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The prevalence and predictors of food insecurity among HIV-infected women in Cape Town, South Africa: A cross sectional study

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Plagiarism Declaration

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Dedication

To My parents, Mr L. S Mzimkulu and Mrs N.R Mzimkulu and my nephew Indibabale.

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Firstly, I would like to thank God almighty for giving me strength during this research period.

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Abstract

Background: Food insecurity is a major public health concern in most settings where the Human Immunodeficiency Virus (HIV) is prevalent, and it affects women disproportionately. However, the prevalence of food insecurity and associated risk factors for women who are living with HIV (WLH) in South Africa is under researched.

Methods: The researcher conducted a secondary, cross-sectional analysis of 346 HIV-infected women aged between 18 and 45, in Gugulethu, Cape Town. All participants were 12 months postpartum and enrolled into the MCH-ART study, a large implementation science study of antiretroviral use in pregnancy. For this study, women completed a 10-item household food security questionnaire that categorised food security status into household-level food insecurity, individual level food insecurity and children hunger. Using this tool, the level of food insecurity was categorised as food insecurity ("yes" to up to four questions), experiencing food insecurity ("yes" to five questions or more) and free from food insecurity ("no" to all questions).

Results: Overall, the mean age was 29 years (SD: 5.46); 25 % of the women completed high school; 61 % were unemployed; nearly 66 % were free from food insecurity; and 25 % experienced food insecurity. Women who were employed were less likely to experience food insecurity when compared to those who were not employed (OR=0.54; 95 % CI: 0.32-0.90; p= 0.01). Those who completed high school were associated with food security than the ones who did not complete high school (OR= 0.5; 95 % CI: 0.28-0.97; p= 0.04). After adjusting for maternal age, marital and cohabiting status, education attainment, and parity, employment remained a significant predictor of experiencing food security (AOR= 0.55; 95 % CI: 0.32-0.95 p=0.03) and educational attainment was no longer associated with food insecurity.

Conclusions: The prevalence of food insecurity was relatively low in the urban-based sample of HIV-infected women. However, most of these HIV-infected women were obese and overweight. Thus, there is a clear need for more research to explore issues of food insecurity and nutrition in HIV-infected South African women.

Keywords: Food insecurity, HIV, food security, malnutrition, women

List of Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
BMI	Body Mass Index
CUMC-IRB	Columbia University Medical Center Institutional Review Board
FAO	Food and Agriculture Organization
GCHC	Gugulethu Community Health Centre
HIV	Human Immunodeficiency Virus
LMIC	Low- and Middle-Income County
MCH-ART	Maternal and Child Health -Antiretroviral Therapy
MOU	Midwife Obstetrics Unit
SES	Socio-economic Status
SSA	Sub-Saharan Africa
UCT-HREC	University of Cape Town's Faculty of Health Sciences Human Research Ethics Committee
UNAIDS	The Joint United Nations Programme on HIV and AIDS
WHO	World Health Organization
WLH	Women Living with HIV

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PART A: PROTOCOL

1. Background

Food insecurity is a growing concerned in the field of public health and is underrecognized as a social determinant of health (1). Food security exist when everyone at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs for an active healthy life. Food access, food availability and utilisation and stability are the main pillars of food security (2). On the other hand, food insecurity is the situation where food is not easily accessible, where there is limited availability of nutritious food and households have a difficulty of securing adequate amounts of food. Food insecurity involves being worried about insufficient food to eat or not having enough money to purchase food when it runs out (3).

Food insecurity leads to hunger and malnutrition, malnutrition is a process whereby an individual's diet does not meet adequate nutrients for growth or it can be defined as a condition when a person is unable to adequately utilise the food consumed due to illness (5). Malnutrition encompasses categories of undernutrition and overnutrition. Undernutrition is a condition whereby an individual is too thin or too short and has deficiencies emanating from a lack of nutrients, whereas overnutrition exist when a person is overweight and obese (5).

It is estimated that about 33% of people residing in the Sub-Saharan African region experience severe food insecurity. They are often faced with limited resources to grow food and lack financial means to purchase food (4). Approximately 230 million people in the Sub-Saharan region are undernourished with an increase of 10 million from 2016 (4). Although South Africa produces enough food at a national level however, it estimated that about a quarter of South Africans is food-insecure (2). When South Africa experienced drought between 2008 and 2009 it is estimated that more than 22 million were classified as food-insecure (6).

According to Statistics South Africa (Stats SA), food insecurity is high in rural settings and informal urban areas (7). In addition, approximately 46 % of South African's population is food secure. African National Health and Nutrition Examination Survey (SANHANES) reported that most people who experience food insecurity are in rural (37 %) and urban informal (32 %) areas (6). In Cape Town, about 80% households were reported to be moderately or severely food-insecure and this proportion was high in Khayelitsha (89 %) and only 15 % were classified as food-secure (8).

According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), it is estimated that about 36.7 million people are living with HIV /AIDS (9). In sub-Saharan Africa, three in four new infections are among girls aged 15 to 19 years. Young women aged 15 to 24 years are twice as likely to be living with HIV than men in the same age group. There are about 7 million of HIV-infected people in South Africa (9).

Food insecurity is associated with poor health outcomes particularly among people who are HIV-infected (10, 11). Evidence shows that food insecurity is likely to hasten progression of AIDS related illness and negatively impacts adherence and response to antiretroviral therapy (ART) (12). In South Africa, one of the barriers to taking a HIV treatment was the fear of not having enough food and taking medication on an empty stomach (13). Similar findings were recorded in Tanzania based study where people who are living with HIV did not sustain long anti-retroviral treatment adherence (14).

Furthermore, HIV-infection has detrimental effects on food security as it comprises nutritional status of individuals who are infected, weakens work capacity and consequently destabilize household functioning and livelihoods (12). Food insecurity is linked with risky sexual

behaviours (15) . Evidence shows that food insecurity and HIV contribute to the burden of malnutrition especially in impoverished areas (16). In one study that was conducted in Senegal, about 78% of adults that were HIV-infected were severely food -insecure(16). Similarly, in South Africa and in Ethiopia, women who are HIV-infected experience food insecurity (12, 16-18). It is worth noting that food insecurity often affects the vulnerable group which include women and children (19).

There are number of predictors also known as risk factors that can contribute to household food insecurity. Literature shows that households that have employed members often experience less of food insecurity (18). In addition, in South African cities, Cape Town and Johannesburg, about 32 % of households that had full-time employed members were food-secured when compared to the households that had casual or part-time employed members and received the state social grants (20). Employment and or income can have severe consequences on food security because most of the poor households spend more than half of their income on purchasing food (21). About 55 % of households in Cape Town informal settlements spend their income on food (21).

A study conducted in South Africa showed that approximately 49% people who received their primary income from the state social grants did not experience food insecurity when compared to 33% of individuals with no income or who were unemployed (16). Furthermore, literature suggest that women with low educational attainment often experience food insecurity when compared to those who have high levels of education (21). Evidence shows that in Cape Town about 64 % of households who had family members who completed high school or received tertiary training did not experience food insecurity (8, 21).

The 2002 Integrated Food Security Strategy (IFSS) was implemented by the government of South Africa in order to address poverty and food insecurity in the country. The policy seeks to ensure that there is available, enough food for all citizens and that there is access to nutritious and safe food. Another government initiative to address the issue of food insecurity is state social grants (3). These social grants include dependency grant, child support grant, disability grant, foster child grant, grants for older persons (old age pension), grant in aid, social relief of distress grant and war veterans grant.

2. Study Aim and Objectives

The overall aim of this thesis is to examine the determinants and prevalence of food insecurity among mothers who are living with HIV. The secondary aim is to assess nutritional status of HIV-infected women guided by the following objectives:

- To describe levels of food insecurity among HIV-infected women
- To describe patterns of food security and nutritional status of women living with HIV
- To examine the association between food insecurity with mother's demographic characteristics.

3. Hypotheses

- HIV-uninfected women who reside in informal urban areas have a higher prevalence of food insecurity
- HIV-infected women who are younger, unemployed and have low educational status have a higher likelihood of experiencing food insecurity.
- Women who are experiencing food insecurity are more likely to be obese or overweight

4. Methods

4.1 Study Design

This cross-sectional study used a secondary data obtained from the Maternal and Child Health-Antiretroviral Therapy (MCH-ART). The primary aim of the MCH-ART study was to evaluate different strategies for providing HIV care and treatment to HIV-infected women who initiated ART during their pregnancy. MCH-ART is a prospective study consist of three integrated phases, in which HIV-infected pregnant women were followed during the antenatal and postnatal periods.

Phase 1: was a cross-sectional component of the study that evaluated HIV-infected pregnant women seeking antenatal care at the Gugulethu Midwife Obstetric Unit (MOU). Phase 2: of the study was an observational cohort of all women who were eligible for initiation of lifelong antiretroviral therapy (ART) from their second antenatal clinic visit until their first postpartum clinic visit (conducted within 7 days postpartum).

Phase 3: was a randomised trial that compared strategies for delivering ART to women during the postpartum period. In arm A: women were referred to their nearest general adult ART services for about 48 weeks postpartum. In arm B: women continued receipt of ART in the antenatal clinic, as part of maternal child health focused ART service at the Gugulethu MOU.

4.2 Sample size

Data from approximately (n=346) women from MCH-ART Phase 3 seeking antenatal care at the Gugulethu MOU was reviewed. This sample size was estimated for a main (parent) study to ensure precision of estimates and inclusion of heterogeneity within the study population.

4.3 Location of the research

MCH-ART study was conducted at Gugulethu Community Health Centre (GCHC)' MOU in Cape Town, South Africa. GCHC is a primary health care facility that provides HIV/AIDS and TB-related treatment care and support services. There are number of services that are successfully provided there which include but are not limited to delivery of HIV care and treatment services since 2003. In addition, GCHC has a history of successful operations research on ART service delivery in partnership with the provincial government.

4.4 Study population

The MCH-ART had three phases, therefore the study population will be described per each phase. In phase 1 participant had to consent that they are HIV positive, pregnant and seeking antenatal care at Gugulethu MOU. Phase 2 included participants who were ART eligible from phase 1. Phase 3 participants were the subset of Phase 2, participants who choose to breastfeed their infants and who gave consent to be randomized to one of two postpartum HIV care strategies during the postpartum period.

4.5 Eligibility Criteria

Inclusion Criteria

The inclusion criteria for MCH-ART study Phase 3 were as follows:

- Study participants must be 18 years or older
- Study population needed to be known to be HIV positive
- Consented and participated in Phase 2
- Initiated ART during the antenatal period
- Women who were breastfeeding within less than 7 days postpartum

Exclusion Criteria

Individuals who met any of the following exclusion criteria at the point in the study were excluded:

- Intention to relocate out of Cape Town permanently during the study period
- Any medical, psychiatric or social condition which in the opinion of the investigators would affect the ability to consent and or participate in the study including refusal to take ART/ARVs and denial of HIV.

4.6 Recruitment

Women who participated in the MCH-ART were recruited from Gugulethu MOU. Pregnant women who made their first antenatal visit and who met the inclusion criteria were approached and were told about the study by the research staff. If a woman showed interest in participating in research after being informed about its purpose, the study staff provided them with basic information about the study and then screening was conducted based on set of eligibility criteria. If a woman agreed to participate in the study, a written consent form was administered by research interviewers in the local language, isiXhosa.

4.7 Research Procedures and data collection methods

Household food security and Children grants questionnaires were used to collect the information for this study (See Appendixes 1.6 and 1.7). These tools were administered to women who gave consent to participate in Phase 3. In this Phase participants attended five visits which took place approximately at 6 weeks, 3 months, 6 months, 9 months and 12 months. The information that was collected included but was not limited to: demographics, socio-economic status, difficulties with purchasing food, child grants, HIV treatment knowledge, infant feeding practices. Food security questionnaire was administered during a 12

month visit and children grants questionnaire was administered in 6 weeks visit. Questionnaires were translated into isiXhosa by trained research staff who were isiXhosa speakers. All questionnaire translations were reviewed, and approved versions were back translated to English by an English speaker who spoke isiXhosa fluently. This was important because the research site is in an area where most participants speak isiXhosa.

5. Data Safety and Monitoring

MCH-ART data was collected and managed according to the study protocol. Data was collected on paper forms and it was entered into a custom designed Microsoft Access database, maintained in a firewall-protected UCT server with backups. The study database was password-protected using standard password safety procedure. All study records contained anonymous participant identification numbers, and no participant names were recorded. Quality control was conducted to ensure that there was no missing data and logic violations. This study did not involve any further questionnaires or enrolment.

6. Data Analysis

Data were exported to Stata Version 15.0 (Stata Corporation, College Station, Texas) for analysis. Baseline characteristics of the study population were then summarized using medians and inter-quartile ranges for continuous variables and proportions and frequencies for categorical variables. Pearson chi-squared tests were used to test the association between categorical variables and the outcome.

The primary outcome of interest was the food insecurity in the households of HIV- infected women. Each item in the questionnaire was scored 0, 1, 2 and 9 for unspecified response and scores were summed for all the 10 items from the tool. The total household food security scores

were then categorized according to affirmative responses into three household food security statuses: Free from food insecurity (No to all 10 questions), Risk of food insecurity (yes to up to 4 questions) and Experiencing food insecurity (yes to up to 5 questions or more) (4).

For analysis purposes, the outcome variable was dichotomized into free from food insecurity and experiencing food insecurity. This was obtained by combining the scores of those who were at risk of food insecurity and those who were free from food insecurity. Thus, free from food insecurity (yes to 0-4 questions) and experiencing food security (yes to 5-10 questions). Furthermore, logistic regression models were fitted to determine the association between food insecurity and socio-demographic characteristics of women.

7. Ethical Consideration

7.1 Informed consent process

The study utilised a secondary data from MCH-ART and there was no direct interaction with human participants. All the MCH-ART phases had a consent forms and these consent forms were administered before participant was enrolled into the study (see appendix 1.3). Consent forms were delivered in isiXhosa, a local language by a trained interviewer who followed a script that outlined study purpose and aims. Participants were asked to seek clarity when they did not understand something about the study. All the consent forms stipulated that participation was entirely voluntary, and participants were free to exit the study at any time and that was not going to affect the way in which they receive services at the MOU. Additionally, consent forms stated that participation would not in any way influence the quality of antenatal or postnatal routine medical care for mothers and infants.

7.2 Risks

The risk of participating in the study was minimal since we conducted the secondary analysis of an existing datasets. The identities of study participants were protected using participant identity numbers (PID), thus the study posed limited potential risks to participants.

7.3 Benefits

Findings of this study have a potential to inform and improve nutritional intervention programmes for HIV-infected women. This may lead to awareness of malnutrition and may prevent adverse outcomes that are associated with food insecurity. Therefore, the results will contribute to knowledge in developing policies that seeks to address nutritional status for HIV-infected women.

7.4 Privacy and confidentiality

Although this study utilised existing data however, all the data that was analysed was kept in a password protected encrypted files. Therefore, participant privacy and confidentiality were maintained.

8. Logistics

The primary study MCH-ART received ethics approval from University of Cape Town Human Research Ethics Committee (UCT-HREC) and Columbia University Medical Centre Institutional Review Board (CUM-IRB). The researcher conducted analysis on existing data, therefore no further cost or payment were required.

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PART B: LITERATURE REVIEW

1. Introduction and Background

This section will provide the aim and objectives of the literature review and it will further identify the search strategy, inclusion and exclusion criteria of the literature that will be included in this literature review. In addition, reviewing literature that applies to themes which are linked to the study's objectives will be explored.

