THE INCIDENCE OF MALNUTRITION AND THE IDENTIFICATION OF DETERMINANTS AFFECTING THE NUTRITIONAL STATUS OF RURAL BLACK CHILDREN AGED 0 TO 24 MONTHS IN UMBUMBULU, KWA-ZULU NATAL.

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Dissertation submitted in compliance with the requirements for the Master's Degree in Technology: Food and Consumer Sciences, in the Faculty of Commerce at Technikon Natal, Durban.

I, Ashika Naicker, do declare that this dissertation is representative of my own work.

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ACKNOWLEDGEMENTS

I hereby wish to express my sincere thanks to the following people for their contribution to this dissertation.

Dr Frida Rundell, Head of Department of Child Care, Technikon Natal, my supervisor for her expert advice and guidance.

Mrs Suna Kassier, Senior Lecturer of Department of Food and Nutrition, my co-supervisor, for her expert advice, constant support and encouragement.

NRF, Technikon Natal and Mangosuthu Technikon for providing funds to make this research possible.

My husband, Daya, my daughter, Grishka, my son, Kaiueran and my family for their support and their unending patience in allowing me to pursue my studies.

Mr K. Thomas, Technikon Natal Research Statistician for his guidance.

Prof. Grace Marquis, Associate Professor at Iowa State University for unselfishly sharing her expertise with me.

My colleagues at Mangosuthu Technikon for their support and encouragement.

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ABSTRACT

This study examines the incidence of malnutrition and the factors influencing malnutrition amongst rural black children aged 0 to 24 months in Umbumbulu, Kwa-Zulu Natal so as to formulate guidelines for the development of a nutrition intervention education programme.

Adequate nutrition and health are fundamental human rights. Nutrition is a cornerstone that affects and defines the health of all children. Globally and specifically in developing countries, childhood malnutrition is a major public health problem and is one of the main cause of death for many of the world's children. Nationally, although there has been an improvement in the nutritional status of many South Africans, malnutrition still exists and rural black children and women are the most vulnerable groups.

In order to establish the nutritional status of the target group, anthropometric measurements were taken and the diet was assessed by with the aid of the 24-hour food recall and the food frequency questionnaire. Socio-biographical information, food and nutrition knowledge of the mother/caregiver, dietary habits and food security information was collected to establish if a link exists between these variables and the nutritional status of the target group.

Results of the study indicated that stunting was the most common nutritional disorder. Moderate stunting was present amongst the following: 48.5% of the 0-6 month old infants,36% of the 18 to 24 month old infants and 25% of the 12 to 18 month old infants. The following associations between the incidence of undernutrition and nutrient intake

were established: undernutrition and energy intakes in the 6-12 month category, undernutrition and fat intake in the 12-18 month category and undernutrition and carbohydrate intake in the 12-18 month category. In terms of dietary assessment, the Energy, Protein, Riboflavin, Niacin, Vitamin B6, Iron, Zinc, Calcium and Selenium intake were to be lower than the recommended daily allowance. A significant relationship between nutritional status and the early introduction of water in the diet was established. None of the ecological factors showed a significant association with undernutrition.

The results of the study are used to make recommendations on focus areas of intervention at different ecological levels for the future development of a nutrition education programme. However, admittedly, this research is very broad based which makes zoning into certain issues very difficult. Therefore, research exploring sub-disciplines highlighted in this study such as the influence of nutrition on child care and the environment will be very valuable.

"Extend this idea as far as it will go you can imagine the Earth at large, including ourselves and our culture as a single evolving system of life" (Roszak, 1977) (as cited by O'Connor and Lubin, 1984:34)

Chapter 1

The Problem and its Setting

Title: The incidence of malnutrition and the identification of determinants affecting nutritional status of rural black children aged 0 to 24 months in Umbumbulu, Kwa-Zulu Natal (KZN).

1.1 General Introduction

This dissertation is an in-depth survey to determine the incidence of malnutrition defined as the combination of inadequate dietary intake and disease by the United Nations Children's Fund (UNICEF)(1998:24-29) in Umbumbulu. In addition, it goes on further to identify and analyse factors influencing the nutritional status of rural black children aged 0 to 24 months in Umbumbulu, KZN.

1.2 Background of the study

Adequate nutrition and health are fundamental human rights. Nutrition is a cornerstone that affects and defines the health of all people. It paves the way for people to grow, develop, resist infections and aspire to realise their fullest potential (World Health Organisation (WHO, 2000). Conversely, malnutrition makes people more vulnerable to disease and premature death (WHO, 2000).

Globally and specifically in developing countries, childhood malnutrition is a major public health problem and is one of the main causes of death for many of the world's children (Murray and Lopez, 1997). It was estimated that in 2000, 49% of the ten million deaths among children less than five years of age in developing countries, were attributed to malnutrition (WHO, 2000). It was also estimated that in 2000, 33% of preschool children were chronically malnourished (United Nations Administrative Committee on Co-ordination/Sub-Committee on Nutrition (ACC/SCN),

2000)(i).

South Africa is regarded as a developing country and is currently in a transitional phase whereby past inequalities are being addressed. However, this mammoth task is difficult considering that a large percentage of South Africans, in particular black households are living under the poverty line (Parliamentary Bulletin, 1996). Vorster, Oosthiuzen, Jerling, Veldman and Burger (1997:23), highlighted the fact that poverty is universally accepted as a fundamental cause of undernutrition. According to the Parliamentary Bulletin, in 1995, 35% of South Africans were living below the poverty line (Parliamentary Bulletin, 1996). Furthermore, poverty was found to be most acute in rural areas and mainly amongst black South Africans. This Bulletin also indicated that there is a strong correlation between the level of education, ill health and the standard of living. The poverty rate of people with no education was 69% in comparison to 54% of people with primary school education (Parliamentary Bulletin, 1996).

Results from the review of the nutritional status of South Africans between 1975 -1996, showed that on a national level, 20-25% of preschool children were stunted and therefore suffered from chronic malnutrition (Vorster et al.1997:31). Similarly, results from other studies support the documented national figures of malnutrition. The South African Vitamin A Consultative Group (SAVACG), under the auspices of the Department of Health, conducted a national survey to determine growth patterns and micronutrient status of South African children between the ages of 0 to 71 months (Vitamin Information Centre, 1996:1-4). Findings showed that one in three children in the country had a marginal vitamin A status and one in five children were anaemic.

Furthermore, children from the Northern Province and Kwa-Zulu Natal, particularly in rural areas, had the highest incidence of sub-clinical vitamin A deficiency. The National Food Consumption Survey (1999) conducted amongst children between one to nine years of age, showed almost similar results pertaining to the incidence of malnutrition. Nationally, 21,6% of children were stunted, coupled with a 33% incidence of stunting amongst children in rural areas. The results also showed that children between one to three years of age were the primary victims of malnutrition and infants together with their mothers/caregivers should be prime targets for nutrition intervention (Labadarios, Steyn, Maunder, MacIntyre, Swart, Gericke, Huskisson, Dannhauser, Vorster and Nesamvumi, 2001).

Apart from poverty, another possible reason, why South Africa is still burdened with a high incidence of malnutrition, is that historically, South Africa has been plagued by many unsuccessful nutrition intervention programmes. According to Vorster et al. (1997:1-33), there is a perception that the few national government and the many efforts from non-government organisations aimed at addressing malnutrition are not effective. One of the main reasons is probably because these nutrition education programmes were not based on an analysis of the real problem and were not targeted at the most needy. The reasons for the varying degrees of success of nutrition education programmes has been discussed in detail by McLachlan and Kuzwayo (1997), McLachlan and Marshall (1995), Steyn, Pettifor, Van Niekerk and Nel (1992) and Walker (1989).

Nutrition Intervention Education Programmes (NIEP), have been implemented by the past and present government and non-government organisations via a multitude of

programmes. The Department of Health under the previous government introduced two NIEP's, namely the Protein Energy Malnutrition (PEM) scheme and the National Nutrition and Social Development programme (NNSDP). According to McLachlan and Kuzwayo (1997), the PEM scheme was flawed, as it was not adequately linked to the crucial function of the health care delivery system for the prevention of malnutrition.

The demand driven nature of the NNSDP undermined attempts of geographic targeting. Districts closer to urban areas were better served than rural areas, where nutritional intervention was needed the most. The failure of the PEM scheme and the NNSDP bears testament to the fact that nutrition intervention programmes under the previous government were largely fragmented and food based (McLachlan and Kuzwayo, 1997).

The nutrition initiatives since 1994 have experienced varying degrees of success. The Primary School Nutrition Programme (PSNP) also failed due to a lack of comprehensive planning, poor community consultation and its rapid implementation. Vorster et al.(1997:1), stated that these programmes were never evaluated in a scientific way and there was a perception that it was not cost effective. McLachan and Marshall(1995), describe reasons for the failure of the NIEP's:

- *Programmes were designed without adequate information.*
- *The designs reflected a limited understanding of the problem of malnutrition.*
- *Goals were ill defined.*
- *Programmes were not targeted at the most needy.*
- *Participation and involvement of communities were inadequate*.

It is therefore clear that the various attempts that were applied to address malnutrition fell short, because they were fragmented, narrowly defined and focused simply on providing food rather than looking into the deeper causes of malnutrition.

The rights, needs and the development of children are clearly identified priorities in the South African government's Reconstruction and Development programme which emphasises that children's needs must be of paramount importance throughout all programmes aimed at meeting basic human needs and enhancing socio-economic upliftment (African National Congress,1994:41-42). The White Paper for the transformation of the health system in South Africa (South Africa, 1997:84-96)(i), contextualises nutrition within the framework of the new Constitution. It is here that the Bill of Rights states that everyone has the right to have access to sufficient food and water. Subsequently, an Integrated Nutrition Strategy was developed by the Department of Health based on the White paper's objectives with the following guiding principles:

- *Adequate nutrition for all South Africans should be promoted as a basic human right. Nutritional status, especially of the children, must be the gauge to measure the country's social and economic development.*
- *Nutrition programmes should be integrated, sustainable, environmentally sound, people and community driven. Programmes should target the most vulnerable groups namely women of childbearing age and children.*
- *Nutritional well being should be promoted and monitored within nationally defined goals. There should be a clear information strategy.*

As a result of the above the impact objectives, the Integrated Nutrition Programme was developed with the following impact objectives to be reached by 2000 (Intergrated Nutrition programme, 2001):

- *Reduction of the prevalence of underweight for age to less than 10% among children under three years of age (estimated present prevalence = 15%).*
- *Reduction of the prevalence of stunting by one third among children less than six years of age (estimated present prevalence = 30%).*
- *Reduction of severe malnutrition by one half among children under the ages of three (estimated present prevalence = 2-3%).*
- *Reduction of iron deficiency in children under three years of age by one half (estimated present prevalence in infants = 25%).*
- *Reduction in sub-clinical vitamin A deficiency by 50% in children under the ages of six (estimated present prevalence = 20-50%).*

The Integrated Nutrition Programme (INP) has to date reached many milestones. However, it has not been evaluated to determine whether it has achieved all its impact objectives set for 2000. Despite this fact, the NFCS of 1999, under the INP, when compared to the 1995 SAVACG survey, showed that existing interventions aimed at improving nutritional status have positively impacted on the malnutrition problem. Nevertheless, the NFCS concluded that the greater majority of 1-9 year old children in the country consumed a diet deficient in energy and of poor micronutrient density (Labadarios et al. 2001). Furthermore, children living on commercial farms had a stunting prevalence of 33% (Labadarios et al. 2001). The statistics reflected by

the National Food Consumption survey indicate that although the incidence of malnutrition has been lowered in comparison to the SAVACG study, malnutrition still exists especially amongst rural children between the ages of 1-3 years living on commercial farms.

The Department of Health has developed a comprehensive set of policies in order to address the problem of malnutrition. However, the problems raised by the national PSNP evaluation has highlighted the need to pay more attention to the actual mechanisms of transforming policies into appropriate action. McCoy and Modise (1997), states that what is lacking are feasible and appropriate plans at the community and district levels.

Adequate nutrition is a basic human need and a pre-requisite to good health. It appears that undernutrition in rural areas of Kwa-Zulu Natal is caused not only by poverty, but also by the lack of nutritional knowledge and the inadequate utilisation of the available resources (Vorster et al. 1997:1-33). Vorster et al. (1997:1-33), documented that the nature and the extent of nutritional vulnerability among specific South African populations was poor, particularly among black children between the ages of 0-6 years. Conclusions and recommendations that can be drawn from this meta-analysis are as follows (Vorster et al.1997: 1-33):

- *In all reports where dietary patterns were examined, there was a consensus that low energy density of weaning foods and the low intake milk, vegetables and legumes are responsible for most of the nutrient imbalances in the diets of young children.*

- *Although analyses of dietary patterns and determinants of malnutrition showed that cultural influences explain some differences in nutritional status, other factors such as poverty, food insecurity, disruption of the family unit, parasitic infections and the lack of education are probably more important determinants.*
- *On a national level 20-25% of pre-school children are stunted and suffer from chronic malnutrition. Rural black and coloured children are the most vulnerable groups.*
- *The prevalence of stunting in pre-school children indicates that programmes must be flexible and based on real and specific communities.*

The poor nutritional status of young children reflected in recent studies, especially in rural areas, and the minimum success rates of NIEP's necessitates a baseline survey to assess the needs of a typical rural area. It is envisaged that the information retrieved, will assist in drawing up holistic guidelines for the future development of a NIEP. Moreover, it could be adapted and applied to other typical rural areas in KZN to combat malnutrition.

1.3 Origin of the study

The study is self-initiated by the researcher as a result of the high prevalence of malnutrition in the rural areas of KZN, mainly amongst children as expressed by the SAVACG study in 1994, the review of the nutritional status of South Africans between 1975-1996 and the National Food Consumption Survey in 1999. These studies collectively display the urgent need for NIEP's. Considering the paucity of the

nutritional status of rural black preschool children (see pg 3-4) and the minimum success rate of NIEP's initiated by the previous government and the failure of the PSNP by the present government (see pg 4-5), there is an urgent need for NIEP's which are based on the needs of specific target communities, provided communities are active participants in the entire process.

Many studies have focused on assessing the needs of communities, which is essential (Kretzmann and McKnight, 1993:1-11). However, they are normally serviced by people outside the community and as a result they see themselves as people with special needs that can only be met by outsiders (Kretzmann and McKnight, 1993:1-11). Kretzmann and McKnight (1993:1-11), state that the alternate path is the asset building model approach, which leads towards the development of policies and activities based on the capacities, skills and assets of the community targeted. Kretzmann and McKnight (1993:1-11), emphasise that the way researchers perceive communities according to their deficiencies and needs or by their strengths and capacities, will determine how problems are addressed in a community. Need orientated policies can create client neighbourhoods that deepen the dependency on external assistance. Thus, there is a need for a NIEP's that places the communities needs at heart and involves communities in the programme process as active participants. It is envisaged that this strategy will empower communities, allow them to be more sustainable and build human capacity. McLachan and Van Twisk (1995), are of the opinion that when community nutrition programmes are based on a holistic understanding of the problem, improvements in the nutritional well-being of the communities are sustainable.

1.4 Statement of the problem

The purpose of the study is to determine the incidence of malnutrition and to identify factors associated with the development of malnutrition amongst rural black children aged 0 to 24 months from the Umbumbulu area, KZN. Based on the results obtained, programme planning objectives will be identified and guidelines will be formulated for the future development of a nutrition intervention education programme by the researcher (see pg 142-144).

1.5 Primary Objectives

1.5.1 The first Sub-problem

To determine the incidence of malnutrition amongst children between the ages of 0-24 months from the Umbumbulu area, KZN by means of weight for recumbent length, weight for age, recumbent length for age measurements.

1.5.2 The second Sub-problem

To determine whether a correlation exists between the incidence of malnutrition and nutrient intakes of children aged 0-24 months in Umbumbulu, KZN.

1.5.3 The third Sub-problem

To assess the existing home management skills, food preparation knowledge, food related beliefs and dietary practices regarding childhood nutrition amongst rural black families from the Umbumbulu area, KZN by interviewing the mothers/caregivers of children aged 0-24 months old within each family.

1.5.4 The fourth Sub-problem

To identify the presence, the role of and the interrelatedness of ecological factors that

are associated with the occurrence of malnutrition amongst rural black children aged 0-24 months in the Umbumbulu area, KZN.

1.6 Secondary Objectives

1.6.1 The fifth Sub-problem

To analyse and integrate the existing food and nutrition knowledge of the household, food related beliefs; and dietary practices of the target group via the mother/caregiver with the ecological factors that possibly influence the occurrence of malnutrition in order to compile guidelines for the future formulation of a culturally sensitive nutrition intervention education programme to build human capacity in the Umbumbulu area, KZN.

1.7 Importance of the study:

The assessment of the nutritional status and factors influencing the nutritional status of rural black children aged 0 to 24 months in Umbumbulu will be of extreme importance in the compilation of guidelines based on the research findings for the future development of a NIEP. It is envisaged that if the NIEP is designed according to the guidelines and recommendations of this study, rural communities will be empowered to gain positive attitudes, increased confidence and skills in developing good dietary practices and maintain food security. Investing in childhood nutrition will have both short and long term benefits of huge economic and social significance, including the reduced health care costs throughout the life cycle, the reduction of non-communicable diseases, increased educability and sustained intellectual capacity (ACC/SCN, 2000:66)(ii).

1.8 Delimitations:

- The study will target only rural black children between the ages of 0 to 24 months in Umbumbulu, KZN via the mother/caregiver of the child.
- The study is limited to dietary and anthropometric measurements as indicators of nutritional status.
- The study will not attempt to develop a nutrition intervention education programme but instead compile guidelines and recommendations for the future development of nutrition intervention education programme.

1.9 Assumptions

- That the sample is representative of the target population.
- The caregiver is responsible for the care of the child in the absence of the mother.
- It was assumed that the contribution of information by the mother/ caregiver would be positive, constructive and honest and that the data would accurately reflect the nutritional and dietary practices of the target group.

1.10 Conceptual Clarification:

1.10.1 Definitions

- Acculturation: A long-term process during which individuals simultaneously learn and/ or modify certain aspects of a new culture and their culture of origin (Lucia, Kaiser, Hugo, Quintonezi, Cathi, Lamp, Herwood and Jones, 2001).

- Anthropometry: The measurement of the variations of the physical dimensions and the gross composition of the human body at different age levels and degrees of

nutrition (Jelliffe, 1966)(as cited by Gibson, 1990:155).

- Food Finder 11: A dietary analysis computer software programme designed and developed by the Medical Research Council of South Africa. It was released in January 2001 and is used in dietary analysis (Medical Research Council, 2001).

- Food Security: The access by all people at all times to enough food for an active, healthy life and includes at a minimum the ready availability of nutritionally adequate and safe foods and the assured ability to acquire foods in a socially acceptable way (Anderson, 1990).

- Malnutrition: The result of a combination of inadequate dietary intake and disease, where a lack of food in the diet is under nutrition and an excess of food in the diet is over nutrition (UNICEF, 1998:10-90).

- Nutrition Intervention Education Programme: A powerful dynamic process improving health and nutrition related behaviours with the aid of a designed intervention programme (American Dietetic Association, 1990).

- Recommended Dietary Allowances: The daily dietary level that is sufficient to meet the nutrient requirements of nearly all (97-98%) individuals in a given life-stage (Vitamin Information Centre, 1999:1-4).

- Stunting: The shortness that is a deficit or linear growth that has failed to reach genetic potential as a result of poor diet and disease. Stunting is defined as low height for age at <2 Standard Deviation (SD) of the median value of the National

Centre for Health Statistics (WHO, 1995:425-456).

- Underweight: A deficit and is defined as low weight for age at < 2SD of the median value of the NCHS/WHO reference (WHO, 1995:425-456).

- Wasting: A severe process that has produced a substantial weight loss, usually as a consequence of acute shortage of food or severe disease. Wasting is referred to as low weight for height at <2SD of the median value of the NCHS/WHO international weight for height reference (WHO, 1995:425-456).

1.10.2 Abbreviations

- ADA :American Dietetic Association
- ACC/SCN :Administrative Committee on Co-ordination/ Sub-Committee on Nutrition
- FAO : Food and Agricultural Organisation
- FFQ : Food Frequency Questionnaire
- FPPB : Food Photograph Portion Book
- IFPRI : International Food Policy Research Institute
- INP : Integrated Nutrition Programme
- KZN : Kwa-Zulu Natal
- MRC : Medical Research Council
- NCHS : National Centre for Health Statistics
- NFCS : National Food Consumption Survey

- NIEP : Nutrition Intervention Education Programme
- NNSDP : National Nutrition and Social Development Programme
- PEM : Protein Energy Malnutrition
- PSNP : Primary School Nutrition Programme
- RDA : Recommended Dietary Allowances
- SAVACG : South African Vitamin A Consultative Group
- SD : Standard Deviation
- SPSS : Software Package for Social Sciences
- UNICEF : United Nations Children's Fund
- WHO : World Health Organisation

1.11 Overview of the Chapters

-Chapter 1 states the problem to be researched as well as the background of the study with respect to the investigation of the incidence of malnutrition and factors associated with malnutrition amongst rural black children aged 0 to 24 months in Umbumbulu.

-Chapter 2 gives an overview of the literature related to the incidence, determinants and causes of malnutrition amongst children internationally and nationally.

-Chapter 3 explains the methodology used for the descriptive survey.

-Chapter 4 presents the results of the processed data.

-Chapter 5 deals with the discussion and the comparison of the results with other

similar national studies. It also outlines programme planning recommendations and guidelines based on the results of the data.

-Chapter 6 evaluates the research outputs in terms of weaknesses and strengths; and the way forward.

The references and annexures appear at the end of the dissertation.
The next chapter deals with the literature review related to malnutrition and the theoretical frameworks used in this study.

Chapter 2

Literature Review

2.1 Introduction

Universally good nutrition and health is accepted as basic human rights. The Jakarta declaration (WHO) (1997), states that good health is a basic human right and is essential for social and economic development. An individual's nutritional status is the result of the food one eats, one's overall state of health and the environment in which one lives. In short, food, health and caring are the three pillars of well being.

Malnutrition is primarily caused by poverty, which leads to a great deal of human suffering and it is a violation of a child's rights (UNICEF, 1998:10-90). According to UNICEF (1998: 10-90), malnutrition is not just a silent emergency. It is largely invisible as well. Malnutrition is visible in extreme forms of PEM and micronutrient deficiencies, but the most pervasive forms of malnutrition are often hidden and are difficult to determine if a child is not assessed frequently (UNICEF, 1998:10-90).

In this chapter the theoretical framework adopted, the incidence of malnutrition and the factors influencing the nutritional status of young children will be discussed.

2.2 Malnutrition and the life-cycle

Nutrition challenges occur throughout the life-cycle and malnutrition affects all age groups across the life span. Figure 1 (see pg 20) depicts malnutrition and nutrition challenges throughout the life cycle. This figure shows how various nutritional problems, causes and consequences change and interact over time. Poor nutrition often starts in utero and extends well into adolescent and adult life. According to Brundtland (1999), one third of low birth weight babies are moderately malnourished and half are malnourished by the age of one year. The poorer the start babies have in

life, the more likely they are to become sick, malnourished and vulnerable to death. UNICEF (1998:10-90), indicated that low birth weight babies develop into children with growth failure. This in turn leads to low weight teenagers and small adults. An intergenerational cycle of growth failure develops. Hence, the cycle of poor nutrition perpetuates itself across generations.

Evans (1985), concluded that malnutrition, disease and infection suffered during the early years have a permanent effect on later development, not only because of the consequences to the child's physical well being, but because these variables interact with and have an impact on the child's social environment. According to Evans (1985), the behavioural effects of malnutrition, disease and infection in young children are visible through characteristics such as apathy, reduced responsiveness to people and the environment. The child becomes less engaging. Caretakers find the child less appealing and fail to provide the child with stimulation. Thus, a vicious cycle is created which results in poor development outcomes.

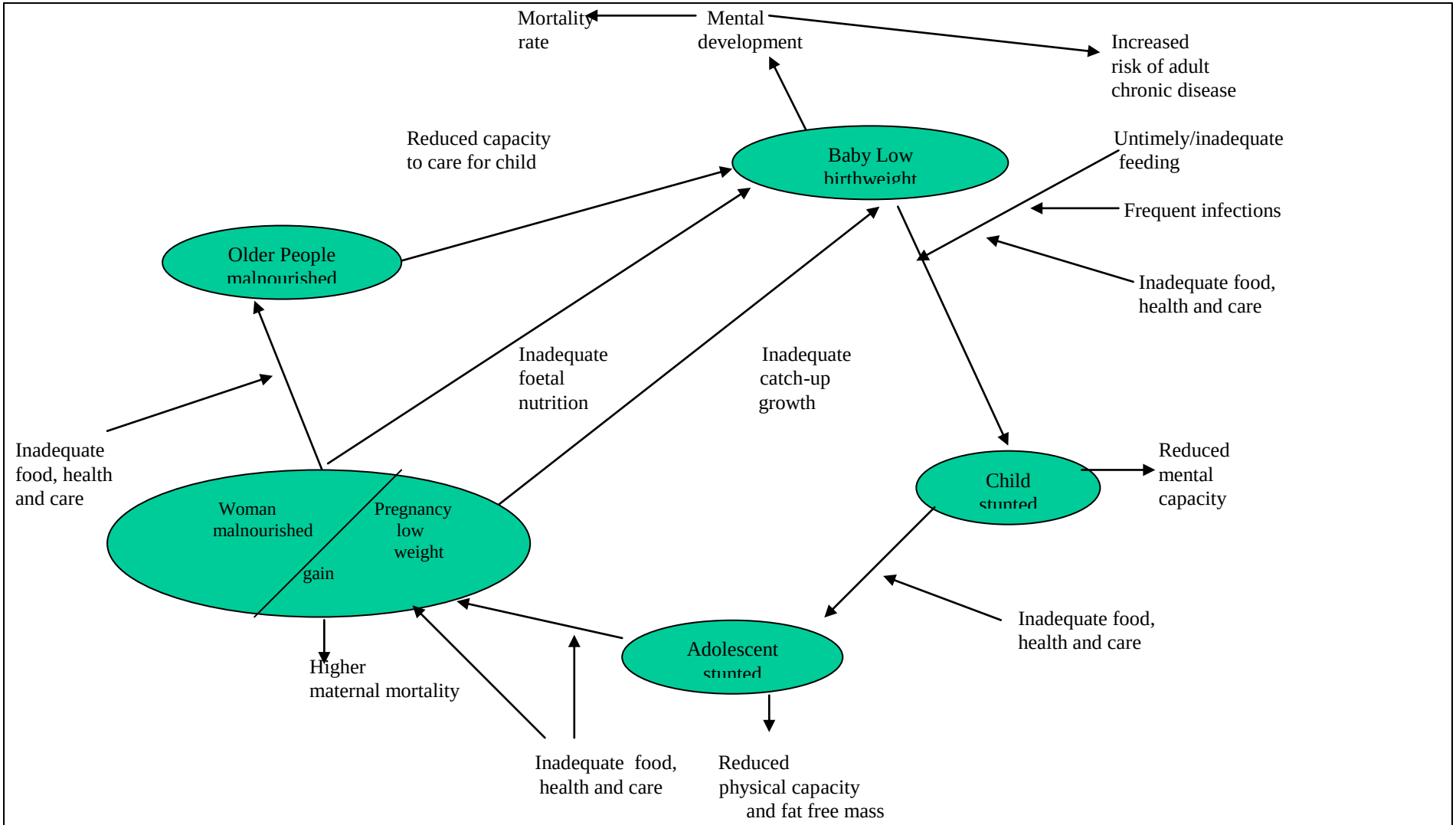

Figure 1: Malnutrition and the nutrition challenges throughout the life cycle (ACC/SCN, 2000: 1)

2.3 Nutrition Education

Nutrition Education is defined as any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition related behaviours conducive to health and well being (Contento, Balch, Bronner, Lythe, Maloney, Olson and Swadener, 1995). This behaviour suggests that behavioural change should be the primary goal for effective nutrition education. According to the American Dietetic Association (ADA) (1996), behaviours are identified by the needs and perceptions of the target groups as well as national nutrition goals and science based research.

The major findings of a comprehensive review of nutrition intervention by Contento et al. (1995), was that nutrition education does work when behavioural changes are set as a goal and education strategies employed are designed with that as a purpose. The ADA, (1996), states that in addition to understanding the needs of the target audience, a clear understanding of the desired outcomes for the target audience is also a key to success in nutrition education. The ultimate goal must be sustainable behavioural change with an intermediate goal of a shift towards a more healthful diet.

2.4 Theoretical Framework

According to Lancaster, Onega and Forness (1996:251-263), conceptual models organise global ideas and complete systems into succinct formats. They provide meaningful descriptions to guide the thinking, observations and recommendations of researchers. Contento et al. (1995), documented that effective nutrition education programmes are those that are behaviourally focused and are based on appropriate theory and prior research. The review also highlighted the fact that effective nutrition education programmes use a variety of complementary theoretical models of individual,

social and environmental change in combination (Contento et al. 1995). The ADA (1996), indicates that a combination of existing theories and models are used to create a research base that suggests how best to achieve dietary change by allowing NIEP's to take into account the complexity of dietary change and the interaction of the many variables involved.

Traditionally, many studies in nutrition education aimed at the mothers /caretakers of children used the Knowledge Attitude Behaviour model, where it is assumed that by exposing people to new knowledge, there would be a attitudinal change which would positively influence dietary behaviour (Contento et al. 1995). However, studies indicate that NIEP's that merely disseminate information and teach skills do not bring about behavioural change successfully because they fail to motivate target groups attitudinally (Contento et al. 1995).

A useful systematic planning tool for nutrition education intervention which integrates many theories and models of individuals and communities is the Precede/Proceed model. This study will therefore, adopt the Precede/Proceed model of programme planning (see figure 2, pg 24). According to Green and Kreuter (1992: 23-59) , the Precede framework takes into account multiple factors that shapes health status and helps the planner arrive at a highly focused subset of those factors as targets of the intervention. The Proceed framework provides additional steps for developing policy and initiating the implementation and evaluation process.

The Precede/Proceed model has a number of advantages. In Green and Kreuter (1992: 23-59), it is stated that the model provides for comprehensive programme

planning and it has been successful in a number of vigorously evaluated, randomised clinical and field trails. Lancaster et al. (1996:251-263), finds it advantageous in the sense that it consistently involves the target group in the problem solving approach to provide health education for an identified area of need.

Lancaster et al. (1996:251-263), have described the entire process of the model in a number of steps. It begins by assessing the environment in which the group lives and considers the social factors that influence health behaviours. Next the model examines both the internal and environmental factors that predispose it to certain behaviours or health problems. The model, then identifies factors that will help the group in adopting healthy action. Priorities are set and finally the programme is developed, implemented and evaluated.

For figure 1, refer to appendices

2.5 Malnutrition: Immediate and Long-term effects

Malnutrition is characterised by a wide array of health problems, including extreme weight loss, stunted growth and weakened resistance to infections. People who survive a malnourished childhood are less physically and intellectually productive and suffer from one or more chronic diseases (UNICEF, 1998:10-90). The short-term and long-term effects of early nutrition is clearly illustrated by the ACC/SCN in figure 3.

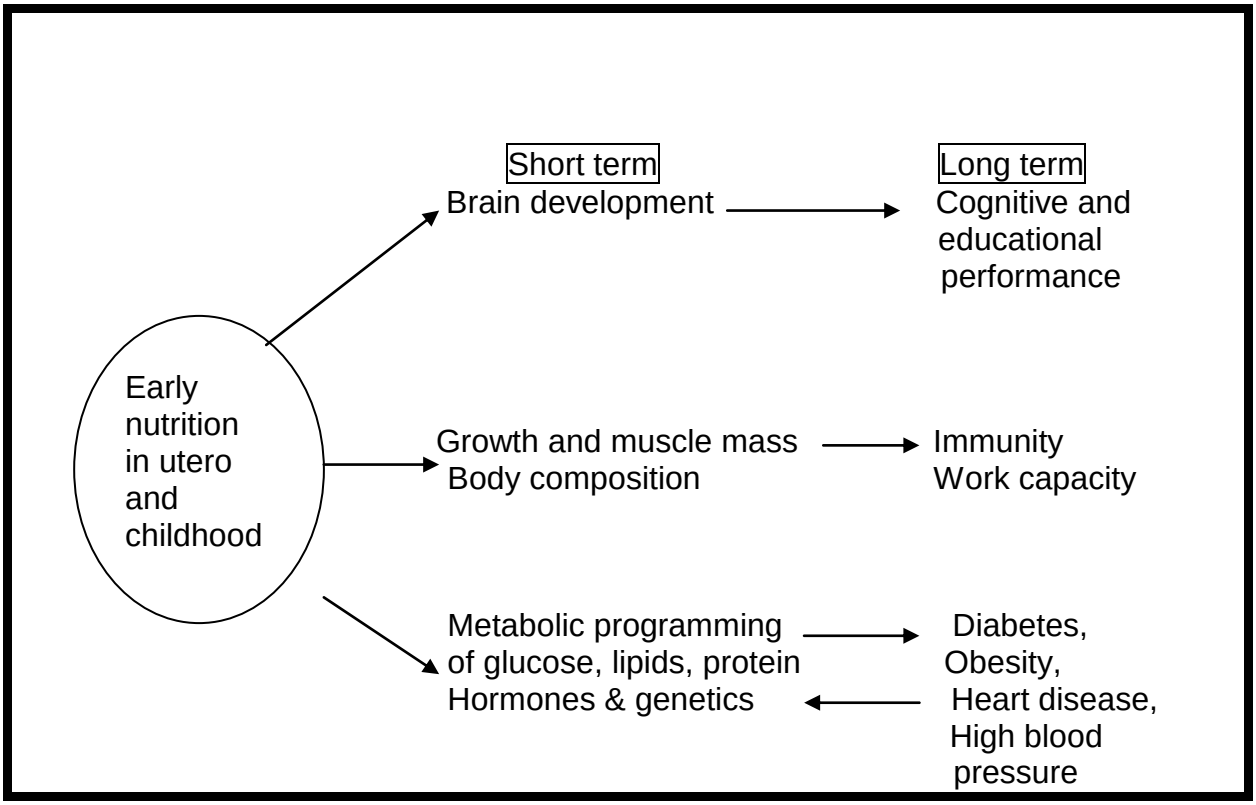

Figure 3: Short- term and Long-term effects of early nutrition, (ACC/SCN, 2000: 2-55)(i).

According to McLachan and Kuzwayo (1997), malnutrition can lead to three serious consequences namely: malnutrition leads to increased mortality, malnutrition leads to increased morbidity and malnutrition leads to reduced cognitive development.

2.5.1 Malnutrition and Mortality

Mortality is defined as the death rate (Dictionary.com, 2000). Death rates increase exponentially with a high degree of malnutrition. In 2000, 49% of the 10 million deaths in developing countries amongst children less than five years of age, were associated with malnutrition (WHO, 2000).

2.5.2 Malnutrition and Morbidity

According to Dictionary.com (2000), morbidity is defined as the amount of disease and sickness present. It was estimated that in 2000, 182 million (33%) of preschool children in the developing world were stunted or chronically malnourished (ACC/SCN, 2000: 2-55). It was also estimated that in 2000, 27% of pre-school children in the developing world were underweight (<-2SD weight for age) (ACC/SCN, 2000:2-55)(i).

According to the review of the nutritional status of South Africans between 1961-1997, 20%-25% of pre-school children nationally were chronically malnourished (Vorster et al.1997:1-33). These results are supported by the more recent study, the National Food Consumption Survey of 1999 (Labadarios et al. 2001). Results of this study showed that 21.6% of children between the ages of 1-9 were stunted with the highest prevalence in rural areas. (Labadarios et al. 2001).

Malnutrition and infection creates a vicious cycle. Figure 4, (see pg. 27) illustrates the cycle of malnutrition and infection by Tomkins and Watson, 1989 (as cited by UNICEF, 1998:25). Malnutrition magnifies the effect of disease and lowers the body's resistance to infection. Infection causes the loss of appetite. This in turn increases the body's nutrient and energy requirements. Conversely, the presence of

infections decreases dietary intake and the cycle continues (UNICEF, 1998: 25-26).

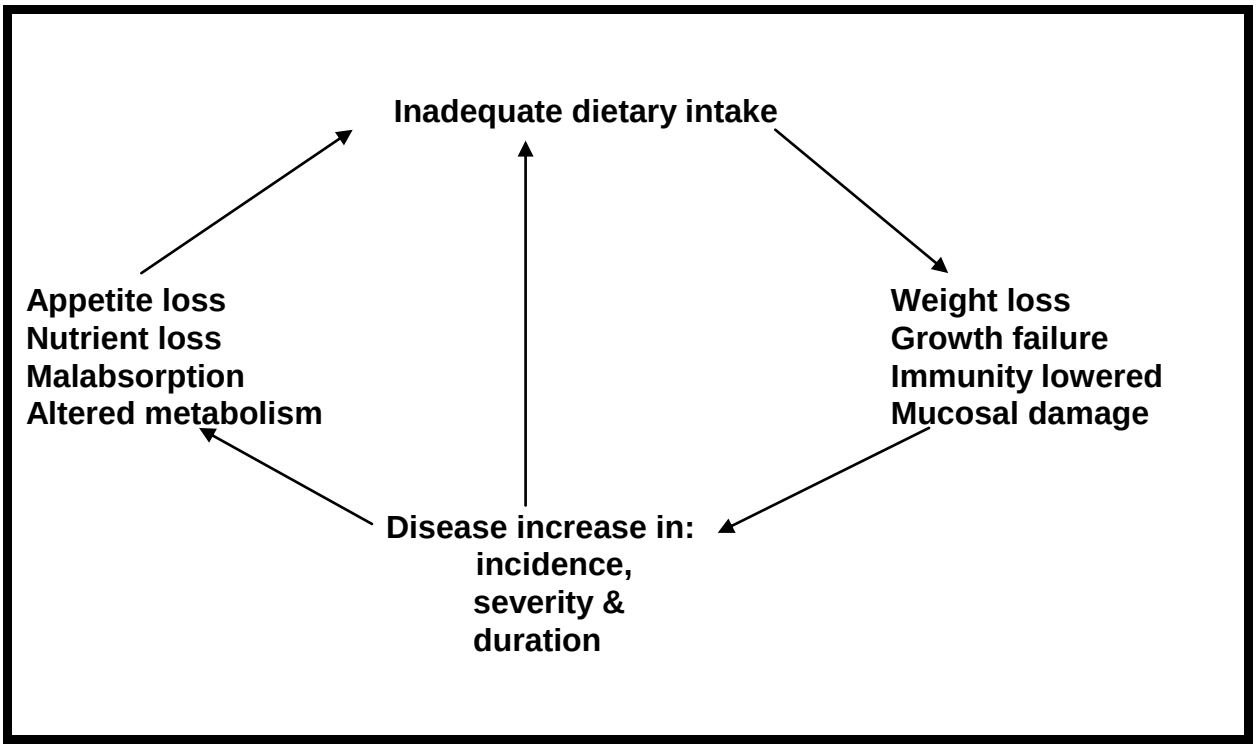

Figure 4: Malnutrition and the Infection Cycle, (Tomkins and Watson, 1989) (as cited by UNICEF, 1998: 25).Figure :3 Malnutrition and the Infection Cycle by the ACC/SCN, 1989 by A. Tomkins and F. Watson.

During early childhood, frequent infection, inadequate dietary intake of nutrients, particularly energy, protein, vitamin A, iron and zinc compounds to growth retardation. According to the SAVACG study (Vitamin Information Centre, 1996), three micro-nutrient deficiency diseases namely that of vitamin A, Iodine and Iron are considered a public health problem in developing countries. These micro-nutrient deficiency diseases contribute to growth retardation, brain damage, diminished cognitive function and increased susceptibility to diseases and infection (UNICEF, 1998:25).

2.5.3 Malnutrition and Cognitive development

According to McLachan and Kuzwayo (1997), severe malnutrition has always been recognised as a main contributor towards impaired cognitive development and poor education outcomes. However, recent research documents that even mild to moderate forms of malnutrition can impact negatively on the cognitive development of children and later productivity of adults (Levinger, 1994). According to UNICEF (2001:1-66), most brain development happens before a child reaches three years old. Furthermore, choices made and actions taken on behalf of children during this critical period, affect not only how a child develops, but also how a country progresses. Figure 5 (see pg. 29), shows the critical periods of brain development. The malleability of the brain during the early years, means that if children don't get the care they need during prime developmental times or if they experience starvation, abuse or neglect, brain development may be compromised.

