

Evaluation of the implementation of the nutritional supplementation programmes for pregnant women within the Cape Town Metropolitan Area

by
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Declaration

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Abstract

Introduction:

The primary objective was to determine whether pregnant women visiting primary health care clinics (PHCs) were aware of the nutritional supplementation programmes: Nutrition Supplementation Programme (NSP) food, folate-, iron- and vitamin A supplementation. The secondary objective was to determine whether pregnant women qualified for the NSP food-, folate- and iron supplementation. The third objective was to determine whether those who qualified received the prescribed NSP food-, folate-, and iron supplementation and whether they were compliant with these interventions.

Design:

A cross-sectional descriptive study was conducted at all PHCs hosting basic antenatal clinics in the Cape Town Metropolitan Area of the Western Cape Province, South Africa.

Method:

One hundred and fourteen pregnant women who met the inclusion criteria were included in the study using a non-random quota sampling strategy. Pregnant women were interviewed using a validated questionnaire. The mid upper arm circumference (MUAC) was measured and the symphysis-fundus (SF) measurement was obtained from the medical files to determine whether participants met the entry criteria for the NSP. Written informed consent was obtained from participants.

Results:

Fifty per cent of participants were between 12 and 24 weeks of gestation. Most of them (68%) had an MUAC of between 24,7 cm and 34,4 cm. Fifty (44%) of the participants had a sufficient SF measurement. Twenty-one (18%) of the participants indicated that they were aware of the vitamin A Programme, 56 (49%) were aware of the NSP food-supplementation and 79 (70%) knew about the folic- and iron supplementation that pregnant women should receive from the clinic. Six (5%) participants qualified for the NSP with an MUAC of below 23 cm. Only one (17%) participant was registered with the NSP and received the food-

supplementation. Seventy (61%) of the participants indicated that they received and used the iron- and folic supplements, of which 30 (43%) did not know why they needed to take these supplements.

Conclusion:

Folate- and iron supplementation appears to be reasonably successfully implemented in the Cape Town Metropolitan Area among pregnant women visiting PHCs. The NSP food-supplementation, however, appears to be unsuccessfully implemented and needs further attention. Resources could be appointed to inform pregnant women about the reasons for and importance of taking these supplements.

Opsomming

Inleiding:

Die hoofdoelstelling was om te bepaal of swanger vroue wat primêre gesondheidsorgklinieke (PGK's) bywoon, bewus was van die voeding supplementasie programme: Voedsel Supplementasie Program (VSP) – voedselaanvulling, folaat-, yster- en vitamien A supplementasie. Die tweede doelstelling was om te bepaal of hierdie swanger vroue in aanmerking kom vir die VSP– voedselaanvulling, folaat- en yster supplementasie. Die derde doelstelling was om te bepaal of hierdie swanger vroue die voorgeskrewe VSP – voedselaanvulling, folaat- en yster supplementasie ontvang het en hierdie intervensies nagevolg het.

Ontwerp:

'n Deursnit beskrywende studie is gedoen en data is ingesamel van al die PGK's wat voorgeboortelike klinieke huisves in die Kaapstadse metropolitaanse gebied, in die Wes-Kaapprovinsie, Suid-Afrika.

Metode:

Honderd en veertien swanger vroue wat aan die insluitingskriteria voldoen het, is volgens 'n nie-ewekansige kwotastrategie uitgesoek om aan die studie deel te neem. Onderhoude is volgens 'n bevestigde vraelys met swanger vroue gevoer. Die omtrek van die middelboarm is geneem en die *symphysis-fundus*-meting is van die mediese lêers verkry om te bepaal of deelnemers aan die insluitingskriteria vir die VSP voldoen. Deelnemers het 'n vrywaringsvorm geteken voordat hulle aan die studie begin deelneem het.

Resultate:

Vyftig persent van die swanger vroue het 'n gestasie-ouderdom van tussen 12 en 24 weke gehad. Die omtrek van die meeste vroue (68%) se middelboarm was tussen 24,7 cm en 34,4 cm. Vyftig (44%) van die vroue se *symphysis-fundus*-meting was voldoende. Een en twintig (18%) van die deelnemers het aangedui dat hulle van die Vitamien A-program bewus was, 56 (49%) was van die VSP-voedselaanvulling bewus en 79 (70%) van die deelnemers was bewus van die folaat- en yster supplementasie wat swanger vroue van die kliniek behoort te

ontvang. Ses (5%) deelnemers, met 'n middelboarm-omtrek van minder as 23 cm, het vir die VSP in aanmerking gekom. Slegs een (17%) deelnemer was geregistreer en het die voedselaanvulling ontvang. Sewentig (61%) van die deelnemers het aangedui dat hul wel yster- en folaat supplementasie ontvang en gebruik, waarvan 30 (43%) nie geweet het waarom hulle dié supplemente neem nie.

Gevolgtrekking:

Dit wil voorkom asof folaat- en yster supplementasie vir swanger vroue wat PGK's in die Kaapstadse metropolitaanse gebied besoek, redelik suksesvol toegepas word. Daarteenoor word die VSP – voedselaanvulling onsuksesvol uitgevoer en behoort dit verdere aandag te geniet. Hulpbronne kan aangewys word om swanger vroue beter in te lig oor die doel en belangrikheid daarvan om hierdie supplemente te neem.

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Contributions by authors and fellow researchers

The principal researcher (Heila Gründlingh) adopted the idea from the main study *Evaluation of selected components of health facility-based nutrition programmes in the Western Cape Province of South Africa* and developed the protocol accordingly. The principal researcher planned the study, undertook data collection, captured the data for analysis, analysed the data with the assistance of a statistician (Mr. W. Scholtz), interpreted the data and drafted the thesis. Professors M.G. Herselman and P-O. Iversen (supervisors) provided input at all stages and revised the protocol and thesis.

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List of abbreviations

AIDS:	Acquired immunodeficiency syndrome
BANC:	Basic antenatal care
BMI:	Body mass index
CDC:	Centers for Disease Control and Prevention
cm:	Centimetre
d:	Day
dl:	Decilitre
DNA:	Deoxyribonucleic acid
g:	Gram
HFBNP:	Health Facility-Based Nutrition Programme
HIV:	Human immunodeficiency virus
INP:	Integrated Nutrition Programme
IU:	International units
kcal:	Kilocalories
kg:	Kilogram
l:	Litre
LBW:	Low birth weight
MDG:	Millennium Development Goal
mg:	Milligram
ml:	Millilitre
mmol:	Millimol
MUAC:	Mid upper arm circumference
n	Sample size
NFCS-FB-I:	National Food Consumption Survey Fortification Baseline I
ng:	Nanogram (1 ng = 1 x 10 ⁻¹² kg)

NIDDM:	Non-insulin-dependent diabetes mellitus
NSP:	Nutrition Supplementation Programme
NTDs:	Neural tube defects
PHC:	Primary health care
R:	Rand (South African currency)
RDA:	Recommended dietary allowance
RE:	Retinol equivalents
SD	Standard Deviation
SF:	Symphysis-fundus measure(ment)
ug:	Microgram
UL:	Tolerable upper intake level
UNICEF:	United Nations Children's Fund
WHO:	World Health Organization
y:	Year

List of definitions

Antenatal:	The period of time before birth. ¹
Body mass index:	Weight in kilograms divided by the square of height in meters; body mass indexes of 20–24,9 kg/m ² are considered normal. ¹
Blastogenesis:	The transformation of lymphocytes into larger cells capable of undergoing mitosis. ²
Conception:	The fecundation of the ovum. ³
Deaf-mutism:	Lacking the sense of hearing and the ability to speak. ²
Diplegia:	Paralysis of corresponding parts (as the legs) on both sides of the body. ²
Dysarthria:	Difficulty in articulating words due to disease of the central nervous system. ²
Ectopic pregnancy:	Gestation elsewhere than in the uterus (as in a fallopian tube or in the peritoneal cavity). ²
Foetus:	The human child in utero after completion of the eighth gestational week. ⁴
First term:	See first trimester.
First trimester:	The first three months of pregnancy. ⁴
Fortification:	The process of adding nutritive substances not naturally occurring in the given food to increase its nutritional value. ⁵
Gestation:	The time from fertilisation of the ovum until birth; in humans, the length of gestation is usually 38–42 weeks. ⁵
Infant:	Birth to one year of age. ¹
Intrauterine:	Within the uterus. ³
In utero:	See intrauterine.

Late gestation:	See late term.
Late term:	Occurring or performed after the 20 th week of gestation in humans. ³
Low birth weight:	A birth weight of less than 2 500 g (5,5 lb). ¹
Low prepregnancy weight:	A woman with a BMI less than 20 kg/m ² before becoming pregnant. ¹
Malnutrition:	A condition that develops due to inadequate or unbalanced intake of nutrients or their impaired assimilation or utilisation. ⁴
Maternal:	Pertaining to the mother. ³
Neonate:	A newborn infant. ³
Neural tube defect(s):	A defect resulting from failure of the neural tube to close during the fourth week of embryogenesis; related to folic acid deficiency. ¹
Nutrition supplementation:	Nutrients taken in addition to normal food and drink to supplement the nutritional needs of the body. ⁴
Periconception:	Relating to the period from before conception to early pregnancy. ⁴
Perinatal:	From 28 weeks of gestation to four weeks after birth. ¹
Perinatal mortality:	The number of infant deaths occurring in the period that extends from 28 weeks' gestation to four weeks after birth. ¹
Placental abruption:	Premature detachment of the placenta from the wall of the uterus. ²

Placenta praevia:	An abnormal implantation of the placenta at or near the internal opening of the uterine cervix so that it tends to precede the child at birth, causing severe maternal haemorrhage. ²
Premature:	See preterm.
Preterm:	An infant born prior to the 37 th week of gestation; also referred to as a premature infant. ⁴
Quadriplegia:	Paralysis of all four limbs; also called tetraplegia. ²
Second term:	See second trimester.
Second trimester:	The middle three months of pregnancy. ⁴
Supplement:	Something that completes or makes an addition. ⁴
Symphysis-fundus measurement:	The distance from the junction of the pubic bones on midline in front to the uppermost part of the uterus. ⁶
Term infant:	One born from the beginning of the 38 th week through the 42 nd week of gestation. ⁵
Third term:	See third trimester.
Third trimester:	The third and final three months of pregnancy. ⁴
Trimester:	Any of three periods of approximately three months each into which a human pregnancy is divided. ⁴
Undernutrition:	The state that results from a deficiency of one or more nutrients. ⁵

CHAPTER 1: LITERATURE REVIEW

1.1 INTRODUCTION

Pregnancy nutrition plays an important role in the development of the foetus and the newborn infant's weight as well as long-term health risks for the infant.¹ During World War 2, famine was rife and undernutrition among pregnant women had deleterious effects on the health of their newborn babies and also on the health of these children later in life.¹⁻⁷ Exposure to famine during *any stage of gestation* was associated with glucose intolerance in adults aged 50 to 58 years,^{7,8} whereas those infants exposed to famine in *early gestation* was associated with more coronary heart disease, a more atherogenic lipid profile, disturbed blood coagulation, increased stress responses and more obesity in later life.⁷ Infants exposed to famine during *mid gestation* had more microalbuminuria and obstructive airway disease.⁷ These findings show that maternal undernutrition during gestation has important effects on health in later life; especially early gestation seems to be a vulnerable period.⁷

The key components of the American Dietetic Association guidelines for a healthy lifestyle during pregnancy include, among other things, appropriate weight gain, consumption of a variety of foods and appropriate and timely vitamin and mineral supplementation.⁹

1.2 NUTRITIONAL REQUIREMENTS DURING PREGNANCY

1.2.1 Energy

Due to the metabolic demands of pregnancy and foetal growth, additional energy is required.¹ Unlike the popular belief that the foetus can protect itself by parasitising the mother, the opposite is true.¹ Unbalanced diets during pregnancy, particularly with respect to protein and carbohydrates, have been linked to adverse pregnancy outcomes, including low birth weight (LBW).⁹ Table 1.1 gives a summary of the appropriate energy, protein and carbohydrate intake for pregnant women according to the different trimesters.

Table 1.1: Recommended energy, protein and carbohydrate intake for different trimesters during pregnancy.^{1,5,9,10}

Macronutrients	First trimester	Second trimester	Third trimester
Energy (kcal/d)	(+) 300	(+) 340–350	(+) 452–500
Protein (g/d)	60–71	60–80	60–84
Carbohydrates (g/d)	100–175	100–175	100–175

(+) Additional to the recommended intake for healthy nonpregnant women.

1.2.2 Protein

Protein is required to build foetal tissue as well as the tissue of the pregnant mother: blood volume increases, breasts develop and the uterus enlarges and fills with a sac containing amniotic fluid.⁵ For these reasons, protein intake for pregnant women is 71 g/d (compared to the 46 g/d for nonpregnant women).⁵

1.2.3 Micronutrients

1.2.3.1 Vitamin A

The recommended dietary allowance (RDA) of 4 000 IU/800 RE for vitamin A is not increased for pregnancy in view of maternal stores that easily meet foetal accretion rate. At least seven case reports of adverse pregnancy outcome have been associated with a daily ingestion of 25 000 IU/7 500 RE or more. In addition, epidemiological evidence indicates that the drug isotretinoin, a vitamin A analogue used for treatment of cystic acne, causes major malformations involving craniofacial, central nervous system, cardiac and thymic changes. These findings do not apply to β -carotene, a precursor of vitamin A. Vitamin A poses the most danger when taken in high amounts two weeks prior to conception and during the first two months of gestation.¹ Placental transport of vitamin A between mother and foetus is substantial, and recommended intakes are increased by 10% in

communities at risk for vitamin A deficiencies. Low maternal vitamin A status is inconsistently associated with intrauterine growth retardation in these communities. Diet supplementation with 7 000 µg RE vitamin A or 42 mg β-carotene is reported to reduce maternal mortality by 40% and 49%, respectively, but does not affect foetal loss or infant mortality rates.¹¹ Zinc supplementation during pregnancy improves vitamin A status of mothers and infants postpartum.¹²

1.2.3.2 Folic acid

Folate functions as a coenzyme in the metabolism of nucleic and amino acids¹; therefore, during periods of enhanced anabolic activity (such as pregnancy),¹³ folate requirements are increased.^{1,14} A deficiency in folic acid is marked by a reduced rate of DNA synthesis and mitotic activity in individual cells. Clinical detection of megaloblastic anaemia may not occur until the third trimester. Maternal folic acid deficiency is associated with an increased incidence of pregnancy-related problems, including congenital malformations in the offspring.¹

Neural tube defects (NTDs) account for most congenital anomalies of the central nervous system and result from failure of the neural tube to close spontaneously between the third and fourth week of in utero development.¹ Normally, the rostral end of the neural tube closes on the 23rd day and the caudal neuropore closes by a process of secondary neurulation by the 27th day of development, before the time that many women realise that they are pregnant.^{1,15} NTDs have a fairly high recurrence rate of 2–10% worldwide.¹ In South Africa the prevalence of NTDs was found to be 0,98 per 1 000 births in a study done among 12 public hospitals in four provinces.¹⁶ The Lancet series on Maternal and Child Undernutrition,¹⁷ the World Health Organization (WHO) publication on Prevention of Neural Tube Defects^{18,19} and the United Nations Children's Fund (UNICEF)²⁰ state and support findings that between 50% and 80% of NTDs can be prevented by the consumption of folic acid by women before and during early pregnancy.^{15,21} Red cell folate levels exceeding 906 nmol/l are best for preventing NTDs.¹ Since the neural tube closes by 28 days of gestation, folic acid supplementation should be initiated before conception and continued until at least 12 weeks of gestation when neurulation is complete.^{1,15}

Women planning a pregnancy should begin periconceptional supplementation with folic acid at levels 400–800 µg/d.^{1,9} The Institute of Medicine (United States of America) recommends 400 µg/d folic acid in addition to normal dietary intake to reduce the risk of NTDs.²² Women of childbearing age should be encouraged to include a generous amount of folic acid sources in their diets – dark green, leafy vegetables, legumes, orange juice, soy, wheat germ, almonds and peanuts.¹ Women with a folate intake of 240 µg/d or less were found to have double the risk of bearing a LBW or premature infant,^{1,23} especially when the deficiency occurred during the second and third trimester of pregnancy.²⁴ Mothers following a prudent eating pattern (high in fish, garlic, nuts and vegetables) had increased vitamin B₁₂ and serum folate levels and a lower risk of cleft lip/palate in their offspring compared to mothers following a Western diet (high in meat, fat and refined carbohydrates and low in fruit).²⁵

However, folic acid supplements are believed to be more bioavailable than food folate.²⁶ In a study done among late pregnant and lactating women, it was found that one third of highly educated women did not meet their folate requirements from diet alone. Without fortification, 98% of this sample would not have met their folate requirements from dietary sources.¹⁴ An extensive study on the effects of folic acid fortification reported a 19% drop in the rate of NTDs in the United States of America.²⁷ Data from the National Health and Nutrition Examination Survey before and after food fortification suggest that serum and red blood cell folate concentrations have increased by 153% and 63%, respectively.¹⁴ Food fortification with folate was also associated with significant decreases in the prevalence of spina bifida among non-Hispanic white (34%) and Hispanic (36%) births.²⁸

In Ethiopia 46% of women of childbearing age had a severe folate deficiency (< 4 ng/ml), 21% had a marginal deficiency (4–6,6 ng/ml) and 33% had an optimal level (> 6,6 ng/ml).²⁹ The study suggested that folate deficiency in Ethiopia was related to diet, since the risk of women of childbearing age to develop folate deficiency was 0,9 times lower among those who consumed grain and vegetables more than once a day.

