

*An evaluation of the Protein Energy Malnutrition (PEM)
Program in children \leq 5 years at primary healthcare
facilities in the Free State*

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Dissertation submitted in fulfillment of the requirements for the degree

*Magister Scientiae:
Dietetics*

in the
Department of Nutrition and Dietetics
University of the Free State

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BLOEMFONTEIN

January 2008

Declaration of Independent Work

DECLARATION WITH REGARDS TO INDEPENDENT WORK

I, **Magda (M.M.) Botha**, identity number **7505300022085** and student number **1994038170**, do hereby declare that this research project submitted to the **University of the Free State** for the degree **MAGISTER SCIENTIAE: An Evaluation of the Protein Energy Malnutrition (PEM) Program in children \leq 5 years at primary healthcare facilities in the Free State**, is my own independent work, and has not been submitted before to any institution by myself or any other person in fulfillment of the requirements for the attainment of any qualification. I further cede copyright of this research in favour of the University of the Free State.

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Acknowledgements

This study would not have been possible without the assistance of the following persons:

- My supervisor, Prof. C.M. Walsh, for her advice, assistance and encouragement;
- The Department of Biostatistics, University of the Free State, for the valuable input regarding statistical analysis of data;
- The National Research Foundation, for financial support in the execution of the study;
- The Free State Department of Health for the support in using the patient records and information at the Primary Healthcare facilities;
- The fieldworkers that supported me in collecting the data;
- The respondents for taking part in the study;
- My family and friends for their interest and moral support;
- My Heavenly Father, for giving me the ability, opportunity and strength to undertake this study.

Summary

Globally, Protein-Energy Malnutrition (PEM) is a public health problem that affects especially children younger than 5 years. Malnutrition, together with acute respiratory infections, HIV and AIDS and diarrhoeal disease, is one of the leading causes of death amongst infants and young children.

In South Africa, the Integrated Nutrition Programme (INP) is implemented nationally to assist with the reduction of the prevalence of malnutrition and hunger through various child survival strategies, including health facility-based services and community-based interventions. The Protein-Energy Malnutrition Programme (PEM Program) forms an essential component of the INP.

Currently the PEM Program is implemented at public health facilities to treat and manage clients suffering from malnutrition or those that are at risk of becoming malnourished. Vulnerable children, orphans, pregnant and lactating women and the elderly benefit from the PEM Program in receiving not only nutrition education, but also food supplements. Food supplements that are distributed include infant formula, enriched maize meal and a high energy drink.

The purpose of this cross-sectional descriptive study was to evaluate the implementation of the PEM Program in primary healthcare (PHC) facilities ($n = 51$) in the Free State. Randomized proportional sampling was applied to include 30% of the total numbers of primary healthcare facilities in the Free State. A representative sample of 399 children younger than 5 years was selected from these clinics, of which only 46 children participated in the PEM Program. Question-

naires were also administered to dietitians (n = 15), professional nurses (n = 43) and mothers / caretakers (n = 46). The professional nurses, mothers / caretakers and children who were included in the research were those who were available at the healthcare facility on the specific day on which the facility was visited by the researcher and the fieldworkers. The dietitians who were included in the sample included all the district dietitians and community service dietitians.

Retrospective data was collected by reviewing clinic records and interviews were undertaken with professional nurses and mothers / caretakers. Questionnaires completed by dietitians were self-administered. Body mass index (BMI) of mothers/ caretakers and weight-for-age of children who were attending the clinic on the day of data collection were also determined.

The results of the study generally indicated that the PEM Program was not implemented effectively in the Free State, where the PEM Program was mainly the responsibility of professional nurses. Poor recordkeeping of client and program information was identified, resulting in poor management of the client's progress. Food supplements were not continuously available at PHC facilities for distribution to PEM Program clients, due to logistical challenges in the procurement, ordering and delivery of food supplements. PEM Program clients had received food supplements for approximately 7 months. Food supplements were, however, often shared with family members and were often the only food eaten by the PEM Program clients at home.

