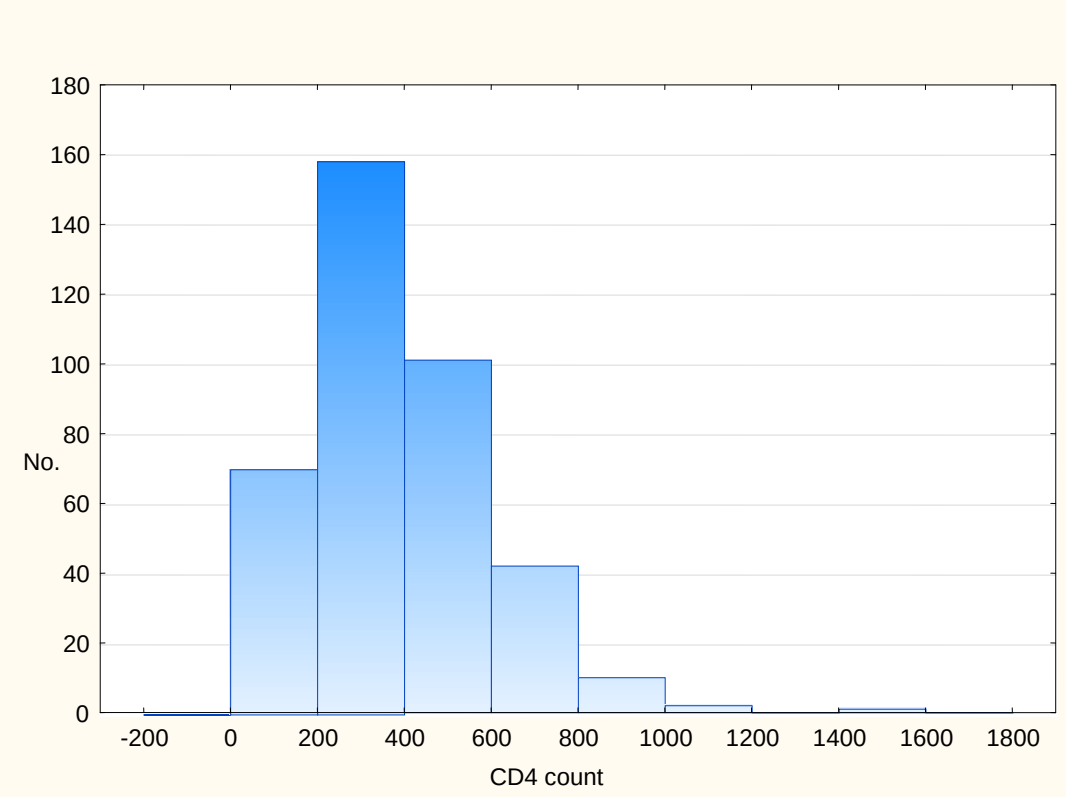

Fig.3 Distribution of CD4 counts

Of 410 women, 162 (40%) qualified for HAART according to the protocol. Of those requiring HAART 85 (52%) received HAART, while 53 (33%) did not receive it, and in 24 (15%) of cases it was not documented if HAART was started or not (See fig. 4). Four of the 85 women who were started on HAART defaulted treatment.

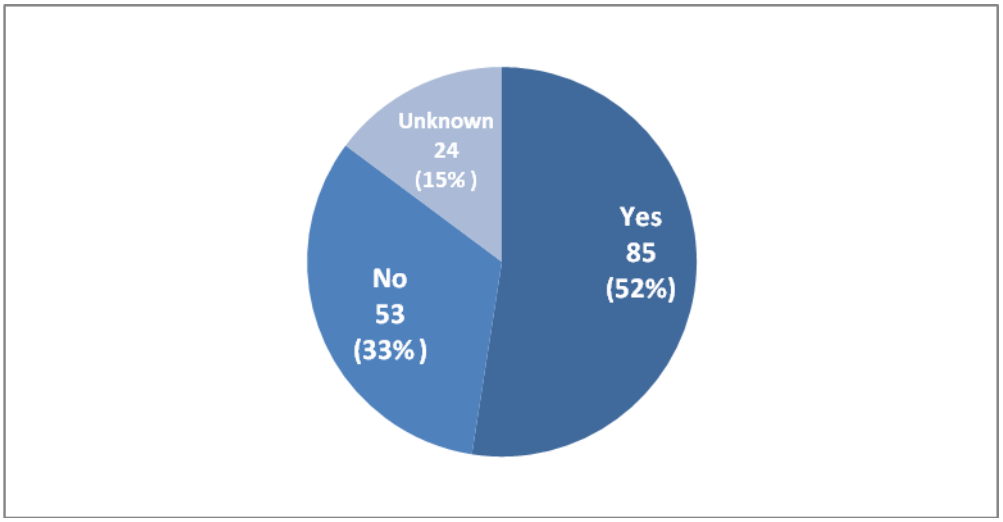

Fig.4 HAART started in those that qualified (n=162).

293 (71.5%) of the women received adequate antenatal PMTCT cover, while 114 (27.8%) did not. (See fig. 5).