According to a study in Vancouver, Canada, 95% of women had heard of folate but only 25% knew that it could prevent birth defects.³⁰ The most common sources of information on folate were magazines, newspapers, doctors, television and radio. Lack of awareness of the importance of folate was the most common reason given for choosing not to use folic acid supplementation before pregnancy. Seventy-eight per cent of the women indicated that with knowledge of the benefits of folate, they would have used supplemental folic acid daily to reduce the risk of birth defects.³⁰

In South Africa the findings of the National Food Consumption Survey of 1999 identified, among other parameters, the foods most commonly consumed in the country by type and amount³¹ and paved the way for the statutory fortification of maize and wheat products. The legislation was enacted in April 2003 and implemented in October 2003.³² Nutrients added to maize meal and wheat flour included folic acid as part of the six vitamins that were added. Other nutrients that were added were vitamin A, B₁, B₂ and B₆, niacin, iron and zinc.^{32,33}

A study conducted in the Limpopo Province in South Africa showed a significant improvement in folate status in women of childbearing age approximately nine months after this fortification of maize and wheat products had been introduced in South Africa.³⁴ The prevalence of low serum folate (< 3 ng/ml) in the study population was 28% before fortification; after fortification, none of the women had low serum folate. Low red cell folate (< 164 ng/ml) was observed in 26% of subjects before fortification and in 2% of subjects after fortification. In another study done in the Limpopo Province, folate deficiency based on red cell folate and serum folate was present in 5% and 10% of pregnant women, respectively. The authors explained this improvement of folate levels, compared with previous studies done in the same province, as a result of the folate supplementation by the Department of Health.^{35,36} A study that involved 12 provincial hospitals was also done in South Africa to measure the change in prevalence of NTDs before and after the implementation of the food fortification legislation. This study showed a significant decline of 30,5% in NTDs.¹⁶

The National Food Consumption Survey Fortification Baseline (NFCS-FB-I) study was conducted in 2005 in South Africa.³⁷ The panel summarised its findings as follows: 1) The status of folic acid, according to mean serum and red blood cell folate, appeared to be adequate throughout the country. 2) Higher serum and red blood folate concentrations were noted among respondents from provinces where there was a better consumption of green leafy vegetables. 3) This could be the first indication that the food fortification programme was associated with a beneficial outcome. These findings of the NFCS-FB-1 support the findings of the Limpopo Province studies and correlate well with the finding of a reduction in the prevalence of NTDs.

1.2.3.3 Vitamin B₁₂

Vitamin B₁₂ is required for a series of reactions that precede the role of folic acid in DNA replication.¹ Without vitamin B₁₂ folic acid is unable to assist in the manufacturing of red blood cells.^{3,38} Vitamin B₁₂ is also essential for the synthesis and maintenance of myelin, the substance that permits speedy transmission of impulses along the nerves. Vitamin B₁₂ requirement is therefore slightly raised during pregnancy to 2,6 mg/d.⁵ Vegetarians particularly should be informed of the cobalamin content of their food because neurological impairment has occurred in their infants.⁵

1.2.3.4 Vitamin C

Increased amounts of vitamin C are needed during pregnancy.⁵ Vitamin C converts folic acid into its active form, enhances the absorption of iron and helps to form connective tissues. Women who have been using oral contraceptives have been found to have lower levels of vitamin C, among other nutrients, that may take four months to return to normal after the drugs have been discontinued. Early signs of vitamin C deficiency are tender sore gums that bleed easily and small skin haemorrhages due to weakened blood vessels.⁵ Pregnant women with low vitamin C levels has a risk of prolonged rupture of membranes and amnionitis, which are both common causes of preterm delivery.³⁸ The dietary reference intake for vitamin

C during pregnancy ranges between 80 and 85 mg/d, compared to the 60 mg/d for nonpregnant women.³⁹

1.2.3.5 Calcium

Calcium is the chief mineral in the adult body, with the bones serving as a storage depot. When serum calcium is low, the bones demineralise to restore the serum level. However, no long-term detrimental effect of pregnancy on bone mineral measure was found in a study of 2 516 twins. Intestinal absorption of calcium increases during pregnancy. In a longitudinal study, it was found that the average proportion of calcium absorbed increased from 33% at prepregnancy to 50% during the second trimester and to 54% during the third trimester. One reason for this increased absorption is the ability of the placenta to convert inactive vitamin D to the active form. The adequate intake for calcium for pregnant women 19 years and older is 1 000 mg/d. For pregnant women 18 years and younger, the adequate intake is 1 300 mg/d.⁵

1.2.3.6 Phosphorus and magnesium

In addition to calcium, two other minerals involved in skeletal formation are also in great demand during pregnancy: phosphorus and magnesium.⁵ The RDA for phosphorus is 1 250 mg/d for pregnant women 19 years and younger and 700 mg/d for pregnant women 19–50 years.⁵ The RDA for magnesium is 350 to 400 mg/d for pregnant women.

1.2.3.7 Iron

A marked increase in the maternal blood supply during pregnancy greatly increases the demand for iron.¹ With the availability of this mineral, total erythrocyte volume increases by 20–30%. Active bone marrow may utilise an extra 500 mg of elemental iron during pregnancy, and the term foetus and placenta accumulate 250–300 mg of elemental iron. A pregnant woman must have between 700 and 800 mg of extra iron, most of which is needed during the last half of pregnancy. Averaged over the entire pregnancy, this amounts to a daily increment of 15 mg iron. Adding this to the recommended intake of 15 mg/d for nonpregnant

women, it brings the recommendation for pregnant women to 27–30 mg/d.^{1,9} Women rarely enter pregnancy with sufficient iron stores to cover extra needs; therefore, iron supplementation (usually in a ferrous salt form) is often acknowledged as a necessary means of preventing iron deficiency anaemia. Maternal anaemia is defined as a haematocrit value < 32% and a haemoglobin level < 11 g/dl.¹ Elevated maternal haemoglobin levels (> 13 g/dl) have been associated with increased foetal risk as well as increased maternal hypertension, possibly reflecting a failure in plasma volume expansion or the harmful effect of high haemoglobin levels on utero-placental circulation. Maternal anaemia is associated with perinatal maternal and infant mortality and premature delivery,⁴⁰ impaired mother-infant interaction,⁹ muscle dysfunction and lower physical capacity.⁴¹

In a randomised controlled trial, it was found that maternal iron supplementation from enrolment to 28 weeks of gestation led to a significantly higher mean birth weight (increased birth weight by 206 g), a significantly lower incidence of LBW infants and a significantly lower incidence of preterm LBW infants when compared with a placebo.⁴²

According to the 1999 National Nutrition Survey in Mexico, the prevalence of anaemia was 27% among pregnant women. Women maintained sufficient iron stores during the first 16 weeks, but from there on there was a substantial reduction, especially at 28 weeks of gestation.⁴³

In South African studies, anaemia has been diagnosed in 7–29% of pregnant women. In the Limpopo Province, low haemoglobin levels were present in 8% of the women before fortification with iron and in 5% of the women after fortification.³⁴ Iron deficiency was present in 51% of participants in another study done in the Limpopo Province; 26% were severely iron depleted (ferritin levels < 12 ug/ml) and 25% were moderately depleted (ferritin levels between 12 and 20 ug/ml).^{35,36} Mothers who were students had an 11,43 higher risk of being anaemic than those who were not students. For those who were unemployed, the risk was 8,43 compared with those who were employed.³⁵ The South African NFCS-FB-I

found that a third of women were anaemic on the basis of haemoglobin concentration and that a fifth of women had a poor iron status.³⁷ In other parts of sub-Saharan Africa, the prevalence of anaemia among pregnant women ranges from 22% in Kenya to 69% in Malawi.³⁵

For optimal absorption, iron supplements should be taken between meals, not with milk, tea or coffee.¹ If iron deficiency anaemia is detected, therapy should consist of 60–120 mg ferrous iron in divided doses throughout the day.^{1,9} When haemoglobin returns to the appropriate level for pregnancy, a regimen of 30 mg/d may be resumed.¹

1.2.3.8 Iodine

As part of thyroid hormones, iodine is essential to the control of metabolism. The thyroid gland secretes thyroxine (T_4) and triiodothyronine (T_3) in response to the thyroid-stimulating hormone from the anterior pituitary gland. Both T_3 and T_4 increase the oxidation rate in cells, thereby increasing metabolism. During the second half of pregnancy, resting energy expenditure increases by 23%.⁵ The RDA for iodine for pregnant women is 175–220 μg .^{1,5} For deficiencies in countries where cretinism is endemic, supplementation is recommended. Cretinism is a congenital condition present at birth,⁵ characterised by mental deficiency, spastic diplegia or quadriplegia, deaf mutism, dysarthria, short stature and hypothyroidism.¹ In South Africa it was found during the NFCS-FB-I that, based on the median urinary iodine of women and children, iodine deficiency disorders had been virtually eliminated. In the Northern Cape Province, urinary iodine was found to be in the excessive category of iodine status and further investigations were recommended.³⁷ In the light of these findings, iodine supplementation (excluding table salt and iodine found in water) is not recommended to pregnant women in South Africa.

1.3 ADVERSE CONSEQUENCES OF MATERNAL MALNUTRITION

1.3.1 Perinatal mortality and birth weight

The birth weight of infants correlates better with perinatal mortality than with the length of gestation; therefore, the aim should be to decrease the incidence of LBW deliveries in order to decrease mortality rates.¹ LBW also leads to an increased risk of adult non-insulin-dependent diabetes mellitus (NIDDM) and features of the insulin resistance syndrome⁴⁴ as well as the development of chronic heart disease in adult life.⁴⁵

A study in South Africa investigated infant mortality rate inequalities in the Western Cape Province. The most common defined cause of death in all areas (except rural farm areas) was LBW.⁴⁶ The Saving Babies 2003 Report reported a LBW rate of 15,4% for South Africa and 19,8% for the Western Cape Province.⁴⁷ In the Cape Town Metropolitan Area, the LBW rate was 15,2% in 2005.⁴⁸ The occurrence of LBW deliveries decreased to 13,1% in South Africa and 15,7% for the Western Cape Province in 2010.⁴⁹

Inadequate maternal weight gain during pregnancy is associated with a significantly lower infant birth weight.^{1,50} Correlation between infant birth weight and prepregnancy body mass index (BMI) showed conflicting results. For example, one study found no correlation between prepregnancy weight and infant birth weight⁵⁰ while other studies reported that a low prepregnancy weight has a negative influence on infant birth weight.^{1,5,10,36} Maternal weight gain supports the products of conception (foetus, placenta and amniotic fluid) and maternal accretion of tissue (expansion of blood volume and extracellular fluid, uterine and mammary glands and maternal fat stores).⁹ Low maternal weight at delivery is associated with preterm labour, LBW and prematurity.⁵¹

Epidemiological studies have shown that both small size and thinness of infants at birth are related to later disease in life (e.g. chronic heart disease and diabetes mellitus). In a study of over 15 000 men and women born between 1911 and 1930, death rates from chronic heart disease fell progressively between those who

weighed less than 2,5 kg at birth and those who weighed 4,3 kg;^{52,53} thus, the lower the birth weight below 2,5 kg, the greater the chance of developing a chronic heart disease. There was also a steep fall in the prevalence of glucose tolerance or NIDDM between men who were small and those who were large at birth.⁵⁴ Moreover, it is thinness at birth and not simply small size that is associated with the insulin resistance syndrome, which includes impaired glucose tolerance, raised blood pressure and disturbed lipid metabolism, in later life.⁵⁵ It has been suggested that undernutrition in mid to late gestation alters the normal pattern of muscle development, leading to modifications in muscle metabolism and insulin resistance.^{8,56} A proposed mechanism for this alteration in muscle development is that poor foetal and infant nutrition has an effect on nuclear steroid/thyroid hormone receptors, such as sarcolemmal growth hormone receptor, janus kinase 2 phosphorylation and insulin-like growth factors, glucose transporters myosins and glycolytic enzymes. This effect causes impaired cellular growth and metabolism (e.g. vascularisation and glucose sensitivity) together with insulin resistance, NIDDM and cardiovascular disease.⁵⁶

The most extensive, consistent and persuasive data relate to the association between LBW and high blood pressure.⁵⁷ It was found in all ages and populations studied that as blood pressure increased, birth weight tended to decrease.⁵⁸

It has been speculated that LBW contributes to renal disease among the Aborigines in Australia's Northern Territory. The researchers thought that the association might be mediated through impaired nephrogenesis caused by intrauterine malnutrition.⁵⁹

1.4 CONSEQUENCES OF NONNUTRITIONAL FACTORS

1.4.1 Alcohol

Heavy alcohol consumption is linked with teratogenicity.¹ Another outcome of high alcohol consumption during pregnancy is foetal alcohol syndrome. Features of this syndrome include prenatal and postnatal growth failure, developmental delay, microcephaly, eye changes (including involvement of the epicanthal fold), facial

abnormalities and skeletal joint abnormalities.^{1,6} Alcohol use during pregnancy is also associated with an increased rate of spontaneous abortions, placental abruption and LBW delivery.¹ Due to insufficient data to recommend any safe level of alcohol consumption during pregnancy, pregnant women are advised to abstain from alcohol during pregnancy.^{1,6}

The mechanisms by which alcohol affects the foetus are still unclear. Alcohol may accumulate to toxic levels when crossing the placenta, which are damaging during blastogenesis and cell differentiations. Foetal damage may also be caused by dietary deficiency (i.e. folic acid, magnesium and zinc), which is known to occur among heavy drinkers.⁶

1.4.2 Smoking

Smoking, whether a woman is pregnant or not, exerts harmful effects. Pregnancy just dramatically magnifies the hazards of this practice: smoking during pregnancy harms the placenta, the embryo, the foetus and the infant and child in later life.⁶

Cigarette smoking during pregnancy is associated with greater risk of spontaneous abortion, placenta praevia, placental abruption, ectopic pregnancy, preterm birth, foetal growth retardation and sudden infant death syndrome.⁹ The more a pregnant woman smokes, the smaller her infant will be.⁶ On average, infants of mothers who smoke weigh 200 g less than those born to non-smoking mothers.⁶ The deficit reflects a disproportionate lack of lean tissue. This LBW reflects a small-for-gestational-age profile, indicating that maternal smoking directly retards foetal growth rate.⁶

Tobacco smoke contains hundreds of compounds that are harmful, including nicotine and carbon monoxide.⁶ Carbon monoxide and nicotine from smoking increase foetal carboxyhaemoglobin⁹ and restrict the blood supply to the growing foetus and so limit oxygen and nutrition delivery and waste removal.⁶ Carbon monoxide in pregnant mothers' blood may deprive the developing foetus of the oxygen necessary for optimal growth.⁶

1.5 THE NEED FOR NUTRITIONAL SUPPLEMENTATION PROGRAMMES

The Millennium Development Goals (MDGs) are eight goals that all United Nations (UN) member states have agreed to try to achieve by the year 2015.⁶⁰ The UN Millennium Declaration, signed in September 2000, committed world leaders to combating poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women. The MDGs are derived from this declaration and all have specific targets and indicators. South Africa, as one of the UN member states, has committed to the eight MDGs and included them in a national set of 10 priorities.⁶¹ The eight MDGs are 1) to eradicate extreme poverty and hunger, 2) to achieve universal primary education, 3) to promote gender equality and empower women, 4) to reduce child mortality, 5) to improve maternal health, 6) to combat HIV/AIDS, malaria and other diseases, 7) to ensure environmental sustainability and 8) to develop a global partnership for development.⁶¹ MDG 5 (to improve maternal health) has two targets, namely 1) to reduce by three quarters, between 1990 and 2015, the maternal mortality ratio and 2) to achieve, by 2015, universal access to reproductive health.⁶² Maternal deaths per 100 000 live births were 870 for sub-Saharan Africa in 1990. This value declined to 640 deaths per 100 000 live births in 2008. Despite this decline, a woman's risk in sub-Saharan Africa to die from preventable or treatable complications of pregnancy and childbirth over the course of her life is one in 31, compared to only one in 4 300 in the developed regions.⁶³ South Africa's MDG target for 2015 for maternal mortality is 38 deaths per 100 000 live births, far below the actual 625 deaths per 100 000 live births found in 2007.⁶¹ South Africa will probably not meet the target of 38 maternal deaths per 100 000 live births by 2015. The target of 100% antenatal care coverage (at least one booking visit and at least four follow up further visits) was met by South Africa in 2009 with 102,8%.⁶¹ South Africa should continue to look for strategies to optimise pregnancy outcomes.

The Centers for Disease Control and Prevention (CDC) has made 10 recommendations for preconception interventions to optimise pregnancy outcomes. These recommendations are 1) individual responsibility across the life

span, 2) consumer awareness, 3) preventive visits, 4) interventions for identified risks, 5) interconception care, 6) prepregnancy check-up, 7) health insurance coverage for women with low incomes, 8) public health programmes and strategies, 9) research and 10) monitoring of improvements. Recommendation 2 (consumer awareness) suggests health promotion campaigns, which include healthy diet and optimal weight. One of the 10 action steps that should be taken during counselling (Recommendation 3: preventive visits) suggests counselling concerning nutrition, folic acid intake and weight management.⁶⁴

In South Africa there are two kinds of medical health care available: private sector and governmental sector. Only the wealthy make use of private sector health care while governmental sector health care allows anyone to make use of government health care facilities, despite the patient's gender, ethnic descent or employment status.⁶⁵ The governmental sector thus makes provision for health insurance coverage for women with low incomes (Recommendation 7 of the CDC).

Within the governmental health care system, there are primary health care facilities, secondary health care facilities and tertiary health care facilities. South Africa has nine provinces and each province is divided into districts. Each district has primary health care (PHC) clinics to ensure that health care is available to all. Already at this level it is mandatory that health care professionals give advice to patients on a healthy lifestyle to advocate healthy living and prevent undesirable fatal health outcomes⁶⁶ since South Africa is bound to the Alma-Ata Declaration of 1978 as well as the Kopanong Declaration on Primary Health Care of 2003. These strategies comply with recommendations 1, 2, 3, 4 and 8 of the CDC.