Food insecurity overlaps with HIV and AIDS epidemic and can have detrimental effects on the nutritional status of affected individuals (1-3). According to World Food Summit, food security refers to the availability of food and access to food (4). Whereas food insecurity is defined as the situation that exist when people lack secure access to sufficient amount of safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (4).

It is Estimated that approximately 37 million people were living with HIV around the globe in 2017 (5). South Africa has the largest HIV epidemic in the world with an estimated of 7.2 million people living with HIV in 2017 (5). Young women between the ages of 15 and 24 made up 37 % of new infections in South Africa in 2016 (5). One of the cited reasons for this is poverty that is experienced by women (6, 7).

Even though there is a decline in food insecurity in most parts of the world , many people still experience severe food insecurity ,especially in the Sub-Saharan region and Asia (8). After an extensive decline of world hanger however, in the recent years it appears that it has increased again. The number of undernourished people increased from 777 million to 815 million in 2016 (8). It is estimated that about 23 million people around the globe are living in poverty-stricken regions and about two thirds of these people are from the sub-Saharan region (9). In

South Africa, there was a hanger decline since 1999, a survey conducted in 2013 shows that about 46 % of South African population experienced food security, 28 % were at a risk of hunger and about 26 % experienced food insecurity (10). Furthermore, in South Africa approximately 1.8 million people experience food insecurity (11).

Food insecurity is one of the driving factors that leads to HIV among women (7, 12). Evidence shows that women who are food-insecure tend to engage in risky sexual behaviours (transactional sex) in exchange for food (13). Women who experience food insecurity often have multiple partners and often struggle and fail to negotiate condom use (14, 15). This can aggravate the effects of HIV and hasten HIV/AIDS-related illnesses among people who are living with HIV (16).

In addition, literature also suggests that HIV-infected individuals are more likely to default their medication due to lack of food, this worsen their health thereby leading to advanced HIV/AIDS disease (17-19). Studies conducted among people who are HIV-infected showed that women who experienced food insecurity were likely not to adhere to HIV treatment compared to those who had food security (19, 20).

Food insecurity is strongly associated with malnutrition (21). Evidence shows that in poor communities with high levels of food insecurity people tend to opt for foods that are readily available and less expensive (22). Such foods are often high in fat and carbohydrate but lower in nutrient density. In addition, literature shows that women in households that are food-insecure have the highest body mass index (BMI; calculated as kg/m^2) and there is a high prevalence of obesity and overweight (23)

Younger age, low educational attainment, employment, low socio-economic status and household size are commonly associated with food insecurity (24-26). Furthermore, literature shows that women who are experiencing food insecurity are more likely to have low educational attainment, unemployed, not married or cohabiting and are living with more than two or more children (24).

In Cape Town South Africa, approximately a quarter of households are headed by women in (27). Households with children that are headed by women are more likely to experience food insecurity when compared to households that are male- headed (27).This evidence does not only exist in South Africa but also in other parts of the world. For instance, a study that was conducted in Tanzania revealed that female-headed households were worse off than male-headed households, in terms of socio-economic status (SES). Female-headed households had lower SES than male-headed households (28).

The South African government has implemented different strategies to address poverty. Some of these strategies include but are not limited social grants. Social or state grant is a non-conditional cash transfers paid by government to South African citizens who need assistance, people who are vulnerable such as children, persons with disabilities and older people. For instance, child social grant (CSG) is directly received mostly by mothers who live with the intended child beneficiaries. Evidence shows that cash transfers improve food availability and reduce hanger in most South African households (29).

The existing literature shows that women in rural settings are more likely to experience food insecurity and it appears that there is limited literature on food insecurity among women in urban setting (30). In addition, there is a rapid growth of urbanisation in South Africa and

limited evidence on the nutritional status of HIV-infected women (27, 31, 32). It is under this light that this literature review focuses on risk factors that contribute to food insecurity of women living with HIV (WLH) in informal urban setting. Furthermore, the growth of anti-retroviral treatment programme in South Africa coupled with the importance of reducing malnutrition necessitate us to explore and understand nutritional status of HIV-infected women.

2. Aim and Objectives of Literature Review

The aim of the literature review was to identify literature on prevalence and of food insecurity in South Africa, and sub-Saharan Africa more generally, with a focus on women who are HIV-infected. Secondly, it highlights the predictors of food insecurity in people who are living with HIV, particularly women. This literature review section identifies and reports on current issues related to nutritional status of women with a special attention on studies of HIV-infected women. Furthermore, it synthesizes findings and identifies knowledge gaps where further research would be helpful. This is to better inform the primary purpose of this dissertation: To describe the prevalence and predictors of food insecurity among HIV-infected women in Gugulethu Cape Town, South Africa.

3. Literature Search Strategy

The search for literature relating to the study was conducted through Pubmed for peer-reviewed scientific articles and systematic reviews. In addition, Google scholar was also used to help identify relevant reports and policy documents. The search was restricted to documents written in English language. Search terms used alone and in combination were “food insecurity”, “nutrition”, “food security,” “women”, “South Africa”, “factors of food insecurity”, “undernutrition”, “malnutrition”, “HIV” “AIDS”. The search was not limited to studies

conducted in South Africa alone as literature from other countries was also considered. Relevant Articles from the reference list were also incorporated. Additionally, further research was conducted on the websites of international organisations such as, the World Health Organisation (WHO), United Nations (UNICEF and UNAIDS) considering that they produce relevant international reports on food insecurity. Some South Africa based reports and publications were retrieved from the Statistics South Africa (Stats SA) website.

4. Inclusion and Exclusion criteria

The researcher reviewed sources that were published between January 2008 and December 2018. In addition, the search was restricted to English language publications and reports on food insecurity households of HIV-infected women. Furthermore, publications that reported factors that contribute to food insecurity and the nutritional status of HIV-infected women were also included. All study designs were included in this review and priority was given to studies conducted in South Africa, then Sub-Saharan African countries and followed by other countries with similar health profiles. The most relevant studies were those relating to HIV-infected women and people living with HIV.

5. Definition of food security and food insecurity

There is a variety of scholarly definitions of the term food security, however the concept of food insecurity seemed relatively consistent in the literature. The concept of food security can be defined as the situation that is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (4). According to the South African Department of Agriculture, Forestry and Fisheries (DAFF), "food security is defined as access to and control over the physical, social and economic means to ensure sufficient, safe and nutritious food at

all times for all South Africans in order to meet the dietary requirements for a healthy life"(33). On the other hand, Food Agriculture Organisation (FAO), define food insecurity as the situation where people lack access to adequate amounts of safe and nutritious food for normal growth and an active and healthy life (4).

The aforementioned definition of food insecurity highlights the fact that food insecurity includes having limited access to adequate amounts of food and being uncertain about the availability of food (34). In addition, the definition also stresses that food insecurity is associated with access to food that is nutritionally inadequate (34). Therefore, this definition highlights that it is possible to have access to endless amounts of food and still be food-insecure.

The definition of food security and food insecurity encompasses important dimensions such as: availability, access, utilisation and stability (35). Thus, it is of great importance when defining food insecurity, to explain these dimensions as they apply to situations of food insecurity. Linked factors that may lead to a situation of food insecurity include unavailability of food, lack of access, improper utilization and instability over a certain time.

Food Access

Food access is one of the key elements in food insecurity. The term food access refers to when individuals have enough resources to purchase food that will enable them to live their healthy lives (4). Lack of food access is linked to poverty, households that experience poverty do not have resources to purchase nutritious food (36). A survey conducted in Cape Town showed that poor households' access to food was through purchases from informal outlets and through social networks (31). In addition, the same study found that there was about 5% of households

that grow their own food while close 94% of households purchased food from supermarkets and about 60% purchased their food in the streets (31). Further, a substantiate number of households rely on borrowing food from neighbours and other households (37).

Food Availability

The availability of food is achieved when people have enough amounts of food and when food is constantly available to individuals and the country (38). Thus, food availability can be categorised into two broad areas, which include self-production and market purchases, surplus of household production and imports or food assistance (39). In South Africa, food is available as production levels can satisfy demand but many of South Africans struggle to purchase food (40). The most important factors of food availability is access and income (10). Many households in informal settlements struggle to sustain a decent income (18). As a result, women residing in these households find it very difficult to purchase enough food to feed the entire household (29).

Food Utilization and Food Stability

Food utilisation is referred to as the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, clean water and adequate sanitation (38). Food stability is achieved when every individual have access to enough food and unpredictable negative economic changes should not be a risk factor to food access (29). A popular indicator of human health utilised in the study is the measurement of anthropometric parameters, used to assess Body Mass Index (BMI) (41).

6. Prevalence of food insecurity

The prevalence of food insecurity is often measured by the level of food access, food consumption scores, poverty line and food expenditure (9). However, it is important to note that in South Africa there is no agreed food insecurity measurement (42, 43). In addition, In South Africa there are limited representative samples that have included food security indicators. Thus, there is no consistent indicator sets between the surveys that are conducted (43). It is under this light that this section will explore the prevalence of hunger, poverty and nutrient deficiency in Sub-Saharan Africa region.

A 2018 global report on the state of food insecurity and nutrition indicated that a percentage of people who do not have enough dietary energy consumption is rapidly growing (5). According to the report, the number of undernourished people around the globe increased from 804 million in 2016 to almost 821 million in 2017 (8). South Africa is considered to have food security at the national level, which means that the country can produce and export food. However, research has shown that about 70 % of households in informal settlements skip meals or eat the same meal on most days (29, 37). Furthermore, income earners from these households often struggle to provide meals or worry about having no food or not having enough money to buy food (42).

Evidence on the prevalence of food insecurity in South Africa appears to be consistent. A report from Statistics South Africa (Stats SA) showed that the proportion of households with inadequate or severely inadequate access to food decreased from 24 % in 2010 to 21 % in 2017. In addition, during this period, the percentage of individuals that were at risk of going hungry decreased from 29 % to 25%. The percentage of household that experience hunger also

decrease from 24 % to 10 % while the percentage of individuals who experienced hunger decreased from 29 % to 12 % (44).

Furthermore, food access problems were reported to be most common in the City of Cape Town (30%), Nelson Mandela Bay (23 %) and Mangaung (23 %) (44). These findings concur with the findings of The South African National Health and Nutrition Examination Survey (SANHANES), this survey showed that about 54 % of the South Africans were food-insecure. In addition, 32 % of people who experienced hunger were in the urban informal settlements. Approximately 37 % of people in urban informal areas were at the risk of experiencing hunger (10).

Literature shows that HIV-infected people often experience hunger when compared to HIV-uninfected people. Studies that were conducted in South Africa showed that a high percentage of people who reported to run out of money to buy food and rely on limited food items were HIV-infected (25, 45). Studies conducted in Ghana and Canada showed similar findings (46, 47).

7. Overnutrition and HIV

There is a growing burden of overweight and obesity among people living with HIV (48). Obesity and overweight are defined as abnormal or excessive fat accumulation that may impair health (49). According to World Health Organisation (WHO), body mass index (BMI) is a simple index of weight for height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m). Individuals with a BMI above 25 kg/m^2 are classified as being overweight, and those with a BMI above 30 kg/m^2 as obese (49).

South Africa is faced with a burden of both non-communicable and infectious diseases (50). The prevalence of obesity and overweight is rapidly growing in developing countries including South Africa. This trend is spreading to low and middle-income countries (LMIC) (50). WHO states that the number of people with obesity has doubled from 1980 and 2014 (49). Approximately 1.9 billion adults over the age of 18 are overweight. The prevalence of obesity and overweight in the world is higher in females (15 %) compared to males (11 %) (49). This trend is similar to South Africa's obesity levels which are amongst the highest in the world at 42 % for women (11).

Further, a cross sectional studies conducted in Kwazulu Natal province showed that females who were HIV-infected had a high prevalence of obesity (51, 52)**.** These findings concur with the findings of the study that was conducted in Dominican Republic (DR). This study showed that women who received anti-retroviral treatment (ART) had high levels of body fat when compared to males who were also on ART (53).

Although many LMIC still experience high levels of undernutrition, there is an increase number of people who are overweight and obese (9). In addition, being obese or overweight is strongly associated with non-communicable diseases such as diabetes, cardiovascular diseases (9, 41). One study conducted in New York City showed that obesity and overweight are risk factors among individuals who are HIV-infected (41). Food insecurity may lead to micronutrient deficiencies and may help contribute to more rapid progression of HIV disease (54-56).

There is a growing evidence that shows that food insecurity is associated with obesity and overweight (50). Literature suggest that resources to purchase food are becoming scarce and therefore people resort to food that cost less and not healthy (9). Households that experience food insecurity are often headed by females and there is often no money to purchase food (37). Furthermore ,women often lack access to resources such as land and employment (56). Thus, women use coping strategies which include consuming relatively cheap high calorie food (48). There was 10 to 20 % decrease in the consumption of vegetables, protein foods and fruit in 2009 (55).

Furthermore, a study conducted in South Africa showed that female headed households were food-insecure with family members who were overweight and obese (11). These findings are similar to the study that was conducted in US (41), and with high rate of urbanisation and low employment rate in South Africa, most people resort to cheap high energy dense, processed and low fibre food (31, 32, 50, 52).

8. Determinants of food insecurity

Employment and income

Evidence from studies conducted in South Africa, Sub -Saharan region and around the world shows that employment is one of the risk factors of food insecurity (25, 45). In South Africa the employment rate is stubbornly low, and the market still favours men over women (57). Even though there are improvements in females' labour sector participation, but there is still a high proportion of unemployed women (44). Literature shows that food security is often experienced in households where the head is employed or has a source of income. In contrast, households that did not have any income experience food insecurity (32). Results from a study

that was conducted in Iran, suggested that employment or income was strongly associated with food security (58).

Lack of employment and/or income can have severe consequences on food security, as most poor households spend more than half of their income on purchasing food (27). Research has shown that in Cape Town and Johannesburg, approximately 32 % of households that had individuals with full-time employment and received social grants were food-secure compared to the households that had unemployed individuals (32). Similarly, in Nigeria, higher household income had higher chance of becoming food-secure (38).

Educational attainment

Education is one of the important tools in empowering women. Evidence shows that education is strongly linked with employment and better income (25, 31). In the survey that was conducted in Cape Town, revealed that 64 % of households who had family members who completed high school or received tertiary training did not experience food insecurity (24). On the other hand, household with no family member who completed high school experienced food insecurity (27). In addition, a cross sectional study in Ethiopia showed that households with educated spouse experienced food security (59).

Furthermore, literature suggests that women who have better educational attainment have better way of handling food insecurity in terms of food production and purchasing of food (60). There is a growing evidence that HIV-infected women with low educational attainment tend to experience food insecurity, as a result they often default their ART (15).

Household size

Household size is defined by the number of persons that dwell together and some of the individuals may not be physical present in the household but benefit from the financial support of the household (44). Evidence shows that when the household size increases food security decreases (61, 62). Thus, households with high number of members are more likely to consume more food compared to the household with few members. Furthermore, it was observed that when there is an increase in one member of a household, the household is more likely to reduce an income expenditure per head. Therefore, an additional member of the household puts pressure on food consumption and household food requirement than it does on food production (38).

Women's age

There is no clear evidence on whether the age of women is the risk factor for food insecurity. Thus, there is a mixed evidence on the association of food security and maternal age. On one hand, literature shows that young women are more likely to experience food insecurity than women who are older (25). It was also reported that, HIV-infected women from rural areas and urban areas in South Africa were mostly young, with the mean age of 30 years. However, generally, both groups experienced food insecurity (25). These findings are different from a study conducted in Iran, which revealed that most food-secure households were headed by older women aged between 45 and 54 years (58). Similarly, a study conducted in Nigeria showed that as age increased food security also increased (62).