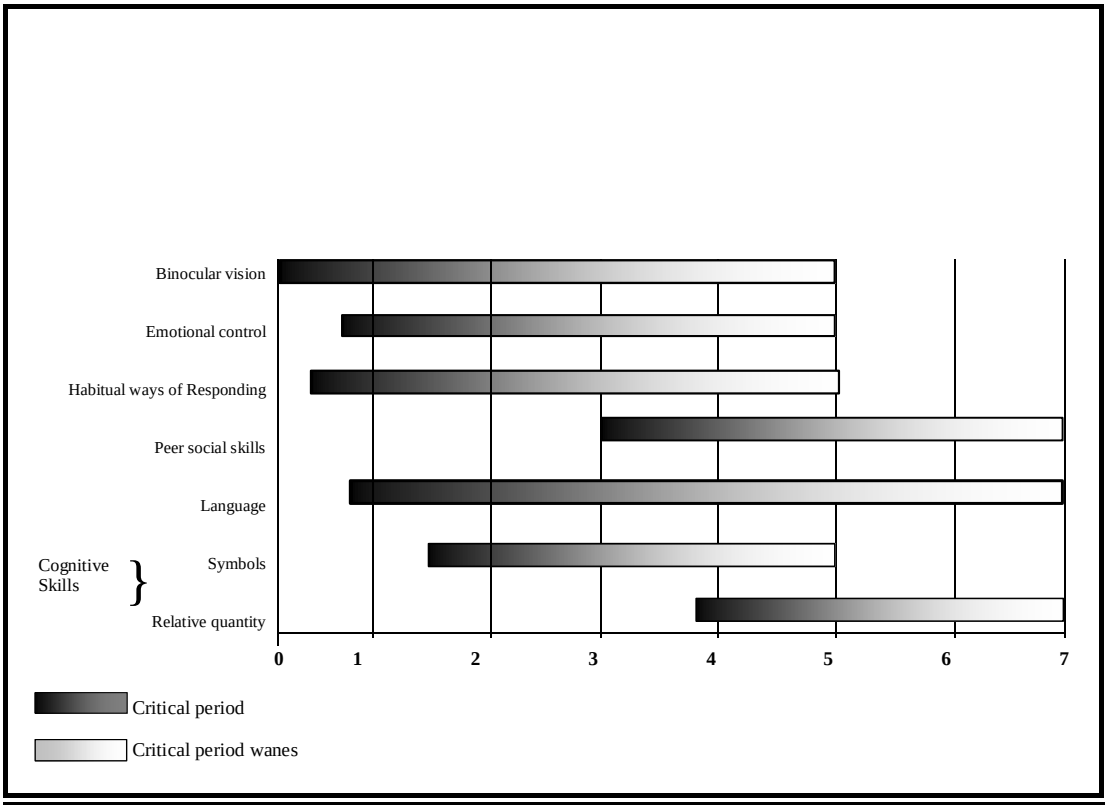

Figure 5: Critical periods of brain development, (UNICEF, 2001:1-66).

2.6 Determinants of malnutrition

Nutrition education should form part of a broader, general education focused on improvement of the quality of life. According to Greyventsein (1994), this approach demands a shift away from a ego-centric view of highly specialised nutrition education towards an eco-centric holistic view where nutrition education is interdependent among integrated factors. Pelto (1981), states that a holistic ecological approach encourages examination of the causes of malnutrition at multiple levels from household, individual, community and national an international level. Therefore, to understand the causes of malnutrition, it is necessary to systematically consider the operations of various determinants of malnutrition at different levels of society. In order to propose an

effective nutrition strategy, this study will use the UNICEF conceptual framework of malnutrition (UNICEF,1998) (see pg 33), and the adapted version of the UNICEF framework of malnutrition to the South African context (see pg 59) in conjunction with the ecological model by Sims (1981) (see pg 31). Hence, this process of programme planning belongs to the Precede part of the Precede/Proceed model (refer to figure 2 pg 24).

Any intervention programme, based on planned changed efforts should ideally be based on an ecological model. In the ecological model by Sims (1981) (see figure 6 pg. 31), it is assumed that all factors affecting a given problem or situation are interrelated and therefore form a system. If a single factor or component of the system is changed it affects all the other components and totally alters the system. In this model, the individual as an ecosystem is influenced by several exogenous factors namely: the natural environment, technological and socio-cultural environment which in turn influence food consumption behaviour. Certain endogenous characteristics co-exist with the larger environment to influence an individual's food choices. These factors include knowledge, values, attitudes and beliefs. The individual uses these endogenous factors to make food decisions from the available food and resources. Emanating from the external and the internal environment, is the macro-system (natural, technological and socio-cultural environment, the exo-system (community and environment), the meso-system (links between the family and the environment) and the micro-system (family). The ecological model (see pg 31)is used in conjunction with the UNICEF framework of malnutrition (see pg 33) to provide an overview of the different ecological levels present and the interrelatedness of the various systems within the

framework of malnutrition.

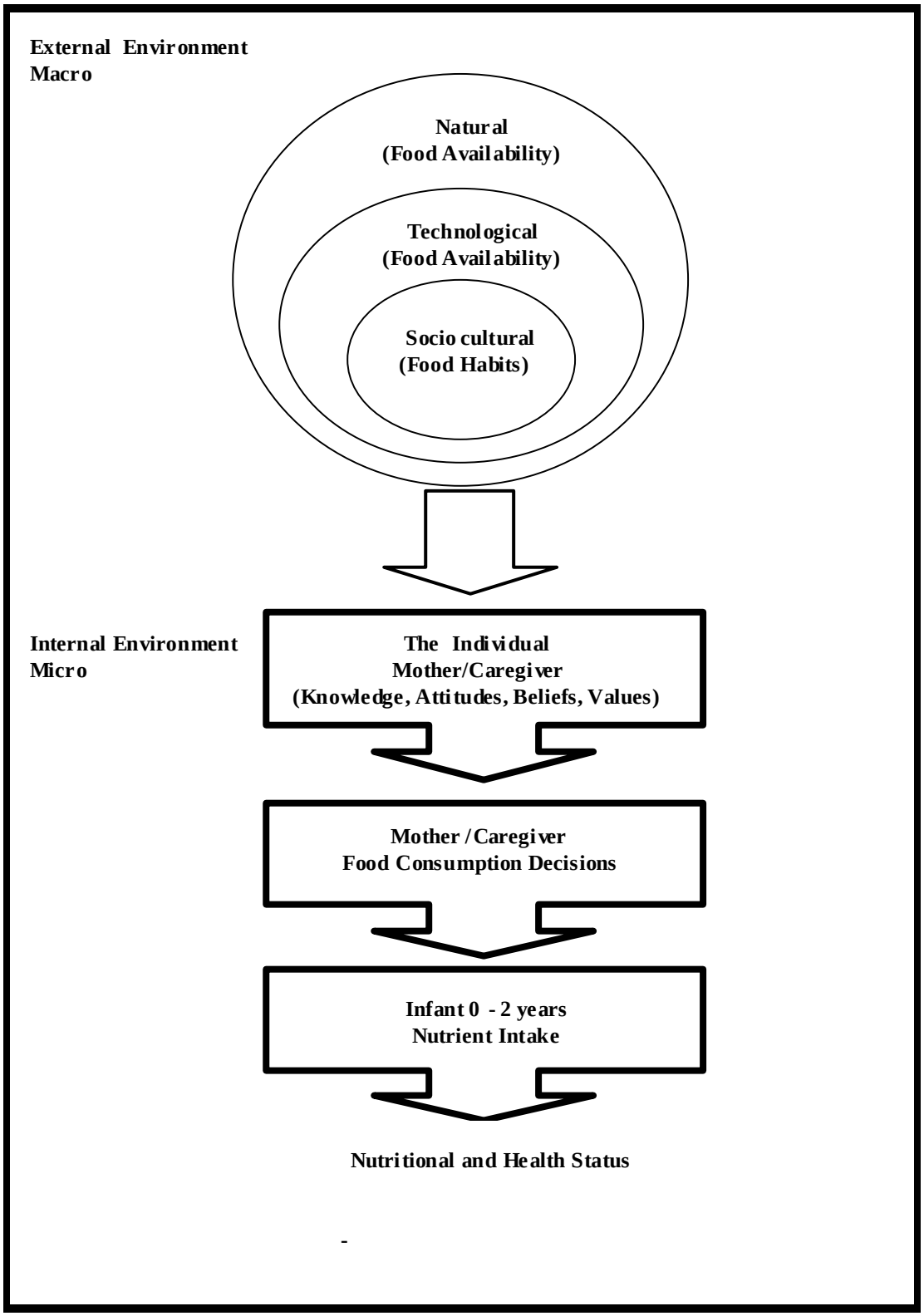

Figure 6: The Ecological systems perspective, (Sims, 1981).

UNICEF developed the Triple A approach namely: assessment, analysis and action, which is often used in tandem with the UNICEF framework of malnutrition (UNICEF,1990). According to UNICEF (1990:15-18), the Triple A approach depends on the views of a problem. It has been noted that with the Triple A approach, there can be agreement about the existence of a problem but disagreement to the cause of the problem. This in turn could lead to disagreement over which action to be taken to alleviate the problem. It is therefore compulsory to use the UNICEF conceptual framework to help to identify and clarify issues before action is taken.

The UNICEF conceptual framework of malnutrition (See figure 7 pg 33), provides a basis for assessment, analysis and actions to improve childhood nutrition and development (UNICEF, 1998:10-90). It portrays the causal factors and their interaction at three main levels namely the immediate, underlying and the basic causes. The synergistic interaction between the two immediate causes, inadequate dietary intake and disease, accounts for much of the high morbidity and mortality rates in developing countries (UNICEF,1998:10-90). The three underlying causes at household family level, insufficient access to food, inadequate maternal and child caring practices, poor water and sanitation and inadequate health services are underpinned by basic causes that relate to the amount of control and use of various resources by households. The framework deliberately leaves vague the ecological levels to permit the emergence of different causal patterns in a different context for specific circumstances. According to UNICEF (1990:15-18), the framework helps to identify what should be assessed and how causative relationships should be identified and analysed. It also helps to clarify the objectives of actions selected for implementation.

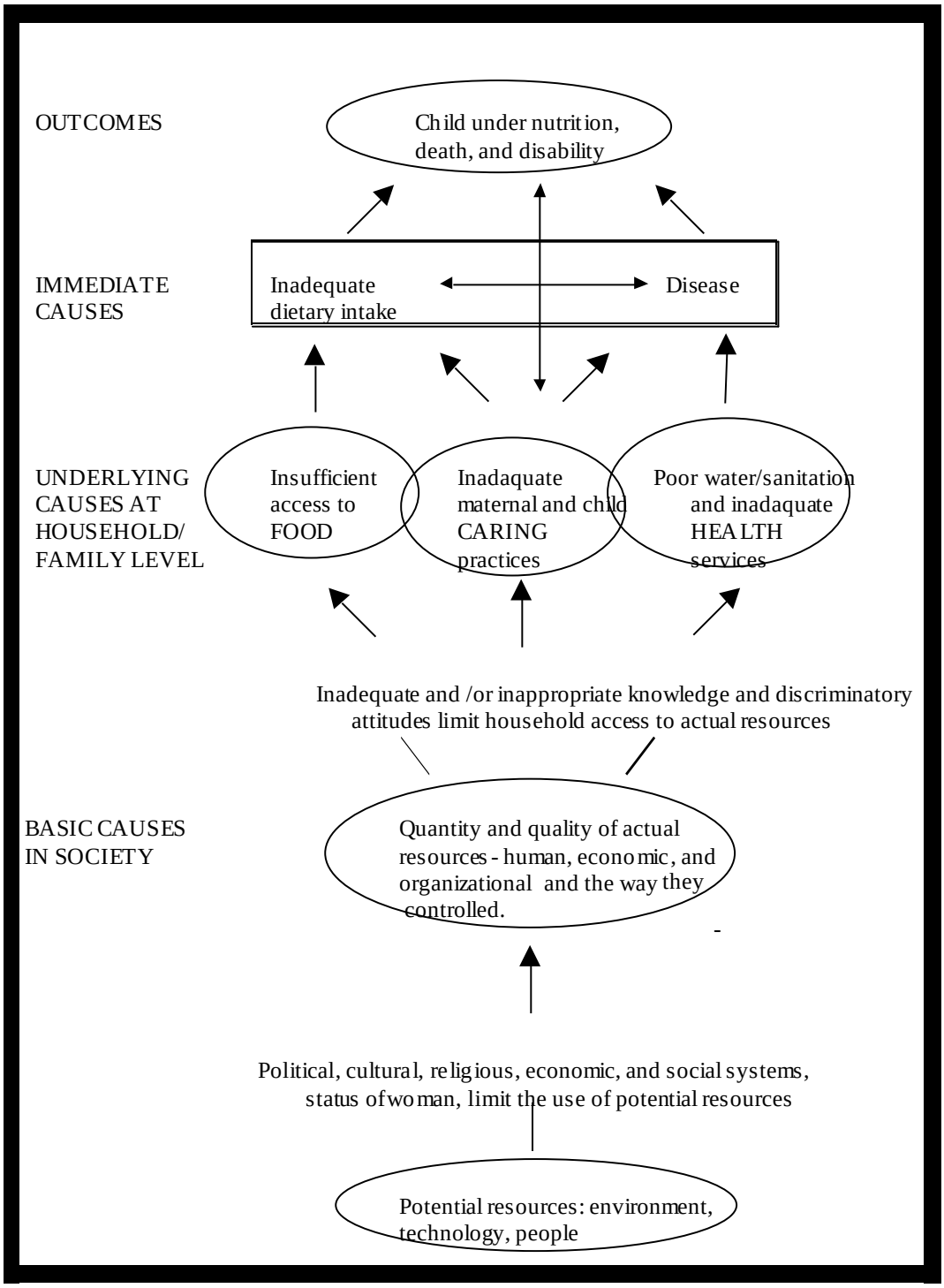

Figure 7: UNICEF conceptual framework of malnutrition, (UNICEF,1998:24).

2.6.1 Immediate causes

Inadequate dietary intake and disease are the most significant and immediate cause of malnutrition. The vicious cycle of inadequate dietary intake and disease has been discussed under the causes of malnutrition were this cycle ultimately leads to death or disability (see pg 27).

2.6.2 Underlying causes at household/family level.

2.6.2.1 Insufficient access to food

In South Africa, while there is adequate food at a national level, 30-50% of the population have insufficient food or experience an imbalanced diet as a result of income (Department of Agriculture, 1999).

Food security is defined by Radimer, Olson & Campbell (1990), as the access by all people at all times to enough food for an active and healthy life and includes at a minimum the ready availability of nutritionally adequate and safe food; and the assured ability to acquire foods in socially acceptable ways. Food insecurity exists whenever the available nutritionally adequate and safe foods or the ability to acquire acceptable food in socially acceptable ways are limited or uncertain.

There are eight elements that form part of the phenomenon of food security. Figure 8 (see pg 35) depicts these elements (Hanekom and Faul, 2000:1-38). According to Hanekom and Faul. (2000: 1-38), all of these elements are closely linked to one another and each one influences the degree and intensity of food insecurity. It does not matter which element develops first, because they all influence the degree and outcome of food insecurity. Hanekom and Faul. (2000: 1-38), also state that it is

important to keep all these elements in mind when any intervention is planned, implemented and evaluated because of their interdependence. A lack of food security in a household has negative effects on the health of all members, especially on children under the age of five. According to UNICEF (1998:10-90), an infant in a food insecure household has an increased chance of suffering from malnutrition.

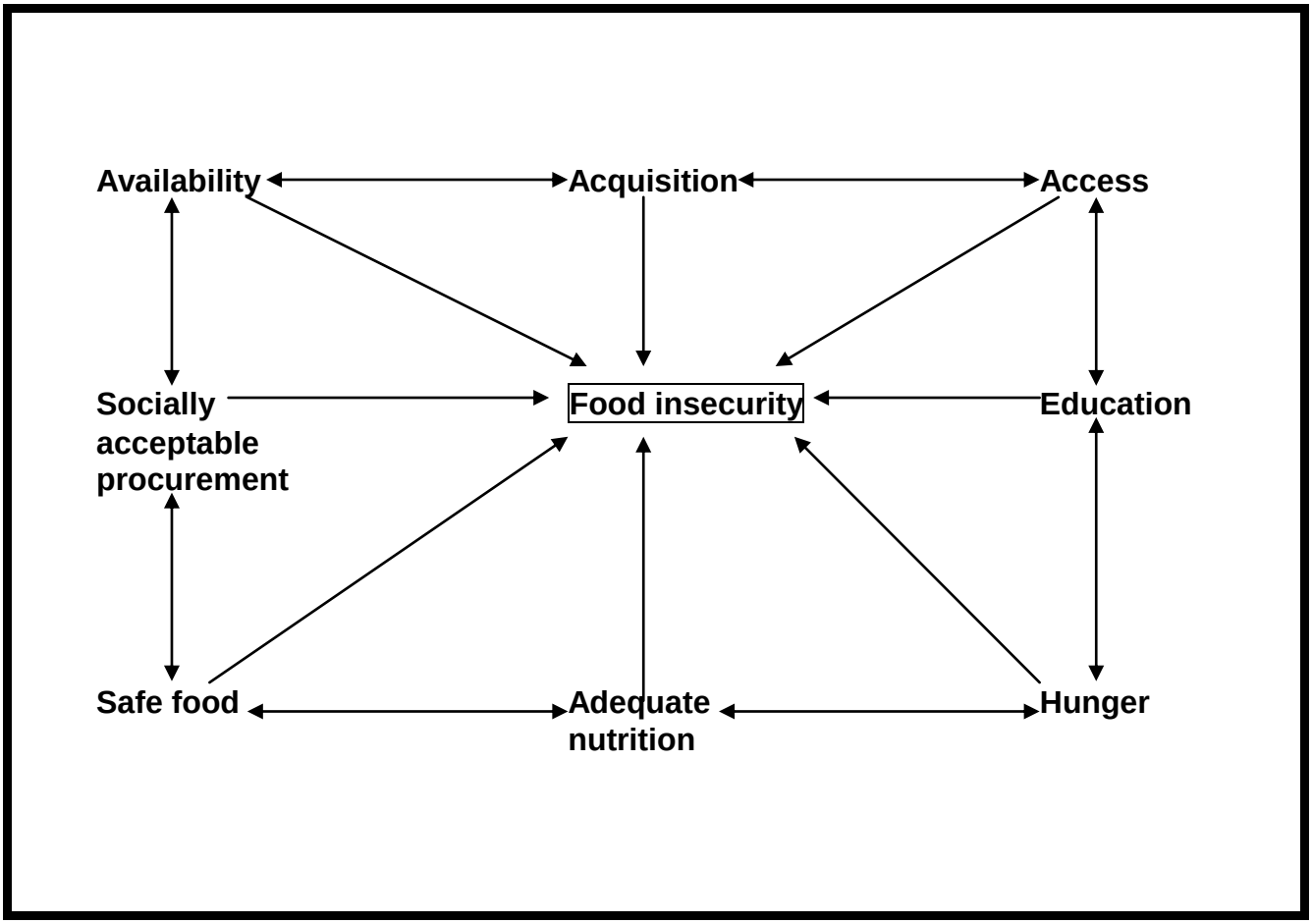

Figure 8: Elements that form part of the phenomenon of food security, (Hanekom and Faul. 2000:1-38).

Furthermore, it is evident from observations throughout the world that peoples food security; namely their physical and economic access to nutritionally adequate food, does not automatically translate into their nutritional well being (Food and Agricultural

Organisation (FAO)(2000). In addition to having access to food, people must have:

- *Sufficient knowledge and skills to prepare and consume nutritionally adequate food.*
- *Access to health services and a healthy environment to ensure the effective biological utilisation of foods.*
- *Time and motivation to provide adequate family and household feeding practises (FAO, 2000).*

According to the ADA (1996), when starting nutrition education efforts it is essential to recognise the need for food security because if food insecurity is a factor, then nutrition messages may be limited. Dodd and Bessigner (1992), state that the effect on nutrition status is controlled more by the situation than by the design and the delivery message. Smith and Smitasiri (1999), describe components that are fundamental to the planning of nutrition education programmes. Each of these components are underpinned by the nature of food supply as illustrated in figure 9 (see pg 37) This should be born in mind when designing a NIEP.

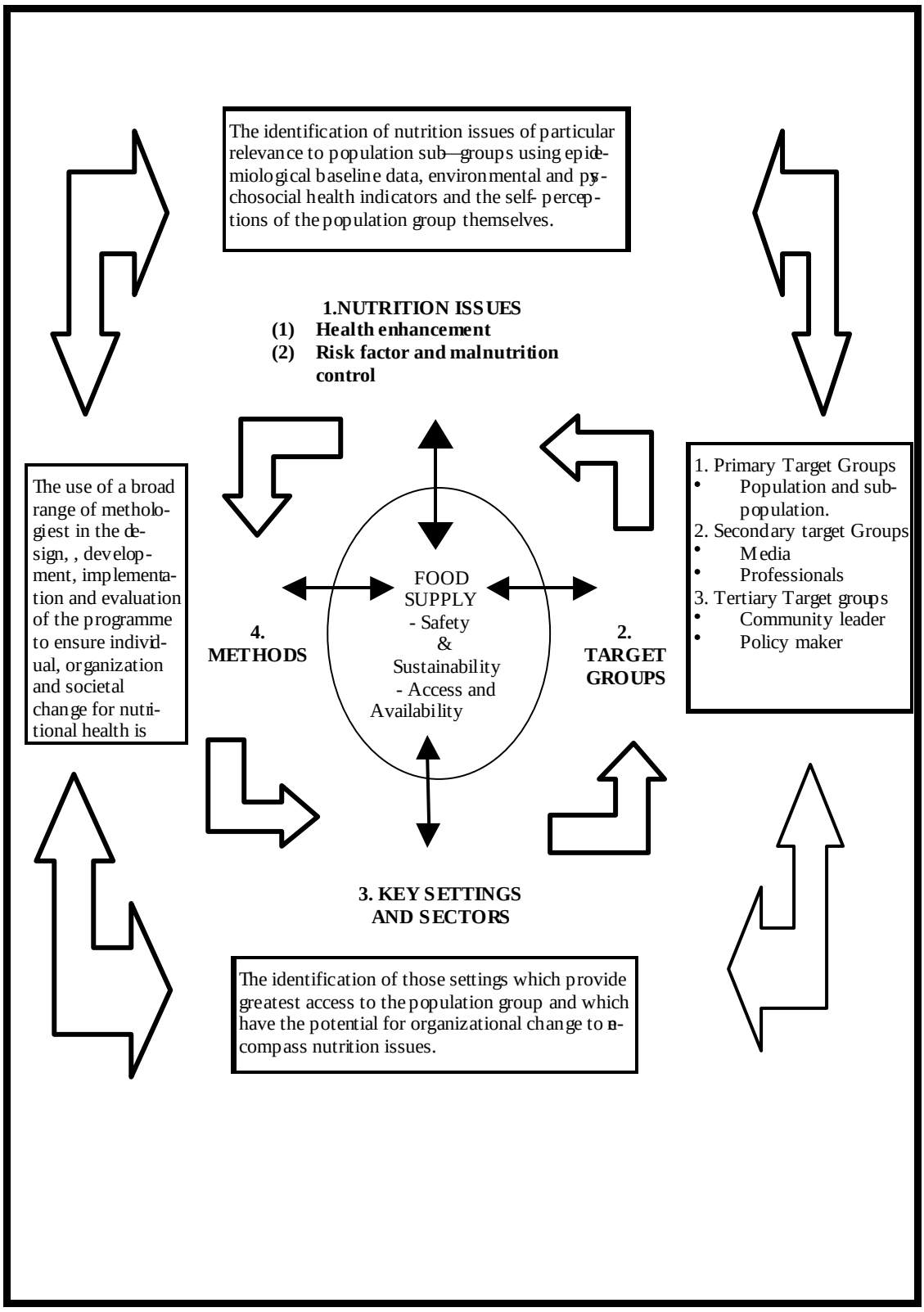

Figure 9: Components of nutrition education programme underpinned by food supply (Smith and Smitasiri, 1999)

2.6.2.2 Inadequate maternal and child care practises

For the very young child, good nutrition relates to good care. According to McLachan and Kuzwayo (1997), care is the most misunderstood and ignored component in the analysis of the causes of malnutrition and in the design of nutrition intervention programmes. Care is defined as the behaviours and practises of the caregiver to provide food, health care, stimulation and emotional support necessary for a child's healthy growth and development (ACC/SCN, 2000)(i). Care refers to the provision of time, attention and support to households to meet the needs of family members especially women and children. According to UNICEF (1998:10-90), good care not only protects the child from harm, it also produces an enabling environment for extending survival while promoting growth and psychosocial cognitive development of the child.

Care is manifested in the ways a child is fed, nurtured, taught and guided by cultural values (WHO, 2000). Nutritional care encompasses measures and behaviours that translate available food and health resources into good child growth and development. According to McLachan and Kuzwayo (1997), the provision of care is dependent on resources such as education, knowledge, beliefs, nutritional status and the self confidence of the care giver. Results of a study conducted by Ayer, Agboka & Albertse (2000), showed that poor quality care practises contributed to an increased rate of stunting in children. According to the International Food Policy Research Institute (IFRPI) (ACC/SCN, 2000)(i), care related measures and women education contributed to more than half of the 1970 to 1995 reduction in the prevalence of malnutrition. Increased knowledge and skills enhances food security and improves the quality of childcare.

The extended model of care by Engle, Lhotska & Armstrong (1997:1-55), (see figure 10, pg 40) provides a framework which shows that child survival, growth and development are affected directly by nutrient intake and health status which in turn are influenced by underlying factors namely: household food security, health care services and caregiving behaviours. Caregiving behaviours performed by the caregiver are grouped by Engle et al. into the following categories (1997:1-55):

- *Care for women.*
- *Breastfeeding and feeding of young children.*
- *Psychosocial stimulation of children.*
- *Food preparation and food storage behaviours.*
- *Hygiene behaviours.*
- *Care for children during illness.*

Furthermore, Engle et al. (1997:1-55), state that the performance of these behaviours requires enough resources for caregiving. Resources for care include:

- *Caregivers education and beliefs.*
- *Caregivers mental health and self-confidence.*
- *Autonomy and decision making power at home.*
- *Workload and time constraints.*
- *Social support available for alternate caregiving*.

Therefore, the concept of care has to be closely scrutinised, in order to facilitate realistic guidelines for a NIEP.

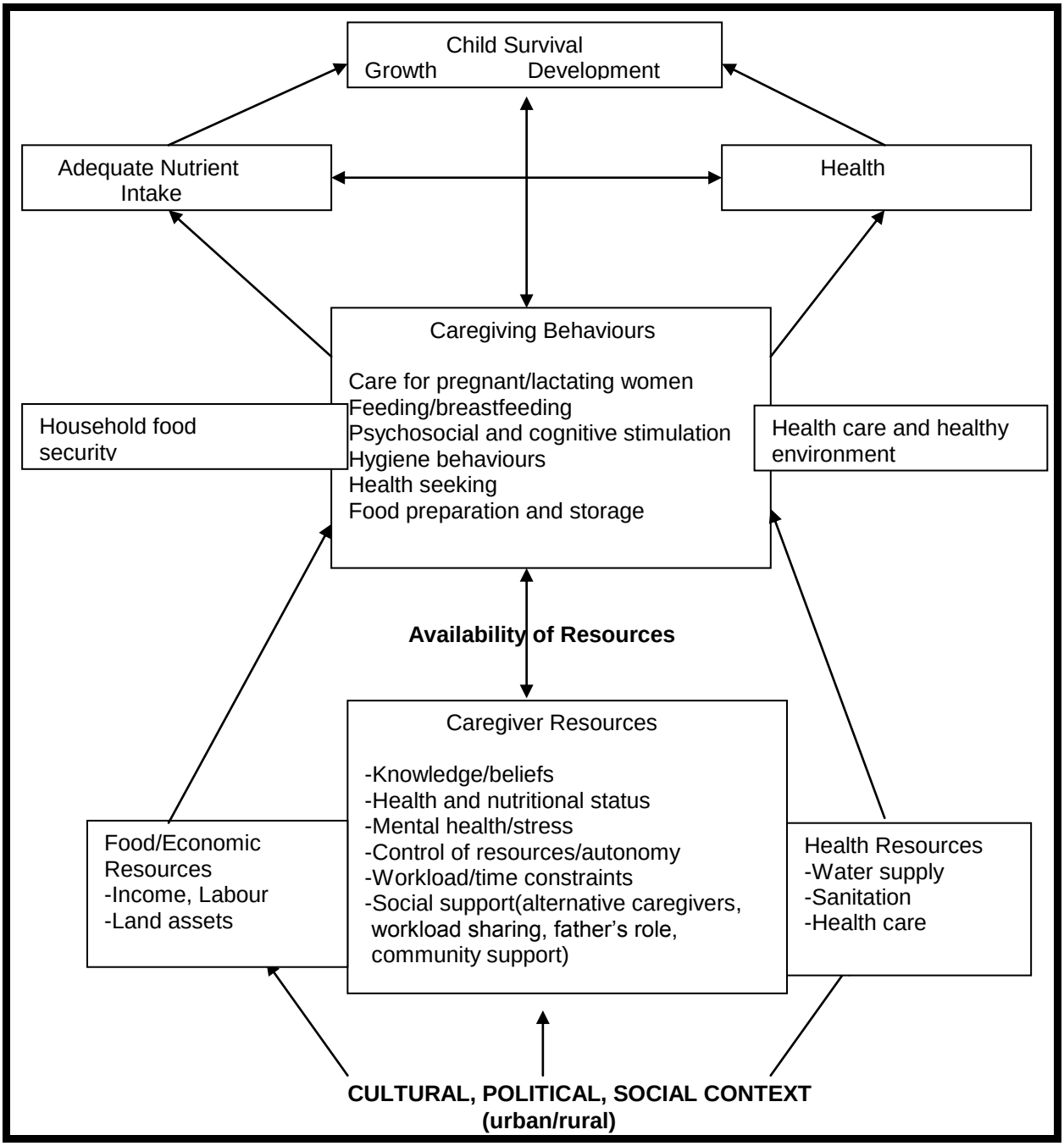

Figure 10: Extended model of care, (Engle et al. 1997:1-55)

Women's gains are children's gains. Two areas where woman's rights directly affect

children are in health and education. Figure 11(see pg 42), depicting maternal literacy and child development clearly illustrates this. Caldwell (1979); and Wolfe and Behrman (1982), also documented that the effect of maternal education on child health has been consistently positive in most developing countries. Unfortunately, women's alternate time commitments have been recognised as one of the most important constraint to care. McGuire and Popkin (1990), state that these time commitments that compromise on care of the child include labour intensive tasks such as carrying water, fuel wood gathering and agricultural work. The synergism that exists between nutritional status and care dictates that nutrition intervention has to be multi-focal allowing for integration for success.

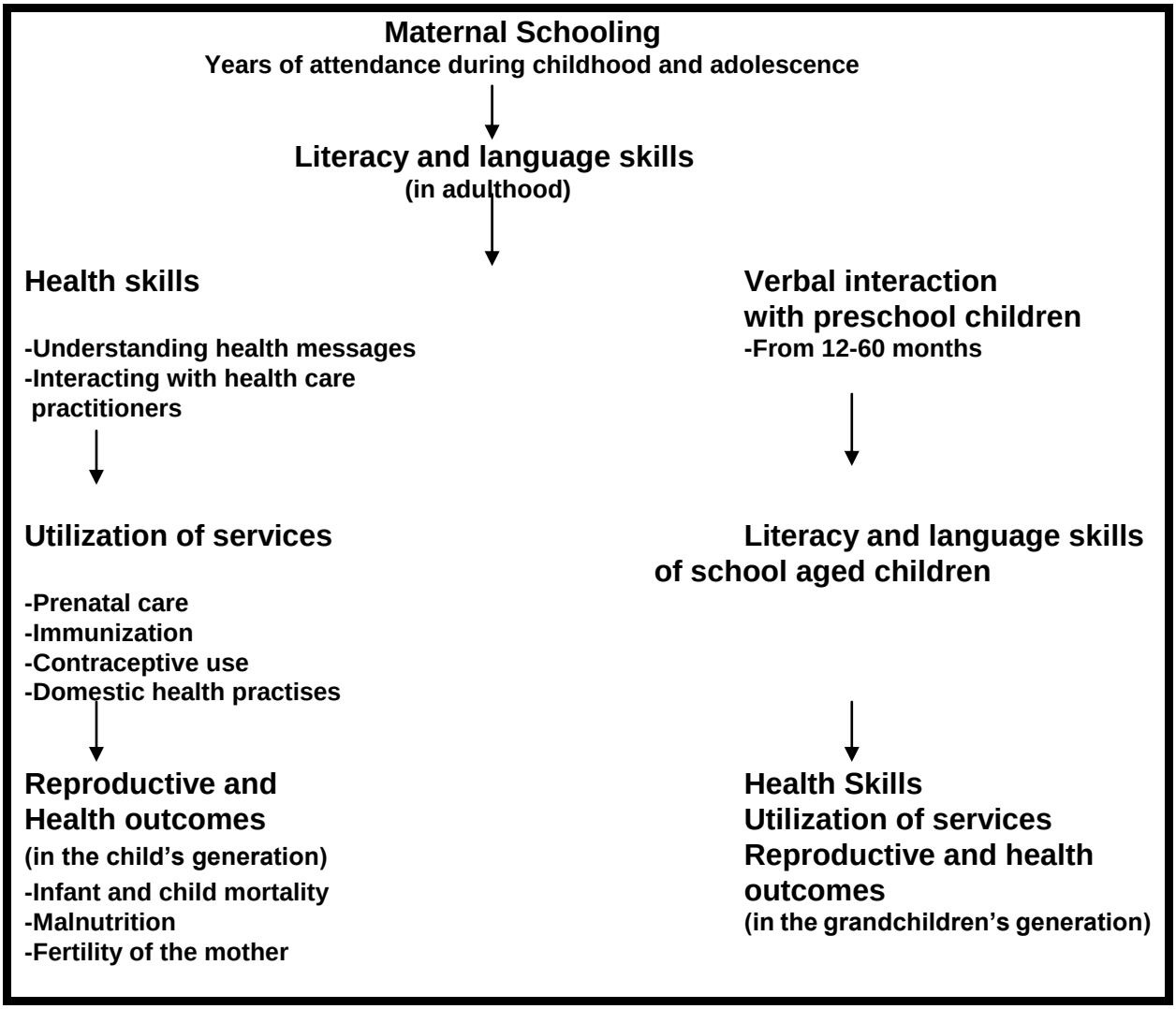

Figure 11: Maternal literacy and child development, (UNICEF, 2001:1-66).

Apart from the effect of maternal literacy on the child's development, women are also principal providers of nourishment during the most crucial periods of an infant's development. Infant feeding behaviour is affected by a number of determinants. Figure 12 (see pg 43) elaborates on the interplay between factors that determines the capacity, resources and care practices for young children.

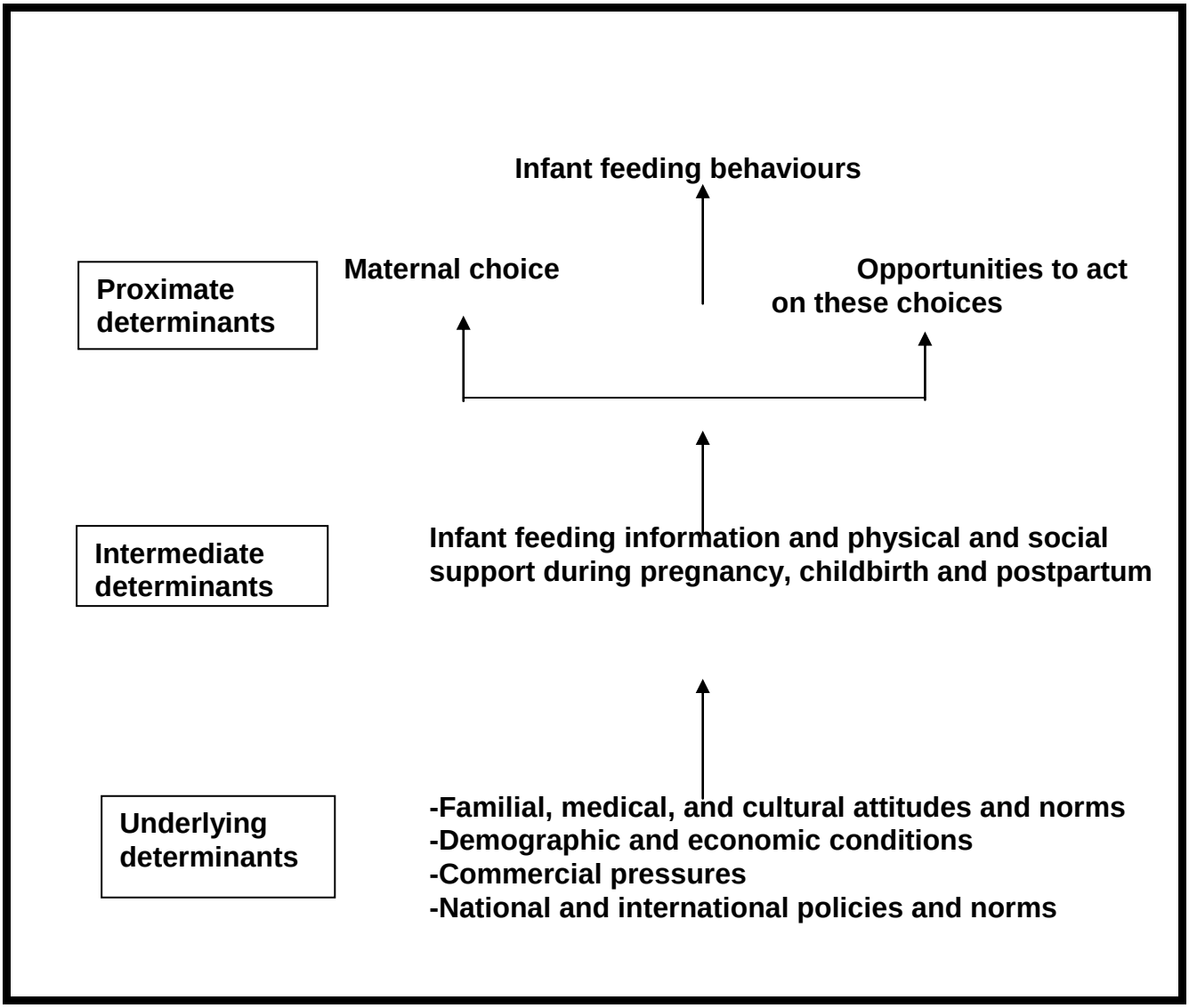

Figure 12: Determinants of infant feeding behaviour, (ACC/SCN, 2000:35)(i).

In South Africa, breastfeeding initiatives are high (Moodley, Linley and Saitowitz, 1998). The WHO (2001:119-120)(ii), recommends that infants should be exclusively breastfed for the first 4 to 6 months of life. Thereafter, to meet their evolving nutritional requirements, infants should begin to receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond. Nevertheless, according to Cohen, Haddix, Hurtado and Dewey (1995),

UNICEF has suggested changing the WHO recommendation to stipulate that infants should be exclusively breastfed for the first 6 months, based on the belief that delaying the introduction of complementary foods until 6 months will benefit both child and the mother. Breast-fed infants show better immune responses. Breastmilk also protects infants from diarrhoea and upper respiratory tract infections (Moodley, Linley and Saitowitz, 1998). However, apart from the high frequency of breastfeeding, there does appear to be a problem with the early introduction of complementary foods (Moodley, Linley and Saitowitz, 1998). Glinsmann, Bartholomey and Coletta (1996), indicated that young infants have immature digestive and excretory systems and are not equipped to handle a variety of foods at an early age. Truswell (1986:1-121), recommended that infants should be weaned after 6 months as at this age fewer allergic reactions are likely to occur since the mucosa of the intestinal tract is less permeable to foreign proteins.

Reitsma and Gericke (1981), refers to the mother as a gatekeeper to the food channel. The gatekeeper is confined to certain external limitations such as the availability of food and certain internal limitations such as nutritional knowledge. Children's well being invariably suffer when women don't have access to correct information resources. According to Walker, Walker, Jones, Duvenhage and Mia (1982), an increase in knowledge can play a significant role in improving infant feeding practises, hopefully leading to a decrease in malnutrition.

Without information strategies in place, the awareness, skills and behaviours needed to alleviate malnutrition can not be developed.