Examples of a few strategies in place to promote a healthy lifestyle and prevent fatal outcomes in the South African context are the Baby-Friendly Hospital Initiative, prevention of mother-to-child transmission of human immunodeficiency virus (HIV), Road to Health Chart (child growth monitoring and promotion), food fortification, nutrition education as part of the school curriculum, school feeding programmes and the Nutrition Supplementation Programme (NSP).⁶⁷ South Africa also has its own Medical Research Council that supports the Department of Health

in monitoring and evaluation of the effectiveness of current policies and strategies and the health status of South Africans.⁶⁶ This complies with recommendations 9 and 10 of the CDC. Although all these strategies are in line with the CDC's recommendations, there may be a problem with the implementation of these strategies. South African clinics tend to have a shortage of health care professionals, have limited resources and experience financial constraints due to a strict budget within which they have to render an effective service to all South Africans.⁶⁷

Pregnant women with a poor nutritional intake can benefit from nutrition supplementation, which can be taken in the form of additional energy, protein, vitamins or minerals.¹ Multivitamin and -mineral supplementation is recommended for women with iron deficiency anaemia or poor-quality diets. Multivitamin and -mineral supplementation may also be beneficial in pregnant women who are infected with HIV.⁹ In HIV-infected women in Tanzania, a supplement containing a vitamin B complex, vitamin E and vitamin C slowed progression of the disease, reduced some of the complications of HIV and reduced the incidence of LBW infants compared to using iron and folic acid alone.^{68,69} It may be that micronutrient supplementation protects the integrity of oral and gastrointestinal epithelia and enhances local and systemic immunity and hence reduces the progression of HIV.⁶⁸ Multivitamins may also reduce HIV replication because viral loads were significantly lower after supplementation.⁶⁸ Maternal micronutrient supplementation in rural Nepal decreased the incidence of LBW neonates by almost 15%,⁷⁰ and in a randomised, placebo-controlled, doubled-blind trial in Zimbabwe, it was found that supplementation might be a feasible strategy to increase birth size.⁷¹

1.6 THE INTEGRATED NUTRITION PROGRAMME OF SOUTH AFRICA

Malnutrition is a serious problem in South Africa.^{37,72,73} Under- and overnutrition coexist between and within communities and across age groups. Stunting among children aged 1–9 years was found to be 18% in the NFCS-FB-I and underweight 9,3%.³⁷ In the same age group, 10% of the children were classified as overweight according to international standards and 4% as obese. Among women of

childbearing age, the prevalence of chronic energy deficiency (defined as a BMI < 18,5) was 4,6%. On the other end of the scale, the combined prevalence of overweight and obese women was 51,5%. When studying the UNICEF conceptual framework, one sees that inadequate food intake and illness are the most immediate causes of this malnutrition.²⁰ One of the underlying causes, according to the conceptual framework, that could influence inadequate food intake is household food insecurity. The NFCS-FB-I found that one out of two households experienced hunger, one out of four was at risk of hunger and only one out of four appeared to be food secure.³⁷ This means that almost half of the South African population experiences household food insecurity. Some of the basic factors that are outlined by the framework to contribute to the malnutrition are poverty and a lack of resources.²⁰

During the elections of 1994 in South Africa, the Department of Health was tasked to implement a national feeding scheme. During 1995 the Integrated Nutrition Programme (INP) was born.⁷⁴ Some of the main aims included were reduction of the prevalence of LBW neonates, reduction of iron deficiency anaemia in pregnant women and reduction of subclinical vitamin A deficiency.⁷⁴ In September 2002, once again one of the strategic objectives of the INP was to decrease the prevalence of LBW neonates and underweight in pregnant and lactating women.⁷⁵ Today the NSP of the Health Facility-Based Nutrition Programme (HFBNP) is seen as part of the broader INP that is implemented at primary health care level. Two focus points of the HFBNP are 1) to improve the feeding practices of pregnant and lactating women and 2) to ensure that health workers are trained and encouraged to implement the policy.⁷⁶

The South African Government compiled the INP in order to address the malnutrition problem by providing adequate health care and nutrition to South Africans who are at risk of malnutrition, throughout the lifespan.⁷⁷ The INP supports exclusive breastfeeding of infants younger than six months, growth monitoring of children younger than five years, poverty alleviation, food institutions, deworming and the primary school nutrition programme.⁷⁷ The INP makes

provision for the NSP, which includes supplements (e.g. vitamin A) and nutrition advice for specific conditions (e.g. HIV and tuberculosis).

Statistical information on the number of pregnant women registered with the NSP in the Western Cape Province is unavailable.⁷⁸ Statistical data collection and information cluster pregnant and lactating women together, which causes data to be reflective of both groups and not pregnant women alone. Available data also reflect only *new* pregnant and lactating women enrolled in the NSP and not those women already in the NSP. No data are available on the number of pregnant women exiting the NSP successfully. Due to the lack of specific data for pregnant women registered with the NSP, it is difficult to draw conclusions regarding pregnant women and the NSP.

In future literature the NSP will be known as the Nutrition Therapeutic Programme (NTP). The name change occurred during 2011 on request from the South African Government. Since the change was implemented after completion of this study, the investigator will use the term NSP in this document.

1.6.1 Summary of Nutrition Supplementation Programme for pregnant women

During the first visit to the basic antenatal care (BANC) clinic, pregnant women should be evaluated according to the entry criteria (see Table 1.2) for their specific target group of the NSP. Identified patients are entered into the NSP and they should then visit the counsellor on a monthly basis to be re-evaluated to ensure positive progress regarding nutritional status and effectiveness of intervention. During each visit the identified pregnant women should receive nutritional products, as stipulated in Table 1.2.

Table 1.2: Summary of Nutrition Supplementation Programme for pregnant women⁷⁶

Target group	Entry criteria	Products available
Pregnant women	<ul style="list-style-type: none"> • Insufficient growth according to symphysis-fundus graph • Mid upper arm circumference < 23 cm 	<ul style="list-style-type: none"> • Enriched porridge • Enriched nutritional supplementary drink for adults • B-immune energy drink: 40 g sachets • High-energy enriched paste (if no history of nut allergy)

Pregnant women are also eligible to receive micronutrients (folate and iron) with each visit to the BANC clinic.

1.7 MOTIVATION FOR STUDY

Nutrition during pregnancy plays an important role in the newborn infant's weight as well as in long-term adverse health outcomes, for example ischaemic heart disease, hypertension and NIDDM.^{1,26} Factors such as LBW, disproportion in head circumference and below-average length and weight are markers of lack of nutrients at particular stages of gestation, which reflect adaptations that the foetus made to sustain its development. This adaptation has the potential to permanently programme the body's structure and function.⁴⁵ To maintain health during pregnancy, adequate energy, vitamin and mineral intake is essential.¹ Increase in daily intake or supplementation can help pregnant women to meet their acquired needs, although supplementation with iron and folate is recommended for all pregnant women.¹

Although a high dose vitamin A is contra indicated for pregnant women, it is indicated that post partum mothers should receive vitamin A after delivery. Pregnant women should therefore be aware of this intervention, and by including vitamin A in the study, the data could be used to determine awareness of vitamin A among pregnant women. In developing countries, such as South Africa, vitamin A deficiency is also a reality.^{11,12,80} Vitamin A deficiency during pregnancy can lead to intrauterine growth retardation.¹¹

Almost 12 years have passed since the initiation of the INP and yet no study has been conducted to fully evaluate the implementation and efficacy of the nutritional supplementation programmes available to pregnant women. For the INP to be successful, it relies on two components found in the health care system: those who implement the programme and those who need to follow the instructions. Health care workers, such as nursing personnel, would qualify as those who implement the programme and patients, such as pregnant women, would qualify as those who need to comply with the interventions. To follow the instructions (comply), pregnant women must receive adequate information, understand the instructions correctly and be motivated to fulfil the intervention. For the INP to be successful, not only do pregnant women need to receive adequate information but they also need to receive the correct supplements. Not receiving these supplements or incorrect usage thereof could lead to health risk for the pregnant woman and her unborn infant. As the nutrition supplementation programmes relies largely on the compliance of the individual receiving the product(s), it is thus important to understand how well it is implemented at clinic level and adhered to at household level to ensure patients reap the full benefit it has to offer.

CHAPTER 2: METHODOLOGY

2.1 AIM

To evaluate the implementation of the NSP for pregnant women in the Cape Town Metropolitan Area of the Western Cape Province, South Africa.

2.2 OBJECTIVES

1. To determine pregnant women's awareness regarding the NSP food-, folate-, iron- and vitamin A supplementation programmes at PHC clinics.
2. To determine whether pregnant women visiting the PHC clinics qualified for the NSP food-, folate-, and iron supplementation.
3. To determine whether qualifying pregnant women visiting the PHC clinics received and were compliant with the prescribed NSP food-, folate- and iron supplementation regimens.

2.3 METHODOLOGY

This thesis serves as a substudy that forms part of a larger parent study: *Evaluation of selected components of health facility-based nutrition programmes in the Western Cape Province of South Africa* (Ethics approval number N07/10/232, Appendix H).

The aim of the parent study was to examine various nutrition supplementation programmes offered at PHC clinics and HIV/AIDS clinics in the Western Cape Province. Target groups of the parent study included children and their mothers, pregnant and lactating women and patients with HIV/AIDS and/or tuberculosis who visited these clinics.

As part of the parent study project, the evaluation of the NSP for children under five years and their caregivers has already been conducted by two master's students of Oslo University, Norway.^{81,82} A qualitative study has also been done among HIV/AIDS patients at the various PHC clinics in the Western Cape Province by another master's student of Oslo University.⁸³ The present substudy focused its

research on pregnant women visiting BANC clinics in the Cape Town Metropolitan Area.

2.3.1 Study design

A cross-sectional descriptive study was conducted amongst pregnant women visiting all PHC clinics hosting BANC in the Cape Town Metropolitan Area, with the exception of one clinic that was used in the pilot study.

2.3.2 Study population

The study population consisted of all pregnant women visiting public BANC clinics in the Cape Town Metropolitan Area on the day the researcher visited the clinic. Other health care units that provide BANC include hospitals and maternity obstetric units. These units were not targeted by the parent study and were excluded during sampling.

The study population was derived from the poorer part of the population, who could only afford to visit a government-funded clinic since services at these clinics are free of charge. Most of the clinics were situated in the lower sociodemographic areas of the Cape Town Metropolitan Area, such as Gugulethu, Khayelitsha, Masiphumelele in Noordhoek, Manenberg and Du Noon. These areas are known for their informal settlements, poor sanitation and high crime rates.⁸⁴

2.3.3 Sample selection

At the time of data collection, in the Cape Town Metropolitan Area only 14 PHC clinics hosted BANC. One of the 14 clinics was chosen randomly for validating the questionnaire and was not included in sampling.

Census sampling of the remaining BANC clinics were used by including all 13 clinics that hosted BANC in the Cape Town Metropolitan Area. Nonrandom quota sampling was used to select 7–10 pregnant women at each clinic, giving a total sample size of 114. On arrival at each clinic, whichever pregnant woman was first

in line and met the entry criteria was asked to participate in the study. After completing the interview with a pregnant woman, the next pregnant woman in line was asked to participate. The interviewer continued this process until the quota of pregnant woman was met. Only women that met the stated selection criteria were included in the study.

2.3.3.1 Inclusion criteria

Participants were included in the study if they complied with the following inclusion criteria:

- Had to be pregnant.
- Had to attend the selected BANC clinic on the day of data collection.
- Had to be 18 years or older.
- Informed consent had to be given.
- Had to be able to communicate in Afrikaans, English or Xhosa.

2.3.3.2 Exclusion criteria

Participants were excluded from the study if they complied with the following exclusion criteria:

- Not pregnant.
- Younger than 18 years old.
- Did not give written informed consent.
- Participated in the pilot study.

2.4 DATA COLLECTION

Data collection took place from May 2008 to June 2008. Due to time constraints, only one day was spent at each clinic where 7–10 participants were interviewed by the investigator on weekdays from 07:30 till 16:00. Before each interview, the investigator explained the study objectives to the participant and it was stated

clearly that participation was voluntarily. If participants agreed to participate, the consent form was explained to them and they were kindly asked to sign the consent form. Interviewing only started after each participant had signed the consent form.

The investigator, who can speak Afrikaans and English fluently, collected the data. For those participants who could only speak Xhosa, the investigator made use of a hired interpreter. The interpreter was familiar with translation work since she translated for health care professionals in the community on a regular basis. Before the study commenced, the interpreter was informed about the objectives of the study and the questionnaire was explained to her in detail.

A week before commencing data collection, each clinic was phoned and informed about the study and letters of approval from the ethics committees of Stellenbosch University and the Department of Health were faxed to the clinics where possible (see Appendix A). If not possible, an address was obtained from the particular clinic to post certified copies of documentation. Clinics were notified telephonically regarding the date and time of planned visits. A day prior to data collection, the clinic was phoned again to confirm the date and time of arrival.

2.4.1 Questionnaire

A structured questionnaire for the pregnant women was completed during the interviews with individual participants. It was adapted from the questionnaire developed for the parent study and consisted of 55 questions divided into two sections: sociodemographic data (18 questions) and supplementation data (37 questions). The supplementation section was divided into four subsections: introduction (six questions), vitamin A supplementation (10 questions), nutrition supplementation (12 questions) and micronutrient supplementation (nine questions). Each of the subsections was completed by the investigator according to the participants' responses. These questions were developed in collaboration with dieticians from the Provincial Department of Health, Western Cape. The questionnaire was available in Afrikaans, English and Xhosa (see appendixes B, C

and D) with translations by professional translators from the Language Service of Stellenbosch University.

In each subsection (vitamin A, nutrition and micronutrient supplementation), the questions were aimed towards determining the awareness of the participants of the supplementation programme during pregnancy and whether these participants received the supplements and complied with the intervention.

2.4.1.1 Questions to assess awareness of the supplementation programmes among participants

The following questions aimed to assess the awareness of the participants of the supplementation programmes:

- Have you heard about any of these nutritional supplementation offered at this clinic? (Question 20)
- Have you seen any of these supplements? (Show examples of supplements) (Question 21)

Within each subsection (vitamin A, nutritional and micronutrient supplementation), questions were asked to determine awareness for the specific subsection (i.e. vitamin A supplementation):

- Has anyone talked to you about vitamin A supplementation? (Question 29)
- Have you received any written information about vitamin A supplementation? (Question 32)

2.4.1.2 Questions to determine whether qualifying pregnant women received and are compliant with the prescribed supplementation regimens

The following questions aimed to assess whether the qualifying pregnant women received prescribed supplements and whether they were compliant with the intervention:

- Have you received any of these supplements for yourself? (Question 22)
- If yes, what type of supplementation have you received? (Question 23)

The questions within each subsection to determine whether qualifying pregnant women received supplementation and whether they complied with the intervention were as follows (i.e. micronutrient supplementation):

- Do you remember when you received the micronutrient supplementation? (Question 48)
- Who gave it to you? (Question 49)
- Have you experienced any problems taking the micronutrient supplementation? (Question 54)
- Have you experienced any side effects with the micronutrient supplementation? (Question 55)

2.4.1.3 Pilot study

A pilot study was conducted before the substudy commenced in order to improve face validity. A BANC clinic was chosen randomly from the 14 BANC clinics available in the Cape Town Metropolitan Area. At this clinic, 10 pregnant women were asked to participate in the pilot study. This BANC clinic and participating pregnant women did not form part of the study population for the actual study.

2.4.1.4 Changes to questionnaire

Following the pilot study of the 10 pregnant women visiting the BANC clinic, adaptations were made to the questionnaire in order to improve face validity. Adaptations to questions included the following: In the anthropometric section, questions were aimed at gathering information regarding pregnancy anthropometry (for example, gestational period, symphysis-fundus [SF] measurement and mid upper arm circumference [MUAC] were included). In the case of Question 19 (breastfeeding practices), questions were put in a futuristic form, for example, “Do you plan to breastfeed your baby?” instead of “Did you breastfeed your baby?” In the micronutrient section, Question 50 (“Did you take the micronutrients at the clinic?”) was left out since the pregnant women were supposed to receive supplementation to take at home and not at the clinic.

2.4.2. Determining whether participants qualified for the supplementation programme

The participant's age, weeks of gestation and SF measurement were recorded from the participant's medical file. The SF measurement could be read from a graph that was available in the participant's file. The graph had different intervals for gestation in weeks (on the X-axes) and SF measurement in centimetres (on the Y-axes). Across the graph there were three different percentile curves, namely the 10th, 50th and 90th percentiles. Insufficient growth was defined as a measurement below the 10th percentile or a measurement that showed growth stagnation/decline (even if the measurement was above the 10th percentile).⁸⁵ Insufficient growth was seen as inclusion criterion for the NSP. These measurements were taken by the nursing staff at the clinic.

The MUAC, in centimetres, was measured by the investigator using a measuring tape to determine eligibility for the NSP food supplementation. An MUAC below 23 cm was used as entry criterion, as stipulated in the Department of Health's policy and implementation guidelines for the NSP of the HFBNP.⁷⁶ The procedure followed for the anthropometric measurement was as follows⁸⁶:

For the midpoint of the upper arm:

- The measuring apparatus was checked by making sure that the material of the measuring tape was nonelastic, that measure indicators were in millimetre and/or centimetre and that those indicators were clearly marked.
- The measurement was taken on the right arm.
- The woman was standing in an upright position with her feet together.
- The arm was bent at 90⁰ at the elbow.
- The palm of the hand showed upwards.
- The midpoint between the upper edge of the acromion and the point of the olecranon was taken, in the posterior position.

MUAC:

- The measurement was taken on the right arm.
- The measurement was taken on the horizontal plane on the same level as the midpoint of the arm.
- The woman stood with her arm hanging relaxed beside her hip.
- Soft tissue was not pressed together.
- The measurement was taken to the last millimetre.
- The mean of three measurements was used as the MUAC.

2.5 ETHICS**2.5.1 Informed consent**

The consent forms (see appendixes E, F and G) were thoroughly explained to the participants before data collection. Names of the clinics and participants were only used on the consent forms, and each participant received a copy of the form. Participants had a choice in language preference of Afrikaans, English or Xhosa. It was clearly stated before the interview that participation was voluntary. The participants had the option to withdraw from the study during any stage of the interviewing process.

2.5.2 Confidentiality

Each participant had an identification number, which was randomly allocated and entered on the questionnaire form in the allocated space. The identification number consisted of an acronym associated with the clinic visited and a number between zero and 10. The number was allocated as participants entered the room for the interviewing process. No names or personal details that could be linked to participants were obtained. All collected data were thus anonymous.

2.5.3 Ethics approval

The study was approved by the Ethics Committee of the Faculty of Health Sciences, Stellenbosch University (see Appendix H, ref. no. N07/10/232) and the Provincial Department of Health.