9. Impact of food insecurity on children and breastfeeding

Food insecurity have severe impact on children particularly those who are born by HIV-infected mothers. According to Stats SA, it is estimated that more than 13 million children are living under poverty in South Africa (67). In addition, it was reported that about 1760 946 households had a child who had gone hungry in 2016. Malnutrition is the underlying cause of death of about 2.6 million children each year globally. Children who experience food insecurity are likely to suffer from stunting due to chronic malnutrition and some of the risk factors linked to child malnutrition include poor cognitive development and premature death (70,71). It is important to note that in South Africa there is limited evidence on prevalence of food insecurity in households with children of women living with HIV.

About a third of pregnant women visiting antenatal clinic are HIV-infected (68). Furthermore, food insecurity level is high mainly in households of people living with HIV and women (69). According to WHO breast feeding provides infants with essential nutrients they need for optimal growth, development and health. Evidence suggest that food insecurity can compromise breast feeding chiefly among HIV-infected women (69). A study conducted in Uganda showed that food insecurity may shorten exclusive breast feeding (70). In addition, literature suggest that food insecurity can compel women to work outside of their home, thus compromising them from breast feeding (70,72). A study conducted in Kenya showed that women made a choice of breastfeeding however, food insecurity was linked with lower intake of breast milk that is food insecurity may undermine breast milk output (69). Thus, food insecurity can adversely affect breastfeeding among women who experience food insecurity.

10. Food security Strategy

South Africa's food security policies are informed by international and regional policies and programmes and are guided by contextual factors (63). The Government of South Africa has set out number of policies to address food insecurity. One of the key policies is Integrated Food Security Strategy (IFSS). Before 1994 there were no policies that emphasized developing a comprehensive food security strategy (64, 65). Thus, the South African Cabinet had to formulate a national strategy to improve food security status of South Africans (30).

The 2002 IFSS was guided by the vision "to attain universal physical, social and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preferences for an active and healthy life." Its objectives included, ensuring that enough food is available to all, now, and in the future, to match incomes of people to prices in order to ensure access to enough food for every citizen and to empower citizens to make optimal choices for nutritious and safe food.

Although the IFFS has made number of improvements and is recognised as one of the innovative strategy and comprehensive approach to address food insecurity however, it failed to achieve number of its goals (63, 65). The IFFS acknowledged that food insecurity often affects women and children. However, the policy failed to consider the complex way in which gender and class interact to impact women and children's access to safe and nutritional food (63).

Another government initiative that seeks to address food insecurity is social grants which come in the form of: old age pension funds, disability grants, foster care grants, care dependency grants and child support grants. All of these have been shown to increase women's purchasing

power as well as their access to food (44). From 1999 to 2003, approximately 2.6 million South Africans received social grants and by 2017 this figure had increased to 17 million. Despite this remarkable achievement, not all South Africans who qualify for these grants manage to access them or adequately utilize them to prevent food insecurity (29).

11. Gaps that exist in literature

There is a substantial literature on the determinants and prevalence of food insecurity in Sub-Saharan Africa, particularly in South Africa. The studies report that there is a high proportion of food insecurity, mostly among people informal urban areas and rural areas (10, 25). Literature also shows that despite government intervention, the prevalence of food insecurity is still high in South Africa particularly, in rural areas and informal urban settlements (29, 31, 42). However, most of the studies did not specifically report food insecurity and nutritional status among HIV-infected women. Thus, it appears that there is a gap on the data on the nutritional status of HIV-infected women in South Africa.

Existing research shows that unemployment, educational attainment and poverty are some of the key determinants of food insecurity (24, 32). However, most of the studies that report determinants and prevalence of food insecurity are cross sectional (10). Thus, the evidence about the direction and causality of food insecurity and socio-demographics associations is unclear. There is limited evidence about the effects of food insecurity particularly in poor areas. This include food insecurity effects on weight and nutritional outcomes as well as its effect on progression of HIV/AIDS. Therefore, more research is needed to guide well-organized interventions that seeks to address food insecurity among HIV-infected women (3).

12. Conclusion

The literature reviewed revealed that food insecurity is prevalent in many parts of the world, especially in sub-Saharan Africa (66). Of note, women who experience food insecurity are more likely to be obese or overweight (47, 50, 52). This is worrying given the existing evidence that being obese, and overweight is strongly associated with non-communicable disease such as diabetes and heart diseases.

There are number of risk factors that contribute to food insecurity in the household of women who are living with HIV. Even though literature shows that risk factors of encountering food insecurity are influence by both political and environmental factors. Evidence shows that women who are employed and or had the land experienced less food insecurity. Also, women who had high educational attainment had food security compared to women who had low levels of education.

There seems to be a gap around the knowledge of risk factors that influence household and individual' food insecurity among HIV-infected women. It is in this light that this dissertation seeks to address this gap by investigating the determinants of food insecurity among HIV-infected women in an urban area. The analysis also looks at the nutritional status of HIV-infected women. Furthermore, the literature on HIV-infected population was explored to examine the association of food insecurity with socio-demographic factors. This study will inform further research on the nutritional status of urban-based HIV-infected women from informal settlements who are on ART. Findings will potential serve to inform innovative interventions and nutritional programmes for HIV-infected women.

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PART C: MANUSCRIPT

The prevalence and predictors of food insecurity among HIV-infected women in Cape Town, South Africa: A cross sectional study

Short Title: Food insecurity among women living with HIV

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Abstract

Background: Food insecurity is a major public health concern in most settings where the Human Immunodeficiency Virus (HIV) is prevalent, and it affects women disproportionately. However, the prevalence of food insecurity and associated risk factors for women who are living with HIV (WLH) in South Africa is under researched.

Methods: We conducted a secondary, cross-sectional analysis of 346 HIV-infected women aged between 18 and 45, in Gugulethu, Cape Town. All participants were 12 months postpartum and enrolled into the MCH-ART study, a large implementation science study of antiretroviral use in pregnancy. For this study, women completed a 10-item household food security questionnaire that categorised food security status into household-level food insecurity, individual level food insecurity and children hunger. Using this tool, the level of food insecurity was categorised as food insecurity ("yes" to up to four questions), experiencing food insecurity ("yes" to five questions or more) and free from food insecurity ("no" to all questions).

Results: Overall, the mean age was 29 years (SD: 5.46); 25 % of the women completed high school; 61 % were unemployed; nearly 66 % were free from food insecurity; and 25% experienced food insecurity. Women who were employed were less likely to experience food insecurity when compared to those who were not employed (OR=0.54; 95 % CI: 0.32-0.90; p= 0.01). Those who completed high school were associated with food security than the ones who did not complete high school (OR= 0.5; 95 % CI: 0.28-0.97; p= 0.04). After adjusting for maternal age, marital and cohabiting status, education attainment, and parity, employment remained a significant predictor of experiencing food security (AOR= 0.55; 95 % CI: 0.32-0.95 p=0.03) and educational attainment was no longer associated with food insecurity.

Conclusions: The prevalence of food insecurity was relatively low in the urban-based sample of HIV-infected women. There is a clear need for more research to explore issues of food security and nutrition in HIV-infected South African women.

Keywords: Food insecurity, HIV, food security, malnutrition, women

1. Introduction

Food insecurity refers to the limited or uncertain availability of nutritionally adequate and safe food (1). Across sub-Saharan Africa, food insecurity affects millions of individuals and is particularly prevalent among people who are HIV-infected (2). Some of detrimental health effects of food insecurity include, malnutrition and increased risk of infectious and/or chronic disease in adults (3, 4). More than 800 million people worldwide are chronically undernourished (5). It is estimated that 60 % of undernourished people worldwide are women (6). Although South Africa is food-secure at national level, many households remain food-insecure (7). Nearly 26 % of households in South Africa are likely to have insufficient food access (8). In Cape Town, between 58 % and 80 % of households have moderate to severe food insecurity, particularly in areas of low-socioeconomic status (9, 10).

The HIV and AIDS epidemic has detrimental effects on food security and the nutritional status of affected individuals. Globally it is estimated that about 18.6 million women and girls were living with HIV in 2017 (11). Nearly 133 million people are living with HIV in Sub-Saharan region (12). In South Africa, approximately 20 % of women in their reproductive ages (15-49 years) are HIV positive (12). Households with HIV-infected adults often have high rates of hunger and are food-insecure (13, 14).

Among people living with HIV, food insecurity is a significant concern due to its harmful effects on health outcomes (14). Existing evidence indicates that some of the outcomes of food insecurity in developing countries include being obese or overweight particularly among women (15). The rates of being obese or overweight are high in South Africa; they range from 28% to 32 % and from 20 % to 37 % in HIV-infected women, respectively (15, 16). Similar findings were found among HIV-infected Nigerian adults, 38 % were overweight and 22 %

were obese (17). The prevalence of women who are obese and experience food insecurity is higher in areas with low socioeconomic status (18).

There are several predictors that are associated with food insecurity that are documented. These include: employment, educational attainment and age (19, 20). In a study that was conducted in the Caribbean, findings suggested that women living with HIV experienced hunger and food insecurity due to HIV-related labour discrimination in both formal and informal employment sectors (14). They concluded that unemployment and lack of support from friends, family members and spouse are some of the factors that drive food insecurity among HIV-infected women (14). Similarly, in studies conducted in Cape Town, South Africa, mothers who were living with HIV had less income, stayed in informal houses and were likely to be food-insecure than men headed household (21, 22).

In addition, food insecure households have been associated with younger age and low educational attainment. Findings from a cross-sectional study conducted in Zimbabwe showed that women living with HIV were less likely to be educated (23). Compared to older women aged 25 and above, young women within the ages of 18 and 24 years were more likely to be in households that had food insecurity (22). A systematic review showed that , younger women engage in transactional sex activities so that they can afford to buy food (24).

The South African government implemented policies such as Integrated Food Security Strategy (IFSS) with an aim of achieving food security for all citizens. Poor implementation of such policies can result in inadequate access to nutritious food (41). Furthermore, as indicated earlier, state social grants are also part of the South African government' initiatives to address

food insecurity in the country (7). Evidence shows that there is food security in households that receive social grants (41)

This study sought to examine the prevalence and predictors of food insecurity among HIV-infected women. Our objectives were to: (a) describe levels of food insecurity among HIV-infected women (b): describe patterns of food insecurity and nutritional status of women living with HIV (c): examine the association between food insecurity with women's demographic characteristics.

2. Method

2.1 Study setting and design

The researcher conducted cross-sectional analysis of secondary data from a large implementation science MCH-ART study that aimed to investigate strategies to optimise ART services of postpartum (26). The parent study was conducted at the Midwife and Obstetrics Unit (MOU) in Gugulethu, Cape Town South Africa. Pregnant women presenting for antenatal care who were living with HIV and eligible for ART between April 2013 and June 2014 were recruited. 346 HIV-infected women were recruited in their first postpartum clinic visit at the MOU. All women who participated were followed up through 12-18 months postpartum. HIV treatment services have been delivered in this centre since 2003 (26).

2.2 Study population

HIV-infected women aged 18 years and above who were breastfeeding were recruited on their first postpartum clinic visit. Participants were approached when they were presenting at the end of their first routine postpartum clinic visit. Participants were enrolled on the same day that they presented on the clinic for this visit.

2.3 Data collection and analysis

This is a secondary analysis of data that was collected using a questionnaire in MCH-ART study. Questionnaires were translated into the local language (isiXhosa) by trained field workers who were isiXhosa speakers and all translations were reviewed. Questionnaires were administered verbally by a trained study interviewer. Interviewers were trained on general research issues, ethical conduct and administration of questionnaires. Household food security was assessed using a validated 10-item questionnaire (7, 27). Food security tool was administered during a 12 month visit and children grants questionnaire was administered in 6 weeks visit.

Additional information was collected on maternal anthropometric measurements and socio-demographic characteristics. Educational attainment was determined by the Grade level completed and was further categorised into two categories: completed less than high school and completed high school and any tertiary education. Socioeconomic status (SES) was determined by using variables such as employment status, level of education, housing type and number of amenities in the household using house type, and list of household assets ownership (such as TV, stove, refrigerator) (See appendix 1.4)

2.4 Outcome assessment

The primary outcome was a food insecurity status obtained from the household food security questionnaire scores. Each item in the questionnaire was scored 0 for “no”, 1 for “yes but rarely”, 2 for “yes sometimes”, 3 “for yes often” and 9 for unspecified response. Scores were summed for all the 10 items from the tool. The total household food security scores were then categorised according to affirmative responses into three household food security status: free

from food insecurity (answered “no” to all 10 questions), risk of food insecurity (answered “yes” to up to 4 questions), experiencing food insecurity (answered “yes” up to 5 questions or more) (7).

For analysis, the outcome variable was dichotomized into experiencing food insecurity and free from food insecurity. This was obtained by combining the scores of those who were at risk of food insecurity and those who were free from food insecurity. Thus, free from food insecurity (answered “yes” to 0-4 questions) and experiencing food security (answered “yes” to 5-10 questions) (7, 27)

2.5 Data analysis

Statistical analysis was performed in STATA, version 15.0 (Stata Corporation, College Station, Texas, USA). Frequency distributions and proportions were reported to describe the baseline characteristics. Pearson chi-squared tests were used to test the association between categorical variables and the outcome. A logistic regression model was fitted to investigate the association predictors of food insecurity. Models were built by using forward selection using the Akaike Information Criterion (AIC). Variables with p-value less than 0.2 from the logistic univariate were included in the bivariate analyses.

2.6 Ethical consideration

Ethics approval for the MCH-ART study was obtained from UCT-HREC and CUM-IRB. Informed consent forms were administered to all women prior to participation to the study. Participant’ confidentiality and privacy were maintained at all times. Approval for secondary analysis was obtained from UCT-HREC.

3. Results

3.1 Descriptive characteristics

A total of 346 of HIV-infected women were included in this analysis (Table 1). The average age of the women was 29 years (SD:5.46), 65 % of them were between the ages of 25 and 34. More than half (58 %) were either not married and or not staying with their partners. Although 93 % had attended high school (Grade 8 or above), only 25 % of them completed high school or had any tertiary qualification. A majority (61 %) of the women reported being unemployed.

We found an association between age and food insecurity (p=0.04), women who are younger are more likely to experience food insecurity than women who are older. 57 % of women were not married or cohabiting were free from food security. Women who are employed were likely to have food than those who were unemployed (p=0.02). There was no difference in educational attainment between women who were free from food insecurity and those at risk and experiencing food insecurity. Most women from all three groups were exclusively breastfeeding at 6 months, but the proportion of those exclusively breastfeeding dropped across all groups at 12 months from 61 % to 42 % in the group of women who are free from food insecurity, 73 % to 53 % under the group of women who are at risk of food insecurity and from 57 % to 46 % under the group of women who are experiencing food insecurity. These declines did not differ significantly across groups.

