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Knowledge, attitudes, and practice of exclusive breast feeding amongst mothers attending postnatal clinic in Tswaing sub-district, North West Province

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KNOWLEDGE, ATTITUDES, AND PRACTICE OF EXCLUSIVE BREAST FEEDING AMONGST MOTHERS ATTENDING POSTNATAL CLINIC IN TSWAING SUB-DISTRICT, NORTH WEST PROVINCE.

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DECLARATION

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Hereby declare the following:

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Signed.....

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DEFINITIONS AND ABBREVIATIONS:

AFASS CRITERIA.....Acceptable, Feasible, Affordable, Safe, and Sustainable. Criteria for assessing advisability of proposed infant feeding modality.

AIDS.....Acquired immune deficiency syndrome.

ANC.....Antenatal care.

ANOVA.....Analysis of Variance.

ARV.....Anti-retroviral medication.

CCO.....Clinical care outcomes.

CD4 cells.....Cluster of differentiation 4. Subset of T-lymphocyte cells targeted by the HI virus. Also called T-helper cells.

DHIS.....District health information system.

DNA PCR.....Deoxyribonucleic acid polymerase chain reaction. Qualitative method involving amplification and detection of HIV DNA incorporated into host DNA.

HAART.....Highly active antiretroviral therapy.

HIV.....Human immunodeficiency virus.

HREC.....Human research and ethics committee of the University of the Witwatersrand.

IMJ.....International medical journal.

PMTCT.....prevention of mother to child transmission of HIV.

PNC.....postnatal care.

Pub Med.....Online medical journal database and search engine.

RCT.....Randomized controlled trial.

UNAIDS.....United Nations AIDS agency.

UNICEF.....United Nations Children Education Fund.

UNISA.....University of South Africa.

VCT.....Voluntary counseling and testing.

ABSTRACT

Introduction:

Tswaing sub-district is located within the Ngaka Modiri Molema district of the rural North West province of South Africa. The PMTCT programme is a key component of a holistic approach aimed at reducing HIV associated morbidity and mortality. One of the objectives of the PMTCT programme involves the provision of evidence based infant feeding information during the ANC period to assist pregnant women make informed infant feeding choices. The HIV epidemic has changed the context within which such an important decision is made. Current evidence is in support of exclusive breast feeding as the safest choice in the PMTCT and child health contexts in resource poor settings irrespective of HIV status. The objectives of this study were to: 1) describe the demographics of HIV positive and HIV negative women attending PNC clinic; 2) determine knowledge, attitudes and reported practice of these women with reference to exclusive breast feeding; and 3)determine the strength of the association between HIV status and knowledge, attitude and reported practice.

Methods:

A quantitative cross sectional descriptive and analytical study design was employed. A total of 386 randomly selected women who were six weeks postpartum and attended the 7 primary health care clinics in the sub-district from November 2009 to February 2010 were enrolled in this study. A researcher administered questionnaire that encompassed knowledge of and attitude to exclusive breast feeding and reported infant feeding practice was used. This was done after written consent was obtained. Data was entered into and analyzed with statistical software SPSS 17.0. Ethics approval was obtained from the HREC of the University of the Witwatersrand and the North West Department of Health.

Results:

The mean age of respondents was 25years and most reported they were married. Majority was in the grade 9-12 education category, lived in shared accommodation and had their parents as the

principal source of income. A preponderance of respondents received infant feeding counseling with HIV negative mothers significantly constituting the majority. The HIV positive prevalence in the study stood at 18.4%, with 19.7% of HIV positive respondents reporting to have disclosed their status to their parents. Overall maternal knowledge was low, with 17.3% scoring the preset 75% and above score on the knowledge scale. A significant difference existed between HIV positive and negative mothers with reference to knowledge score, with HIV positive mothers attaining higher mean scores than their HIV negative counterparts. This did not seem to be a determinant of exclusive breast feeding in this study. Majority of respondents (52.3%) reported that they were practicing exclusive breast feeding, with HIV negative women constituting the significant majority. Maternal attitude to exclusive breast feeding was high, with significantly more HIV negative women being positively disposed to the idea of exclusive breast feeding.

Conclusion:

HIV positive women, a high risk group in the PMTCT context, were less likely to receive infant feeding counseling and to exclusively breast feed compared to HIV negative women in this rural based study. Overall maternal knowledge of exclusive breast feeding was low. A more positive attitude to exclusive breast feeding and the fact that they were significantly more exposed to infant feeding counseling, seemed to be the main determinant of the reported higher exclusive breast feeding rates in HIV negative women compared to HIV positive women. Findings point to direction for further studies to help improve the PMTCT programme in Tswaing sub-district, for it seems that HIV positive mothers, a critical focal point for PMTCT efforts seem not to be getting the right education and support needed to reduce infant feeding associated HI virus transmission.

CHAPTER 1: INTRODUCTION

Tswaing sub-district is within the Ngaka Modiri Molema district of the North West province of South Africa. The magisterial headquarters is the town of Delareyville. The population is essentially rural, with settlements aggregated mainly around farms. It is about 150 kilometers from the provincial capital of Mafikeng.

The public health facilities available provide first line, comprehensive medical services to the whole population. Referrals are made to either the Gelukspan District hospital or the Mafikeng provincial hospital based on the assessed need for secondary or tertiary care respectively.

These facilities play a key role in the management of the HIV epidemic in this rural province through the provision of comprehensive and qualitative care to the population infected and those at risk. The North West province recorded an overall HIV prevalence of 11.3% in 2008. This represents the fourth highest prevalence level out of South Africa's nine provinces.[1] The HIV prevalence as extracted from DHIS data for Tswaing sub-district excluding Antenatal clients for the period April 2009 to March 2010 stood at 28.8%, whilst the antenatal prevalence for the same period was recorded as 19.6%.

As such the burden of HIV infection in both ANC attendees and the general population of Tswaing sub-district in general could be viewed as one in need of an urgent and robust response in this predominantly rural population.

A key component of the response to the HIV epidemic is the prevention of transmission of the HI virus from mother to child. This is a holistic initiative that has been implemented as a response to the challenge of reducing the burden of this disease in the paediatric age group in particular, and the population in general.

This programme includes the provision of evidence based information on safe infant feeding practices and support to expectant mothers, with the hope that their infant feeding practice would

lead to a decreased risk of the transmission of the virus from mother to child, amongst other initiatives.

As a consequence, ANC visits by pregnant women has involved the provision of information by counselors to expectant mothers with a view to improving their knowledge base and empowering them to make informed and safe infant feeding decisions post-partum.

Nursing mothers in my experience do not seem to have a full grasp of the cause-effect relationship between the HI virus and diseases that could ensue, the utility of exclusive breast milk to infants born to both HIV positive and negative mothers, and risk of viral transmission in the case of a mother being positive. Importantly they seem not to take into consideration the influence of context in deciding what infant feeding modality is best for them irrespective of HIV status.

The socio-cultural influences on infant feeding have dictated that the context of the mothers needs to be taken into consideration when counseling is being done. The issues of stigma, lack of resources, low educational attainment, and the spill-over effects of the infant feeding practices of HIV negative mothers or mothers who do not know their status are some of the factors contributing to sub-optimal feeding practices in HIV positive mothers.

With evidence seemingly in support of exclusive breast feeding in resource poor settings where safe formula feeding is not feasible, safe, acceptable, affordable or sustainable (AFASS criteria)[2], it is worthwhile exploring the knowledge and attitudes to exclusive breast feeding in all mothers irrespective of HIV status in resource poor settings. Paradoxically the provision of formula feeds to this sub-population at some cost, could lead to an increase in mixed feeding which in the PMTCT context would result in an increased risk of viral transmission.

A total abolition of formula feeds is not being advocated, but rather that a more critical and evidence based appraisal of expectant mothers is done by suitably qualified and empowered counselors who not only provide evidence based information, but act in partnership with knowledgeable and confident expectant and nursing mothers in ensuing that what the mothers

opt for can be safe and sustainable.

Thus, the assessment of the knowledge, attitudes and practice of HIV positive and HIV negative mothers with reference to exclusive breast milk would serve to provide information on the quality and adequacy of knowledge and to some extent help identify socio-cultural determinants of infant feeding behaviour in the HIV context.

It is hoped that this research would also indirectly contribute to improving the practice of counseling by identifying areas that need strengthening, and provide management at the district and hopefully provincial level with evidence that could influence policy and save costs with an attendant amplification of the gains of the PMTCT programme.

CHAPTER 2: LITERATURE REVIEW

2.1. BACKGROUND:

HIV infection and AIDS more heavily affect Sub-Saharan Africa than any other region of the world. According to UNAIDS an estimated 31.3 million adults and 2.1 million children were living with HIV at the end of 2008, with 2.7 million being infected with the virus in 2008, and 2 million deaths as a result of AIDS in the same year. [3]

In 2008, around 430,000 children aged 14 or younger became infected with HIV. More than 90% of newly infected children are babies born to women with HIV, who acquire the virus during pregnancy, labour or delivery, or through their mother's breast milk. Over nine-tenths of such transmissions occur in sub-Saharan Africa. Drugs are available to minimize the dangers of mother-to-child HIV transmission, but these are still often not reaching the places where they are most needed.[3]

In South Africa it has been estimated that approximately 40,000 children acquire HIV-1 from their mothers each year reflecting poor prevention of mother to child transmission. AIDS is one of the main contributors to South Africa's' infant mortality which increased significantly between 1990 (44 deaths per 1000 infants) and 2008 (48 per 1000) when all regions of the world saw decreases. Approximately 30% of pregnant women in South Africa's 2009 national Antenatal care survey where HIV positive. This highlights the need for South Africa to deliver an effective PMTCT programme.[4]

The estimated risk of transmission is put at between 25-45%.[5] This has contributed significantly to the burden of childhood hospital admissions and cost of health care delivery. In a study in Soweto, South Africa, it was found that 29.2% of hospitalized children were truly HIV infected, with a significant proportion of these children having previous frequent hospital admissions, malnutrition, longer duration of hospital stay and a resultant high mortality.[6]

It thus stands to reason that preventive efforts aimed at reducing the number of HIV infected

children would go a long way in mitigating the adverse socio-economic effects of the epidemic.

There are indeed a number of such initiatives, notably the PMTCT programme. This initiative has pre-partum, intra-partum and post-partum components. The post-partum component includes the prevention of transmission of the virus from an infected mother to her baby, and includes testing to ascertain the status of the child after delivery and the encouragement of evidence based feeding practices that prevent and/or reduce the risk of infection from birth.

2.2. AIM:

The aim of the literature review is to:

1. Give a brief historical overview on the evolution of exclusive breast feeding in both the child survival and PMTCT contexts;
2. Highlight current evidence based recommendations with regards to exclusive breastfeeding in the PMTCT context;
3. Estimate the risk of breastfeeding associated transmission of the HI virus from mother to child;
4. Make transnational comparisons that dwell on study variables;
5. Situate the practice and utility of exclusive breast feeding within the child health and HIV prevention strategies, in HIV endemic rural settings;
6. Underline the influence of context and its effect on exclusive breast feeding in HIV endemic populations;
7. Identify key determinants for, and challenges to successful exclusive breast feeding in HIV endemic rural areas;
8. Bring to the fore the role of counseling and peer support.