2.6 STATISTICAL ANALYSIS

Data was captured electronically with Microsoft Excel® from the questionnaires and regularly cross-referenced to ensure precision of data transfer. The researcher made use of a statistician who used the Microsoft Excel® package for statistical analysis of data, including calculations of the minimum, maximum, average and standard deviation of base parameters. Microsoft Excel® was used for configuration of graphs and figures. Descriptive statistics were used.

CHAPTER 3: RESULTS

3.1 DESCRIPTION OF THE STUDY POPULATION

3.1.1 Participants

A total of 114 pregnant women were sampled from 13 BANC clinics in the Cape Town Metropolitan Area and were interviewed during the study. The number of women who participated from each clinic varied from seven to 10, with four clinics having 10 participants, five clinics having nine participants, two clinics having eight participants and two clinics having seven participants. One of the clinics' having only seven participants was due to poor attendance, and at the other clinic this was due to xenophobia attacks that took place during data collection.

3.1.2 Areas and population groups

The clinics were situated in the lower sociodemographic areas of the Cape Town Metropolitan Area, such as Gugulethu, Khayelitsha, Masiphumelele in Noordhoek, Manenberg and Du Noon.

The largest population group represented was the black population, followed by the coloured population. Less than 2% was represented by the white population, and no Indian women were interviewed (see Table 3.1).

Table 3.1: Representation of the population groups

Population group	n	%
Black	72	63.2
Coloured	40	35
White	2	1.8
Indian	0	0
Total (n)	114	100

Representation of the different population groups varied from 1:7 (black:coloured) to 7:1 (black:coloured); thus, a clinic was either black dominant or coloured dominant. The most heterogeneous clinic had a ratio of 3:4 (black:coloured). There was very poor representation from the white population.

3.1.3 Socioeconomic and demographic factors

Participants had a mean age of 26 years ($\pm 5,5$ SD). When looking at the total number of participants, one sees that 42% ($n = 48$) of participants did not have any other children to look after. Thirty-three per cent ($n = 38$) had one other child to look after, 18% ($n = 20$) had two other children to look after and 7% ($n = 8$) had three to four other children to look after. There were no pregnant women with five or more children to look after at home (see Table 3.2).

Table 3.2: Sociodemographic factors of participants

Characteristics	Black	Coloured	White	Total		
	($n = 72$)	($n = 40$)	($n = 2$)	($n = 114$)		
	Median	Median	Median	Median	Min	Max
Age (y)	25,71	27,13	25,00	26,27	18	49
Number of children	1	1	0	1	0	4
Persons living in house	2	3	1	3	1	14
Household income (rand/month)	1 001–3 000	1001–3 000	1 001–3 000	1 001–3 000	0	> R5 000
Education (grade)	11–12	8–10	8–10	11–12	Primary	Tertiary
Money spent on food (rand/month)	101–200	201–400	101–200	201–400	0–100	> 400

The lowest percentage of participants had a primary school and tertiary level education (both 10%), followed by Grade 8–10 (40%). The highest percentage of participants had an education level of Grade 11–12 (41%).

Forty-two per cent of participants ($n = 48$) had an income of R1 001 to R3 000 per month per household. Participants with no income for the household was 5% ($n = 6$), and 13% ($n = 15$) had an income of more than R5 000 per month (see Figure 3.1).

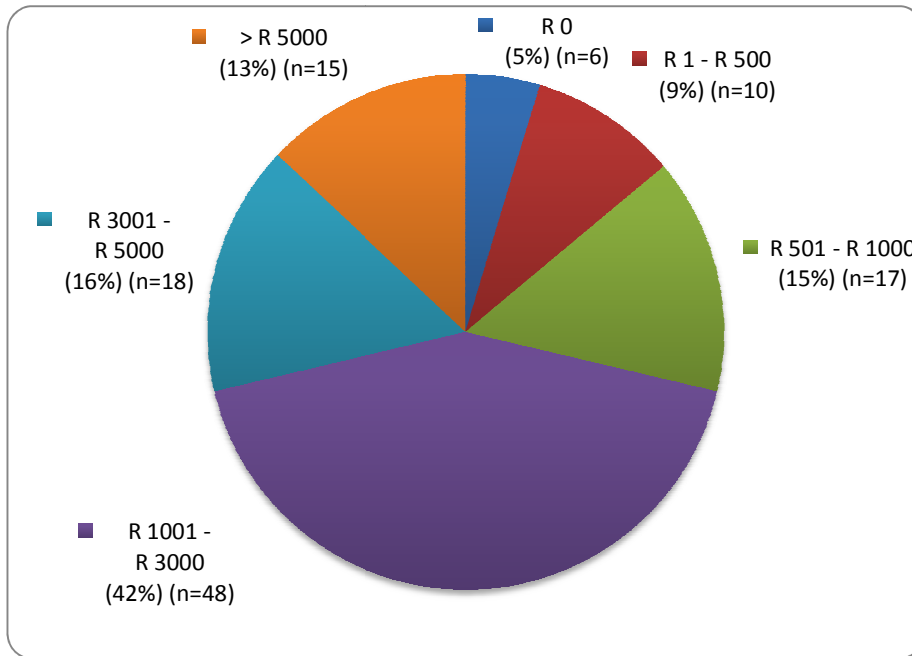


Figure 3.1: Total household income per month for the total group (n=114)

The amounts of money spent on food per month by the majority of the participants were between R201 and R400 (39%). Thirteen per cent (n = 15) spent between R0 and R100 per month on food, and 15% (n = 17) spent more than R401 per month on food. Of the black population, 39% (n = 28) spent R101– R200 of their monthly income on food, while 54% (n = 22) of the coloured population spent between R201 and R400 per month (see Table 3.3).

Table 3.3: Income spent on food per month

	Black	Coloured	White	Total
<i>Number of participants (%)</i>				
R0–R100	14 (19)	1 (3)	0	15 (13)
R101–R200	28 (39)	8 (20)	1 (50)	37 (33)
R201–R400	22 (31)	22 (54)	1 (50)	45 (39)
> R401	8 (11)	9 (23)	0	17 (15)
Total	72	40	2	114

When asked about the work status of the pregnant women, 55% (n = 62) said that they were stay-at-home mothers/women. Pregnant women that earned a wage

were 34% (n = 39), and only 8% (n = 9) were self-employed. Although being a student was not classified as 'work', 3% (n = 3) gave it as an 'other' option.

Comparing the work status of the participants with their education level, one sees that 47% (n = 29) of the participants who stayed at home had an education level of Grade 8–10 and 5% (n = 3) had a tertiary education. Of those earning a wage, 41% (n = 16) had an education level up to Grade 8–10, 41% (n = 16) had an education level up to Grade 11–12 and 13% (n = 5) had a tertiary qualification.

Most pregnant women were married (42%), followed by 37% who were living alone and 18% who lived with their partner but were not married. Only 3% were divorced and there were no widows.

More of the black population, 46% (n = 33) compared to the 22% (n = 9) of the coloured population, lived alone (see Table 3.4). In the coloured population 50% (n = 20) and in the black population 37% (n = 27) were married. Fourteen per cent (n = 10) of the black population lived with their partner but were not married. In the coloured population, 22% (n = 9) lived with their partner, not being married. In total, 18% (n = 20) of respondents lived with their partner (not married), 37% (n = 42) lived alone and 41% (n = 48) were married.

Table 3.4: Marital status of the pregnant women for different population groups

	Black	Coloured	White	Total
	<i>Number of participants (%)</i>			
Divorced	2 (3)	2 (6)	0	4 (4)
Live alone	33 (46)	9 (22)	0	42 (37)
Live with partner (not married)	10 (14)	9 (22)	1 (50)	20 (18)
Married	27 (37)	20 (50)	1 (50)	48 (41)
Total	72	40	2	114

The majority of the participants lived in a brick house (54%), followed by a total of 46% who lived in a 'shack' (informal settlement known to the lower socioeconomic

classes in South Africa). Of these shacks, 40% were made of tin and 60% were made of wood.

For their water source, 74% of participants had their own tap and 26% made use of a communal tap to collect water. No one reported using a river or borehole to collect water from. Regarding toilet facilities, 85% had a flush toilet to use, 11% made use of the bucket system and only one (1%) reported using a pit latrine.

In summary, most of the participants (41%) had an education level of Grade 11–12. Forty-two per cent had an income of between R1 001 and R3 000, of which between R201 and R400 (39%) was spent on food per month. The majority of participants stayed at home with their children (54%), while 42% earned a wage or was self-employed. Pregnant women were more likely to be married (41%), with 37% who lived alone. They tended to stay in a brick house (54%), with 74% reporting having their own tap to obtain water from. Eighty-five per cent reported that they made use of a flush toilet.

3.1.4 Reasons for clinic attendance

Reasons given by pregnant women for attending the clinic on the particular day are shown in Figure 3.2. Reasons classified under 'other' included assisting a friend to the clinic and requesting a letter for work stating pregnancy status from the clinic. The average pregnant women visited the clinic for the first time during the 18th week of gestation (mid second term of pregnancy).

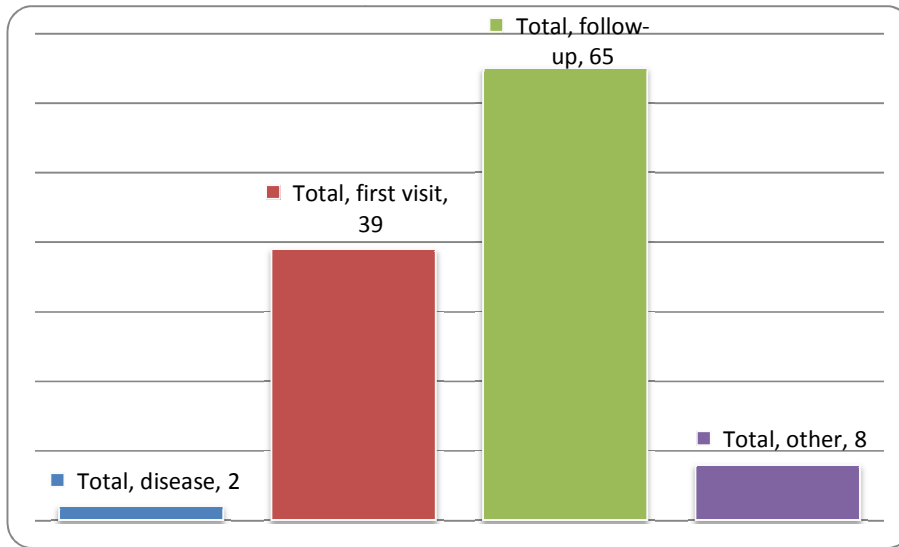


Figure 3.2: Reasons for attending the clinic (n = 114)

3.1.5 HIV status

Participants were asked whether they had any chronic diseases, and 14% (n = 16) indicated that they were HIV positive.

3.1.6 Breastfeeding

Most of the pregnant women (78%; n = 90) indicated that they planned to breastfeed their babies. Of those who did not plan to breastfeed (22%; n = 25), 52% (n = 13) gave HIV infection as a reason, 16% (n = 4) said that due to work responsibilities they could not breastfeed, 8% (n = 2) thought it would be painful, 8% (n = 2) still had to decide whether they were going to breastfeed, one person (4%) thought it would spoil her figure, one person (4%) thought that baby milk formulas/products were better than breast milk, one person (4%) said that her husband would not allow it and one person (4%) said that she would be staying in Cape Town while her baby was going to her mother's in the Eastern Cape and distance was thus a problem.

Pregnant women who indicated that they planned to breastfeed were asked for how long they planned to do so, and 10% (n = 9) said for three months, 21% (n = 19) planned to breastfeed for 4–6 months, 26% (n = 23) planned to breastfeed for

7–12 months, 35% (n = 31) planned to breastfeed for 13–24 months and 8% (n = 7) planned to breastfeed for more than 24 months.

In summary, although most of the pregnant women indicated that they planned to breastfeed, 10% (n = 9) indicated that they did not plan to breastfeed for longer than three months. For those who did not plan to breastfeed, the majority (52%; n = 13) gave HIV infection as a reason.

3.1.7 Opinions of participants who did not receive nutritional supplementation

For the participants who did not receive any nutritional supplementation (food supplement and micronutrients), the question was asked whether they had any opinion on why they did not receive the supplementation. Eighteen per cent (n = 8) had no opinion on not receiving supplementation, 70% (n = 31) was of the opinion that it was because it was their first visit to the BANC clinic, 5% (n = 2) was of the opinion that it was related to their HIV status, 5% (n = 2) thought it was because they had seen a private doctor and 2% (n = 1) had blood taken that indicated that she did not need supplementation.

3.2 PARTICIPANTS' AWARENESS REGARDING THE NUTRITIONAL SUPPLEMENTATION PROGRAMMES FOR PREGNANT WOMEN

3.2.1 Vitamin A supplementation programme

From the 114 participants, 13% (n = 15) indicated that they had heard about vitamin A in the past, and 5% (n = 6) indicated that they had seen the vitamin A capsules and/or drops. No one reported having used these capsules/drops before.

3.2.2 NSP food supplement

Twenty-five per cent (n = 29) of the participants had heard about the NSP food supplements while 24% (n = 27) had also seen these. The one participant who received the supplementation had talked to an NSP counsellor and had found it

helpful. Advice given concerning food habits was for the pregnant woman to increase vegetable (potato, carrots and cabbage) intake. This woman had not received any written information. She was of the opinion that she received the supplementation 'to make her strong'.

3.2.3 Micronutrient supplementation programme: folate and iron

Forty-seven per cent (n = 53) of the participants had heard about the supplements that pregnant women should receive from the clinic. By being shown the different packages in which the supplements were given as well as the actual appearance of the supplements, 79 participants recognised them.

Forty-six per cent (n = 32) of participants could remember that someone had talked to them about micronutrient supplementation. A professional nurse had talked to 88% (n = 28) of the women, a doctor to 9% (n = 3) and a professional nurse and a doctor to 3% (n = 1). Eighty-one per cent (n = 26) had found the verbal information helpful, 6% (n = 2) had found it confusing and 13% (n = 4) said that they had not found it helpful at all. Only three (4%) of the participants indicated that they had received written information about supplements during pregnancy. All three women said that they had found the written information to be helpful.

Most of the participants (54%; n = 61) had received information (either verbal or written) regarding the micronutrient supplements from a professional nurse. Eight per cent (n = 9) indicated that a doctor had given them information.

Of the 70 participants who received the micronutrients, 43% (n = 30) did not know why they received the micronutrient supplements and 57% (n = 40) indicated that they did know why they had to take the supplements. Their opinions on why they thought they had to take the micronutrients were as follows: 65% (n = 26) said that it was necessary to build/protect/help the baby, 5% (n = 2) said that it was necessary for the development of the baby, 3% (n = 1) said that it was because she was pregnant, 3% (n = 1) said that it was to improve her appetite, 3% (n = 1) said that it was to take dizziness away, 20% (n = 8) said that it was necessary

because their iron levels were low and 3% (n = 1) said that the iron helped with the development of the baby's spine.

In summary, a total of one out of five women was aware of the vitamin A programme, half of the participants knew about the NSP-food supplementation and more than two thirds were aware of the micronutrient supplementation (folate and iron).

3.3 NUMBER OF PARTICIPANTS QUALIFYING FOR THE NUTRITIONAL SUPPLEMENTATION PROGRAMMES

3.3.1 Vitamin A supplementation programme

None of the participants qualified for the vitamin A supplementation, since the INP of the HFBNP only provides vitamin A supplementation to children less than five years of age and postpartum women 6–8 weeks after delivery.⁷⁶

3.3.2 NSP food supplement

The criteria participants had to comply with to be entered into the NSP were as follows⁷⁶:

- Had to be pregnant.
- The SF measurement should show insufficient growth of the foetus according to the SF graph.
- The participant had to have an MUAC < 23 cm.

Only 5% (n = 6) had an MUAC < 23 cm and thus qualified to be entered into the NSP. The average MUAC was 29,56 cm. Sixty-eight per cent (n = 78) were within the interval of 24.73–34.40 cm. The average MUAC was 30,17 cm for black participants and 28,56 cm for coloured women.

None of the participants qualified for the NSP due to an insufficient SF measurement. Forty-four per cent (n = 50) of the participants had an SF

measurement taken that was above the entry level for inclusion in the NSP. Of the 114 participants, 56% (n = 64) did not have an SF measurement available, of which 34% (n = 39) were first visits.

3.3.3 Micronutrient supplementation programme: folate and iron

Participants had to be pregnant to qualify for the micronutrient supplementation. Since all of the participants were pregnant, they were all eligible to receive the micronutrients folate and iron. The average weeks of gestation were 24 for the total population investigated. Most participants (21%; n = 24) were between 17 and 20 weeks of gestation. A total of 44% (n = 50) of the participants were before 20 weeks of gestation. Only 11% of the participants were before 12 weeks of gestation. Data for the participants who indicated that the day of investigation was their first visit to the BANC clinic showed that 23% (n = 9) were before 12 weeks of gestation, 49% (n = 19) were between 12 and 20 weeks of gestation and 28% (n = 11) were after 20 weeks of gestation. A total of 72% (n = 28) visited the clinic before 20 weeks of gestation for the first time.

In summary, only six participants (5%) qualified to be entered into the NSP due to an MUAC < 23 cm. Since all of the participants were pregnant, all 114 qualified to receive the micronutrients folate and iron.

3.4 NUMBER OF QUALIFYING PARTICIPANTS WHO RECEIVED AND ARE COMPLIANT WITH THE PRESCRIBED SUPPLEMENTATION REGIMENS

3.4.1 NSP food supplement

Only one out of the six participants who qualified (17%) received the food nutritional supplementation. She received the supplementation from a professional nurse and she took the products as she was instructed to do. She did not experience any problems or side effects with the nutritional products. She shared the products with her children at home but never sold the nutritional products. The other five participants who qualified but did not receive nutrition supplementation

were brought to the attention of the BANC sister so that they could be referred to the nutrition counsellor.

3.4.2 Micronutrient supplementation programme: folate and iron

Sixty-one per cent (n = 70) of the participants indicated that they were using the micronutrient supplements. Eighty-seven per cent (n = 61) received the micronutrient supplementation from a professional nurse at the clinic, and 13% (n = 9) received the supplementation from the doctor.