Table 1: *Demographic characteristics of women stratified by their food insecurity status.*

Variable	n (%) or Mean (SD)	Free from Food Insecurity n=213	At Risk of Experiencing food insecurity n =15	Experiencing Food Insecurity n=97	Unspecified n=21	p-value
		n (%)	n (%)	n (%)	n (%)	
Mean age	29 (6)	28.96	28.87	29.34		0.93
Age Category						
18-24	73 (21)	46 (22)	4 (27)	21 (22)	2 (9)	
25-34	225 (65)	141 (66)	10 (67)	55 (57)	19 (91)	
35-45	48 (14)	26 (12)	1 (7)	21 (22)	0 (0)	0.04
Married /Cohabiting						
No	201 (58)	122 (57)	9 (60)	57 (60)	13 (61)	
Yes	145 (42)	91 (43)	6 (40)	40 (41)	8 (38)	0.97
CSG Recipient						
No	11 (3)	6 (3)	0 (0)	5 (5)	0 (0)	
Yes	27 (78)	166 (78)	13 (87)	73 (75)	19 (90)	0.63
Unspecified	64 (18)	41 (19)	2 (13)	19 (20)	2 (10)	
Employment Status						
Unemployed	212 (61)	117 (55)	11(73)	68 (70)	16 (76)	
Employed	134 (39)	96 (45)	4 (27)	29 (30)	5 (24)	0.02
Education Attainment						
Completed less than high school	263 (76)	155 (73)	11 (73)	81 (84)	16 (76)	
Completed high school/Tertiary	83 (24)	58 (27)	4 (27)	16 (17)	5 (24)	0.23
Socio Economic Status (SES)						
Lowest	89 (26)	47 (23)	4 (27)	30 (31)	8 (38)	
Moderate	127 (37)	81 (38)	6 (40)	37 (38)	3 (14)	
Highest	130 (38)	85 (40)	5 (33)	30 (31)	10 (48)	0.20
Breastfeeding at 6 Month						
No	143 (41)	8 (39)	4 (27)	42 (43)	13 (62)	
Yes	203 (59)	129 (61)	11 (73)	55 (57)	8 (38)	0.14
Breastfeeding at 12 Month						
No	201 (58)	124 (58)	7 (47)	52 (54)	18 (86)	
Yes	145 (42)	89 (42)	8 (53)	45 (46)	3 (14)	0.04

CSG, Child Support Grant

3.2 Food insecurity status

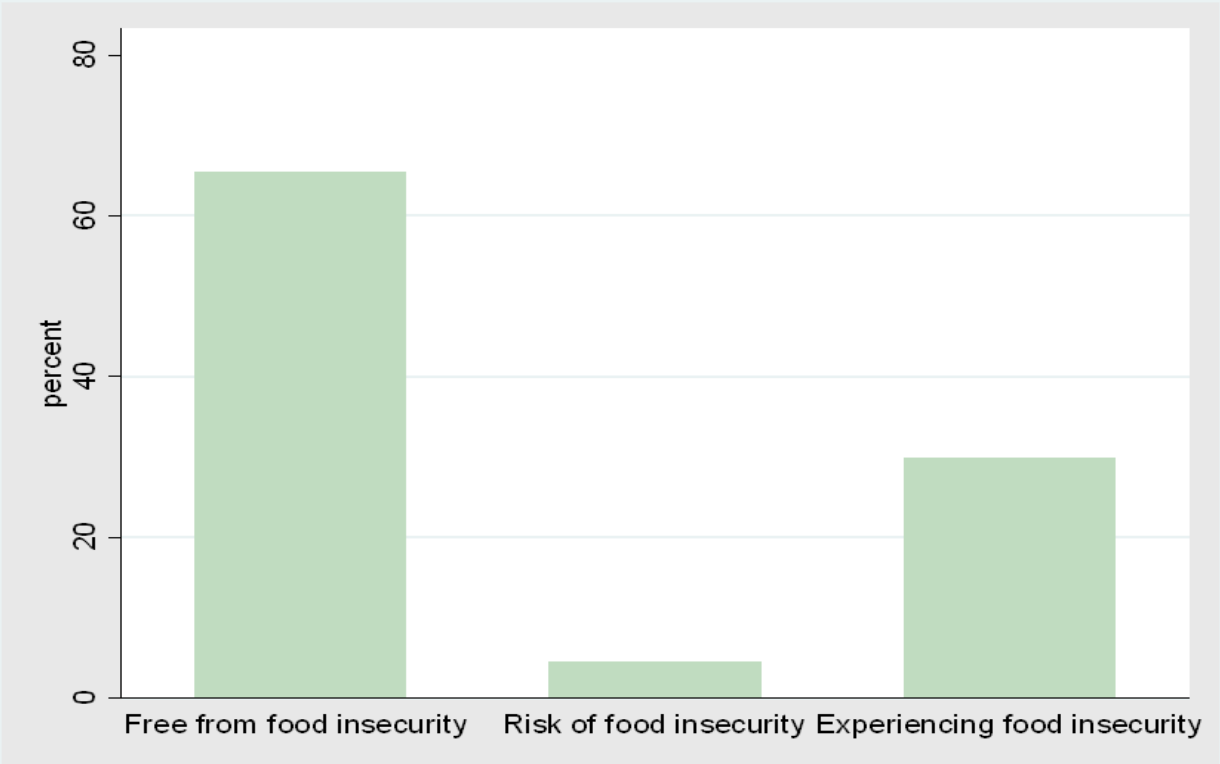
Table 2 shows a pattern of food insecurity among women based on the 10-item household food security questionnaire. We arranged the responses in three levels, namely: household level,

individual level, child hunger. At the household level, 53 % of women reported that they did not worry about food and did not run out of money to purchase food. Furthermore, 58 % of the households did not rely on a limited number of foods because they were running out of money. Similarly, two thirds of women did not report food insecurity at the individual level. 68 % of women reported that they did not cut meal sizes or skip meals due to money shortage. Child hunger was also reported low, 78 % reported that children did not cut or skip meals because there was no money to buy food. Almost all the women reported that children did not go to bed hungry because there was not enough money to buy food. Two-thirds of women were free from food insecurity, a quarter experienced food insecurity and 4 % were at risk of food insecurity, Figure 1.

Table 2*: Number and percentage of people's responses from a household food security 10 item questionnaire*

Question	NO n (%)	Yes, but rarely n (%)	Yes, sometimes n (%)	Yes, often n (%)	Unspecified n (%)
Household level food insecurity					
1. Household worry about food	179 (53)	56 (17)	97 (29)	5 (2)	9 (3)
2. Household runs out of money for food	182 (53)	60 (17)	102 (30)	0 (0)	2 (0.3)
3. A limited number of food because running out of money for food	199 (58)	46 (14)	95 (28)	1(0.3)	5(2)
Individual level food insecurity					
4. Cut meal sizes/skip meals because money is not enough	233 (69)	33 (10)	70 (21)	3 (1)	7 (2)
5. Eat less than you should because money is not enough	237 (69)	32 (9)	73 (21)	2 (1)	2 (0.3)
6. You/other adults go to bed hungry because money is not enough	312 (91)	12 (4)	19 (6)	0 (0)	3 (1)
Child Hunger					
7. Children hungry because food is not enough	254 (74)	28 (8)	56 (16)	4 (1)	4 (1)
8. Children skip meals/cut meal sizes because money not enough	270 (78)	26 (8)	45 (13)	2 (1)	3 (1)
9. Children eat less than they should because money not enough	268 (78)	25 (7)	50 (15)	2 (1)	1 (0.3)
10. Children go to bed hungry because money not enough	326 (95)	3 (1)	13 (4)	0 (0)	4 (1)

Figure 1: Prevalence of food insecurity among HIV-infected women



3.3 Nutritional status of mothers

The majority (75 %) of women who were free from food insecurity were obese and one third of those who experienced food insecurity had normal weight. There was a very low number of women from both food insecurity categories who were underweight. It was established that there is no strong association between BMI status and food insecurity (p=0.05) (Table 3).

Table 3: *Frequency for food insecurity by BMI status*

Food insecurity status	Underweight N (%)	Normal weight N (%)	Overweight N (%)	Obese N (%)	Unspecified N (%)	p-value
Food security	2(67)	61 (63)	50 (63)	81 (75)	34 (59)	0.05
Food insecurity	0(0)	31(32)	24(30)	25(23)	17(29)	
Unspecified	1 (33)	5(5)	6(8)	2(2)	7(12)	

3.4 Association between food insecurity and mother's demographic characteristics

In the univariate analysis, factors which did not impact on food insecurity included maternal age, socio economic status of mothers, marital/cohabiting status, parity, exclusive breastfeeding at 6 and 12 month and poverty status. Employment status and educational attainment predicted food insecurity. Women who were employed were less likely to be food-insecure compared to those who were not employed (OR= 0.5; 95 % CI: 0.32-0.90; p= 0.01). Women who had completed high school were less likely to have food insecurity than women who did not complete high school (OR= 0.5; 95 % CI: 0.28-0.97; p= 0.04) (Table 4).

After adjusting for maternal age, marital and cohabiting status, educational attainment, and parity, employment remained a predictor of being more food secured (AOR= 0.46; 95 % CI: 0.25-0.85 p=0.03). After adjustment there was no longer an association between food insecurity and educational attainment (AOR= 0.56; 95 % CI: 0.29-1.07)

Table 4: *Multivariate logistic regression predicting food security status.*

	Univariate			Multivariate		
Variable	**OR**	**95 % CI**	**p-value**	**AOR**	**95 % CI**	**p-value**
Maternal age						
18-24	**Ref**					
25-34	0.86	0.47 -1.57	0.63	0.95	0.48 -1.89	0.90
35-45	1.85	0.86 -3.97	0.11	1.84	0.74-4.58	0.18
Married/cohabiting	0.94	0.58 -1.53	0.82	0.80	0.47-1.35	0.41
Educational Attainment	0.53	0.28 -0.97	0.04	0.56	0.29 -1.07	0.08
Employment	0.54	0.32 -0.90	0.01	0.55	0.32 -0.95	0.03
Parity						
0	**Ref**					
1-2	0.89	0.45- 1.72	0.72	0.80	0.37-1.73	0.57
3-5	2.00	0.86-4.66	0.10	1.46	0.54-3.96	0.46
Breast Feeding at 6 Month	0.82	0.50 -1.33	0.42	0.74	0.44-1.23	0.24
Breast Feeding at 12 Month	1.16	0.72-1.88	0.52	-	-	-
BMI status						
Under weight	**Ref**					
Normal weight	1.64	0.88-3.06	0.11	-	-	-
Overweight	1.55	0.80-3.01	0.19	-	-	-
Obese	1	-	-	-	-	-
Poverty status						
Most disadvantaged	**Ref**					
Moderate disadvantaged	0.96	0.54-1.71	0.90	-	-	-
Least disadvantaged	0.82	0.44-1.49	0.51	-	-	-
Mother stays with a baby	0.71	0.12-3.96	0.69	-	-	-
Socio Economic Status (SES)						
Lowest	**Ref**					
Moderate	0.72	0.39-1.30	0.28	-	-	-
Highest	0.56	0.321.04	0.60	-	-	-

OR, odds ratio; AOR, Adjusted odds ratio; CI, Confidence Interval

4. Discussion

This is one of the few studies that has quantified the burden of food insecurity among HIV-infected women in South Africa. It examined the food security status of 346 HIV-infected breastfeeding women residing in Gugulethu, Cape Town. Overall, two-thirds of this population was free from food insecurity and about 30 % experienced food insecurity. Most participants reported that they were less worried about running out of money or cut their meals due to a shortage of money. One of the possible explanation for these findings could be that the most of them were recipients of state social grants, thus implying that child grants can improve food availability in households where there are children (7).

The results suggest that women who are HIV-infected are relatively free from food insecurity. Several studies concur with these findings, with evidence that household and individual food insecurity decreased in South Africa between 1999 to 2008. During this period, the prevalence of food insecurity declined from 52 % to 26 % (4). In addition, the Western Cape province where this study was undertaken, has the lowest percentage (16 %) of food insecurity (28). However, our findings are in contrast with findings for the food insecurity status of women in similar settings elsewhere in in Sub-Saharan Africa (13, 22, 29, 30). For example, findings from a study in Senegal showed that 85 % of people living with HIV experienced food insecurity (31). Furthermore, several studies from other parts of Africa have suggested that in informal urban areas the sharing and borrowing of food masks the extent of food insecurity (9, 32); this this could be the case in this sample.

While most women reported to be food-secure, about a one third were obese and about a quarter were overweight. Obesity is one of the risk factors for cardiovascular diseases (4). The nutritional status of women is worrying given the fact that a high number of women who are

obese are living with HIV. The high levels of obesity but low levels of food insecurity in this cohort may indicate hidden hunger, which occurs when an individual consumes food that does not meet nutrient requirements (25). Therefore, even though these women have access to food however they are more likely to experience hidden hunger. Our findings may be in keeping with number of studies that reported that most women in South Africa are obese and that hidden hunger exists in settings that appear to have enough food (4, 15-17, 33).

Employment was a predictor of food insecurity; women who were employed were less likely to experience food insecurity. These findings are comparable with the findings of a study that was conducted in Johannesburg, which revealed that there is a strong relationship between employment, income and food insecurity. This study concluded that members of a household who had full-time jobs were more likely to be food-secure than those with part-time jobs(34). In addition, it is well documented that employment and or income is a predictor of food insecurity (20, 35-37). Evidence indicates that the number of South African households are affected by unemployment that is stubbornly high, and most households rely heavily on social grants to purchase food (7).

In addition, we found that educational attainment was associated with food insecurity, women who completed high school were less likely to be food insecure, in keeping with a number of other studies (31,38). In addition, we found an association between maternal age and levels of food insecurity status, with older women (35 to 45 years) reporting lower levels of food insecurity compared to younger women (18 to 24 and 25 to 34). These findings concur with studies in South Africa and in others in the sub-Saharan region: households that are headed by older women were found to have more food than households that were headed by younger women (13, 22, 31, 39).

This study has several limitations. Firstly, this is a cross-sectional study, so we could not assess the temporal association between food insecurity and several risk factors. For example, longstanding food insecurity may undermine women's educational achievement, rather than the other way around. In turn, it is difficult to assess causality for several of the associations observed here.

Secondly, the data was self-reported in nature thus there could be a possibility of recall bias: women of lower socioeconomic status may be more likely to report food insecurity compared to women of higher socioeconomic status. Similarly, there is a possibility of social desirability bias considering that the women who participated in this study visit may have reported what they thought was 'correct' about child hunger and food availability in their households. Thirdly, most study participants come from Gugulethu township we did not include women from other parts of Cape Town or South Africa, therefore the results may not be generalisable.

5. Conclusion and Recommendations

In conclusion, this study showed that there were low levels of food insecurity among HIV-infected women who reside in Gugulethu, Cape Town. Being employed and having high levels of education appeared protective of food insecurity. However, many women were obese and overweight. There is a clear need for more research to explore issues of food security and nutrition in HIV-infected South African women.