2.3. SEARCH METHODOLOGY AND CRITERIA:

1. Pub Med was used as the primary search engine for research publications with the following criteria:

- Articles published in English were searched with regards to the hierarchy of evidence;
- A 5 year publication limitation (from 2010) was used for relevant articles, though exception was made for articles with relevant methodological and epidemiological data;
- Article search was limited to core journals, and were any of the following types: meta-analysis, practice guidelines, RCT's, review articles, comparative studies, historical studies, and journal articles;
- The Google search engine was used as a secondary aid for epidemiological data and other evidence based publications, in this case, Clinical Care outcomes (CCO), and the International Medical Journal (IMJ);

2. Data and information from guidelines and publications available within the South African public Healthcare system, notably the new Anti-retroviral guidelines from the National Department of Health were also used;

3. Articles were deemed relevant if they:

- Were based primarily on research done in South Africa with transnational studies used for comparison purposes;
- Determined the effects of exclusive breast feeding compared to other infant practices in HIV endemic and non-endemic populations;
- Provided epidemiological data on the effects of the HIV pandemic on infant survival;
- Identified key determinants for successful breast feeding;
- Gave insight into current evidence backed practice in the PMTCT context that makes for safer exclusive breast feeding.

Relevant research was assessed with reference to the study variables (knowledge, attitude and

practice) that form the basis of this study, highlighting study design, setting and results.

Keywords: PMTCT, exclusive breast feeding, knowledge, attitudes and practice.

2.4. REVIEW:

The Thirty-first World Health Assembly in May 1978 recommended that member states should give priority to preventing malnutrition in infants and young children by supporting and promoting breast feeding through legislative and social action. Pursuant to this, the WHO and UNICEF in the later part of 1978 organized a multisectoral meeting within their existing programmes with a view of making effective use of the groundswell of opinion in favour of promoting breast feeding and regulating the breast-milk substitutes industry that was viewed as one of the challenges to the universal acceptance of breast feeding. By 1980, the Thirty-third World Health Assembly endorsed the statements and recommendations that emanated from the 1978 meeting, calling for an international code of Marketing of infant formula and other products used as breast-milk substitutes.[7]

In 1990, in Innocenti, Florence, Italy, a meeting focused on infant and young child feeding was held. Operational targets were agreed upon, amongst which were that National governments: 1) appoint a National breast feeding coordinator with appropriate authority, and establish a multisectoral National breastfeeding committee comprised of representatives from relevant government departments, non-governmental departments and health professions association, and 2) ensure that every facility providing maternity services fully practice all the "ten steps to successful breastfeeding" set out in the WHO/UNICEF statement on breastfeeding and maternity services. This declaration became known as the Innocenti declaration. It went on to serve as part of the policy framework for the Baby Friendly Hospital Initiative of 1991.

Another meeting was held in 2005, again in Innocenti, to mark 15 years after the initial declaration, in its communiqué it reaffirmed its support for the initial operational targets, and added others, including that: 1) Health and relevant sectors protect, promote and support exclusive breast feeding for six months and continued breastfeeding up to 2 years of age or beyond, while providing women access to the support they require, and 2) guidance on feeding

infants and young children in exceptionally difficult circumstances be provided in addition to relevant support to mothers, families, and caregivers. The original four operational targets from the declaration of 1990 and the five new ones added in 2005 became known as the Global strategy for infant and young child feeding.[8] Of note was the shift from breast feeding as emphasized in declarations in the preceding paragraphs to exclusive breast feeding and the recognition of special circumstances, notably the challenges posed to exclusive breast feeding from the HIV pandemic and poverty.

The WHO had prior to the Innocenti 2005 declaration, in 2002, given advice relating to the challenges of "feeding in exceptionally difficult circumstances", with regards to HIV transmission in the MTCT context. It stated that that the absolute risk of HIV transmission through breastfeeding for more than one year needs to be balanced against the increased risk of morbidity and mortality when infants are not breastfed. As a consequence it suggested that all HIV infected mothers should receive counseling which includes provision of general information about meeting their own nutritional needs and about the risk and benefit in selecting the option most likely to be suitable for their situation. For mothers who test negative for HIV, or who are untested, exclusive breast feeding should be the recommended feeding option.[9]

By 2006 the WHO released guidelines on HIV and infant feeding, which have been revised and released in 2009 in the light of programmatic experience and research evidence, notably evidence showing that antiretroviral interventions to either the HIV infected mother or HIV exposed infant can significantly reduce the risk of postnatal transmission of HIV through breast feeding. Important changes from the 2006 guidelines are: 1) Mothers known to be HIV infected should be provided with lifelong antiretroviral therapy or antiretroviral prophylaxis to reduce HIV transmission through breastfeeding according to WHO recommendations. The 2006 guidelines had stated that ARV's should be given to women for their own health, 2) exclusive breastfeeding for the first six months of life, introducing appropriate complementary feeds thereafter , and continuation of breast feeding for the first 12 months of life. Breast feeding should only stop when a nutritionally adequate diet can be used to replace breast milk and, 3) National authorities in each country should decide which infant feeding practice will be primarily promoted and supported by maternal and child health services.

This decision is expected to be based on international recommendations and considerations which include, major causes of infant and child mortality, socio-economic and cultural contexts, and HIV prevalence amongst pregnant women. In contradistinction, the 2006 WHO guidelines made provision for the health worker to counsel individual mothers about various feeding options, assisting through the application of the AFASS criteria. Where ARV's are available, mothers who are HIV infected are now recommended to breast feed their infants until 12 months of age.[10]

The AFASS (Acceptable, Feasible, Affordable, Sustainable, and Safe) criteria were previously recommended in the 2006 guidelines as an aid to be used by healthcare workers in assisting nursing mothers in assessing their ability to safely formula feed. While the 2009 guidelines still accepts its utility, adjustments have been made by the recommendation that conditions for assessing the eligibility of mothers is expressed in common everyday language rather than referring to the acronym, AFASS. The WHO believes that carefully defining the environmental conditions that make replacement feeding a safe or unsafe option for HIV- exposed infants would improve HIV survival of infants.[10]

While the new approach of national or sub-national governments making infant feeding recommendations for their populations at risk as contained in the 2009 guidelines, might seem as a "top-to-bottom" approach to governance, the retention and refinement of the AFASS principles assures that the universal ethical principle of patient autonomy within a patient centered context is still observed. This balance is commendable, for there may still be some expectant or nursing mothers, albeit a minority in the rural settings, who based on this more critical approach, are able to safely practice exclusive formula feeding.

The feeding practices which expectant mothers were counseled about in the PMTCT context were exclusive formula feeding up to the age of 12 months or exclusive breast milk up to 4-6 months of age with rapid weaning and switch over to formula feeds. This has now been superseded by the new WHO recommendations of 2009 as stated above. In addition weaning should now be gradual and anti-retroviral prophylaxis therapy should continue for at least one

week after complete cessation of breast milk when this is indicated.[10] Mixed feeding in this sub-population is absolutely discouraged. This is of importance as a relationship has been shown to exist between infant feeding practices and infant infections and death, with exclusive breast feeding shown to be substantially associated with reduced breast feeding-associated HIV infection compared to mothers who predominantly breast fed or mixed fed.[11]

Exclusive breast feeding does carry some risk of infection, as breast milk is known to contain the virus in HIV infected breast feeding women, but prospective studies done in Durban, South Africa to determine the risk of HIV transmission by infant feeding modality, has shown that infants exclusively breast fed for 3 months or more had no excess risk of HIV infection over 6 months than those that never breast fed.[12]

It must be added at this stage that studies estimating transmission risk associated with exclusive breast feeding in HIV positive mothers as stated above and in other literature below, would currently have to be viewed against the background of recent revisions to the South African Antiretroviral treatment guidelines, which now states amongst other specifications, that babies born to HIV positive mothers who had or had not received antiretroviral treatment during pregnancy, should be given Nevirapine for their babies as long as they are breast feeding unless there is evidence of failure to prevent transmission as ascertained through laboratory testing, usually by HIV DNA PCR testing done as early as six weeks postpartum. Furthermore the eligibility criteria for the commencement of triple HAART has changed to now include women with a CD4 of 350 cells per cubic millimeter and below, or stage 3 or 4 disease.[13]

What this would mean is that in a HIV endemic setting like South Africa, with a PMTCT programme, previously stated transmission risks associated with exclusive breast feeding in HIV positive mothers might be further reduced by this new initiative. In addition, promising data from well structured studies seem to support the efficacy of continued ARV's to HIV positive mothers during breast feeding. Though the efficacy of ARV intervention to reduce MTCT during late pregnancy and delivery are now well established, new randomized control trials have assessed the safety and efficacy of continued maternal ARV during breast feeding.

Of note is the Kesho Bora multicentre collaborative study, with an arm in Durban, South Africa, which assessed the safety and effectiveness of antiretrovirals during pregnancy, delivery and breastfeeding for the prevention of mother to child transmission of HIV-1. The strength of the study was the inclusion of a nested randomized control arm in addition to two observational cohort arms which compared triple long term antiretrovirals to standard short course prophylaxis in women with CD4 counts between 200 and 500 cells per cubic millimeter. This group can be viewed as similar to mothers in South Africa who satisfy the new eligibility criteria for the commencement of triple therapy under the new South African expanded access initiative. Preliminary results so far show significant risk reduction in the triple arm compared to the short arm with regards to the stated endpoints of HIV infection at 12 months, deaths by 12 months and HIV infection or deaths by 12 months.[14 15]

The applicability and importance of the above study lies in the fact that it was carried out in resource poor settings where exclusive breast feeding can be viewed as the most practical early infant feeding option and the fact that it seems to give further scientific grounding to the new South African PMTCT guidelines. It can then be said that the future for assuring that more children born to HIV positive mothers are born and remain HIV negative, while benefiting from the nutritional and nurturing advantages conferred by exclusive breast feeding, looks bright. Furthermore, data from the Kesho Bora study also supports the paradigm shift that assuring the safety of exclusive breast-milk in the PMTCT context and support for maternal health can both be guaranteed by triple HAART therapy offered to mothers previously deemed in-eligible to commence them.

Though exclusive formula feeding carries a zero risk of HIV transmission in the feeding context, there is increased mortality and morbidity from childhood killer diseases particularly the pneumonias and diarrheal illnesses especially in developing countries or resource poor settings where the lack of access to clean water, electricity or refrigeration has contributed to making exclusive formula feeding unsafe for infants whose mothers opt for it. This is in addition to the fact that the passive transfer of maternal antibodies in breast milk which serves to protect infants during this critical stage of life is lacking in exclusively formula fed infants. There is also the added risk of malnutrition in formula fed children in poor communities.

The above is supported by a meta-analysis from 6 studies, with data on all cause mortality for 1 123 children under 2 years of age which showed that non-breast fed infants are at a higher risk of mortality than breast fed infants. There was a six-fold increased protection against diarrheal illnesses and a 2.4 fold increased protection from respiratory illnesses within the first six months of life in breast fed infants.[16]

Underscoring the veracity of the above study and the added layer of complexity added by the HIV epidemic, is an intervention cohort study done in Durban, South Africa by Coovadia et al, in seven rural, one semi-urban, and one urban antenatal clinic on 1132 infants born to HIV infected mothers. They showed that breastfed infants who were mixed fed were significantly more likely to acquire HIV infection than were exclusively breastfed children. Furthermore the cumulative three month mortality in HIV infected children exclusively breastfed was 6.1% compared to 15.1% mortality in infants given replacement feeding.[17]

In resource poor settings, it would then appear that one must appreciate that a balance needs to be struck between the practice of exclusive breast feeding as a child survival strategy and exclusive formula feeding as a HIV prevention strategy. In essence this underscores the influence of context in determining which infant feeding modality would be most advisable in a nursing mother.