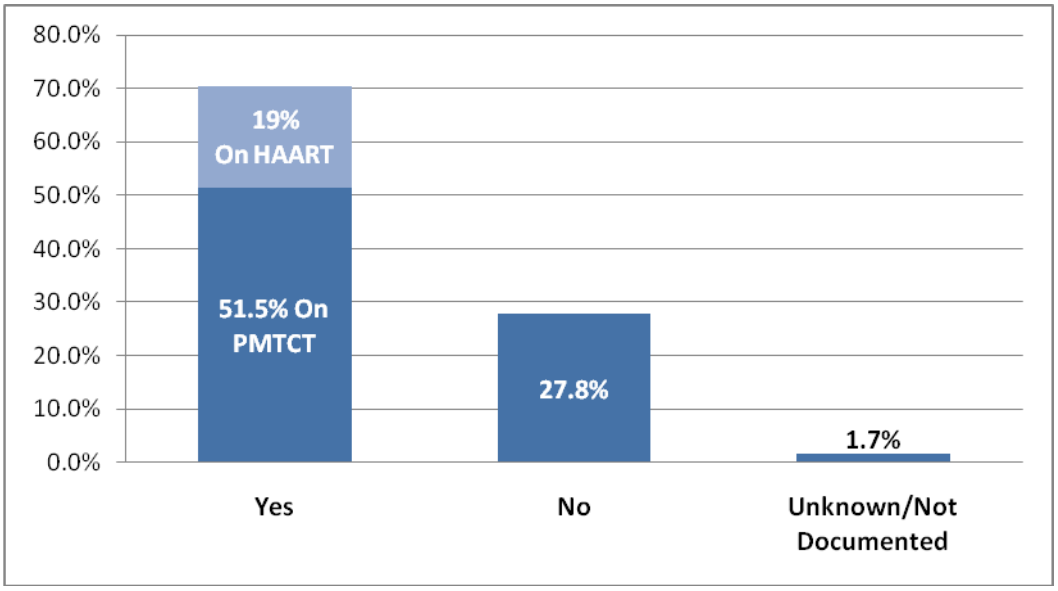

Fig. 5 Adequate antenatal PMTCT cover (n=410).

Figure 6 describes the reasons for inadequate antenatal PMTCT treatment. 43 (38%) had treatment interrupted usually by missing clinic appointments. 25 (22%) had insufficient PMTCT cover as they did not receive at least four weeks of continuous treatment. 17 (15%) were poor clinic attendees, and a further 17 (15%) were unbooked and therefore missed the opportunity to be started on PMTCT treatment.

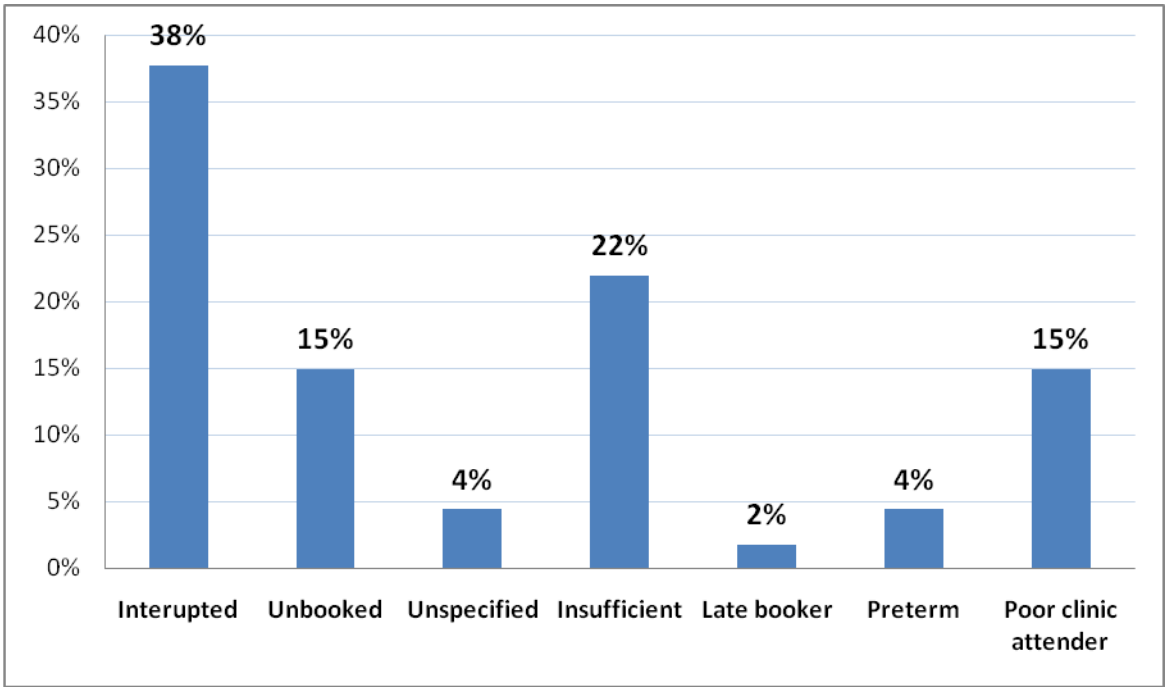

Fig. 6 Reason for inadequate antenatal PMTCT treatment (n=114).

226 (55%) women received adequate PMTCT cover in labour, while 139 (34%) women did not. In 45 (11%) women it was unknown if they received PMTCT treatment during labour due to insufficient documentation. (See fig. 7).