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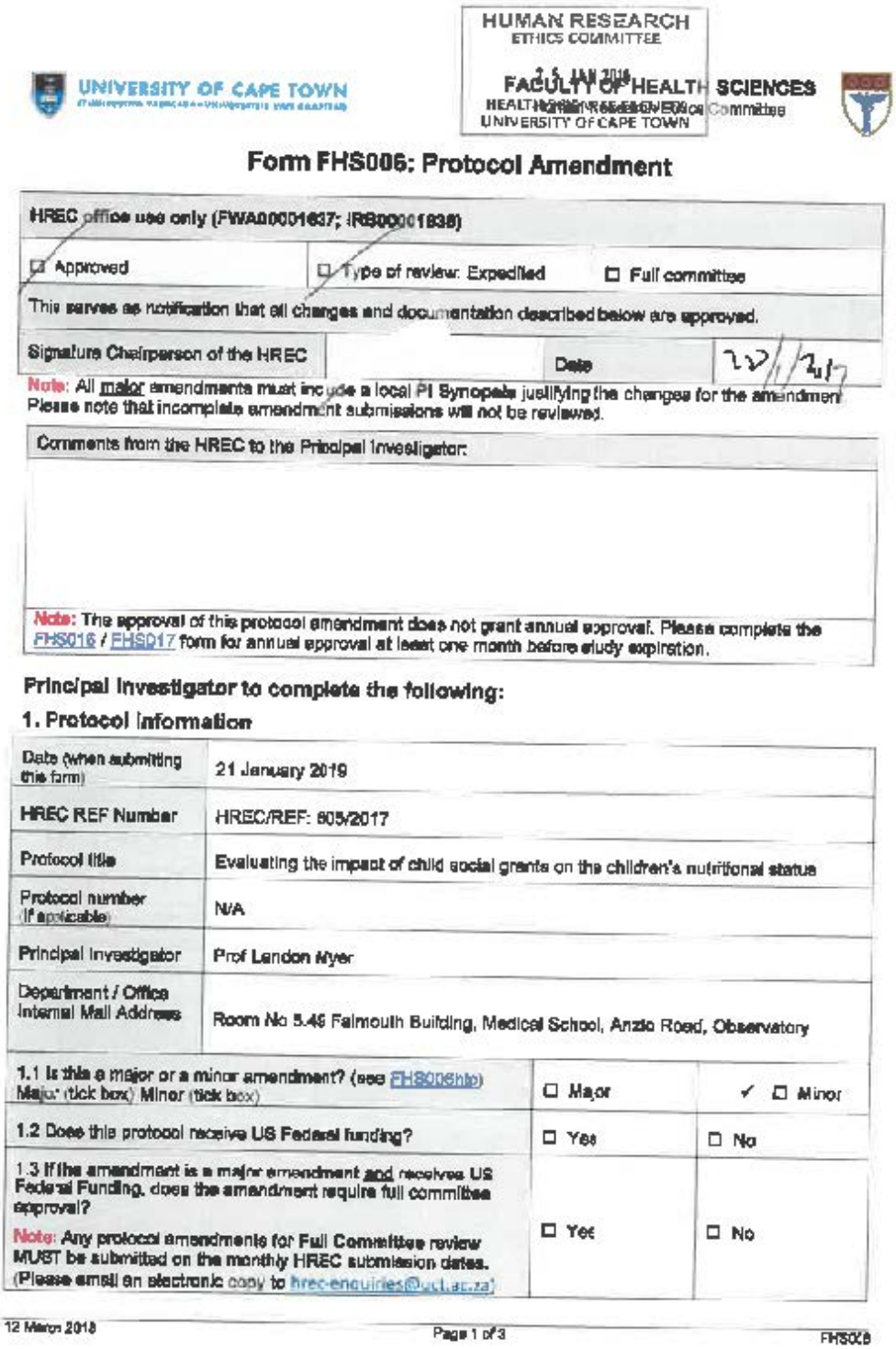
PART D: APPENDICES

1.1 Ethics Approval



UNIVERSITY OF CAPE TOWN

HUMAN RESEARCH ETHICS COMMITTEE
25 JAN 2019
FACULTY OF HEALTH SCIENCES
HEALTH SCIENCES RESEARCH OFFICE
UNIVERSITY OF CAPE TOWN

Committee

Form FHS006: Protocol Amendment

HREC office use only (FWA00001637; IRB00001938)		
☑ Approved	☐ Type of review: Expedited	☐ Full committee
This serves as notification that all changes and documentation described below are approved.		
Signature Chairperson of the HREC	Date	22/1/19

Note: All major amendments must include a local PI Synopsis justifying the changes for the amendment. Please note that incomplete amendment submissions will not be reviewed.

Comments from the HREC to the Principal Investigator:
Note: The approval of this protocol amendment does not grant annual approval. Please complete the FHS016 / FHS017 form for annual approval at least one month before study expiration.

Principal Investigator to complete the following:

1. Protocol Information

Date (when submitting this form)	21 January 2019
HREC REF Number	HREC/REF: 605/2017
Protocol title	Evaluating the impact of child social grants on the children's nutritional status
Protocol number (if applicable)	N/A
Principal Investigator	Prof Landon Myer
Department / Office Internal Mail Address	Room No 5.49 Falmouth Building, Medical School, Anzio Road, Observatory

1.1 Is this a major or a minor amendment? (see FHS006info) Major (tick box) Minor (tick box)	☐ Major	✓ ☐ Minor
1.2 Does this protocol receive US Federal funding?	☐ Yes	☐ No
1.3 If the amendment is a major amendment and receives US Federal Funding, does the amendment require full committee approval? Note: Any protocol amendments for Full Committee review MUST be submitted on the monthly HREC submission dates. (Please email an electronic copy to hrec-enquiries@uct.ac.za)	☐ Yes	☐ No

2. List of Proposed Amendments with Revised Version Numbers and Dates

Please itemise on the page below, all amendments with revised version numbers and dates, which need approval.
This page will be detached, signed and returned to the PI as notification of approval. Please add extra pages if necessary.

Change of protocol title for a mini dissertation, study aim and objectives.
A new research title is: The prevalence and predictors of food insecurity among HIV positive women.

3. Protocol status (tick ✓)

☐	Open to enrolment
☐	No participants have been enrolled
☐	Closed to enrolment (tick ✓)
☐	Research-related activities are ongoing
☐	Research-related activities are complete, long-term follow-up only
☐	Research-related activities are complete, data analysis only

4. Proposed changes will affect: (tick ✓ all the categories that apply)

	Protocol
✓ ☐	Study objectives, design (including investigator's brochure, clinical activities, study length)
☐	Study instruments, questionnaires, interview schedules
☐	Sample size
☐	Recruitment methods
☐	Eligibility criteria (inclusion and exclusion criteria)
☐	Drug/device (composition, amount, schedule, route of administration, combination with other drugs/devices, safety information)
☐	Data collection/ analysis
☐	Principal Investigator. (Please attach revised conflict of interest and PI declaration statements. Refer: sections 7 and 8.4 in the New Protocol Application Form FHS013)
☐	Consent form and information sheet
☐	Recruitment materials (e.g. advertisements)
☐	Administrative (e.g. change in sponsor's name, change in contact information)

UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

HUMAN RESEARCH ETHICS COMMITTEE
25 JAN 2019
HEALTH SCIENCES FACULTY
UNIVERSITY OF CAPE TOWN

FHS017: Annual Progress Report / Renewal

Record Reviews/Audits/Collection of Biological Specimens/Repositories/Databases/Registries

HREC office use only (FWA00001637; IRB00001938)			
This serves as notification of annual approval, including any documentation described below.			
☐ Approved	Annual progress report	Approved until/next renewal date	30/01/2020
☐ Not approved	See attached comments		
Signature Chairperson of the HREC		Date Signed	28/1/2019

Principal Investigator to complete the following:

1. Protocol Information

Date (when submitting this form)	21 January 2019		
HREC REF Number	HREC/REF: 805/2017	Current Ethics Approval was granted until	
Protocol title	Evaluating the impact of child social grants on the children's nutritional status **Changed to: Prevalence and predictors of food insecurity among HIV-positive women**		
Principal Investigator	Prof Landon Myer		
Department / Office Internal Mail Address	Room No 5.49 Falmouth Building, Medical School, Anzio Road, Observatory		
1.1 Does this protocol receive US Federal funding?		☐ Yes	✓ ☐ No

2. Protocol status (tick ✓)

☐	Research-related activities are ongoing
✓ ☐	Data collection is complete, data analysis only

Please indicate (in the block below) the titles and HREC reference numbers of any projects currently making use of the Database/registry/repository.

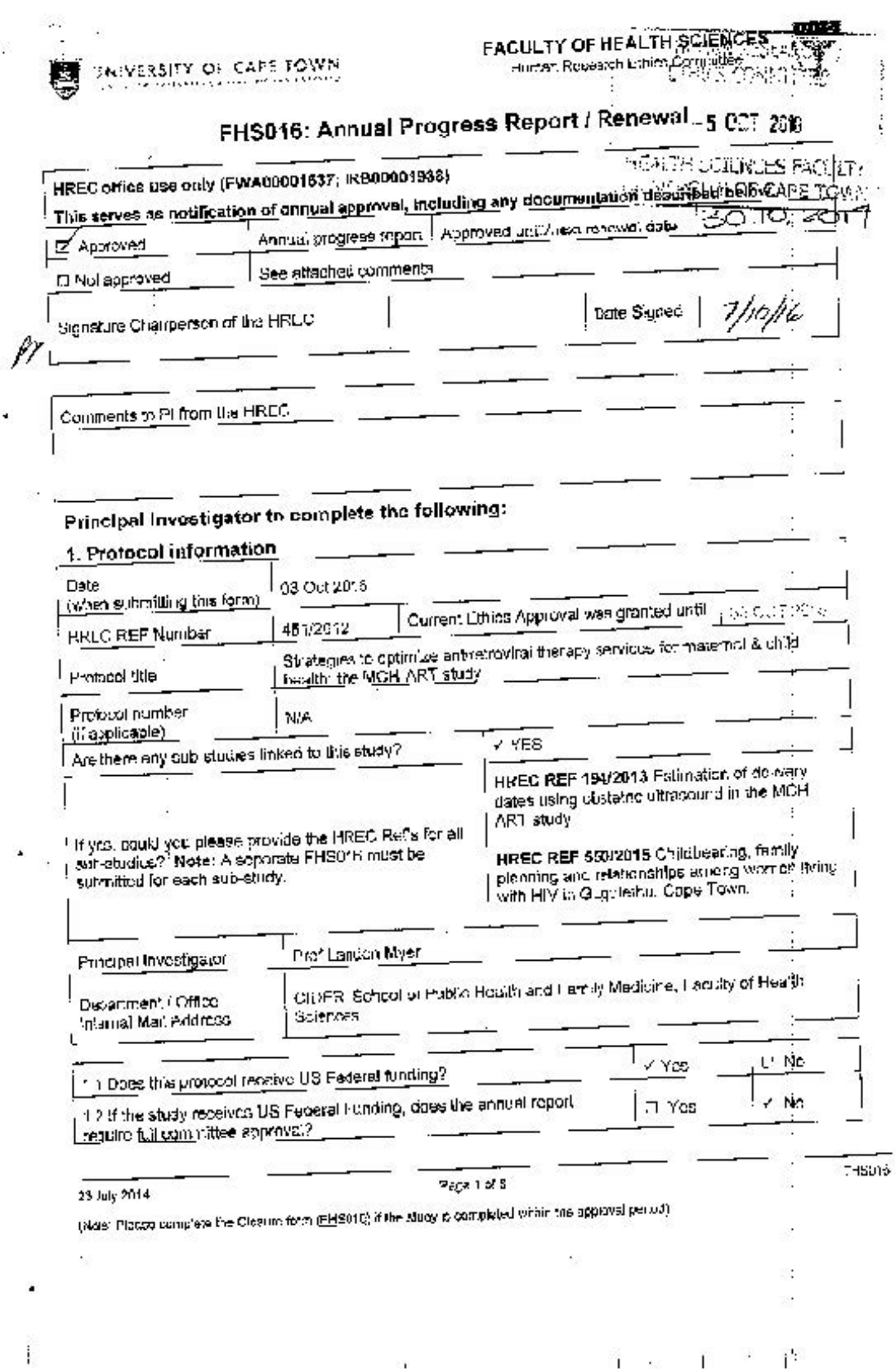
3. Protocol summary

Total number of records or specimens collected, reviewed or stored since the original approval		
Total number of records or specimens collected, reviewed or stored since last progress report		
Have any research-related outputs (e.g. publications, abstracts, conference presentations) resulted from this research? If yes, please list and attach with this report.	☐ Yes	☐ No

4. Signature

Signature of PI		Date	21/01/19

1.2 Ethics approval of the main study (MCH-ART)



UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

FHS016: Annual Progress Report / Renewal 5 OCT 2016

HEALTH SCIENCES FACULTY
UNIVERSITY OF CAPE TOWN

HREC office use only (FWA00001637; IRB00001938)
This serves as notification of annual approval, including any documentation described below

☑ Approved	Annual progress report	Approved until/next renewal date 30 OCT 2017
☐ Not approved	See attached comments	
Signature Chairperson of the HREC		Date Signed 7/10/16

Comments to PI from the HREC

Principal Investigator to complete the following:

1. Protocol information

Date (when submitting this form)	03 Oct 2016
HREC REF Number	461/2012 Current Ethics Approval was granted until 30 OCT 2016
Protocol title	Strategies to optimise antiretroviral therapy services for maternal & child health: the MCH-ART study
Protocol number (if applicable)	N/A
Are there any sub studies linked to this study?	✓ YES
If yes, could you please provide the HREC Ref's for all sub-studies? Note: A separate FHS01B must be submitted for each sub-study.	HREC REF 194/2013 Estimation of delivery dates using obstetric ultrasound in the MCH-ART study HREC REF 550/2015 Childbearing, family planning and relationships among women living with HIV in Gugulethu, Cape Town.
Principal Investigator	Prof Landon Myer
Department / Office / Internal Mail Address	CIDER, School of Public Health and Family Medicine, Faculty of Health Sciences
1.1 Does this protocol receive US Federal funding?	✓ Yes ☐ No
1.2 If the study receives US Federal Funding, does the annual report require full committee approval?	☐ Yes ✓ No

(Note: Please complete the Closure form (FHS01C) if the study is completed within the approval period)

1.3 Informed consent form (MCH-ART)

Phase 3 Informed Consent Form

TITLE OF RESEARCH: **Strategies to optimize antiretroviral therapy services for maternal & child health: the MCH-ART study**

WHAT IS THE PURPOSE OF THIS STUDY?
We are from the University of Cape Town and ICAP at Columbia University. You are being asked to take part in a study that is being conducted at the Gugulethu Midwife Obstetric Unit (MOU). The purpose of this study is to compare two different ways of providing HIV treatment to women after they deliver a baby.

We know that it is important for their own health as well as the health of their baby, that HIV-positive women receive the HIV care and treatment that they need both during and after delivery. Information learned in this study will help us to improve HIV services for pregnant women.

You are being asked to take part in this study because you are woman with known HIV infection who is currently breastfeeding a baby and who is taking HIV drugs. In addition, you have taken part in the previous phases of this study. The purpose of this consent form is to give you information to help you decide if you want to continue to take part in the last phase of this study.

WHAT DO I HAVE TO DO IF I AGREE TO TAKE PART?
If you agree to take part, you will be randomized (like a flip of a coin) to one of two places to receive your ART, as described below:

1. MCH-focused ART services group: Women assigned to this group will continue to receive HIV care and medicines here, at the MOU, as they did during their pregnancy. Their babies will also receive their routine baby care here at the MOU. When they have stopped breastfeeding, women in this group will be referred to their nearest general ART clinic, and their babies to their nearest City of Cape Town clinic for routine baby care

2. General ART services group: Women assigned to this group will be referred to the nearest ART clinic for HIV care and to continue their HIV medicines. Their babies will be referred to their nearest clinic for routine baby care.

   This is currently the standard of care for all HIV-positive women and their babies attending the MOU.

"Randomized" means that you will have a 50% chance of being in the group that will stay at the MOU to receive care. You will also have a 50% chance of being in the group that gets referred to an ART clinic. Neither the study staff nor you can choose which group you will be assigned to. The decisions are made by a computer and put into an envelope. The staff does not know which group is in each envelope.