In rural settings which can be viewed as resource poor, a systematic review has shown that early weaning is strongly associated with young maternal age, low maternal education, low socio-economic status, absence or short duration of breast feeding, maternal smoking and lack of advice from health care providers. On the other hand the early introduction of modified cow's milk was strongly associated with low maternal education, and socio-economic status. In both scenarios these observed phenomena can be viewed as typical demographic variables seen in rural South Africa. The review was not structured to assess if these determinants varied in the HIV endemic setting, but it is noteworthy that the study stresses the importance of improving advice given by health care workers as the most effective short term intervention for ensuring optimal and safe nutrition for the feeding infant.[18]

This is of relevance in the PMTCT context, where infant feeding counseling plays a critical role in the reduction of HIV transmission post-partum. As such assessing maternal knowledge could be deemed an indirect indicator of the quality of advice given, in addition to assessing the distribution of the above stated determinants as putative risk factors militating against exclusive breastfeeding in the rural South African context.

In Nigeria, Uchendu et al showed that exclusive breast feeding was associated with a high maternal education level, small family size, and absence of opposing family beliefs. Most subjects who exclusively breast fed in their cross-sectional study were from upper and middle socio-economic classes.[19] It is noted however, that multi-variate analysis was not done to determine the possibility of any of the aforementioned factors confounding the association.

In Malaysia, a cross-sectional study done in 2006 in one rural and one urban clinic to determine the effects of urbanization on the knowledge, attitudes and practice of exclusive breast feeding, with multivariate analysis for confounding, showed that only one-third of all respondents exclusively breast fed for six months, with women of Chinese ethnicity, working, from a high family income background, and with male infants being less likely to exclusively breast feed at six months.[20]

Neither of the two studies cited above was structured to take the HIV status of participants into consideration as an independent variable that might be associated with infant feeding behavior.

In South Africa, HIV has changed the context within which mothers make decisions regarding infant feeding. Doherty et al in a qualitative study that examined the effect of the epidemic on infant feeding in South Africa, identified key characteristics in HIV infected women who achieved success in exclusivity, and these included: 1) the ability to resist pressure from the family to introduce other feeds and 2) the ability to recall messages on mother to child transmission risks and mixed feeding. Among women who maintained exclusive breast feeding, a strong belief in the benefits of breast feeding and a supportive home environment was important. For women using formula milk, having resources such as electricity, a kettle, and

flask made feeding at night easier.[21]

Demographics reveal that most mothers battling with making such an important choice are young, single and unemployed. They struggle to protect their decision making autonomy against a background of fear of disclosure and stigma. Other issues that have been uncovered are the uncertainty surrounding the safety of breast milk, increased power and influence of healthcare workers who are seen as custodians of new knowledge and resources, inflexible formula feed collecting policies experienced by women who choose to formula feed and limited postpartum support that has led to social isolation and mothers doubting their ability to care for their children.[22]

In fact, at one week postpartum, a cross sectional qualitative study that examined the infant feeding intentions of HIV infected and uninfected women and the appropriateness of their choices according to home resources, showed that most HIV infected women compared to uninfected women, intended to exclusively breast, rather than replacement feed, and adhered to their intention at one week. It also showed that most HIV infected women were more likely not have resources for safe replacement feeding. Furthermore, the number of antenatal home visits significantly influenced adherence to feeding intention.[23]

The relevance of this study is the comparison done between two cohorts of women, HIV infected and uninfected. The fact that this study was done at one week postpartum might make the extrapolation of the results of this study in predicting exclusive feeding behavior at six months postpartum a little difficult. It might be plausible that the longer the postpartum period extends, mothers who choose to exclusively breast feed might face various challenges that might jeopardize this practice. Thus, studies that examine practice at a longer time postpartum, specifically within the first six months, are called for. The study also divided the women into two cohorts-exclusive breast feeding and replacement feeding. The inclusion of a third arm-mixed feeding would have been worthwhile as in the PMTCT context, this poses the greatest risk with regards to mother to child viral transmission.

The phenomenon of mixed feeding seems to be a challenge in other African countries such as

Cote d'ivoire in West Africa, where though a vast majority of women regarded breast feeding as an appropriate method of infant feeding, exclusive breast feeding was not well accepted. Water was felt to be a necessary supplement. In case of suggested HIV infection of the mother, 74% voted for weaning by 3 months, 83% accepted the exclusive use of breast milk substitutes from birth, 67% were ready to heat their milk for pasteurization. Only 37% considered a wet nurse to breast feed their child. It was then suggested that, as mixed feeding implied a high risk of infection in the context of maternal HIV infection, the most favoured option in the study sample, exclusive breast feeding and early weaning requires some effort to convince women that breast milk is a sufficient source of nutrients, fluid and energy for their child.[24] It therefore seems evident from the foregoing that there may exist in rural communities a knowledge deficit with regards to the utility and safety of exclusive breast feeding as a child survival strategy irrespective of HIV status of the mothers, and the risk of transmission if the mother is infected.

In resource poor settings there may exist the danger of mixed feeding or replacement feeding with the addition of formula feeds which cannot be safely prepared or stored. These two infant feeding modalities could increase the risk of child hood infections and malnutrition, further worsening the morbidity and mortality pattern in children of uninfected and infected mothers. The risk is further magnified by the fact that children born to HIV positive women not only stand the risk of HIV infection, but also childhood diseases and malnutrition occasioned by mixed feeding which their immune system is least able to handle due to probable concurrent HIV infection.

The attitude and practice of HIV positive mothers to infant feeding might also be influenced by that of HIV negative mothers or mothers whose status is unknown, whose infant feeding practice, an inclination to mix feed, might be viewed as the norm to which HIV positive mothers might want to align themselves. In such a setting peer support, which has been shown significantly to increase the duration of breast feeding with an attendant reduction in diarrhea[25], would be difficult.

2.5. SUMMARY:

This literature search did not yield research focused on this area of interest, that is to what extent the knowledge of HIV-positive and negative mothers differ, the determinants of observed and reported practice, and similarities or differences between these two groups.

Furthermore, it is also be possible that prospective studies cited that estimated exclusive breast feeding rates in lactating mothers might have had results influenced by the presence of researchers or the seemingly controlled nature of the research environment (Hawthorne effect). Thus, it might be worthwhile comparing the results of a research like this to the already existing body of knowledge to see by how much they differ or concur with reference to the research question.

Thus, primarily this research would seek to determine the knowledge, attitude and practice of HIV positive and negative mother's with reference to exclusive breast feeding at six week post-partum when these women are expected to attend post-natal clinic in Tswaing sub-district in the North West province of South Africa. Demographic variables would be ascertained with a view of ascertaining if determinants identified in literature have a bearing on the rural situation under study.

CHAPTER 3: METHODS

3.1. AIM OF STUDY:

To ascertain and compare the knowledge, attitudes and practices of HIV positive and HIV negative women attending post natal clinic in Tswaing Sub-district in the North West province with regards to exclusive breast feeding.

3.2. OBJECTIVES:

The objectives of the study were to:

1. Describe the demographics of HIV positive and HIV negative women attending PNC clinic.

2. Determine knowledge, attitudes and reported practice of these women with reference to exclusive breast feeding.

3. Determine the strength of the association between HIV status and knowledge, attitude and reported practice.

3.3. DESIGN:

A quantitative cross sectional descriptive and analytical study design was used.

Site of study

The research was conducted at the 7 primary care clinics in Tswaing sub-district in the North West province. These clinics provide antenatal services including counseling, postnatal care, and 24 hour delivery services in addition to comprehensive first line care.

Study Population

The study population consisted of all women who attended the clinics offering postnatal and antenatal services in Tswaing Sub-district, who were six weeks post partum during the months of November 2009 to February 2010. Data extracted from the DHIS, showed that the total number of women within the study area who attended clinics six week postpartum for immunization of

infants from November 2009 to February 2010, was 729. This represented the sample frame.

3.4. SAMPLING:

Sample size

To estimate the proportion of women with acceptable levels of breastfeeding knowledge, with 5% of the true proportion, at 95% confidence interval, 386 individuals were needed (This represents approximately 53% of the sample frame). Assuming a 20% non-response rate, a total number of 463 women thus represented the study sample size. This represents approximately 64% of the sample frame. (The sample size calculation was done with help of a statistician in the School of Public Health at the University of the Witwatersrand.)

Acceptable levels of breastfeeding knowledge was defined as a score of 75% and above on the Knowledge scale section of the questionnaire. This mark was deemed appropriate by the researcher on account of the fact that all women attending antenatal and postnatal clinics in Tswaing Sub-district receive breast feeding education and counseling.

Sampling method

A random sample of participants who met the inclusion criteria was used, as the background population under study is relatively homogeneous. A sample size of 66 (463/7) per clinic was predetermined. Clinics unable to provide the sample size per clinic during the study period resulted in numbers selected from other clinics being increased to achieve the study sample size. The underlying homogeneity of the target population and the fact that the research did not seek to compare variables across the clinics, ensured that results achieved were not biased. This number was randomly selected from the clinic populations using a random number generator. Clinics were visited on a rotational basis over the study period until the target sample size per clinic was attained.

Inclusion criteria

All female patients 18 years and above attending first PNC clinic visit at six week postpartum who:

- Signed consent to partake in the study;

- Had antenatal care in Tswaing sub-district;
- Had HIV status recorded as evidenced by appropriate coding on antenatal card and/or infants Road to Health Card (coding stipulates HIV status to be recorded as **positive, negative** or **refused.** For the purposes of this study, the refused group will be referred to as the **unknown** HIV status category).

Exclusion criteria

- Mothers with medical presenting complaints that have influenced infant feeding practice. This serves to control for reverse causality. Reverse causality refers to existing health related impairments resulting in nursing mothers being unable to breastfeed, in spite of their expressed desire to do so. Assessing postpartum mothers at postnatal clinic with regards to this constitutes part of the routine care given at these visits.

3.5. MEASURING TOOL OR INSTRUMENT:

A **researcher administered** questionnaire was used. This was formulated by the researcher, based on literature and consultation with experts, to operationalize the constructs under study. The questionnaire consisted of 4 parts, namely: 1) demographic data, 2) knowledge scale, 3) Attitude scale, and 4) reported practice. Numerical codes were assigned to questionnaire data to make them amenable to statistical operations.

The questionnaire was translated into the local language (Tswana) and back translated to English to test the fidelity of the translation. It was then piloted with the aid of a translator. Translators were either midwives or VCT counselors, who administered the questionnaire under the supervision of the researcher after training and orientation. Training and orientation was done to ensure validity of the measuring instrument.

3.6. DATA COLLECTION:

Data was collected from an envisaged study sample population of about 463 women. This was sampled from the 7 postnatal clinics which all run concurrently from Monday to Friday across the Sub-district. Actual data collection stopped after 386 respondents had been enrolled and data collected from them. This number represented the number of statistically determined respondents minus the 20% envisaged non-responders. A total of 38 women, approximately 10% of the study

sample population, could not be accounted for after the issuing of serial numbers, and were thus assumed to have dropped out. Thus the total number of women issued serial numbers was 424 (386 respondents + 38 who dropped out before the administration of the questionnaire).

This researcher attended these clinics on a rotational basis during the study period until the target sample size per clinic was attained. The researcher normally conducts clinical visits to each of these clinics twice every month and to Atamelang Health Centre four times a month.