About 20% of the children included in the study were underweight-for-age (W/A below the 3rd percentile of the NCHS median). The majority of the children (82.41%) that were weighed had gained approximately 1 kilogram since previ-

ously being weighed. Twenty two percent of children that did not gain weight were at risk of severe malnutrition and had weights below the 3rd centile. According to the BMI half of the mothers / caretakers were overweight or obese (BMI \geq 25 kg/m²), while only 15% of the mothers / caretakers that accompanied the children to the health facilities were underweight (BMI < 18.5 kg/m²).

Almost all the children younger than 5 years had an original copy of the RTHC, but RTHC's were often not completed in full by healthcare workers and children were often not effectively screened. Mothers / caretakers were requested by healthcare professionals to bring children back to the clinic if the child lost weight. In cases where both the mother and child were underweight, or when a lactating mother and her infant were underweight, both the mother and her child received food supplements.

Eighty percent of children had been breastfed for a period of approximately 5 months, but healthcare professionals often advised mothers to end or interrupt breastfeeding for reasons unknown to the mothers. Most of the children participating in the PEM Program had an inadequate food intake for the day. In most cases, the food intake for breakfast and lunch were adequate; however the food intake for supper was mostly inadequate.

Health professionals indicated that more training about the PEM Program would improve the implementation of the PEM Program. Staff felt that in-service training should focus on the entry and exit criteria of the program, how to issue and control the food supplementation stock, criteria for identifying underweight children, when to supplement children of HIV positive mothers, HIV and infant

feeding, nutrition education to mothers, how to prepare and feed the food supplements and recording of the PEM Program

Opsomming

Protein-Energie-Wanvoeding (PEW) is wereldwyd 'n publieke gesondheidsprobleem, veral onder kinders jonger as 5 jaar. Wanvoeding, tesame met akute respiratoriese infeksies, MIV en VIGS en diaree, is een van die hooforsake van baba- en kindersterftes.

In Suid-Afrika is die Geïntegreerde Voedingsprogram (*INP*) ontwikkel om die voorkoms van honger en wanvoeding te verlaag deur verskeie kinderoorlewings-strategië. Die *INP* is daarop gemik om primêre gesondheidsdienste, sowel as gemeenskapsprogramme te verbeter. Die Protein-Energie Wanvoedings-Program (PEW Program) vorm 'n integrale deel van die *INP*.

Huidiglik word die PEW Program by publieke gesondheidsfasiliteite geïmplementeer om diegene wat aan wanvoeding ly of 'n risiko het om wangevoed te word, te behandel. Kwesbare kinders, weeskinders, swanger en lakterende vrouens en bejaardes is onder andere van die teikengroepe wat voordeel trek uit die PEW Program. Nie net voedingsonderrig word gegee aan hierdie persone nie, maar ook voedingsaanplante soos baba formule, verrykte mieliepap en 'n hoë-energie drankie.

Die doel van hierdie kruis-seksie beskrywende studie was om die implementering van die PEW Program in primêre gesondheid (PGS) fasiliteite ($n = 51$) in die Vrystaat te evalueer. Ewekansige proporsionele steekproefneming is toegepas om 30% van die totale hoeveelheid PGS fasiliteite in die Vrystaat in te sluit. 'n Verteenwoordigende steekproef van 399 kinders jonger as 5 jaar was gekies van

hierdie klinieke, waarvan slegs 46 kinders deelgeneem het in die PEW Program. Vraelyste is ook uitgedeel aan dieetkundiges (n = 15), professionele verpleegsters (n = 43) en moeders / versorgers (n = 46). Die professionele verpleegsters en moeders / versorgers wat in die studie ingesluit was, was diegene wat beskikbaar was by die kliniek op die spesifieke dag wat die navorser en veldwerkers die fasiliteit besoek het. Al die distrik-dieetkundiges en gemeenskapdiens dieetkundiges is in die steekproef ingesluit.