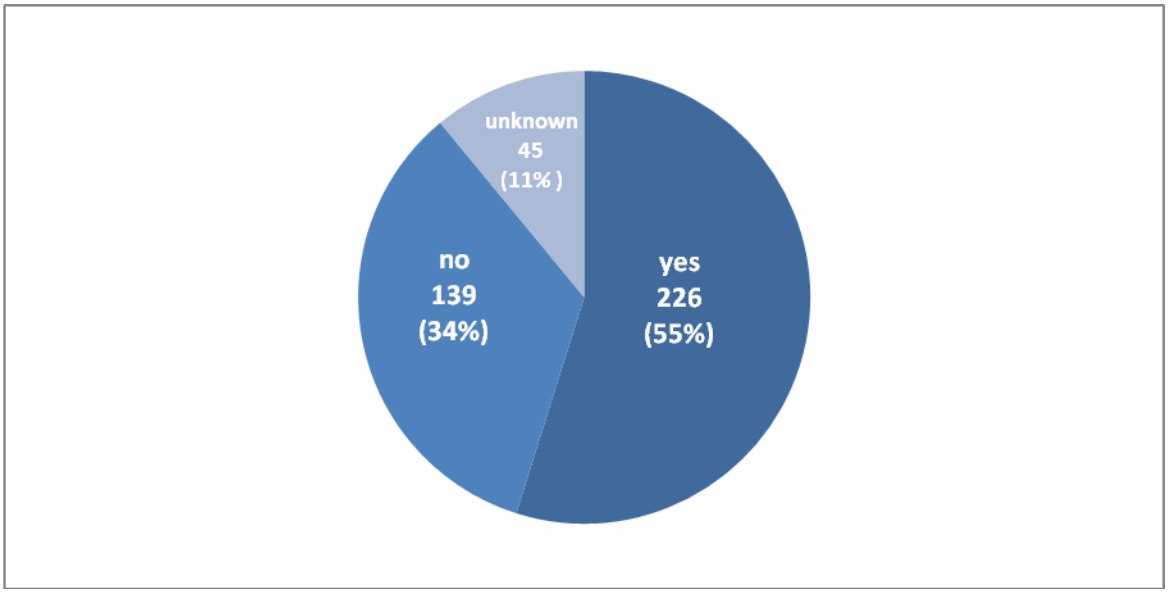

Fig.7 Received adequate PMTCT treatment during labour (n=410).

Figure 8 shows reasons for inadequate PMTCT treatment during labour. 54 (38.6%) of the 139 women who had inadequate treatment, received their treatment, but it was too late (less than two hours before delivery) to be effective. 28 (20%) women's babies were born before

arrival (BBA) at the hospital; and 24 (17.1%) women arrived at the hospital fully dilated with imminent delivery, and so medication was not given. (These women all delivered within 5-30 minutes of arrival at hospital). 19 (13.6%) women were given treatment, but it was interrupted, this means that while single doses were given, health care workers did not follow the protocol of three hourly AZT during active labour, and doses were missed, or unduly delayed. Delays of an hour or more were seen as significant. One patient was intubated and ventilated in ICU, and gave birth unexpectedly, before any PMTCT medication could be given. When intra-uterine deaths (IUD's) or miscarriages were diagnosed, medication was not needed and therefore not given, as seen in five (3.6%) of the 139 women.

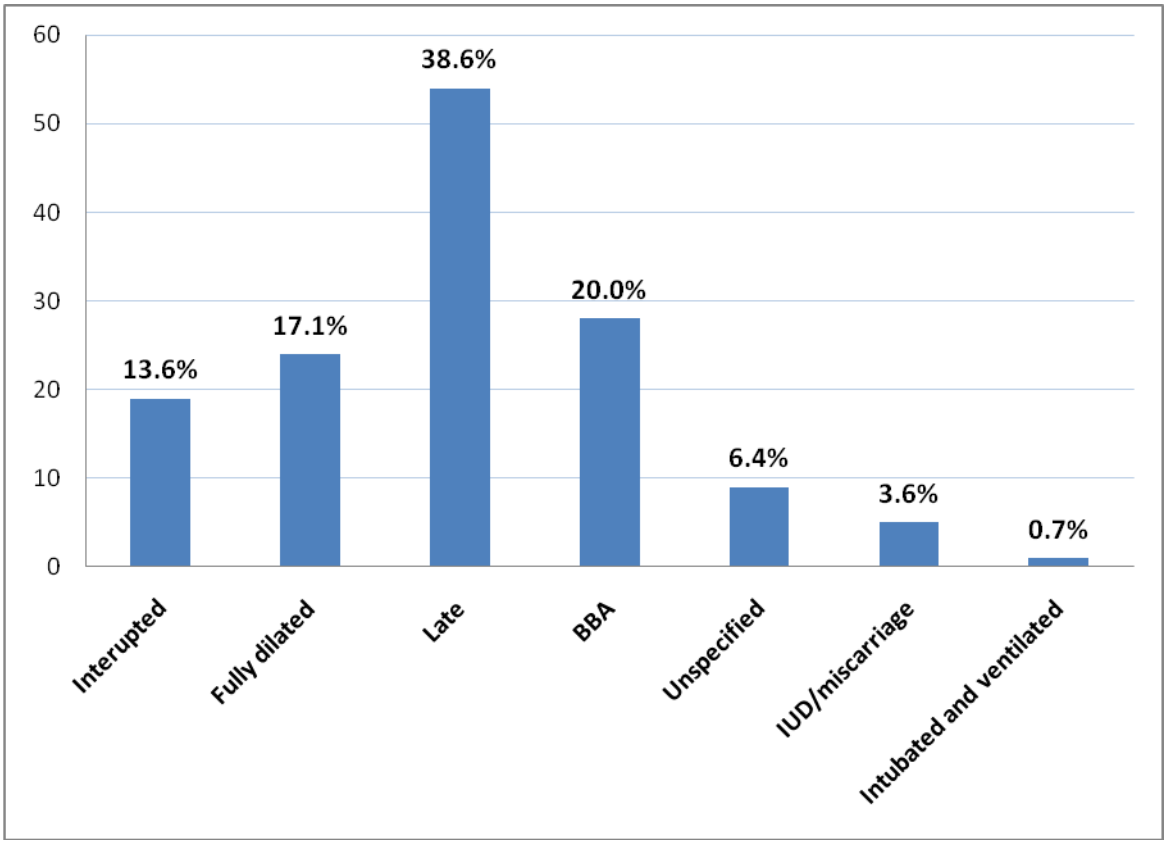

Fig. 8 Reason for inadequate PMTCT treatment in labour (n=139).