The average expecting mother first received the micronutrient supplements during the 16th week of gestation. Nine per cent (n = 6) said that they experienced problems in taking the supplements. Reasons given were that it was difficult to swallow (n = 2), the supplements had a bad smell/taste (n = 3) and the supplements were not available during the clinic visit (n = 1).

Twenty-six per cent (n = 18) experienced side effects with the micronutrient supplementation. The most prominent side effects included nausea (n = 9) and constipation (n = 5), while diarrhoea, heartburn and dizziness were also given as reasons.

In summary, only a sixth of participants who qualified for the NSP received the food supplementation, and almost two thirds of participants received the micronutrient supplementation (folate and iron).

CHAPTER 4: DISCUSSION

The main aim of this study was to evaluate the implementation of the NSP for pregnant women in the Cape Town Metropolitan Area of the Western Cape, South Africa, in 2008. Data were collected to determine participants' awareness regarding the NSP food-, folate-, iron- and vitamin A supplementation programmes, to determine whether participants qualified for the NSP food-, folate- and iron supplementation, to determine whether participants received the NSP food-, folate- and iron supplementation and to determine whether participants were compliant with the supplementation programmes.

4.1 SOCIODEMOGRAPHIC AND GESTATION DATA

The study population consisted mostly of black people and had a mean age of 26 years. Interesting to note is that most participants indicated that they only had one child to look after, with two other persons living in the same house. This could partly be explained by the common practice among the black community to send their children to the grandmother, living in the rural areas of the country. The child then becomes the responsibility of the grandmother to look after. The majority of the participants had an education level of Grade 11–12, which explains the average income per household per month of between R1 001 and R3 000, of which R201–R400 was spent on food. The majority of the participants lived in brick houses, with their own tap as a water source and a flush toilet. This is probably because participants stayed in the urban areas where water sources such as rivers and boreholes are not easy accessible.

Seventy-seven per cent of the participants who visited the clinic for the first time had a gestational age of more than 12 weeks. This could be problematic in the prevention of NTDs. The rostral end of the neural tube closes on the 23rd day and the caudal neuropore closes by the 27th day of development. Ideally, folic acid supplementation should start before conception and be continued until at least the 12th week of gestation.^{1,15}

There may be many reasons for the late first visit to the clinic. Poor sexual information and guidance can lead to women not realising that they are pregnant

and need to visit the clinic. Some pregnant women may not realise the health benefits and better pregnancy outcomes if they attend clinics as soon as they realise that they are pregnant. Another reason why pregnant women only visited the BANC clinic after 12 weeks of gestation may be that they were afraid to tell their employers of their pregnancy status in fear of losing their jobs. It is also possible that many of these women did not plan to become pregnant and therefore did not visit the clinic before pregnancy to collect information on the importance of antenatal care.

The South African Department of Health aim that pregnant women attend antenatal care four times during their pregnancy, starting before 20 weeks gestation.⁸⁵ In the light of the latter, the BANC clinics involved in the present study are well on track with 72% of the participants first visits being before 20 weeks of gestation.

4.2 AWARENESS RELATING TO THE NUTRITIONAL SUPPLEMENTATION PROGRAMMES

4.2.1 Vitamin A supplementation programme

None of the participants had used vitamin A supplementation before, but 18% (n = 21) indicated that they were aware of the vitamin A supplementation. It is interesting to note that in a previous study conducted in Cape Town, it was found that 15% of the eligible mothers received vitamin A supplementation after giving birth.⁴⁴ This correlates quite well with the 18% of pregnant women in the current study who indicated that they were aware of vitamin A supplementation. It appears that the women were aware of the vitamin A supplementation if they had experienced it themselves by receiving it either for themselves or for their infant. However, 58% of the participants indicated that they had more than one child to look after. If one assumes that these children were their own, one should expect the awareness of vitamin A to be closer to 58% and not only 18%. How and where the women became aware of vitamin A supplementation is unknown, since the questionnaire was only developed to question participants who had received vitamin A before. The questionnaire also did not enquire about gravidity; therefore,

no statistical conclusion could be reached regarding the effectiveness of the implementation of this intervention. It only makes sense that primigravida women would not have used vitamin A before.

4.2.2 NSP food supplement

Almost half of the participants (49%; n = 56) knew about the NSP-food supplementation that was available. Once again, their sources of information are unknown since the questionnaire did not provide the opportunity to question pregnant women regarding their source of information. Only participants who had used the products before and/or were currently registered to use this supplementation were further questioned. The one participant who was registered with the NSP had heard about the food supplements from a professional nurse who had referred her to an NSP counsellor. The participants could be unaware of the NSP- food supplementation due to a lack of nutrition education / health promotion: there may be no pamphlet available to inform pregnant women of the NSP, clinic staff and nursing personnel may not educate pregnant women and friends may not share that they receive these products from the clinic because they are ashamed of being indigent.

4.2.3 Micronutrient supplementation programme: folate and iron

Seventy-three per cent (n = 83) of the participants were aware of the micronutrients folate and iron that pregnant women should receive from the clinic. When the participants were asked whether they had ever heard of the micronutrient supplementation, only 54 participants could answer positively. After being shown the packages and the supplements, 113 of the participants indicated that they were aware of the supplements folate and iron that should be issued. Visual examples of the supplements assisted in the identification and thus increased the awareness of the micronutrients by 25%. This makes sense in the light of the education level of the study population. Only 9% indicated that they had a tertiary level of education. Most of the participants (41%) only completed Grade 11–12.

Forty per cent had no idea why they should take the micronutrient supplementation. This is almost half of the pregnant women who take these micronutrients. Of those indicating that they *did know* the reason for taking the micronutrients, only one said that “it helps with the baby’s spine”. Some of the participants indicated that it helped the baby (“build/help the baby”), but they could not identify in which way it would help the baby. This is despite the fact that about 40% of the participants could remember that someone did talk to them about the micronutrients that they should take. Mostly it was a professional nurse (88%) who informed them about the micronutrients.

It could be that the nursing personnel did not educate the pregnant women due to a lack of time. It could also be that the information from the professional nurse regarding the functions and importance of the micronutrients (folate and iron) was insufficient. On the other hand, it may be that the pregnant women were just not interested in the information and therefore did not remember/recall what the professional nurse had told them. Of the 40% of participants who had received information, most had found it helpful. Even the small percentage (4%; n = 4) that had received written information felt that it had helped them.

4.3 MEETING THE ENTRY CRITERIA FOR THE NUTRITIONAL SUPPLEMENTATION PROGRAMMES

4.3.1 NSP food supplement

Most of the participants (68%; n = 77) had an MUAC above the entry criterion of 23 cm. A small number of participants (5%; n = 6) had an MUAC of < 23 cm. A previous study conducted in Cape Town had found that 8% of the mothers with children of less than five years old were underweight.¹⁹ This occurred four times more among mothers in rural areas than in mothers in urban areas. This could explain why only six of the participants in the present study had an MUAC < 23 cm, because this study was undertaken in the urban areas of Cape Town.

More than half of the participants (56%; n = 64) did not have an SF measurement available. This could partly be explained by the observation that for more than a third of these women, it was their first visit to the BANC clinic. Such a measurement had then not been taken yet. The remaining participants did not have an SF measurement for reasons one can only speculate on. It could be that the clinics were understaffed and that there was a lack of appropriate resources, some of the obstacles that are known to South African clinics.⁶⁷

4.3.2 Micronutrient supplementation programme: folate and iron

All of the participants met the criteria for receiving the micronutrients folate and iron, as it is compulsory that they receive it routinely during pregnancy.

4.4 ISSUING AND COMPLIANCE OF PARTICIPANTS WITH PRESCRIBED SUPPLEMENTATION REGIMENS

4.4.1 NSP food supplement

Although 5% (n = 6) of the participants qualified to be registered with the NSP, only one participant (17%) was registered with the programme. After assessment according to the questionnaire, it was clear that she was compliant with the NSP. The other five participants were brought to the attention of the professional nurse working at the BANC clinic. They were also referred to the nutrition counsellor for nutrition advice and receiving the NSP- food supplementation. It could be that the other five participants had not been referred to the NSP because the nursing personnel had not taken their MUAC to screen them as possible participants in the programme. Nursing personnel may also be unaware of the entry criteria for pregnant women into the NSP and therefore neglect to screen their pregnant patients. Nursing personnel should complete a BANC activity checklist for each pregnant woman that they see.⁸⁵ On this checklist, maternal weight and height should be noted but not MUAC. In the manual that is used by clinics, community health centres and district hospitals on guidelines for maternity care⁸⁵, no recommendations are made regarding actions to take when an undernourished pregnant patient is identified. This could also have caused participants not being

referred to an adequate resource such as a dietician or nutrition counsellor. Understaffing of clinics is a known problem,⁶⁷ which can also lead to nursing personnel having a high work load and insufficient time to take the relevant measurements.

4.4.2 Micronutrient supplementation programme: folate and iron

For 75 of the participants, the visit on the day of data collection was not their first visit to the BANC clinic for their current pregnancy. Out of these 75 pregnant women, 70 (93%) indicated that they did receive the micronutrient supplementation (folate and iron). This could support the decrease in LBW deliveries from 19,8% to 15,7% in the Western Cape Province^{47,49} since iron supplementation could lead to a decrease in the incidence of LBW deliveries.⁴² In the long run this could lead to fewer South Africans suffering from high blood pressure because an indirect correlation between birth weight and hypertension was found.⁵⁸

Six (9%) of the participants experienced problems taking the micronutrient supplements, which included difficulty to swallow and bad taste/smell of the supplements. Eighteen (26%) of the participants experienced side effects when taking the micronutrient supplements, but the side effects were commonly associated with pregnancy, for example nausea, constipation and heartburn. It could be that the side effects of the supplements were rather 'symptoms' associated with pregnancy.

It is doubtful that these complaints regarding side effects could contribute to suboptimal compliance since it has been reported that side effects are a less significant reason for not taking supplements.⁸⁷ A study done among pregnant women in Senegal found that only 13% of women had stopped taking their iron and folate supplement due to side effects.⁸⁸ A review of the literature on compliance with iron supplementation found that unavailability of iron supplements was the most common reason why women did not take iron supplements.⁸⁹ In the Senegal study, compliance was increased by the role that the midwife played: 15%

said that they continued to take the supplementation because the midwife had instructed them to do so, and 11% continued with supplementation because the midwife had indicated that it would improve their health. Educating women about the common side effects associated with iron and folate supplementation and helping them to learn to manage these side effects were also found to be effective in increasing adherence.^{89,90} The role of the professional nurse at the clinic should not be underestimated. Not only can she be a source of information but she can also be a motivator to pregnant women to continue taking their iron and folate supplementation. Another proposed way of increasing compliance is to provide reminders such as posters and calendars about taking supplements.⁸⁹

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

Eighteen per cent ($n = 21$) of participants were aware of vitamin A supplementation. Although the ideal is for every pregnant women visiting the BANC clinic to be aware of the NSP, only half of the participants (49%; $n = 56$) indicated that they knew about the NSP- food supplementation that was available. Awareness of the micronutrients folate and iron was very good amongst all of the participants indicating that they knew about these nutrients that needed to be issued at the clinic.

Five per cent ($n = 6$) of the pregnant women qualified for the NSP, which in terms of underweight among the pregnant women in the Cape Town Metropolitan Area does not show such a dark picture. It is, however, a concern that five of the six participants were not registered on the NSP and were missed opportunities for this nutrition intervention. The other participants (83%) had to be referred to the NSP by the investigator. The one participant that was registered with the NSP received and used her products as she was instructed.

Ninety-three per cent ($n = 70$) of the participants who were eligible for a follow-up visit, received their micronutrients folate and iron, with 7% not being issued with their micronutrient supplementation. Nausea, constipation and heartburn were some of the complaints that 26% ($n = 18$) of participants raised when taking the micronutrients.

5.2 RECOMMENDATIONS

- I. The adequacy of human resources, such as health care workers, should be investigated at these clinics. More health care workers can reduce the work load, leading to more time available to provide quality antenatal care with pregnant women.
- II. Training of health care workers may familiarise them with the NSP and in particular the entry criteria for pregnant women into the NSP.

- III. Consideration should be given to updating the BANC activity checklist (used at clinics by nursing personnel) to include measurement of the MUAC and to include a section on referring identified undernourished patients to a dietician or nutrition counsellor. This could help nursing personnel to remember to screen for undernutrition and help patients to be referred to the appropriate personnel to enter them into the NSP.
- IV. Training should be extended to health care professionals (e.g. social workers) working in the community and not only those working at public facilities. This would help to identify possible clients that could benefit from the NSP that were not noted by the nursing staff.
- V. More effort could be made to inform pregnant women about the NSP-food, vitamin A-, folate- and iron supplementation. Possible ways of communication are pamphlets, posters at the clinics and hospitals, advertisements on television and radio interviews.

5.3 LIMITATIONS

Limitations of the study include the following:

- I. During data collection, xenophobic attacks were prominent in the investigation areas, which may explain the low number of participants attending the clinics.
- II. The questionnaire did not make provision for participants to comment on where they had heard about the NSP food-, vitamin A-, folate- and iron supplementation, even if they were not using the particular supplement currently. This could have helped to determine which resources the government can focus on to inform the general population about interventions in place to improve pregnancy outcomes.
- III. This study did not include a staff component that investigated nursing personnel's awareness, insight and experience regarding the nutritional supplementation programmes offered to pregnant women at the clinics. This could have help to explain some of the findings of the study.

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APPENDICES

APPENDIX A

INFORMATIVE LETTER SENT OUT TO PARTICIPATING CLINICS



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvennoot • your knowledge partner

Tygerberg, February 2008

Evaluation of Selected Components of Health Facility-Based Nutrition Programmes in the Western Cape Province of South Africa

The purpose of this correspondence is to inform you of a planned audit of the Nutrition Supplementation Programme (NSP). The Sub-Directorate: Nutrition of the Western Cape Department of Health supports this NSP audit.

The aim of this audit is to examine nutritional supplementation programmes (NSP) offered at primary health clinics (PHC) in the Western Cape Province.

The study/audit will identify implementation barriers, inefficiencies and successes in the nutrition supplementation programme, and thus serve as a basis for improvement.

The study was approved by the Human Research Committee and the research committee of the Department of Health. The Division of Human Nutrition at Stellenbosch University will coordinate the study with the cooperation of the Department of Health, Sub Directorate nutrition.

Field-workers and master students in clinical nutrition will undertake the practical part of the study. We started the study in December 2007. The practical work including explanations of the study to the clients, obtaining their written consent, interview, measurements (will bring our own scales) etc. will be performed by the field-workers and master students in order not to impose additional burden on the clinic staff. *We will clarify with the staff when it will be most convenient for them to participate during our visit.*

The target groups will be clients during their PHC visits as well as PHC staff members.

The following methods will be used:

- Anthropometry to assess nutrition-related variables amongst the target groups.
- Identify the knowledge and compliance among the target adults in relation to these programmes by interviewing them.
- Among the PHC staff knowledge, allocated resources and compliance with implementation of these supplementation programmes (using structured interviews and questionnaires) will be determined.
- In a subset of clients blood samples will be collected for analysis of nutrients and inflammatory parameters. *Note: We will specifically address this issue to selected PHCs only.*

All collected data and information will be treated with confidentiality and neither individual PHCs, clients nor staff members will be identified in data reporting. After completion of the study a report will be presented to the Department of Health and all relevant authorities.

Before the planned study is initiated, further practical and logistic arrangements will be made with the facility manager.

Should you have any further queries at this stage, please do not hesitate to contact us, see details below.

Yours faithfully,

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APPENDIX B
QUESTIONNAIRE– AFRIKAANS

Deel A: Sosiodemografiese data

Swanger vrou

Datum van onderhoud: (DD/MM/JJJJ):

Veldwerker (voorletters):

Naam en nommer van kliniek:

Soort kliniek: PGK ARVK

Vir die veldwerker:

1. Antropometrie (swangerskap data):

Gestase (weke): _____

Groei volgens symphysis-fundus grafiek: Voldoende Onvoldoende
 Nie beskikbaar

Middel bo-arm omtrek: _____ cm

2. Vir watter soort aanvulling kom sy in aanmerking?

Vitamien A Voedingsaanvulling Mikronutrient-aanvulling

3. Is hierdie aanvulling in die protokol van die Voedingsaanvullingsprogram of
êrens anders geregistreer? Ja Nee (spesifiseer as nie in
Voedingaanvullingsprogram geregistreer is nie):

4. Huidige chroniese siektes¹ (indien geregistreer):

MIV/vigs (of aangeteken as RVS) TB Ander (spesifiseer):

1) Chroniese siektes waarna as “Sekere chroniese siektes” verwys word in die beleid- en implementeringsriglyne van die Voedingsaanvullingsprogram, wat deel uitmaak van die Gesondheidsfasiliteitgebaseerde Voedingsprogram (2007): chroniese diarree, sistiese fibrose, onkologiese siekte, chroniese longsiekte, aangebore hartsiekte, vroeggebore babas, chroniese lewersiekte, niersiekte, disfagie/lewensgevaarlike aspirasie, aangebore metabolismegebrekke, ander bv. kind of moeder gediagnoseer met uiters middelweerstandige of veelmiddelweerstandige TB.

