guessing any answers, the majority of those guessing reported guessing less than half and only 4 of the mothers reported guessing more than half of the answers. On further investigation, the knowledge scores regarding HIV transmission indicate a range of scores, indicating that this may not have skewed the results.

The knowledge of HIV transmission and MTCT was close to 100%, with the majority of women scoring at least 80%. This could be expected as they had received counselling[‡] and the scores were positively associated with their high level of education.

The women generally knew that HIV causes AIDS, but it is of concern that almost a third believed that HIV/AIDS is curable and almost another third were unsure. ARV drugs and to a lesser extent exclusion of breastfeeding were the most common responses for the prevention of the transmission of the virus. The literature indicates that the best way to prevent MTCT is to prevent the infection of girls and women of childbearing age. Education about safer sex, use of condoms and diagnosis and treatment of sexually transmitted infections should be provided. Ensuring the safety of medical procedures, such as labour and blood transfusion, and universal safety precautions also play a role in primary prevention.[3,5,13] The effectiveness of ARV therapy in PMTCT has been shown during pregnancy, if provided intravenously during labour and if provided to the infant for 6 weeks after delivery,[3,5] but it has not yet been proven during lactation.[13] The use of ARV therapy, however, can lead to many ethical and practical problems. The literature is also conflicting regarding breastfeeding and MTCT, indicating an increased risk of transmission with breastfeeding compared with formula feeding in some studies,[16-20] whereas others have shown no additional risk of breast-feeding.[9,20,21] Exclusive breastfeeding has been shown to lower the risk significantly compared with mixed feeding which affects the integrity of the infant's gut mucosal lining.[22]

Terms that are supposed to be used in counselling about infant feeding options to enable the mother to make an informed decision,[14] i.e. exclusive breastfeeding, mixed feeding and cup feeding, were not defined correctly by the majority of women, indicating that in the PMTCT programme not enough emphasis or reinforcement is placed on the different feeding options available. The crucial message of the PMTCT programme is that whichever feeding option is chosen, it should be implemented exclusively.[4]

The women seemed positive about the health workers' advice and they preferred to follow their advice compared with that of family and friends, which indicates the important role of the health workers and the major impact that they could have on the women's decisions.[23] Less than two-thirds of women reported receiving information from a health worker regarding feeding practices although, as previously mentioned, this is supposed to be part of the PMTCT programme. Although the mother is meant to make an informed decision herself, almost two-thirds of women in this sample reported that the health worker had advised them to formula feed. It must be noted though that three-quarters of the women stated that their reason for choosing formula feeding was to prevent MTCT, which may indicate that their perception that the health worker advised them may actually have been part of their informed decision making process. A concurrent study[11] also reported that health workers influenced 80% of women in their feeding choice. It shows the importance of health workers remaining objective and providing all the necessary information when counselling patients, so that women are enabled to make informed choices.

Participants' attitude towards breastfeeding and formula feeding did not differ between the health, nutritional value, satisfaction level and hygiene of both feeding options. Although not statistically significant, when the difference of responses in percentages is compared, more women felt that breastfeeding was more nutritionally complete (5.6%) and hygienic (8.3%), whereas more women felt that formula feeding was more satisfying to the infant (5.5%) than breastfeeding. This perception has been reported in the literature.[24] The statistically significant relationship found between MTCT knowledge and attitude towards breastfeeding indicates that they appropriately based their preference for formula feeding on the risk of MTCT associated with breastfeeding.

The participants showed a positive attitude towards breastfeeding, but owing to their HIV status felt that it was too much of a risk and not the best feeding option for them. Most women indicated that they were satisfied with their decision to formula feed and had made the best feeding choice under the circumstances. Only 1 woman indicated that receiving free formula was her motivation for her feeding option, but 8 indicated that it did influence their decision. These women also reported that they would be unable to sustain the formula feeding option after the free supply ended. Davis *et al.*[11] similarly reported that 24% of the participants in that study chose formula feeding because it was free. The question therefore arises whether had infant formula not been provided free, would more participants have chosen to breastfeed?