Women attending the PNC clinic were first approached as a group in order introduce the researcher and explain the purpose of the activity. This assisted in allaying any fears of preferential treatment or victimization. On each day using simple random sampling, women were selected to partake in the study. The participants were selected using a random number generator. The process entailed limiting the range of possible random numbers to the number of patients booked for the day, and choosing random numbers from this range to select 30% of the women. The 30% daily sampling ratio was mutually agreed upon between the researcher and translators as least likely to interfere with normal clinic activities. This procedure was applied to them as they awaited booking seated in a queue in the clinic waiting area. Serial numbers were issued to the selected women after going through the post natal clinic process. This was to ensure that the women did not feel unduly coerced or committed to partake in the study.

These women were allowed to finish the postnatal procedures they expected to receive before the questionnaire was administered. It was expected that some of the women who previously consented before undergoing the postnatal clinic process would at this stage decide to drop out. The use of multiple visits during the data collection stage ensured that this did not compromise the sample size. The interview was done in a private room to ensure privacy and confidentiality, after a letter of information was issued and the consent form was signed. Considerations taken into account due to the social sensitivity and public health importance of the human immuno-deficiency virus infection were as follows:

1. When asked about their HIV status, it was stressed to the patients that they did not need to divulge this if they had any misgivings about doing this;
2. Mothers who were HIV positive were assessed with regards to clinical staging, CD4

counts, DNA PCR for infants, need for prophylaxis and eligibility to commence highly active anti-retro-virals. Appropriate referrals and treatment were made with regards to extant guidelines and protocols.

This process continued until all the women selected were sampled.

3.7. PILOT STUDY:

A pilot study was conducted by the researcher on 33 women attending post-natal clinic at Atamelang health center in Tswaing Sub-district. This number represented a sampling ratio of 50% of the projected sample size of 66 predetermined for each clinic, and was part of the study sample population selected for the clinic. This health center is one of the 7 clinics that were used for the study. Its choice for the pilot study was based on its proximity to Delareyville where the researcher is based, and was convenient in terms of cost of travel. Simple random sampling was used. The first participant was once again randomly selected.

Only participants who consented to participate in the pilot study were used. Participants who consented to partake in the pilot were assessed by direct questioning on the need for a translator.

The researcher, participant and the interpreter were seated in a private room. A copy of the questionnaire in Tswana was administered via the translator. Translators who volunteered to partake in this study signed a confidentiality clause before they were engaged. Translators were restricted to reading out only what was contained in the Tswana questionnaire. Any need for clarifications from the participant was first discussed with the researcher.

The aim of the pilot study was to:

- Estimate time needed to complete the questionnaire;
- Identify ambiguous and sensitive questions that need modification;
- Identify questions that need to be added;
- Test the fidelity of translation from English to Tswana;
- To test the reliability and internal consistency of the questionnaire.

3.8. RESULT OF PILOT STUDY:

- Estimated time to complete the questionnaire ranged from 10 to 15minutes;
- No ambiguous or sensitive questions needing modification were identified;
- The request to estimate the number of minutes needed to access a source of water if respondents had no potable water in the demographic section of the questionnaire, was excluded because of the difficulty experienced by some respondents in accurately assessing this;
- No translation difficulties were encountered, particularly on account of the translators being fluent Tswana and English speaking. Midwives who conducted postnatal care clinics were found to be more reliable and showed enthusiasm in participating as translators after requisite training by the researcher;
- Data quality control was assured by subjecting the measuring instrument to tests of reliability and internal consistency. The overall Cronbach's alpha coefficient stood at 0.84, this meant that the measuring tool was reliable as the Cronbach's alpha coefficient was above 0.7, which is the usually accepted cutoff for reliability.[26] The internal consistency was also determined for the three components of the questionnaire (Knowledge, attitude and practice scales), and they were all found to be internally consistent. (Reliability and internal consistency tests were done with the assistance of a statistician in the department of statistics at UNISA.)

3.8. DATA ANALYSIS:

Descriptive analysis was done of the participants to give estimates of central tendency and variability from the mean. The results were analyzed using statistical software SPSS 17.0. The data was presented in frequency tables and bar charts for all variables in order to determine the distribution of variables. Cross tabulation was also done to determine the relationship between the predictor variables and the response. Chi-square test and Analysis of variance (ANOVA) were calculated and a P- value of less than 0.05 was used to determine statistical significance. This was done with the help of a statistician from the Department of Statistics, UNISA.

3.9. ETHICS:

All effort was made in adhering to ethical guidelines for research on human subjects. The study was approved by the HREC of the University of the Witwatersrand and the research committee of the North West Department of Health and Social development.

A few challenges cropped up due to the realities of the operational environment. Of note were:

- Constraints of space in a few clinics made administration of the questionnaire in a separate room difficult, as such consulting rooms had to be used, but strict privacy and confidentiality was observed;
- The operation of the supermarket approach in primary care sometimes made conducting the research process separate from normal clinic activities difficult. As such in a few cases this caused a buildup of waiting lines in affected clinics. At all times affected patients were first checked to triage out emergency cases and attended too, and the process and estimated time for completion of data was explained to them. This helped to reduce tension and discontent;
- As with other studies with a thematic focus on HIV, efforts were made to protect the identity and status of women who volunteered to participate. The women generally felt comfortable with the staff who administered the questionnaire, but some were initially uncomfortable with the fact that this information was been revealed to some third party outside the clinic environment. The concept of anonymous data was explained to them, and the fact that a provision for refusal to reveal HIV status was made for in the questionnaire.
- All questionnaires (**Appendix 1**) used were anonymous and not linked to the consent forms (**Appendix 4**), furthermore all translators who participated in the study signed a confidentiality clause (**Appendix 5**).

CHAPTER 4: RESULTS

4.1. DEMOGRAPHICS (n=386):

The backgrounds of all respondents are shown in **Table 1.** The mean age of the mothers was 25 years (SD=±6.4yrs) and ranged from 18 to 41 years. The age group distribution of respondent's shows that majority of respondents (45.3%) belong to the age group of 18 – 23 years. With regards to marital status, the majority (79.3%) reported they were married.

The proportion of women with access to pipe borne water was 75.6%, 27.2% had no access to electricity, and the majority of respondents (96.4%) were living in shared accommodation. The educational levels of women in this study showed that the majority (36.6%) were in the grade 9-12 category. With regards to source of income, the largest group, 31.3% of women, reported that their parents were the principal source of income for them.

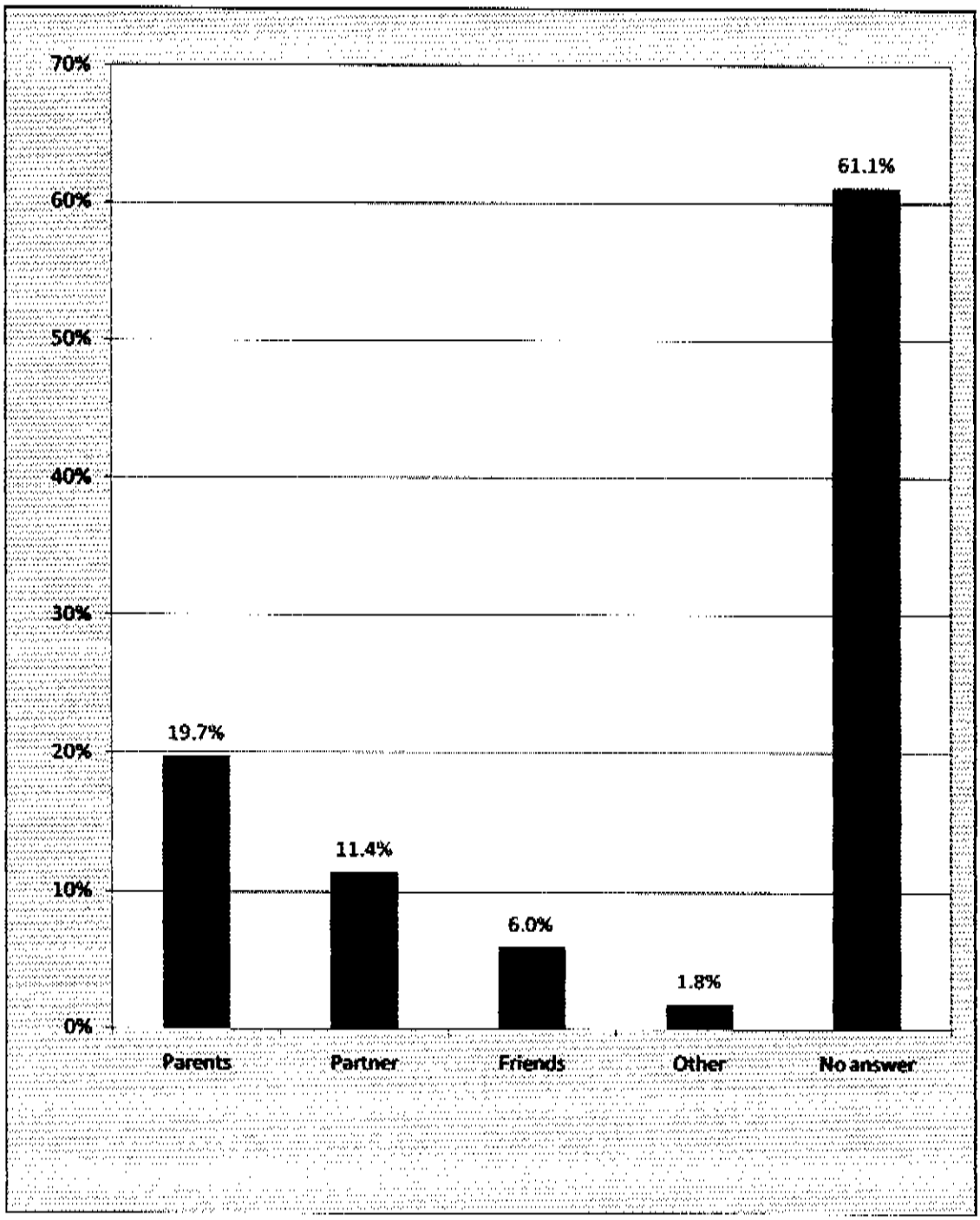
Mean monthly expenditure was R648.80, with a standard deviation of ±R700.38. The largest bracket was represented by the R351-R650 band (44.3%).

When mothers were asked if they received any advice on how to feed their babies during pregnancy, 96.6% responded positively. The majority of the respondents in this study (77.2%) were HIV negative with 18.4% testing HIV positive. This gave a study HIV prevalence of approximately 18%. With regards to disclosure of HIV status, 38.9% of HIV positive women reported that they had disclosed their status. Disclosure pattern of HIV status **(Figure 1)** revealed that the majority of those who revealed to whom they had disclosed to, had disclosed to their parents.

