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Association between postnatal maternal nutritional status, maternal HIV disease progression and infant feeding practices in 4 clinics in Pretoria, South Africa

by

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Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

in the
Faculty of Health Sciences

University of Pretoria

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Co-Supervisor: Prof. UE MacIntyre

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DECLARATION

I declare that the thesis which I hereby submit for the degree Philosophiae Doctor at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or at any other tertiary institution.

Signed : …… Date : ……..
Joan Nteboheleng Matji

I hereby confirm the above

Signed : …… Date : ……..
Supervisor **Prof DF Wittenberg**

PUBLICATIONS

Based on the research presented in this thesis, the following articles have so far been published:

Matji JN, Wittenberg DF, Makin JD, Jeffery B, MacIntyre U, Forsyth BWC. Psychosocial and economic determinants of infant feeding intent by pregnant HIV-infected women in Tshwane/Pretoria. South African Journal of Child Health 2008; 2(3): 114-118.

Matji JN, Wittenberg DF, Makin JD, Jeffery B, MacIntyre U, Forsyth BWC. Factors affecting HIV-infected mothers' ability to adhere to antenatally intended infant feeding choice in Tshwane/Pretoria. South African Journal of Child Health 2009; 3(1): 20-23.

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PRESENTATIONS AT CONFERENCES

Poster Presentation: Choosing to Formula or Breastfeed: Factors affecting infant feeding choices of HIV infected women in Tshwane, 2003. Presented at the September 2006 South African Paediatric Association Conference, Sun City, South Africa

Oral Presentation: Determinants of infant feeding choices among HIV infected women in Tshwane. Presented at the Biennial Nutrition Congress of South Africa in September 2006 in Port Elizabeth.

DEDICATION

This thesis is dedicated with love and gratitude to my parents, my husband Ramatseliso and our two cherished daughters, Morakane and Thenjiwe.

ABSTRACT

Association Between Postnatal Maternal Nutritional Status, Maternal HIV Disease Progression And Infant Feeding Practices In Four Clinics In Pretoria, South Africa

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Introduction

A group of 317 HIV-1 infected pregnant women and 53 postpartum HIV-negative women were recruited for a two-year prospective descriptive study of psychosocial and other determinants of antenatally planned and actual postnatal feeding, associations between maternal status and infant feeding practices, and health outcomes.

Methods

The subjects were interviewed periodically for 2 years using structured research instruments. Anthropometric measurements, biomarkers of nutritional status and measurements of pysychosocial wellbeing were obtained from the mothers. Data was collected on infant feeding and outcomes for the babies.

Results

At recruitment, 74% of mothers planned to formula-feed. Significant differences between these women and those who planned to breastfeed emerged.

After delivery, 25% of the women who antenatally planned to formula-feed changed their minds and actually breastfed. Conversely, half of the women who

antenatally planned to breastfeed actually formula-fed. Some significant reasons emerged for these feeding changes.

Most mothers were well-nourished or overweight. Breastfeeding mothers lost little weight between six weeks and six months after delivery. At the end of follow-up, 65% were obese.

While there were differences between HIV-infected and uninfected women in respect of micronutrients, no deficiencies were observed. Vitamin A and selenium concentrations were higher in the HIV-infected women than uninfected women at six weeks. There were no significant micronutrient changes over time.

Most mothers maintained an adequate immune status with only slow deterioration of CD4 counts. At two years postpartum, 60% had a CD4 cell count greater than 500cells/mm³, and only about 8% less than 200/mm^3.

HIV transmission was 15% by 24 months of follow-up. Among the 65 ever breastfed children, 16 (24.6%) were HIV-infected compared to 12.8% of never breastfed children. Most children were growing normally, suggesting that, overall, maternal HIV status did not interfere with feeding ability.

Eight mothers (3%) and 33 children (11%) died. Only 12 of 33 children who had died had a positive HIV-PCR. By 2 years, 78% surviving HIV-infected children had been initiated onto ARV therapy. Maternal adherence to HAART was poor.

Conclusion

HIV and infant feeding counselling is inadequate in the routine PMTCT programme, with stigma and lack of disclosure continuing as major barriers to appropriate care. Whilst maternal obesity was common, most children were

growing normally. Weaknesses in routine PMTCT services were identified, and compliance with HAART was poor.

Key words: HIV infection, infant feeding practices, psychosocial wellbeing, maternal anthropometric status, maternal micronutrient status, child growth and outcomes.

OPSOMMING

Die verhouding tussen post-natale moederlike voedingstatus en die progressie van moederlike MIV siekte, baba voedingspraktyke en uitkomste in vier klinieke in Pretoria, Suid Afrika

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Opsomming

Drie honderd en sewentien MIV-1 ge-infekteerde swanger vroue asook 53 MIV-negatiewe post-partum vroue is gewerf vir deelname aan 'n twee-jaar prospektief beskrywende studie van psigososiale en ander determinante van antenataal beplande en postnataal werklik deurgevoerde babavoeding, asook van assosiasies tussen moederlike status, voedingspraktyke en gesondheidsuitkomstes.