2.6.2.3 Poor water/ sanitation and inadequate health services

An essential element of good health is the access to preventive and curative health care services that are affordable, accessible and of a good quality. Using health care facilities to treat sick children or for timely immunisation, is an important caregiving behaviour. Engle et al. (1997:1-55), states that there are a number of determinants of these behaviours namely: price (transportation), time allocation to use the facility (opportunity), cost and waiting time, perception of health need and educational levels of the decision makers in the household. In terms of environmental health, the lack of access of water, proper sanitation, unhygienic handling of food and unhygienic conditions around the house spreads infection (UNICEF,1998:10-90). Cliff and Freimuth (1995), state that a total health problem analysis should be carried out prior to the design of an intervention programme.

2.6.3 Basic causes: Resources

The basic causes of malnutrition result from the lack of availability, access to and control of resources such as human capabilities, economic resources and organisational resources which are determined by ecological, technological, socio-economic, cultural, social and political conditions. Many nutrition education programmes focus on the immediate causes of malnutrition. However, Ladzani, Steyn and Nel (1992), suggested that that nutritionists should be more aware of the socio-economic factors that compound the problem. According to Lilley and Johnson (1994), general socio-economic background information should be the basis of any intervention programme aimed at dietary change. Lerer and Yach (1995), state that the socio-economic indicators of importance in nutrition related issues are major health

determinants such as housing, water, sanitation and energy sources and these variables should be included in the development of a NIEP. Cliff et al. (1995), reported that a total health problem analysis should be carried out prior to the design of a NIEP.

2.6.4 Influence of culture on eating habits

Culture has an important impact on an individual's diet. Kgaphola and Viljoen (2000), stated that food is part of culture and food habits are influenced by culture. Mead and Guthe in DeGarine (1972), defined food habits as the means by which individuals select, consume and utilise the available food supply in response to social and cultural pressure. Viljoen and Gericke (1998), developed a model that illustrates factors that influence the formation of habitual eating patterns. Figure 13 (see pg 48) shows how the external and internal environment influences and individual's habitual eating pattern. According to Vorster et al. (1997: 1-33), knowledge of cultural influences on the diet and of specific taboos is necessary to analyse theKnowledge of these influences and of specific taboos is necessary to analyse the adequacy of the diet and also to ensure that dietary recommendations for nutrition education programmes are culturally sensitive. Culture and tradition influence the eating patterns of all South Africans. In order to guarantee the success of NIEP, provision has to be made for it to be culturally acceptable. According to NIEP, provision has to be made for it to be culturally acceptable. According to Mead (1979) as cited by Burgess and Dean (1980:66-67), argue that the best way to promote and improve the health of a community and to Mead (1979) to best promote and improve the health of a community and to prevent nutrition

related diseases,

nutritional recommendations need to be expressed in terms of the usual foods. Mead (1979) (as cited by Dean and Burgess, 1980:66-67), also state that it is important to bring about changes that are in keeping with the established food habits of the community and that these changes are within a framework of their value system.

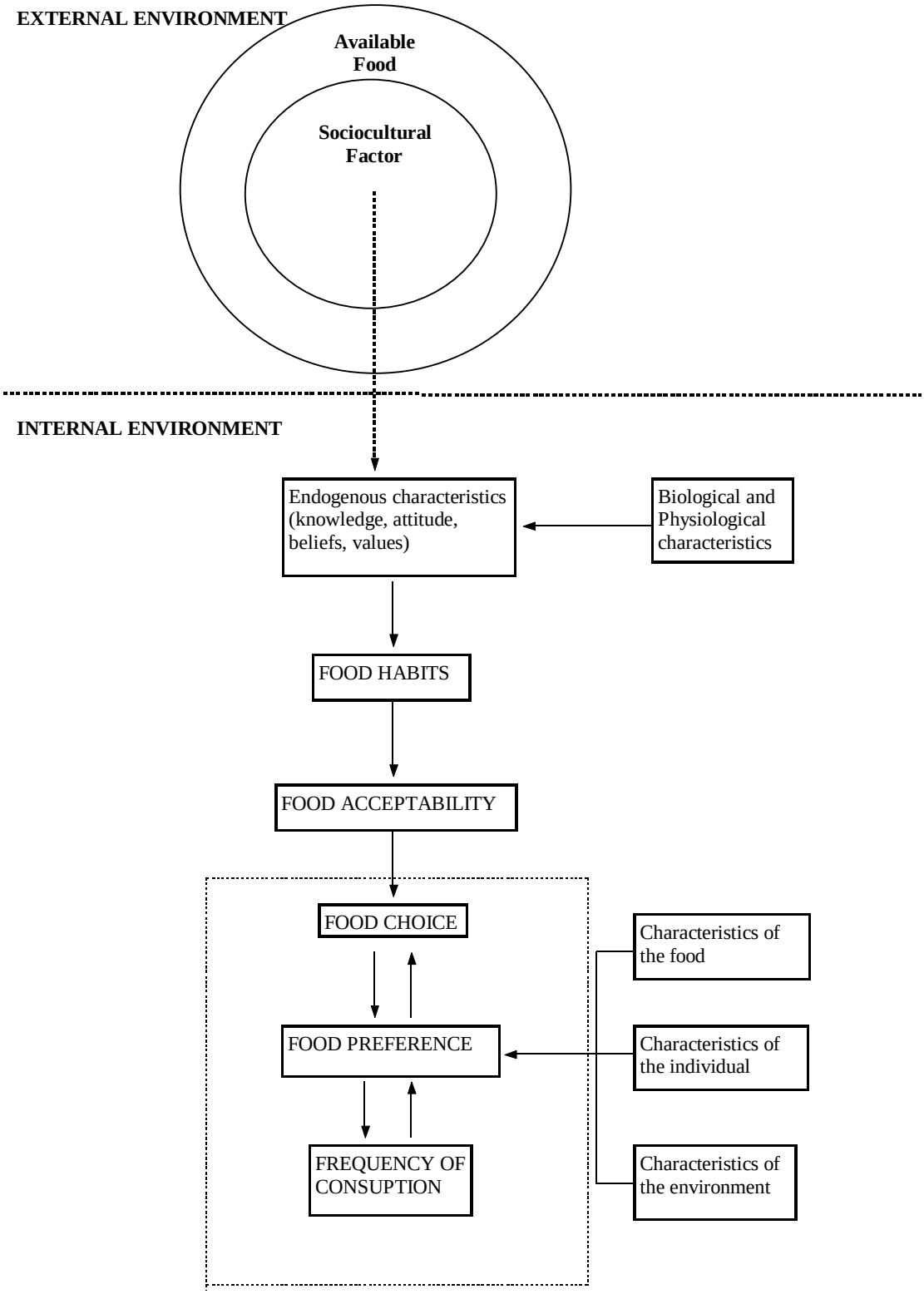

Figure 13: Factors that influence the formation of habitual eating patterns, (Viljoen and Gericke, 1998)

Against this background of the causes of malnutrition and the factors associated with malnutrition discussed under the conceptual framework of malnutrition (refer to pg 34), interventions aimed at improving nutritional and psychological development of children are more likely to be successful.

2.7 Evaluation of the research outputs.

In community nutrition, evaluation has been defined as the systematic collection, delineation and use of information to judge correctness of the situation analysis, critically assess the resources and strategies selected to provide feedback on the process of implementation and measure the effectiveness and measure the impact of the action programme (Oshaung, 1995).

Kelly (1966, 1970 a;b, 1971 a;b) (as cited by Trickett, 1984:261-279) suggests that any planned intervention needs to be evaluated by the following guiding principles:

- *Cycling of resources*
- *Adaptation*
- *Interdependence*
- *Succession*

The entire research process of this study will be evaluated by Kelly's four guiding principles. Trickett (1984:261-279), states that in terms of re-cycling of resources, cognisance of the community setting and their resources have a positive effective on the development of the research. The research should be evaluated to determine

whether resources within the community have been identified and incorporated in the programme development.

Adaptation refers to the characteristics of the setting e.g. norms, values, structures and process (Trickett, 1984:261-279). Questions such as: How adaptable is the research to other areas should be asked at the conclusion of the research.

Interdependence includes community networking and the connecting of different microsystems (Trickett,1984:261-279). It alerts one to the interconnectedness, which exists among the component parts of a setting. The research outputs should be evaluated to determine the interconnectedness of different micro-systems.

Succession provides for the long-range time perspective of assessing as time passes (Trickett, 1984:261-279). The research outputs should be evaluated to determine whether the results of the study can lead on to a successful NIEP. Kelly's four ecological principles will be used to evaluate the research outputs in chapter 6 (Trickett, 1984:261-279).

2.11 Overview of Chapter 2

The researcher has concluded from the literature review, the necessity to intergrate a few different models in addressing the sub-problems mentioned in 1.5 and 1.6 (see pg 11-12). Figure 14 (see pg 52) provides a broad overview of how the Precede/Proceed Model (Green and Kreuter, 1992: 23-59), is used in conjunction with the UNICEF

framework of malnutrition (UNICEF, 1998:24) and the Ecological model by Sims (Sims, 1981), from the programme planning component of this study to the final recommendations in chapter five.

Chapter 3 deals with the methodology, questionnaire development, sampling and the research process.

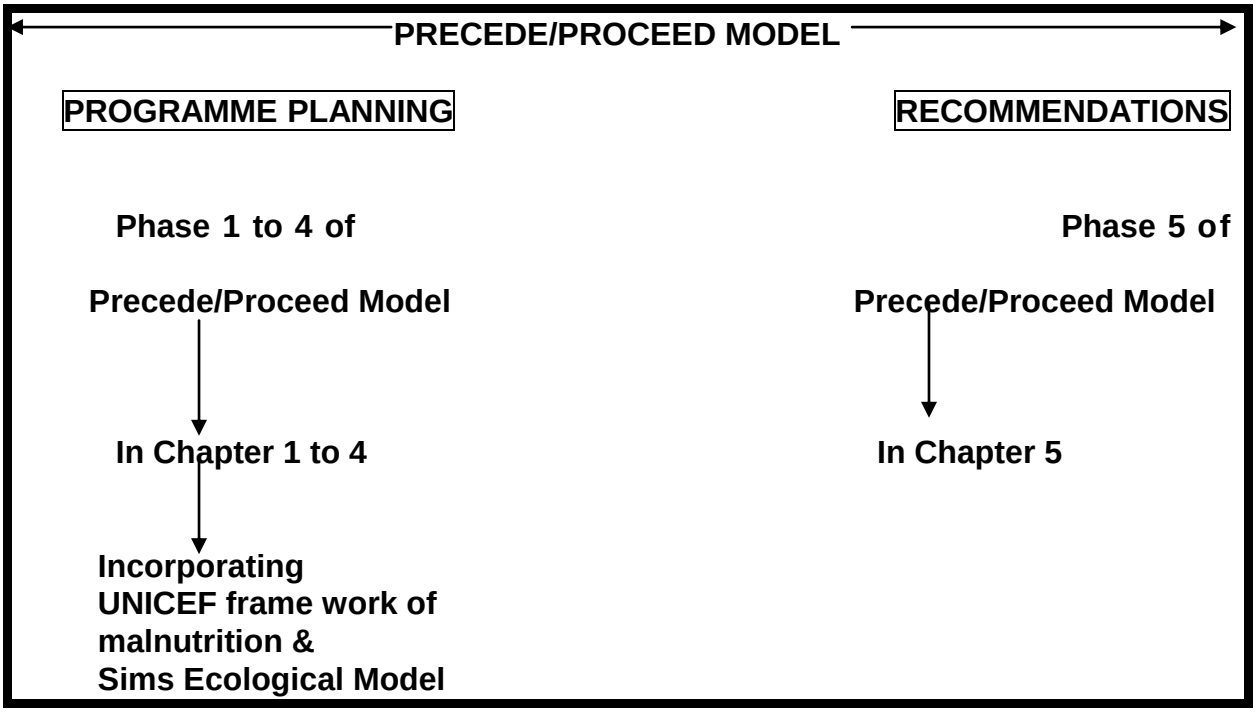

Figure 14: Broad overview of this study based on theoretical frameworks used, (Naicker, 2002).

Chapter 3

Research Design

3.1 Introduction

This chapter outlines the methodology used to approach the sub-problems in chapter one (see pg 11-12). The questionnaire design, sample selection and data collection procedures are explained and reliability and validity argued.

3.2 Research Hypotheses:

3.2.1

- Hypothesis 1: Rural black children aged 0 to 24 months in Umbumbulu, KZN have a high incidence of malnutrition.

3.2.2

- Hypothesis 2: There is correlation between the incidence of malnutrition and the energy intake of children aged 0 to 24 months in Umbumbulu, KZN.

3.2.3

- Hypothesis 3: The existing food and nutritional knowledge, home management skills, food related beliefs, dietary practices and available food affect the nutritional status of rural black children aged 0 to 24 months in Umbumbulu, KZN.

3.2.4

- Hypothesis 4: Ecological factors affects the nutritional status of rural black

children aged 0 to 24 months in Umbumbulu, KZN.

3.2.5

- Hypothesis 5: The identification and analyses of factors affecting nutritional status will assist in compiling guidelines for the development of a NIEP.

3.3 Study design:

Throughout the life-cycle, nutritional assessment is the first step in developing a nutrition care plan and programme. The study design will be a descriptive cross sectional survey and it will use a community profile questionnaire, dietary methods of assessment, focus group discussions, a food security scale of measure and anthropometric measurements.

The multifaceted nature of the situation analysis to determine the incidence of malnutrition, and to identify factors affecting malnutrition will use both qualitative and quantitative research techniques (Leedy, 1992:137-142). The Qualitative data will provide a holistic view of the determinants of nutritional status. It is flexible, exploratory and discovery orientated. Thus, there is flexibility that permits for a deeper understanding of the problem (Leedy, 1992: 137-142). Quantitative data will analyse the independent and dependent variables.

One characteristic of the descriptive survey, is that there is no control over the variables. Results will be dependent on what has happened or what is happening in the field. The advantages of using the survey method is that it can yield abundant data in

a short space of time. The limitations of using the survey is the high cost of field workers and that the survey is essentially a human communication process between the field worker and the respondent. The most serious problems occur when the field worker intervenes between the intentions of the researcher and those of the respondent, equating to the interviewer respondent effect (Leedy,1992:187-192; Schnetler and Geldenhuys,1989:126-138). Subsequently, attention was given to safe guard the data from the influence of bias inherent in this method by training the field workers and pre-testing the questionnaire.

Questionnaires will be used to gather baseline survey information. The design of the questionnaire was based on the guidelines of questionnaire design by Leedy (1992:187-192), to avoid poor quality data. The feasibility of using a questionnaire was based on its advantages and disadvantages. Although, questionnaires are costly to be administered and are likely to experience respondent bias (Neuman, 1997:253), they have the highest response rate and are less time consuming than other survey methods.

The questionnaires was pre-tested in a pilot study in rural Umlazi. The sample size of the pilot study was 5 out of a total of 20 qualifying households in terms of the selected age category for the study. The sample size was randomly selected. A list of all the households was formulated and every fourth household was selected in order to achieve the sample size of 20. The pilot study was conducted to establish questions redundant, questions to be reworded, ambiguous questions and the appropriate

statistical methods for processing the data. The major changes that were made after the pilot study was the sequencing of the 24-hour food recall before the FFQ and refining the food list. It was found to be easier to administer the 24-hour food recall before the FFQ as it assisted the mothers/caregivers in memory recall.

3.4 The Data

The data of this study are of two kinds namely; primary and secondary data. The nature of these two types of data will be discussed below:

3.4.1 The Primary Data:

The following primary data is needed:

- Weight for age, weight for recumbent length and recumbent length for age measurements of children aged 0 to 24 months.
- The responses of the mothers/caregivers to the questions on the community profile, food and nutrition knowledge and dietary practises which also includes the 24-hour food recall and the food frequency questionnaire.
- The responses from the mothers/caregivers to questions on the food security status of the household and of the children.
- The responses of the mothers/caregivers to questions posed at the focus groups on the influence of culture on the dietary practises of the children aged 0 to 24 months.

3.4.2 The Secondary Data

The Secondary data comprises of published studies and books; and unpublished dissertations and theses dealing with malnutrition and factors influencing nutritional status of young children both nationally and internationally.

3.4.3 Primary data and Questionnaire development

A structured questionnaire (see Annexure A) was designed by the researcher. The questionnaire was based on the adapted version of the UNICEF framework of malnutrition to the South African context (Steyn, 2000). Figure 15 (see pg 58) depicts the factors determining the adequate dietary intake in children based on the UNICEF framework of malnutrition and adapted to the South African context. The questionnaire was translated into isiZulu to ensure uniformity in questioning. The back translation method was used (MacIntyre, Venter and Vorster, 2000:20). A fluent speaker of both English and Zulu translated the questionnaire into Zulu. A second translator translated the Zulu version into English. Both translations were compared for any discrepancies.

For Figure 15, refer to Appendices

3.4.4 Questionnaire layout

- Section A: Biographical and Community Profile information (Question no 1-25).
- Section B: Questions related to the existing Food and Nutritional knowledge; and Home Management skills (Question no 1-18).
- Section C: Questions related to Dietary Practices (Question 1-16, 24-hour food recall and FFQ).
- Section D: Food Security Status (Question no 1-10).
- Section F: Anthropometric measurements (Question 1-2).
- Section E: Focus group discussions on the influence of cultural beliefs on the dietary practices of children aged 0 to 24 months.

3.4.5 Criteria for Admissibility of Data

- Only data from questionnaires completed by the trained field workers will be used.
- The completed questionnaires will be screened to determine whether it is completed correctly and whether it is answered by mothers/caretakers of children falling within the target age group.
- Incomplete questionnaires will be ignored at the discretion of the researcher.

3.4.6 Specific Treatment for each Sub-problem (see1.5 and 1.6 pg 11 and 13)

Sub-problem	Data Needed	Means of obtaining the data	Treatment of the data	Dependent variables	Independent variables
Sub-problem 1 (refer to 3.2.1) To determine the incidence of malnutrition amongst rural black children in Umbumbulu by weight for age, weight for Recumbent length and age for recumbent length measurements	-Weight for age, weight for recumbent length, and age for recumbent length, measurement -NCHS data files	-The anthropometric measurements were taken by trained field workers using electronic scales for weight and measuring boards for recumbent length.	-The anthropometric measurement will be compared with NCHS reference tables using Epiinfo 2000 to calculate Z scores	-Incidence of malnutrition	-Anthropometric measurements
Sub-problem 2 (refer to 3.2.2) To determine whether a association exists between the incidence of malnutrition and energy intake of children aged 0 to 24 months in Umbumbulu	- The data needed will be obtained from the 24-hour food recall and FFQ and the anthropometric results	-The data will be collected by trained fieldworkers by interviewing the mothers/caretakers of the child and by taking the anthropometric measurements.	- A correlation matrix will be conducted using SPPS 9.0 for Windows	-Incidence of malnutrition	-24-hour food recall and FFQ results for energy, protein, fat and carbohydrate intake
Sub-problem 3 (refer to 3.2.3) To assess the existing food and nutritional knowledge, home management skills, food related beliefs and dietary practices of the household regarding child nutrition amongst black families in Umbumbulu	-The data needed will be obtained from the questionnaire: Section B	-The data will be collected by trained fieldworkers by interviewing the mothers/caretakers of the child	-Frequency distributions and graphical representation will be compiled for specific survey questions using SPPS 9.0 for Windows Central tendencies and measures of dispersion will be determined. Dietary practices will be analysed using the Food Finder 2 programme.	-Childhood nutrition	-Existing food and nutritional knowledge, home management skills, food related beliefs and dietary practices

Sub-problem	Data needed	Means of obtaining the data	Treatment of the data	Dependant variables	Independent variables
Sub-problem 4 (refer to 3.2.4) To identify the presence and the role of ecological factors that are associated with the occurrence with malnutrition amongst rural black children in Umbumbulu	-The data needed for testing sub-problem 3 will be obtained from the questionnaire: Section A - Community profile and Biographical information Section F: Focus groups Section E: Food security	-The data will be obtained from trained fieldworkers by interviewing the mother/caretaker of the child	-Frequency distributions and graphical representation will be compiled for specific survey questions. Measures of central tendencies and dispersion will be established. Contingency tables will be used to identify and analyse ecological factors affecting the nutritional status of rural black children.	-Undernutrition, stunting and wasting	-Ecological factors: *Income *Household density *Education *Room density *Access to clinics *Access to portable water *Santitation
Sub-problem 5 (refer to 3.2.5) To analyse and integrate the existing food and nutrition knowledge food related beliefs and dietary practices of the mother/caregiver as well as the ecological factors that possibly influence the occurrence of malnutrition in order to compile guidelines for the future formulation of a NIEP	-The data will be obtained from the results of sub-problem 1, 2, 3 and 4	-The data will be obtained from the statistical analyses of sub-problem 1, 2, 3 and 4	-The analysed data of sub-problem 1, 2, 3 and 4 will be correlated in order to develop guidelines and recommendations for the future development of a NIEP.	-Under nutrition	-Factors influencing nutritional status: *Existing food and nutritional knowledge, food related beliefs and dietary practises *Ecological factors

From the questionnaire layout, the following problems relate to the sub-problem stated below:

- Section A: Question 1 to 25 deals with Sub-problem 3.
- Section B: Question 1 to 18 deals with Sub-problem 2.
- Section C: Questions 1 to 16 and the 24-hour food recall and the FFQ deals with Sub-problem 2.

- Section D: Question 1 deals with Sub-problem 3.
- Section E: Question 1 deals with Sub-problem 3.
- Section F: Question 1 deals with Sub-problem 1.

3.5 Methodology

3.5.1 Methods of nutritional assessment

Nutritional assessment is defined as the interpretation of information from dietary, biochemical, anthropometric and clinical studies (Gibson, 1990:4). This information is used to determine the health status of individuals or groups as influenced by their intake and utilization of nutrients. For the purpose of this study only dietary and anthropometric methods of nutritional assessment will be used.

3.5.1.1The 24-hour Food Recall and the Food Frequency Questionnaire

The 24-hour food recall and the FFQ are very popular and widely used methods of dietary assessment. A seven day food frequency questionnaire and a 24-hour food recall will be used to assess the food intake of the children aged 0 to 24 months through the mothers/caregivers of the child. According to Robinson, Lawler, Chenoweth and Garwich (1990:122-123), the combination of these two methods is intended to overcome the limitations of each method in the data collection process. In the 24-hour food recall, the mothers/caregivers are asked to recall all the foods and beverages consumed by the child over the past 24 hours. An advantage of the 24-hour food recall is that it is convenient and time effective (Lee and Nieman, 1993). Literacy and

numeracy is not required from the respondents. The weakness of this method is that it gives a poor idea of the general diet as it is only applicable to one day. The large intra individual variability in the food and nutrient intake of people, makes a single 24-hour food recall an inappropriate measure for estimating the usual intake of a particular subject (Mansen, 1992). However, Karvetti and Knutts (1985), compared the 24-hour food recall with the observed intake of the respondents. They concluded that the validity of the 24-hour food recall is unsatisfactory on the individual level for all nutrients, but satisfactory for the group level because of under and over estimation (the flat slope syndrome) which cancels each other out. This is supported by the study conducted by Faber, Gouws, van Staden, Wolmarans and Benade (1987). In their study the results of the 24-hour food recall gave the same mean values for all nutrient intake as the 7 day dietary record. The 24-hour food recall sometimes exhibits a flat slope syndrome were subjects increase or decrease their diet during recording (MacIntyre, Steyn, Moeng and Theron, 2000:9-25). The reason for the latter is that subjects may withhold information about what they ate due to embarrassment or to please the interviewer (Lee et al, 1993).

To overcome the weaknesses of the 24-hour food recall, a seven day food frequency questionnaire (FFQ) adapted from the Nutrigro study (MacIntryre, 2000), will be administered in conjunction with the 24-hour food recall adapted from Steyn, (2000) FFQ's are designed to assess the usual eating habits over a period of time and comprises of a list food that is mainly eaten by the subjects. The strength of this method

is that is an easy and a low cost method and indicates dietary variations (MacIntyre et al., 2000:9-25).The FFQ has limitations in that it can experience respondent bias as it relies on the respondent's ability to retrieve the relevant information, process it and provide answers within a short period of time. Asking the respondents to recall frequencies requires some calculations from the respondent. Inaccurate responses may occur when respondents do not remember their food consumption and when they omit foods (MacIntyre et al., 2000:9-25).The FFQ also experiences interview bias, which includes errors caused by incorrect questioning, incorrect recording of responses, intentional or unintentional omissions. Personal characteristics of the field worker such as age, gender, social background and ethnic group might affect the way the respondent answers questions. Both the 24-hour food recall and the FFQ used in this study were pre-tested through the pilot study carried out in Umlazi. The questionnaires were be pre-tested in order to refine the food list according to the target population. Field workers were instructed to ask the respondent how many times per day, per week, per month the child eats an item from a list of foods (See Annexure B). Portion sizes were selected with the aid of the food portion photograph book (MacIntyre, Venter, Vorster, 2000)

The purpose of any dietary intake study is to obtain more accurate information regarding the habitual diets of the subjects. However, in order to give the required information, the subject must not only recall what was eaten, but they also have to describe the amounts of foods and drink usually consumed. These descriptions are

then quantified for nutrient analyses. Small errors in estimation, either under or over estimation, could lead to a distorted picture of the individual's consumption. Visual aids, food photograph books and household measuring utensils are often used to help subjects estimate the quantity consumed (Mansen, 1992).

The Food portion photograph book (FPPB) developed by MacIntyre et al. (2000), will be used in this study to estimate portion sizes. The validity of the FPPB was tested on a sample of 169 adult volunteers in the North West Province who did not participate in the dietary intake study. Volunteers had to select the portion sizes of various foods that they consumed from the FPPB. Of the 2959 portion sizes tested, 68% were accurately estimated. Clearly defined solid foods, e.g. bread were better estimated than foods with an amorphous appearance e.g. porridge. With regards to the subjects characteristics and their ability to estimate portion sizes, there was no significant differences between gender, age group and education level (MacIntyre et al.,2000).

The FPPB was developed with the aid of a FFQ using the common foods consumed by black South Africans in the North West Province. The FPPB consist of 37 foods, photographed and laminated in three to four portion sizes as well as photographs of utensils and cartons. All foods are photographed on a 26cm enamel plate. To obtain a picture as close to life size as possible, the pictures were enlarged by colour photocoping to the A4 size (MacIntyre et al., 2000:127-196). According to MacIntyre et al., (2000:127-196), the diameter of the plate in the enlarged photograph was 20,5cm which is approxiamately 80% of the actual size. The FPPB is accompanied by a guide

of foods that could be used to represent other foods with similar appearance e.g. the soft maize meal porridge picture could be used for oats porridge. This guide was included into the Field workers instruction manual (see Annexure B). To extend the range of portions, subjects were instructed that if portions consumed did not match the portions in the picture, they could indicate whether the portion position in question was e.g. between picture A and B.

The FPPB has disadvantages. Firstly, it is costly to reproduce, bulky and heavy to use. Secondly, the size of the serving dishes are not always the same as represented in the FPPB which could create confusion during portion size recall. According to MacIntyre et al., (2000:127-196), foods with an amorphous appearance were difficult to estimate. Therefore, the photographs of these foods were highlighted at the borders. The advantage of the FPPB outweighs its disadvantages. It simplifies data analysis by assisting respondents in estimating more accurate portion sizes. It reduces respondents fatigue and interview time.

Accurate estimation of breastmilk intake of infants is essential. The test weighing procedure is ideally suited for home based studies. Although the test weighing procedure could be carried out a clinic setting, logistic reasons and time constraints prevented it from being used. Instead, the quantity of breastmilk consumed was estimated from available literature. Data available form the Democratic Republic of Congo (Hennart and Vis,1980), was used to estimate breastmilk consumption.

Breastmilk consumption in 24 hours was assumed to be the following (Hennart and Vis, 1980 (as cited by the Effect of diet on maternal health and lactation performance, 2000):

Age of child	Consumption of milk/ml
0-2 months	517
3 months	605
4-5 months	525
6-9 months	553
10-12 months	585
13-20 months	509

Only children being breastfeed at the time of the questionnaire administration will be considered for the estimation of breastmilk consumption. The result of the 24-hour food recall and the FFQ will be analysed using the Medical Research Council Food Finder 2 programme for Windows (Medical Research Council, 2001) to determine the adequacy of the child's diet in relation to the Recommended Dietary Allowances (RDA). The Food Finder 2 programme contains the latest version of the South African Food Composition Database. The dietary results will be interpreted in terms of the RDA. The RDA was developed by the United States Nutrition Committee in 1989. The RDA provides standards to serve as a goal for good nutrition. It provides specific level of nutrient ntake recommended for individuals/groups based on gender, age and stage of life-cycle. (National Academy of Sciences: 1989:10)

It should be borne in mind that RDA's are recommended intakes of nutrients that meet the needs of almost all healthy people. However, there are some caveats regarding RDA's (United States RDA, 2000). Firstly, the requirements for many nutrients have

not been established. Secondly, RDA's represent estimates that exceed the requirements of most people due to inherent genetic differences amongst individuals. Thirdly, RDA's were developed for healthy people under normal circumstances with no illness, no genetic weaknesses and no environmental toxin exposure. Therefore, it should be borne in mind that RDA's are recommended intakes of nutrients that meet the needs of almost all healthy people of similar age and gender.

3.5.1.2 Anthropometry

Anthropometric measurements are useful screening tools to determine nutritional status and thus the general health of the child. In children, malnutrition is synonymous with growth failure. Malnourished children are shorter and lighter than they should be for their age. Among children, weight for age, age for recumbent length and weight for recumbent length are the most sensitive and commonly used indicators of growth.

The advantages of using anthropometry to determine nutritional status, is that it is quantitative, objective, safe, specialist personnel are not required for implementation and it is quick procedure (Gibson, 1990:156-158). The disadvantages of anthropometry are that the equipment is expensive, measurement error can occur and genetic variation makes current height for age an insensitive measure in children. Furthermore, Gibson (1990:156-158), states that it cannot detect disturbances in the nutritional status over short periods of time or identify

specific nutrient deficiencies).

Weight for age, weight for recumbent length and age for recumbent length measurements will be calculated and compared against a reference population. To date, no national norm for a reference population exists. Almost all nutritional studies conducted amongst children use the reference data collected from healthy, well nourished American children by the NCHS. The latter data is recommended by the WHO for international use (WHO, 1995:425-456). The anthropometric measurements in this study will be compared to the NCHS reference population. The indices will be expressed in terms of Z-scores. According to Vorster et al. (1997:1-33), Z-scores are defined as the standard deviation score and is defined by the WHO (1996), as the deviation of the value for an individual from the median value of the reference population, divided by the standard deviation for the r reference. The level of median –2SD is usually taken as the cut-off point or threshold below which the status is considered unsatisfactory, that is undernutrition exists (WHO, 1986: 929-941).

Weight for height is a measure of acute undernutrition or wasting and it is a useful method in assessing the nutritional status of children. According to WHO (1986: 929-941), if 5% to 10% of the population is below –2SD, then the degree of acute undernutrition is described as moderate. If more than 10% of the population is below than –2SD, then the degree of acute undernutrition is regarded as severe.

Height for age is used to assess chronic undernutrition. Impaired height gain is referred to as stunting. A population in which 25 to 50% of children under the ages of 5 years with height for age below –2SD is considered to be moderately affected (WHO, 1986: 929-941).

With regards to weight for age in a population were 20 to 40% of the children are below –2SD, they are considered to be moderately affected (WHO., 1986: 929-941). When >40% of the population are below –2SD, they are considered to be severely affected (WHO, 1986: 929-941). The anthropometric measurements will be collected according to the guidelines presented at a national workshop on weighing and measuring infants (Dhansay, 2000:1 - 6). For the measurement of the supine length, the child will be placed on the measuring board, face upward without shoes and the measurements will be taken. For weight measurements, an electronic s scale with a scoop will be used with the infant/toddler wearing no clothes or shoes (refer to Annexure B for the training manual for field workers).

3.5.2 Focus Groups

Focus groups will be used to determine what foods are increased, decreased or omitted in the diet of children aged 0-2 years and the reasons thereof. Focus groups have proven to be an invaluable method in obtaining qualitative data in nutrition research.
Chopra and Ross (1996), made use of focus groups in their research. They concluded that focus groups allows one to gain a deeper understanding of problems faced by individuals, families and communities. They went on further to state that focus groups

facilitate the participation of communities in the analyses of the problems and thus become empowered in planning, implementing and monitoring intervention. One advantage that focus groups have over other research methods, is that group dynamics often encourage participants to voice their opinions and attitudes that would otherwise be unheard (Borra and Robert, 2001). According to Botha (2001), the qualitative interview is flexible and the very virtue of the qualitative interview is its openess. The disadvantages of focus groups is that data gathering is time consuming (Jones, 1985), and it cannot be assumed that everyone is capable of expressing their thoughts on a particular subject (Siedman, 1998). The focus groups for this research were carefully designed around its advantages and disadvantages. The focus groups will compose of 6 randomly selected participants in 4 separate groups. 6 mothers/caretakers that will be used in the question administration will be randomly selected per clinic,hence totalling 4 separate groups. Each focus group will be led by a moderator using a tape to record the discussion (Morgan, 1998). The moderator will be trained to probe responses in the event of there being vague answers. The moderator will be instructed to ensure that all group members participates in the discussion (See Annexure B, training manual for fieldworkers). The moderator will be required to follow a structured question route as described by Krueger (1998:15-17), to ensure that there is consistency in question administration to all the focus groups.

3.5.3 Food Security Questionnaire

The Likert Scale will be used to determine the food security status of households. It is

simple to use but the response set is a potential danger where some people answer a large number of items in the same way out of laziness or psychological predisposition (Neuman, 1997). A validated food security scale by Radimer/Cornell (1990), will be used to determine the food security status at a household and individual level. Kendall et al. (1995), assessed the construct and criterion related validity of the Radimer/Cornell measure of hunger and food insecurity. With regards to criterion related validity, as food insecurity worsened, there was a significant and progressive increase in the percentage of subjects participating in food programmes and a significant decline in the average household food availability. These results support the validity of the Cornell/ Radimer measure of hunger and food insecurity and illustrates its ability to differentiate among groups of households experiencing food insecurity. There are four components of the phenomenon at each level namely: the qualitative and quantitative aspects of the food available to the household and its individuals, and the psychological and social components experienced by the households and individuals (Kendal, Olson and Frongillio, 1995).

3.6 Quality Control and Reproducibility

The researcher will select 4 respondents randomly (one from each clinic) after all 210 questionnaires are administered. These respondents will be alerted that they will be re-interviewed after 2 days. The questionnaires will be re-administered by different fieldworkers in order to assess quality control and reproducibility.

3.7 Reliability and Validity

When compiling the questionnaire, content and face validity was taken into account. The content of the questionnaire was evaluated by the co-supervisor. The relative validity of the FFQ was tested with the 24-hour food recall (see pg 137). The 24-hour food recall and the FFQ questionnaire are adapted questionnaires to suit the target group. The food list was refined after the pre-testing of the questionnaire so as to suit the target group. 5 respondents who were not involved in the quality control tests were selected for reproducibility. The 24-hour food recall and the FFQ was administered and then re-administered after 2 days to ascertain reproducibilty.

The food photograph book used,is a validated tool to estimate portion sizes (MacIntryre et al. 2000). The validity of the FPPB has been discussed in this chapter under methodology (see pg 62-66). The Cornell/Radimer (1996), hunger food security scale was used, to measure food insecurity. The validity of the Cornell/Radimer hunger food security scale has been discussed in this chapter, (pg 72). Reliability is a statistical measure of how reproducible the instrument is (Lilwen, 1995). In terms of reliability, the baby scales were checked. They were calibrated before each measuring session with a common weight of 1kg. Test re-test reliability was carried out during anthropometric measurements. Measurements were double-checked by the researcher and with the help of the clinic sister for every 10th child. An alternate form of reliability was used to determine the age of the child and double-checked with the date of birth through the questionnaire (refer to question 3 and 4, Section A, Appendix A).

3.8 Sample Selection

The sample consisted of children aged 0 to 24 months from the Umbumbulu area, approximately 80km South of Durban, Kwa-Zulu Natal from 4 randomly selected clinics out of a total of 8 clinics namely: Odidini, Imfume, Umbumbulu and Inkwali clinics. The clinics selected, attended to all health calls such as immunisations, weighing of children and attending to sick children. The sample size was obtained using techniques of systematic random sampling. A complete list of all the children names under the ages of 2 years was obtained from the 4 selected clinics. The were 521 children under the ages of 2 years. The first child visiting the clinic was selected from the list. From then, on every third child in the queue belonging to the list of names was selected until 52/53 children from each clinic was interviewed and weighed at the clinic to obtain the total sample size of 210. The following exclusion criteria was used for the selection of the sample:

- Only children between the ages of 0-24 months were included in the sample selection.
- Only children that were accompanied by their primary caregiver/ mother was eligible for sample selection.
- Only children that came for immunisations or weighing were included for the sample selection.

3.9 Process

The quality of collected survey data is influenced by a number of factors. One specific factor is the fieldworker. According to Schnetler and Geldenhuys (1989:126-138), the

field worker plays an important role in determining the quality of responses obtained from the study sample. It is vital that the field workers have to be carefully selected and backed up with effective training (Schnetler et al.1989:126-138). A training manual was developed. (see Annexure B). Five Community Extension undergraduate students from Mangosuthu Technikon administered the questionnaire to the mothers/caregivers of the children aged 0 to 24 months. Field workers selected were Zulu speaking and trained in nutrition and extension in their undergraduate programme. One field worker also acted as the moderator for the focus groups. According to Schnetler et al.(1989:126-138), the main purpose of training the field workers is to equip them with knowledge and skills to effectively administer the questionnaire. The field workers were trained by a dietician to collect anthropometric measurements and to administer the dietary questionnaire with the aid of a food photograph book. The training had a theoretical component, including the purpose of the research and interviewing skills. The field workers also viewed the fieldworker training video of the National Food Consumption Survey (1999). The questionnaire was translated to isiZulu to avoid misinterpretation. Field workers were also briefed on the respondent effect and how to avoid it (See Annexure B for fieldworkers training manual).

3.10 Statistical Methods:

3.10.1 Descriptive methods:

Frequency distribution in the form of tables and graphical representation will be compiled for specific questions in order to gain a global overview of the nutritional status of rural Black children aged 0 to 24 months in Umbumbulu, KZN (see Chapter). Other descriptive methods will be used to determine central tendencies (mean, median and mode) and measures of dispersion (range, standard deviation) (see Chapter 4). Contingency tables will be formulated to determine the association between a number of variables and nutritional status (see Chapter 4).

3.10.2 Inferential statistics

Inferential statistics will be used to test the validity of the hypotheses. The Statistical Software Package for Social Sciences (SPSS for Windows,1999) will be used to analyse data in Section A, B, part of section C, D and E. The 24-hour food recall and the food frequency questionnaire will be analysed using the MRC Food Finder 2 programme (Medical Research Council, 2001) (see pg 67). The anthropometric measurements in the study will be compared with the NCHS percentile indices using Epiinfo 2000-Nutstat programme (Epiinfo, 2000). Nutstat is a programme for recording and evaluating measurements of length, stature, weight, head and arm circumference for children and adolescents. The indices will be expressed in terms of Z-scores as discussed in this chapter (see pg 68-70).

3.11 The area:

Umbumbulu is a rural area situated approximately 40 kilometers from Durban. It is an agricultural area with little infrastructure. The main agricultural crops produced are sugar cane, sweet potatoes, maize and vegetables (Naicker, 2000).

3.12 Ethics

Permission was obtained from the Department of Health via the Head of Department servicing the Umbumbulu area to conduct the survey. Thereafter clinics were informed of the survey to be conducted. Clinics informed caregivers of the intended research by briefing them during prior visits. Verbal consent was obtained from the mothers/caregivers to participate in the survey. Subjects were promised anonymity and were not forced to partake in the research. Subjects were also briefed on the purpose of the research before answering the questionnaire. In the event that a subject felt she no longer wanted to continue with the questionnaire, the fieldworkers respected their wishes.

3.13 Training Manual for field workers

Components: (See Annexure B)

- General information about the research topic.
- Discussion of the characteristics of an effective fieldworker for conducting surveys.
- An overview of the questionnaire and discussion of each section.
- The use of the 24-hour food recall and FFQ with the aid of the food photograph

book.

- Anthropometric training:

  Overview of the guidelines of anthropometric measurements with the aid of:

  -The training manual for field workers (Dhansay:2000).

  - Practical training: taking anthropometric measurements.

- Viewing of the National Food Consumption Video.
- Focus Groups: Training the moderator.
- Conducting the pilot.
- Report back to the researcher.

3.14. Overview of Chapter 3

- This chapter outlined the procedures followed in obtaining the data through the descriptive survey technique.
- The methodology used to obtain the data relating to each sub-problem was discussed. The process included an examination of the sample selection, administration of data processing, question formulation, determining the criteria for the admissibility of the data and the interpretation of the data.
- The limitations of the survey method and its susceptibility to bias were also discussed.