Table 1: Demographic distribution:

VARIABLE	NUMBER	PERCENTAGE
Age(in years)		
Mean age (± SD)	24 years(± 6.4)	
18 - 23	175	45.3%
24 - 29	129	33.4%
30 - 35	66	17.1%
36 - 41	16	4.1%
Marital status		
Single	73	18.9%
Married	306	79.3%
Cohabiting	7	1.8%
Pipe borne Water		
Yes	292	75.6%
No	94	24.4%
Electricity		
Yes	281	72.8%
No	105	27.2%
Sharing accommodation		
Yes	372	96.4%
No	14	3.6%
Highest level of education		
None	47	12.2%
2-4	81	21.0%
5-8	114	29.6%
9-12	141	36.6%
Post-sec.	2	0.5%
Source of income		
Grant	104	26.9%
Pension	25	6.5%
Employed	97	25.1%
Parents	121	31.3%
Partner	39	10.1%
Monthly expenditure on self		
Mean (±SD)	648.8 (± 700.38)	
50-350 rand	40	10.4%
351-650 rand	171	44.3%
651-950	0	0%
951-1250 rand	141	36.5%
1251-1550 rand	21	5.4%
+1551Rand	13	3.4%
Received infant feeding counseling		
Yes	373	96.6%
No	13	3.4%
HIV Status		
Positive	71	18.4%
Negative	298	77.2%
Unknown	17	4.4%

FIGURE 1: Pattern of persons to whom HIV positive disclosure made:



Some demographic variables were also analyzed to see if they varied with HIV status **(Table 2)**. Of these only the provision of infant feeding counseling during antenatal care was found to differ significantly between tested groups.**(P=0.000)**. Significantly more women received infant feeding counseling, and majority of them were HIV negative.

Table 2: Distribution of some demographic variables against HIV Status of respondents:

n=386

Variable	Positive	Negative	Unknown
Age			
18-22	19 (26.8%)	114 (38.3%)	10 (58.8%)
23-27	16 (22.5%)	85 (28.5%)	3(17.6%)
28-32	15 (21.1%)	61 (20.5%)	4(23.5%)
33-37	12 (16.9%)	29 (9.7%)	0(0%)
38-42	8 (11.3%)	6 (2.0%)	0 (0%)
43-47	1 (1.4%)	3 (1.0%)	0 (0%)

χ^2 =84.3 and p= 0.29

n=386

Variable	Positive	Negative	Unknown
Marital Status			
Single	19 (26.8%)	68 (22.8%)	6 (35.3%)
Married	52 (73.2%)	208 (69.8%)	11 (64.7%)
Cohabiting	0 (0%)	22 (7.4%)	0 (0%)

χ^2 =8.40 and p= 0.21

n=386

Variable	Positive	Negative	Unknown
Received infant feeding counseling			
Yes	65 (91.5%)	258 (86.6%)	16 (94.1%)
No	6 (8.5%)	40 (13.4%)	1 (5.9%)

χ^2 =40.7 and p= 0.000

4.2. KNOWLEDGE:

Questions contained in the knowledge scale were asked to assess the adequacy of knowledge of exclusive breast feeding. For the purposes of this study, a mark of 75% and above on the knowledge scale was deemed to represent adequate knowledge of exclusive breast feeding. The mean score **(Table 3)** was approximately 59.3%, with a median score of 60%, and a standard deviation of 17.0. A proportion of 17.3% of study participants scored 75% and above.

Table 3: Distribution of Knowledge scores:*

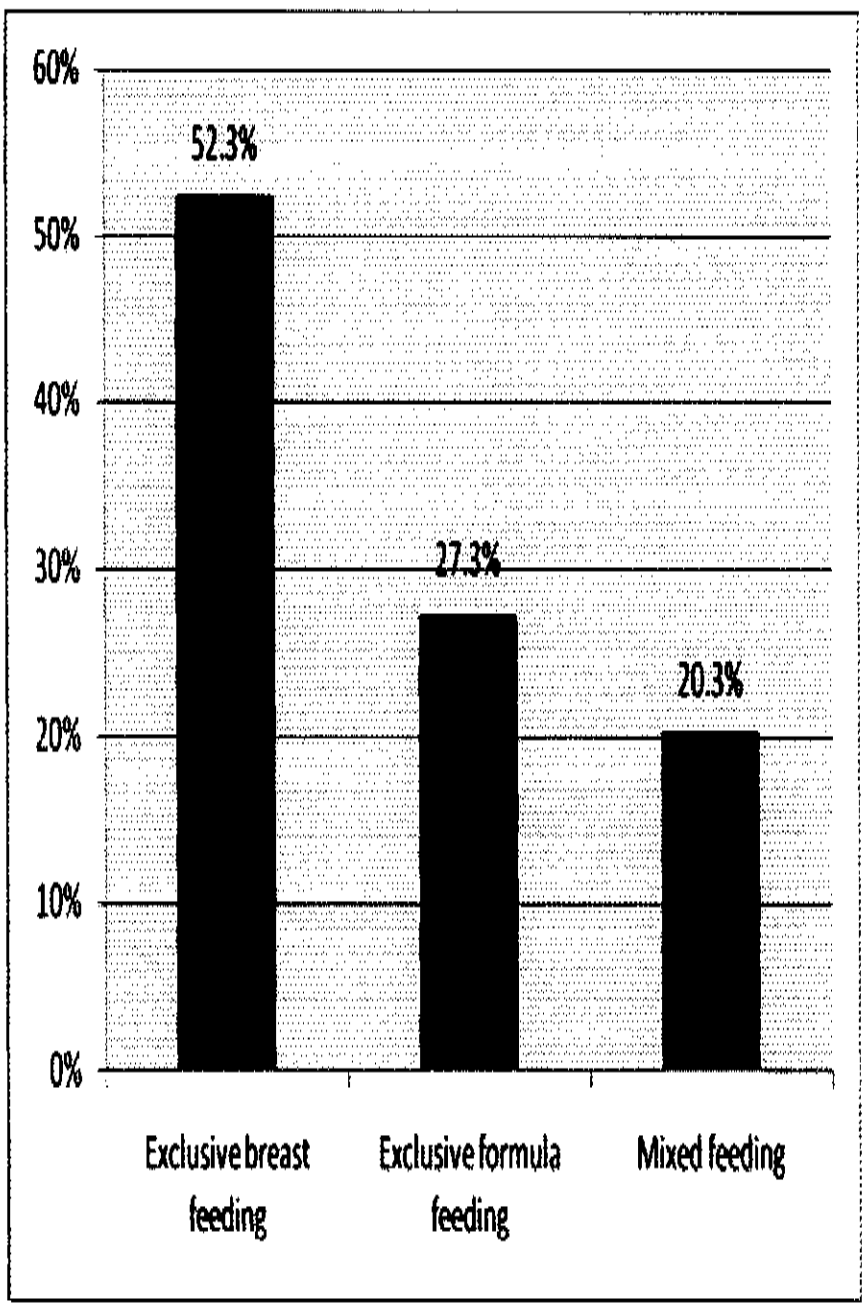
Score (%)	Frequency	Cumulative Percent
0	1	.3
5	1	.5
10	1	.8
15	3	1.6
30	9	3.9
35	12	7.0
40	22	12.7
45	36	22.0
50	48	34.5
55	35	43.5
60	98	68.9
65	26	75.6
70	27	82.6
75	13	86.0
80	7	87.8
85	20	93.0
90	7	94.8
95	4	95.9
100	16	100.0
Total	**386**	**100%**
Mean	**59.27**	
Median	**60.00**	
Std. deviation	**17.022**	
Range	**0-100**	

***scores were obtained by adding up the total scored on the knowledge scale and dividing by 20, which is the maximum obtainable, and multiplying by a factor of 5 to convert to percentages.**

4.3. PRACTICE:

With regards to reported practice, the majority (52.3%) of respondents said they were exclusively breastfeeding at the time of responding to the questionnaire **(See figure 2)**.

FIGURE 2: Distribution of reported practice at 6 weeks postpartum:



4.4. MATERNAL ATTITUDE TO EXCLUSIVE BREAST FEEDING:

Maternal attitude **(Figures 3, 4 and 5)** was assessed by the use of a 5 point likert scale. For reporting and analysis the "agree" and "strongly agree" groups were merged to form an agree group, whilst the "disagree" and "strongly disagree" groups formed the disagree category. A combined proportion of 41.1% agreed to want to breastfeed exclusively for six months. With regards to maternal opinion on the possibility of exclusively breast feeding for six months, and the acceptability of exclusive breast feeding to friends and relatives, majority also agreed to these.

Figure 3: Do you personally want to exclusively breast feed for 6 months?

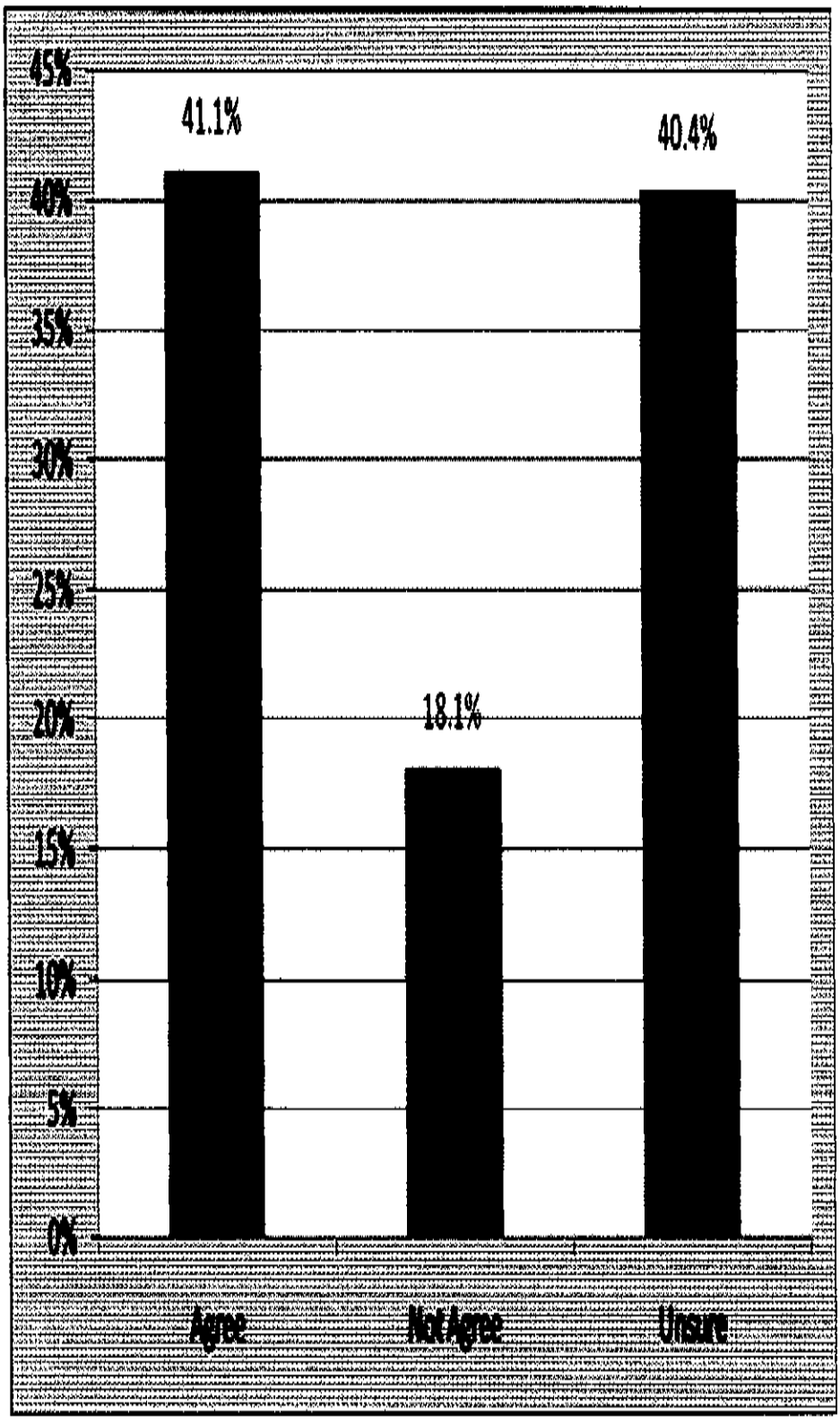


Figure 4: In your opinion do you think exclusive breast feeding for 6 months is possible?