Vrae aan vrou:

5. Geboortedatum (DD/MM/JJJJ): _____
Ouderdom (jaar): _____
6. Gesinsverband:
 Getroud Geskei Weduwee Woon saam, ongetroud
 Woon alleen
7. Getal kinders om voor te sorg:
 0 1 2 3–4 > 5
8. Hoeveel mense woon in u huis/in dieselfde huis as u? _____ persone
Wie?: _____
9. Bevolkingsgroep:
 Swart Kleurling Indiër Wit Ander: _____
10. Voltooide opvoeding:
 Geen Laerskool Graad 8–10 Graad 11–12 Tersier
11. Werkstatus:
 Tuis met kinders In eie diens Loontrekker
 Ander (spesifiseer): _____
12. Totale maandelikse inkomste van huishouding:
 Geen R1–R500 R501–R1000 R1001–R3000
 R3001–R5000 > R5 001 Weet nie
13. Ontvang u/u gesin toelaes?
 Nee Kindertoelae Maatskaplike bystand
 ongeskiktheidspensioen Ouderdomspensioen Van familie
 Ander (spesifiseer): _____
14. Geld wat weekliks aan kos bestee word:
 R0–R100 R101–R200 R201–R400 >R401
15. Soort behuising:
 Baksteen of beton Tradisionele modder Sinkplaat
 Plank/hout Ander (spesifiseer): _____
16. Waar kry u meestal drinkwater vandaan?
 Eie kraan Gemeenskaplike kraan Rivier, dam
 Boorgat, put Ander (spesifiseer): _____

17. Watter soort toilet het u huishouding?

- Spoel Put of verbeterde-ventilasieput Emmer of pot
 Geen Ander (spesifiseer): _____

18. Borsvoedingspraktyk:

A. Beplan u om u kind te borsvoed? Ja Nee

B. Indien nie, waarom? Nie bewus van gesondheidsvoordele nie

Nie goed vir my figuur nie Formule is beter My man laat dit nie toe nie Sal nie by die werk kan borsvoed nie Het nog nie daaroor gedink nie Ander (spesifiseer): _____

C. Indien wel, vir hoe lank beplan u om te borsvoed?

Deel B: Aanvulling

Swanger vrou

Datum van onderhoud: (DD/MM/JJJJ):

Veldwerker (voorletters):

Naam en nommer van kliniek:

Soort kliniek: PGK ARVK

19. Waarom besoek u vandag die kliniek?

- Opvolg besoek vir swangerskap Om aanvullings te kry Siekte
 Ander (spesifiseer): _____

20. Het u gehoor van enige van hierdie voedingsaanvullings wat by hierdie kliniek aangebied word?

- Vitamien A-aanvullings Voedingsaanvullings (drankies, ontbytgrane, ens.)
 Mikrovoedingstowwe (wat folaat en yster insluit) Nee

21. Het u al enige van hierdie aanvullings gesien? (Wys die kliënt die boksie met die vitamien A-kapsules, die vitamien A-kapsule self en voorbeelde van voedings- en mikrovoedingstof-aanvullings)

- Vitamien A Voedingsaanvullings Mikrovoedingstowwe
 Nee

INDIEN NIE, LOS DIE RES VAN DIE VRAE.

22. Het u enige van hierdie vir eie gebruik ontvang?

- Nee Ja Kan nie onthou nie

23. Indien wel, watter soort aanvulling het u ontvang?

- Vitamien A
– DOEN DIE AFDELING “DIE VITAMIEN A-AANVULLING”.
 Voedingsaanvullings (drankies, ontbytgrane, ens.)
– DOEN DIE AFDELING “DIE VOEDINGSAANVULLING”.
 Mikrovoedingstof-aanvulling (wat folaat en yster insluit)
– DOEN DIE AFDELING “DIE MIKROVOEDINGSTOF-AANVULLING”.

24. Indien nie, het u enige mening oor wat die rede daarvoor kan wees?

- Nee Ja (spesifiseer): _____

Die vitamien A-aanvulling

25. Weet u hoekom u ’n vitamien A-aanvulling ontvang het?

- Nee Ja (spesifiseer): _____

26. Kan u onthou wanneer u die vitamien A-aanvulling ontvang het?

- Nee Ja (spesifiseer, maande): _____

27. Het u die vitamien A-kapsule by die kliniek gedrink?

- Ja Nee (spesifiseer): _____

28. Indien u ’n vitamien A-aanvulling ontvang het, wie het dit vir u gegee?

- Professionele/geregistreerde verpleegkundige/suster
 Verpleegpersoneel Dieetkundige
 Ander (spesifiseer): _____

29. Het enige iemand met u oor ’n vitamien A-aanvulling gepraat?

- Nee Ja (spesifiseer): _____

30. Indien 'n lid van die kliniekpersoneel met u oor 'n vitamien A-aanvulling gepraat het, wie was dit? Professionele/geregistreerde verpleegkundige/suster Verpleegpersoneel Dieetkundige Ander (spesifiseer): _____
31. Hoe het u u gesprek met hierdie personeellid ervaar? Nuttig Verwarrend Geeneen van die voorafgaande nie (spesifiseer): _____
32. Het u enige skriftelike inligting (soos 'n voubiljet, ens.) oor u vitamien A-aanvulling ontvang? Nee Ja
Indien wel, het u dit as nuttig ervaar? Nee Ja
33. Het u enige probleme met die neem van die vitamien A-aanvulling ondervind? Nee Ja (spesifiseer): _____
34. Het u enige nuwe-effekte van die vitamien A-aanvulling ondervind? Nee Ja (spesifiseer): _____

Die voedingsaanvulling

35. Weet u hoekom u die voedingsaanvulling ontvang het? Nee Ja (spesifiseer): _____
36. Het u enige raad oor eetgewoontes ontvang voordat u die voedingsaanvulling ontvang het? Nee Ja (spesifiseer): _____
37. Wie het die aanvulling vir u gegee? Professionele/geregistreerde verpleegkundige/suster Verpleegpersoneel Dieetkundige Ander (spesifiseer): _____
38. Neem u die voedingsaanvulling soos die personeellid gesê het u dit moet doen (of het u dit so geneem)? Ja Nee (spesifiseer): _____
39. Het enigiemand met u oor 'n voedingsaanvulling gepraat? Nee Ja (spesifiseer): _____
40. Indien 'n lid van die kliniekpersoneel met u oor 'n voedingsaanvulling gepraat het, wie was dit? Professionele/geregistreerde verpleegkundige/suster Verpleegpersoneel Dieetkundige Ander (spesifiseer): _____

41. Hoe het u u gesprek met hierdie personeellid ervaar?
 Nuttig Verwarrend Geeneen van die voorafgaande nie
(spesifiseer): _____
42. Het u enige skriftelike inligting (soos 'n voubiljet, ens.) oor u
voedingsaanvulling ontvang?
 Nee Ja Indien wel, het u dit as nuttig ervaar? Nee Ja
43. Het u enige probleme met die neem van die voedingsaanvulling ondervind?
 Nee Ja (spesifiseer): _____
44. Het u enige newe-effekte van die voedingsaanvulling ondervind?
 Nee Ja (spesifiseer): _____
45. Deel u ooit die voedingsaanvulling met enige lede van u huishouding?
 Nee Ja (spesifiseer): _____
46. Het u ooit die voedingsaanvulling verkoop om geld te kry om ander items
mee te koop?
 Nee Ja (spesifiseer): _____

Die mikrovoedingstof-aanvulling

47. Weet u hoekom u 'n mikrovoedingstof-aanvulling ontvang het?
 Nee Ja (spesifiseer): _____
48. Kan u onthou wanneer u die mikrovoedingstof-aanvulling ontvang het?
 Nee Ja (spesifiseer, weke): _____
49. Indien u 'n mikrovoedingstof-aanvulling ontvang het, wie het dit vir u
gegegee?
 Professionele/geregistreerde verpleegkundige/suster
 Verpleegpersoneel Dieetkundige
 Ander (spesifiseer): _____
50. Het enigiemand met u oor 'n mikrovoedingstof-aanvulling gepraat?
 Nee Ja (spesifiseer): _____
51. Indien 'n lid van die kliniekpersoneel met u oor mikrovoedingstof-aanvulling
gepraat het, wie was dit? Professionele/geregistreerde
verpleegkundige/suster Verpleegpersoneel Dieetkundige
 Ander (spesifiseer): _____

52. Hoe het u u gesprek met hierdie personeellid ervaar?

Nuttig Verwarrend

Geeneen van die voorafgaande nie (spesifiseer): _____

53. Het u enige skriftelike inligting (soos 'n voubiljet, ens.) oor u

mikrovoedingstof-aanvulling ontvang? Nee Ja

Indien wel, het u dit as nuttig ervaar? Nee Ja

54. Het u enige probleme met die neem van die mikrovoedingstof-aanvulling ondervind?

Nee Ja (spesifiseer): _____

55. Het u enige newe-effekte van die mikrovoedingstof-aanvulling ondervind?

Nee Ja (spesifiseer): _____

APPENDIX C
QUESTIONNAIRE – ENGLISH

Part A: Socio-demographic data

Pregnant woman

Date of interview (DD/MM/YYYY):
 Field worker (initials):
 Name and number of this clinic:
 Type of clinic: PHC ARVC

For the field worker:

1. Anthropometry (pregnant data):

Weeks gestation: _____

Growth according to symphysis-fundus graph:

Sufficient Insufficient Not available

Mid upper arm circumference: _____cm

2. For what type of supplementation is she eligible?

Vitamin A Nutrition supplementation Micronutrient supplementation

3. Is this supplementation registered in the Malnutrition Register or elsewhere?

Yes No (specify if not in Malnutrition Register): _____

4. Present chronic disease¹ (if recorded):

HIV/AIDS (or noted as RVD) TB Other (specify): _____

1) Chronic diseases referred to as “Certain Chronic diseases” in Policy and Implementation Guidelines for the Nutrition Supplementation Program of the Health Facility Based Nutrition Programme (2007): Chronic diarrhea, cystic fibrosis, oncological disease, chronic lung disease, congenital cardiac disease, premature infants, chronic liver disease, renal disease, dysphagia/life threatening aspiration, inborn errors of metabolism, others e.g. infant of mother diagnosed with XDR or MDR.

Questions to woman:

5. Date of birth (DD/MM/YYYY): _____
Age (years): _____
6. Family relation:
 Married Divorced Widow Living together, not married
 Living alone
7. Number of children to support:
 0 1 2 3 -4 > 5
8. How many persons are living in your home/in the same house as you?
_____ persons. Who? : _____
9. Population group:
 Black Colored Indian White Other: _____
10. Completed education:
 None Primary school Grade 8-10 Grade 11-12 Tertiary
11. Working status:
 Home with children Self-employed Wage earner
 Other (specify): _____
12. Total household income per month:
 None R1-500 R501-1000 R1001-3000 R3001-5000
 > R5001 Do not know
13. Do you/your family receive grants:
 No Child support Social relief Disability Old age pension
 From family Other (specify): _____
14. Money spent on food weekly:
 R0-100 R101-200 R201-400 >R401
15. Type of housing:
 Brick or concrete Traditional mud Tin Plank/wood
 Other (specify): _____
16. Where do you get drinking water most of the time:
 Own tap Communal tap River, dam Borehole, well
 Other (specify): _____

17. What type of toilet does this household have:

Flush Pit or VIP Bucket or pot None Other (specify): _____

18. Breastfeeding practice:

A. Do you plan to breastfeed your child? Yes No

B. If not, why? Not aware of its health benefits It spoils my figure

Formulas are better Not permitted by husband Will not be able to breastfeed at work Haven't thought about it yet

Other (specify): _____

C. If Yes, for how long do you plan to breastfeed? _____

Part B: Supplementation

Pregnant woman

Date of interview (DD/MM/YYYY):

Field worker (initials):

Name and number of this clinic:

Type of clinic: PHC ARVC

19. Why are you visiting the clinic today?

Follow-up visit for pregnancy To receive supplementation

Disease Other (specify): _____

20. Have you heard about any of these nutritional supplementation offered at this clinic?

Vitamin A supplements Nutrition supplements (drinks, infant formulas, cereals etc.) Micronutrients (including folate and iron) No

21. Have you seen any of these supplements? (Show the client the box with vitamin A capsules, the vitamin A-capsule itself and examples of nutrition and micronutrient supplements)

Vitamin A Nutrition supplements Micronutrients No

IF NO, SKIP REST OF QUESTIONS

22. Have you received any of these for yourself?

No Yes Do not remember

23. If yes, what type of supplementation have you received?
- Vitamin A
-DO THE SECTION "THE VITAMIN A SUPPLEMENTATION"
- Nutrition supplements (drinks, infant formulas, cereals etc.)
-DO THE SECTION "THE NUTRITION SUPPLEMENTATION"
- Micronutrient supplementation (including folate and iron)
-DO THE SECTION "THE MICRONUTRIENT SUPPLEMENTATION"
24. If no, do you have any opinion of what the reason for this may be?
- No Yes (specify): _____

The vitamin A supplementation

25. Do you know why you have received vitamin A supplementation?
- No Yes (specify): _____
26. Do you remember when you received vitamin A supplementation?
- No Yes (specify, months): _____
27. Did you take the vitamin A capsule at the clinic?
- Yes No (specify): _____
28. If you received vitamin A supplementation, who gave it to you?
- Professional/registered nurse/sister Nursing staff Dietician
 Other (specify): _____
29. Has anyone talked to you about vitamin A supplementation?
- No Yes (specify): _____
30. If a member of the clinic staff has talked to you about vitamin A supplementation, who talked to you? Professional/registered nurse/sister Nursing staff Dietician Other: _____
31. Talking to this staff member, did you find it:
- Helpful Confusing None of the above (specify): _____
32. Have you received any written information (like a flyer etc) about your vitamin A supplementation? No Yes
- If Yes, did you find it useful? No Yes
33. Have you experienced any problems taking the vitamin A supplementation?
- No Yes (specify): _____

34. Have you experienced any side-effects with the vitamin A supplementation? No Yes (specify): _____

The nutrition supplementation

35. Do you know why you have received the nutrition supplementation?
 No Yes (specify): _____
36. Did you get any advice concerning food habits before you got the nutrition supplementation?
 No Yes (specify): _____
37. Who gave the supplementation to you?
 Professional/registered nurse/sister Nursing staff Dietician
 Other (specify): _____
38. Do/did you take the nutrition supplement as this staff member told you to?
 Yes No (specify): _____
39. Has anyone talked to you about nutrition supplementation?
 No Yes (specify): _____
40. If a member of the clinic staff has talked to you about nutrition supplementation, who talked to you?
 Professional/registered nurse/sister Nursing staff Dietician
 Other (specify): _____
41. Talking to this staff member, did you find it:
 Helpful Confusing None of the above (specify):

42. Have you received any written information (like a flyer, etc) about your nutrition supplementation? No Yes
If Yes, did you find it useful? No Yes
43. Have you experienced any problems taking the nutrition supplementation?
 No Yes (specify): _____
44. Have you experienced any side-effects with the nutrition supplementation?
 No Yes (specify): _____
45. Is the nutrition supplementation ever shared with any members of your household? No Yes (specify): _____

46. Have you ever sold the nutrition supplement to get money to buy other items? No Yes (specify): _____

The micronutrient supplementation

47. Do you know why you have received micronutrient supplementation?
 No Yes (specify): _____
48. Do you remember when you received micronutrient supplementation?
 No Yes (specify, weeks): _____
49. If you received micronutrient supplementation, who gave it to you?
 Professional/registered nurse/sister Nursing staff Dietician
 Other (specify): _____
50. Has anyone talked to you about micronutrient supplementation?
 No Yes (specify): _____
51. If a member of the clinic staff has talked to you about micronutrient supplementation, who talked to you?
 Professional/registered nurse/sister Nursing staff Dietician
 Other (specify): _____
52. Talking to this staff member, did you find it:
 Helpful Confusing None of the above (specify): _____
53. Have you received any written information (like a flyer etc) about your micronutrient supplementation? No Yes
If Yes, did you find it useful? No Yes
54. Have you experienced any problems taking the micronutrient supplementation?
 No Yes (specify): _____
55. Have you experienced any side-effects with the micronutrient supplementation? No Yes (specify): _____

APPENDIX D

QUESTIONNAIRE – XHOSA

Icandelo A: linkcukacha-manani

Umama okhulelweyo

Umhla wodliwano-ndlebe (DD/MM/YYYY):

Umsebenzi owenza uphando (oonobumba bokuqala bamagama akho):

Igama nenombolo yale kliniki:

Uhlobo lwekliniki: iPHC i-ARVC

Oku kwenzelwe umsebenzi owenza uphando:

1. Izifundo zokujonga imilinganiselo yomzimba womntu (ingxelo egciniweyo ungakhulelewanga):

Zingaphi iinyanga ukhulelwe: _____

Umntwana ukhula ngomlinganiselo oqingqiweyo na:

kakuhle ngoko mlinganiselo

ngokungekho mlinganiselweyo

akukho mlinganiselo

Ubukhulu besiphanga: _____cm

2. Ulungele ukufumana uhlobo luni lwezongezelelo ?

uVitamin A izongezelelo zezondlo izongezelelo zezakha-mzimba

3. Ingaba ezi zongezelelo zibhaliswe ngokusesikweni kwiNSP protocol okanye endaweni ethile? Ewe Hayi

4. Isifo anaso esiphela ngokufa¹ (ukuba sisezincwadini):

iHIV/AIDS (okanye esiqondwa njengeRVD) iTB Esinye (cacisa):

1) Izifo eziphelela ekufeni nekubhekiswa kuzo njenge “Zifo ezithile eziphelela ekufeni” kuMgaqo-nkqubo nokuSetyenziswa koMkhomba-ndlela kwiNkqubo yeZongezelelo zeZondlo eziQhutyelwa kumaZiko (2007): Utyatyazo oluyingozi, ukukrala kwemiphunga, isifo samathumba, isifo semiphunga esiyingozi, isifo sentliziyo kwasesizalweni, iintsana ezivela phambi kwexesha, isifosesibindi esiyingozi, isifo sezintso, ukungakwazi ukuginya/isifo esinokudala ukufa,

iingxaki zokwetyisa kwasesizalweni, ezinye umz.umama womntwana onesifo iXDR yeMDR.