Retrospektiewe data is ingesamel deur die evaluaering van kliniek rekords en onderhoude wat gevoer is met professionele verpleegsters en moeders / versorgers. Die vraelyste wat aan die dieetkundiges uitgedeel is, was selfgeadministreerd. Die liggaam-massa-indeks (LMI) van moeders / versorgers en massavir-ouderdom van kinders wat die kliniek besoek het op die dag wat die data ingesamel is, was ook bepaal.

Die algemene resultate van die studie het aangetoon dat die PEW Program nie effektief in die Vrystaat geïmplementeer word waar die PEW Program hoofsaaklik die verantwoordelikheid van die professionele verpleegsters was nie. Swak rekordhouding van kliente en program inligting was geïdentifiseer, wat daartoe gelei het dat die klient se vordering swak bestuur is. Voedingsaanplante was nie aaneenlopend beskikbaar by PGS fasiliteite vir verspreiding na PEW Program kliente nie as gevolg van logistieke probleme met aankope, bestelling en aflewering van die voedingsaanplante. PEW Program kliente het die voedingsaanplante vir 'n gemiddeld van 7 maande gekry. Voedingsaanplante was dikwels gedeel met gesinslede en ook dikwels die enigste voedsel wat die PEW Program klient by die huis geeet het.

Omtrent 20% van die kinders wat in die studie ingesluit is, was ondermassa-vir-ouderdom (massa-vir-ouderdom laer as die 3de persentiel van die NCHS median). Die oorgrote meerderheid van die kinders (82.41%) wat geweeg is, het omtrent 1 kilogram opgetel vandat die kind 'n vorige keer geweeg is. Twintig persent van die kinders wat nie massa opgetel het nie, het 'n risiko gehad vir ernstige wanvoeding met massas onder die 3de sentiel. Volgens die LMI was die helfte van die moeders / versorgers oorgewig ($LMI \geq 25 \text{ kg/m}^2$), terwyl slegs 15% van die moeders / versorgers wat die kinders na die klinieke gebring het ondermassa ($LMI < 18.5 \text{ kg/m}^2$) was.

Ongeveer al die kinders onder die ouderdom van 5 jaar het oorspronklike RTHC gehad, maar die RTHC was dikwels nie volledig ingevul deur gesondheidswerkers nie en kinders is dikwels nie behoorlik gesif nie. Moeders / versorgers was gevra om hulle kinders terug te bring na die kliniek wanneer die kind massa verloor het. In gevalle waar beide die moeder en die kind ondermassa was, of wanneer 'n lakterende moeder en haar baba wangevoed was, het beide die moeder en die baba voedingsaanplak ontvang.

Tagtig persent van die kinders was geborsvoed vir 'n gemiddelde periode van 5 maande, maar gesondheidswerkers het moeders dikwels aangemoedig om borsvoeding te staak vir redes onbekend aan die moeders. Meeste van die kinders het voldoende voedselinnames vir die dag gehad; alhoewel in die meeste gevalle was dit slegs die voedselinnames vir ontbyt en middagetete wat voldoende was terwyl die voedselinname vir die aand onvoldoende was.

Gesondheidswerkers het aangetoon dat meer opleiding daartoe sal bydra dat die implementering van die PEW Program sal verbeter. Personeel het gereken dat

indiens opleiding moet fokus op die insluiting en uitsluiting kriteria vir die program, hoe om die voedingssupplemente te versprei en beheer, kriteria vir die identifisering van ondermassa kinders, wanneer om kinders van MIV positiewe moeders te supplementeer, MIV en babavoeding, hoe om die voedingssupplemente voor te berei en voer en rekordhouding van die PEW Program inligting op die voorgestelde vorms.