Of the 410 mother-infant pairs, 353 (86%) of the babies received their initial PMTCT medication within 72 hours of birth. In 11 (3%) cases the medication was not applicable, due to infant demise. In 42 (10%) cases it was not documented if medication was received or not, and four (1%) cases did not receive medication at all. (See fig. 9).

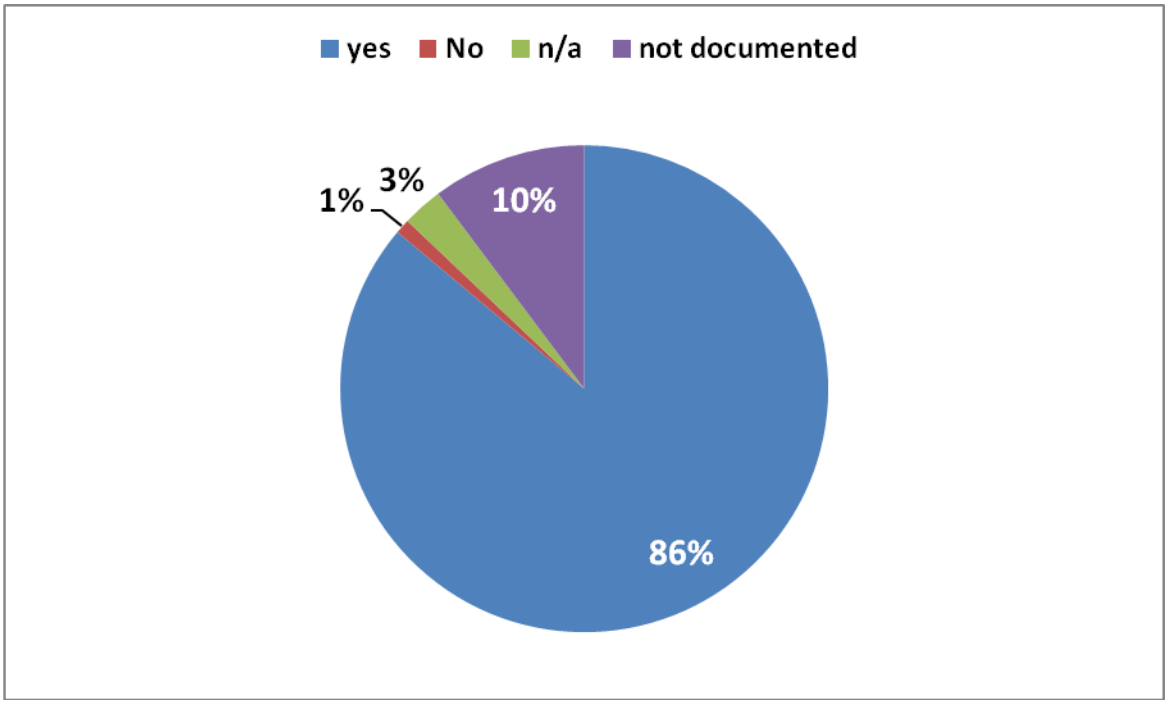

Fig. 9 Baby received initial PMTCT medication within 72 hours (n=410).

The treatment of the baby after the 72hours is where the protocol change most significantly affected the study. The protocol in use before October 2010 stated that if the mother had received adequate antenatal (at least four continuous weeks of PMTCT) and intra-partum PMTCT coverage, then short course (one week) of AZT was given to the baby. However if the mother had received inadequate PMTCT coverage, then the baby received long course (one month) of AZT. After October 2010 all babies received six weeks of NVP on discharge from hospital. (See Appendix C)

The one month of AZT group comprised 308 of the 410 babies. In 151 (49%) cases the one month of treatment was not applicable, this was either due to infant demise (2.5%), or due to the fact that they did not qualify for the long course treatment according to the protocol. These babies then received the short course (one week) of AZT. 64 (21%) of the 308 babies were documented to have received their long course PMTCT medication. In 93 (30%) cases it was not documented if medication was given. (See fig. 10).

The six week NVP group comprised 102 babies. In two (2%) cases the medication was not applicable due to infant demise. 24 (24%) of the babies from this group were documented to have received their PMTCT medication, while in 76 (74%) it was not documented if they received their medication or not. (See fig. 11).