The results of the data processing are reported in Chapter 4.

Chapter 4:

Results

4.1 Introduction

In chapter three, the questionnaire design, administration, sample realisation, sampling method, methods of data collection and criteria for admissibility were discussed. In this chapter, the results of the processed data are presented and the significance indicated.

4.2 Sample Description

Table1: Sample Description

Table 1 reflects the sample description in terms of age, gender and clinic distribution.

	n	Odidini	Umbumbulu	Imfume	Inkwali
Total no males	104	26	26	27	27
Total no females	106	26	26	26	26
Age distribution 0-6 months	105	27	23	26	29
6-12 months	36	8	8	10	10
12-18 months	36	11	9	8	8
18-24 months	33	6	10	8	9

4.3 Statistical Hypotheses 1

Ho: Rural black children aged 0 to 24 months from Umbumbulu do not have a high incidence of malnutrition in the form of stunting, wasting and undernutrition.

H1: Rural black children aged 0 to 24 months from Umbumbulu have a high incidence of malnutrition in the form of stunting, wasting and undernutrition.

Table 2: Anthropometry

Table 2 represents Z scores for recumbent length for age, weight for age and weight for recumbent length measurements in 6 month intervals.

Anthropometric indicators and age groups	Z Scores							
	<-2SDs		>-2SDs to –1SDs		>-1SDs to 2SDs		>2SDs	
	n	%	n	%	n	%	n	%
Recumbent length for age (stunting) 0 to < 6year months 6 to < 12 months 12 to < 18months 18 to < 24months	51 8 9 12	48.5* 22 25* 36*	22 4 6 6	20.9 11 11 18	31 19 14 10	29.2 52.7 38 30	1 5 7 5	0.9 13.8 19.4 15
Weight for age 0 to < 6 months 6 to < 12 months 12 to < 18 months 18 to < 24 months	2 2 1 0	1.9 5.5 2.7	20 4 6 3	19 11 16 9	83 30 28 30	79 83 77 90.9	0 0 1 0	2.7
Weight for recumbent length (wasting) 0 to < 6 months 6 to < 12 months 12 to < 18 months 18 to < 24 months	2 3 2 1	1.9 8.3* 5.5* 3	5 2 8 2	4.76 5.5 22.2 6	52 27 17 21	49 75 47 63	0 4 9 9	11 25 27

*Significant factor

Decision Rule:

Weight for recumbent length

-If 5 to 10% of the population is below –2SD = moderately affected.

-If >10% of the population is below –2SD = severely affected.

Therefore,

-Accept null hypothesis for 0 to < 6months.

-Reject the null hypothesis for 6 to < 12 months (moderately affected by wasting).

-Reject the null hypothesis for 12 to< 18 months (moderate affected by wasting).

-Accept the null hypothesis for 18 to < 24 months.

Recumbent length for age:

-If 25 to 50 % of the population is below –2SD = moderately affected.

-If >50% of the population is below –2SD = severely affected.

Therefore,

-Reject the null hypothesis for 0 to < 6 months (moderately affected by stunting).

-Accept null hypothesis for 6 to <12 months.

-Reject null hypothesis for 12 to <18 months (moderately affected by stunting).

-Reject the null hypothesis for 18 to <24 months (moderately affected by stunting).

Weight for age:

-If 20 to 40 % of the population is below –2SD = moderately affected.

-If > 40% of the population is below –2SD = severely affected.

Therefore,

-Accept the null hypothesis for 0 to <6months.

-Accept the null hypothesis for 6 to <12 months.

-Accept the null hypothesis for 12 to < 18 months.

-Accept the null hypothesis for 18 to <24 months.

4.4 Statistical Hypotheses 2

Statistical Hypothesis:

Ho: There is no correlation between the incidence of malnutrition and the nutrient intake of children between the ages of 0-24 months.

H1: There is a correlation between the incidence of malnutrition and the nutrient intake of children between the ages of 0-24 months.

Table 3: Correlation matrix: Energy intake and Undernutrition

Table 3 represents the correlation between the incidence of undernutrition and the energy intake for children between 0 to 24 months for weight for age (W/A), recumbent length for age (H/A) and weight for recumbent length (W/H) measurements from the FFQ .

Age group	0 to < 6 months			6 to < 12 months		
Anthropometric parameters	W/A	H/A	W/H	W/A	H/A	W/H
Pearson correlation (r)	.108	-.138	1.38	.495	.423	0.15
Sig. (1-tailed)	.275	.239	.120	.002*	0.01*	.465
N	105	105	105	36	36	36

Table 3 continued

Age group	12 to <18 months			18 to < 24 months		
Anthropometric parameters	W/A	H/A	W/H	W/A	H/A	W/H
Pearson correlation (r)	.003	.163	.124	.180	.162	.268
Sig. (1-tailed)	.986	.341	.236	.316	.367	.66
n	36	36	36	33	33	33

*Significant factor: When n=36, r = >.3338.

When n =105, r = <.1966

When n = 33, r = <.3494

α = 0.05

Decision Rule:

If P <.05, the hypothesis is rejected.

Since p= .002 <.05, Reject Ho for weight for age in the 6 to < 12 month age group.

Since p=.01 <.05, Reject Ho for recumbent length for age in the 6 to < 12 month age group.

Note: No significant correlation was established for the 0 to <6 months, 12 to <18 months and 18 to 24 months age groups.

Table 4: Correlation Matrix: Protein intake and Undernutrition

Table 4 represents the correlation between the incidence of undernutrition and the total protein intake for children aged 0-24 months for weight for recumbent length (W/H), weight for age (W/A) and recumbent length for age (H/A) measurements from the FFQ.

Age group	0 to < 6 months	6 to < 12 months

Anthropometric parameter	W/A	W/H	H/A	W/A	W/H	H/A
Pearson Correlation (r)	.086	-.171	-.013	-.265	.084	-.314
Sig. (1-tailed)	.191	.073	.448	.059	.313	.031
n	105	105	105	36	36	36

Age group	12 to <18 months			18 to < 24 months		
Anthropometric parameter	W/A	W/H	H/A	W/A	W/H	H/A
Pearson Correlation (r)	-.015	.230	-.244	.173	.046	.115
Sig. (1 tailed)	.465	.088	.076	.168	.399	.262
n	36	36	36	33	33	33

Decision Rule:

If $p < .05$, the hypothesis is rejected.

Since $p > .05$ for all age groups and anthropometric parameters, the hypothesis is accepted.

Table 5: Correlation Matrix: Carbohydrate intake and Undernutrition

Table 5 represents the correlation between the incidence of undernutrition and the total carbohydrate intake for children between the ages of 0-24 months for weight for recumbent length (W/H), recumbent length for age (H/A) and weight for age (W/A)measurements from the FFQ.

Age	0 to < 6 months			6 to < 12 months		
Anthropometric parameters	W/A	W/H	H/A	W/A	W/H	H/A
Pearson Correlation (r)	0.62	-.171	.102	-.174	.115	-.234
Sig. (1 tailed)	.266	.073	.151	.155	.251	.80
n	105	105	105	36	36	36

Age	12 to < 18 months			18 to < 24 months		
Anthropometric Parameters	W/A	W/H	H/A	W/A	W/H	H/A
Pearson Correlation (r)	.302	.219	-.086	-0.97	-0.82	-.009
Sig. (1 tailed)	.037*	.100	.309	.295	.326	.481
n	36	36	36	33	33	33

Decision Rule:

If p <.05, the hypothesis is rejected.

Since p = .037 < .05, Reject Ho for underweight for the 12 to <18 months age group.

Note: No significant correlation was established for the rest of the age groups and anthropometric parameters.

Table 6: Correlation Matrix: Fat intake and Undernutrition

Table 6 represents the correlation between the incidence of undernutrition and the total fat intake for children between the ages of 0 to 24 months for weight for recumbent length (W/H), weight for age (W/A) and recumbent length for age (H/A) measurements from the FFQ.

Age	0 to < 6 months			6 to <12 months		
Anthropometric parameters	W/A	W/H	H/A	W/A	W/H	W/A
Pearson Correlation (r)	0.39	.164	.041	-.161	.118	-.234
Sig. (1-tailed)	.346	.082	.337	.174	.246	.085
n	105	105	105	36	36	36

Age	12 to < 18 months			18 to < 24 months		
Anthropometric parameters	W/A	W/H	H/A	W/A	W/H	W/A
Pearson Correlation (r)	-.012	.089	-.330	-.258	-.094	-.073
Sig. (1-tailed)	.473	.303	.025*	-.074	.301	.344
n	36	36	36	33	33	33

Decision Rule:

If $p < .05$, the hypothesis is rejected.

Since $p = .025 < .05$, Reject the hypothesis for weight for recumbent length for the 12 to < 18 month age group.

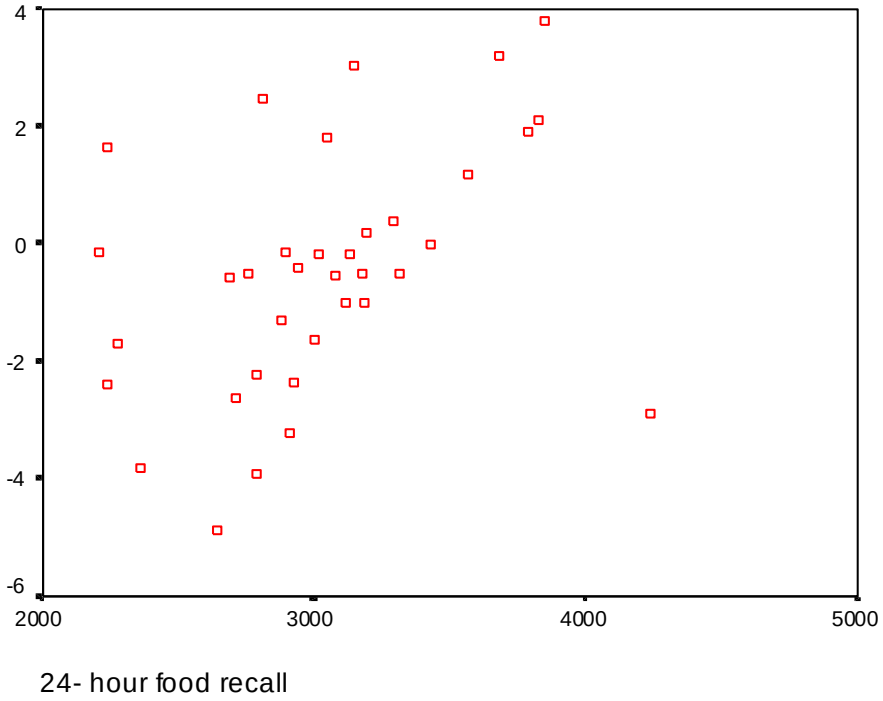

Figure 16: Scatterplot on height for age measurements for infants 6 to 12 months of age, in correlation with their energy intake for the 24-hour food recall, (Naicker, 2002)

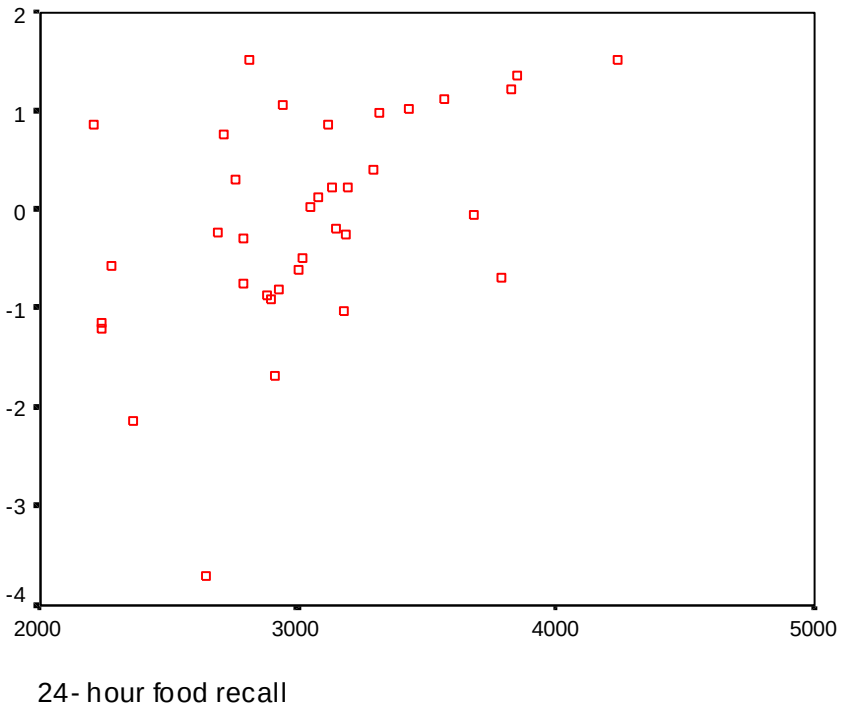

Figure 17: Scatterplot on weight for age measurements for infants 6 to 12 months of age, in correlation with their energy intake for the 7-day FFQ, (Naicker ,2002)

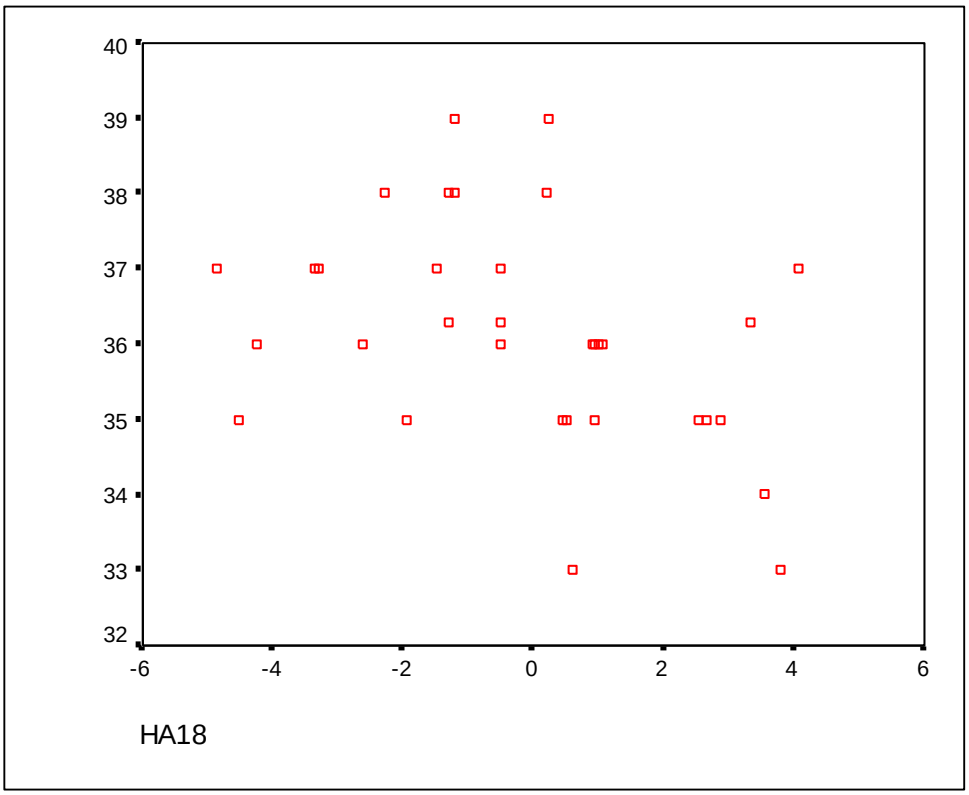

Figure 18: Scatterplot on weight for age measurements for infants 12-18 months of age in correlation with their fat intake for the FFQ, (Naicker, 2002).

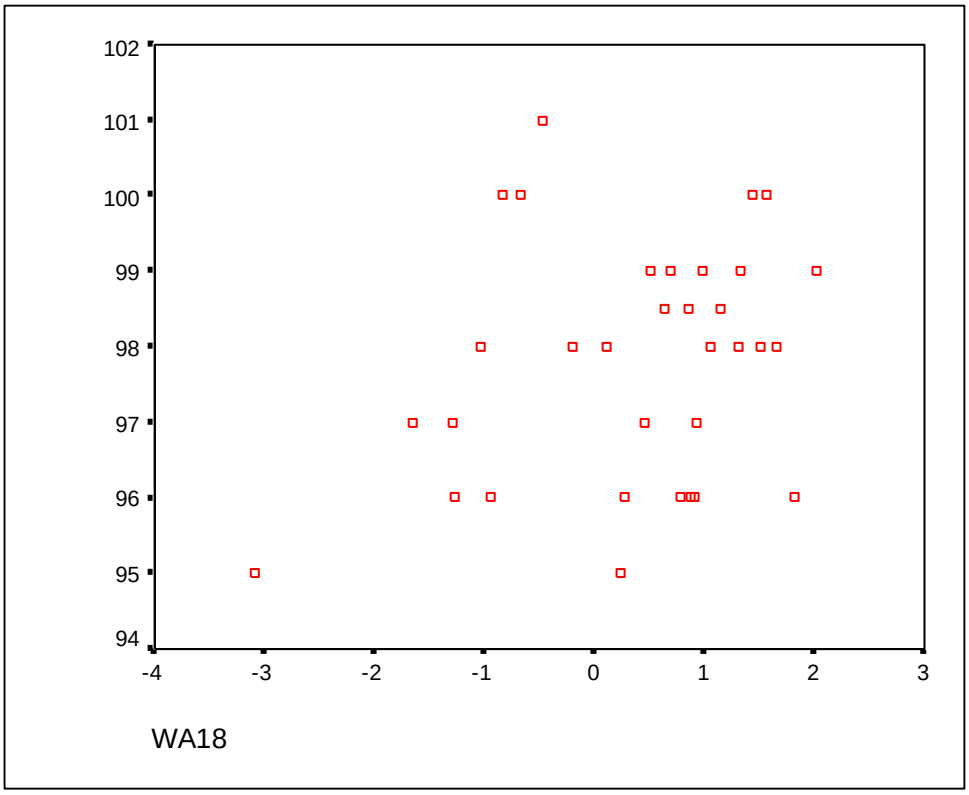

Figure 19: Scatterplot on height for age measurements for infants 12-18 months of age in correlation with their carbohydrate intake, (Naicker, 2002).

4.5 Statistical Hypotheses 3

Ho: The existing food and nutritional knowledge, dietary practices and food availability do not influence the nutritional status of rural black children aged 0 to 24 months in Umbumbulu.

H1: The existing food and nutritional knowledge, dietary practices and food availability affect the nutritional status of rural black children aged 0 to 24 months in Umbumbulu.

Hypothesis 3 is reflected in Table 7 which is formatted according to the questionnaire (See Appendix A, Section B- Questions 1-18).

n= 210, however sample size varies according to the applicability of the question to the respondents.

Table 7: Existing food and nutritional knowledge, home management skills and food preparation techniques

Questionnaire (refer to Appendix A)		n=210	%
1. Receive nutritional advice	Yes	78	37.1
	No	132	62.9
2. Person responsible for grocery purchasing	Mother	137	65.2
	Father	23	11.0
	Grand mother	27	12.9
	Other family member	23	11.0
3. Outcome of purchasing flour with weevils	Throw it away	110	52.4
	Sift and use it	32	15.2
	Return it to the shop	68	32.4
4. Storage of dry ingredients	Airtight container	180	85.7
	In its original packaging	30	14.3
5. Person responsible for food preparation	Mother	62	29.5
	Grandmother	5	2.4
	Other family member	62	29.5
	Combined effort	81	38.6
6. Own a Fridge	Yes	126	60.0
	No	84	40.0
7. Use of a solar cooker	Yes	10	5.0
	No	200	95.0
		n = 84	%
8. Alternate method of storing perishables	Buy enough for 1 day	29	34.5
	Dry it	17	20.2
	Place in cold water	12	14.2
	Keep in a cool place	26	30.9

Table 7 Continued

Questionnaire (refer to Appendix A)		n=210	%
9. Method of boiling vegetables	Vegetables covered in little water	173	82.4
	Vegetables covered in a lot of water	37	17.6
10. Amount of time to boil vegetables	5 minutes	76	36.2
	10 minutes	108	51.4
	15 minutes	26	12.4
11. Usage of lid when boiling vegetables	Yes	186	88.6
	No	24	11.4
12. Use of leftover cooking liquid from the boiled vegetables	Throw it away	166	79.0
	Use it in soups and sauces	43	20.5
	Other	1	.5
13. Time of vegetable preparation for cooking	1 hour before cooking	48	22.9
	½ before cooking	34	16.2
	15 minutes before cooking	59	28.1
	Whilst cooking	69	32.9
14.Ability to preserve foods	Yes	94	44.8
	No	116	55.2
15. Economic skills	Market it	117	55.7
	Share it	50	23.8
	Preserve it	43	20.5
16. Use of the hay box	Yes	5	2.4
	No	205	97.6
		n=5	%
17. Knowledge of the correct usage of the Hay box	To cook legumes	3	60
	To cook meat	2	40
18. Use of Bicarbonate of soda	Yes	52	24.8
	No	158	75.2

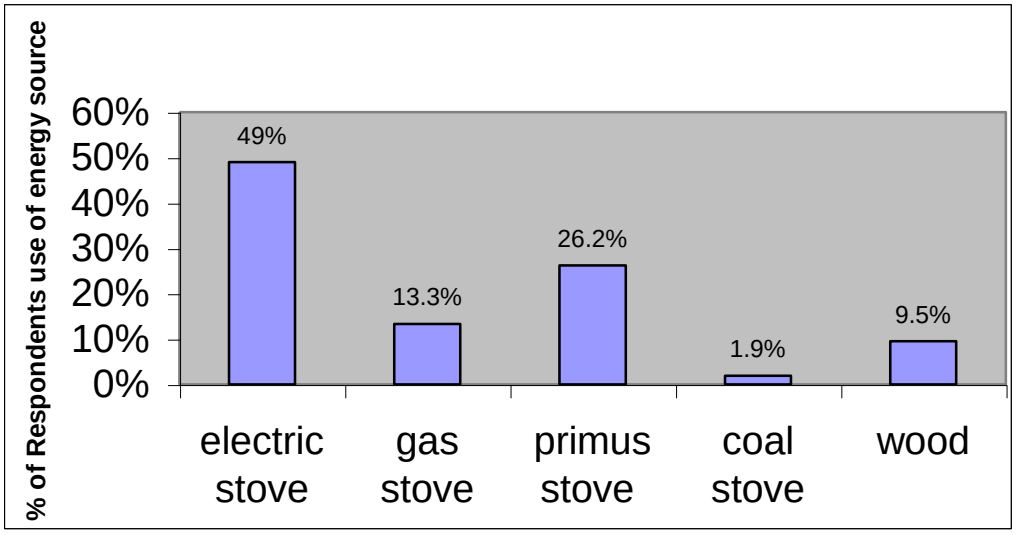

Figure 21: Energy Source, (Naicker, 2002)

4.5.2 Dietary Practices, General health of the infant/toddler

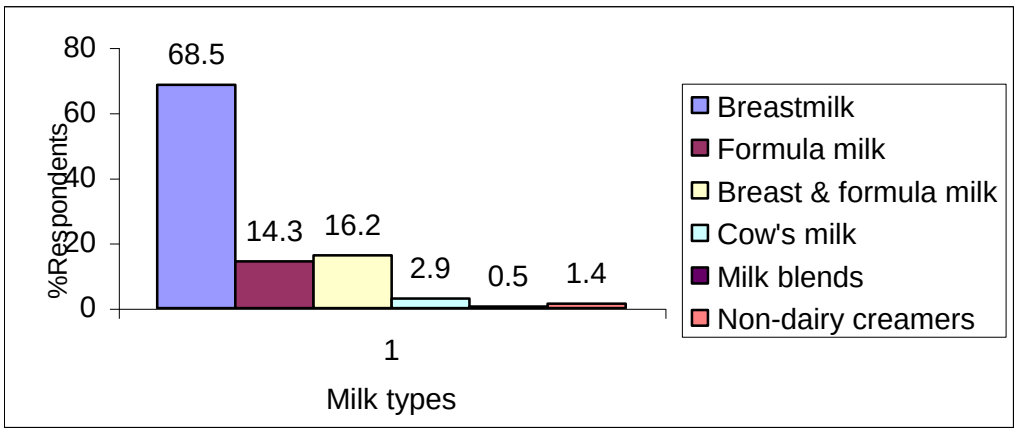

Figure 22: Current milk consumption, (Naicker, 2002)

Table 8: Dietary Practises and General Health of children aged 0-24 months

Table 8 is formatted according to the questionnaire (See Appendix A, Section C, Questions no 2.1 to 16. n= 210, however at times the sample size varies according to the applicability of the question to the respondent.

Questionnaire (see Appendix A)		n= 178	%
2.1 Influencing breastfeeding	*Own choice	129	72.4
	Your partner	3	1.6
	Family member	7	3.9
	Clinic	39	21.9
2.2 First introduction to breastmilk	Immediately at birth	147	82.5
	*One day after birth	25	14
	2/3 days after birth	6	3.3
		n=178	%
2.3 Type of breastfeeding	On demand	19	10.6
	When most convenient	50	28
	Routine	109	61.2
2.4 Use of both breasts for feeding	Yes	161	90.4
	No	17	9.55
2.5 Who terminates feeds first	Mother	82	46
	Child	96	53.9
		n=19	%
2.6 A of child when breast milk was stopped	*Under 3 months	12	63.1
	Between 3 to 6 months	1	5.2
	Between 6 to 12 months	5	26.3
	Between 12 to 18 months	1	5.2
2.7 Reason for stopping breastfeeding	*- Not enough milk	10	52.6
	- The baby is big enough	2	10.5
	- Nipples Sore	4	2.1
	- Baby cried a lot	1	.52
	- Baby does not like the taste	1	.52
	- Had to go to work	1	.52

Table 8
Continued…..

		n= 64	%
3.2 Who influenced your choice selection of formula feeds	Doctor	18	28.1
	Clinic	31	48.4
	Family member	9	14
	Cheapest one available	6	9.3
3.3 Number of scoops of formula in 100ml water	*3	15	23.4
	4	28	43.7
	*5	15	23.7
	*6	6	9.3
		n =64	%
3.4 boiling water for feed preparation	Yes	64	100
3.5 Cooling the water before feed preparation	Yes	61	95.3
	No	3	4.6
3.6 Sterilizing method of bottles	Sterilizing solution	15	23.4
	Salt water	19	29.6
	Wash in detergent	30	49.1
		n=6	%
4.1 Age introduction to cow's milk	*Between 7 to 10 months	5	83.3
	Between 10 to 13 months	1	16.6
4.2 Type of cow's milk drank by the child	Fresh cows milk from home	4	66.6
	Pasteurised milk	1	16.6
	Powder milk- Nespray	1	16.6
4.3 Is the milk boiled before drinking	Yes	3	50
	No	3	50
		n = 145	%
6.Introduction to water- Age	*0-2 months	102	70.3
	3-4 months	42	28.9
	4 to 6 months	1	.68

Table 8 Continued

		n=145	%
7.1 Introduction to solids – Age	*0-2 months	67	46.2
	2 to 3 months	48	33.1
	4 to 5 months	30	20.6
7.2 Method of eating cereal	From a bowl	74	51
	*The bottle	71	48.9
7.3 Addition of salt in the child's food	Yes	80	55
	No	65	64
7.4 Addition of sugar in the child's food	Yes	67	46.2
	No	78	53.7
		n=145	%
7.5 Addition of fat in the child's food	Yes	68	46.8
	No	77	48.2
7.6 Reasons for adding salt, fat or sugar	*For improved taste	138	95
	To prevent jaundice	2	1.3
	To grow	3	2
	For strong bones	2	1.3
		n= 210	%
8. Intake of vitamins supplements	Yes	28	13.3
	No	182	86.7
10. Is the child often sick	Yes	27	12.9
	No	183	87.1
		n=27	%
11.Type of illnesses	Running nose	4	1.9
	Diarrhoea	10	5.2
	Cough	3	1.4
	Measles	2	1
	Ear problems	3	1.4
	Chest problems	2	1
	Small pox	1	0.5
	Vomitting	1	0.5

		n =210	%
	Rash	1	.5
12. Type of help sought	Doctor/Clinic	203	96.7
	Traditional healer	7	3.3
13. Has the child been dewormed	Yes	37	17.6
	No	173	82.4
14. Possession of a Road to Health Card	Yes	209	99.5
	No	1	0.5
		n=210	%
15. Immunisation against polio and measles	Yes	191	91
	No	19	9
16. Reasons for not receiving these vaccines	Didn't know	13	68.4
	No time	5	26.3
	Other	1	5.2

Table 9A: Association of undernutrition to variables enlisted

N=210, p< 0.05

Pearson Chi -Square

Variables	Asymp. Sig (2-tailed)
Nutritional advice	0.306
Boiling of vegetables- lid	.124
Cooking time of vegetables	.536
Cooking liquid	.563
Vegetable preparation	.600
Preservation	.14
Stopped breastfeeding	.247
No scoops of formula feed	.68
Introduction of water- age	.001*
Introduction of solids	.234
Dewormed	.10

$\alpha = 0.05$

Decision Rule:

If P <.05, the null hypothesis is rejected

The null hypothesis is accepted for all variables investigated except for the introduction of water in the children's diet.

Here P= 0.001 <0.05, Reject Ho.

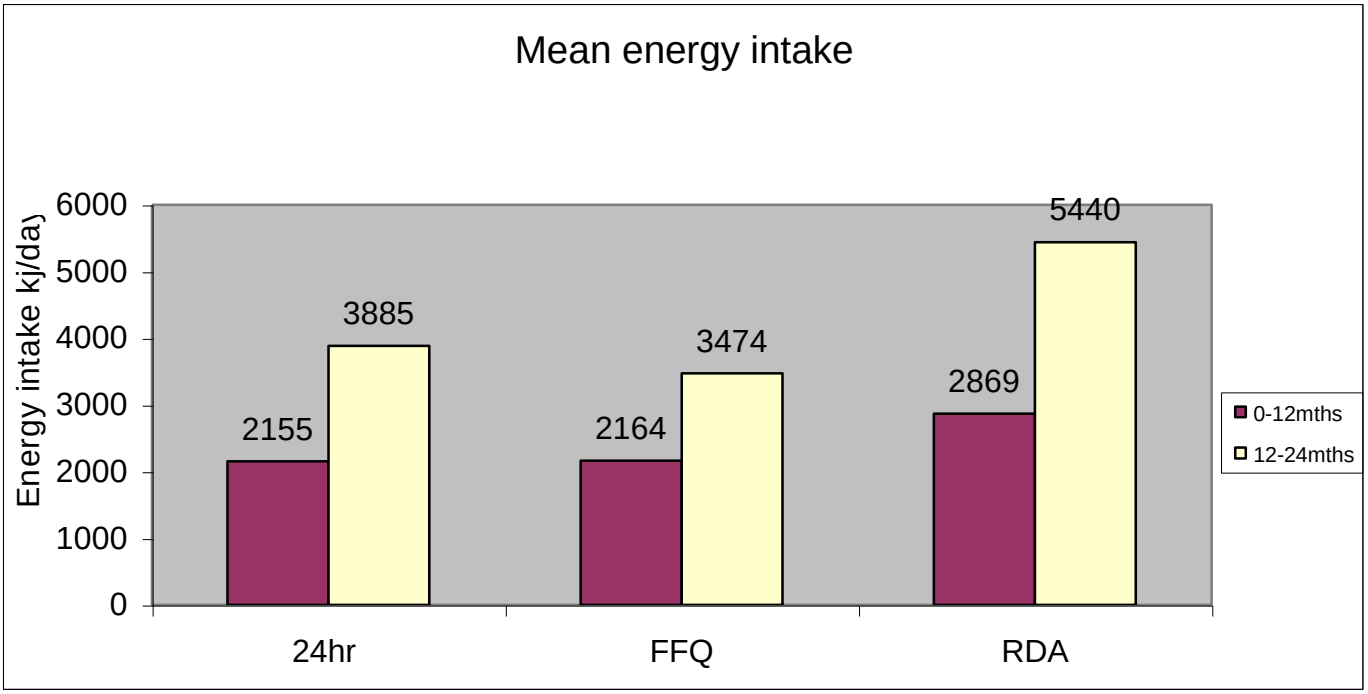

Figure 22: Mean energy intake for 24 hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

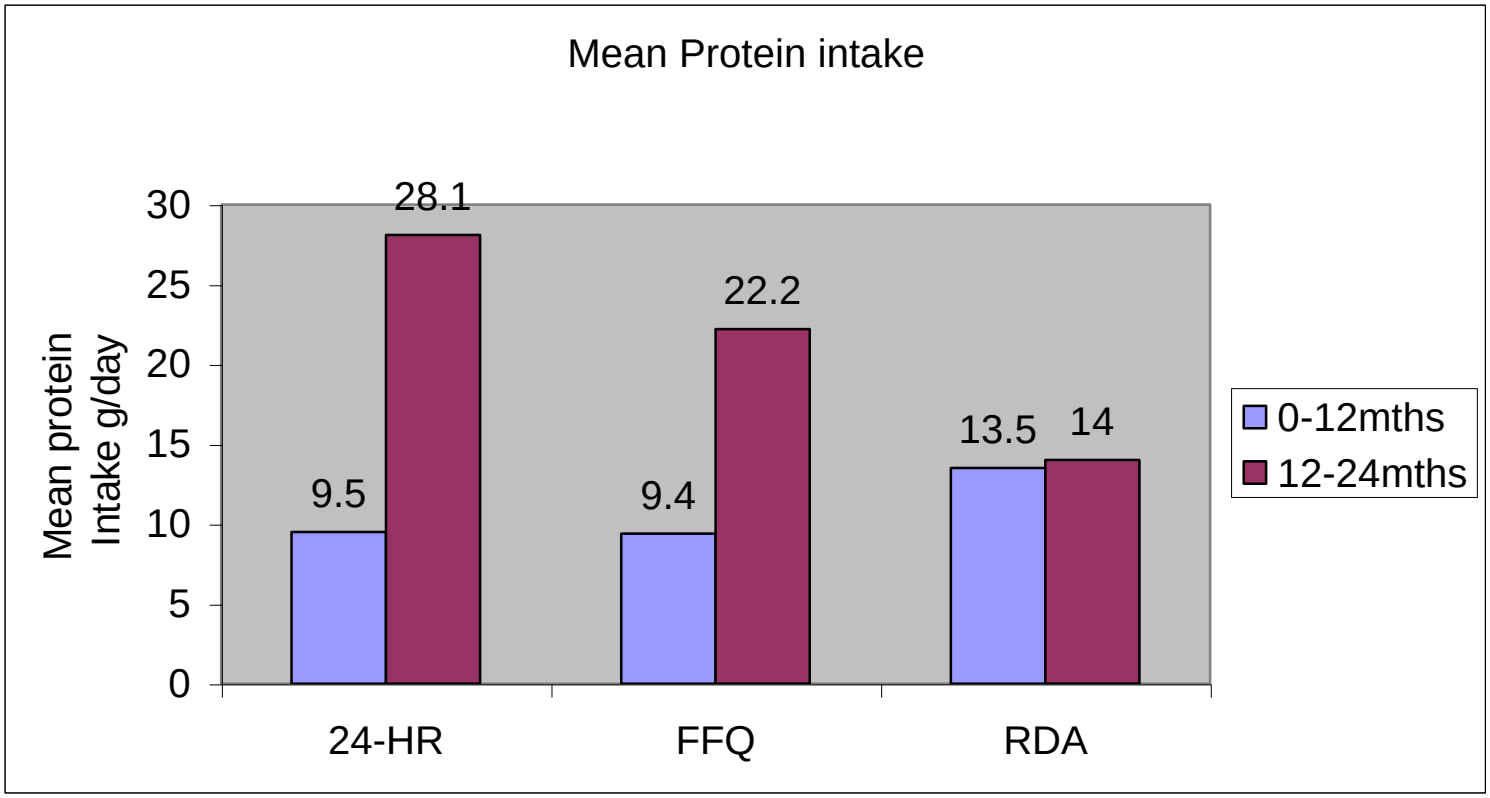

Figure 23: Mean Protein intake for 24-hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

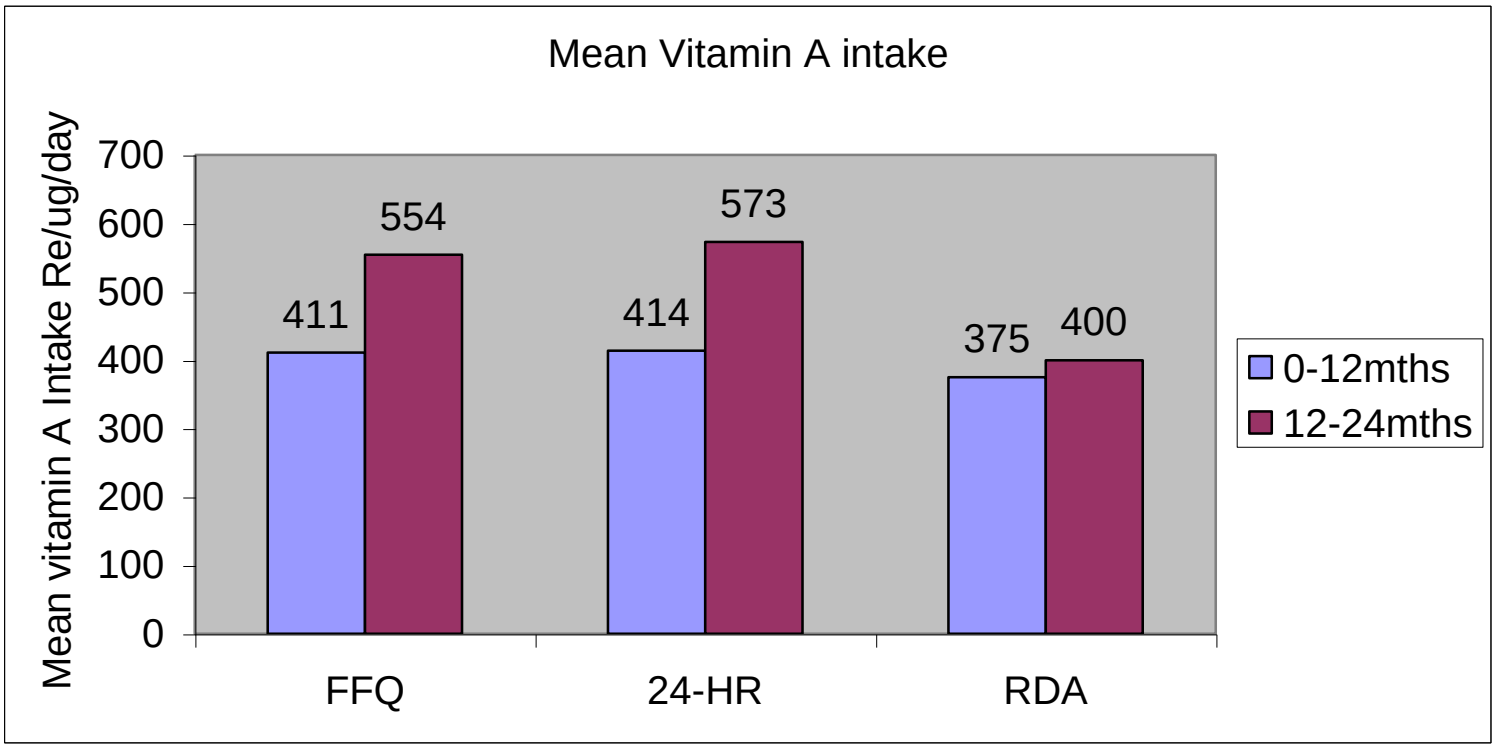

Figure 24: Mean Vitamin A intake for 24 hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker,2002)