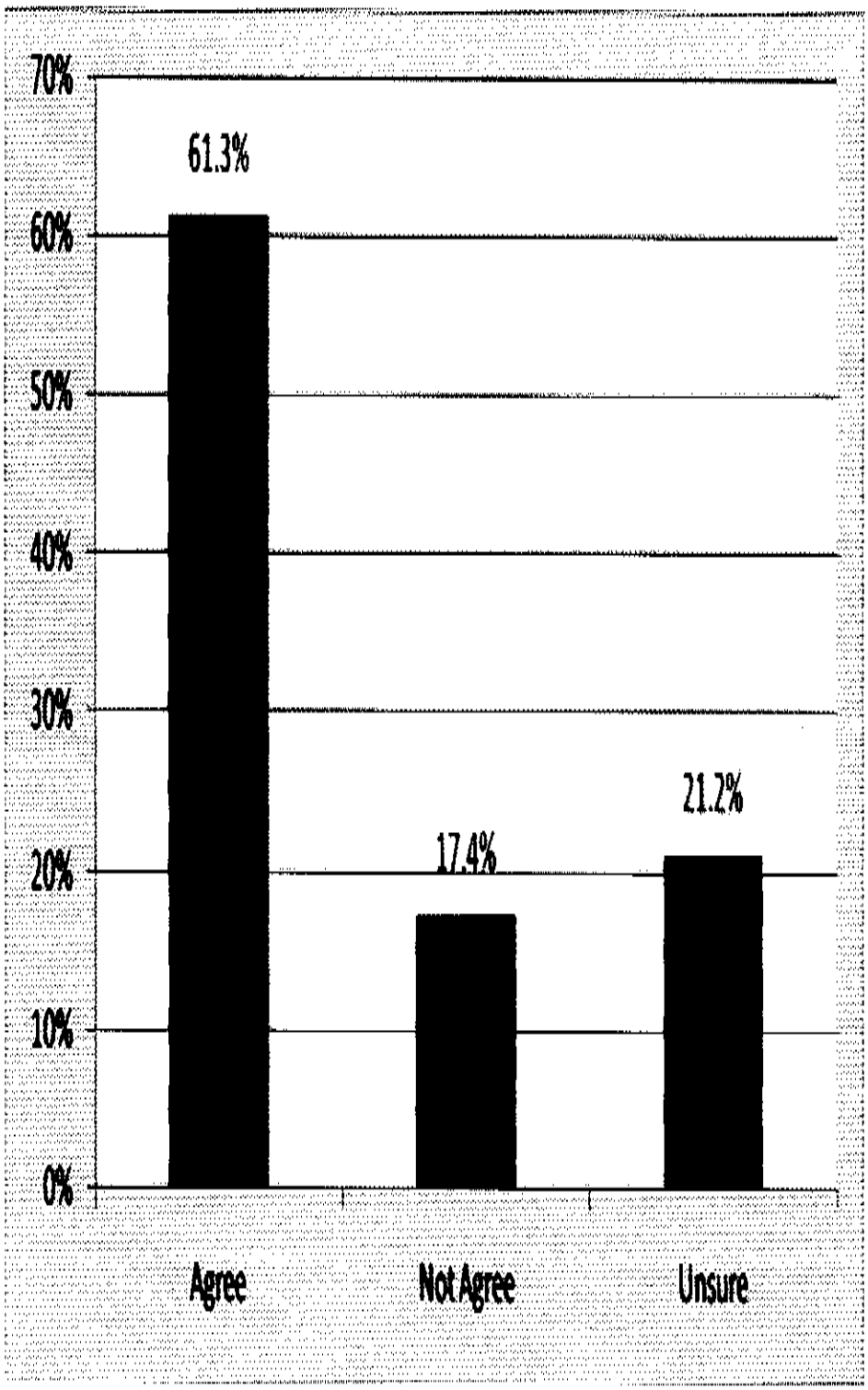
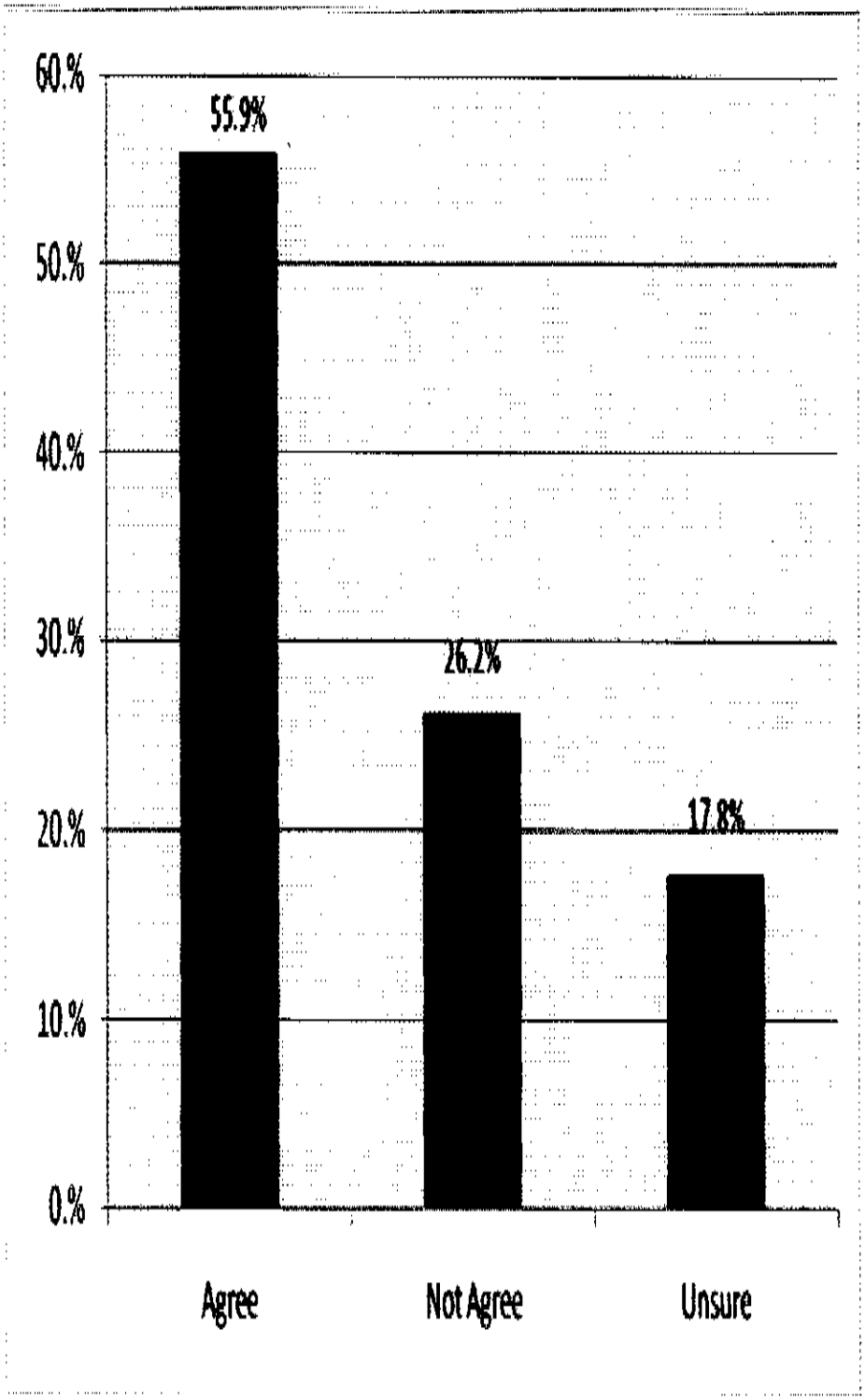


Figure 5: Is exclusive breast feeding acceptable to your friends and relatives?



4.5. RELATIONSHIP BETWEEN HIV STATUS AND KNOWLEDGE:

An analysis of variance (ANOVA) was conducted (Table 4) to determine whether there is a relationship between HIV status and knowledge scores.

The HIV positive population had a higher mean score of 61.2% compared to the HIV negative that scored 59.4%. The difference between the two groups was significant (**P=0.00**), thus HIV positive status was associated with a higher knowledge score in this study, though this was deemed inadequate as it still fell below the preset score of 75% for adequate knowledge.

Table 4: ANOVA

	Sum of Squares	df	Mean Square	F Value	P Value
Between Groups	20.662	3	6.887	12.617	**0.00**
Within Groups	208.532	382	.546		
Total	229.194	385			

HIV status	Mean scores	Std. Deviation	95% Confidence Interval	
			Lower Bound	Upper Bound
Positive	61.20	17.268	57.11	65.28
Negative	59.35	16.432	57.36	61.35
Unknown	56.35	19.178	50.79	61.92
Total	**59.27**	**17.022**	**57.57**	**60.98**

A secondary level of analysis was done for the knowledge scores against HIV status. In this the scores were analysed from the point of individual questions on the scale (**Table 5**). HIV negative mothers performed significantly better on nine out of the total number of twelve questions asked. For all other questions there was no significant difference.

4.5.1. INDIVIDUAL QUESTIONS ON KNOWLEDGE SCALE AGAINST HIV STATUS:

Table 5: Knowledge:

Questions		HIV status			P-Value
		Positive	Negative	Unknown	
1. Exclusive……	**Count**	63	234	44	**0.00**
2. Recommended….	**Count**	61	241	42	**0.00**
3. Healthiest feeding……	**Count**	**60**	**243**	**44**	**0.00**
4. Orally…..	**Count**	61	236	35	**0.00**
5. Breast milk protects….,	Count	49	183	39	0.550
6. Nutritional….	**Count**	**50**	**229**	**42**	**0.00**
7. Mixed feeding…	Count	52	190	34	0.66
8. Effect….	Count	66	240	41	0.19
9. Mother HIV +…	**Count**	52	212	40	**0.00**
10. Risk …	**Count**	47	200	35	**0.04**
11. Community….	**Count**	64	249	43	**0.00**
12. Above statement …	**Count**	66	240	42	**0.00**

4.5.2. COMPARISON OF PRACTICE AGAINST HIV STATUS OF RESPONDENTS:

The analysis of the infant feeding practice (**Table 6**) showed that only exclusive breast feeding showed a significant difference with regards to HIV status (**P=0.02**). HIV negative women were more likely to exclusively breast feed compared to HIV positive women. HIV positive status was then not associated with exclusive breast feeding.

Table 6: Practice (n=386):

Variable	Positive (n=71)	Negative (n=298)	Unknown (n=17)	P-value
Giving breast milk alone	43(60.6%)	157(52.7%)	5 (29.4%)	0.02
Giving formula alone	18(25.4%)	79(26.5%)	6(35.3%)	0.18
Mixed feeding	10(14.1%)	62(20.8%)	6(35.3%)	0.66

4.5.3. COMPARISON OF ATTITUDE AGAINST HIV STATUS OF RESPONDENTS:

Attitudinal disposition was also assessed with reference to HIV status (Table 7). This was done with reference to HIV status. Analysis showed that a signifant difference existed between respondents on the attitude scale on the basis of HIV status. HIV negative women compared to HIV positive women where more disposed to wanting to exclusively breast feed for six months (**P=0.042**), thought that it was possible (**P=0.000**), and felt it was acceptable to both friends and relatives (**0.032**).