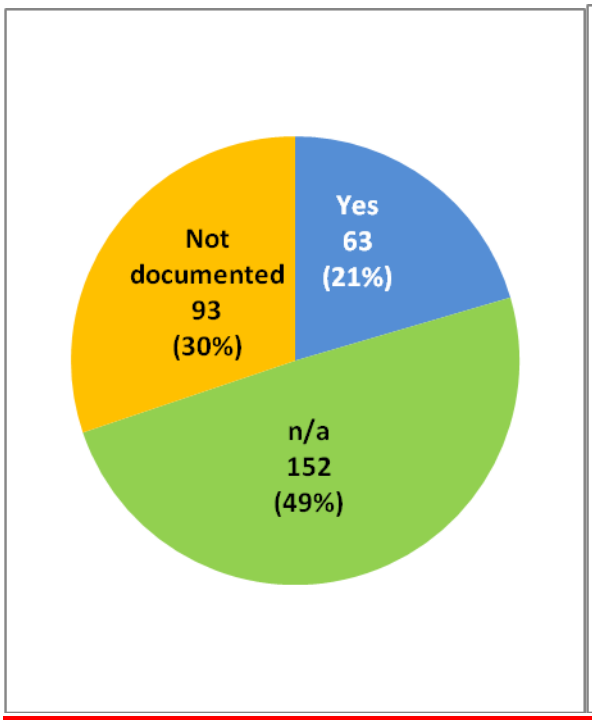

Fig. 10 Baby received one month of AZT Before October 2010 (n= 308).

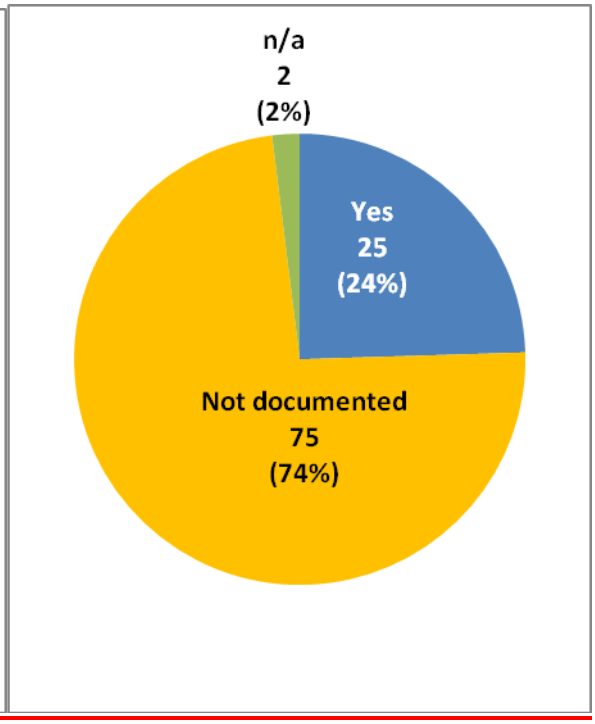

Fig.11 Baby received six weeks of NVP After October 2010 (n=102).

In total, 392 (96%) were counseled with regards to infant feeding options; in ten (2%) counselling was seen as not applicable due to infant demise, while in a further eight (2%) counseling was not documented. (See fig. 12).

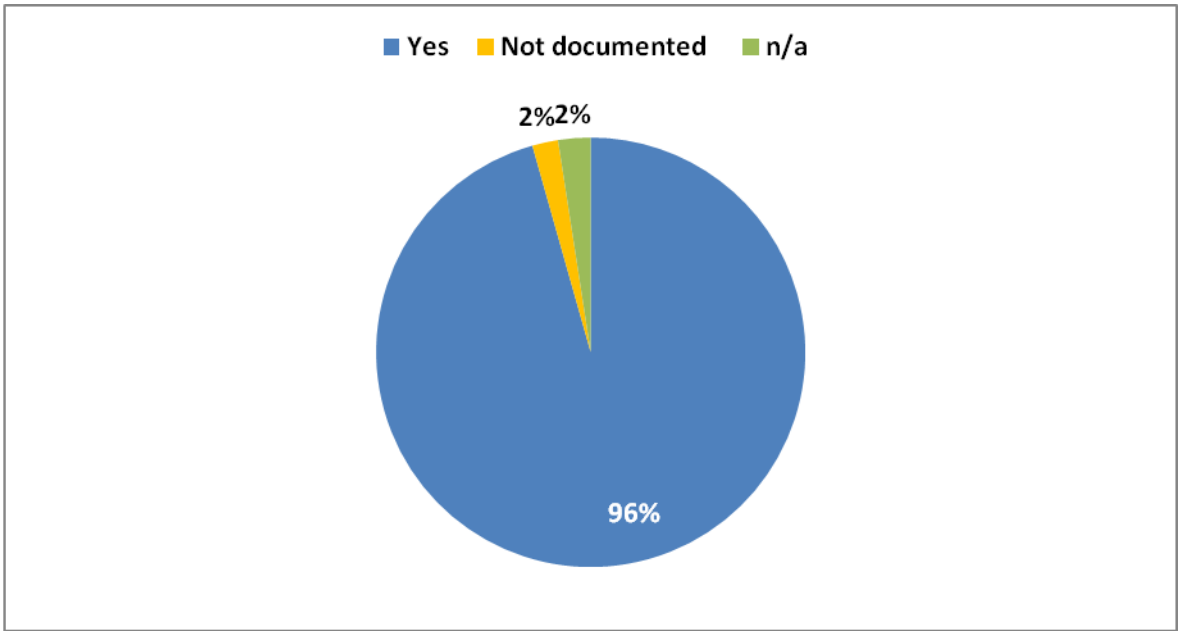

Fig. 12 Counseled with regards to infant feeding (n=410).

341 (83%) mothers chose to exclusively formula feed, 38 (9%) chose to exclusively breast feed. Two babies (1%) had documented mixed feeds in the ward. In eight (2%) cases the feeding choice was not documented. Nine (2%) chose pasteurised expressed breast milk (PEBM) and two (1%) chose donated expressed breast milk (DEBM) (from an HIV negative donor). In ten (2%) cases feeding choice was not applicable due to infant demise. (See fig. 13).