Imibuzo eya kumama:

5. Umhla wokuzalwa (DD/MM/YYYY): _____
 Ubudala (iminyaka): _____
6. Unxulumano losapho:
 Utshatile Uqhawulo-mtshato Umhlolokazi
 Nihlala kunye, anitshatanga Uhlala wedwa
7. Inani labantwana obondlayo:
 0 1 2 3 – 4 > 5
8. Bangaphi abantu abahlala kwikhaya lakho/kwindlu ohlala kuyo? _____
 Ngoobani? _____
9. Uhlanga:
 oMnyama oweBala uMndiya Omhlophe Okunye
10. Imfundo oyigqibileyo:
 Ayikho Amabanga aphantsi iBakala lesi-8 – 10
 Ibakala le-11 – 12 Imfundo enomsila
11. Ubume bomsebenzi:
 Uhlala ekhaya nabantwana Uziqeshile Ufumana umvuzo
 Ezinye (cacisa): _____
12. Imali engenayo kusapho ngenyanga:
 Ayikho R1 – R500 R501 – R1000 R1001 – R3000
 R3001 – R5000 > R5001 Andazi
13. Ingaba wena/usapho lwakho nifumana izibonelelo zegranti?
 Hayi Inkxaso-mali yabantwana Uncedo lwentlalo
 Eyokugogeka ilungu Inkamnkam Esuka kusapho
 Okunye (cacisa): _____
14. Imali echithwayo ekutyeni rhoqo ngeveki:
 R0 – R100 R101 – R200 R201 – R400 > R401
15. Uhlobo lwendlu:
 Yenziwe ngezitena okanye isamente Yenziwe ngodaka

Ngamankcenkce Ngamaplanga Olunye (cacisa):

16. Uwafumana phi amanzi okusela ixesha elininzi:

Itepu yakho Itepu yomntu wonke Emlanjeni, edamini

Ephikweni, equleni Ezinye (cacisa): _____

17. Zeziphi izindlu zangasese ezisetyenziswa lolu sapho ?

Zinamanzi Umgodi okanye iVIP Amabhakethi okanye ipoti

Ayikho Ezinye (cacisa): _____

18. Ukuncancisa _____ umntwana:

A. Uyamncancisa/ukhe wamncancisa umntwana? Ewe Hayi

B. Ukuba akumncancisi kutheni? bendingayazi ukuba ubisi lwebele lunempilo

kumosha isiqu sam Ubisi lwe *formulalolona* lungcono umyeni wam walile

andikhange ndikwazi ukuncancisa emsebenzini bendingekakucingi oko

Okunye (cacisa): _____

C. Ukuba uyancancisa, ungathatha ixesha elingakanani? _____

Icandelo: Izongezelelo zezondlo

Umama okhulelweyo/oncancisayo

Umhla wodliwano-ndlebe (DD/MM/YYYY):

Umsebenzi owenza uphando (oonobumba bokuqala bamagama akho):

Igama nenombolo yale kliniki:

Uhlobo lwekliniki: iPHC i-ARVC

19. Yintoni ekundulule ukuba uze eklinikhi namhlanje?

Kukuza eklinikhi komntu okhulelweyo Kukuza kufumana izongezelelo

Kukugula Okunye (cacisa): _____

20. Zikhona izongezelelo zezakha-mzimba ezikhutshwa yile kliniki owakhe weva ngazo?

izongezelelo zika *Vitamin A* izongezelelo zezakha-mzimba (iziselo, isiriyeli, njl.) izakha-mzimba ezizipilisi (kuquka ne-*iron*) Hayi

21. Zikhona izakha-mzimba owakha wazibona kwezi? (Mbonise ibhokisi eneepilisi ezinovitamin A, inkqu yeepilisi ezinovitamin A nemizekelo yezongezelelo

zezondlo nezezakha-mzimba) uVitamin A Izongezelelo zezondlo
 Izongezelelo zezakha-mzimba Hayi

UKUBA UTHI HAYI, YITSIBE YONKE LE MIBUZO.

22. Zikhona kwezi owakha wazifumana wena buqu
 Ewe Hayi Andisakhumbuli

23. Ukuba uthi ewe, zeziphi izongezelelo zezondlo owazifumanayo?
 uVitamin A

-YENZA ICANDELO "UKONGEZWA KUKAVITAMIN A"
 Izongezelelo zezakha-mzimba (iziselo, neesiriyeli, njlnjl)

-YENZA ICANDELO "UKONGEZWA KWEZONDLO"
 Izongezelelo zezakha-mzimba (kubandakanywa ifolate ne-iron)

-YENZA ICANDELO "UKONGEZWA KWEZAKHA-MZIMBA"

24. Ukuba uthi hayi, ingaba unazo izizathu ezenza oku?
 Hayi Ewe (cacisa): _____

Izongezelelo zika Vitamin A

25. Uyazi ukuba kutheni ufumene izinto ezanceda ukongeza uvitamin A?
 Hayi Ewe (cacisa): _____

26. Usakhumbula ukuba wazifumana nini izinto ezanceda ukongeza uvitamin A ?
 Hayi Ewe (cacisa, iinyanga): _____

27. Wawusela iipilisi ezinovitamin A ekliniki?
 Ewe Hayi (cacisa): _____

28. Ukuba ubuzifumene izinto ezongeza uvitamin A, ngubani owakunikayo?
 Umongikazi oyingcali/obhalisiweyo Abasebenzi kwezonyango
 Ingcali yokutya okusisondlo Abanye (cacisa): _____

29. Ingaba ukhona umntu owakhe wathetha nawe ngezongezelelo zikavitamin A?
 Hayi Ewe (cacisa): _____

30. Ukuba umntu osebenza ekliniki wakhe wathetha nawe ngezongezelelo zikavitamin A, ngubani owathetha nawe?
 Umongikazi oyingcali /obhalisiweyo

- Abasebenzi kwezonyango Ingcali yokutya okusisondlo
 Abanye (cacisa): _____
31. Ngokuthetha nalo msebenzi, ingaba oku wakufumanisa :
 Kuluncedo Kudida Akukho nanye kwezi zingentla (cacisa): _____
32. Ingaba zikhona iinkcukacha ezibhaliweyo owazifumanayo (njengephetshana elineenkukaca njlnjl) ngezongezelelo zikavitamin A? Hayi Ewe
 Ukuba uthi ewe, uye walifumanisa liluncedo? Hayi Ewe
33. Wakhe wafumana iingxaki ngokusebenzisa kwakho izongezelelo zikavitamin A? Hayi Ewe (cacisa): _____
34. Ingaba zikhona iziphumo ezingentle ezabonakalayo kuwe ngokusebenzisa kwakho uvitamin A? Hayi Ewe (cacisa): _____

Ukongezwa kwesondlo esinempilo

35. Uyazi ukuba kutheni ufumene izongezelelo zezondlo?
 Hayi Ewe (cacisa): _____
36. Ingaba ukhe wacetyiswa ngokutya iindidi ezithile zokutya phambi kokuba ufumane izongezelelo zesondlo esinempilo Hayi Ewe (cacisa): _____
37. Ngubani okunike izongezelelo zezondlo ezinempilo?
 Umongikazi oyingcali /obhalisiweyo Abasebenzi kwezonyango
 Ingcali yokutya okusisondlo Abanye (cacisa): _____
38. Uyazithatha/ wazithatha izongezelelo zezakha-mzimba njengoko eli gosa lalikuyalela? Ewe Hayi (cacisa): _____
39. Ingaba kukho umntu owakhe wathetha nawe ngezongezelelo zezondlo?
 Hayi Ewe (cacisa): _____
40. Ukuba umntu osebenza ekliniki wakhe wathetha nawe ngezongezelelo zezondlo, ngubani owathetha nawe?
 Ingcali yomongikazi/obhalisiweyo Abasebenzi kwezonyango
 Ingcali yokutya okusisondlo Abanye (cacisa): _____
41. Ngokuthetha nalo msebenzi, ingaba oku wakufumanisa:
 Kuluncedo Kudida Akukho nanye kwezi zingentla (cacisa): _____
42. Ingaba zikhona iinkcukacha ezibhaliweyo owazifumanayo (njengephetshana elineenkukaca njlnjl) ngezongezelelo zezondlo? Hayi Ewe
 Ukuba uthi ewe, uye walifumanisa liluncedo? Hayi Ewe

43. Wakhe wafumana iingxaki ngokusebenzisa kwakho izongezelelo zezondlo?
 Hayi Ewe (cacisa): _____
44. Ingaba zikhona iziphumo ezingezihle owazibonayo ngokusebenzisa kwakho izongezelelo zezondlo?
 Hayi Ewe (cacisa): _____
45. Ingaba ukhe wabelane namalungu osapho ngezongezelelo zezondlo ekhaya?
 Hayi Ewe (cacisa): _____
46. Wakhe wazithengisa izongezelelo zezondlo ukuba ufumane imali yokuthenga ezinye izinto?
 Hayi Ewe (cacisa): _____

Izongezelelo zezakha-mzimba

47. Ingaba uyazi ukuba kutheni unikwe izongezelelo zezaka-mzimba?
 Hayi Ewe (cacisa): _____
48. Usakhumbula ukuba wawuzinikwe nini izongezelelo zezakha-mzimba?
 Hayi Ewe (cacisa, iinyanga): _____
49. Ukuba ubufumana izongezelelo zezakha-mzimba, ubuzifumana kubani?
 Umongikazi oyingcali /obhalisiweyo Abasebenzi kwezonyango
 Ingcali yokutya okusisondlo Abanye (cacisa): _____
50. Ingaba kukho umntu owakhe wathetha nawe ngezongezelelo zezakha-mzimba?
 Hayi Ewe (cacisa): _____
51. Ukuba umntu osebenza ekliniki wakhe wathetha nawe ngezongezelelo zezakha-mzimba, ngubani owathetha nawe?
 Ingcali yomongikazi/obhalisiweyo Abasebenzi kwezonyango
 Ingcali yokutya okusisondlo Abanye (cacisa): _____
52. Ngokuthetha nalo msebenzi, ingaba oku wakufumanisa:
 Kuluncedo Kudida Akukho nanye kwezi zingentla (cacisa): _____
53. Ingaba zikhona iinkcukacha ezibhaliweyo owazifumanayo (njengephetshana elineenkukaca njlnjl) ngezongezelelo zezakha-mzimba?
 Hayi Ewe
 Ukuba uthi ewe, uye walifumanisa liluncedo? Hayi Ewe
54. Wakhe wafumana iingxaki ngokusebenzisa kwakho izongezelelo zezakha-mzimba?
 Hayi Ewe (cacisa): _____
55. Ingaba zikhona iziphumo ezingentle ezabonakalayo kuwe ngokusebenzisa kwakho izakha-mzimba?
 Hayi Ewe (cacisa): _____

APPENDIX E
CONSENT FORM – AFRIKAANS

**INLIGTINGSBROSJURE VIR DEELNEMERS EN TOESTEMMINGSVORM VIR VROUE
VAN VRUGBARE LEEFTYD**

TITEL VAN DIE NAVORSINGSPROJEK:

Evaluering van voedingsaanvullingsprogramme gemik op kwesbare groepe in die Wes-Kaapprovinsie van Suid-Afrika

VERWYSINGSNOMMER: N07/10/232

HOOFNAVORSERS:

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- U word genooi om aan 'n navorsingsprojek deel te neem. Lees asseblief rustig deur hierdie inligting wat die besonderhede van die projek verduidelik. Vra asseblief die studiepersoneel enige vrae oor enige deel van die projek wat u nie ten volle verstaan nie. Dit is baie belangrik dat die inligting u heeltemal tevrede stel en dat u volkome verstaan wat hierdie navorsing behels en hoe u betrek kan word. U deelname is **heeltemal vrywillig**; dit staan u dus vry om te besluit om nie deel te neem nie. Indien

u téén deelname sou besluit, sal dit u geensins benadeel nie. Dit staan u ook vry om u te eniger tyd aan die studie te onttrek, selfs al het u aanvanklik ingestem om deel te neem. Alle inligting wat tot u teruggevoer kan word, met inbegrip van assesserings- en toestemmingsvorme, sal as vertroulik hanteer word en geen werklike name sal in enige dokument in hierdie studie gebruik word nie. Gemagtigde lede van die Universiteit Stellenbosch se Komitee vir Navorsingsetiek mag slegs indien nodig die inligting sien wat tydens die studie ingesamel is, op voorwaarde van streng vertroulikheid, vir doeleindes van gehaltebeheer en inspeksie.

- Hierdie studie is deur die **Universiteit Stellenbosch se Komitee vir Mensnavorsing** goedgekeur, en sal ooreenkomstig die etiese riglyne en beginsels van die Internasionale Verklaring van Helsinki, die Suid-Afrikaanse Riglyne vir Goeie Kliniese Praktijk, en die Mediese Navorsingsraad (MNR) se Etiese Riglyne vir Navorsing uitgevoer word.

WAAROM GAAN HIERDIE NAVORSINGSTUDIE?

- Die hoofdoel is om die huidige voedingsaanvullingsprogramme vir kinders en hulle moeders/versorgers, vroue van vrugbare leeftyd en diene met tuberkulose en/of MIV/vigs te evalueer. Die studie sal hopelik tot beter implementering van hierdie programme tot voordeel van toekomstige ontvangers bydra. Die studie sal by ongeveer 100 primêre gesondheidsklinieke (PGK's) in die Wes-Kaapprovinsie gedoen word.
- In die studie sal u gevra word om vrae rakende u ondervinding van voedingsaanvullingsprogramme te beantwoord. U sal klinies ondersoek word en u lengte, gewig en die omtrek van u arm/middel/heupe sal bepaal word.

WAAROM WORD U GENOOI OM AAN DIE STUDIE DEEL TE NEEM?

- U word genooi omdat u 'n vrou van vrugbare leeftyd is en een van die uitgesoekte klinieke besoek.

WAT SAL U VERANTWOORDELIKHEDE WEES?

- Indien u instem om aan die studie deel te neem, sal u met die studiepersoneel moet saamwerk om die vraelyste in te vul, u lengte, gewig en die omtrek van u arm/middel/heupe te laat bepaal. Beantwoord asseblief die studiepersoneel se vrae eerlik om die akkuraatheid van die studie-uitslae te verseker.

SAL U VOORDEEL TREK UIT DEELNAME AAN HIERDIE NAVORSING?

- U sal waarskynlik geen direkte voordeel uit deelname aan hierdie studie trek nie. U deelname sal ons egter hopelik in staat stel om die suksesvolle implementering van voedingsaanvullingsprogramme in die Wes-Kaapprovinsie, en sodoende ook die gesondheidstatus van dié provinsie se bevolking, verder te verbeter.

IS DAAR ENIGE RISIKO'S VERBONDE AAN U DEELNAME AAN HIERDIE NAVORSING?

- Daar is geen langtermynrisiko's nie.

WIE SAL TOEGANG TOT U MEDIESE REKORDS HÊ?

- Slegs die studiepersoneel sal toegang hê tot inligting wat tydens die studie van u ingesamel is, en alle inligting sal as vertroulik hanteer word. Indien die studie-inligting in 'n publikasie of tesis gebruik word, sal u identiteit nie bekend gemaak word nie.

WAT SAL GEBEUR IN DIE ONWAARSKYNLIKE GEVAL DAT U 'N SOORT BESERING OPDOEN AS 'N DIREKTE GEVOLG VAN U DEELNAME AAN HIERDIE NAVORSINGSTUDIE?

- Dit is onwaarskynlik dat u as gevolg van u deelname aan hierdie studie, wat hoofsaaklik op vraelyste gegrond is, beseer sal word. Indien u egter 'n studieverwante komplikasie opdoen, sal u vir mediese onkoste vir die behandeling van sodanige komplikasies vergoed word. Die Universiteit Stellenbosch het versekeringsdekking wat aan internasionale vereistes voldoen in geval van 'n komplikasie as gevolg van die studie.

SAL U BETAAL WORD OM AAN HIERDIE STUDIE DEEL TE NEEM, EN SAL DIT ENIGIETS KOS?

- U sal nie betaal word om aan die studie deel te neem nie, en dit sal u niks kos nie. Geen bykomende kliniekbesoeke sal vir die doeleindes van hierdie studie nodig wees nie.

IS DAAR ENIGIETS ANDERS WAT U MOET WEET OF DOEN?

- U kan met enige van bogenoemde studiepersoneellede in verbinding tree indien u enige vrae omtrent die studie het.
- Bel gerus die Komitee vir Mensnavorsing by 021 938 9207 indien u enige bekommernisse of klagtes het wat nie voldoende deur die personeel hanteer is nie.

- U sal 'n afskrif van hierdie inligtings- en toestemmingsvorm vir u eie rekords ontvang.

VERKLARING DEUR DEELNEMER

Deur hier onder te teken, stem ek, in om aan 'n navorsingstudie getiteld *Evaluerings van voedingsaanvullingsprogramme gemik op kwesbare groepe in die Wes-Kaapprovinsie van Suid-Afrika* deel te neem.

Ek verklaar dat:

- ek hierdie inligtings- en toestemmingsvorm gelees het of dat dit aan my gelees is, en dat dit geskryf is in 'n taal waarin ek vlot en gemaklik is;
- ek die geleentheid gehad het om vrae te vra en dat al my vrae voldoende beantwoord is;
- ek verstaan dat deelname aan hierdie studie **vrywillig** is en dat daar geen druk op my geplaas word om deel te neem nie;
- ek kan kies om die studie te eniger tyd te verlaat sonder dat ek op enige manier gestraf of benadeel sal word; en
- ek gevra kan word om die studie te verlaat voordat dit afgehandel is, indien die studiepersoneel voel dat dit vir my eie beswil is, of indien ek nie die studieplan volg soos ooreengekom is nie.

Geteken te (*plek*) op (*datum*)

.....
Handtekening van deelnemer

.....
Handtekening van getuie

VERKLARING DEUR NAVORSER

Hiermee verklaar ek,(*naam*), dat:

- ek die inligting in hierdie dokument aan verduidelik het;
- ek hom/haar aangemoedig het om vrae te vra en genoeg tyd geneem het om die vrae te beantwoord;
- ek tevrede is dat hy/sy alle aspekte van die navorsing, soos hierbo bespreek is, voldoende verstaan; en

- ek 'n tolk gebruik het/nie 'n tolk gebruik het nie. (*Indien 'n tolk gebruik is, moet die tolk die verklaring hier onder onderteken.*)

Geteken te (*plek*) op (*datum*)

.....
Handtekening van navorser

.....
Handtekening van getuie

VERKLARING DEUR TOLK

Hiermee verklaar ek,(*naam*), dat:

- ek die navorser,(*naam*), gehelp het om die inligting in hierdie dokument met behulp van Afrikaans/Xhosa as taalmedium aan (*naam van deelnemer*) te verduidelik;
- ons hom/haar aangemoedig het om vrae te vra en genoeg tyd geneem het om die vrae te beantwoord;
- ek 'n feitelik korrekte weergawe van wat aan my deurgegee is, oorgedra het; en
- ek tevrede is dat die deelnemer die inhoud van hierdie ingeligtetoestemmingsdokument ten volle verstaan en dat al sy/haar vrae voldoende beantwoord is.