This randomization will occur today and you and your baby will then come in for up to 6 additional study measurement visits at 6 weeks after delivery and 3, 6, 9, 12 **and 18 months** after delivery. These study visits are separate from the usual clinic visits that you will have for your postpartum and HIV care. Study visits will be timed so that they take place on the same days that you come in for your usual postpartum and/or HIV care. Each visit will take about 30-60 minutes.

These visits will include the following:

- Answer questions about your recent pregnancy- and HIV-related health care, HIV disclosure, and use of HIV drugs (including side effects and adherence).
    - At selected visits, we will ask you additional questions about HIV, stigma, and mental health (including drug and alcohol use), family planning, infant feeding practices, infant health and health care and how you feel about the HIV care that you have received.
- Have 5mLs (1 teaspoon) of blood drawn from your arm
- Measurement of weight, length, head circumference and mid-upper arm circumference of your baby.
- Measurement of your height at the first visit and your weight and mid-upper arm circumference at all study visits

NOTE: The blood that is drawn at each visit will be stored and used to check your viral load (this is the amount of HIV in your blood) at a later time. Results from these tests will not be available to you, the clinic, or the study staff. When the health care providers at the clinic need to check your viral load, they will take a separate blood specimen. When it is stored, your blood and test results will not have your name or any other way of identifying you attached to it.

At both the 12 and 18 month visits, we will also draw blood from your baby:

- Baby will undergo a blood draw to collect up to 5ml of blood (no more than 1 teaspoon).
- This blood will be used to check your baby's HIV status.
    - We will return the results of this test to you as soon as it is available.

Follow-up of missed visits

You will be asked to provide contact information so that we may get in touch with you during the study. Study staff will talk with you about the best way to contact you. In the event that you miss one of the scheduled study visits, a member of the study staff will contact you in order to find another day and time to complete your visit. If you repeatedly miss study visits or the staff is unable to contact you using the information that you provide, it may be necessary to visit you at home in order to reschedule the missed study visit.

Contact for future study

After the completion of your last visit at **18 months postpartum**, it is possible that we will contact you again at your next clinic visit or at another time in the future to take part in additional research studies. At that time, you would be asked to review and sign another consent form. You can choose to not take part in any future studies if you are asked. You will be asked to provide contact information so that we may get in touch with you regarding additional research studies. Study staff will talk with you about the best way to contact you.

WHAT ARE THE POTENTIAL RISKS?
You may feel uncomfortable about some of the personal questions you are asked. You may refuse to answer any question that you do not want to answer. There is some risk in sharing personal and medical information. We will be careful to keep all your information as private as possible.

Drawing blood is normally done as part of routine medical care and presents a slight risk of discomfort. Experienced staff will draw blood under sterile conditions in order to protect you against these risks.

WHAT ARE THE POTENTIAL BENEFITS?
There is no direct benefit to you if you take part in this study, but if we identify any health care problem for you or your baby during the course of the study, we will make sure you are referred to the appropriate health care services. In addition, the information gained in this study may help to improve ART services for HIV-infected pregnant women in Cape Town, the Western Cape Province, and across South Africa.

WHAT ARE THE ALTERNATIVES TO TAKING PART?
The alternative to taking part in this study is to continue with the standard of care for all HIV-positive pregnant women, which means you will be referred from the MOU to your nearest general ART clinic, and your baby will be referred to your nearest clinic for routine baby care, as soon as possible.

WHAT ABOUT CONFIDENTIALITY?
If you agree to take part, all information collected during the study will be kept strictly confidential. Your name will not be written on the study forms and will not be used in connection with any information or lab specimens that are collected as part of the study.

All study materials will be stored in locked filing cabinets. Only study staff and personnel involved in routine audits will have access to these materials. All staff involved in data collection and management will get specific training in confidentiality.

Even with these procedures in place, if the study staff learns that you are a risk to yourself or someone else or of possible child abuse and/or neglect, study staff will tell the proper authorities.

WHAT ABOUT INSURANCE?
There are no experimental medicines being used in this study. Therefore no insurance has been obtained. However you will be protected in terms of the study staffs' personal malpractice insurance or that of the university in the event of injury or illness that is caused by you taking part in this study.

If you sign this form, you do not give up any of the legal rights that you and your child have as research participants.

WILL I BE GIVEN ANYTHING FOR TAKING PART?
At the end of each visit, you will be given R20 in cash to cover the transport cost to your next scheduled study visit, and an R80 grocery voucher. Refreshments will be provided at all visits. You will also receive a small gift, up to the value of R50, at the final study visit when your baby is 12 months old.

ARE THERE ANY COSTS?
There is no cost for being in this study.

CAN I LEAVE THE STUDY?
You have the right to decide not to not take part in the study, to refuse to answer any questions, or to withdraw from the study at any time without any penalty. It will have no effect on the care that you receive at the Gugulethu MOU or any other health facility.

FUTURE USE OF SPECIMENS:
If you agree, any left over blood from the samples you have provided for this research project and the sample taken from your baby at the 12 and **18 month study visit**, may be used for future HIV and maternal and child health related research. It is possible that these stored samples may be tested to see if the HIV in your blood is resistant to any types of HIV medications or to look at other questions related to HIV. It is also possible that the stored blood from you and your baby may be used to look at other questions related to maternal and child health.

At this time, we cannot provide details of when this testing may be conducted. However, additional testing will not be done using these stored samples without the approval of the appropriate ethics committees involved in this research.

If you agree to let us keep your and/or your baby's stored samples for future research, they will be kept in a locked freezer for up to 5 years. If we do use the samples in the future, your name, your baby's name or other identifiers will not be included with this information (as with the rest of the information we collect for this study).

Please initial below to indicate whether or not you give permission for your and/or your baby's specimens to be used for future research. You may still remain in the study, no matter which you choose.

Consent for storage of your blood:

_____ (initial) I agree to have my blood stored for future research.

_____ (initial) I agree to have my blood stored for future research related to this study ONLY.

_____ (initial) I do **NOT** agree to the storage of my blood for future use.

Consent for storage of your baby's blood taken at the 12 and **18 month visit**:

_____ (initial) I agree to have my baby's blood stored for future research.

_____ (initial) I agree to have my baby's blood stored for future research related to this study ONLY.

_____ (initial) I do **NOT** agree to the storage of my baby's blood for future use.

DO YOU HAVE ANY QUESTIONS?
If there is anything that is unclear or if you need further information, please ask us and we will provide it.
Do you have any questions?

FOR ADDITIONAL INFORMATION:
If you have any questions or have any problems while taking part in this research study, you should contact:

Dr Landon Myer
School of Public Health and Family Medicine
Faculty of Health Sciences, University of Cape Town
Tel: 021 406 6661
Email: Landon.Myer@uct.ac.za

Dr Elaine Abrams
ICAP, Columbia University
Mailman School of Public Health
College of Physicians and Surgeons
Tel: +1 212 342 0543
Email: eja1@columbia.edu

If you have any questions about your rights as a research participant, you may contact the following member of the ethics committee:

Prof Marc Blockman
Chair, Human Research Ethics Committee
Faculty of Health Sciences, University of Cape Town
Tel: 021 406 6338

Columbia University Medical Center IRB
Tel: +1 212 305 5883

Phase 3 Informed Consent Form

CONSENT STATEMENT:
I have read this form, or someone has read it to me. I have been offered a copy of this consent form. I was encouraged and given time to ask questions. I agree to be in this study. I know that after choosing to be in this study, I may withdraw at any time. My being in the study is voluntary. I understand that whether or not I participate will not affect my health care services received today, or at any time in the future.

Please indicate your consent with your signature.

Volunteer's name _____

_____
Signature of Volunteer Date

Staff member's name_____

_____
Signature of study staff Date

If the volunteer is unable to read or write the entire counselling process must be observed by an independent witness who can then confirm the procedure once the she has given consent.

Fingerprint of volunteer:

Witness:
I confirm that I am independent of the study and that I witnessed the entire informed consent counselling process in the home language of the volunteer
Name: _____

Signature: _____

Date: _____

Thank you.

1.4 Baseline demographics questionnaire (MCH-ART)

MCH-ART: Demographics & Medical History, Phase 1
Xhosa-English of Version 3.0, 15 October2013

PID: 1 - __ __ __ __ - __ __

		Visit Date: __ __/__ __ __/__ __ __ __
1.	Mingaphi iminyaka yakho *What is your age?*	*Age:* _____Iminyaka/*years*
2.	Ulohluphi uhlanga *What population group do you belong to?*	UmAfrika *African* = 1 Indiya *Indian* = 2 Umntu webala *Coloured* = 3 Umlungu *White* = 4 Olunye = 5, cacisa: _____ *Other specify*
3.	Uthetha oluphi ulwimi ekhayai? *What language do you speak at home?*	isiXhosa = 1 isiZulu = 2 isiBhulu *Afrikaans* = 3 isiNgesi *English* = 4 Olunye = 5, cacisa: _____ *Other specify*
4.	Lelephi elona banga liphezulu oliphumeleleyo? *What is the highest level of schooling/education that you have completed?*	Umgangatho/*Grade*:_____ Okanye/*or* Ibanga/ *Standard*:_____ Imfundo enomsila/ *Postsecondary*:_____
5.	Ngoku uyasebenza okanye uyafunda *Are you currently working and /or studying?*	Hayi *No* = 0 → Gqithela ku Q7 **SKIP to Q7** Ewe *Yes* = 1
6.	Ukuba nguEwe, yeyephi kwezi zilandelayo echaza, bhetele ukuba wenza ntoni? *If yes, which of one the following best describes what you do?* Khetha ibenye */Choose one only*	Ndiphangela isigxina = 1 *Employed full-time* Ndiphangela mangqaphangqapha = 2 *Employed part-time* Ndiphangela izingxungxo/ ndingumatheng 'ethengisa = 3 *Informal job/hawker* Uhamba isikolo/ ungumfundi = 4 *Attending school/learner* Uhamba isikolo semfundo enomsila = 5 *Attending tertiary education facility*
7.	Ngowuphi owona mthombo wemali kwikhaya lakho? *What is the MAJOR source of income for your household?* Khetha ibenye */Choose one only*	Ayikho =0 *None* Umsebenzi osisigxina =1 *Full-time employment* Umsebenzi wamaangqaoha-ngqapha =2 *Part-time employment* Umsebenzi wezingxungxo/ umthengisi =3 *Informal employment* Imali yesibonelelo sokukhuba zeka karhulumente= 4 *Disability grant* Imali yesibonelelo karhulumente =5 *Social grant* Umhlala phantsi =6 *Pension* Olunye imali yesibonelelo =7 *Other grant* chaza: _____ *specify type* Olunye =8 *Other* Chaza: _____ *specify* Andazi = 9 *Don't know*

Initials of counsellor: _____

8.	Uhlala kwikhaya elinjani? *What kind of home do you live in?*		Ityotyombe/ uhlaliso olungahlelwanga = 1 *Shack/informal dwelling* Indlu yesitena = 2 *Formal house* Ifleti/ indlu kamaspala = 3 *Flat/council home* Enye = 4, chaza:_____ *Other, specify*
9.	Ingaba indlu yakho inazo ezi zinto zilandelayo: *Does your house have the following: Read and answer for all*	a. Indlu yangasese *A toilet inside*	Hayi/*No* =0 Ewe/*Yes* =1
		b. Amanzi abalekayo empompo *Running water inside*	Hayi/*No* =0 Ewe/*Yes* =1
		c. Umbane *Electricity inside*	Hayi/*No* =0 Ewe/*Yes* =1
		d. Isikhenkcisi *A refrigerator*	Hayi/*No* =0 Ewe/*Yes* =1
		e. Umnxeba *A telephone*	Hayi/*No* =0 Ewe/*Yes* =1
		f. Umabona kude *A television*	Hayi/*No* =0 Ewe/*Yes* =1
10.	Bangaphi abantu abahlala kule ndlu bedibene nawe(abadala,abancinci)? *Including yourself, how many people (adults and children) live in your house?*		Inani labantu: _____ # *of people:*
11.	Bangaphi abadala (iminyaka-16 nangaphezulu)bedibene nawe abahlala kule ndlu? *How many adults (aged 16 or older), including you, live in your house?*		Inani labadala:_____ # *of adults*
12.	Bangaphi abantwana (iminyaka -15 nanganeno) abahlala nawe? *How many children (aged 15 and under) live in your house?*		Inani labantwana:_____ # *of children*
13.	Ukhulelwe kangaphi (kudibene nesi isisu)? *How many times have you been pregnant (including current pregnancy)?*		inani lokukhulelwa: _____ # *of pregnancies:*
14.	Ingaba ubuzama ukuba nosana ngelixesha ufumanisa ukuba ukhulelwe (Kwesi isisu)? *Were you trying to have a baby when you found out you were pregnant (in this pregnancy)?*		Hayi/*No* = 0 Ewe/*Yes* = 1 Andazi/*I don't know* = 9
15.	Bangaphi abantwana obazeleyo? *How many children have you given birth to?*		Inani labantwana:_____ # *of children* **Ukuba = 0**, Gqithela ku Q20 *If 0, SKIP to Q20*
16.	Bangaphi kwaba bantwana abaphilayo? *How many of these children are living?*		Inani labantwana:_____ # *of children*
17.	Bangaphi kwaba bantwana abahlala nawe ngoku? *How many of these children currently live with you?*		Inani labantwana:_____ # *of children*
18.	Bangaphi kwaba bantwana ekufumaniseke bakho ukuba baphila nentsholongwane? *How many of your children have tested HIV-positive?*		Inani labantwana abaphila nentsholongwane:_____ # *of HIV-positive children*
19.	Bangaphi kwaba bantwana baphila nentsholongwane abasaphilayo? *How many of these children who have tested HIV- positive are currently living?*		Inani labantwana abaphila nentsholongwane abaphilayo ngoku: _____ # *of HIV-positive children currently alive*

Initials of counsellor: _____

20.	Uya thandana ngoku? *Are you currently in a relationship?*	Hayi/*No* = 0➔ **Gqithela ku Q25** *SKIP to Q25* Ewe/*Yes*= 1
21.	Ungaluchaza njani uthando lwakho? *How would you describe your current relationship?*	Utshatile = 1 *Married* Anditshatanga ,ndiya hlalisana =2 *Not married, living together* Nditshatile, asihlali kunye = 3 *Married, not living together* Anditshatanga, asihlali kunye = 4 *Not married, not living together* Enye = 5, cacisa:_____ *Other, specify*
22.	Lileshe ellingakanani unobudlelwana nalomntu? *How long have you been in a relationship with this person?*	Ixesha Inyanga *Months*_____ *Duration in:* Iminyaka *Years* _____
23.	Ingaba eli qabane lakho ngutata womnye wabantwana bakho(kunye nalo umkhulelweyo)? *Is your current partner the parent of any of your children? (Including current pregnancy)*	Hayi/*No* = 0 Ewe/*Yes* = 1
24.	Ulichazele na iqabane lakho ngesimo sakho sentsholongwane? *Have you disclosed your HIV status to your current partner?*	Hayi/*No* = 0 Ewe/*Yes* = 1
25.	Ubukhe wabelana ngesondo nabanye abantu ingenguye lomntu uthandana naye? *In the last 12 months have you had any sexual relationships/sexual partners? (If in a relationship then other than this partner)*	Hayi/*No* = 0 ➔ **Gqithela ku Q28** ➔ *SKIP to Q 28* Ewe/*Yes* = 1
26.	Bunjani ubudlelwanebakho namanye amaqabane ngaphandle kweqabane lakho langoku ukuba akhona? *What is the nature of your relationship(s)? (other than current partner if applicable)* Rhangqa konke okungqamene nawe. *Mark all that apply.*	a. Umlingane/nditshatile *Spouse/ married* b. Iqabane lam *Boyfriend* c. Iqabane lethutyana *Casual Partner/One Night Stands* d. Omnye ,cacisa:_____ *Other, specify*
27.	Ubaxelele aba bantu wabelana nabo ngesondo ukuba uphila nentsholongwane? *Have you disclosed your HIV status to any of these other sexual partners?*	Hayi/*No* = 0 Ewe/*Yes* = 1
28.	Ubuqala ukufumanisa ukuba unentsholongwa kagawulayo kolumitho okanye phambi kokuba ukhulelwe? *Did you first test HIV positive in this pregnancy or before this pregnancy?*	Koku ukukhulelwa =1 ➔ Gqithela ku Q32 *In his pregnancy* *SKIP to Q32* Phambi koku ukukhulelwa =2 *Before this pregnancy*
29.	Kwakunini ukuqala kwakho ukufumanisa ukuba unentsholongwane kagawulayo? *When did you 1st test HIV-positive?*	Umhla:___ Inyanga:_____ Unyaka:_____ Day Month Year
30.	Kwakutheni ukuze oluhlolo lwenziwe? *Why was this test conducted?*	Ndivavanywe ngelixesha ndikhulelweyo = 1 *Tested during pregnancy* VCT/Ndandifuna ukuvavanywe =2 *VCT/Wanted to be tested* Ndafunyaniswa ndinesifo sephepha (TB) = 3 *Diagnosed with TB* Ndangeniswa esibhedlele = 4 *Admitted to the hospital* Enye = 5, cacisa:_____ *Other, specify*