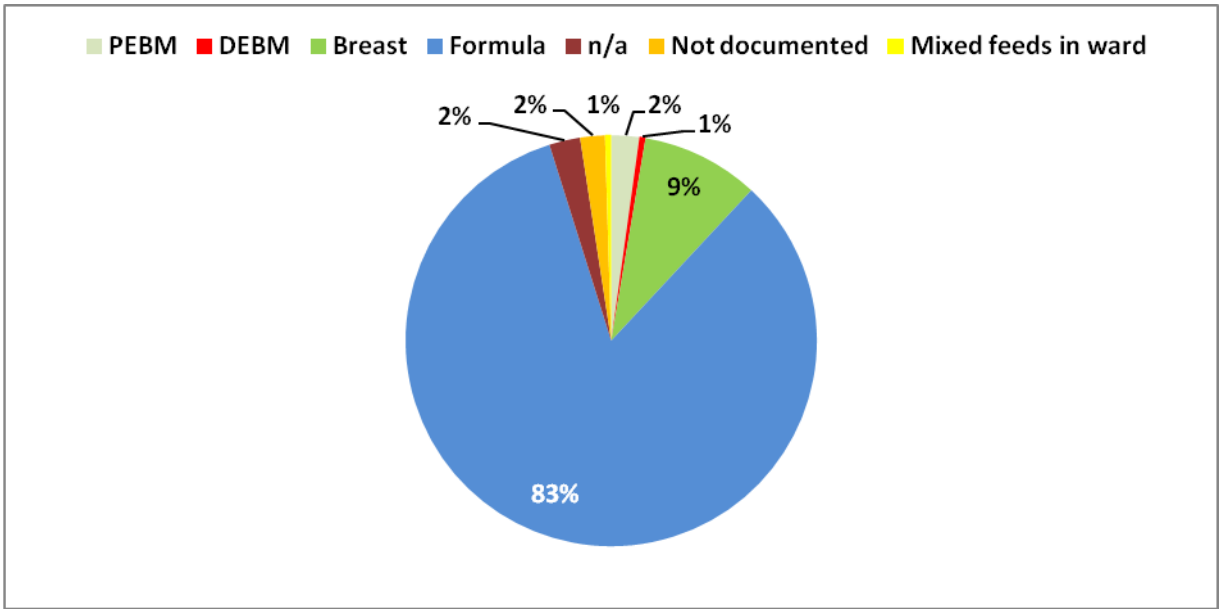

Fig. 13 Chosen feeding method (n=410).

Discussion

The majority (70%) of patients in the study lived in the Thembalethu residential area, in George. Of the 14 PHC facilities, Thembalethu clinic had the highest HIV ANC case load, being attended by 56% of the sample, meaning this one clinic carried the majority of the case load. The clinic with the second highest number of HIV ANC attendees was Lawaaikamp (9%). The reason behind this higher case load may be due to a higher prevalence of HIV in Thembalethu, or that the population served by Thembalethu clinic may be larger than other clinics. Overall, Thembalethu clinic serviced 24% (2719) of the total ANC visits (11275) for all the clinics during 2010. More research is needed to understand this finding.

There was a discrepancy between the number of patients who resided in Thembalethu area 289(70%), and those who attended Thembalethu clinic 229(56%). There could be a number

of reasons for this, for example access difficulties, saturated daily patient quotas and HIV disclosure issues. More research is needed in this area.

95% of women had an HIV test at the clinic and 93% had a CD4 count. This shows good initial uptake and acceptance of the program, compared to other South African studies where only 76% had an HIV test[23], 70% had a CD4 count[22] and 27% of CD4 counts were unknown.[20]

As the total number of deliveries at George provincial hospital for 2010 was 3074 the prevalence of HIV in the pregnant women delivering at George hospital was 13.6% for 2010. This is less than the Western Cape Provincial prevalence in 2006 (15.1%) and 2008 (16.1%).[5]

Only 52% of women requiring HAART were initiated on it and 33% never received it. This is poorer than other studies where 73% and 60% of women received HAART.[22, 24] As this is the group which has the highest risk of transmitting HIV from mother to child due their low CD4 counts, this needs to be improved. One should aim for all women requiring HAART to receive it. Possible reasons for this poor performance may be poor patient referrals between PHC clinics and HAART clinics, delay in the work-up and counselling sessions for HAART and patient attrition due to the inconvenience to patients of now having to attend two separate clinics.

Of the women, 293 (70.5%) received adequate antenatal PMTCT coverage, which is similar to other studies,[18] but can still be improved upon. The reasons for not receiving adequate antenatal PMTCT coverage as found in this study include being unbooked, late booking and poor clinic attendance. The patient centered, community and health system issues underlying these reasons need to be explored in order to create solutions to improve antenatal PMTCT coverage.

During labour, only 55% of women received adequate PMTCT cover, which is not satisfactory and should be markedly improved upon. The reasons for not receiving adequate intrapartum PMTCT coverage as found in this study include the baby being born before arrival at hospital, the mother receiving the medication too late, and the mother arriving at hospital with imminent delivery. The patient centered, community and health system issues underlying these reasons need to be explored in order to create solutions to improve intrapartum PMTCT coverage.