Geteken te (*plek*) op (*datum*)

.....
Handtekening van tolk

.....
Handtekening van getuie

APPENDIX F
CONSENT FORM – ENGLISH

**PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM FOR WOMEN OF
CHILDBEARING AGE**

TITLE OF THE RESEARCH PROJECT:

Evaluation of Nutritional Supplementation Programmes Targeting Vulnerable Groups in the Western Cape Province of South Africa.

REFERENCE NUMBER: N07/10/232

PRINCIPAL INVESTIGATORS:

Assoc. Professor Marietjie Herselman, Acting Head, Div. of Human Nutrition, Stellenbosch University, Professor Demetre Labadarios, Div. of Human Nutrition, Stellenbosch University and Professor Per Ole Iversen, Div. of Human Nutrition, Stellenbosch University.

ADDRESS:

Division of Human Nutrition
Faculty of Health Sciences, Stellenbosch University,
Francie van Zijl Avenue,
Tygerberg, 7505

CONTACT NUMBER: +2721 938 9259 (Assoc. Professor Marietjie Herselman)

- You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied and that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part. All information that can be traced back to you, including assessment and consent forms will be kept confidential and no real names will be used in any

documents on this study. Authorized members of the Stellenbosch University's Research Ethics Committee may see the information collected during the study, under conditions of strict confidentiality, for reasons of quality control and inspection only if necessary.

- This study has been approved by the **Committee for Human Research at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

WHAT IS THIS RESEARCH STUDY ALL ABOUT?

- The main purpose is to evaluate the current nutrition supplementation programmes for children and their mothers/caregivers, women of childbearing age and those suffering from tuberculosis and/or HIV/AIDS. The study will hopefully contribute to an improved implementation of these programmes to the benefit of future recipients. The study will be conducted at about 100 Primary Health Clinics (PHC) in the Western Cape Province.
- In the study you will be asked to answer questions concerning your experience participating in nutrition supplementation programmes. A maximum of 25 ml of blood (approximately 5 teaspoons) will be collected from you during the visit to the clinic to check your nutritional status. You will be examined clinically. In addition, measurements of length/height, body weight and arm/waist/hip circumferences will be taken.

WHY HAVE YOU BEEN INVITED TO PARTICIPATE?

- You have been invited to participate because you are a woman of childbearing age visiting one of the chosen clinics.

WHAT WILL YOUR RESPONSIBILITIES BE?

- If you agree to participate in this study you will be expected to cooperate with the study staff on the completion of questionnaires, measurements of length/height, body weight and arm/waist/hip circumferences, and drawing of blood. Please be honest when answering questions by the study staff to ensure accuracy of the study results.

WILL YOU BENEFIT FROM TAKING PART IN THIS RESEARCH?

- You may have no immediate benefit from participating in this study. However, your participation will hopefully enable us to further improve the successful implementation of supplementation programmes in the Western Cape Province and thereby the health status of its population.

ARE THERE ANY RISKS INVOLVED IN YOUR TAKING PART IN THIS RESEARCH?

- There are no long-term risks involved, but some people experience that the blood sampling procedure may be a bit painful. This pain is normally of short duration, and the volume of the blood sample is small.

WHO WILL HAVE ACCESS TO YOUR MEDICAL RECORDS?

- Only the study staff will have access to information collected from you during the study, and all information will be handled confidentially. If it is used in a publication or thesis, your identity will remain anonymous.

WHAT WILL HAPPEN IN THE UNLIKELY EVENT OF SOME FORM INJURY OCCURRING AS A DIRECT RESULT OF YOUR TAKING PART IN THIS RESEARCH STUDY?

- It is unlikely that you will get injured as a result of taking part in this study which is mostly based on questionnaires. However, if you do experience a study related complication such as infection at the site where blood was drawn, you will be reimbursed for medical expenses for the treatment of complications that were caused by the study. Stellenbosch University has an insurance cover, which meets international requirements in the event of a complication arising from the study.

WILL YOU BE PAID TO TAKE PART IN THIS STUDY AND ARE THERE ANY COSTS INVOLVED?

- You will not be paid to take part in the study, and there will be no costs involved for you, if you do take part. No additional visits to the clinic will be required for the purposes of this study.

IS THERE ANY THING ELSE THAT YOU SHOULD KNOW OR DO?

- You can contact any of the above mentioned study staff members if you have any questions concerning the study.

- You can contact the Committee for Human Research at phone 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by the study staff.
- You will receive a copy of this information and consent form for your own records.

DECLARATION BY PARTICIPANT

By signing below, I agree to take part in a research study entitled Evaluation of Nutritional Supplementation Programmes Targeting Vulnerable Groups in the Western Cape Province of South Africa

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the study staff feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*)

.....

Signature of participant

.....

Signature of witness

DECLARATION BY INVESTIGATOR

I (*name*) declare that:

- I explained the information in this document to
- I encouraged him/her to ask questions and took adequate time to answer them.

APPENDIX G
CONSENT FORM – XHOSA

**IPHETSHANA ELICHAZELA UMTATHI-NXAXHEBA NGEENKCUKACHA
ZOPHANDO KUNYE NEFOMU YOOMAMA
ABASEKWIMINYAKA YOKUFUMANA ABANTWANA**

ISIHLOKO SEPROJEKTHI ELUPHANDO:

Ukuvavanywa kweenKqubo zeZongezelelo zezondlo neziJolise kuMaqela aHluphekayo eNtshona Koloni

INOMBOLO SALATHISO: N07/10/232

ABAPHANDI ABAPHAMBILI:

UNjingalwazi uMarietjie Herselman, kwiCandelo lokutya okusiSondlo eMntwini, kwiYunivesithi yaseStellenbosch,

UNjingalwazi Demetre Labadarios, kwiCandelo lokutya okusiSondlo eMntwini, kwiYunivesithi yaseStellenbosch,

UNjingalwazi Per Ole Iversen, kwiCandelo lokutya okusiSondlo eMntwini, kwiYunivesithi yaseStellenbosch

IDILESI:

Division of Human Nutrition
Faculty of Health Sciences, Stellenbosch University,
Francie van Zijl Avenue,
Tygerberg, 7505

INOMBOLO YOQHAGAMSHELWANO: +27 21 938 9259 (UNjingalwazi uMarietjie Herselman)

- Uyacelwa ukuba uthathe inxaxheba kwiprojekthi yophando. Nceda uthathe ixesha ukufunda ulwazi olubhalwe apha, oluza kucacisa ngeenkukacha zale projekthi. Nceda ubuze abasebenzi besi sifundo nangayiphi na imibuzo ngale projekthi ongayiqondi ngokupheleleyo. Kubaluleke kakhulu ukuba waneliseke ngokupheleleyo ukuba ukuqonda ngokucacile okuqulathwe lolu phando nokuba

ungabandakanyeka njani. Kwakhona, ukuthatha kwakho inxaxheba **akunyanzelekanga kwaphela** kwaye uvumelekile ukuba ungala ukuthatha inxaxheba kolu phando. Ukuba uthi hayi, oku akuzi kukuchaphazela ngendlela embi. Ukwavumelekile ukurhoxa kwesi sifundo nanini na, nokuba ubuvumile ukuthatha inxaxheba. Zonke iinkcukacha ezinokwayamaniswa nawe, kubandakanywa ifomu yovavanyo neyesivumelwano ziza kugcinwa ziyimfihlo, kwaye akukho magama aza kusetyenziswa nakoluphi na uxwebhu olukwesi sifundo. Amalungu agunyazisiweyo eKomiti ejongene nophando ngokuziphatha ngokusesikweni anokuzibona iinkcukacha eziqokelelweyo ngexesha kusenziwa isifundo, phantsi kweemeko zokuba izinto ezilapha ziza kugcinwa ziyimfihlo, ngezizathu zolawulo olusemgangathweni naxa kusenziwa uhlolo kuphela xa kuyimfuneko.

- Esi sifundo sivunywe **yiKomiti ejongenenoPhando ngoMntu kwiYunivesithi yaseStellenbosch** kwaye siza kwenziwa ngokwemigaqo yokuziphatha ngokusesikweninemimiselo yamazwe yesiBhengezo saseHelsinki, iMigaqo yaseMzantsi Afrika yokusebenza kakuhle ngamayeza neBhunga loPhandongamayeza (iMRC) neMigaqo yokuziphatha ngokusesikweni kuPhando.

INGABA ESI SIFUNDO SOPHANDO SINGANTONI NA?

- Eyona njongo iphambili kukuvavanya iinkqubo ezisetyenziswayo ekongezeleleni izondlo kubantwana kunye noonina babo/iimpelesi, amakhosikazi asekwiminyaka yokufumana abantwana nakwabo baneTB kunye neHIV/AIDS. Kukho ithemba lokuba esi sifundo siyakunceda ekuphuculweni kwendlela ezisetyenziswa ngayo ezi nkqubo ukuze kuxhamle nabanye kwixesha elizayo. ZiiKlinikhi zeMpilo esisiSeko (Primary Health Clinics) ezili-100 ekuza kuqhutyelwa ezi zifundo kwiPhondo leNtshona Koloni.
- Kwesi sifundo uza kubuzwa ngokuthabatha kwakho inxaxheba kwiinkqubo zokongezelela izondlo namava onawo. Ezinye izinto ezinokwenziwa, kukuthathwa komlinganiselo wobude/umphakamo, ubunzima kunye nesazingi sengalo/isinqe/amadywantsi.

KUNGASIZATHU SINI UKUBA UCELWE UKUBA THABATHA INXAXHEBA?

- Ucelwe ukuba uthabathe inxaxheba kuba ungumama osekwiminyaka yokufumana abantwana kwaye uhamba iklinikhi kwelinye lamaziko achongelwe ukuqhuba esi sifundo.

LUZA KUBA YINTONI UXANDUVA LWAKHO

- Ukuba uyavuma ukuthabatha inxaxheba kwesi sifundo kuza kufuneka uthobele imyalelo yestafu malunga nokunika iimpendulo kuxwebhu lwemibuzo, umliganiso wobude/umphakamo, ubunzima bomzimba kunye nesazingi sengalo/isinqe/amadywantsi, kunye nokutsalwa kwegazi. Nceda unyaniseke xa uphendula imibuzo ebuzwa sisitafu ukuze siqiniseke ukuba iziphumo zesi sifundo ziza kuchaneka.

INGABA UZA KUXHAMLA NGOKUTHABATHA INXAXHEBA KOLU PHANDO?

- Ungangafumani nzuzo ikhawulezileyo ngokuthatha kwakho inxaxheba kwesi sifundo. Kanti ke, kukho ithemba lokuba ukuthatha kwakho inxaxheba kuza kuphucula iinkqubo zokongezelela izondlo nemeko yempilo kuluntu lwePhondo laseNtshona Koloni.

INGABA BUKHONA UBUNGOZI ONOKUBUFUMANA XA UNOKUTHATHA INXAXHEBA KOLU PHANDO?

- Hayi, emva kophando uza kuziphilela nje kakuhle akuyi kubuya kubekho nto iza kukhathazana nempilo yakho kwixesha elizayo.

NGUBANI OZA KUBA NOLWAZI NGEENKCUKACHA ZONYANGO LWAKHO?

- Ngabaphandi kuphela abaza kufikelela kwezo nkukacha zakho ziqokelelweyo ngeli xesha kwenziwa esi sifundo, kwaye zonke iinkukacha ziza kugcinwa ziyimfihlo. Ukuba ziza kusetyenziselwa upapasho okanye ithisisi, iinkukacha ngawe ziza kugcinwa ziyimfihlo.

XA KUNOKWENZEKA ISEHLO ESINGAQHELEKANGA SOKWENZAKALA NGENXA YOKUTHATHA KWAKHO INXAXHEBA KWESI SIFUNDO SOPHANDO KUZA KUTHWANI?

- Ukonzakala asinto inokufana ikwehlele kwesi sifundo njengoko ukuqhutywa kwaso kusekelwe ekunikeneni iimpendulo zakho kumaxwebhu anemibuzo.

IYunivesithi yaseStellebosch ine-inshorensi evunyiweyo nelungiselwe ukuze ikhawulelane nento enokuthi ikwehlele ngexesha uphantsi kwesi sifundo.

INGABA UZA KUHLAWULWA NGOKUTHABATHA KWAKHO INXAXHEBA KWESI SIFUNDO KWAYE ZIKHO IINDLEKO EKULINDELEKE UKUBA UZIHLAWULE?

- Akukho ntlawulo uza kuyifumana ngokuthatha inxaxheba kwezi zifundo kwaye akukho zindleko zikhoyo xa uthatha inxaxheba. Akusayi kucelwa ukuba uphinde uze eklinikhi kwakhona ngeenjongo zolu phando lunye.

INGABA IKHONA ENYE INTO EKUFUNEKA UYAZI OKANYE UYENZE?

- Ungaqhagamshelana naye namphi na umsebenzi oxeliweyo ngentla ukuba unemibuzo malunga nesifundo.
- Ungaqhagamshelana neKomiti yoPhando ngoMntu kwa-021-938 9207 ukuba kukho izinto ofuna ukuziqonda okanye unezikhalazo ezingaqwalaselwanga ngokwaneleyo ngabasebenza kwesi sifundo.
- Uza kufumana ikopi enezi nkcukacha nefomu yesivumelwano ukuba uzigcinele

UMTHATHI-NXAXHEBA WAZISA PHANDLE

Ngokutyikitya ngezantsi apha, Mna..... ndiyavuma ukuthabatha inxaxheba kwisifundo sophando esihloko sithi “Uvavanyo lwamaSebe aChongiweyo kwiNkqubo eqhutyelwa kumaZiko eMpilo ekunikeneni umzimba isondlo kwiPhondo leNtshona Koloni”

Ndiyavuma ukuba:

- Ndizifundile okanye ndizifundelwe iinkcukacha nefomu yemvume kwaye ibhalwe ngolwimi endilwaziyo nendiziva ndikhululekile ukulusebenzisa.
- Ndibenalo ithuba lokubuza imibuzo kwaye yonke imibuzo yam iphendulwe ngokufanelekileyo
- Ndiyakuqonda ukuba ukuthatha inxaxheba kwezi zifundo **akunyanzelekanga** kwaye khange ndifakelwe uxinzelelo ukuba ndithathe inxaxheba kwezi zifundo.
- Ndingakhetha ukurhoxa kwezi zifundo nangaliphi na ixesha kwaye andizi kohlwaywa okanye ndidlelwe indlala nangayiphi na indlela.
- Ndinokucelwa ukuba ndisishiye isifundo phambi kokuba sigqitywe ukuba abasebenzi besi sifundo babona ukuba oko kuya kundinceda, okanye ukuba andisilandeli isicwangciso njengoko kuvunyelwene.

Kutyikitywe (*indawo*)ngomhla we.....

.....

Ukutyikitya komthathi-nxaxheba Ukutyikitya kwengqina

UMPHANDI WAZISA PHANDLE

Mna (*igama*) ndiyavuma ukuba:

- Ndizicacisile iinkcukacha ezikolu xwebhu ku
- Ndimkhuthazile ukuba abuze imibuzo kwaye ndithathe ixesha elaneleyo ukuyiphendula
- Ndanelisekile ukuba uyiqonda ngokufanelekileyo yonke imiba yophando, njengoko ichaziwe ngentla
- Ndisebenzise/khange ndisebenzise toliki (*ukuba kusetyenziswe itoliki, itoliki kufuneka ityikitye isivumelwano ngezantsi*).

Kutyikitywe (*indawo*) e..... ngomhla we.....

.....

Ukutyikitya komphandi

Ukutyikitya kwengqina

ITOLIKI YAZISA PHANDLE

Mna (*igama*) ndiyavuma ukuba:

- Ndimncedisile umphandi (*igama*)..... ukucacisa iinkcukacha ezikolu xwebhu ku-(*igama lomthathi-nxaxheba*) ndisebenzisa ulwimi lwesiBhulu/Xhosa.
- Simkhuthazile ukuba abuze imibuzo kwaye sithathe ixesha elaneleyo ukuyiphendula.
- Nditolike okuchanekileyo ebendikuchazelwe.
- Ndanelisekile ukuba umthathi-nxaxheba uwuqonda ngokupheleleyo umxholo wolu xwebhu lwemvume kwaye yonke imibuzo yakhe iphendulwe ngokwanelisayo.

Kutyikitywe (*indawo*) e..... ngomhla we.....

.....

Ukutyikitya kwetoliki

Ukutyikitya kwengqina

APPENDIX H
ETHICS APPROVAL FROM HEALTH RESEARCH ETHICS
COMMITTEE OF STELLENBOSCH UNIVERSITY



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
Jou kennisvenoot • your knowledge partner

7 February 2008

Prof Mg Herselman
Division of Human nutrition
Dept of Interdisciplinary Health Sciences

Dear Prof Herselman

RESEARCH PROJECT: "EVALUATION OF SELECTED COMPONENTS OF HEALTH FACILITY-BASED NUTRITION PROGRAMMES IN THE WESTERN CAPE PROVINCE OF SOUTH AFRICA"

PROJECT NUMBER : N07/10/232

At a meeting of the Committee for Human Research that was held on 12 November 2008 the above project was approved on condition that further information that was required, be submitted.

This information was supplied and the project was finally approved on 7 February 2008 for a period of **one year from this date**. This project is therefore now registered and you can proceed with the work. Please quote the above-mentioned project number in all further correspondence.

Please note that a progress report (obtainable on the website of our Division) should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly and subjected to an external audit.

Patients participating in a research project in Tygerberg Hospital will not be treated free of charge as the Provincial Government of the Western Cape does not support research financially.

Due to heavy workload the nursing corps of the Tygerberg Hospital cannot offer comprehensive nursing care in research projects. It may therefore be expected of a research worker to arrange for private nursing care.

Yours faithfully

FRANKLIN WEBER
RESEARCH DEVELOPMENT AND SUPPORT (TYGERBERG)
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