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List of Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
BMI	Body Mass Index
CBNP	Community-based Nutrition Program
CI	Confidence Interval
CTC	Community-based Therapeutic Care
DHS	Demographic and Health Survey
DOH	Department of Health
DOTS	Directly Observed Treatment, Short-course (A strategy used to reduce the number of TB cases)
ETOVS	Ethics committee of the Faculty of Health Sciences, University of the Free State
FBO	Faith-based Organization
FSDOH	Free State Department of Health
GAO	Governmental Accountability Office
HIV	Human Immunodeficiency Virus
IMCI	Integrated Management of Childhood Illnesses
INP	Integrated Nutrition Program
IU	International Units
kg	Kilogram
kg/m ²	Unit of body mass index
LMI	Liggaamsmassa indeks
m ²	Meters square
MDG(s)	Millennium Development Goal(s)
N	Total

NCHS	National Centre for Health Statistics
NFCS	National Food Consumption Survey
NGO	Non-governmental Organization
NICUS	Nutrition Information Centre University of Stellenbosch
NSNP	National School Nutrition Program
ORS	Oral Rehydration Solution
PEM	Protein Energy Malnutrition
PEMP	Protein Energy Malnutrition Program
PEW	Protein-energie wanvoeding
PHC	Primary Healthcare
SA	South Africa
SCN	Standing Committee on Nutrition
SD	Standard Deviation
TB	Tuberculosis
UFS	University of the Free State
UNICEF	United Nations Children's Financial Fund
USA	United States of America
USAID	United States Agency for International Development
WHO	World Health Organization
>	Bigger than
<	Smaller than
≥	Equal to, and bigger than
≤	Equal to, and smaller than

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Chapter 1

Problem statement



(FSDOH, 2005)

1.1.Introduction

Proper nutrition and health are basic human rights (WHO, 2000a). Nutrition is the foundation for effective growth and development and for reaching one's full potential. Poverty, hunger and malnutrition together, contribute to nearly 30% of humanity being deprived from this basic human right, especially in developing countries. Protein energy malnutrition (PEM) in children younger than five years is a serious public health problem in most developing countries and the rehabilitation of malnourished children is a challenge for health services (WHO, 2000a).

PEM manifests itself as a complex problem with underlying social, developmental and nutritional causes (Agboatwalla and Akram, 1995; DOH, 2003; Young and Jaspers, 1995). Malnutrition results from a combination of immediate, underlying and basic causes. An inadequate diet, especially consuming too little energy dense foods and major diseases such as diarrhea, acute respiratory infections and communicable diseases perpetuate PEM. Failure to grow adequately is the first and most important manifestation of PEM (DOH, 2003).

According to the results of the South African Food Consumption Survey (NFCS) conducted in 1999, the prevalence of underweight (weight-for-age < -2 SD of National Center for Health Statistics [NCHS] median) amongst children 1-3 years and 4-6 years was 20,4% and 9,9% respectively in the Free State (Labadarios *et al.*, 1999).

Of the several direct interventions against malnutrition, supplementary feeding is frequently employed in most poor countries. If properly designed, implemented and integrated with other services, the allocation of supplementary foods can contribute significantly to the alleviation of malnutrition (Saloojee and Pettifor, 2001, p.118-119). According to Mason *et al.* (2003) however, supplementary feeding can only be effective in cases of emergency and for individuals suffering from severe cases of poverty. In less severe cases, food supplements may be seen by community members as a source for accessing free food supplies. Food aid programs seem to have a greater impact on improving weight amongst severely malnourished children than those suffering from moderate malnutrition (UNSYSTEM, 2006).

In addition to food aid, nutrition interventions providing health education and income generating services to clients, can improve the knowledge, attitudes and practices of mothers / caretakers with malnourished children, leading to a decrease in malnutrition rates (Agboatwalla and Akram, 1995). Health education not only changes the awareness and knowledge of community members, but can also successfully alter health practices which can result in reduced incidences of malnutrition, diarrhea, fever and respiratory tract infections (Agboatwalla and Akram, 1995; Akram and Agboatwalla, 1992).

Nutrition intervention programs will only be effective and successful when community members (mothers / caretakers of malnourished children) are involved in the management of malnutrition. Shortages of staff and unavailability of effective and efficient equipment at health facilities, can hamper the success of nutrition intervention programs and hamper healthcare delivery (Akram and Agboatwalla, 1992; Ghosh, 1995). The attitude of caregivers and

consumers are often predominantly curative instead of preventative (Vasundhara and Harish, 1993).