86% of the babies received their initial PMTCT medication within 72 hours of birth. This compares favourably with 92% in other work in South Africa.[22]

With regards the one month AZT (protocol in use before October 2010) and six weeks NVP (protocol in use after October 2010) in 30% and 74% of cases respectively it was not documented if the child received the medication or not, which is unacceptably high. There seems to be an assumption made by health care personnel that because an instruction is written in the protocol, it is automatically followed, and that documenting the execution is not needed. Doctors do not consistently prescribe the PMTCT medication on the patient's treatment chart (possibly because they assume the nurses will give the treatment). Nurses do not consistently document in their notes that the treatment has been given (possibly because they assume that it is standard practice that the medication is given appropriately). This lack of consistent documentation not only makes reviewing the PMTCT program difficult, it also obscures whether protocol is being followed or not.

96% of women were counseled about infant feeding choices. 83% chose to formula feed, and 9% chose to breastfeed, which is similar to other studies where 84% chose formula feeding.[20] The latest WHO guidelines recommend that women should be breastfeeding, with ARV coverage.[17]

Limitations of the study

This was a relatively small, retrospective descriptive study and may not be generalisable to the general population, although the intention was to address local shortfalls.

While this study aimed to assess the implementation of the PMTCT program in the George sub-district, the information was accessed at hospital level, introducing bias towards institutional interpretation and giving a reduced community perspective. The obstetric service in the George sub-district is heavily hospital based, as there is no MOU. This limits our understanding of what occurs at the pre-hospital, community level.

The 2009 Policy and Guidelines for the Prevention of Mother-to-Child Transmission of HIV, of the Department of Health of the Western Cape were being used in the George sub-district

in 2010.[27] A revision of these guidelines occurred in 2010, but was only implemented in October 2010. See appendix C for a summary of the main changes. The criteria evaluated in this study were broad, and so this allowed the change in guidelines to be absorbed. What was evaluated was if the treatment was given according to protocol, not which protocol was used, and so when protocol changed, all that happened was that adherence to the new protocol was checked and evaluated.

Only those patients who delivered at George Provincial hospital were included in the study. Patients who delivered at home or in the private sector were missed.

Ten files were lost or misplaced, limiting the number of patient entries.

Recommendations:

The following recommendations are made on the basis of the findings of this study:

- Set up a discussion forum to meet with nursing staff, clinical managers, and senior clinicians to discuss the findings of this study.
- Disseminate the study findings to the community using the community health forum
- The capacity of Thembalethu clinic needs to be increased, in the form of staffing, clinic hours, ambulance support, or even a mobile obstetric unit.
- Record keeping must be improved and consistent.
- The percentage of HIV positive women receiving adequate antenatal and intrapartum PMTCT must be increased.
- The percentage of HIV positive women receiving HAART must be increased.
- Antenatal care and HIV care need to be more integrated.
- There is a definite need to improve upon the PMTCT and HAART coverage of pregnant women and to monitor if improvement is occurring. This can be assessed by a follow up clinical audit or a quality improvement cycle.
- Establishing local targets for PMTCT and HAART coverage may be a useful tool to measure performance.
- Mothers need to make informed decisions on their feeding choice. Health care providers need to have up to date knowledge of the safest feeding practices for HIV exposed babies.
- An improved strategy is needed to ensure adherence to PMTCT medication. This includes improved or extended patient counseling and education, improved

community involvement, awareness and support, and using home-based carers to trace women who miss their ANC clinic appointments.

Conclusion:

This study reviewed the implementation of the PMTCT program in the George sub-district, in order to assess whether the PMTCT program was being conducted according to established provincial protocol, and so to describe possible local shortfalls in the PMTCT program, and to make recommendations to improve the identified shortfalls. The key findings were:

The majority of HIV positive pregnant women in the George sub-district attended the Thembalethu PHC clinic, which clearly carries a disproportional heavy caseload.

Many aspects of the PMTCT program are being well applied, including high uptake of HIV and CD4 testing, initial PMTCT treatment to babies within 72 hours, as well as the counselling of mothers with regards infant feeding choices.

However, opportunities are being missed in all aspects of the PMTCT care continuum. Particular points which need to be focused on are increasing the percentage of HIV positive women receiving adequate antenatal and intrapartum PMTCT, increasing the percentage of HIV positive women receiving HAART, and improved record keeping.

The results of this study will be presented to the nursing staff, clinical managers, and senior clinicians, as well as disseminated to the community using the public health forum, as the shortfalls identified need to move the community and the health systems into urgent action to address these shortfalls.

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Appendix A: Chosen study variables and how they were evaluated.

- Residential area
- Clinic attended
- Age in years.
- Parity (number of children excluding the current pregnancy)
- Did the patient have an HIV test in the antenatal period?

  Yes

  No

  Unknown - if it was not documented that an HIV test was performed, or if the ANC green card was not available to check if an HIV test was performed in the antenatal care period.
- Did the patient have a CD_4 count?

  Yes

  No

  Unknown if it was not documented that a CD4 count was performed, or if the ANC green card was not available to check if a CD4 count was performed in the antenatal care period.
- The actual CD4 count result was also captured where available
- Did the patient receive adequate antenatal PMTCT drugs according to the protocol?

  Yes - if patient received at least four continuous weeks of antenatal AZT according to the protocol. Although the protocol requires AZT be started at 28 weeks of gestation, the minimum acceptable and effective length of treatment was considered to be four weeks, as it is documented as such in the PMTCT register. Four weeks was also used as the cut-off, because if the mother received less than this, then according to the protocol the baby must then receive long course treatment with AZT (four weeks instead of one week) in the neonatal period,

  No - if the patient did not receive a minimum of four continuous weeks of antenatal AZT.

  Unknown - if the antenatal clinic card does not document the information, or if the medical records could not be found.
- Reasons for inadequate antenatal PMTCT:

  Interrupted – if there was an interruption in taking the medication, for any reason, defaulting treatment, missing clinic appointments, not having medication issued

Insufficient – if the patient did not receive the full four weeks of treatment.