Only 1 mother reported deciding to exclusively breastfeed her infant. Mixed feeding was reported, providing other fluids and porridge before the recommendation of 6 months. This is not advised

[‡] PMTCT programme involves four stages of counselling in relation to HIV,[14] i.e. stage 1 specifically involves pre-test counselling where the risk to exposure of HIV, implications of knowing one's HIV status and voluntary counselling and testing are discussed and stage 2 is the post-test counselling to discuss the woman's concerns regarding her status and provide information, support and referral to other services that she may need.

due to the infant's physiological incapacity to handle certain food types and the fact that these foods may replace the essential breastmilk or formula milk[10] as well as affecting the integrity of the infant's gut mucosal lining.[9]

Although evidence exists that cup-feeding is more hygienic[12] and is meant to be part of the infant feeding counselling of the PMTCT programme, participants did not seem to practise cup-feeding. The fact that very few participants could correctly define the term cup-feeding may contribute to this finding, i.e. ignorance regarding this method existed as they were uninformed or did not comprehend during counselling and training.

The participants reported cleaning the bottles and teats before use and preparing the formula correctly, showing that participants have the necessary knowledge to correctly and hygienically prepare the formula milk. Although not part of this study, contamination from using poor water sources may influence the hygienic preparation of the formula, thereby increasing morbidity and mortality.

The literature indicates that the more culturally acceptable a certain way of feeding is, the more likely it is that such methods will be used[4] and that a person's culture affects his/her attitude and beliefs and largely influences decision-making.[9] HIV status seemed to influence the limited practice of breastfeeding in the sample, even though their attitude towards breastmilk was positive. This indicates that the participants would rather minimise the risk of MTCT than conform to culturally acceptable practices. Davis *et al.*[11] also support this finding. Even though families did not always approve of the women's chosen feeding option, they nevertheless supported the decision made. Of those using infant formula, all reported to continue with the chosen feeding method when family and friends came to visit.

Conclusions

It was found that despite the high rate of unemployment, poverty, unreliable water sources and poor housing as well as the women's inability to sustain formula feeding after the completion of the programme, they nevertheless decided to formula feed. It was again shown that health workers play an essential role in the success and effectiveness of the PMTCT programme. The health worker's advice was sought but the information that was provided was not conducive to an informed choice because the women were advised to formula feed. Although the women were knowledgeable about HIV transmission and MTCT, as well as hygiene and preparation of feeds, they were uninformed regarding prevention and cure of HIV/AIDS and the essential aspects of infant feeding such as exclusivity (not mixed feeding) and method of feeding, as demonstrated by the fact that mixed feeding and bottle rather than cup-feeding was practised. The women's decision to formula feed seems to have been influenced by their HIV status and in some cases the free supply of formula milk rather than for its superiority over breast milk (nutritional value, hygiene and health). The perception seems to exist, however, that formula feeding is more satisfying for the infant. Culture, stigma and community influence did not seem to affect their decision-making or practices.

Recommendations

In order to increase the sample size, it is recommended that the study be repeated for a longer duration and at a different time of the year, as many of the potential participants received 2 months' supply of infant formula in December and did not attend the clinic in January. PMTCT programme counsellors should be continually trained and retrained to provide accurate information objectively. There should be more emphasis on explaining the differences between exclusive breastfeeding and mixed feeding and the subsequent consequences of inaccurate practices, and cup-feeding should be emphasised. Socio-economic factors, specifically regarding income and hygiene, should be assessed more stringently to support the decision-making process.

The authors acknowledge Ms C Witten for her input as a consultant and Abbott Clinical Services for financial support, the Department of Health, Provincial Government of the Western Cape, Ms M Lewis and Sr M Abrahams, as well as all the personnel of the MOU, ARV clinic and baby clinic of Vanguard Community Health Centre for their support and co-operation. Dr E Terblanche and Dr J Hugo are thanked for their assistance with the statistical analysis and the questionnaire, respectively.