Initials of counsellor: _____

31.	Ingaba wawukhulelwe ukuqala kwakho ukufumane ukuba unentsholongwane kagawulayo? *Were you pregnant when you first tested HIV-positive?*	Hayi/*No* = 0 Ewe/*Yes* = 1
32.	Wakhe wanazo iziphumo ezingena chaphaza kuvavanyo lwentsholongwane kagawulayo? *Have you ever tested negative on an HIV test?*	Hayi/*No* = 0 → Gqithela ku Q36 *SKIP to Q36* Ewe/*Yes* = 1
33.	Ugqibele nini ukuba neziphumo ezingenachaphaza zovavanyo lwentsholongwane kagawulayo? *When did you last test HIV-negative?*	Umhla:___ Inyanga:_____ Unyaka:_____ Day Month Year
34.	Kwakutheni ukuze uvavanywe ngelo xesha? What was the reason for you doing the HIV test? *Why did you test at that time?*	Ndivavanywe ngelixesha ndikhulelweyo = 1 *Tested during pregnancy* VCT/Ndandifuna ukuvavanywe =2 *VCT/Wanted to be tested* Ndafunyaniswa ndinesifo sephepha (TB) = 3 *Diagnosed with TB* Ndangeniswa esibhedlele = 4 *Admitted to the hospital* Enye = 5, cacisa:_____ *Other, specify*
35.	Wawukhulelwe ngeloxesha uvavanyelwa intsholongwane? *Were you pregnant at the time of that test?*	Hayi/*No* = 0 Ewe/*Yes* = 1
36.	Wakhe waxelela nabanina ukuba unentsholongwane kagawulayo? *Have you told anyone that you are HIV-positive?*	Hayi/*No* = 0 → Gqithela ku Q39 *SKIP to Q39* Ewe/*Yes* = 1
37.	Ngawaphi amlungu osapho lwakho owaxeleleyo ngesimo sakho sentsholonwane? *Which of your family members have you told about your HIV status?* Nceda phendula lombuzo ngelungu ngalinye losapho oludweliswe ngezantsi. *Please answer this question for each of the family members listed below.* Wamxelele u_ _ _ _ _ _ _ ukuba unentsholongwane kagawulayo? *Have you told your _____ that you are HIV positive?*	
a.	Umyeni/Igabane *Husband/partner/boyfriend*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
b.	Umama *Mother*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
c.	Utata *Father*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
d.	Udade *Sister*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
e.	Umtakwenu *Brother*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
f.	Intombi *Daughter*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
g.	Unyana *Son*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
h.	Umalume *Uncle*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
i.	U-anti *Aunt*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9

Initials of counsellor: _____

j.	Umza wesikhomo *Male cousin*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
k.	Umza wesikhomokazi *Female cousin*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
l.	Enye indoda yalapha *Other male family member*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
m.	Esinye isikhomokazi *Other female family member*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
38.	Ngaphandle kwabantu bakowenu aba badweliswe ngentla,ngubani omnye umntu owamxelelyo ukuba uphila nentsholongwane?(funda uphendule yonke imibuzo) *Aside from family members listed above, who else have you told about your HIV status? (read and answer for all)*	
a.	Amanesi/ogqira *Health professionals*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
b.	Iqumru lenxaso labantu abaphila nentsholongwane *Support group*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
c.	Umntu owabelana naye ngesondo ongahlali naye *A sexual partner who does not live with you*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
d.	Isihlobo *Friends*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
e.	Inkokheli ngokwa kwamoya *Spiritual leader*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
f.	Umntu okuqashileyo/wayekuqashile *Current or former employer*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
g.	Ukuchaza esidlangalaleni *Public disclosure/ community*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
h.	Abanye, chaza: _____ *Other, specify*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9
39.	Wakhe wakhulelwa phambi koku ukukhulelwa? *Have you ever been pregnant before this pregnancy?*	Hayi/*No* = 0 →Gqithela ku Q45 *SKIP to Q45* Ewe/*Yes* = 1
40.	Ngokuya ubukhulelwe ngaphambi koku ukukhulelwa wawuke wanikwa amayeza okhusela usana lungosuleleki yintsholongwane (ezeku khusela umntwana hayi amachiza okutho malalisa intsholongwane woborni bonke) *When you were pregnant before this pregnancy have you ever been given medication at the clinic to keep your baby from getting HIV infected? (prophylaxis NOT lifelong ART)*	Hayi/*No* = 0 →Gqithela ku Q45 *SKIP to Q45* Ewe/*Yes* = 1
41.	Ukuba nguEwe, zingaphi izisu ufumane la machiza ngesisizathu? *If yes, during how many pregnancies have you received medication for this purpose?*	Inani lezisu:_____ *# of pregnancies*

Initials of counsellor: _____

42.	Kwezi zisu siyi____ofumene kuzo amachiza, zingaphi izisu otye kuzo iipilisi ngelixesha ubelekayo qha? *For the ___ pregnancies that you received medication, For how many pregnancies did you take pills while you were pregnant and for how many pregnancies did you take pills only at delivery?*	Ngoku wawubeleka *Only at Delivery (Nevirapine)* #:_____ Ngelixesha ukhulelwe *While you were pregnant (AZT)?* #:_____
43.	Bekunini ukugqibela kwakho ukufumana la machiza ngesisizathu? *When was the last time that you received medication for this purpose?*	Umhla:___ Inyanga:_____ Unyaka:_____ Day Month Year
44.	Uwafumene phi la machiza ukugqibela kwakho? *Where did you receive the medication the last time?*	Igama lekliniki:_____ *Name of clinic:*
45.	Wawuke wawathatha amachiza okuthomalalisa intsholongwane (awobomi bakho bonke) *Have you ever taken triple drug antiretroviral therapy (lifelong ART)?*	Hayi/*No* = 0 → **Skip to Q51** Ewe/*Yes* = 1
46.	Ukuba nguEwe, ingaba wawafumana amachiza okuthomalalisa intsholongwane ukugqibela kakho? *If yes, where did you receive ART the last time?*	Igama lekliniki:_____ *Name of clinic:*
47.	Uqale nini ukutya la machiza okuthomalalisa intsholongwane kagawulayo? *When did you start taking ART?*	Umhla:___ Inyanga:_____ Unyaka:_____ Day Month Year
48.	Usawatya amachiza okuthomalalisa intsholongwane kagawulayo? *Are you still on ART?*	Hayi/*No* = 0 Ewe/*Yes* = 1→ SKIP to Q51
49.	Ukuba nguHayi,uyeke nini ukuwatya amachiza okuthomalalisa intsholongwane kagawulayo? *If No, when did you stop taking ART?*	Umhla:___ Inyanga:_____ Unyaka:_____ Day Month Year

Initials of counsellor: _____

50.	Uyekele ntoni ukutya amachiza athomalalisa intsholongwane? *Why did you stop taking ART?* (rhagqa zonke ezibhekisa kuwe) *Circle all that apply*	a. Ndaphelelwa ngumchiza andaya ukuyakuwalanda *I ran out of medicine and didn't go for refills* b. Anencasa embi *The medicine tastes bad* c. Ndulibala *I just forgot* d. Bendikhathazwa yimiphumela yawo *I was worried about the side effects* e. Bendingafuni abanye bandiqaphele ukuba nditya amachiza *I did not want others to notice me taking the medicine* f. Ndandigula *I was ill* g. Ndacinga ukuba andisawafuni nganto *Didn't think I needed it anymore* h. Bendicinga ndingahlala ndiphilile ngaphandle kwawo *Can stay healthy without it* i. Bendicinga ukuba lamayeza anganobu ngozi kum. *I felt the medicine might be harmful to me* j. Ndizive ndinoxinizelelo *I felt depressed* k. Ndandiphilile *I was well* l. Ebemaninzi la machiza ekufuneka ndiwathathe *There was too much medicine to take* m. Bendingekho ekhaya *I was away from home* n. Bendixakekile zezinye izinto *I was busy with other things* o. Ndiye ndafunda ukuba zikho ezinye iindlela endinganyanga okanye ndiphilise intsholongwane kagawulayo *I learned that there are other ways to treat or cure HIV* p. Enye, cacisa: _____ *Other, Specify*
51.	Ubukhe watshaya isagarethi kulenyanga iphelileyo? *Did you smoke cigarettes in the last month?*	Hayi *No* = 0 → END Ewe *Yes* = 1
52.	Utshaya isigarethi ezingaphi ngemini? *How many cigarettes do you smoke in a day?*	#_____ cigarettes

Date completed: _ _/_ _ _/ _ _ _ _ Signed counsellor completing CRF: _____

Date of QC: _ _/_ _ _/ _ _ _ _ Signed measurement nurse: _____

Initials of counsellor: _____

1.5 Phase 3 demographics questionnaire (MCH-ART)

MCH-ART: Demographics & Medical History, Phase 3 12mo pp PID: 3 - __ __ __ __ - __ __
Xhosa-English Version 3.3, 29 September2013

		Visit Date: __ __/__ __ __/__ __ __ __	
Sokubeleka sicela ukujonga ukuba zisemi ngendlela owawusinike yona iinkcukacha zakho: ***Please can we update your locator information:***			
1.	Usahlala okanye ufudukile kula ndlu ubukade uhlala kuyo ukugqibela sithetha? *Have you moved to a different home since we last spoke to you?*	Hayi/*No* =0 Ewe/*Yes* =1	*If YES, updated LOCATOR FORM.*
2.	Uzitshintshile inombolo zakho zomnxeba ukugqibela kwethuukuthetha? *Have you changed your cell phone number(s) since we last spoke to you?*	Hayi/*No* =0 Ewe/*Yes* =1	*If YES, updated LOCATOR FORM.*
3.	Ukhona omnye umntu esinoqhakamishelana naye xa kukho imfuneko? *Is there anyone else that we can contact if we are looking for you in the event of an emergency?*	Hayi/*No* =0 Ewe/*Yes* =1	*If YES, updated LOCATOR FORM.*
Siza kubuza imibuzo embalwa: *We are now going to ask you a few questions:*			
4.	Uze njani ekliniki namhlanje? *How did you get to the clinic today?*	Uqeshe imoto = 1 *Hired car* Uze ngemoto yakho=2 *My own car* Uze ngetaxi=3 *Taxi* Ngebhasi=4 *Bus* Ngenyawo=5 *Walk* Olunye =6,cacisa:_____ *Other, specify*	
5.	Uthathe ixesha elingakanani ukuza ekliniki namhlanje? *How long did it take you to get to the clinic today?*	Imizuzu/*Minutes:* _____ Iyure/*Hours:* _____	
6.	Uhlawule malini ngesithuthi? *How much did you pay for transport?*	*Rand:* _____	
7.	Uthathe ixesha emsebenzini ukuza apha? *Did you take time off of work to come here?*	Hayi/*No* =0 Ewe/*Yes* =1	
8.	Kuye kwafuneka wenze isivumelwano nabantu bajonge umntwana/abantwana? *Did you have to make special arrangements for people to watch your child/children?*	Hayi *No* = 0 → Gqithela ku Q10 *SKIP to Q10* Ewe *Yes* = 1 Andinabantwana = 2 → Gqithela ku Q10 *Don't have any children* *SKIP to Q10*	
9.	Kuye kwafuneka uhlawule umntu oza kujonga usana ngelixesha uze ekliniki? *Did you pay someone to watch your child so you could come to the clinic?*	Hayi/*No* =0 Ewe/*Yes* =1	
10.	Ukugqibela kwethu ukuthethanawe uye wathunyelwa kwesinye isibhedlele ngenxayokugula(Jooste,Groote Schuur) *Since we last spoke to you, have you been referred to any other health facility for other medical care (eg, GF Jooste or Groote Schuur)?*	Hayi *No* = 0 → Gqithela ku Q11 *SKIP to Q11* Ewe *Yes* = 1	
a.	Ubuthunyelwe phi? *Where were you referred?*	Igama lendawo:_____ *Location*	
b.	Wawusithini umhla wokuthunyelwa kwakho? *What was the date of the referral?*	Umhla:____ Inyanga:_____ Unyaka:_____ *Day* *Month* *Year*	