Unbooked - if never attended the clinic

Late booker – if the patient's first clinic visit (booking visit) occurred later than 28 weeks

Preterm – if delivery occurred before a gestation of at least 37 weeks, thus resulting in insufficient time on antenatal PMTCT treatment.

Poor clinic attendee – if the patient did not attend the clinic regularly to allow medication to be prescribed in a continuous manner.

Unspecified - if no reason specific reason could be found for inadequate antenatal PMTCT

- Was HAART started in those that qualified for it?

  Yes - if HAART was appropriately started (if CD4 count less than 250, or if clinically WHO stage 4)

  No - if HAART was **NOT** started despite a CD4 count less than 250

  Not needed – if the patient did not require HAART according to the protocol

  Unknown - if no CD4 count available to establish if HAART was needed, or if it was not documented if HAART was started.

  Those patients that were started on HAART, but then defaulted were also noted

- Did the patient receive adequate PMTCT medication during labour?

  Yes - if patient received adequate PMTCT medication according to the protocol during labour. This included the initial stat doses of medication, given at least 2 hours before delivery, followed by 3hourly AZT, and in the new guidelines which were implemented in October, the stat dose of emtricitabine (FTC)+Tenofovir (TDF). ALL medications must have been given, and given TIMEOUSLY, to be evaluated as adequate.

  No - if the patient did not receive PMTCT medication according to the protocol during labour.

  Unknown - if it was not documented if the patient received medication.

- Reasons for inadequate PMTCT during labour

  Late - if the medication was given, but not in time to be effective before delivery (a minimum of 2 hrs before delivery)

  Interrupted - if there was an interruption in the administration of the medication, so it was not given 3hrly as required. If the delay in 3hourly administration was less than an hour it was accepted as adequate.

Fully dilated - if the patient was already fully dilated and delivery was imminent at the time of admission, and there was no time for administration of medication.

BBA - if the baby was born before arrival at the hospital, thus eliminating the opportunity to receive the PMTCT treatment during labour.

IUD/miscarriage- if there was an identified intra-uterine death or miscarriage

Unspecified, if there was no documentation in the patient's file explaining why the required medication had not been given.

Intubated and ventilated - where a patient was in a critical condition in ICU.

- Gestational age - estimated duration of pregnancy either by dates or ultrasound expressed in weeks
- Delivery type:

  NVD – when a baby was born by normal vaginal delivery

  C-section - when a baby was born by Caesarean section.
- Delivery outcome:

  Live birth - if the baby was born alive

  Stillbirth or IUD - if the baby had demised prior to birth/miscarried

  BBA - if the baby was born prior to arrival at the George Provincial hospital
- Did the baby receive PMTCT medication within 72hours of delivery?

  Yes - if the child received the medication

  No - if the child did not receive the medication

  N/A - if the child had demised.

  Not documented - if it was not documented in the patient's file that the child received the medication.
- Did the baby receive one month of AZT syrup (if required)(protocol in use before October 2010) or six weeks of NVP syrup (protocol in use after October 2010)?

  Yes - if the child received the medication

  No - if the child did not receive the medication

  N/A - if the child did not require the medication according to the protocol, or if the child had demised.

  Not documented - if it was not documented in the patient's file that the child received the medication.
- Was the mother counselled about choice of feeding method?

  Yes - if the mother received counselling.

Not documented - if there is no documentation showing counselling or feeding choice

N/A - if the baby had demised.

- Chosen feeding method:

  Mixed feeding practices - if the staff documented mixed feeding practices in the ward.

  Not documented - if the staff did not document which feeding method the mother had chosen.

  Formula - if exclusive formula feeding is chosen and performed in the ward

  Breast feeding - if exclusive breast feeding is chosen and performed in the ward

  PEBM - if pasteurised expressed breast milk is chosen and performed in the ward

  DEBM - if donated expressed breast milk is chosen and performed in the ward

Appendix B

Excel data sheet – see separate attached document

Appendix C

Main changes in the PMTCT program from 2009 guideline to 2010 guideline

	2009 Guidelines	**2010 Guidelines**
Eligible for HAART if CD4 count	<250	<350
Preferred HAART regime	AZT/d4T+3TC+NVP	TDF+ 3TC/FTC+ NVP
If not eligible for HAART: start AZT 300mg twice daily in the antenatal period from	28wks	14wks
during labour	single dose NVP+ AZT 3hrly	single dose NVP+ AZT 3hrly
During or immediately after delivery	---	TDF+FTC (combination tablet Truvada®)
Infant regimes: If mother on HAART > 4wks	Single dose NVP+ AZT twice daily for 1 week	NVP at birth, then daily for 6 weeks irrespective of infant feeding choice
If mother on AZT for PMTCT for >4wks	Single dose NVP+ AZT twice daily for 1 week	NVP at birth, then daily for 6 weeks and continued as long as **any** breastfeeding
If mother on HAART or AZT for PMTCT for <4wks	Single dose NVP+ AZT twice daily for 4 weeks	NVP at birth, then daily for 6 weeks and continued as long as **any** breastfeeding
If mother had no PMTCT treatment	Single dose NVP+	NVP at birth, then daily for 6 weeks and

	AZT twice daily for 4 weeks	continued as long as **any** breastfeeding

Abbreviations applicable to this table:

3TC	Lamivudine
d4T	Stavudine
FTC	Emtricitabine
TDF	Tenofovir