1. AIDS around the world. http://www.avert.org/aroundworld.htm (last accessed 16 October 2006).
2. South African HIV/AIDS. http://www.avert.org/safricastats.htm (last accessed 16 October 2006).
3. *HIV and Infant Feeding – A Guide for Health Care Managers and Supervisors.* Geneva: WHO and UNAIDS, 1998: 5-28.
4. *Breastfeeding and HIV – An Information Booklet for Health Workers in South Africa.* Pretoria: Department of Health, 2002: 7-14.
5. *HIV and Infant Feeding – A Review of HIV Transmission through Breastfeeding.* Geneva: WHO and UNAIDS, 1998: 5-14.
6. Breastfeeding and replacement feeding practices in the context of MTCT of HIV introduction. http://www.who.int/reproductive-health/publications (last accessed 21 February 2003).
7. *Prevention of Maternal to Child Transmission of HIV. Full Protocol.* Cape Town: Department of Health, Provincial Administration of the Western Cape, December 2001: 1-2.
8. World Health Organization. HIV and infant feeding data analysis workshop report. November 2003. Geneva. http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/WHO_FCH_CAH_04.9.pdf (last accessed 16 October 2006).
9. Coutsoudis A, Pillay K, Spooner E, Kuhn L, Coovadia HM. Influence of infant-feeding patterns on early mother-to-child transmission of HIV-1 in Durban, South Africa: A prospective cohort study. *Lancet* 1999; 354: 471-476.
10. Rossouw JPH, Jansen M. *Memorandum to the Director-General of the Department of National Health and Population Development – Breastfeeding in South Africa: 1987-1989.* Pretoria: Human Sciences Research Council, 1990.
11. Davis A, Labadarios D, Marais D, Cotton M. Prevention of mother-to-child transmission programme: How 'informed' is the literate mother's decision regarding infant feeding options in the Gert Sibande District, Mpumalanga province, South Africa. MNutr thesis, Stellenbosch University, December 2005.
12. Chopra M, Schaay N, Sanders D, Puoane T, Piwoz E, Dunnett L. HIV and Infant Feeding: *Summary of the Findings and Recommendations from a Formative Research*

Study with the Khayalitsha MTCT Programme, South Africa. Draft report. May 2000.

13. *HIV and Infant Feeding – Guidelines for Decision-Makers*. Geneva: WHO and UNAIDS, 1998: 8.
14. WHO/UNAIDS/UNICEF. *HIV and Infant Feeding Counseling: A Training Course*. Participant's Manual. Geneva: WHO/UNAIDS/UNICEF, 2000.
15. De Paoli M, Manongi R, Helsing E, Klepp K-I. Exclusive breast feeding in the Era of AIDS. *J Hum Lact* 2001; 17: 313-320.
16. Santmyire BR. Vertical transmission of HIV from mother to child in sub-Saharan Africa: Modes of transmission and methods for prevention. *Obstet Gynecol Surv* 2001; 56: 306-312.
17. Rosenfield A, Figdor E. Where is the M in MTCT? The broader issues in mother-to-child transmission of HIV. *Am J Public Health* 2001; 92: 703-704.
18. Newell ML. Prevention of mother-to-child transmission of HIV: challenges for the current decade. *Bull World Health Organ* 2001; 79: 1138-1144.
19. Bobat R, Moodley D, Coutsoudis A, Coovadia H. Breast feeding by HIV-1 infected women and outcome in their infants: a cohort study from Durban, South Africa. *AIDS* 1997; 11: 1627-1633.
20. Suryavanshi N, Jonnalagadda S, Erande AS, *et al*. Infant feeding practices of HIV positive mothers in India. *J Nutr* 2003; 1326-1331.
21. Greiner T, Sachs M, Morrison P. The choice by HIV-positive women to exclusively breast feed should be supported. *Arch Pediatr Adolesc Med* 2002; 156: 87-88.
22. Breastfeeding and Replacement Feeding practices in the context of MTCT of HIV – chapter 2. http://www.who.int/reproductive-health/publications (last accessed 21 February 2003).
23. De Paoli MM, Manongi R, Klepp K-I. Counsellor's perspectives on antenatal HIV testing and infant feeding dilemmas facing women with HIV in Northern Tanzania. *Reproductive Health* Matters 2002; 10: 144-156.
24. Savage King F, Burgess A. *Nutrition for Developing Countries*. 2nd ed. New York: Oxford University Press, 1998: 116, 118-119.