Initials of counsellor:

c.	Yintoni isizathu sokuthunyelwa kwakho? *What was the reason for the referral?*		Isizathu: *Reason*	
d.	Ingaba wafumana unyango olutsha/ amayeza? *Did you receive any new treatment or medications as a result of this referral?*		Hayi/*No* =0 Ewe/*Yes* =1 Ukuba nguEwe, cacisa:_____ *If Yes, specify*	
11.	Oku ulubelekile usana lwakho, selukhe lwathunyelwa kwamanye amacandeo empilo kuba lugula zizifo zabantwana? *Since delivery, has your new baby been referred to any other health facility for infant-related care?*		Hayi *No* = 0 → Gqithela ku Q12 *SKIP to Q12* Ewe *Yes* = 1	
a.	Ubuthunyelwe phi? *Where were you referred?*		Igama lendawo: _____ *Location*	
b.	Wawusithini umhla wokuthunyelwa kwakho? *What was the date of the referral?*		Umhla:____ Inyanga:_____ Unyaka:_____ *Day* *Month* *Year*	
c.	Yintoni isizathu sokuthunyelwa kwakho? *What was the reason for the referral?*		Isizathu: *Reason*	
d.	Ingaba wafumana unyango olutsha/ amayeza? *Did you receive any new treatment or medications as a result of this referral?*		Hayi/*No* =0 Ewe/*Yes* =1 Ukuba nguEwe, cacisa:_____ *If Yes, specify*	
12.	Ukugqibela kwethu ukuthetha ugqira okanye unesi bakhe bathi une-TB? *Since we last spoke to you, has a doctor or nurse told you that you have TB?*		Hayi *No* = 0 → Gqithela ku Q17 *SKIP to Q17* Ewe *Yes* = 1	
13.	Uxelelwe nini ngoku kugula? *When did you receive this diagnosis?*		Umhla:____ Inyanga:_____ Unyaka:_____ *Day* *Month* *Year*	
14.	Uxelelwe phi ngoku kugula? *Where did you receive this diagnosis?*		Igama lekliniki :_____ *Name of clinic*	
15.	Iphi emzimbeni wakho le TB? *Where in your body was the TB (eg, lungs, other location)?*		Indawo emzimbeni :_____ *Place in body*	
16.	Uye wafumana unyango lwayo? *Did you receive treatment for TB?*		Hayi/*No* =0 Ewe/*Yes* =1	
17.	Ukugqibela kwethu ukuthetha nawe ukhona omnye umntu osele umxelele ukuba uphila nentsholongwae ongakhange umxelele kuqala? *Since we last spoke to you have you told anyone about your HIV-status who you had not told before?*		Hayi *No* = 0 → Gqithela ku Q20 *SKIP to Q20* Ewe *Yes* = 1	
18.	Noeda phendula lombuzo ngelungu ngalinye losapho oludweliswe ngezantsi. *Please answer this question for each of the family members listed below.*	i. Bahlala nawe ? *Do they live with you?* *If NA selected, do not answer I and II for that person*	II. Bayazi uphila nentsholongwane ? *Do they know you are HIV positive?*	III. Bayazi utya iART? *Do they know if you are taking ART?*
a.	Umyeni/iqabane *Husband/partner/boyfriend*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
b.	Umama *Mother*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1

c.	Utata *Father*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
d.	Udade *Sister*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
e.	Umtakwenu *Brother*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
f.	Intombi *Daughter*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
g.	Unyana *Son*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
h.	Umalume *Uncle*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
i.	U-anti *Aunt*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
j.	Umzala wesikhomo *Male cousin*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
k.	Umzala wesikhomokazi *Female cousin*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
l.	Enye indoda yalapha efemelini *Other male family member*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
m.	Esinye isikhomokazi se femeli *Other female family member*	Hayi/*No* = 0 Ewe/*Yes* = 1 N/A = 9	Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
19.	Ngaphandle kwabantu bakho bekhaya abasentla ,ngubani omnye umntu omxelele ngokuphila nentsholongwane ongazange umxelele ngaphambili? *Aside from family members listed above, who else have you told about your HIV status who you had not told before? (read and answer for all)*		i. Bayazi uphila nentsholongwane? *Do they know you are HIV positive?*	ii. Bayazi utya iART? *Do they know if you are taking ART?*
a.	Amanesi/ogqira *Health professionals*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
b.	Iqumru lenxaso labantu abaphila nentsholongwane *Support group*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
c.	Umntu owabelana naye ngesondo ongahlali naye *A sexual partner who does not live with you*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
d.	Isihlobo *Friends*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
e.	Inkokheli ngokwa kwamoya *Spiritual leader*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
f.	Umntu okuqashileyo/wayekuqashile *Current or former employer*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
g.	Ukuchaza esidlangalaleni *Public disclosure/ community*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1
h.	Abanye, chaza: _____ *Other, specify*		Hayi/*No* = 0 Ewe/*Yes* = 1	Hayi/*No* = 0 Ewe/*Yes* = 1

20.	Ukugqibela kwethu ukuthetha kuye kwakho utshintsho phakathi kwakho nomyeni/iqabane? *Since we last spoke to you, have there been any changes in your relationship with your husband or partner?*	Hayi *No* = 0 → Gqithela ku Q26 *SKIP to Q26* Ewe *Yes* = 1
21.	Ukuba nguEwe, yintoni ethe yatshintsha kokuthandana *If Yes, what has changed in your relationship since we last spoke?*	
	If participant reports that there have been changes in relationship, complete the following questions (Q22-25) with updated information.	
22.	Unomntu omtsha othandana naye? *Are you currently in a new relationship?*	Hayi/*No* = 0 → Gqithela ku Q26 *SKIP to Q26* Ewe/*Yes* = 1
23.	Loo mntu umtsha uthandana naye uhlala nawe *Is your new partner living with you?*	Hayi/*No* = 0 Ewe/*Yes* = 1
24.	Uyathandana /wabelana ngesondo nabanye abantu ngaphandle kwalo mntu mtsha? *Do you have relationships/sexual partners with people other than this new partner?*	Hayi/*No* = 0 → Gqithela ku Q26 *SKIP to Q26* Ewe/*Yes* = 1
25.	Sinjani isimo sobunye ubuhlobo bakho? *What is the nature of your other relationship(s)?* Rhangqa konke okungqamene nawe. *Mark all that apply.*	a. Umlingane/nditshatile *Spouse/ married* b. Iqabane lam *Boyfriend* c. Iqabane lethutyana *Casual Partner/One Night Stands* d. Omnye ,cacisa:_____ *Other, specify*
26.	Loluphi usuku ukugqibela kwakho ukutya iART? *When was the last day you took ART?*	Umhla:____ Inyanga:_____ Unyaka:_____ *Day* *Month* *Year*
a.	Ukhe wawatya iART akho kwezi ntsuku zi-7 zidlulileyo? *Have you taken ART at all in the last 7days?*	Hayi/*No* = 0 Ewe/*Yes* = 1→ Gqithela ku Q27 *SKIP to Q27*
b.	Ukuba hayi, kutheni? *If No, why not?*	Isizathu: *Reason*
27.	Ekugqibeleni kwethu ukuthetha,ubukhe wathetha nekhawunsela ekliniki ngokutya iART? *Regardless of whether or not you have taken ART:* *Since we last spoke to you have you spoken to a counsellor at the clinic/ hospital about taking ART?*	Hayi/*No* = 0 → [illegible] Ewe/*Yes* = 1
a.	Ukuba ewe,uye phi? *If Yes, where did you go?*	Igama lekliniki:_____ *Clinic name*
b.	Emva kokuba sithethile nawe,ukhawunselwe kangaphi? *Since we last spoke to you how many times have you been counselled?*	Amaxesha: _____ # of times
c.	Uye wathetha nabani ngoku ubukhawunselwa? *Who did you speak to during this counselling?*	
d.	Ngoku ubukhanselwa niye nathetha ngantono? *What did you talk about during this counselling?*	
28.	Ugqibele nini ukuya exesheni? When was your last menstrual period?	Umhla:____ Inyanga:_____ Unyaka:_____ *Day* *Month* *Year* Andiqinisekanga/*Unsure* = 9

29.	Ukhulelwa ngoku? Are you pregnant at the moment?	Hayi/*No* = 0 →*Phela apha/END* Ewe/*Yes* = 1 Not sure = 2
30.	Ingaba oku kukhelelwa kuqinisekisiwe? Has the pregnancy been confirmed?	Hayi/*No* = 0 →*DO PREGNANCY TEST NOW* Ewe/*Yes* = 1

Date completed: __ __/__ __ __/ __ __ __ __ Signed counsellor completing CRF: _____

Date of QC: __ __/__ __ __/ __ __ __ __ Signed measurement nurse: _____

1.6 Household food insecurity questionnaire

MCH-ART: Household food security questionnaire Visit 3.5 (12 months)
Xhosa of English Version 1.0, 25 April 2013

PID: 3 - __ __ __ __ - __ __

Visit date: _____ / _____ / _____

Ngoku sizakubuza imibuzo malunga nobunzima okanye ukuba lula ukuthenga ukutya kwendlu yakho.
Xa sithetha "ngendlu yakho" sixela wonke umntu ohlala nawe apha endlini.
We are now going to ask you some questions about how difficult or easy it is for you to buy food for your household.
When we talk about a "household" we are referring to everyone who lives in your house with you.

		0	1	2	3	9
1.	Ukhe ukhathazeke kuba ukutya kungazukwanela abantu ohlala nabo endlini? *Do you ever worry that your household will not have enough food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
2.	Ukhe ungabinayo imali yokutya? *Does your household ever run out of money to buy food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
3.	Ukhe uxhomekeke kumlinganiselo ongonelanga wokutya/ukutyisa umntwana/abantwana kuba imali ingonelanga yokuthenga ukutya? *Do you ever rely on a limited number of foods to feed your child/children because you are running out of money to buy food for a meal?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
4.	Ukhe ukucuthe ukutya okanye kubekho isidlo ongasinikiyo kuba kungekho mali yoneleyo yokuthenga ukutya? *Do you ever cut the size of meals or skip meals because there is not enough money for food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
5.	Ukhe utye ngeneno kunokuba ufuna ukutya ngenxa yokuba kungekho mali yoneleyo yokuthenga ukutya? *Do you ever eat less than you should because there is not enough money for food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
6.	Bakhe abantwana/umntwana atye ngeneno kunokuba ufuna kuba kungekho mali yoneleyo yokuthenga ukutya? *Do your child/children ever eat less than you feel they should because there is not enough money for food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*

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Initials of counsellor: _____

7.	Bakhe abantwana/umntwana bakuxelele ukuba balambile kuba kungekho kutya koneleyo endlini? *Do your child/children ever say he/she/they are hungry because there is not enough food in the house?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
8.	Ukhe ukucuthe ukutya kwabantwana okanye ukhe ungabaniki esinye isidlo kuba kungekho mali yoneleyo yokuthenga ukutya? *Do you ever cut the size of your children's meals or do they ever skip meals because there is not enough money to buy food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
9.	Ukhe omnye wabantwana bakho ayokulala elambile kuba kungekho mali yoneleyo yokuthenga ukutya? *Do any of your children ever go to bed hungry because there is not enough money to buy food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*
10.	Ukhe wena, okanye omnye umntu omdala endlini ayokulala elambile kuba kungekho mali yaneleyo yokuthenga ukutya? *Do you or any other adult in your household ever go to bed hungry because there is not enough money to buy food?*	Hayi *No*	Ewe, kodwa hayi rhoqo *Yes, but Rarely*	Ewe, ngamanye amaxesha *Yes Sometimes*	Ewe, rhoqo *Yes Often*	andiqinisekanga *Unsure*

Date completed: _ _ /_ _ _ / _ _ _ _

Signed counsellor completing CRF: _____

Date of QC: _ _ /_ _ _ / _ _ _ _

Signed measurement nurse: _____

Initials of counsellor: _____

1.7 Children social grants

MCH-ART: Child Grants Phase 3 6wks pp
Xhosa-English Version 2.0, 28 Jan 2013

PID: 3 - __ __ __ __ - __ __

		Visit Date: __ __/__ __ __/__ __ __ __
Le mibuzo ilandelayo ingosana olu ugqiba kulibeleka… *The following questions are about the baby that you just delivered….*		
1.	Usana lunaso isazisi sokuzalwa? *Has this child got a birth certificate?*	Hayi/ *No* = 0 Ewe/ *Yes* = 1→ Gqithela ku Q3/ *SKIP to Q3*
2.	Ukuba hayi,kutheni? *If no, why not?*	Ndibhalisile ,ndisalindile=1 *Have applied, still waiting* Andinamali yokuya kubhalisa=2 *Can't afford transport to home affairs* Andina sazisi(ipasi)=3 *Mother doesn't have an ID* Usana luseluncinci ,andinakulishiya okanyealunakuphuma endlwini=4 *Baby still too young to be left alone or to leave the house* Enye=5, cacisa: _____ *Other , specify*
3.	Sewubhalisele imali yesibonelelo somntwana? *Have you applied for a child support grant for this child?*	Hayi/ *No* = 0 Ewe/ *Yes* = 1→ Gqithela ku Q6/*SKIP to Q6*
4.	Uceba ukulibhalisela imali yesibonelelo somntwana? *Are you planning to apply for a child support grant for this child?*	Hayi/ *No* = 0 Ewe/ *Yes* = 1→ Phela apha/ *END*
5.	Kutheni ungafuni ukubhalisela imali yesibonelelo somntwana? *Why will you not apply for a child support grant for this child?*	Andikwasi ngenxa yomvuzo wam=1 *Do not qualify because of financial situation* Andikwasi ngenxa yezizathu = 2 *Do not qualify for other reasons* Cacisa: _____ *Specify* Andinaso isazisi (ipasi)=3 *Mother does not have an ID book* Ezinye = 4, cacisa:_____ *Other, specify* Phela apha/ *END*
6.	Sewuyifumana le imali yesibonelelo somntwana? *Have you started receiving this grant?*	Hayi/ *No* = 0 Ewe/ *Yes* = 1→ Gqithela ku Q8/ *SKIP to Q8*
7.	Yintoni isizathu sokuba ungekayi fumani? *What is the reason that you have not started to receive this grant?*	Ndisemlindweni=1 *Still on the waiting list* Andinasazisi=2 *No ID book* Andinasazisi sokuzalwa sosana=3 *No birth certificate for the child* Andinalo ikhadi laseklinikini losana=4 *No road to health card for the child* Andinaso isingqinisiso somvuzo=5 *No proof of income* Ezinye = 6, cacisa:_____ *Other, specify* Phela apha/ *END*
8.	Usana lufumana eyiphi imali yesibonelelo somntwana? *Which grant is this child receiving?*	Indodla yabantwana=1 *Child support grant* Indodla yokunakekela =2 *Care dependency grant* Indodla yokugcina umntwana=3 *Foster child grant* Indodla yokukhubazeka=4 *Disability grant* Enye = 5, cacisa:_____ *Other, specify*

Date completed: __ __/__ __ __/__ __ __ __

Signed counsellor completing CRF: _____

Date of QC: __ __/__ __ __/__ __ __ __

Signed measurement nurse: _____

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1.8 Journal submission guideline PLOS ONE

Style and Format	
File format	Manuscript files can be in the following formats: DOC, DOCX, or RTF. Microsoft Word documents should not be locked or protected. LaTeX manuscripts must be submitted as PDFs.
Length	Manuscripts can be any length. There are no restrictions on word count, number of figures, or amount of supporting information. We encourage you to present and discuss your findings concisely.
Font	Use a standard font size and any standard font, except for the font named
Headings	Limit manuscript sections and sub-sections to 3 heading levels. Make sure heading levels are clearly indicated in the manuscript text.
Layout and spacing	Manuscript text should be double-spaced. Do not format text in multiple columns.
Page and line numbers	Include page numbers and line numbers in the manuscript file. Use continuous line numbers (do not restart the numbering on each page).
Footnotes	Footnotes are not permitted. If your manuscript contains footnotes, move the information into the main text or the reference list, depending on the content.
Language	Manuscripts must be submitted in English. You may submit translations of the manuscript or abstract as supporting information.
Abbreviations	Define abbreviations upon first appearance in the text. Do not use non-standard abbreviations unless they appear at least three times in the text. Keep abbreviations to a minimum.
Reference style	PLOS uses “Vancouver” style, as outlined in the ICMJE sample references.
Manuscript Organization	
Beginning section	The following elements are required, in order: Title page: List title, authors, and affiliations as first page of manuscript Abstract Introduction
Middle Section	The following elements can be renamed as needed and presented in any order: Materials and Methods Results Discussion Conclusions (optional)
Ending section	The following elements are required, in order: Acknowledgments References Supporting information captions (if applicable)
Other elements	Figure captions are inserted immediately after the first paragraph in which the figure is cited. Figure files are uploaded separately. Tables are inserted immediately after the first paragraph in which they are cited. Supporting information files are uploaded separately.

1.9 Additional results on household food availability

Table 3: *Distribution of affirmative responses from the Household food security 10 item questionnaire.*

Level of food	**Total Number of affirmative responses**	**n (%)**
Free from food insecurity	0-3	213 (62)
Risk of food insecurity	4	15 (4)
Experiencing food insecurity	5-10	97 (28)