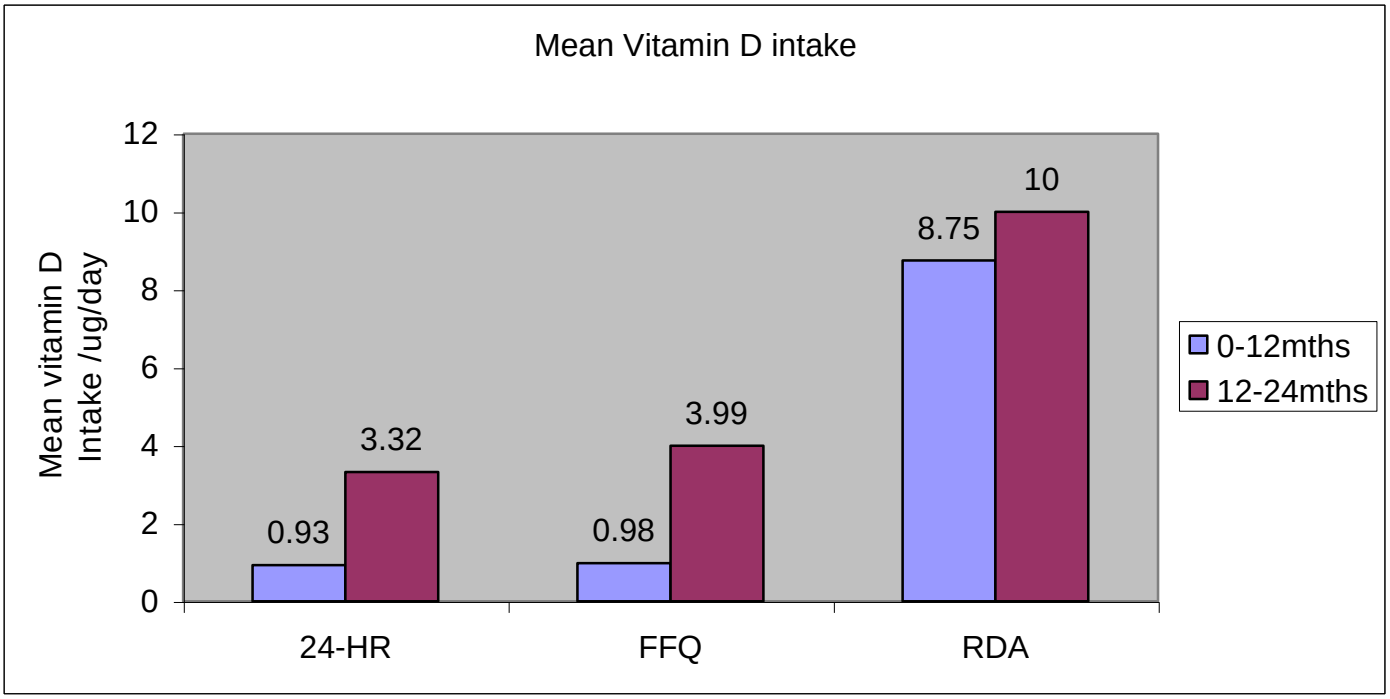

Figure 25: Mean Vitamin D intake for 24-hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

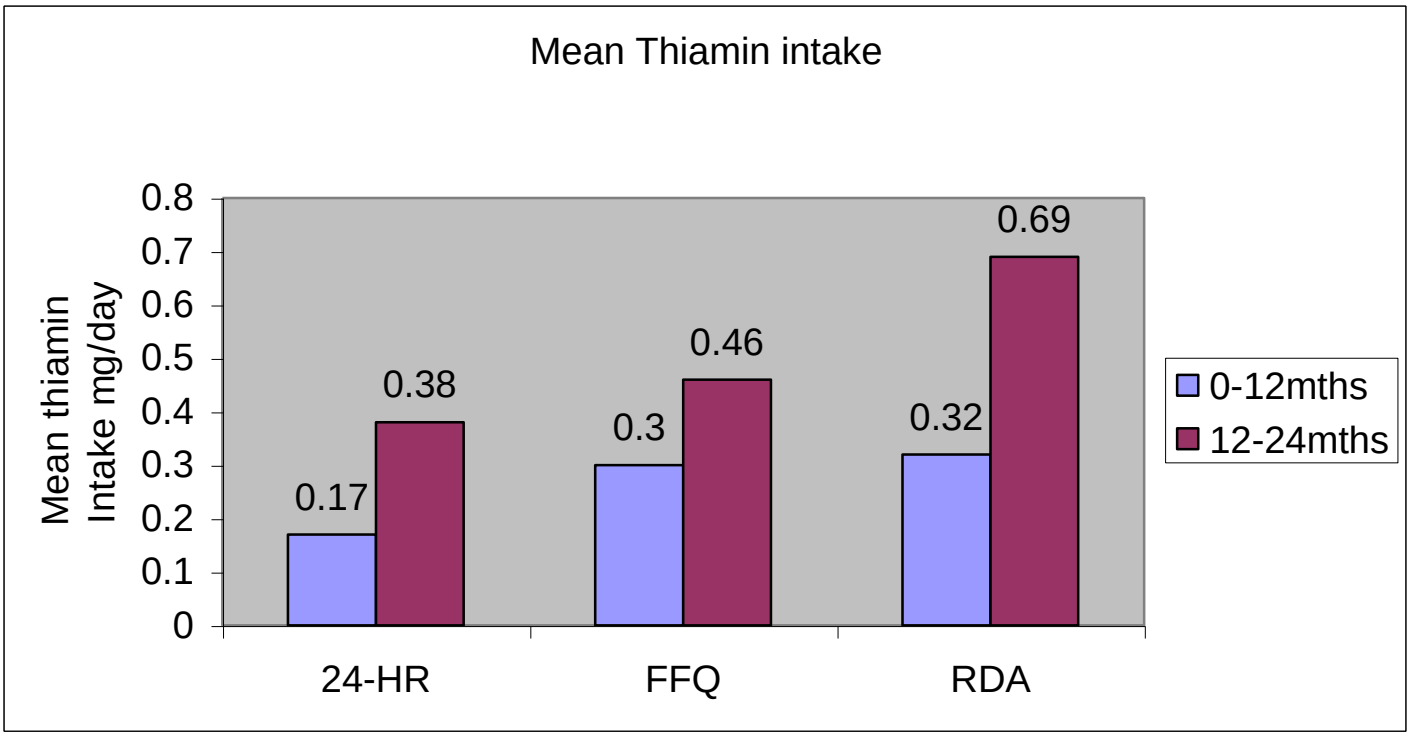

Figure 26:Mean Thiamin intake for 24-hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

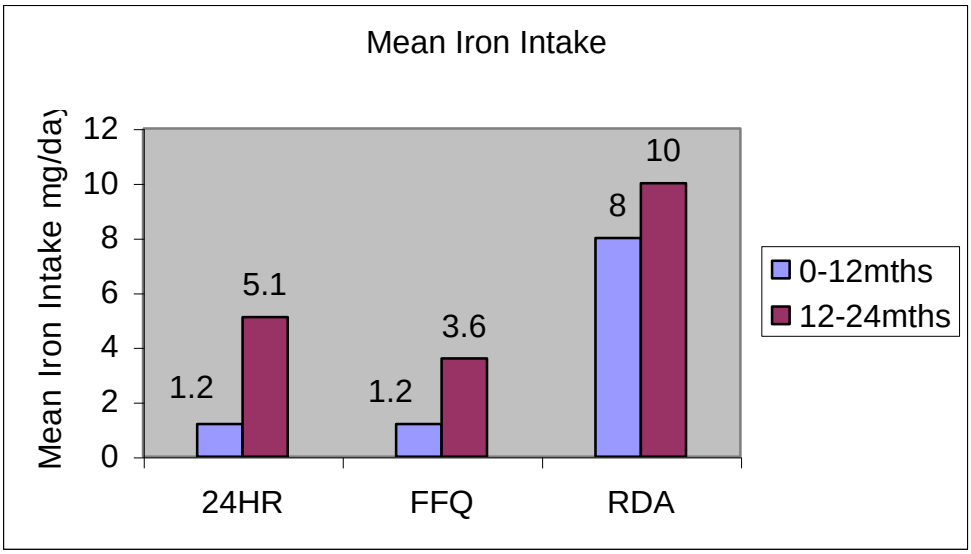

Figure 27: Mean Iron intake for 24-hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

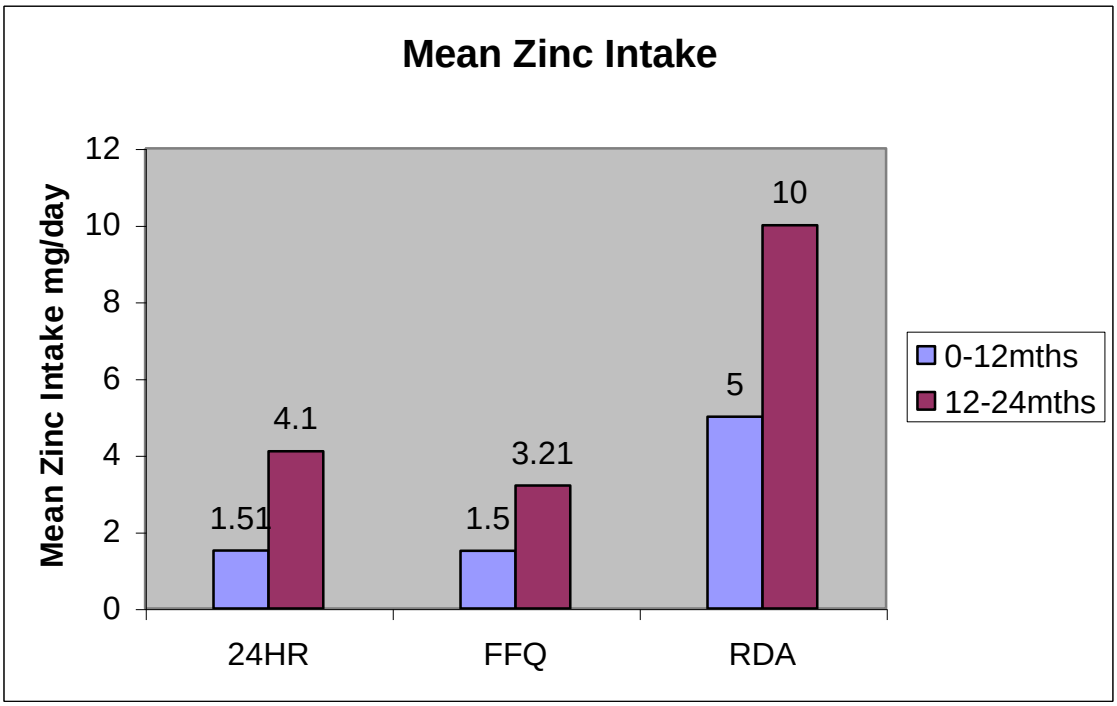

Figure 28: Mean Zinc intake for 24-hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

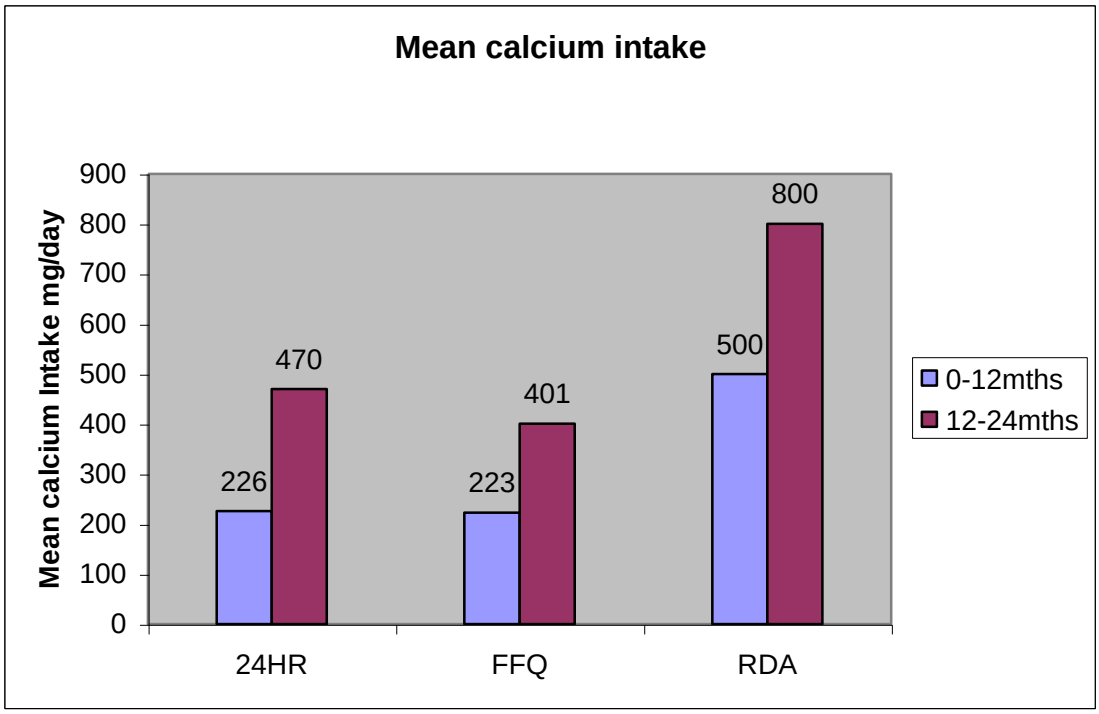

Figure 29 : Mean calcium intake for 24-hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

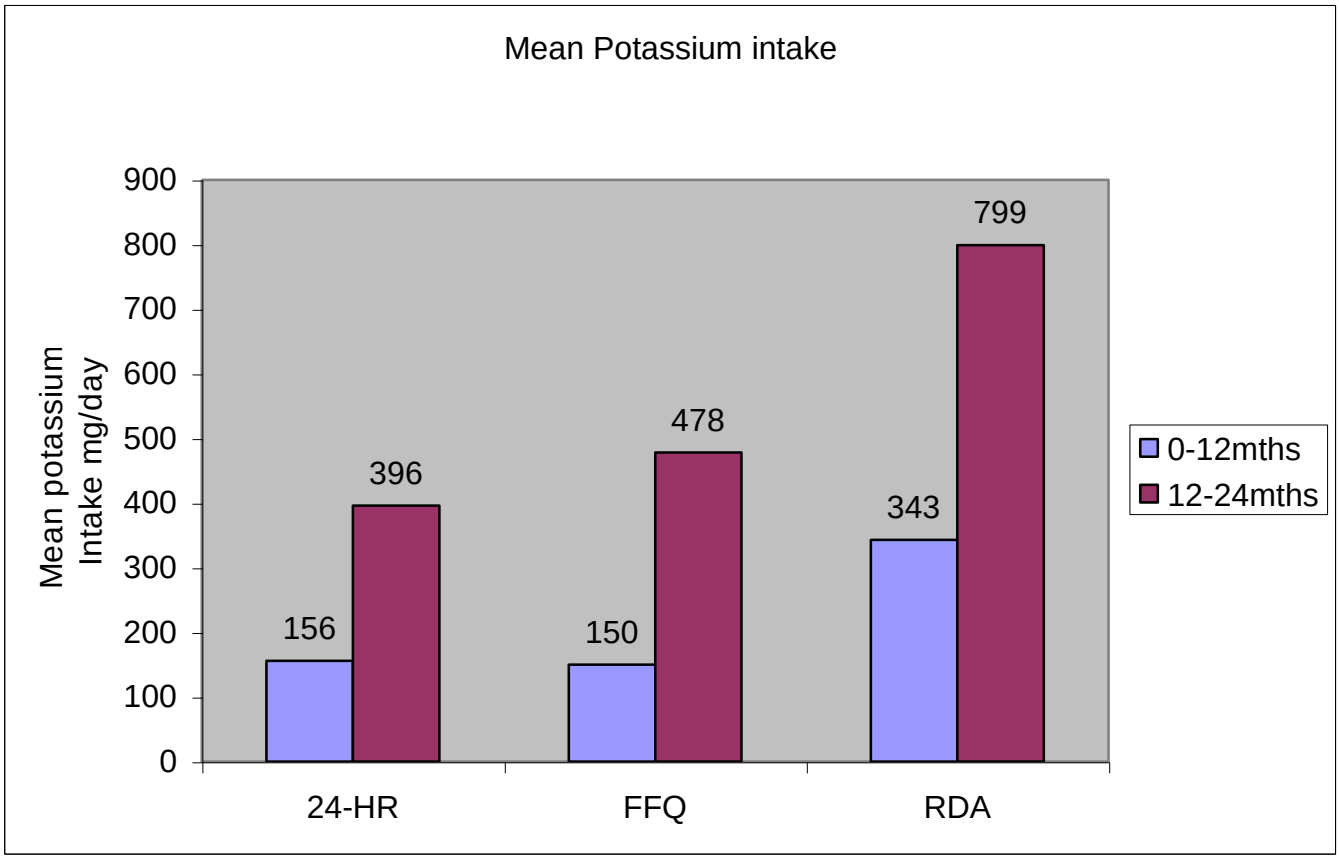

Figure 30 :Mean Potassium intake for 24-hour food recall and FFQ in comparison with RDA for 0-12 months, 12-24 months, (Naicker, 2002)

Table 9B: Mean nutrient intake of 0-12 months and 12-24 months for 24-hour food recall and FFQ in comparison with RDA.

Nutrient	0-12 mths	RDA	12-24 mths	RDA
Total CHO	58		98.5	
Total fat	26.5		36.3	
Vitamin C	38	30	41	40
Vitamin E	5.47	3	6.59	6
Riboflavin	0.3	0.4	0.6	0.8
Niacin	2.1	5	3.9	9
Vitamin B6	0.165	0.3	0.411	1
Vitamin B12	0.3	0.3	1.5	0.7
Phosphorus	36	300	93	800
Magnesium	36	40	86	80
Selenium	10.4	10	15	20

Table 10: Association of Food Security status to Undernutrition:

n= 210, p < 0.05

Pearson Chi-Square

Statements	Often true		Sometimes true		Never true		Asymp. Sig. (2-Tailed)
	n	%	n	%	n	%	
1. I worry whether my food will run out before I get money to buy more	107	51	73	34.8	30	14.3	.655
2. I worry about where the next day's food is going to come.	98	46.7	72	34.3	40	19.0	.102
3. We eat the same thing for several days in a row because we have only a few different kinds of food on hand and don't have money to buy more.	106	50.5	72	34.3	32	15.2	.841
4.The food that I bought didn't last and I didn't have money to buy more.	100	47.6	83	39.5	27	12.9	.864
5. I ran out of foods that I needed to put together a meal and I didn't have money to get more	110	52.4	73	34.8	27	12.9	.748
6. I cannot afford to feed my child/ren the way I think I should	108	51.4	78	37.1	24	11.4	.944
7. I cannot give my child/ren a balanced meal because I cannot afford it	111	52.9	73	34.8	26	12.4	.378
8. My children are not eating enough because I just can't afford enough food	90	42.9	90	42.9	30	14.3	.684
9. I know my children are hungry sometimes, but, I just can't afford more food.	108	51.4	67	31.9	35	16.7	.311
10. I cut the portion size of the children's meal because there wasn't enough money for food	111	52.9	60	28.6	69	18.6	.665

Decision Rule:

If P < .05, the null hypothesis is rejected.

The null hypothesis is accepted for all statements.

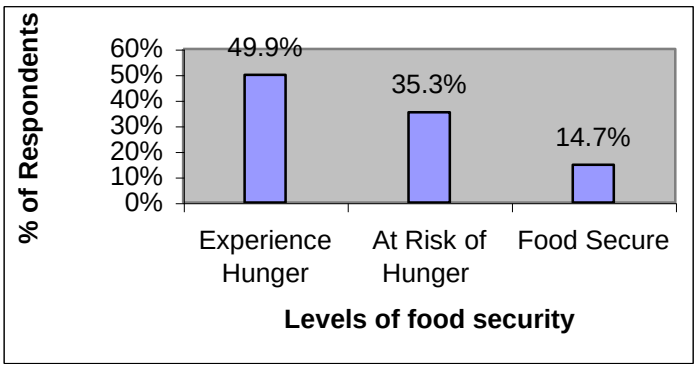

Figure 31: Food Security Status ,(Naicker, 2002)

Table 11: The influence of culture on the diet of children aged 0-24 months.

	Focus group 1		Focus group 2		Focus group 3	
1. Foods excluded from the diet:	n=6	%	n=6	%	n=6	%
-Eggs	5	83.3	6	100	4	66.7
-Cheese	5	83.3	6	100	5	83.3
-Internal organs	3	50	1	16.6	-	-
-Canned food	-	-	3	83.3	1	16.6
-Liver	2	33.3	1	16.7	3	50
-Back portion of chicken	-	-	2	33.3	-	-
-Samp	4	66.7	6	100	5	83.3
2. Foods included in the diet						
-Mealie meal	6	100	6	100	6	100
-Potato	6	100	4	66.7	5	83.3
-Pumpkin	4	66.7	5	83.3	6	100
-Spinach	6	100	3	50	4	66.7

Table 12: Reasons for excluding foods in the diet of children aged 0 to 24 months

Foods: Reasons for exclusion/ Myths	% median (reasons)
1.Eggs: Reach puberty faster	83.3
2.Cheese: Mature faster	88.8
3. Internal organs: Leads to forgetfulness	22.2
4. Samp and beans: Constipation	83.3
5. Tin products-Baked beans: Mature faster	22.2
6. Liver: Given only to males	33.3
7. Back of chicken: Not given to girls as boys will dislike them when older	11.1

4.6 Statistical Hypotheses 4

Ho: Ecological factors do not affect the nutritional status of rural black children aged 0 to 24 months in Umbumbulu.

H1: Ecological factors affect the nutritional status of rural black children aged 0 to 24 months in Umbumbulu.

Table 13: Care of the child

	n= 210	%
1.Mother	203	96.7
2.Caregiver	7	3.3

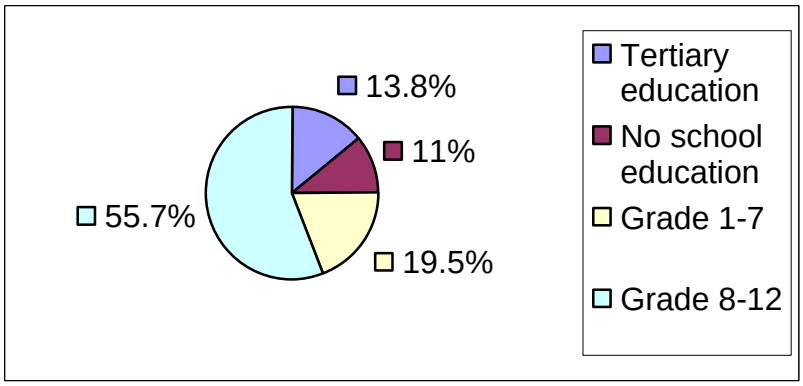

Figure 32: Level of education of the mother/caregiver, (Naicker, 2002)

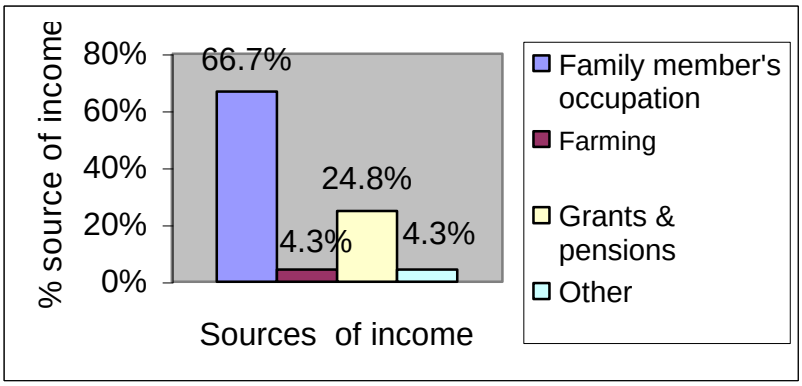

Figure 33: Source of income, (Naicker, 2002)

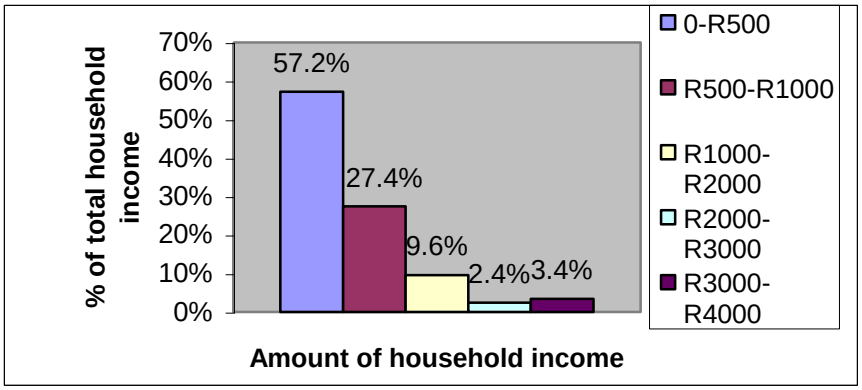

Figure 34: Total household income, (Naicker, 2002)

Table 14: Household density and room density

	n=210	%
1.Household density		
2 to 3 people	17	8.1
4 to 5 people	64	30.5
6 to 7 people	54	25.7
7 and more	75	35.7
2. Room density		
1 to 2	56	26.7
3 to 4	83	39.5
4 to 5	33	15.7
5 and more	38	18.1

Table 16: Access to clinics

1. Access to clinics	n=210	%
Accessible	190	90.5
Inaccessible	20	9.5

Table 17: Uses of clinics

Uses	n= 210	%
Family planning : Yes	171	81.4
No	39	18.6
Immunisation: Yes	186	88.6
No	24	11.4
Illness: Yes	114	54.3
No	96	45.7

Table 17: Service from Extension Officers

	n=210	%
Yes	70	33.3
No	140	66.7

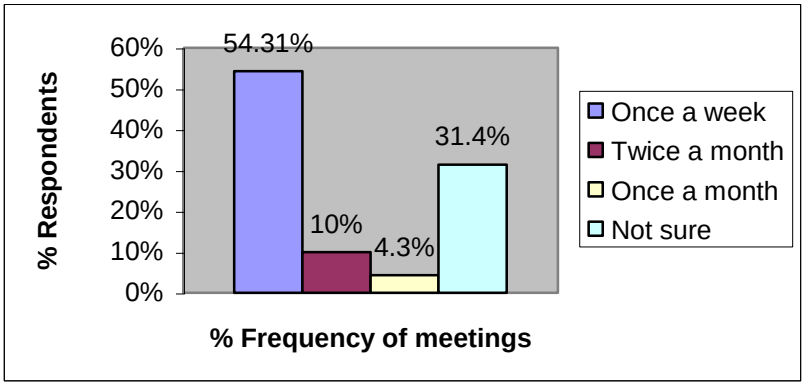

Figure 35: Frequency of Extension Meetings, (Naicker, 2002)

Table 18: Vegetable garden

	n=210	%
Have a vegetable garden	118	56.2
No vegetable garden	92	43.8

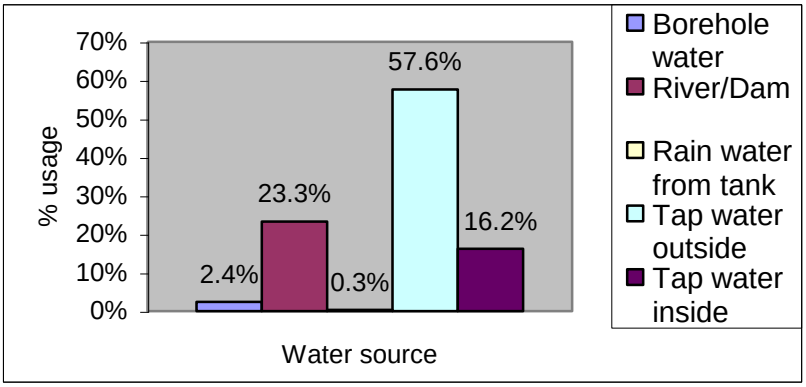

Figure 36: Drinking water, (Naicker, 2002)

Table 19 - Purification of water, Method of purification

		n= 55	%
18. Purification of water	Yes *No	38 17	69 30.9
		n = 38	%
19. Method of purification of water	Jik/Chlorine	27	71
	Boil the water	11	28.9

Table 20 : Living Conditions

		n = 210	%
21.Refuse facilities used	Dump in an open area	50	23.8
	Bin/ drum on stand	160	76.2
22.Toilet facilities	Own flush toilet inside	38	18.1
	Own flush toilet outside	67	31.9
	Pit toilet	105	50.0
23. Bathing facilities	Inside the house	119	56.7
	Outside the house	91	43.3
24.Frequency of bathing the child	Twice a day	192	91.4
	Once a day	18	8.6
25. Presence of rodents in the home	Yes	115	54.8
	No	95	45.2

Table 21 : Association of Undernutrition and the Ecological factors enlisted

n = 210, p < 0.05

Pearson Chi-Square

Variables	**Asymp.Sig. (2-tailed)**
Level of education	.073
Service from Extension Officers	.611
Vegetable gardens	.655
Purification of water	.258
Household density	.894
Room density	.64
Household income	.614
Access to clinics	.051

Decision Rule:

$\alpha = 0.05$

If P < 0.05, the null hypothesis is rejected

Since the values for P for all variables investigated are >0.05, then Ho is accepted.

Chapter 5 deals with the discussion of the results and recommendations thereof.

Chapter 5

Discussions of the Results and Recommendations

5.1 Introduction

In chapter four the results of the study were presented. In this chapter the results of the study are discussed in relation to the hypotheses and are compared to other similar national studies. Stemming from this, several focus areas of intervention are recommended with the intentions of the future development of a NIEP that could be adapted and implemented to other similar rural areas.

5.2 Hypothesis 1:

Hypothesis one sets out to establish whether rural black children in KZN have a high incidence of malnutrition (see pg. 53). Table 2 (see pg. 80) reflects the results of the weight for age, recumbent length for age and weight for recumbent length measurements in 6 month intervals between 0 to 24 months. Poor height for age is characterised by stunting. A child is regarded as moderately stunted, if the height for age Z score is <-2SD (refer to pg. 69-70). However, it must be borne in mind that genetic variation makes height for age an insensitive measure as the child could be genetically short. Moderate stunting was identified in 48.5% of children between the ages of 0 to 6 months, 36% of children between ages of 18 to 24 months and 25% of children between the ages of 12 to 18 months.

Comparatively, the NFCS, concluded that 25% of children between the ages of 1 to years were stunted (Labadarios et al. 2001) (see table 21, pg. 119). The SAVACG

study on the other hand concluded that there was a 16% prevalence of stunting amongst children between the ages of 12-23 months in KZN (see table 21, pg. 119). According to SAVACG, the prevalence of stunting is known to reflect the socio-economic standards of the area (Vitamin Information Centre, 1996). It is also an established fact that the most adverse impact of undernutrition on the growth of children occurs in the 6 to 24 months age group because of poor weaning practises and a decrease in exclusive breastfeeding (Karlberg, Jalil and Lindblad, 1988; and Jalil, Karlberg, Hanson and Lindblad,1989).

In terms of weight for age, 5.5% of infants between 6 to 12 months of age were moderately underweight. This could possibly be related to unsatisfactory complementary feeding practises. Weight for age is influenced by the recumbent length and weight of a child and is thus a composite of stunting and wasting (ACC/SCN, 2000: 1-66)(i). Comparatively, in terms of weight for age the NFCS showed that one in ten children were underweight (Labadarios et al. 2001).

Unlike stunting and underweight, wasting has a global prevalence of only 9.4% (ACC/SCN, 2000:1-66)(i). Similarly, the highest percentage of wasting (8.3%) came from children between the ages of 6 to 12 months (8.3%). Furthermore, 5.5% of children between the ages of 12 to 18 months had a moderate degree of wasting. Children between the ages of 12 to 23 months in the SAVACG study had

Comparatively children between the ages of 1 to 3 in the NFCS had a 4% incidence of wasting (see table 22 pg. 119).

From the results, it can be concluded that stunting remains by far the most common nutritional disorder. This could probably be attributed to premature birth and low birth weight and as stated early, the incidence of stunting is known to reflect socio-economic standards. These factors will be taken into account when making recommendations for the focus areas of interventions.

Table 21: Comparison of results of this study, the NFCS and the SAVACG study.

Anthropometric parameters	This study: 0-24months- rural, KZN				NFCS: 1-3 year rural, national study	SAVACG:6-71 months- rural, national study
n	105	36	36	33	581	
Age distribution	0-6	7-12	13-18	19-24	1-3 years	6-71 months
% H/A <-2SDs	48.5	22	25	36	30.3	27 (n=6094)
% W/A <-2SDs	1.9	5.5	2.7	0	15.1	10.7 (n=6343)
% W/H <-2SDs	1.9	8.3	5.5	3	5.5	2.8 (n=6062)

5.3 Hypothesis 2:

Hypothesis two sets out to establish whether there is a correlation between the incidence of malnutrition and the nutrient intake of children between the ages of 0 to 24 months in Umbumbulu, KZN (see pg. 53).

After conducting the correlation tests for all age groups, only a significant relationship was established in the 6 to 12 months category between the incidence

of undernutrition and the energy intake. Table 3 (see pg. 82/83) together with Graph 16 and 17 (see pg. 87) shows that a correlation exists between the incidence of undernutrition and the energy intake of children in the 6 to 12 month age group. When n= 36, the r value should be >.3338 for the correlation to be significant. The r value for weight for age as compared to the energy intake is .495. Similarly, the r value for height/recumbent length for age as compared to the energy intake is .423. Hence, a correlation does exist between the W/A Z-scores and the W/H Z-scores with the energy intake for children between the ages of 6 to 12 months.

Several reasons can be attributed towards this trend. According to SAVACG (1996), the quality and the quantity of the macro nutrient components of foods like protein, carbohydrates and fat, which are sole contributors to energy intake are principal determinants of growth rate. Research conducted over the past 20 years throughout the world in a variety of settings has demonstrated that post-natal growth faltering begins at around 6 months of age, just as children begin to receive foods to complement their breastmilk intake (Brown, Dewey, Allen, 1998). The ideal age for introducing complementary foods is 6 months as the child cannot get all the necessary nutrients from breastmilk, alone (see pg 43). Hence, poor dietary practises in terms of delaying complementary feeding, poor food selection, early introduction of solids and incorrect preparation techniques can justify the correlation established. Caulfield,Huffman and Piwoz (1999) states that complementary foods in the second six months of life and beyond are often inadequate in energy density,

protein and micro-nutrient concentration. They are also often prepared, stored or fed to children in ways that increase their risk to illness and hence malnutrition as illustrated by the Malnutrition infection cycle (see pg. 27) (Caulfield et al.1999).

After conducting the correlation tests for all age groups, no significant relationship was established between the incidence of undernutrition and the total protein intake (see table 4 pg.85-84). With regards to the correlation between the total carbohydrate intake and the prevalence of undernutrition, only a significant relationship was established for the 12 to <18 months age group (see table 5, pg. 85 and figure 18, pg. 88). A significant relationship was established between the incidence of undernutrition and total fat intake for the 12 to <18 months age group (see table 6, pg. 86 and figure 19, pg. 88). A possible reason that can be attributed towards this phenomenon is that carbohydrate, fat and protein are sole contributors towards energy intake and hence main determinants of growth rate. Hence, lack of energy means that protein sparing is not taking place.

5.4 Hypothesis 3:

Hypothesis 3 sets out to establish whether the existing food and nutritional knowledge, home management skills, food related beliefs, dietary practices and the availability of food affect the nutritional status of rural black children aged 0 to 24 months in the Umbumbulu area.

5.4.1 Existing Food and Nutritional Knowledge, Home Management Skills and Food Preparation Techniques

5.4.1.1 Nutritional Advice

According to the conceptual framework of malnutrition (UNICEF, 1998:24), inadequate and/or inappropriate knowledge limits household access to actual resources. Table 7, (see pg. 90-91) represents the results of the data on the existing home management skills and food preparation techniques. There were 37.1% of thehouseholds who indicated that they received advice on nutrition and feeding practices from Extension officers and Health care workers, whereas 62.9% of households received no advice. Comparatively, 33.3% indicated that they received agricultural and nutrition information from an Extension officer in Table 17 (see pg. 113). Considering the low levels of education as reflected in figure 33 (see pg. 110), the results show that both Health Care workers and Extension Officers are under utilised in terms of providing information on nutrition and agriculture. Despite the low levels of nutritional advice received by respondents there was no significant association established between nutritional advice and the incidence of malnutrition (see table 9A, pg. 97).

5.4.1.2 Home Management Skills and Consumer Education

Home management is an important element in successfully acquiring and managing the available resources. Table 7 (see pg. 90-91) shows that 65.2% of mothers are responsible for the purchasing of consumables as reflected in many traditional

matriachal families. Her food choice and knowledge directly affects the nutrition of the family. Consumer knowledge is an essential element in every household. Lack of consumer education is reflected by the fact that 52,4% of households reported that they would throw a packet of mealie meal infested with weevils. Proper storage of foods will ensure that families will have safe food for consumption without unnecessary wastage. There were 85,7% of households who chose the correct method of storage. The task of cooking as illustrated by the results indicates that it is mainly a task carried out by women in the family. Similar results were illustrated by the energy audit conducted by the University of Natal (Maphephetheni, 2001), where cooking was exclusively undertaken by women in the target area. This result is important as it determines whom to target, if food preparation skills are lacking. Although no significant association was established between home management skills and the incidence of malnutrition, it must be noted that a lack of these skills relate to poor management of resources (see table 9A, pg. 97).

5.4.1.3 Energy Usage

The availability and use of energy sources provides an overall picture of the living conditions of the household. Figure 20 (see pg. 94) represents the usage of various energy sources. The national electrification programme has made electricity more accessible in rural areas. According to Eskom (2000), as of November 2000, an estimated 6,4 million of South Africa households have electricity. Of the electrified households, 3 million are in rural areas and 2,2 million households are

without electricity. Therefore, many households are still dependent on alternative sources of energy, due to economic reasons and because many live in sparsely populated and widely dispersed villages. It has been estimated that at least 20% of South Africa's rural population are not expected to get electricity in the next 20 years (Arent,1998).

In terms of energy source usage, 49% of households indicated that they used electricity, 13.3% used gas, 26.2% used paraffin, 1.90% used coal and 9.5% used wood. The NFCS displayed almost similar results in terms of energy usage were 45% of households used electricity, 5% used gas, 30% used paraffin, 12% used wood and 8% used coal (Labadarios et al. 2001). Although only 9.5 % of households used wood in this study, it is regarded as a time consuming and a tiresome task. Green and Erskine (1998), found that the gathering of firewood was a burden on women and it had a significant impact on the quality of life lead by the household. Only 5% of households made use of solar energy for cooking.

The low percentage of households using the solar energy could probably be attributed to the fact that they lacked knowledge of this technology. It is argued by Simalenya (2001), that more effort needs to be put in place to popularize this technology. Wilson and Green (2000), indicated that the solar cooker is a cost-effective method of cooking and it has the potential to ease the workload of women, especially in households were wood is the main energy source of cooking. There were 60 % of households who depended on alternate methods of keeping perishable

foods, 14,2 % of households indicated that they placed meat in cold water to stay fresh and 30.9% kept meat in a cool place, like the floor. This has serious implications with regards to the loss of nutrients and bacterial contamination.

5.4.1.4 Food Preparation Skills

The conservative method of cooking vegetables is an easy and an important method to preserve vitamins and minerals during cooking. The aim of the method is to minimize the loss of soluble nutrients to the cooking liquid (Charley,1986:96).
It works on the following guiding principles (Bennion,1995:275-309):

- *Vegetables should be cooked in minimum amount of liquid.*
- *Vegetables should be cooked with the lid on.*
- *Cooking time should be short.*
- *Vegetables should be cooked in boiling water.*

There were 82.4% who of households indicated that they cooked vegetables in very little water, which is the ideal method, however 79.0% households indicated that they threw away the cooking liquid. The use of the ideal method of cooking vegetables is cancelled out by throwing away the liquid that possibly contains many water-soluble vitamins and minerals, depending on the nutrient content of vegetable. In terms of the length of cooking period, 51.4% of households indicated that they cooked vegetables for 10 minutes. Most vegetable require a short cooking period between 5 to 8 minutes to avoid the loss of nutrients. There were 32,9% of households who prepared vegetables during cooking which is the ideal method to prevent oxidation of

vitamins and minerals whilst 22,9% prepared vegetables one hour before cooking, allowing enough time for oxidation to take place. No significant association was established between the food preparation methods and the incidence of malnutrition, however it must be borne in mind that incorrect food preparation methods destroys certain nutrients present in foods (see table 7, pg 91).

5.4.1.5 Preservation

Preservation is an invaluable technique, which enables food to have a longer shelf life and assists in maintaining food security. There were 55,2% of households (see pg. 91) who indicated that they had no knowledge on preservation, which immediately diminishes their chances of keeping foods that are abundant, cheap or in season for longer periods of time. No significant association was established between the incidence of undernutrition and preservation (see 9A, pg 97).

5.4.1.6 Marketing

The knowledge and skills of marketing leads to empowerment and helps to maintain food security by providing an alternate source of income. There were 55.7% of households who indicated that they would market an abundance of vegetables, 23.5% indicated that they would share it with others which is reflective of the concept 'Ubuntu'- (sharing) and 20,5% indicated that they will bottle and preserve it (see pg. 91). No attempt was made to determine whether the community has any marketing skills.