Table 7: Attitude (n=386):

Do you personally want to exclusively breast feed for 6 months?	**Positive (n=71)**	**Negative (n=298)**	**Unknown (n=17)**	**P value:**
Agreed	**48 (67.6%)**	**95 (31.8%)**	**17 (100%)**	**0.042**
Not agreed	**18 (25.4%)**	**52 (17.4%)**	**0 (0%)**	**0.32**
Unsure	**5 (7%)**	**151 (50.7%)**	**0 (0%)**	**0.89**
In your opinion do you think exclusive breast feeding for 6 months is possible?				
Agreed	**48 (67.6%)**	**172 (57.7%)**	**17 (100%)**	**0.000**
Not agreed	**15 (21.1%)**	**52 (17.4%)**	**0 (0%)**	**0.28**
Unsure	**8 (11.3%)**	**74 (24.8%)**	**0 (0%)**	**0.54**
Is exclusive breast feeding acceptable to your friends and relatives?				
Agreed	**48 (67.6%)**	**151 (50.7%)**	**17 (100%)**	**0.032**
Not agreed	**16 (22.5%)**	**85 (28.5%)**	**0 (0%)**	**0.10**
Unsure	**7 (9.8%)**	**62 (20.8%)**	**0 (0%)**	**0.61**

Analysis of the above demographic parameters (young, low maternal education, low socioeconomic status) shows that the mothers may be at risk of early weaning and early introduction of modified cow's milk[18]. From the child health perspective, early weaning, and introduction of modified cow's milk, in rural settings, are challenges to optimal growth and development[16]. This could further pose a challenge for initiatives like the PMTCT aimed at improving exclusive breast feeding rates as recommended for rural based HIV positive mothers[11].

The provision of HIV counseling and testing seems to be commendable in this study as only 4.4% of women did not know their status. The HIV prevalence in this cohort was calculated to be 18%, with the corresponding HIV prevalence recorded in Tswaing sub-district DHIS data standing at 22% for the same period as the study, and an overall prevalence of 19.6% for the period April 2009 to March 2010.

Amongst HIV positive respondents, a total of 38.9% reported that they had disclosed their status, with the majority of them disclosing to their parents. Of interest is the fact that about 61% of the HIV positive sub-population chose not to reveal to whom they had disclosed. The fact that this sub-group chose to disclose their status to the researcher, but refused to reveal to whom they have disclosed to seems contradictory. This is a study finding in need of further exploration.

Disclosure to parents in this study is in keeping with the dependant relationship respondents have with their parents or an indicator of the communitarian ethos of rural communities. Of concern is the proportion of women highlighted above who chose not to reveal to whom they had disclosed to. This could have negative implications for the comprehensive management of the respondents HIV infection and affect the provision of PMTCT services to their infants. Literature has shown that non- disclosure, especially to partners, has a negative impact on patient outcomes in the PMTCT context. [27]

Of note is the fact that the only demographic variable by which the women differed was with the provision of infant feeding counseling during antenatal care. Windeale et al stressed the

importance of improving the advice given by health care workers as the most effective short term intervention for ensuring optimal and safe nutrition for the feeding infant[18]. In this study, a significant proportion of women received infant feeding counseling, a state of affairs that could be ascribed to effective service delivery in the PMTCT and child health contexts, but a dichotomy was seen to exist with regards to the provision of infant feeding counseling.

Significantly more HIV negative women compared to HIV positive women said they had been counseled during antenatal visits. This finding points to an important challenge for the PMTCT programme, and could lead to programme failure in the sense that viral transmission from mother to infant could still occur, in spite of the administration of prescribed medications used for reducing transmission risk in the ante and intra partum parts of pregnancy, as a consequence of infected mothers using feeding methods, such as mixed feeding that might serve to increase breast milk associated viral transmission, thus reversing the gains of ante and intra partum viral transmission prevention strategies. This being on account of failure to institute relatively simple targeted interventions, in this case infant feeding counseling.

This is definitely an area for further research activity, probably a much larger study, at the district level. It is commendable that women in general were exposed to counseling in the PMTCT context. The obvious contradiction being the fact that HIV pregnant, or nursing mothers who need it most are least likely to be offered this important programmatic initiative. This phenomena throws up a lot of possibilities that can only be unraveled if this situation is subjected to intense research activity. It must be added though, that the percentage of HIV positive women who received infant feeding counseling was recorded as 91.5%, which seems high. The challenge noted, is the dichotomy observed between the two cohorts. Why this exists would need to be addressed.

Overall maternal knowledge in this study was low, with only 17.3% of participants scoring the 75% and above preset cut-off on the knowledge scale. There was a statistically significant difference in performance between HIV positive and HIV negative women. HIV positive women achieved higher mean scores than HIV negative women (**Table 4.5**). The researcher attributes the higher knowledge score amongst HIV positive respondents to the fact that HIV positive

mothers would tend to recall and identify with messages received during infant feeding counseling because it has realistic implications for them and their unborn or breastfed infants. Within the context of this study, this would have been a reassuring finding if a significant proportion of HIV positive mothers had achieved the preset cut-off mark of 75% for adequate knowledge, for the ability to recall messages on mother to child transmission risks was one of the key determinants identified by Doherty et al associated with exclusive breast feeding in HIV positive women[21]. Since this was not the case, it would be difficult relating the significantly higher mean performance score on the knowledge scale by HIV positive mothers to better PMTCT outcomes. This is further underscored by the fact that exclusive breast feeding rates amongst HIV positive mothers was lower than that of HIV negative mothers. Knowledge seemed not to have been a determinant of exclusive breast feeding in this study. The researcher is of the opinion that measures aimed at improving the knowledge base of mothers, especially HIV positive mothers through the assistance of well trained counselors who are able to translate technical information into formats that clients can relate to would go a long way in improving exclusive breast feeding rates amongst HIV positive mothers in particular. This is in addition to measures to reinforce these messages, especially through peer support groups which the evidence shows significantly increases the duration of breast feeding[25].

Further analysis of the knowledge scale on an individual question basis showed that HIV negative women scored significantly higher on nine out of the total number of twelve questions asked. These questions covered the definition of exclusive breast feeding, prescribed length of time for exclusive breast feeding, transmission risk if mother is HIV positive and comparing infant mortality in formula fed children to exclusively breast fed children amongst other questions.

This is a study finding that seems contradictory, for though HIV positive women had higher mean scores, HIV negative women performed better in the majority of questions. Why this did not translate into higher mean scores would need to be addressed. One reason from the researcher's perspective is the fact that the questions did not carry equal marks on the knowledge scale. Questions **5** (protective effect of breast milk), **7** (what constitutes mixed feeding) and **10** (factors responsible for increased risk of transmission of the HI virus in the infant feeding

context) on the knowledge scale had maximum scores of **3, 4 and 4** respectively, whilst all other questions carried a maximum score of **1 (Appendix 1)**. Out of these three questions there was no significant difference in performance in questions **5** and **7**. It would seem that the significantly better performance of HIV negative women as analyzed from the performance of the individual questions was better on questions which were less weighted in terms of scoring. This could be one of the reasons accounting for the dichotomy between mean performance and analysis of individual scores with respect to HIV status.

It is then reasonable to ask, if HIV negative mothers were more likely to receive counseling during ANC and PNC visits, why did they not significantly perform better on the knowledge score by attaining the 75% pre-set cutoff in significant numbers (mean score=59.4%)? The researcher is of the opinion that:

1. The preset cutoff of 75% might not be an accurate measure of knowledge, because it might in this case be an overestimate based on non-validated assumptions;
2. The quality of counseling itself might need to be examined, with a view of assessing what counselors know in the light of new PMTCT guidelines, their appreciation of risk-benefit analysis needed in counseling in this context, and assessing their competence with reference to the demands of counseling in a rural setting.

In spite of this overall poor knowledge, the majority of respondents reported to be exclusively breast feeding at the time of questioning. What was worrying was that 20.3% reported that they were practicing mixed feeding. This mode of infant feeding carries the highest feeding risk of transmission in the HIV context.[11 24] Further studies in the sub-district are called for not only to determine factors responsible for this, but also to explore how feasible exclusive formula feeding is for mothers like the 27.3% who reported to opt for it in this study. HIV positive and negative women only differed significantly in the area of exclusive breast feeding, with significantly more HIV negative women reported to be practicing exclusive breast feeding. This is not surprising as this study as earlier shown reported that HIV negative mothers were more likely compared to HIV positive mothers to receive infant feeding counseling which in rural South Africa places an emphasis on exclusive breast feeding as the recommended choice of infant feeding. This could have implications for the PMTCT programme in rural settings where exclusive breast feeding is the preferred evidence based feeding recommendations for HIV positive mothers.[17]

The above finding is at variance with findings by Rollins et al, which showed that at one week post partum most HIV infected women intended to exclusively breast feed and adhered to this intention at one week[23]. In this study HIV positive women had an inadequate knowledge of and an overall lower attitudinal disposition to exclusive breast feeding. It would thus seem that this accounted for the divergence from the cited study finding. Furthermore, as alluded to in the literature review the issues of time at which the study was conducted postpartum and the intensive support given to study participants in could also have influenced study outcomes.

Analysis of maternal attitude showed significantly more HIV negative mothers wanting to exclusively breastfeed for six months, believing it was feasible, and that it was acceptable to friends and relatives. This positive attitude expressed by HIV negative women is in keeping with the above stated propensity of HIV negative women in this study to practice exclusive breast feeding and to have received infant feeding counseling.

5.2. LIMITATIONS:

A number of issues need to be taken into consideration in interpreting the results of this study. The setting of a standard of 75% as acceptable knowledge by the researcher for this study might have to be objectively validated, for until this is done it is reasonable to expect that the possibility of over or under estimating this study variable might exist.

Studies like this that involve disclosure of sensitive information might suffer from a social desirability bias which might have some impact on results. In addition mothers may have disclosed to the interviewers what they felt was the socially acceptable answer to give. Though there is practically no way to avoid this, it remains a study limitation nonetheless.

Associations between study variables could also be affected, as cross sectional studies give a weaker estimate of association than other study designs higher up on the hierarchy of evidence. Caution would also need to be exercised in trying to generalize the result of this study to other rural settings, because the possibility of socio-cultural influences which may vary across geographical areas may impact on study variables to give different outcomes and associations.

Finally, females below the age of 18 years were excluded for ethical reasons, but in reality this age group represents a particularly vulnerable group, and as such the study findings might not apply to them.

5.3. SOURCES OF BIAS:

Throughout this study, efforts were made to minimize systematic errors. The main concern of the researcher is the question of generalisability of the results. Of current concern within the sub-district is the fact that data from the DHIS shows that a significant number of women who book for ANC do not deliver in Tswaing sub-district. It is believed that issues related to home delivery, movement outside the sub-district to deliver, and poor recording by clinics might be responsible. As such, generalizing the results of this study might be difficult, and until this challenge is resolved, study findings might have to be restricted to the group of women who were sampled.

5.4. CONCLUSION:

The results of the analysis suggests that HIV positive and negative mothers in this rural sub-district have a low overall level of knowledge of what the benefits and implications of exclusive breast feeding in both an overall child health and HIV context in particular are. HIV positive mothers, a vulnerable sub-group, were less likely to receive infant feeding counseling and exclusively breast feed compared to HIV negative mothers. This would have negative implications for the reduction of maternal to child transmission of the HI virus from the PMTCT stand point. Exclusive breast feeding rates seem high from the study, but the fact that this appeared to be more prevalent in HIV negative women compared to HIV positive women suggests that improving maternal knowledge might serve to increase exclusive breast feeding rates particularly amongst HIV positive women. It seems that the attitudinal disposition of HIV negative mothers and the fact they were more likely to be exposed to infant feeding counseling served as the determinants of exclusive breast feeding in this rural based study.