Metodes

Gestruktureerde onderhoude is periodiek met die deelnemers gevoer tot op 2 jaar. Antropometrie en biomerkers van voedingstatus is van die moeders verkry en metings van psigososiale welsyn is uitgevoer. Data is ook versamel oor die voeding en uitkomstes van die babas.

Resultate:

Met die eerste onderhoud was 74% van die vrouens van voorneme om hulle babas formule melk te voed. Daar was betekenisvolle verskille tussen hierdie vrouens en diegene wat beplan het om borsvoeding te gee.

Na geboorte het 25% van die moeders wat voorheen beplan het om formule melkvoedings te gee, van besluit verander en wel geborsvoed, terwyl die helfte van die vrouens wat borsvoeding wou gee, formule melk gevoed het. Betekenisvolle redes is gevind vir hierdie besluitveranderings.

Die meeste studie moeders was goed gevoed of oorgewig. Borsvoeding het tot min gewigsverlies gelei tussen ses weke en ses maande na geboorte. Met die einde van die studie was 65% van die moeders obees.

Terwyl daar verskille was tussen MIV ge-infekteerde en MIV-negatiewe moeders ten opsigte van mikronutriente, is geen gebrek aangetoon nie. MIV positiewe moeders het op 6 weke hoër vlakke van Vit A en selenium getoon as die kontrole moeders. Daar was geen betekenisvolle ontwikkelings met opvolg oor twee jaar.

Die meeste moeders het 'n voldoende immuniteitstatus gehandhaaf met slegs stadige afname van CD4 tellings. Na twee jaar het 60% steeds 'n CD4 telling >500/mm^3 gehad, en net omtrent 8% se CD4 telling was onder 200/mm^3.

Die MIV moeder-tot-baba transmissie het op 2 jaar 15% beloop. Onder die 65 kinders wat ooit borsvoeding ontvang het, was 16 (24.6%) MIV ge-infekteerd, in vergelyking met 12.8% van babas wat nooit borsmelk gekry het nie.

Die meeste kinders het normaal gegroei, betekende dat die moeders se MIV status oor die algemeen nie hulle sorg-vermoë belemmer het nie.

Agt moeders (3%) en 33 kinders (11%) is oorlede. Net 12 van 33 oorlede kinders het 'n positiewe MIV-PCR toets gehad. Na twee jaar was 78% van die oorlewende MIV-positiewe kinders reeds op ARV behandeling geplaas. Moeders het die ARV behandeling egter swak nagekom.

Gevolgtrekking

In die roetiene PMTCT program word onvoldoende berading oor MIV en babavoeding gegee . Stigma en gebrek aan openbaarmaking van MIV status bly belangrike struikelblokke vir goeie sorg. Moederlike obesiteit kom algemeen voor.

Swakhede van die roetine PMTCT dienste is aangetoon en die moederlike nakoming van ARV behandeling is onvoldoende.

***Sleutelterme**:*
MIV infeksie, baba voeding, psigososiale welsyn, antropometriese status, mikronutrient status, kind groeipatroon, uitkomste.

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Special gratitude to the mothers who, with dedication and hope for a better future, granted us permission to interview them about their health and wellbeing and to follow-up the growth and development of their children for two years.

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TERMINOLOGY AND ACRONYMS

ACT	Alpha 1-antichymotrypsin
AFASS criteria	Acceptable, feasible, affordable, sustainable and safe
AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
ARV	Anti-retroviral drugs or therapy
BF	Breastfeeding
BIS	Bio-impedance spectroscopy
BMI	Body Mass Index
CD4 count	A measure of the absolute CD4 T cell count/cubic mL of blood
CDC	Centres for Disease Control
CI	Confidence Interval
CRP	C-Reactive Protein
CTA	Classification Tree Analysis
DHS	Demographic and Health Survey
EBF	Exclusive Breastfeeding
EFF	Exclusive Formula-Feeding
FF	Formula-Feeding
FFM	Fat free mass
FM	Fat mass
HAART	Highly active antiretroviral therapy
HARS	HIV-associated adipose redistribution syndrome
HIV	Human Immunodeficiency Virus
HR	Hazard Ratio
HST	Health Systems Trust
HR	Hazard Ratio
Ht/age	Height for Age
IVACG	International Vitamin A Consultative Group
MF	Mixed Feeding

MRC	Medical Research Council
MTCT	Mother–to-child-transmission (of HIV)
MUAC	Mid-upper arm circumference
NAIDS	Nutritionally acquired immune deficiency syndrome
NNRTI	Non-nucleoside reverse-transcriptase inhibitors
NRTI	Nucleoside reverse-transcriptase inhibitors
NVP	Neviropine
OI	Opportunistic Infections
OR	Odds Ratio
PCR	Polymerase Chain Reaction
PLWHA	Person/people living with HIV and AIDS
PMTCT	Prevention of Mother to Child Transmission (of HIV)
RDA	Recommended Dietary Allowance
RF	Replacement Feeding
ROI	Reactive oxygen intermediates
SA	South Africa
SADHS	South African Demographic and Health Study
SD	Standard Deviation
TAG	Technical Advisory Group
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
VCT	Voluntary Counselling and Testing
Wt/age	Weight for age
Wt/height	Weight for height
WHO	World Health Organization
Z	Z-score