5.4.1.7 Indigenous Technology

The hay box forms part of indigenous technology as an alternative source of energy. The hay box is 2 cushions filled with either paper or polystyrene chips. Food e.g. speckled sugar beans are brought to boil for a maximum of 10 minutes and then placed between the cushions. The heat within the food is entrapped by the cushions and the food cooks saving energy. However, only 2.4% of households use the hay box (see pg. 91). Of the 2,4 % of households using the hay box, 40% used it for the incorrect foods, namely meat dishes. Meat products cooked in the hay box for a long period leads to bacterial contamination. It is evident from the results that most of the households are not aware of the advantages of using indigenous technology in food preparation.

5.4.1.8 Use of Additives

Bicarbonate of soda shortens the cooking time in pulses and legumes and brightens the colour of boiled vegetables, however in doing so it destroys essential nutrients (Bennion, 1995:275-309). There were 24.8% of households who stated they that used bicarbonate of soda in cooking for purposes mentioned above, unaware that bicarbonate of soda affects the nutritive value of foods. Similarly, Kgaphola et al. (2000) reported that in their study, households used bicarbonate soda to tenderize a leafy vegetable during cooking.

5.4.2. Dietary Practises

5.4.2.1 Frequency and Type of Milk Consumption

Figure 21 (see pg. 92) represents the type of milk consumed and the frequency of milk consumption. The choice of milk a child is given is determined by a number of factors as illustrated in figure 12 in chapter 2 (see pg 43). According to the American Dietetic Association (ADA) (1997), the advantages of breastfeeding are indeed indisputable and include nutritional, immunological, psychological and economic benefits. Of the 178 children that were breasfed, 145 children were introduced to water below 6 months of age. Hence,16% of the children were exclusively breastfed. Exclusive breastfeeding means that they receive only breastmilk and no other liquids or solids with the exception of drops or syrups containing vitamin/mineral supplements or medicine up to 6 months of age (Integrated Nutrition Programme: 2001). In the study conducted by Kruger and Gericke (2000), only 10.4% of the sample were exclusively breastfed and in the study conducted by MacIntyre and Baloyi (2000), only 6.7% infants were exclusively breastfed. The WHO (1995)(ii), stated that infants should be exclusively breastfed for the first 4 to 6 months of life as breastmilk provides all the necessary nutrients for growth during this period. However, many mothers/caregivers have the perception that breastmilk is not adequate and therefore introduce other liquids and complementary feeds before 6 months of age.

Figure 22 (see pg. 92) illustrates that 14.3% children consumed formula milk. Similarly, the study conducted by Kruger et al. (2000), and Faber, Oelofse, Kreik

and Benade (1997) respectively, reported that 18,3% and 18,5% of children consumed formula milk. There were 16.3% of the children who were both formula and breastfed, 2.9% of children were fed cow's milk, 5% were fed milk blends and 1.4% children were fed non-dairy creamers. Milk blends, lack the necessary nutrients present in milk and a possibility exists that the feed could be over diluted or under diluted. Non-diary creamers have none of the nutritional properties of milk. Due to their colour and taste they are incorrectly used as substitutes for milk feeds.

5.4.2.2 Breastmilk Consumption

Table 7, (see pg. 93), represents who influenced the mother's choice to breastfeed the child. There were 72.4% respondents who indicated that it was the mother's own choice and 21.9% indicated that they were advised by the clinic sister/doctor to breastfeed. However, in a study conducted by Faber et al. (1997), 33.3% of mothers indicated it was their own choice and 37,9% indicated that they were advised by the clinic/doctor to breastfeed the child. Possible reasons as to why there is difference in results between this study and the study conducted by Faber et al. (1997), in terms of who influenced the mother to breastfeed could be attributed to the fact that most households are living under the poverty line and therefore can not afford to choose otherwise. Moreover, the increased emphasises by government health departments on the importance of breastmilk could have encouraged more mothers to breastfeed.

There were 82,5% of mothers who indicated that they introduced breastmilk to the child immediately at birth, 14% of mothers/caregivers introduced the child to the breast milk one day after birth and 3.3% introduced the infant to the breast 2 to 3 days after birth. According to Faber et al. (1997), introducing the child to the breast a few days after birth, deprives the child of the full benefit of the protection against various esoteric infections provided by antibodies in the colostrum. Faber et al. (1997), states that the late introduction to the breast is related to the traditional belief that colostrum is unhealthy milk. Furthermore, it is also believed that if a baby is born at home, the baby should not be put to the breast the same day (Faber et al, 1997). In the study conducted by Lategan, Dannhauser and Joubert (1996), their results showed that mothers were unaware of the value of colostrum. Comparatively, in the study conducted by Ladzani, Steyn and Nel, (2000) it was found that after nutrition intervention, the percentages of the mothers who initiated breastfeeding on the day of birth increased form 60% to 90%.

A high percentage of mothers indicated that they fed their children according to the routine method. This trend is probably due to acculturation. There were 93,8% (n=178) of mothers who used both the breasts and 9.5% used only one breast to feed the child, probably due to soreness of breasts or the misconception that only one breast should be used per feed. There were 46% of mothers who indicated that they terminated feeds first, whereas 53.9% of children terminated feeds first. Ideally, the infant should terminate a feed, giving a clear indication that their hunger has

been satisfied. There were 63.1% of mothers (n= 19) who indicated that they stopped breastfeeding when the child was under 3 months. The most popular reason given for this result is that 52% of mothers felt that they did not have enough milk. Faber et al. (1997), states that nipple confusion is the main reason for mothers to believe that they do not have enough milk. In their study, they found that mother's were unaware that breastfeeding is a supply and demand system, as lactation will only be maintained if breasts are suckled.

5.4.2.3 Formula Feeding:

Table 8 (see pg. 93-96) also gives an indication as to who advised the mother on the choice of formula. The choice of formula after 6 months is of detrimental value. Ideally, the formula should be fortified with iron, as the child's iron reserves are depleted around 6 months of age (see pg.125). With regards to the choice of formula milk, 48% and 28% of mothers indicated that they took the clinics and doctors advice respectively. There were 23.4% of mothers/caregivers who prepared underdiluted feeds and 32.7% prepared over diluted feeds. Incorrect preparation of the formula feed can lead to diarrhoea or constipation. Furthermore, the instructions on how to prepare formula feed are printed in only one of the official language, which is English. Considering the low levels of education as stipulated in Figure 32 (see pg. 110), having instructions in English is questionable to the rural people. In the study conducted by Faber et al. (1997), it was reported that many mothers added more water to formula feeds and found it difficult to read instructions on the formula tin

label due to language barriers and illiteracy.

It is essential to boil the water and cool the water before adding the formula. All mothers indicated that they boiled and cooled the water for formula feed preparation. Boiling the water helps to destroy any bacteria present in the water. One of the main problems associated with bottle-feeding is diarrhoea due to poor hygiene and lack of clean water. With regards to sterilization of bottles, surprisingly only 29% (n= 64) used salted water to sterilize the bottles considering that this is a cheap and effective way of sterilization.

5.4.2.4 Cow's Milk:

Table 8 (see pg. 93-94) represents the results of the introduction of cow's milk, the type of cow's milk used and the preparation of cow's milk. There were 83.3 % (n=6) of children who were introduced to cow's milk between 7 to 10 months of age. According to the Canadian Nutrition Committee Paediatric Society (1991), cow's milk is not recommended for children younger than 9 to 12 months of age. Cow's milk is a poor source of iron and it can compromise the absorption of other dietary sources of iron (Kingston, Frontenac and Lennox, 2001). There were 50% of mothers/caregivers who indicated that they boiled the milk before giving it to the child to drink and an equal number did not boil the milk. Of this, 66.6% drank unpasteurised milk. It is not essential to boil pasteurised milk as it under goes various heating processes before it reaches the consumer such as pasteurization, however, it is essential to boil unpasteurised milk so as to destroy any pathogens.

5.4.2.5 Introduction of liquids other than milk:

Table 8 (see pg. 93-94) also represents the age of the introduction to other liquids and the type of liquids consumed by the child. Nutritional knowledge and economic circumstances dictate what a mother feeds her child (see pg. 41). There were 70.3% (n=145) of children who were introduced to water between 0 to 2 months instead of ideally being exclusively breastfed till 6 months of age. The bulk of the children drank boiled water, however 13,8% drank unboiled water, which could have serious implications on the child's health especially if the source of water was non portable. Other studies show similar results. In the study conducted by Faber and Benade (1998), more than 60% of infants were introduced to water during the first month of life. The results of the water consumption in their study was broken down as follows: 46.5% infants were introduced to water in the first week of life, 8.9% in the second week of life, 4% in the third week of life and 2% in the fourth week of life. Furthermore, a study conducted by Theron, Murray, Koornhof and Beukes, (2000) stated that there was a high belief that babies needed extra water. A significant association was established between the early introduction of liquids other than milk on the incidence of malnutrition (see table (9A, pg. 97). The consumption of water displaces the need for milk and in-turn deprives the child from essential nutrients present in breastmilk such as iron. The energy consumption of the child is affected. Ultimately this influences the nutritional status of the child. This could be one possible reason why the energy intake for all the age groups were lower than the RDA (see pg. 99, 137).

5.4.2.6 Introduction of solids:

The WHO (2001)(ii) and UNICEF(1998:10-39) recommends that children should be exclusively breastfed for the first 6 months of life as discussed in chapter 2 (see pg. 44). According to Kingston et al. (2001), an infant's digestive system and kidneys are too immature to handle solid food before 3 months of age. However, 46,2% of children were introduced to solids between the ages 0 to 2 months as reflected in Table 8 (see pg. 95). Similarly, other studies showed a similar trend towards the early introduction of solid foods. In the study conducted by Croucher, Schloss and Bourne (2000). There were 64.2% of infants who were introduced to solid foods before 4 months. The main reason for this was that mothers felt that the infants consumed insufficient milk. The study conducted by Kleynhans and Alberste (2000), reported that 45.2% of children were introduced to solids in their first month of life. According to the study conducted by Faber and Benade (1998), 4% of infants were introduced to solid foods by 2 months, 40% at 3 months and 51% at 4 months. A comparative study conducted at Kayamandi and Ndukanazi showed that on average 80,9% of children ate solid foods before four months of age (Faber et al. 1997). Similarly, results from a study conducted in the rural areas of the Northern Province, showed that a high percentage of infants were introduced to solid foods before 5 weeks of age (Ladzani and Steyn, 2000). In the study conducted by Nnyeni and Bond (2000) and Fairweather-Tait (1989), it was thus concluded that the choice and timing of complementary foods are pivotal to the sustained growth of a breastfeeding child which is at the risk of malnutrition due to unfavourable circumstances

enveloping complementation.

In table 8, (see pg 95) of the 145 children that ate cereal, 50% had it in a bowl whilst 49.8% had it in the bottle. Feeding cereal from a bottle is not the ideal method as it can cause choking and delay the development of important motor skills (Hollowell, 2000). With regards to the addition of salt, sugar and fat to the child's food, 92,4% of mothers/caretakers indicated that they mainly added it for taste. There were 62% of mothers/caregivers who indicated that they added salt to the child's diet. According to Glinsmann, Bartholomey and Coletta (1996), it is neither safe nor reasonable to exclude sodium from the child's diet. However, sodium should be used in moderation. There were 46.2% of mothers/caregivers who indicated that they added sugar to the child's food. Sugar should be used in moderation as it provides an efficientsource of energy. From the first day of life almost all infants have fully functional digestive enzymes and absorptive pathways to digest, absorb and utilize dietary sugars (Glinsmann et al. 1996).There were 46.8% of mothers/caregivers who indicated that they added fat to the child's food. Babies also require fat as their stomachs hold a limited capacity and they require energy dense foods to support their rapid metabolic and growth rate (Glinsmann et al. 1996).

5.4.2.7 General Health of the child:

A large percentage of children received no vitamin supplements (see table 8 pg. 96). This result could be related to the economic circumstances of the household and the level of education of the mother/caregiver. There were12.9% of

mothers/caregivers who indicated that their children were often sickly, with diarrhoea being the most prevalent sickness (5.2%). The incidence of diarrhoea could be related to the access to non-portable water, poor hygiene practices and the early introduction of solids. There were 96.1% of mothers/caregivers who indicated that they received assistance from health care clinics, however, it was observed during the period of data collection that clinics lack medical equipment for example, most children were weighed for the first time with the researchers scales, as many clinics did not have operational scales. All children that were in the sample had Road to Health cards. However, no attempt was made to see what was recorded on these cards.

Only 17,6% of children were dewormed. According to Kvalsig (2000), in regions of exceptional poverty in South Africa, multiple parasitic infections exist alongside nutritional deficits. Helminth species differ in the ways they obtain nutrients from their human host. Some cause iron deficiency, others suppress appetite whilst some cause an inflammatory responses. Kvalsig (2000), concluded that deworming should be viewed as one of several nutritional interventions designed to assist vulnerable children in achieving optimal mental and physical development. There were 9% of the children who did not receive the polio vaccination that was issued free of charge nation-wide by the Department of Health in 2000. There were 61.9% of mothers/ caregivers who indicated that they were not aware of it. Economic circumstances and low level of education can be attributed towards this result.

5.4.3 Nutrient Intake

The relative validity of the 24-hour food recall was compared with the 7 day FFQ (see pg 73).Table 22 reflects the results of the validation studies were the 24-hour recall was administered 3 different times to a sample of 5 respondents from the original sample compared to the 7 day FFQ. The findings of a degree of accuracy is favourably reflected as percentages in the right column to that of the main study.

Table 22: Comparison of the validation results to that of the main study

Results of relative validity					% accuracy compared to main study			
Nutrient	24-hour (mean)		FFQ (mean)		24-hour (mean)		FFQ (mean)	
	0-12	12-24	0-12	12-24	0-12	12-24	0-12	12-24
Energy	2100	3621	2228	3811	97	93	97	98
Protein	9.2	26.3	9.0	23.8	96	93	95	93
Vitamin A	416	562	404	511	98	99	97	89
Vitamin D	0.91	2.9	0.9	3.84	97	87	91	96
Iron	1.5	5.0	0.9	3.9	80	98	75	92
Zinc	1.47	3.8	1.8	4.6	97	92	83	69
Calcium	280	432	245	423	81	91	91	95

Figure 22 to 30 (see pg. 98-106) represents the results of 24-hour food recall and the FFQ in comparison to the RDA. Comparatively, the 24-hour food recall and revealed almost similar results to that of the FFQ.

5.4.3.1 Macronutrient intake

5.4.3.1.1 Energy intake

In terms of the mean energy intake (see figure 23, pg. 93), the 24-hour food recall

and the FFQ for children aged 0 to 12 months was 2155Kj/day and 2164Kj/day respectively. These values related to 75% and 75.4% of the RDA. The mean energy intake for the 24-hour food recall and the FFQ for children aged 12 to 24 months was 3885Kj/day and 3474Kj/day respectively. These values relate to 71,4% and 63,8% of the RDA. The results of the mean energy intake of this study are supported by the results obtained in NFCS, where the mean energy intakes of children in all provinces were below the recommended age (Labadarios et al. 2001).

5.4.3.1.2 Total protein intake

The total protein intake for the 24-hour food recall and the FFQ for children in 0 to 12 month category was 9.5 and 9.4 g/day respectively. These values relate to 70.31% and 69.6% of the RDA. The reverse was, however the case for the 12 to 24 month category. The total protein intake was much higher than the RDA by both methods (refer to figure 23, pg. 99). This is probably due to the fact that normally, children between 12-24 months are properly weaned into solids.

5.4.3.1.3 Total carbohydrate

Almost similar values were obtained for the mean carbohydrate intake for the 0-12 month age group for both dietary methods. The 24- hour food recall for the 12- 24 month age group had the highest mean carbohydrate intake (see table 9B, pg. 106). This could be probably be attributed to the fact that the diet was rich in staples such as mealie meal and rice.

5.4.3.1.4 Total fat intake

Almost similar results were obtained for the mean fat intake for the 0-12 month age group for both dietary methods. Similarly the 24-hour food recall compared favourably well with the FFQ for the 12-24 month age (see table 9B, pg 106).

5.4.3.2 Micronutrient intake

5.4.3.2.1 Vitamin A

In terms of the mean Vitamin A intake the 24-hour food recall was 414ug/day and the FFQ was 411ug/day respectively for children 0-12 months. These values relate to 110.4% and 109.6% of the RDA (see figure 24 pg. 100). The mean vitamin A intakefor the 24-hour food recall for children aged 12-24 months was 573ug/day and the FFQ was 554ug/day respectively. These values relate to 143% and 139% of the RDA. The results are reflective of the fact that in the study population, a large percentage of children were breastfed and breastmilk is a natural source of Vitamin A. Breastfeeding of young children has proven to be protective against developing vitamin A deficiency in later childhood (West, Chirambo and Somner, 1986; Mahalabanis, 1991). Comparatively, the results from the NFCS (2001), showed that children in the Western Cape and in urban areas nationally had vitamin A intakes that are higher than the RDA for 1 to 4 year olds. However, children from rural areas and the remainder of the provinces showed low levels of Vitamin A intake (Labadarios et al. 2001). Similarly, SAVACG found that one in three children had a marginal vitamin A status (Vitamin Information Centre, 1996).

5.4.3.2.2 Vitamin D

The mean Vitamin D intake was significantly below the RDA for both the age categories under both the dietary methods (refer to figure 25, pg. 101). However, during interpretation of these results cognisance must be taken of the fact that Vitamin D synthesis in skin occurs upon exposure to sunlight.

5.4.3.2.3 Vitamin C

For all the age groups and for both dietary methods, the mean intake for vitamin C was much higher than the RDA (see table 9B, pg 106).

5.4.3.2.4 Vitamin E

For all the age groups and for both the methods, the mean intake for vitamin E was higher than the RDA (see table 9B, pg. 106). This is probably due to the fact that on average, the target groups diet was rich in cereals, rice and leafy vegetables which are all sources of Vitamin E.

5.4.3.2.5 Thiamin

The mean intake for thiamin was below the RDA for all age groups under both methods (refer to figure 26, pg.104). Thiamin deficiency is normally caused by an unbalanced diet that consist mainly of milled white cereals. It is worthy to note that mealie meal was the food consumed most often by the study population.

5.4.3.2.6 Riboflavin

The mean intake for riboflavin was below the RDA for all age groups under both

dietary methods (see table 9B, pg 106). A rich source of riboflavin is organ meats. However, the results from the focus groups indicate that organ meats are normally excluded from the diet of young children due to cultural reasons (see pg 146).

5.4.3.2.7 Vitamin B6

The mean intake for vitamin B6 was below the RDA for all groups under both dietary methods (see table 9B, pg 106). Pork and egg yolk are rich sources of Vitamin B6. However, these foods are limited in the diet due to cultural reasons (see pg 146).

5.4.3.2.8 Vitamin B12

The mean vitamin B12 intake was lower than the RDA for both dietary methods in the 0 to 12 months category. However, in the 12-24 months category, it was much higher than the RDA (see table 9B, pg. 106). This could probably be due to the fact that children between 12-24 months are properly weaned into solids and hence are more exposed to foods that are rich in Vitamin B12.

5.4.3.3 Minerals and trace elements

5.4.3.3.1 Iron Intake

In terms of iron intake (see figure 27, pg. 103), both the 24-hour food recall and the FFQ recorded 1.2 mg/day for children 0 -12 months as compared to the RDA of 6.8mg/day. For children 1 to 2 years the 24-hour food recall and the FFQ recorded 5.1mg/day and 3.6 mg/day respectively as compared to the RDA (10 mg/day). Similarly, the NFCS showed that the mean Iron intake was consistently low in all

age groups and in all provinces (Labadarios et al. 2000).

The SAVACG study established that one in five children in the country was anaemic and iron deficiency aneamia was the most serious in the 6 to 23 month age group (Vitamin Information Centre,1996). Two factors that could possibly lead to this phenomenon, is prolonged breastfeeding without timely introduction of complementary feeding and the use of cow's milk. (Iron deficiency in children, 2001). Iron in breastmilk, although well absorbed, is low in concentration. Iron stores are normally adequate for the first 4-6 months of life. From the age of 4-6 months, iron intake is inadequate, because of rapid growth rate, insufficient iron content in milk and impaired absorption of iron from staple foods (Vitamin Information Centre, 1996 and Oski, 1993). Therefore, exclusive breastfeeding without the introduction of complementary foods around 6 months could lead to Iron deficiency. Furthermore, cow's milk has a low concentration of iron which is poorly absorbed. According to UNICEF (1998), iron deficient children under the ages of 2 showed problems with co-ordination, balance and appeared withdrawn and hesitant. Lozoff et al. (1987), and Walter, de Adraca, Chudud and Perals (1989), concluded that iron deficiency leads to abnormal cognitive and social development, coupled with consistent delays in body balance and motor skills.

5.4.3.3.2 Calcium Intake

The mean calcium intake for the 24-hour food recall recorded 226mg/day and the FFQ recorded 223mg/day as compared to the RDA of 500 mg/day for children

aged 0-12 months (see figure29, pg. 105). The mean calcium intake for the 24-hour food recall recorded 470mg/day and for the FFQ recorded 401mg/day for children aged 12 –24 months as compared to the RDA value of 800mg/day. The NFCS established that in KZN, the mean calcium intake for children aged 1-3 years was just under 400mg/day and nationally it was less than half of the recommended allowance, in almost 95% of children in most of the provinces (Labadarios et al, 2001).

5.4.3.3.3 Zinc Intake

The mean Zinc intake (see figure 28, pg 104) for the 24-hour food recall recorded 1.51mg per day and the FFQ recorded 1.50 mg/day as compared to the RDA of 4.5mg/day for children aged 0-12 months. For children 12-24 months the mean Zinc intake for the 24-hour food recall was 4.10mg/day and 3.21mg/day for the FFQ, compared to the RDA of 10mg/day. Similarly, the NFCS concluded that the mean Zinc intake was inadequate in all age groups and in all provinces. At the national level, 52.6% of children had an intake of less than 50% of the RDA and the mean Zinc intake was significantly lower amongst children living in rural areas (Labadarios et al. 2001). Zinc deficiency causes growth retardation or failure, diarrhoea, immune deficiencies, skin and eye lesions and behavioural changes (WHO, 2000). Futhermore, it has been suggested that Zinc deficiency may have a role in stunting (De Onis, Monteiro and Clugston, 1993). Apart from the deficiencies, it is worthy to note that Zinc deficiency in the developing world is due to an unbalanced diet

consisting mainly of cereals, pulses and vegetables (Zinc deficiency, an underestimated problem, 2001).

5.4.3.3.4 Magnesium

The mean intake for magnesium was similar to the RDA for the 0-12 month age group and the 12-24 month age group under both dietary methods (see table 9B, pg. 106). This is probably due to the fact that on average the diets were rich in whole grain cereals and green leafy vegetables which are rich sources of magnesium.

5.4.3.3.5 Selenium

The mean intake for selenium was lower but closer to the RDA for all age groups under both dietary methods (see table 9B, pg 106). This is probably due to the fact that on average the diets were rich in grains and leafy vegetables which are good sources of selenium.

5.4.3.3.6 Potassium

Potassium is necessary for carbohydrate and protein metabolism. However, the mean intake of potassium was lower than the RDA for all age groups (see figure 30, pg. 106).

From the results of the nutrient intake, it can be concluded that a significant number of children consumed a diet deficient in energy and of poor nutrient density to meet their micro nutrient requirements. This should be borne in mind when making recommendations for the focus areas of intervention.

5.4.4 Food Security:

The right to access sufficient food and water is enshrined in the South African Constitution. According to the Report on Local Innovation against hunger (2000), South Africa has an estimated 14 million people who are at risk of being food insecure. Insufficient access to food is one of the underlying causes of malnutrition at the household level (UNICEF,1998: 10-90). The hunger experienced in rural areas is mainly due to poverty. Ewang (1999), states that in South Africa it is evident that most of the people who suffer from hunger and malnutrition live in rural areas where unemployment is common, income distribution is skewed and the standard of living is low.

Table 10, in conjunction with figure 31 (see pg. 108), represents the results the food security situation in Umbumbulu. At the household level, in terms of both the qualitative and quantitative component, 49.6 % of respondents experienced hunger, 35.5% were at the risk of hunger and 14.8% were food secure. At the child level, in terms of both the qualitative and the quantitative component, 50.2% of children experienced hunger, 35% were at the risk of hunger and 14.6% were food secure. The results of the NFCS (2001), showed that on a national level, 52% of households experienced hunger, 23% of households were at the risk of hunger and only 25% of households appeared to be food secure. However, in rural areas 66% experienced hunger as compared 41% of households in the urban areas (Labadarios et al. 2001). Results of the study conducted by Rose and Charlton

(1995), concluded that higher food insecurity rates were found with decreasing income levels, increasing household size and households headed by females. Furthermore, results from the study conducted by Erik, Mohlake and Albertse (2000), showed that rural households with stunted children spent on average R331 on food and households with non-stunted children spent on average R403 on food. The study concluded that food insecurity in the presence of unemployment and poverty appears to be one of the multi-factorial causes of stunting (Erik et al. 2000). Although no significant association was established between the food security status and the incidence of malnutrition, the high levels of food insecurity from the results obtained, neccesitates that ways in gaining and maintaining food security should be a component of the focus areas of recommendations for the NIEP.

5.4.5 Cultural Influences on Dietary Practises:

Vorster et al. (1997), states that in addition to the availability and the affordability of food; culture, tradition and religion influence the eating patterns of many South Africans. An ethnographic study of the cultural influences and of specific taboos is an essential element in developing a NIEP. If changes have to be made, it must be made along the established eating habits and cultural influences.

Table 11 and 12 (see pg 108-109) represents the focus groups results. What is evident from the results is that animal protein intake is decreased in the diet of the child. 83.3% and 88.8% of mothers/caretakers excluded eggs and cheese from the diet respectively. The reason for doing so, is attached to the belief that protein foods

lead to faster maturation of the child. This probably explains the results obtained from the FFQ and the 24-hour recall for the percentage energy obtained from protein, which was 5.6% for children aged 0-12 months and 7.85 % for children aged 12-24 months as compared to the Prudent Dietary guidelines which should be 15%. Although the food patterns followed by the group resemble a traditional Zulu diet, the shift towards a Western diet is evident through the foods choices in FFQ and the 24-hour food recall. Furthermore, certain foods which are normally excluded from the diet by most mothers/caretakers of children aged 0 to 24 months, were included in the diet of some children e.g. eggs. In focus group one, 83.3% omitted eggs from the diet, whereas in focus group two and three, 100% and 66,7% omitted eggs from the diet respectively. Hence, acculturation is evident in the study.

Acculturation is defined as a long-term process, during which certain individuals simultaneously learn to modify certain aspects of a new culture and their culture of origin (Kaiser and Jones, 2001). According to Letsoala and Viljoen (2000), acculturation is mainly responsible for the traditional food habits of different cultures and ethnic groups that are in a transitional phase. In the study conducted by Viljoen and Gericke (2000), it was concluded that tradition still played an important role in food choice and it should be acknowledged and respected in nutrition education in order to establish sound eating habits.

Hence, it can be concluded that although only one significant association was established between the early introduction of water and the incidence of

undernutrition, the evident lack of nutritional knowledge, poor home management skills, dietary practices, food security status and food related beliefs should be considered in the focus areas of recommendation.

5.5 Hypothesis 4:

Hypothesis four sets out to establish whether or not ecological factors affects the nutritional status of rural black children aged 0 to 24 months in Umbumbulu.

Socio-Biographical information is a very important element in understanding the living conditions, lifestyle and resources a target group has to depend on, as most often it compounds the problem of malnutrition as described by Ladzani, Steyn and Nel (1992).

5.5.1 Carers of the child

Table 13 (see pg.109) indicates that 96.7% of children are primarily taken care of by their mothers. This result has an important implication with regards to whom any intervention should be targeted at for achieving the best results.

5.5.2 Level of Education of the Mother/Caregiver

The level of education of the mother/caregiver has important implications on the development of the child, (see pg 41). Figure 32 (see pg. 110) illustrates that 11% of the mothers/caregivers had no formal education, 19.5% were educated between grade 1 to 7. Furthermore, 55,7% obtained between grade 8 to 12 and 13,8% had tertiary education. Similar results were noted by the NFCS , were 10% of

mothers had no school education, 25% had primary school education, 27% had standard 6 to 8, 25% had standard 9 to 10 and 8% had tertiary education (Labadarios et al., 2001). According to Steyn (1996), in 1994, 54% of the black population were regarded as illiterate. The low levels of education is mainly attributed to the apartheid regime and circumstances such as poverty emanating from it. Inadequate knowledge or inappropriate knowledge is one of the underlying causes of malnutrition (UNICEF, 1998:10-990). Although no significant association was established between the level of maternal education and the incidence of undernutrition, it has to be considered during the development of the NIEP for successful intervention (see table 20, pg. 116).

5.5.3 Sources of Household Income:

Figure 33 (see pg. 110) illustrates the sources of income of the households. There were 66.7% of households who depended on a family member's occupation, 4.3 % of households depended on farming and 24,8% households depended on pensions and grants. Umbumbulu is largely an agricultural area, therefore it is assumed from the results obtained that the main sources of employment comes from Durban and its surrounding areas. It has been observed from other studies that a large percentage of families were dependent on pensions or grants, which is their main source of income. In a study conducted by Steyn (2000), it was reported that 30 % of the primary source of income was made up of pensions and grants. A possible reason that can be attributed to the above trends in sources of income, is

that South Africa has a high degree of unemployment. This statement is supported by the results of the NFCS, were it was reported that the Eastern Cape and Kwa-Zulu Natal had the highest incidence of unemployed fathers (Labadarios et al, 2001).

5.5.4 Total Household Income:

Limited income directly influences the access to sufficient food, water, health services and other important resources for the successful development of a child. Figure 34 (see pg. 111) indicates that 57,6% of households survived on a total monthly income of 0-R500. Other studies also reported low levels of total household income in rural areas. The NFCS, (Labadarios et al., 2001) and the Thusa study (Greyvenstein et al.1999), reported that the total household income ranged between R100-R1000 and 0-R499 respectively. According to the Parliamentary Bulletin in 1996, the poverty line for a rural household of 2 adults and 4 children was defined as a monthly income of less than R740 (Parliamentary Bulletin, 1996). From this, it can be deduced that more than half of the households in this study lived below the poverty line.

5.5.5 Household density and Room density:

Table 13 (see pg. 111) illustrates the household density and room density. Household density and room density is reflective of the living conditions of the target group. A study conducted in Ethopia by LIndtjarn, Alemu and Bjorvatih in1993 (as cited by Steyn, 1998), showed that crowding significantly influenced the nutritional

status of children. At least 35,7% of households had seven or more occupants. This result is indicative of the fact that the extended family system still exists in rural areas but the shift towards the nuclear family system is evident with 8.1% of households reporting to have 2 to 3 members per household.

With regards to the room density, 26.7% reported that 1 to 2 members shared a room, indicating comfortable living space, 39,5% indicated 3 to 4 members per room, which is acceptable considering the economic circumstances surrounding the area. There were 15.7% and 18.15% of respondents who indicated that they have 4 to 5, and 6 and more occupants per room respectively. No attempt was made to determine the size of the living space. However, the latter indicates limited living space and overcrowding which worsens living conditions. Similar results of overcrowding were obtained by surveys conducted by the HSRC and the Health Systems Trust. According to the Human Sciences Research Council (HSRC) (2000), KZN have on average 6 occupants per household. Castro and Hirschowitz (1998), under the Health Systems Trust developed and index of household density. The index consisted of 3 components namely, high density (3 people per room), average density (2 people per room), low density (1 person per room). Using this index of household density in their study, they concluded that more than 50% of South African households were overcrowded.

5.5.6 Access to Health Care Services:

One of underlying causes of malnutrition as described by the UNICEF framework of

malnutrition (UNICEF, 1998:10-90), is inadequate access to health care services. Table 14 (see pg. 112) shows that 90.5% of households indicated that they have easy access to clinics and 9,5% of households indicated that clinics are far from their homes. Table 15 (see pg.112), shows that in terms of utilisation of clinic facilities, 88,6% of households use it for immunization, 54.3 % use it for illnesses and 81.4% use it for family planning. The varying results with regards to the usage of clinics could be attributed to the fact that 3.3% of households seek traditional help during illnesses and 9.5% find the clinics inaccessible Furthermore, the mother's/caregiver's perception of health need as discussed in chapter 2 (see pg. 45) would determine whether a household utilises clinic facilities or not.

5.5.7 Extension Officers:

Extension Officers are paraprofessionals who provide knowledge and practical skills on agriculture, food, nutrition and craft skills. They aim to improve the quality of life of communities by improving self sufficiency. Table 16 (see pg. 113) represents the service rendered by Extension Officers. There were 33.3% of the households who indicated that they made use of this invaluable resource whilst 66,7% did not use this resource. The results reflect the fact that one Extension Officer services at least 400 people in a community (Naicker, 2001). This is probably a reason why 66,7% of households do not use this resource. Extension Officers largely reach their communities by conducting meetings with many small working groups. The results of the frequency of meetings held with working groups as illustrated in figure 35 (see

pg. 113), supports the fact that Extension Officers have to reach a large target audience, which is humanly impossible. As a result of this, many households are left unserviced by this invaluable resource.

5.5.8 Vegetable Gardens:

Over the past few years vegetable gardens have become very popular amongst rural black South African households. Vegetable garden assists in providing food security, especially in households that have limited income. Most of the works, advocating food gardens in rural and urban areas use the need for improved nutrition and food security as a major part of their argument (Sachs, 1995; Rogerson,1996 Yeung,1987). Table 17 (see pg.114) shows that 56,2% of households have vegetable gardens whereas 43,8% are without one. The large percentage of households without a vegetable garden could probably be attributed to the fact that they lack knowledge on the preparation of a vegetable garden or they could lack agricultural space.

The study conducted by Peberdy, Loening and Arbuckle (1997), concluded that one of the ecological variables that were found to be significantly associated with the incidence of malnutrition, was whether or not households grew their own vegetables.

5.5.9 Water Access:

According to the conceptual framework of malnutrition (UNICEF, 1998: 10-90), poor water facilities is one of the underlying causes of malnutrition at the household level.

Figure 36 (see pg. 114) illustrates that a large percentage of households have access to portable water. This is mainly due to the fact that the national government in 1997 (White Paper on Water Policy), started a project, taking portable water to the households in rural areas. The reason for households still being dependant on non portable water is probably due to the fact that the project is still ongoing due to the vast areas that have to be covered and the cost implications thereof involved in installation and payment for the portable water by households. The lack of clean, portable water can spread infections (UNICEF, 2001:1-66). From 1999 to date KZN, has been troubled by cholera, which is spread mainly by contaminated water and food. It was reported that in KZN as of the 14/06/2001, that of the 10769 infected by cholera there were 210 deaths (Cholera in S.A., 2001). Cholera is an acute, intestinal infection caused by the bacterium Vibrea Cholera (WHO, 2000). It produces an enterotoxin that causes copious painless, watery diarrhoea that can quickly lead to severe dehydration and death if treatment is not promptly given. The Department of Health have the mammoth task to control the epidemic by educating the public. Table 18 (see pg. 115) shows that of 26.1% households using non-portable drinking water, 8% of households did not purify their drinking water. This leaves them vulnerable to conditions such as Cholera.

5.5.10 Sanitation:

The conceptual framework of malnutrition (UNICEF, 1998: 10-90), states that poor sanitation is also one of the underlying causes of malnutrition at the household level

which leads to sicknesses and disease. The dirty chicken model (UNICEF, 1998: 10-90), compares chickens to children. Chickens cannot survive in an unhygienic environment. Similarly studies suggest that children living in unsanitary conditions suffer from a constant low level challenge to their immune system that impairs their growth. Table 19 (see pg. 115) shows that 23.8% of households reported to have bins on stands where as 76.2% reported to have dumped refuse in an open area. This has important health implications. In terms of toilet facilities Table 19 (see pg. 115) shows that 50% of the households have pit toilets outside the home. There were 56,7% of households who indicated that they have bathing facilities inside the house whereas 43.3% indicated that they have this facility outside the house. Furthermore, in terms of care, Table 19 (see pg. 115) shows that the children are bathed regularly. Table 19 (see pg. 115) also shows that 54.8% of households experience a problem with rodents. Rodents are carriers of viral, rickettsial and bacterial diseases. The causative agents could enter the human body through ecto-parasites of rats e.g. fleas, via food contaminated by rodents or by direct contact of rodent excreta (Rodents, pest and their control, 2000). It is assumed that because maize is one of the main crops that are farmed in the area, once it is dried and stored, it attracts rodents.

The results of the Socio-Biographical data gives a clear indication of the living conditions and the lifestyle that the households in Umbumbulu are subjected to. Although no significant correlation was established between the ecological

variables and the incidence of malnutrition, there is still a need to address them in the focus areas of intervention (see table 20, pg. 118).

5.6 Hypothesis 5:

This hypothesis sets out to analyse and integrate hypothesis 1- 4 in order to compile guidelines for the future formulation of a culturally sensitive nutrition intervention education programme.

5.6. 1 Recommendations:

Objectives will be set and recommendations will be made based on the results of the study for the development of a NIEP. Hypothesis five will be assessed by looking at the interrelatedness of various factors influencing the nutritional status of rural black children aged 0 to 24 months in Umbumbulu.

NIEP's have proven to be very effective in many rural settings in South Africa. Studies conducted by Dannhauser, Cox, de Wet, Erasmus, Jacobs, Schoeman, Swart, Nel (1996), showed that nutrition education have a positive effect on improving the nutritional status. However, Cerquiera and Olson (1995), state that nutrition education has limited effects in improving nutritional status when household income and the food availability is limited. Futhermore, Gillespie and Mason (1991), concluded that nutrition education is not the answer in an environment where the lack of resources is the primary constraint. It should therefore be recognised that nutrition education should not be an immediate goal when extreme forms of poverty

exist. It should rather be an intervention that follows after poverty has been addressed.

According to Travern (1997), critical research begins with lived experiences and an attempt to explain their interconnectedness with the social environment. Understanding the realities of everyday life of the target group empowers nutrition researchers to facilitate nutrition education for social change. Many researchers advocate that the multidisciplinary and multisectoral approach as the most appropriate approach in the development of a NIEP (Benade, Oelsofe, Stuivenberg, Faber, Kunneke, Benade and Phungula (1995), Naidoo , Padayachee and Verburgh (1993), and Greyventsein (1994). Nutrition education should expand from the traditional curative and risk reduction strategies to include the promotion and enhancement of overall nutritional health with maximum community involvement.

5.6.2 Focus areas for intervention to be included in a NIEP .

From the data gathered and the discussion of the results, the following focus areas for intervention are deduced from all the factors influencing the nutritional status of rural black children. The recommendations are made in line with the broad objectives of the INP, according to the available community resources and the synergistic relationship that exists between all variables to allow for integration of intervention.

- Improving the mothers/caregivers nutritional knowledge on the feeding practices of infants by encouraging exclusive breastfeeding up to 6 months of age;

- Emphasising the importance of the timely introduction of appropriate complementary foods and liquids with the use of the comprehensive approach on improving complementary feeding practises by Caulfield et al. (1999). This approach entails the following:

  -Firstly mothers/caregivers need action orientated information that is age appropriate and changes as the child grows.

  -Secondly, content should be based on current local practises and beliefs.

  -Thirdly , mothers/caregivers need advice and information on not only what to feed the child but also how to feed the child;
- Improving household food security by encouraging the cultivation of food gardens, as well as providing knowledge on preservation, processing techniques, storage methods and marketing skills;
- Improving the mothers/caregivers nutritional knowledge and skills in food preparation. It should entail the following:

  -Methods on conserving nutrients during meal preparation

  -Food hygiene

  -Meal planning

  -Methods of increasing portion yields

  -Selection of meat alternatives

  -Methods in enriching foods

  -Household and recipe programme trails

- Improved dietary intake of children aged 0 to 24 months with special emphasis on increased energy density of weaning foods, protein and iron intake;
- Improving the mothers/caregivers home management skills, consumer skills, decision making skills and skills in the control of and accessing of resources;
- Emphasising the importance of early childhood care in relationship to the developmental outcomes of the child;
- Improving the mothers/caregivers capacity to care for children;
- Improving hygiene practices in terms of sanitation and purification of drinking water;
- Promoting the use of alternate energy sources and indigenous technology;
- Promotion of the identification of children with an urgent health need at the household level;
- Preventing and managing infectious diseases;
- Encouraging the utilization of the health care services and access to health information;
- Increasing an awareness of immunization and timeous deworming;
- Recognizing the influence of culture and acculturation on dietary habits;

Apart from the content of the NIEP, community participation has to be fostered. Local mechanisms has to be created for addressing health issues by mobilizing local resources. There should be a promotion of the optimal use of skills, experience and expertise of people within the community.