Furthermore, it is hoped that in the light of these findings and recent revisions to the South African PMTCT guidelines which have made evidence based modifications that would assure reduced breast feeding associated viral transmission, efforts are made towards assessing, and if indicated improving the knowledge base of health care workers charged with delivering evidence

based advice on exclusive breast feeding to rural women, who in the PMTCT context would benefit from the infant and maternal advantages it confers. The assumption being made is that the knowledge base of expectant and feeding mothers would be a function of the information given to them when attending ANC and PNC clinic, service that is widely available in Tswaing sub-district. The results of this research shows that opportunities for improving exclusive breast feeding rates amongst HIV positive mothers exist in the areas of improved quality of knowledge and better risk-benefit analysis on the path of HIV positive mothers. This falls within the purview of quality improvement within the infant feeding counseling context.

Finally, the researcher would like to state that from the results of this study, there are some positives that can be ascribed to the PMTCT programme, if study findings are appreciated within the HIV positive group without making comparisons with HIV negative mothers. Some of these are:

1. Though significantly more HIV negative women received infant feeding counseling, 91.5% of HIV positive women were recorded to have been counseled;
2. HIV positive mothers were less likely to exclusively breast feed compared to their HIV negative peers, but the exclusive breast feeding rates amongst HIV positive women stood at 60.6%)
3. On the attitude scale 67.6% of HIV positive women expressed a positive disposition to exclusive breastfeeding;
4. Only 4.4% of the study population did not know their HIV status.
5. Though below the preset study cut-off of 75% for adequate knowledge, HIV positive women attained higher mean scores on the knowledge scale.

As such, it is the researcher's opinion that the PMTCT programme has made positive strides in the right direction, and hopefully a study like this would seek to help consolidate its gains and assist in improving standards for better service delivery.

APPENDICES

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APPENDIX 1.

QUESTIONNAIRE

(To be administered with the assistance of a researcher trained translator)

DEMOGRAPHIC DATA:

1. How old are you?

2. What is your marital status?

3. How many children do you have?

4. Residential details:

a. Do you have pipe borne water?

YES	NO

5. Do you have electricity at home?

YES	NO

6. Are you sharing accommodation with relatives or friends?

YES	NO

7. What is the highest level of school you have attended?

8. From where do you get money to look after yourself?

9. About how much do you spend looking after yourself every month?

10. Did you receive any advice on how to feed your baby during pregnancy?

YES	NO

11. What is your HIV status? (Question to be asked in the privacy of a closed room with only the researcher and an -interpreter if needed. Furthermore it would be stressed at this stage that they do not have to answer this question)

12. Have you disclosed your status? (For those who chose to answer)

YES	NO

13. Who have you disclosed to? (For HIV + patients who chose to reveal status to researcher)

REPORTED PRACTICE

Which one of these describes how you are feeding your baby?

Are you giving breast milk alone?	
Are you giving formula feed alone?	
Are you mixing breast milk with formula feed and other types of food or liquids?	

KNOWLEDGE SCALE

Questionnaire:

1. **Do you know what exclusive breast feeding is? - If yes can you explain?**

2. **How long do you know it is recommended for a child to be exclusively breast fed?**

3. **What do you think is the healthiest feeding option for a child under six months of age**

4. **What else can be given orally during exclusive breast feeding?**

5. **Does breast milk protect the baby from the following?** (To be given choices in data entry sheet to choose from)

6. **About the nutritional value of breast milk?** (To be given choices in data entry sheet to choose from)

7. **Which of these refers to mixed feeding?** (To be given choices in data entry sheet to choose from)

8. **What do you think are the effects on the baby of mixed feeding compared to exclusive breast feeding in a HIV +ve mother?**

9. **If a mother is HIV +ve, what do you think are the chances of her transmitting HIV to her? child while feeding the child with breast milk alone during the first six months of life?** (To be given choices in data entry sheet to choose from)

10. **Which of these do you think increases the risk of transmitting HIV from a breast feeding mother to a breast feeding infant?** (To be given choices in data entry sheet to choose from)

11. **In your community, do you think children who are exclusively breast fed are less likely compared to children who are exclusively formula fed or mixed fed to die in the first year of life from Illness?**

12. **Do you think the above statement true even if the mothers are HIV +?**

Data entry sheet for knowledge scale:

(One mark for each correct answer- marks in bracket for correct answers)

1. Breast milk alone, with vitamins and oral vaccines and if needed, medications prescribed by a doctor or nurse. - (1)						
2. 6 months- (1)						
3. Exclusive breast feeding -(1)						
4. Vaccines and prescribed medications and vitamins.- (1)						
5. Does breast milk alone protect the infant from diarrhea? -(1)	**b) Does breast milk alone protect the feeding infant from pneumonia?- (1)**	**c) Does it protect the feeding infant from malnutrition -(1)**	**d) (a) , (b) and (c)- (3)**	**e) don't know**		
6. a) Sufficient alone for growth in the first six months. –(1)	**b) not as sufficient as formula milk**	**c) infant needs supplemental feeds in addition**	**d)don't know**			
7. a) breast milk and water -(1	**b) Breast milk and formula –(1)**	**c) breast milk and other types of animal milk- (1)**	**d) breast milk and other foods- (1)**	**e) all of the above-(4)**	**d) don't know**	
8. There is an increased risk of HIV transmission to baby if mother is +ve and an increased risk of baby dying from infections and malnutrition.-						

(1)						
9. a) almost all will be infected	b) few would be infected-(1)	c) none will be infected	d) all will be infected	e) don't know		
10. a) cracked nipples or breast infection –(1)	b) mouth infection in baby –(1)	c) mixed feeding-(1)	d) Very sick mother with HIV -(1)	d) all of the above-(4)	d) don't know	
11.True-(1)						
12.True-(1)						

ATTITUDE TO EXCLUSIVE BREAST FEEDING SCALE

(SD: strongly disagree, D: disagree, U: unsure, A: agree, SA: strongly agree.)
(This would be explained to the patients before administration of scale.)

						score
1. Do you personally want to exclusively breast feed for 6 months?	SD (0)	D (1)	U (2)	A (3)	SA (4)	
2. In your opinion, do you think exclusive breast feeding for 6 months is possible for you?	SD (0)	D (1)	U (2)	A (3)	SA (4)	
3. Is exclusive breast feeding for six months acceptable to your family and relatives?	SD (0)	D (1)	U (2)	A (3)	SA (4)	
					Total	

APPENDIX 2.

Letter of Information for HIV negative patients:

Dear Patient,

I am conducting a research titled: **Knowledge, attitudes, and practice of exclusive breast feeding amongst mothers attending postnatal clinic in Tswaing sub-district, North West province,** and would like to invite you to voluntarily participate.

This study has been undertaken with the permission of the Tswaing Sub-district department of health, North West department of Health research committee and the Human research and Ethics Committee (HREC) of the University of the Witwatersrand.

Completion of this research project is a requirement for my graduating from the department of Family Medicine at the University of the Witwatersrand where I am also a postgraduate student.

The purpose of this study is also to determine your knowledge of the transmission of the HI virus from breast feeding mothers to their infants and what might be influencing your chosen method of feeding.

It is only with your permission that you can be used in this study, and I am assuring you that your participation and all information you volunteer would not be given to anybody else. You are also free to refuse to participate or exercise the right to withdraw from the study at anytime you feel like. Doing this would not negatively affect your access to care.

If you agree to participate a questionnaire would be used to ask you questions and your answers recorded.

Participation in this study would be done after you have gone through your expected post natal care processes and is expected to last..... mins.

The report of this study would be sent to the University of the Witwatersrand, Sub-district department of health and the North West department of health research committee.

An interpreter who you would have to consent to would be available if you find communicating effectively in the English language problematic. He/she has also signed necessary forms to ensure that your participation and information is kept secret.

If you want to volunteer for this study, please fill in the portion below.
Thanks for your assistance.

Dr. Umaru Ahmadu-Ali
Department of Family Medicine,
University of the Witwatersrand. **Tel NO: 053 948 0930**

APPENDIX 3.

Letter of Information for HIV positive patients:

Dear Patient,

I am conducting a research titled: **Knowledge, attitudes, and practice of exclusive breast feeding amongst mothers attending postnatal clinic in Tswaing sub-district, North West province,** and would like to invite you to voluntarily participate.

This study has been undertaken with the permission of the Tswaing Sub-district department of health, North West department of Health research committee and the Human research and Ethics Committee (HREC) of the University of the Witwatersrand.

Completion of this research project is a requirement for my graduating from the department of Family Medicine at the University of the Witwatersrand where I am also a postgraduate student.

The purpose of this study is also to determine your knowledge of the transmission of the HI virus from breast feeding mothers to their infants and what might be influencing your chosen method of feeding.

It is only with your permission that you can be used in this study, and I am assuring you that your participation and all information specifically your HIV positive status would not be revealed to anyone. You are also free to refuse to participate or exercise the right to withdraw from the study at anytime you feel like. Doing this would not negatively affect your access to care.

If you agree to participate a questionnaire would be used to ask you questions and your answers recorded.

Participation in this study would be done after you have gone through your expected post natal care processes and is expected to last..... mins.

The report of this study would be sent to the University of the Witwatersrand, Sub-district department of health and the North West department of health research committee.

An interpreter who you would have to consent to would be available if you find communicating effectively in the English language problematic. He/she has also signed necessary forms to ensure that your participation and information is kept secret.

If you want to volunteer for this study, please fill in the portion below.
Thanks for your assistance.

Dr. Umaru Ahmadu-Ali
Department of Family Medicine,
University of the Witwatersrand. **Tel NO: 053 948 0930**

APPENDIX 4.

Letter of consent:

I..... A Patient at .....

Clinics do consent to participating in this study titled: **Knowledge, attitudes, and practice of exclusive breast feeding amongst mothers attending postnatal clinic in Tswaing sub-district, North West province.** It is being undertaken by **Dr. Umaru Ahmadu-Ali**.

Signature or thumb print.....

Date.....

APPENDIX 5.

Confidentiality clause for translators:

I....., serving as a translator for the research project titled: **Knowledge, attitudes, and practice of exclusive breast feeding amongst mothers attending postnatal clinic in Tswaing sub-district, North West province**, being undertaken by **Dr. Umaru Ahmadu-Ali**, is aware of and understands the legal prescriptions relating to my maintaining full confidentiality during and after my assignment, and the implications of any breach of this.

This serves as an undertaking by me to act within the limits of extant laws binding my actions during and after the completion of this project.

Signed..... Date.....

Witness..... Date.....

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr Umaru A Ahmadu-Ali

CLEARANCE CERTIFICATE	M090411
PROJECT	Knowledge, attitudes and Practices of Exclusive Breastfeeding amongst Mothers Attending Postnatal Clinic in Tswaing Sub-District, North West Province
INVESTIGATORS	Dr Umaru A Ahmadu-Ali,
DEPARTMENT	Department of Family Medicine
DATE CONSIDERED	09.04.29
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 09.06.03 CHAIRPERSON .....
(Professor P E Cleaton Jones)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Prof I Couper

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and ONE COPY returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. I agree to a committee of a yearly progress report.

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

CHAPTER 6 REFERENCES

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