Ultimately, the FAO (2000), states that improving the nutritional knowledge in nutrition education should be an objective of pre-service and paradigm shifts needs to be supported within the community. This should be accompanied by in service training of personnel working with communities in various sectors such as health, agriculture and education. The above-proposed recommendations can be considered as short term solutions. Long term, sustainable solutions must await redistribution of resources and socio-economic upliftment.

5.6.3 Programme Planning:

From an ecological point of view, the summary of results of sub-problem one, two three and four are used to make recommendations for the development of the NIEP resulting in sub-problem five.

A programme can be developed using the recommendations already discussed along the following guiding components adapted from a Stress Model (see figure 38, pg 162):

- Creating educational awareness: Methodologies (face to face, participatory approach, mass media) and focus areas selected to educate mothers/caregivers.
- Personal profile of the child available at the clinics and from the results of the survey.
- Group skill training for mothers/caregivers in identified areas.
- Counselling of households should be conducted via home visits dealing with various focus areas as identified by this study.

- Meeting with administration and feeding back to authorities

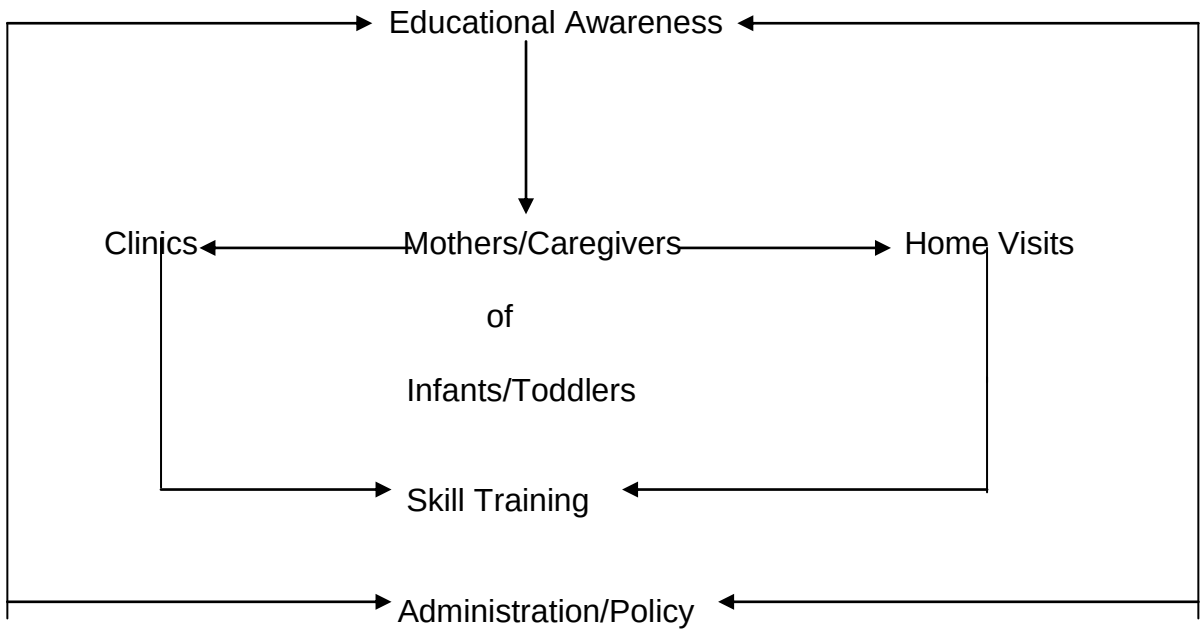

Figure 38: Nutrition Intervention Education Programme Plan, (Naicker, 2002).

5.6.4 Evaluation of the research

The overall study will be evaluated by Kelly's four ecological processes as discussed in chapter 2 (see pg. 49-50). In terms of re-cycling of resources, socio-biographical information of the target households was gathered and a community profile was compiled. The intentions of the latter was to gather information on the needs of the community, and acknowledge and recognize strengths; and the availability resources in the community as identified by the works of McKnight et al. (1992) (see pg 11). Breastmilk is a natural resource and considering the misconceptions regarding colostrum and the low percentage of exclusive

breastfeeding (see pg 128), there is need for more education regarding this valuable resource. Professionals such as Health care workers and Extension Officers have been identified as valuable human resources within the community. Land has been identified as a resource that could help alleviate food insecurity. People within the community with income generating skills have been identified as a resource that could help to reduce the poverty rates by teaching other community members certain skills. Health care workers could assist in identifying malnourished children that require nutritional support. Extension Officers on the other hand, could assist in developing various life skills such as agricultural, food preparation and craft skills to improve the quality of life.

In terms of adaptability, the community has adapted to their natural environment and resources. They have learnt to adapt and improvise without electrical appliances (see pg 92).The study is realistic as it is based on the current situation of the households and the recommendations that are made, are not too far fetched in terms of their lifestyles. Furthermore, the study is adaptable in the sense that it is culturally sensitive. Moreover, the recommedations of this study can be adapted to other typical rural black areas in KZN.

The use of the conceptual framework of malnutrition (see pg 32) displays an interrelatedness of several factors that are linked to the nutritional status of the target group. Professional within the community have been identified and community networking can be part and parcel of the NIEP. Overall, the results of the study being

multi- disciplinary allows for further interrelatedness and exploration by sub-disciplines such as child and maternal care, agriculture, indigenous technology etc. Thus, the link with other disciplines would create synergies that would enhance intervention and lead to positive outcomes.

In terms of succession, the project started by evaluating the needs of the target group with the aid of various techniques. Then recommendations were made. The study can now proceed to design, implement and evaluate the NIEP based on the recommendations made. Succession in this way can be evaluated at a long term perspective.

5.7 Summary of Chapter 5:

In this chapter the results of the study were discussed in accordance with the hypotheses and the recommendations for focus areas of intervention for the development of a NIEP. In the next chapter, the evaluation of the research outputs will be discussed.

Chapter 6

Evaluation of research outputs

6.1 Introduction

In chapter 5, the results of data were discussed and recommendations were made for the development of a NIEP. In this chapter the research outputs will be discussed in terms of shortfalls, strengths and weaknesses of the study. Areas of further research will also be identified.

6.2 Shortfalls and Weaknesses:

The research topic was too broad based and explored many variables. Due to this, it became very expansive to work on as an individual researcher. It is suggested that similar research should be handled by group research with expertise from different areas, adding more value to the research outputs. Certain aspects that were excluded which could have increased the value of the research is as follows:

- It would have been worthwhile to ascertain the gestational age and the birth weight of the children so as to determine whether this factor could have influenced the nutritional status of the child.
- It would have been worthwhile to establish the age of introduction of certain foods in the child's diet.
- It would have been worthwhile to determine the age at which the child was first dewormed.
- It would have been more valuable to have the study, home-based as it would

have allowed for the test weighing procedure to be carried out as well assessing the energy density of weaning foods. Furthermore, room sizes could have been measured to determine accurately whether households were overcrowded.

- No external audit was conducted on the focus groups.
- There is a possibility of bias in the sample by only using clinic attendees as it may not correctly reflect the entire health situation of the area. However, it must be borne in mind that the clinics selected were extremely rural and was located near the local shop which was frequented by the community.

6.3 Areas of further research:

- Drawing up the NIEP using the recommendation as listed in chapter 5 (see pg. 158-160).
- Implementing and Monitoring of the NIEP. Formative evaluation should take place in this area.
- Evaluating the NIEP through summative evaluation (see figure 39, pg. 168).
- Overall, the research topic dealt with many multidisciplinary areas. From this, it is suggested that other disciplines could explore sub-issues evolving from this study. Hence synergies would be created that would enhance positive outcomes. Types of interdiscplinary groups could be as follows:

  -Child care investigating the concept of care of the child and its effect on the nutritional status of the child.

  -Environmental health investigating the effects of hygiene and sanitation on the

nutritional status of the child.

-Agriculture investigating the influence of agricultural diversification on food security and hence its influence on the nutritional status of the child

6.4 Conclusion:

It is envisaged that if the recommendations are applied to the development of a NIEP, the project will not only promote health. It will also conserve and regenerate natural resources; and reinvigorate rural communities in maintaining sustainable food systems.

Ultimately, conceptualizing the fact that all things in nature are complexly but systematically interrelated will lead to a more appropriate design of a NIEP. The essence of this perspective is succinctly captured by Bateson (1971) (as cited by O'Connor and Lubin, 1984:7)" *The shift from a single to a multiple person treatment unit brings with it a new epistemology and ontology, i.e. a new way of thinking".*

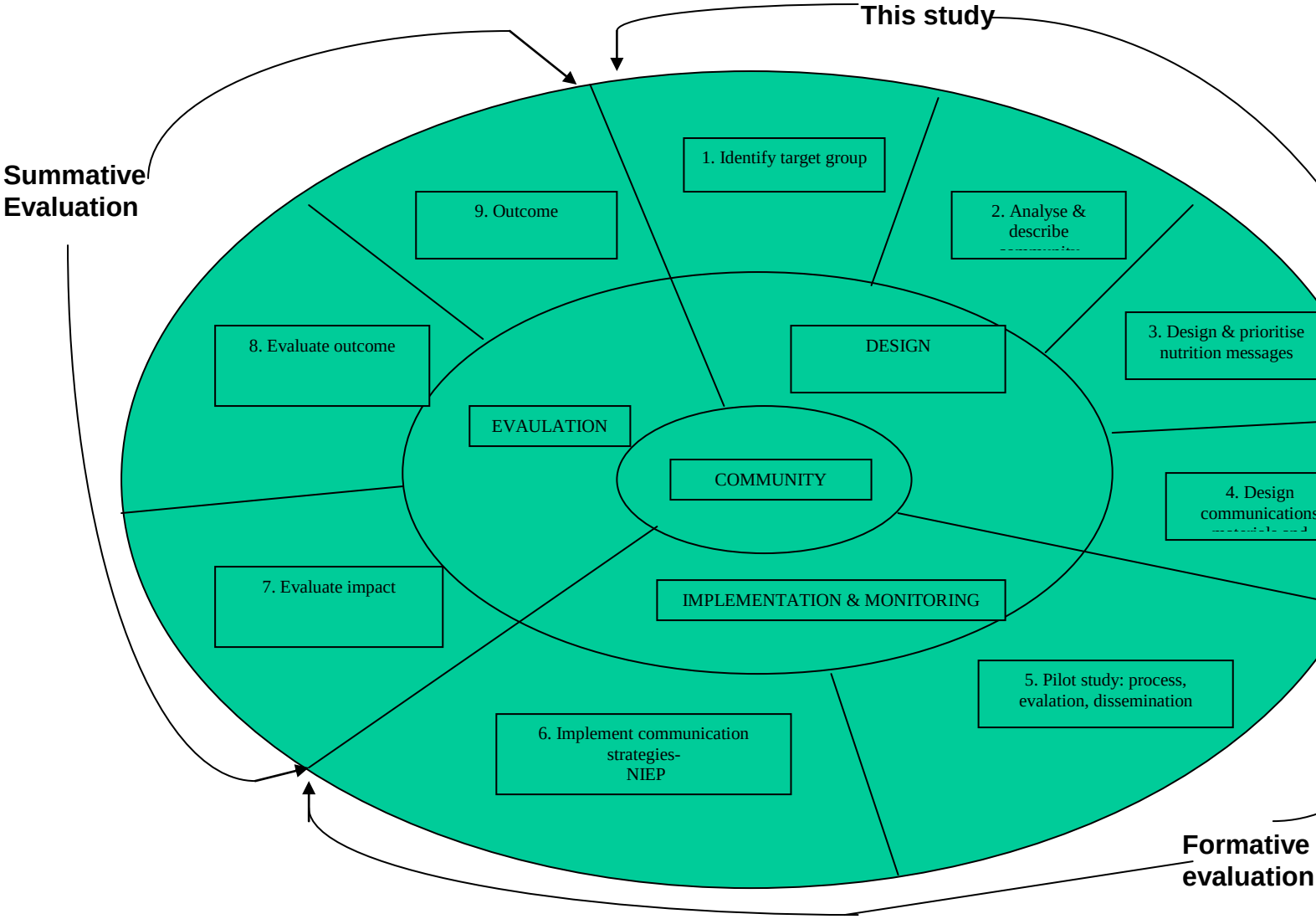

Figure 39: Conceptual Framework for Development and Evaulation of the NIEP adapted from Donovan, 1995: 216 (Naicker , 2002).

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APPENDICES

Name of field worker:_____ Date:_____ Appendix A
Name of respondent
Area/Address:_____

GREETINGS

Thank you for giving up your time to take part in this survey. I would like to find out what your child, 0-24 months, usually eats and drinks. This information is important for us to know, as it will help us to assess the nutritional status of your child.

Please note:

1. There are no right or wrong answers.
2. The information will be treated confidentially and used for research purposes only.

Is there anything you want to ask me now?

Are you willing to go on with the questionnaire?

SECTION A - BIOGRAPHICAL and COMMUNITY PROFILE INFORMATION

1. What is your relationship to the child?:
   Mother
   Caregiver
2. If you are the caregiver, how much of time are you responsible for the care of the child on a daily basis?
   _____
3. Age of the child: Year/s_____ Month/s_____
4. Date of birth of child: Year_____Month_____Date_____
5. Gender of the child:
   Female
   Male
6. What is your education status?
   No school education
   Grade 1 –7
   Grade 8-12
   Tertiary education
7. How many years did you spend in school?
   0-2
   3-5
   6-11

12-17

8. What sources of income does the family depend on?
   Family members occupation
   Farming and livestock
   Pension or grants
   Other_____
9. What is the total income of the household?
   0-R500 per month
   R500- R1000 per month
   R1000-R2000 per month
   R2000- R3000 per month
   R3000- R4000 per month
   R4000 upward

10. How many people live in the household?

2 to 3
4 to 5
6 to 7
7 and more

11. How people sleep in a single room?

1-2
3-4
4-5
6 and more

12. What is the average size of a bedroom? (NB: Field worker- Use the measuring tapes supplied to measure a bedroom)

_____

13. Are there health service facilities within walking distance e.g. clinics?

Yes
No

14. If you answered Yes to Q13, When do you make use of this facility?

During illness
Family planning
Immunisation
Not at all

15. Does a Home Economics or Agricultural Extension Officer service your community?

Yes
No

16. If you answered Yes to Q15. How often do you'll meet to discuss issues such as nutrition, agriculture?

Once a week
Twice a month
Once a month
Not sure

17. Are general dealers or spaza shops within walking distance of your home?

Yes
No

18. What is the name/s of the general dealer or spaza shop that you use to purchase food?

_____

19.Do you have a productive vegetable garden?

Yes
No

20. Where do you get your drinking water?

Borehole
River/dam
Rain water in a tank
Tap in the house
Tap water outside house on own stand
Tap water outside shared

If you get your drinking water from either river/dam, borehole or rain water in a tank, then proceed with question 21.

21. Do you purify/clean the water before drinking?

Yes
No

22. If you answered Yes to Q21. How do you purify/clean the water?

Jik

Chlorine
Boil the water
Other

23. What refuse/bin facilities do you have?

Common refuse dump
Dump in an open area
Bin/Drum on stand

24. How often is the refuse removed?

Twice a week
Once a week
Once a month
Never

25. What toilet facilities do you have?

Own flush toilet inside
Own flush toilet outside
Own pit toilet outside
Share pit toilet
Other_____

26.Where are the families bathing facilities?

Inside the house
Outside the house

27. How often is the baby bathed (NB:Fieldworker- Check with mother as well, if child is taken care by the caregiver)

Twice a day
Once a day
Once every alternate day
Once a week
Other_____

28. Do you a problem with the presence of rodents inside the house?

Yes
No

SECTION B: Existing nutritional knowledge, Home Management skills and Food Preparation Techniques

Has a health care worker or a home economics extension officer ever given you any advice about feeding your child?

Yes
No

2. Who does the grocery shopping in the family?

Mother
Father
Grandmother
Other family member
Caregiver

3.If a packet of mealie is bought and weevils are found in it. What would you do?

Throw it away
Sift and use it
Return it to the shop
Other_____

4. How would you store a packet of mealie meal?

In an airtight container
In its orginal package
Other_____

5. Who does the food preparation in the family?

Mother
Grandmother
Other family member
Combined effort

6. What is the energy source of cooking in the home?

Electric stove/hot plate
Gas stove
Primus stove
Coal stove
Wood/fire

7. Do you have a refrigerator in the house?

Yes
No

If you answered No to Question 7, then proceed with Question 8.

8. Where do you store your perishables e.g. meat?

_____

Instruction to field worker: Q 9. to 18. must be directed to the person that does the most amount of food preparation in the household.

9. When you boil vegetables, Is the:

Vegetables covered with a little water
Vegetables are covered with a lot of water

10. How much of time does it take you to boil vegetables e.g. 1 cup of carrots?

5 minutes
10 minutes
15 minutes

11. Do you use a tight fitting lid to boil vegetables?

Yes
No

12. What do you do with the water that you boiled your vegetables in?

Throw it away
Use it in soups or sauces
Other_____

13. Is vegetables cleaned/peeled:

1 hour and more before meal preparation
½ hour before meal preparation
15 minutes before meal preparation
whilst cooking

14.Do you know how to preserve foods? E.g. Bottling, drying, freezing

Yes
No

15.If you have an abundance of a particular vegetable in your garden e.g. beetroot. What would you do with it?

Market it
Share it with others
Bottle and preserve it
Other_____

16.Do you own a hay box?

Yes
No

If you answered Yes to Question 16. What do you use it for?

To cook legumes e.g. Beans
To cook meat dishes
Other

17.Do you add bicarbonate of soda to vegetables or legumes to improve colour or

fasten the cooking time?

Yes
No

18. Is pork or chicken cooked:

Rare/ half cooked –you can see the blood

Thoroughly cooked to the bone

Section C
Dietary Practices

1. Does the baby have/had:

Breast milk
Formula milk
Breast milk and formula milk
Cows milk
Goats milk
Milk blends e.g. Nespray
Coffee whiteners e.g. Cremora

If the child receives any breastmilk, then answer Q 2.1. to 2.9. (NB:Fieldworker-questions 2.1 to 2.9. must be directed the mother)

2.1. Who influenced you the most to breastfeed the child?

Own choice
Your partner
Family member
Health care worker
Other_____

2.2. When was the child first introduced to breastmilk?

Immediately at birth
One day after birth
Three days after birth
Other_____

2.3. How many times a day is the child currently breastfed?

2-3 times per day
3-4 times per day
4-5 times per day
more than 6 times per day

2.4. Do you feed the child on:

On demand
When it is most convenient for you
Routine basis

2.5. How long does each feed last?

1 to 5 minutes
5 to 10 minutes
More than 10minutes

2.6. Do you use both breasts when feeding?

Yes
No

2.7. Who terminates the feed first?

Mother
Child

If you did breast feed the child and have now stopped. Answer question 2.8 and 2.9

2.8 At what age did you stop breastfeeding?

Under 3 months
Between 3 to 6 months
Between 6 to 12 months
Between 12 to 18 months
Between 18 to 24 months

2.9. What was the reason for stopping breast?

The child did not like it
I was tired
I felt that the child was big enough
Other_____

If the baby receives any formula milk, then answer Question 3

3.1. What type of formula is the baby fed?

Milk based e.g. Naan, S26, SMA,
_____
Soy based e.g. Infasoy, Infasoy with iron,
_____

3.2. What made you choose this type of formula?

Paediatrician recommendation
Clinic's recommendation
Family members recommendation
Cheapest one available
Easily available
Other

3.3. How many level scoops of formula do you put into 100ml of water when preparing the feed? (Show example of pre-packed baby bottle)

3
4
5
6

3.4. Do you boil water for the formula feed preparation?

Yes
No

3.5. Do you allow the water to cool down before adding the formula?

Yes
No

3.6. How is baby's bottle sterilised?

In a sterilising solution e.g. Milton
The bottles are boiled in salt water
Washed in detergent/soap
Other_____

If the baby drinks any fresh cow's milk then proceed to Q4.

4.1. At what age was the baby first introduced to fresh cow's milk?

Between 3 to 6 months
Between 7 to 10 months
Between 10 to 13 months
13 months upwards

4.2. What type of cow's milk does the child drink?

Full cream pasteurised milk
Full cream UHT milk

Sterilized milk
Low fat milk
Powdered milk e.g. Nespray
Milk from the cow at home

4.3. Is the milk boiled first before drinking?

Yes
No

4.4. If the milk is boiled, do you stir the milk during boiling?

Yes
No

5. Does the child drink any of the following:

Boiled water
Unboiled water
Sugar Water
Diluted fruit juice
Undiluted fruit juice

6. If the child drinks water? At what age was the child introduced to it?

0 -2months
3 -4 months
4-6 months
6 months and older

If the child is on soilds then proceed with Question 7.

7.1. When was the child first introduced to solids? e.g. cereals, pureed foods

0 to 2 months
2 to 3 months
4 to 5 months
6 months upward

7.2. Does the child have cereal from the:

From the bottle
A bowl
Not at all
Other_____

7.3.Do you add salt to baby's food?

Yes
No

7.4. Do you add sugar to baby's food?

Yes
No

7.5. Do you add fat (margarine or butter) to baby's food?

Yes
No

7.6. If you add either salt, sugar or fat to baby's food. Why do you add it?

_____

8. Does the baby have any vitamin supplements?

Yes
No

9. Does the child have any allergies?

Yes: specify_____
No

10. Is the child often sick?

Yes: Specify how often_____
No

If you indicated Yes to Q10, then proceed to Q11.& Q12.

12.What type of illness does the child currently suffer from?

Running nose
Diarrhoea
Cough
Other_____

13. When the child is sick have you sought help from?(specify for which sickness)
_____

Medical organisations
Traditional healers
No help sought

14. Has the child been dewormed?

Yes
No

15. Does the child have a road to health card /clinic card?

Yes
No

16. Has the child received the extra dose of polio and measles vaccine in June/July this year?

Yes
No

17. If the child has not received these vaccines. Why has the child not received it?

You did not know about it
You did not have the time for it
Other_____

Now you are required to answer a **food frequency questionnaire**
Please think carefully about the food and drink the child has consumed during the past month and I would like you to tell me:
-if the child eat the food
-how the food is prepared
-how much of the food does the child consume at a time
-how many times a day the child eats it and if the child does not eat it everyday, how many times a week or month does the child eat it.
- at what age was the child first introduced to the food
To help you describe the food; we will use food photograph book.

Food	Description	Amount	Per day	Per week	Per month	Seldom / never	Code	Amount FI
Maize meal porridge p9-11	Stiff pap						E4225	
Maize meal porridge p9-11	Soft						E4225	
Maize meal porridge p7-8	Crumbly						E4225	
Mabella p9-11	Soft						4082	
Oats p9-11							4032	
Breakfast cereal	Brand names of cereals at home now Don't know							

Do you pour milk on the child's porridge or cereal? Yes 1 No 2

If YES, what type of milk (whole, sour, 2% lowfat free, milk blend)

_____

INSTRUCTION: Show subjects examples

Do you pour sugar on the child's cereal /porridge/mabella

If YES how much sugar?						9012	

Food	Description	Amt	Per day	Per week	Per month	Sel/ never	Code	Amt FI
Samp p12-15	Bought Self ground						4077 4073	
Samp and beans P12-15							A013	
Rice p16-18	White Brown Maize rice						4040 4134 4043	
Pastas p16-18	Macaroni Spaghetti Other						4062	
Dried beans/peas/ lentils	Soup Salad							
Soya products e.g. Imana	Brands at home now Don't know						3527	
Food	Description	Amt	Per day	Per week	Per month	Sel/ never	Code	Amt FI
Pilchards in tomato/ chilli/ brine	Whole p39-41 Mashed with onion p42-44						2557 A005	
Fried fish P45-47	With coating Without coating						2509 2523	
Other canned	Tuna						2547	

fish P39-41	Sardines Other						2562	
Fish cakes p92	Fried						2531	
Eggs	Boiled/ poached Scrambled Fried Other						1001 1025 1003	

FRUITS AND VEGETABLES

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt FI
Cabbage P48-50	How do you cook cabbage? Boiled nothing added Boiled with potato and onion and fat Fried nothing added Other Don't know						8066 A006 A007	
Spinach P51-53	How do you cook spinach? Boiled, nothing added Boiled with onion tomato and fat -onion ,tomato & potato -with peanuts Don't know						8071 A011	
Pumpkin P57-59	How do you cook pumpkin? Cooked in fat and sugar Boiled Other Don't know						A010 A009	
Carrots P60-62	How do you cook carrots? Boiled, sugar & fat With potato and onion Raw, salad Other Don't know						8129 A008 8015	
Mealies/ sweet corn p63-65	On cobb Off cobb						8033 8034	
Beetroot salad P66-68	Home made Bought						8005	
Food	Description	Amt	Per day	Per week	Per month	Sel/ never	Code	Amt FI
Potatoes	How do you cook it? Boil/baked with skin p112-114 Mashed p112-114 French Fries p69-71						8046 8187 8048	
Sweet potatoes P112-114	How do you cook sweet potatoes? Boil/baked with skin Mashed Other						8057	
Salad vegetables P115-117	Raw tomato Lettuce Cucumber						8059 8031 8025	

Other vegetables-Specify								
Apples/Pears	Fresh p75 Canned p79-81						7001 7054	
Bananas	P72-74						7009	
Oranges/naartjie	P76-78						7031	
Grapes	P118-120						7020	
Peaches	Fresh Canned p79-81						7036 7038	
Mangoes	P75						7026	
Other fruit								

BREADS AND SPREADS

Bread/Bread rolls P86-87	White Brown whole wheat						4001 4002 4003	

Do you spread anything on the child's bread? 1Yes 2 No

Margarine	What brand do you have at home now? Don't know Show examples							
Peanut butter							6509	
Jam/syrup/honey							9008	

CHICKEN, MEAT, FISH

Does the child eat chicken skin? 1 Yes 2 No

Food	Description	Amt	Per Day	Per Week	Per Month	Seld/ never	Code	Amt FI
Chicken P17-22	Boiled fried in batter/ crumbs fried- not coated Roasted/ grilled						1521 1634 1520 1520	
Chicken bones/ stew p29-31							A003	
Chicken head & feet p21							A004	
Chicken offal p32-34							1610	

Red meat P23-25	-With fat -Fat trimmed							
Red meat	Fried p26-28 Stewed p29-31 minced with tomato & onion p29-31						A001 1585	
Beef offal	Intestines: boiled, nothing added p32-34 Stewed with vegetables p32-34 Liver p103-105 Kidney p103-105 Other, specify						1616 1515 1518	
Wors/sausage	Fried p35-37						1526	
Bacon							1501	
Cold meats	Polony p38 Ham p38 Viennas p106-108 Other-specify						1514 1564 1531	
Canned meat	Bully beef p38 Other: specify						1535	
Meat pie	Bought						1548	
Hamburger	Bought						A015	

DRINKS

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt FI
Tea							9514	
Coffee							9513	
Sugar with tea or Coffee							9012	
Milk cup of tea or coffee	What type of milk do you use in tea or coffee? Fresh/long life whole Fresh/ long life 2% fresh/long life fat free whole milk powder- Brand Skimmed milk powder Brand Milk blend Brand Whitener Brand Condensed milk Evaporated milk None						 0006 0069 0072 0009 0008 0068 0039 0002 0003	
Maas							0006	
Milk drinks-brand	Hot chocolate-WM Milo-WM						0023	

	Flavoured milk Other							
Squash	Sweet O Oros/ Lecol with sugar artificial Kool aid Other: specify						9013 9002 9013	
Yoghurt	Drinking yoghurt Thick yoghurt						0044 0020	
Fruit juice	Fresh/liquifruit/ceres Tropica						0535 0089	
Frizzy drinks- Coke, fanta	Sweetened: Coke, Fanta Lemonade						9045 9023	

SNACKS & SWEETS

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt FI
Peanuts p97-99	raw Roasted						8049	
Cheese curls, Nik Naks p94-96							4076	
Peanuts & raisins	P97-99						6007	
Chocolates p101	Name						9024	
Candies p101							9009	
Biscuits	Types							
Cakes and tarts	Types							
Scones							4029	
Rusks							4160	
Savouries	Sausage rolls samoosas Biscuits- bacon kips						1534 4196 4162	
Jelly							9004	
Food	Description	Amt	Per day	Per week	Per month	Sel/never	Code	Amt
Baked pudding							4181	
Instant pudding							4066	
Ice cream Sorbet							6507	
Other; specify							6516	
Potato crisps p94-96							8049	

MISCELLANEOUS: Please mention any other foods used more than once in two weeks which we have not talked about:

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt

24-Hour Food Recall

1. Day of the week interviewed:

1 Mon
2 Tues
3 Wed
4 Thurs
5 Fri
6 Sat
7 Sun

2. Was yesterday typical/ routine for the child
(i.e. not sick, no birthday/party/funeral)

1 Yes
2 No

Now I want you to tell me everything the child ate and drank yesterday. Lets start with when the child woke up. Then proceed through the day following the child's activities. Any forgotten items can be added last.

Instruction to the field worker

Enter each item eaten in grams under the correct interval of the day eaten.
Specify when new items are entered.

Abbreviations:

Measures: **Meat**

1t= 1teaspoon
1T=1tablespoon
1Ls=1serving spoon
C= measuring cup(250ml)
s/s =small size
m/s=medium size
l/s=large size

Milk

Sm=skim milk
Wm=whole milk
LL= long life
Bl=blend

Meals

BR=breakfast
IS=inbetween snack, L= Lunch, D= Dinner, AD= after dinner

F=with fat
Ft=fat trimmed

Bread

Wh=white
Br=brown
Ww=wholewheat

Oil/fat

B=butter
Hm=hard marg
Pm=polyunsaturated
Med=Medium margarine
Vo= vegetable oil
Wf=white fat

FOOD ITEM	CODE	QUANTITY(G/ML)	BR	IS	L	IS	D	AD
Cheddar-0010; Sweetmilk/0011		grated:med=10g Thick=15g 1 melrose =30g						
Cheese spread	0018	med=12g ; thick=25g						
Macaronui cheese: SM-4176; Wh-4120		1T=45g; 1LS=90g; 1/2 cup=115g						
Bacon: Fried; Lean=1510 F =1501		1 rasher=10g						
Beef: Corned/Cold cuts:F-1519		138x85x3=20g						
Fillet: F-1528		100x70x10=90g						
Mince:Pan fried F-1505		T=40g;LS=85g; 1/2c=100g						
Mince Savoury (tomato & onion)	1586							
Cottage pie: WM + HM	1628							
Beef roast		120x60x5 =35						

		120x60x10=70						
Beef stew: cabbage,onion,potatoes	1619	1LS=105g;1/2c =125g						
Beef stew: pot, carrots, peas, onions	1504							
Chicken boiled+ skin-1621		breast+ skin=125g thigh=80g drumstick=42g						
Chicken: Giblets-1610								
Chicken pie	1549	pie=150g						
Chicken roast								
Chicken stew: Carrts, pot, peas=1618 Cabbage, potato=1619 Tomato + onion=1583		1LS= 90g; 1/2c=125g						
Chicken,battered+fried	1634	!LS=105g;1/2c=125g						
Cornish pie	1548	med=150g						
Liver: Beef fried1515 , Chicken 1567, Sheep 1550		Sheep=55g Beef= 80g Chicken= 30g						
Meat patty Hamburger	1561	s/s=50g; m/s=100g						
Polony	1514	Slice 5mm thick=8g Comm slice=16g						
Salami & Russians	1543	Slice 5mm thick=12g 1 russian=50g						
Sausage: Beef		Thinx200mm =45g thick;165mm=90g						
Sausage: pork	1527	Med=55g						
Toppers: Cooked	3527	LS=85g; 1/2c =120g						

FOOD ITEMS	CODE	QUANTITY	B R	I S	L	I S	D	A D
BREAKFAST CEREALS								
Mabella: soft or stiff	4034	1/2c=125ml						
M/Meal: soft	4254	1c=250g						
Crumbly	4256	1c=crumbly						
Stiff	4255	1c stiff=250g						
Oats	4032	1/2 c = 125ml						
Corn flakes	4036	1c=40g						
Pronutro	4316	1/2c=50g						
Rice crispies	4046	1/2c=20g						
Coco pops	4216	1/2c=20g						

Weetbix	4037	1=25g						
+milk: Wh-0006: 2%-0069: BL-0068								
+Sugar	9027	1t=6g						
FISH								
Fish cakes	2531	65 x 15mm=50g						
Fish fingers	2532	85mm=35g						
Pilchards: Tomato sauce	2503	1=75g						
Sardines + oil	2560	S/s=7g;L/s=25g						
White fish: hake -batter	2523	S/s piece 50x55x30=60g						
White fish: hake- fried	2509	Med:100x55x30=120g						
STARCH								
Maize pap: Stiff Crumbly	 4255 4256 	T LS 1/2cup 75 120 125 30 75 70						
Mabella	4315							
Maize rice	4043	25 45 65						
Samp Cooked	4043	55 125 125						
Rice: White	4040	25 60 65						
Spagetthi/ macaroni	4062	35 70 90						
LEGUMES & SOUP								
Baked beans	3504	50 105 135						
Soup: commercial	3504	125						
Sugar Beans	3542	50 85 135						
TEA & COFFEE								
Tea	9514	Teacup=180ml Mug=250ml						
Rooibos	9560							
Coffee	9513							
+Sugar	9012	1t=6g						

FOOD ITEMS	CODE	QUANTITY						
+ Non dairy milk	0039	1 t = 10 g						
+ Milk blend	0068	20ml tea in cup 35ml tea in mug 40ml coffee in cup 75ml coffee in mug						
+Whole milk	0006							
MILK DRINKS								
Maas	0085	S/s+ 175ml L/s=500ml 1/2 c = 125g						
custard-WH	0004							

Ice cream	6548	1 scoop =40g						
Sorbet	6516							
Milo, cocoa	0024	1t=5g						
Yoghurt: Flavoured (yogisip)	0044	S/s=175ml yogisip=350ml 1/2c =125g						
:Fruit	0020							
COOL DRINKS/ JUICE								
Apple juice- no sugar	7080	Liquifruits=250ml Ceres=200ml Cartons/bottles s/s=350ml L/s=500ml						
Orange juice with sugar	7033							
Orange juice with no sugar	7133							
Carbonated cooldrinks	9001	S/s bottle=300ml S/s can =340ml						
BREAD & ROLLS								
Bread: Wh-4001; Br-4002: Ww-4003	4001	Wh+br10mm=30g Ww10mm=35g Wh20mm=70g Ww20mm=70g						
Rolls-white	4206	Wh 10cm long=30g						
Scones	4029	6cm=35g 8cm diam=60g						
Vetkoek	4057	8cm diam=60g						
SPREADS & BUTTER		Thin Med Thick						
Butter	6502	5 10 15						
Fishpaste	3567	5 7 10						
Jam		10 20 35						
Marg: H-6508: Med6560: PM-6521		5 7 10						
Marmite	9502	2 4 7						
Peanut Butter	6509	5 10 20						
EGGS								
Boiled	1001	1 egg=50g						
Fried	1037	1egg=52g						
Scrambled/Omelette	1008	1T=35g; 1Ls=80g						
FOOD ITEMS	CODE	QUANTITY	BR	IS	L	IS	D	AD
SALADS								
Beetroot grated & sugar	8005	1T=25g: Ls=65g						
Carrot raw	8015	1T=25g						
Coleslaw & mayonnaise	8011	1T=20g; Ls=40g						
Cucumber raw	8025	Med slice=10g; thick=15g						

Lettuce	8031	1 med leaf=30g											
Mixed tomato, cucumber, lettuce- no dressing	8240	1T=40g: 1Ls=85g											
Tomato raw	8059	Med=120g; slice=15g											
Potato & mayonnaise	8247	T=45g; 1 Ls=105g											
Other													
DRESSING													
French dressing	6512	1t=5g; 1t=15G											
Mayonnaise		1T=10G; 1t=40G											
COOKIES													
Comm+fill, plain-4007													
Doughnuts: Jam-4031; Plain-4024													
SWEETS													
Chocolates:assorted	9017												
Coated bars:tex, lunch,chomp	9024												
Milk:smarties,flake,aero	9010												
Marshmallows	9028												
Jelly sweets:sugus, Jelly tots	9009												
PUDDINGS & CAKES													
Ice cream	6507												
Instant pudding	4135												
Jelly	9004												
Sorbet	6516												
Trifle	4310												
Custard	0004												
Banana loaf													
Sponge plain	4011												
MISCELLANOUS													
Popcorn	4163												
Potato crisps; Simba	4275												
Fritos, Niknaks	4067												

Food items						Code	Quantity			Br	Is	L	Is	D	Ad
VEGETABLES	Boil	Fat added or fried													
	NF	B	HM	PM	Vo		T	Ls	1/2						
Green Beans	8002	8080	8098	809	8100		25	60	80						

				9											
Green bean, potato, onion		8003	8102	8103	8104		40	75	120						
Brocolli	8007	8114	8115	8116			25	60	75						
Cabbage	8066	8012	8120	8121	8122		30	55	80						
cabbage, potato, onion		8014	8123	8124	8125		35	75	80						
Carrots	8067	8074	8126	8127	8082		20	50	80						
Carrots, potato, onion		8073	8132	8133	8134		35	70	105						
Marog	8302						40	105	90						
Mealies	8033						30	60	95						
Mix veg: tin/froz	8035	8144	8145	8146	8147		35	75	75						
Peas	8026	8075	8166	8167	8168		30	105	90						
Potato+ skin	8046						S/s=60; m/s=90g								
Potato chips	8044						1/2c=50g;med=80g								
Potato peeled	8045	8076	8177	8178	8179		S/s=60g;m/s=90g								
Potato mash WM		8047	8817	8188			50	115	125						
Pumpkin & butternut	8069	8050	8202	8203	8081		45	85	105						
Spinach	8071	8055	8209	8210	8121		40	105	90						
Spincah, potato, onion		8056	8212	8213	8096		50	105	110						
Gem Squash	8070	8052	8193	8194	8195		1/2 gem=45g 1Ls=marrow=85g								
Sweet potato	8214				8214		50	110	145						
Other															

FRUITS	Canned +sugar	Raw	Dry	Stewed	Code	Quantity	B R	I S	L	I S	D	A D
Apple	7001	7001	7074	7077		1T=60g: 1/2c=120g 1 med =150g						
Banana		7009			7009	1 med=75g						
Fruit Salad	7051	7079	7066	7062		1/2c=110g						
Grapes		7020			7020	1/2c=90g						
Guava	7023	7021				Med(6cm)=95g						
Mango		7026			7026	135mm=350g						
Nartjie	7110	7028				5cm=75g						
Orange		7031				7cm=180g						
Paw-paw	7114	7034				wedge: 165x26x27=90g						
Pineapple	7123	7052				1 slice=40g						
Pear		7053	7056	7057		1 med=165g						
Raisins	7054	7022				handful=27g						
Other												

Name of fieldworker: ..... Date: .....

Name of respondent: .....

Area: .....

Isibingelelo

Ngiyabonga ngokunginika isikhathi senu sakuthatha indawo kulemibuzo. Ningathanda ukwazi ukuthi izingane kusukela ku 0 - 24 wezinyanga zidlani siphuze ini. Lemininingwane ibalulekile ubuka ngiyazi ukuze ngizokwazi ukuthola ukuthi izingane zidla ukudla okukahle futhi zondlekile.

Qaphela lokhu

1. Ayikho imibuzo.
2. Lemininingwane izotshengiswa ngokucophelela.
   Kukhona obengathanda ukungibuza kona manje?
   Ungathanda ukuqhubeka nokuphendula lemibuzo?

SECTION : - BIOGRAPHICAL AND COMMUNITY PROFILE INFORMATION

1. Buyini ubuhlobo bakho nengane?

   Umama

   Umgadi wengane

2. Uma uwumbhasobhi wengane, umbhasobha isikhathi esingakanani ngosuku?

3. Iminyaka yengane: Unyaka _____ Inyanga

4. Usuku lokuzalwa: Unyaka _____ Inyanga_____ Usuku

5. Ubulili bengane:

   Intombazane

   Umfana

6, Wagcina kuliphi ibanga lemfundo?

   Awuzange uyenhlobo

   Ibanga lokuqala kuya ebangeni lesihlanu

   Ibanga lesithupha kuya ebangeni leshumi

   Esikoleni sokufundela ezobuchwephesha

Office use

			1-3

7. Mingaki iminyaka oyichithe esikoleni: 6-11

   0-2

   3-5

8. Lingakanani inani lomholo umndeni ophila ngalo?

   Emisebenzini eyenziwa abomndeni

   Ukutshala nemfuyo

   Imali yempesheni

   Okunye

9. Imalini engenayo ekhaya?

   0 - R 500 ngenyanga

   R500 - R1000 ngenyanga

   R1000 - R2000 ngenyanga

   R2000 - R3000 ngenyanga

   R3000 - R4000 ngenyanga

   R4000 kuyaphezulu

10. Bangaki abantu abahlala nani ekhaya?

    2 kuya ku 3

    4 kuya ku 5

    6 kuya ku 7

    7 nangaphezulu

11. Bangaki abantu abalala endlini ngayinye?

    1 kuya ku 2

    3 kuya ku 4

    4 kuya ku 5

    6 nangaphezulu

1	
2	

12. Ninazo yini izindawo eziyimitholampilo ebangeni elihambekayo? Ye

bo

Cha

13. Uma uvumile ku nombolo 12 ngenhla, usebenza nini?

Uma nigula

Uma nihlela umndeni

Uma niyogoma

Noma aniwasebenzisi nhlobo

14. Ukhona umsebenzi wezolimo noma wosizo lomphakathi osizayo endaweni?

Yebo

Cha

15. Uma uphendule ngo yebo kunombolo 14 ngenhla, nihlangana kangaki ukuxoxa ngezinto enjengempilo nezemvelo nokutshala?

Kanye ngeviki

Kabili ngenyanga

Kanye ngenyanga

Awunaso isiqiniseko

16. Unayo insimu ethelayo ngokwanelisayo amaveji?

Yebo

Cha

17. Amanzi okuphuza niwathathaphi?

    Amanzi omgodi

    Emfuleni noma edamini

    Amanzi emvula engena ethangini

    Unompompi

    Empompilo yomphakathi

    Uma uphuza amanzi kulezi ndawo engenhla

18. Uyawahlanza amanzi?

    Yebo

    Cha

19. Uma uwahlanza, kanjani

    Ujikhi

    Uyawabilisa

    Okunye

20. Ninahlobo luni lwendawo yemfucuza?

    Indawo ehlanganiselwe yokulahla

    Indawo evulekile

    Umgqomo

21. Banithathela kangaki udoti?

    Kabili ngeviki

    Kanye ngeviki

    Kanye ngenyanga

    Noma abawuthathi nhlobo

22. Iyiphi indawo yendlu yangasese oyisebenzisayo?

    Ithoyilethi elishaywayo elisendlini

    Ithoyilethi elishaywayo elingaphandle

    Ithoyilethi eliwumgodi enilisebenzisa nomakhelwane

23. Iyiphi indawo umndeni ogezela kuyo?

Iphandle

Isendlini

24. Ugeza kangaki umntwana ngosuku?

Kabili ngosuku

Kanye ngosuku

Kanye emva kokweqa usuku

Kanye ngeviki

25. Ninayo yini inkinga yamagundane endlini?

Yebo

Cha

Section B: Lukhona ulwazi ngokudla okunomsoco, kanye nezindlela zokuphatha ikhaya kanye nokulungisa ukudla.

1. Ngabe umeluleki wenu ukewanazisa ngendlela yokupha ingane ukudla?

Yebo

Cha

2. Ubani othengayo ukudla kwasekhaya?

Umama

Ubaba

Ugogo

Omunye emndenini

Usisi osizayo

3. Uma kwenzeka nithenga impuphu niyithole inezilwane niyenzenjani?

Niyayilahla

Niyayisefa niyisebenzise

Niyiphindisela esitolo

Okunye

4. Ulibeka kanjani iphakethe lempuphu?

   Esitsheni esivaliwe wsinangeni moya

   Ephaketheni efikenalo

   Okunye

5. Ubani opheka ukudla ekhaya?

   Umama

   Ugogo

   Elinye ilunga lomndeni

   Niyalekelelana

6. Yiluphi uhlobo lomlilo enilusebenzisayo ekhaya okuthe nipheke?

   Isitofu sikagesi

   Isitofu segesi

   Isitofu sikaphalafani

   Isitofu samalahle

   Isitofu esibasa izinkani

7. Ninalo yini ifiliji ekhaya?

   Yebo

   Cha

Uma uphendule ngo cha embuzweni 7 qhubeka uphendule umbuzo 8

8. Nikubeka kanjani ukudla okubolayo njengenyama?

Instructions to field worker Q9 to Q19 must be directed to the person that does the most amount of food preparation in the household.

9. Uma ubilisa izitshalo ufaka?

   Amanzi amancane angamboza izitshalo

   Isitshalo simbozwe amanzi amaningi

10. Kukuthatha isikhathi esingakanani sokubilisa izitshalo njengenkomishi yezaqathi?

    Imizuzu emihlanu

    Imizuzu elishumi

    Imizuzu elishumi nanhlanu

11. Usebenzisa isivalo esingangenisi moya uma ubilisa izitshalo?

    Yebo

    Cha

12. Ubese uwenza njani amanzi obukade ubilise ngawo?

    Uyawachitha

    Upheka ngawo isobho

    Okunye

13. Amaveji ayahlanzwa?

    Ihora noma ngaphezulu kungakalungiswa

    Imizuzu engu 30 ngaphambi kokupheka

    Imizuzu engu 15 ngaphambi kokupheka

    Ngesikhathi upheka

14. Ngabe uyakwazi ukugcina ukudla njengokungena emabhodleleni, ukukomisa, noma ukukubandisa efulijini kube yi-ayisi

    Yebo

    Cha

15. Uma unesivuno esiningi engadini njengo bhithiludi uwenza njani?

    Uyawudayisa

    Ukupha abanye

    Uyakufaka emabhodleleni

    Okunye

16. Ngabe unalo ibhokisi lokupheka (hay box)?

Yebo

Cha

Uma uphendule ngo yebo embuzweni 16, ungaqhubeka uphendule umbuzo 17.

17. Ulisebenziselani?

Ukupheka ubhontshisi

Ukupheka inyama

Okunye

18. Uyawufaka ubicarbonate of soda uma upheka isitshalo noma ukusheshisa isikhathi sokupheka?

Yebo

Cha

19. Ingulube noma inkukhu ephekiwe?

Yebo

Cha

Section C
Dietary Practices

1. Ngabe ingane ithola

Ubisi lwebele

Ubisi lwethini

Ubisi lwethini nebele

Ubisi lwenkomo

Ubisi lwembuzi

Ubisi oluyimpuphu

Ubisi lwetiye njenge cremora

If the child receives any breastmilk, then answer Q2.1 to 2.9 (NB) Fieldworkers: Questions 2.1 to 2.9 must be directed to the mother.

2.1 Ubani owathi ingane inike ibele?

Wazikhethela

Umyeni wakho

Ilunga lomndeni

Usonhlalakahle/umhlengikazi

Okunye

2.2 Ingane yaziswa nini ubisi lwebele?

Emva njekokuzalwa

Emuva kosuku izelwe

Emuva kwezinsuku ezintathu izelwe

Okunye

2.3 Ngabe ingane inceliswa kangaki kulezinsuku noma okwamanje?

2-3 ngosuku

3-4 ngosuku

4-5 ngosuku

Ngaphezu kwa 6 izikhathi ngosuku

2.4 Ingane uyifunza kanjani?

Ngenkani

Uma unesikhathi

Ngezikhathi ezithile ezisamgomo

2.5 Usebenzisa womabili amabele ukumncelisa?

Yebo

Cha

2.6 Ubani oyeka ukuncelisa/ukuncela

Umama

Ingane

2.8 Uma ingane isiliyekile ibele, iyeke seyingakanani?

Ngaphansi kwezinyanga eziyisithupha

Phakathi kwezinyanga 6 kuya ku 12

Phakathi kwezinyanga 12 kuya ku 18

Phakathi kwezinyanga 18 kuya ku 24

2.9 Kwakuyini imbangela yoku yeka ukuncela?

Uma ingane idla ubisi lwethini phendula umbuzo 3

3.1 Ithatha luphi ubisi lwethini?

Olugcwele ubisi, njenge Nan

Olune soya

3.2 Yini eyakwenza wakhetha loluhlobo lobisi?

Umtholampilo

Ilunga lomnndeni

Ilona olwalushibhile

Lutholakala kalula

3.3 Ufaka izipuni ezingaki ku 100ml wamanzi uma wenza ibhodlela?

3

4

5

6

3.4 Uyawabilisa amanzi okwenza ibhodlela?

Yebo

Cha

3.5 Uyawalinda amanzi ukuthi aphole ngaphambi kokwenza ibhodlela?

Yebo

Cha

3.6 Ulihlanza kanjani ibhodlela lomntwana? Ujusi ongenam anzi

Emuthini wokuhlanza ibhodlela

Emanzini abilayo anosawoti

Amanzini anensipho

Okunye

Uma umntwana encela ubisi lwenkomo qhubeka uphendule umbuzo 4

4.1 Wayengakanani umntwana eqala ukudla ubisi lwenkomo

Ezinyangeni ezi 3-6

Ezinyangeni ezi 7-10

Ezinyangeni ezi 10-13

Ezinyangeni ezi 13 nangaphezulu

4.2 Yiluphi uhlobo lobisi lwenkomo ingane eluphuzayo?

Olukhilimu ogcwele

Olunokhilimu ophelele olubiliswe emlilweni omkhulu

Olutheniwe

Olutheniwe

Olunamafutha amancane

Oluyimpuphu

4.3 Luyabiliswa yini ubisi kuqala?

Yebo

Cha

4.4 Uma lubiliswa ngabe uyalugoqoza ngenkathi ulubilisa?

Yebo

Cha

5. Ngabe ingane iyakuphusa lokhu okulandelayo?

Amanzi abilile

Amanzi angabilanga

Amanzi anoshukela

Ujusi enamanzi

3	
4	

Uma umntwana esedla ukudla okuqinile, qhubeka uphendule umbuzo 7

7.1 Ingane yaqalanini ukudla okuqinile?

2 kuya ku 3 izinyanga

4 kuya ku 5 izinyanga

Izinyanga eziyisithupha kuya phezulu

7.2 Ingane idla emanestum?

Ebhodleni

Endishini

Akawadli nhlobo

Okunye

7.3 Uyawafaka usawoti ekudleni kwengane?

Yebo

Cha

7.4 Iyawuthela ushukela ekudleni kwengane?

Yebo

Cha

7.5 Ngabe uyawafaka amafutha

Yebo

Cha

7.6 Uma ngabe uwufaka usawoti, ushukela noma amafutha ekudleni kwengane? Ukufakelani?

8. Ngabe udla amaphilisi anezezelwe amavitamini?

Yebo

Cha

9. Ngabe umntwana unazo izifo eziphathelene nokudla?

Yebo, bese uzisho

Cha

1	77
2	

10. Ngabe ingane igula njalo?

Yebo, bese uzisho

Cha

Uma uphendule ngoyebo embuzweni 10, qhubeka uphendule umbuzo 11 no 12

11. Yisiphi isifo esiphethe umntwana njengamanje?

Amafinyila

Uhudo

Okunye

12. Uma ingane igula ulutholaphi usizo (yisho uhlobo lwesifo)?

13. Ngabe ingane yakhishwa izikelemu?

Yebo

Cha

14. Ngabe ingane inalo ikhadi lase mtholampilo?

Yebo

Cha

15. Umntwana uwutholile yini umgomo wepolio ne measles kulonyaka?

Yebo

Cha

16. Uma ingane ingawutholanga, kungani?

Ubungazi ngakho

Awunasikhathi sakho

Okunye

24- Hour Food Recall

1. Day of the week interviewed:
   1 Mon
   2 Tues
   3 Wed

4 Thurs
5 Fri
6 Sat
7 Sun

2. Was yesterday typical/ routine for the child
(i.e. not sick, no birthday/party/funeral)

1 Yes
2 No

Now I want you to tell me everything the child ate and drank yesterday. Lets start with when the child woke up. Then proceed through the day following the child's activities. Any forgotten items can be added last.

Instruction to the field worker
Enter each item eaten in grams under the correct interval of the day eaten.
Specify when new items are entered.

Abbreviations:

Measures:
1t= 1teaspoon
1T=1tablespoon
1Ls=1serving spoon
C= measuring cup(250ml)
s/s =small size
m/s=medium size
l/s=large size

Meat
F=with fat
Ft=fat trimmed

Bread
Wh=white
Br=brown
Ww=wholewheat

Milk
Sm=skim milk
Wm=whole milk
LL= long life
Bl=blend

Oil/fat
B=butter
Hm=hard marg
Pm=polyunsaturated
Med=Medium margarine
Vo= vegetable oil
Wf=white fat

Meals
BR=breakfast
IS=inbetween snack, L= Lunch, D= Dinner, AD= after dinner

FOOD ITEM	CODE	QUANTITY(G/ML)	BR	IS	L	IS	D	AD
Isheda shizi-0010		grated:med=10g Thick=15g						

		1 melrose =30g						
Ibhotela likashizi	0018	med=12g ; thick=25g						
Ushizi owenziwe nemakaroni: SM-4176; Wh-4120		1T=45g; 1LS=90g; 1/2 cup=115g						
Ubhekeni, othasiwe; Lean=1510 F =1501		1 rasher=10g						
Inkomo: Ebandyo noma esethini:F-1519		138x85x3=20g						
Inkomo uphisi osikwe kahle: F-1528		100x70x10=90g						
Inkomo egayiwe: yathoswa epanini F-1505		T=40g;LS=85g; 1/2c=100g						
	1586							
Cottage pie: WM + HM	1628							
Inkomo ethoswe kuhhavini		120x60x5 =35 120x60x10=70						
Isitshulu senkomo esineklabishi, n-anyanisi namazabane	1619	1LS=105g;1/2c =125g						
Beef stew: pot, carrots, peas, onions	1504							
Inkuuhu ebilsiwe-1621		breast+ skin=125g thigh=80g drumstick=42g						
Ezinganzila wenkukhu-1610								
Uphaya wenkukhu	1549	pie=150g						
Inkukhu ethiswea kukharini								
Isitshulu senkukhu: Carrots, pot, peas=1618 Cabbage, potato=1619 Tomato + onion=1583		1LS= 90g; 1/2c=125g						
Inkukhu echwiliswe enhlameni yase ithoswa	1634	1LS=105g;1/2c=125g						
Cornish pie	1548	med=150g						
Isibindi esithosiwe: Senkomo1515 , Senkuku 1567, Semvu 1550		Sheep=55g Beef= 80g Chicken= 30g						
Amahamburger enyama	1561	s/s=50g; m/s=100g						
Upholini	1514	Slice 5mm thick=8g Comm slice=16g						
Russians	1543	Slice 5mm thick=12g 1 russian=50g						
Amasosishi enkomo		Thinx200mm =45g thick;165mm=90g						
Amasosishi engulube	1527	Med=55g						
Itophasi ephekiwe	3527	LS=85g; 1/2c =120g						

FOOD ITEMS	CODE	QUANTITY	B R	I S	L	I S	D	A D
BREAKFAST CEREALS								
Amabele ephelawe yaqina/ yathamba								

	4034	1/2c=125ml						
Iphalishi lempuphu elithambile	4254	1c=250g						
Uphutu	4256	1c=crumbly						
Elishubile	4255	1c stiff=250g						
Oats	4032	1/2 c = 125ml						
Ama Khon flakhisi	4036	1c=40g						
Ipronutro	4316	1/2c=50g						
Amarayisi asekuseni/Rice Krispies	4046	1/2c=20g						
Okwenziwe ngokokho	4216	1/2c=20g						
Weetbix	4037	1=25g						
Kufakwe ubisi: Wh-0006: 2%-0069: BL-0068								
Kufakwe ushukela	9027	1t=6g						
FISH								
Amakhekhe ufishi/ Fish cakes	2531	65 x 15mm=50g						
Ufishi ongamaphisi okudba ekuseni	2532	85mm=35g						
Osethinini onotamati	2503	1=75g						
Usayidini nowoyela	2560	S/s=7g;L/s=25g						
Ufishi omhlophe ocwiliswe enhlameni	2523	S/s piece 50x55x30=60g						
Fishi omhlophe othosiwe	2509	Med:100x55x30=120g						
STARCH								
Iphalishi lempuphu elishubile uphutu	 4255 4256	T LS 1/2cup 75 120 125 30 75 70						
Amabele (ipalishi)	4315							
Ilayisi likambhila	4043	25 45 65						
Isitambu sesiphekiwe	4043	55 125 125						
Ilayisi elimhlophe	4040	25 60 65						
Isipagethi/ nemakaroni	4062	35 70 90						
LEGUMES & SOUP								
Baked Beans	3504	50 105 135						
Soup: commercial e.g. Royco	3504	125						
Ubhothisi osethini	3542	50 85 135						
TEA & COFFEE								
Itiye	9514	Teacup=180ml Mug=250ml						
Rooibos	9560							
Ikhofi	9513							
+Ushukela	9012	1t=6g						

FOOD ITEMS	CODE	QUANTITY	B	I	L	I	D	A

			R	S		S		D
Cremora	0039	1 t = 10 g						
Ubisi oluyimpuphu: Nespray	0068	20ml tea in cup 35ml tea in mug 40ml coffee in cup 75ml coffee in mug						
Ubisi olunokhilimu ogcwele	0006							
MILK DRINKS								
Amasi	0085	S/s+ 175ml L/s=500ml 1/2 c = 125g						
Ukhasitadi	0004							
Uayisikhulimu	6548	1 scoop =40g						
Uayisikhilimu oyisobhetu	6516							
Imilo nokhoko	0024	1t=5g						
Iyoghathi ne yogisphi	0044	S/s=175ml yogisip=350ml 1/2c =125g						
Iyoghathi noma eyenziwe ngezithelo	0020							
COOL DRINKS/ JUICE								
Eseapula esingenashukela	7080	Liquifruits=250ml Ceres=200ml Cartons/bottles s/s=350ml L/s=500ml						
Ese-olintshie sinoshukela	7033							
Ese-oluntshi esinyenashukela	7133							
Coke, fanta, sprite, lemon twist ….	9001	S/s bottle=300ml S/s can =340ml						
BREAD & ROLLS								
Isinkwa: Esikakolo-4001; Esimsundu-4002: Esimhlophe-4003	4001	Wh+br10mm=30g Ww10mm=35g Wh20mm=70g Ww20mm=70g						
Amabhanisi amhlophe	4206	Wh 10cm long=30g						
Amaskonisi	4029	6cm=35g 8cm diam=60g						
Amagwinya	4057	8cm diam=60g						
SPREADS & BUTTER		Thin Med Thick						
Ibhotela	6502	5 10 15						
Isigcobo sikafishi	3567	5 7 10						
Ujamu		10 20 35						
Imajalini: H-6508: Med6560: PM-6521		5 7 10						
Imarmite	9502	2 4 7						
Ibotela lamakinati	6509	5 10 20						
Amaqanda								
Abilisiwe	1001	1 egg=50g						
Athosiwe	1037	1egg=52g						

Aphehliwe	1008	1T=35g; 1Ls=80g						
FOOD ITEMS	CODE	QUANTITY	BR	IS	L	IS	D	AD
Amasaladi								
Ubhuthiluthi ogileyithiwe wafakwa ushukela	8005	1T=25g: Ls=65g						
Iziqati ezihlaza	8015	1T=25g						
Ikhabishi neziqathi nemayonecyisi	8011	1T=20g; Ls=40g						
Ukhukhumba ohlaza	8025	Med slice=10g; thick=15g						
Ulethisi	8031	1 med leaf=30g						
Ingxube ka tamatsi, ukhukhumba, ulethisi	8240	1T=40g: 1Ls=85g						
Utamatisi ohlaza	8059	Med=120g; slice=15g						
Amazambane nemayonasi	8247	T=45g; 1 Ls=105g						
Okunye								
DRESSING								
Eyasefulansi	6512	1t=5g; 1t=15G						
Imayonasi		1T=10G; 1t=40G						
COOKIES								
Comm+fill, plain-4007								
Doughnuts: Jam-4031; Plain-4024								
SWEETS								
Chocolates:assorted	9017							
Coated bars:tex, lunch,chomp	9024							
Milk:smarties,flake,aero	9010							
Marshmallows	9028							
Jelly sweets:sugus, Jelly tots	9009							
PUDDINGS & CAKES								
Ice cream	6507							
Instant pudding	4135							
Jelly	9004							
Sorbet	6516							
Trifle	4310							
Custard	0004							
Banana loaf								
Sponge plain	4011							
MISCELLANOUS								
Popcorn	4163							
Potato crisps; Simba	4275							
Fritos, Niknaks	4067							
Other								

Food items						Code	Quantity			Br	Is	L	Is	D	Ad
Izitshalo	Boil	Fat added or fried													
	NF	B	HM	PM	Vo		T	Ls	1/2						
Ubhontshisi oluhlaza	8002	8080	8098	8099	8100		25	60	80						
Ubhontshi oluhlaza amazambame no anyanisi		8003	8102	8103	8104		40	75	120						
Brocolli	8007	8114	8115	8116			25	60	75						
Iklabishi	8066	8012	8120	8121	8122		30	55	80						
Iklabisi,amazambane, u-anyanisi		8014	8123	8124	8125		35	75	80						
Iziqathi	8067	8074	8126	8127	8082		20	50	80						
Iziqathi amazambane u-anyanisi		8073	8132	8133	8134		35	70	105						
Umfino	8302						40	105	90						
Umbila	8033						30	60	95						
Mix veg: tin/froz	8035	8144	8145	8146	8147		35	75	75						
Uphizi	8026	8075	8166	8167	8168		30	105	90						
Amazambane asesikhumbeni	8046						S/s=60; m/s=90g								
Amashibusi amazambane	8044						1/2c=50g;med=80g								
Amazambane acwewiwe	8045	8076	8177	8178	8179		S/s=60g;m/s=90g								
Amazambane abondiwe		8047	8817	8188			50	115	125						
Ithanga ne phuzi	8069	8050	8202	8203	8081		45	85	105						
Ispinashi	8071	8055	8209	8210	8121		40	105	90						
Isipinashi,amazambane u-anyanisi		8056	8212	8213	8096		50	105	110						
Gem Squash	8070	8052	8193	8194	8195		1/2 gem=45g 1Ls=marrow=85g								
Uphatata	8214				8214		50	110	145						
Other															

FRUITS	Canned +sugar	Raw	Dry	Stewed	Code	Quantity	B R	I S	L	I S	D	A D
I-apula	7001	7001	7074	7077		1T=60g: 1/2c=120g 1 med =150g						
Ubhanana		7009			7009	1 med=75g						
Ingxube yecitshalo	7051	7079	7066	7062		1/2c=110g						
Amagilebhisi		7020			7020	1/2c=90g						
Ugwava	7023	7021				Med(6cm)=95g						
Umango		7026			7026	135mm=350g						
Inanthsi	7110	7028				5cm=75g						
Iwolintshi		7031				7cm=180g						
Uphopho	7114	7034				wedge: 165x26x27=90g						
Uphayinaphu	7123	7052				1 slice=40g						
Iganandoda		7053	7056	7057		1 med=165g						
Amagileblisi omisiwe	7054	7022				handful=27g						
Okunye												

Food Frequency Questionnaire

Food	Description	Amount	Per day	Per week	Per month	Seldom / never	Code	Amount FI
Iphalishi lempuphu P5-8	Iphalishi elingaqinile kahulu						E4225	
Iphalishi Lemphuphu p9-11	Elithambile						E4225	
Iphalishi lempuphu p5-8	Uphuthu						E4225	
Amabela p9-11	Eliqinile						4082	
Oats p9-11							4032	
Ukudla kwasekuseni	Izinhlobo ezikhona nyengamanje ekhaya Awazi							

Uyalusebensiza yini ubisi ephalishini owntwana? Yebo 1 Cha 2
Uma ulusebenzisa

_____

Uyawusebenzia ushukela ekudleni kwengane ekuseni Yebo 1 Cha 2

Umanthe yebo, olungakanani?						9012	

Food	Description	Amt	Per day	Per week	Per month	Sel/ never	Code	Amt FI
Isitambu p12-15	Okuthengiwe Okutshalwe ekhaya						4077 4073	
Isitambu nobontshisi p12-15							A013	
Uayisi p16-18	Elimhlophe Elinsundu Iuayisi lombila						4040 4134 4043	
Pastas p16-18	Imakaroni Ispaghetti Okunye						4062	
Ubhontshisi owomile, uphisi, ulentisi	Isobho Ingxube							
Soya products e.g. Imana	Izinhlobo eziklone Awazi						3527	
Food	Description	Amt	Per day	Per week	Per month	Sel/ never	Code	Amt FI

Inhlanzieku tamatisi enopelepele	-Ephelele p39-41 -Ecutshiwe no anyanisi p42-44						2557 A005	
Inhlanzi ethosiwe P45-47	-Ekhaviwe -Engakhaviwe						2509 2523	
Omunye ufishi osethinini P39-41	-Ituna -Usayidini -Okunye						2547 2562	
Ufishi oyikhekhe p92	-Ethosiwe						2531	
Amaqanda	-Ebulisiwe -Exutshhiwe -Elithosiwe -Okunye						1001 1025 1003	

FRUITS AND VEGETABLES

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt FI
Iklabishi P48-50	Ukupehka kanjani:? -Uyalibilisa ungafaki lutho -Uyalibilisa namazembane uanyanisi namfutha -Ethosiswe yangafakwa lutho -Okunye -Awazi						8066 A006 A007	
Isipinashi P51-53	-Ukupheka kanjani? -Uyasibilisa ungafaki lutho -Uyasibilisa no anyanisi no tamatisi namafutha -Uyasibilia no anyanisi no tamatisi & potatoes -Namakinati -Awazi						8071 A011	
Ithanga P57-59	-Ukupheka kanjani? -Ukupheka ngoshukela namafutha -Uyalibisa -Okunye -Awazi						A010 A009	
Food	Description	Amt	per day	Per week	Per mon	Sel/ Nev	Code	Amt FI
Iziqathi	-Ukupheka kanjani?						8129	

P60-62	-Uyalibisa ufaka amafutha noshukela -Namazambane no anyanisi -Zihlaza -Okunye -Awazi						A008 8015	
Umbila p63-65							8033 8034	
Ingxube kabeetroot P66-68	-uwenza ekhaya -Othengiwe						8005	
Amazambane	-Ukupheka kanjani? -Uyawabilisa uwabhaka nesikhumbe p112-114 -Uyawatwsa p112-114 -Uyawamesha p69-71						8046 8187 8048	
Ubhatata P112-114	-Ukupheka kanjani? -Uyabilisa lupheka nesikhumba -Uyawucube -Okunye						8057	
Ingxube yezitshalo P115-117	-Ohlazi utamatisi -Ulettuce -Ukhukhamba						8059 8031 8025	
Other vegetables-Specify								
Ama apula namganandoda	Fresh p75 Canned p79-81						7001 7054	
Ubhanana	P72-74						7009	
Amawolinthsi	P76-78						7031	
Amagilebhisi	P118-120						7020	
Amapentshisi	Fresh Canned p79-81						7036 7038	
Umango	P75						7026	
Okunye								

BREADS AND SPREADS

Izinkwa namabhanisi P86-87	-Esimhlophe -Esinsundu -Esikakolweni						4001 4002 4003	

Food	Description	Amt	Per day	Per week	Per Mon	Sel/ never	Cod	Amt FI
Imarjarini	What brand do you have at							

	home now? Don't know Show examples							
Ibhotela lamakinati							6509	
Ujamu/uju							9008	

Chicken, Meat, Fish
Ingane uyasidle isikhuma senkukhu? 1 Yebo 2 Cha

Food	Description	Amt	Per Day	Per Week	Per Mon	Seld/ never	Code	Amt FI
Inkukhu P17-22	-Ebilisiwe -Ethosiwe ongxubeni -Ethosiwe engaewilisiwe -Ephekwe kuhhavini						1521 1634 1520 1520	
Amathambo enkukhu p29-31							A003	
Amakhanda nezinyano zenkukhu p21							A004	
Ezangaphakathi enkukhu p32-34							1610	
Inyama ebomvu P23-25	-Uyithanda injani enamafutha -Esuswe amafutha							
Inyama ebomvu	- Ethosiwe p26-28 -Isitshulu p29-31 -Ecutshiwe enotamatisi anyanisi p29-31						A001 1585	
Ezangaphathi zeyama ebomvu	-Amathumbu abilisiwe ongafakwa lutho p32-34 -Isitshulu esinezithshalo p32-34 -Isibindi p103-105 -Izinso p103-105 -Okunye, chaza						1616 1515 1518	
Isosishi	-Ethosiwe p35-37						1526	
Ubhekeni							1501	
Izinyama ezidlwa zibanda	-Upoloni p38 -Ham p38 -Amaviyena p106-108 -Okunye:chaza						1514 1564 1531	
Inyama esethini	Bully beef p38 Okunye:chaza						1535	
Uphaya wenyama	-ethengiwe						1548	
Hamburger	-ethengiwe						A015	

DRINKS

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt FI
Itiye							9514	

Ikhofi							9513	
Ushukela netiye noma ikhofi							9012	
Inkonishi yobisi enetiye noma ikhofi	Usebenzisa luphu ubisi etiyeni noma lekhofini? Fresh/long life whole Fresh/ long life 2% fresh/long life fat free whole milk powder-Brand Skimmed milk powder Brand Milk blend Brand Whitener Brand Condensed milk Evaporated milk None						 0006 0069 0072 0009 0008 0068 0039 0002 0003	
Amasi							0006	
Iziphuzo zobisi inhlobo igama lenkampani elwenzayo	Hot chocolate-WM Milo-WM Flavoured milk Okunye						0023	
Squash	Sweet O Oros/ Lecol with sugar artificial Kool aid Okunye Chaza						9013 9002 9013	
Iyogathi							0044 0020	
Ujusi wezithelo	Fresh/liquifruit/ceres Tropica						0535 0089	
Frizzy drinks-Coke, fanta	Sweetened: Coke, Fanta Lemonade						9045 9023	

SNACKS & SWEETS

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt FI
Amakinati p97-99							8049	
Cheese curls, Nik Naks p94-96							4076	
Amakinatia nama gilebisi omsiwe	P97-99						6007	
ushokoledi p101	Igama						9024	

Amaswidi p101	Uhlobo						9009	
Amakhekhe	Uhlobo							
Amakhekhe amakhulu nama tart	Uhlobo							
Amaskonisi							4029	
Amarasiki/ amakhele omile							4160	
Savouries	Sausage rolls samoosas Biscuits- bacon kips						1534 4196 4162	
Ujeli							9004	
Uphudingi opheliwe							4181	
Uiyiskhilimu							4066	
Ice cream Sorbet							6507	
Okunye: chaza							6516	
Amazambane othosiwe omiswa aklamuzelayo p94-96							8049	

MISCELLANEOUS: Please mention any other foods used more than once in two weeks which we have not talked about:

Food	Description	Amt	Day	Week	Mon	Sel	Code	Amt FI

Section E

Anthropometry

Now we are going to take a few measurements of the child

1. Weight:_____
2. Height/ Recumbent length:_____

Thank you for your co-operation!

Appendix B

FIELD WORKERS TRAINING MANUAL

Complied for: Collection of data from mothers/caregivers of rural black infants/toddlers aged 0-24 months in Umbumbulu, Kwa-Zulu Natal.

Complied by: Ashika Naicker
Student no: 9049711
Department of Food & Nutrition,
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1. Objectives of the training session:

At the end of the training session, the fieldworkers must be able to:

1. Understand the purpose of the study and its objectives.

2. Understand the importance of the study.
3. Understand the role and the purpose of a fieldworker.
4. Identify qualities of a good fieldworker.
5. Understand the processes involved in conducting a survey.
6. Understand the general procedure involved in the questionnaire administration.
7. Conduct the dietary assessment using the FPPB.
8. Measure and record anthropometric measurements accurately.
9. Complete an interview with respondents successfully.

2. Outline of the training session

2.1 Day 1

- The study:
  -The purpose and the importance of the study.

-General overview of the study.

-Procedure to achieve the objectives of the study.

- Field work and the role of fieldworkers:

-Qualities of a good fieldworker.

-Interviewing skills.

- Weaknesses.

- Anticipated problems:

-Actions to be taken.

- Viewing of the NFCS training video.

2.2 Day 2

- Overview of the questionnaire.
- Recording procedure :

-Section A: Socio-biographical information- close ended questions.

-Section B: Nutritional knowledge, food preparation skills- close and open ended questions, food availability: Likert scale and dietary assessment: 24-hour food recall and FFQ used in conjunction with the FPPB.

-Section C: Food Security- Likert scale

-Section D: Anthropometric assessment- theory related to anthropometric assessment for infants/toddlers and equipment; and tools used.

2.3 Day 3:

- Use of the Food photograph portion books
- Working with anthropometric measurements:

    -Measuring recumbent position for infants/toddlers.

    -Measuring weight for infants/toddlers.

    -Recording measurements.

3. Introduction:

The quality of collected survey data is influenced by a number of factors, one of which is the fieldworker. According to Schnetler and Geldenhuys (1992), the

fieldworker plays an important role in determining quality of responses obtained from the study sample.

4. The purpose of the manual:

- Guide the fieldworker during data collection.
- Make the fieldworker aware and prepared of the various scenarios that could possibly prevail during data collection.
- Train the fieldworker in administrating the questionnaire.

5. The Purpose of the Study:

The purpose of the study is to determine the incidence of malnutrition and to identify factors associated with the development of malnutrition amongst rural black infants/toddlers aged 0-2 years from the Umbumbulu area, Kwa-Zulu Natal. Based on the results obtained, programme planning objectives will be identified and guidelines will be formulated for a Nutrition Education Intervention Programme.

6. What is to be surveyed:

- Socio-biographical information and a community profile.
- Food and nutritional knowledge of the caregiver/mother, home management skills of the mother/caregiver, cultural influences on the diet of the child and the availability of food per household.
- Dietary assessment of the infant/toddler: 24-hour food recall and the Food frequency questionnaire.

- Anthropometric measurements of the infant/toddler.

7. Target Group:

- 0-2 years infants/toddlers via the caregivers/mothers of the infants/toddlers in Umbumbulu, Kwa-Zulu Natal.

8. When to be surveyed:

- Questionnaires are to administered on weekdays only. It should be a routine day for the infant/toddler.

9. Sampling:

- Systematic random sampling
- List of names
- Selection procedure: every third child from the list of names

10. The fieldworker:

- Qualities of a good fieldworker.
- Interviewing skills.
- Anticipated problems during fieldwork e.g. respondent bias etc.

11. Recording Process:

11.1 Socio-demographic information and Community Profile:

- Open ended questions
- Close ended questions
- Skipping questions

11.2 Food and nutritional knowledge, dietary practises, home management skills

- Close ended questions

- Open ended questions
- Demonstration: number of scoops of formula per 100ml of water.

11.3 **Dietary Assessment:**

- Abbreviations used in the 24-hour food recall and the Food Frequency Questionnaire.
- The Food Portion Photograph Book :

  -The purpose of the FPPB

  -The use of the FPPB in conjunction with the 24-hour food recall and the FFQ

  - Calculation of intermediate portion sizes (MacIntrye, Venter and Vorster, 2000):

Portion Sizes	Weight Calculation
Smaller than A	WA- (WB- WA)/2
Between A and B	(WA+ WB)/2
Between B and C	(WB+ WC)/2
Larger than C	WC + (WC - WB)/2
Between C and D	(WC + WD)/2
Larger than D	WD + (WD-WC)/2

  -A, B, C and D refers to the small, medium, large and extra large portion sizes respectively. WA, WB, WC and WD refer to the weights of the portion sizes used in the photographs.
- Recording process of the 24-hour food recall and the FFQ
- How to include items that are not listed in the 24-hour food recall and the FFQ

11.4 **Food Security Questionnaire**

- Understanding the difference between often true, sometimes true and never true on the Likert scale.

- Recording process.

11.5 Anthropometric Measurements:

- Purpose of anthropometric measurements

  -Anthropometry is the scientific study of the measurements of the human body. It indicates to us whether someone is too short, too thin or overweight. These situations reflect inadequate or excess food intake, insufficient exercise and disease, all of which may lead to ill health, poor performance and premature death

- Equipment and tools used:

  -The measuring board

  -The electronic scale

- Method of collecting supine length:

  -Place the measuring board on a flat surface

  -Make sure that child is not wearing shoes

  -Gently place the child, face upwards, on the smooth surface or the board with his/her head towards the fixed board at the end with the help of the mother/caregiver.

  -Ensure that the child's body lies parallel to the long axis of the measuring board, and the shoulders are firmly against the surface.

  -The first fieldworker should place the top of the child's head firmly against the headboard. Position the child so that the line between the angle of the eye and the top of the ear-hole is perpendicular to the long axis of the measuring board (the Frankfort plane). maintain the hold on the child until

after the reading has taken place.

-The second fieldworker holds the child's feet with the toes pointing directly upwards, and the knees straight and brings the moveable foot-board to rest firmly against the child's heels.

-Take the reading to the nearest 0.1cm and write it down immediately

-Release the child.

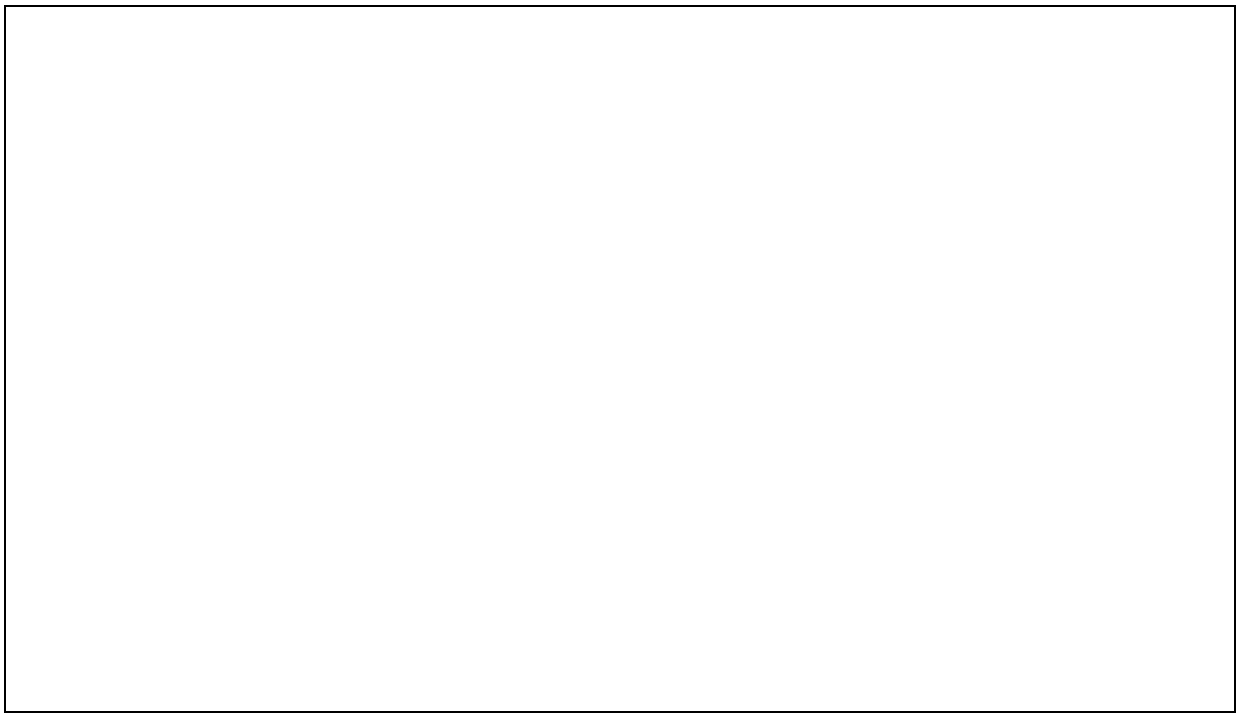

Figure1: Length measurement in children less than 2 years (Dhansay, 2000).

- Weighing a child using the electronic scale:

  -The child should wear minimum clothing, shoes and socks and heavy ornaments should be removed.

-Make sure that the scale is on zero after placing the baby mat

-Gently place the child on the scoop of the scale.

-Wait for the scale to beep. Record the measurement and release the child. Repeat the procedure once more. If the 2 recordings have a huge discrepancy (>100g), check the scale for accuracy and then repeat the procedure.

- Anticipated problems:

  -Where the child is restive and difficult to measure, the fieldworker may follow the same procedure for measuring supine length but use only the child's left leg against the footboard.

11.6 Focus groups (only for moderator)

- Purpose of the focus group
- Qualities of the Moderator (Kruger, 1998)

  -Knowledge of understanding the group process

  -Good communication skills

  -Friendliness: Ability to relate to the community

  -Openness to new ideas

  -Listening skills
- Before the focus group:

  -Arrange the room for the discussion.

  -Set up and test recording equipment.
- During the focus group:

  -Introduce yourself.

  -State the purpose of the focus group.

-Ask questions.

-Anticipate flow.

-Control your reactions.

-Probe as needed.

-Listen.

-Make sure that everyone participates in the discussion.

-Thank the group for their participation.

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