The South African Department of Health, Directorate: Nutrition, is addressing the prevention and treatment of malnutrition amongst children younger than 5 years by means of the Integrated Nutrition Program (INP). The latter aims to facilitate a co-ordinated, intersectoral approach to solving the current nutrition problems in South Africa (DOH, 2003).

The INP seeks to reduce the prevalence of malnutrition and hunger to ensure optimal growth of infants and young children and also to improve decision making at all levels to solve the problem of malnutrition (DOH, 2003). The INP aims to improve health facility-based services as well as community interventions. Primary interventions include nutrition education, the protection, promotion and support of exclusive breastfeeding for 6 months, appropriate complementary feeding practices, growth monitoring and the prevention of growth faltering. Secondary interventions include the provision of supplementary food to those children who have been identified with growth faltering and additional support to the mothers of malnourished children by referring them to community-based nutrition interventions and projects of the INP (DOH, 2003).

In order to achieve its full potential, the implementation of nutrition interventions at health facilities should include relevant training of healthcare workers. Monitoring of the INP should be done on a regular basis to ensure the success of the program. The elements of the intervention that should be evaluated include the success of the intervention in reaching the neediest of the

target groups, improvement in and application of acquired nutrition knowledge, the efficacy of referral systems between health facilities and other social services. The perceptions of the community regarding the appropriateness of the intervention also need to be evaluated to ensure that the program is acceptable and applicable (DOH, 2003).

The Protein Energy Malnutrition (PEM) Program, which forms part of the INP, represents the first step in addressing the urgent need to treat undernutrition amongst children younger than 5 years. With the PEM Program, underweight children younger than 5 years, underweight pregnant women and lactating women are identified. Nationally, these clients then receive supplements that consist of a combination of the following products according to age and individual needs:

- Enriched maize meal
- Enriched protein drink
- Acidified / Soya formula
- Multivitamin syrup

Clients should receive these supplements for a minimum of three months and a maximum of six months. Household food insecure clients are referred to the Social Welfare Department for social grant support. These clients also receive vegetable seeds in order to establish vegetable gardens (DOH, 2003).

The successful implementation of the PEM Program is dependant on the attitudes, perceptions and knowledge of the nursing staff, mothers / caretakers and dieticians towards it, due to the fact that they are the ones who are re-

sponsible for the implementation, monitoring and evaluation of the PEM Program (DOH, 2003).

Although the PEM Program is implemented at a very high cost, no study has been undertaken to evaluate the impact of the program.

1.2. Research questions

With reference to the problem statement, the following research questions have been identified for this study:

- Is the PEM Program implemented according to the criteria set out in the Free State Malnutrition Policy, for children < 5 years in Primary Healthcare facilities in the Free State?
- Do health professionals and mothers / caretakers have the necessary knowledge, attitudes and practices to ensure that the PEM Program is implemented according to the criteria set out in the Free State Malnutrition Policy?

1.3. Aim

In order to answer the identified research questions, the aim of the study was to evaluate the implementation of the PEM Program amongst children under 5 years in PHC Facilities in the Free State.

1.4.Objectives

In order to reach the aim, the following objectives were identified:

- Evaluate the implementation of the PEM Program against the criteria set out in the Free State Malnutrition Policy
- Determine the involvement of nutrition services, which include dietetic and nutrition services, and the impact thereof on the implementation of the PEM Program
- Determine the growth status of clients participating in the PEM Program
- Determine the knowledge of healthcare professionals (professional nurses and dieticians) and mothers / caretakers regarding the PEM Program
- Determine the attitudes and practices of health professionals and mothers / caretakers towards the PEM Program
- Determine training provided to health professionals and mothers / caretakers related to the effective implementation of the PEM Program
- Evaluate the practices of referral of PEM Program clients to Department of Social Welfare, community structures, health facilities and dieticians

1.5.Hypotheses

The PEM Program is not implemented according to the criteria set out in the Free State Malnutrition Policy amongst children under 5 years in the PHC facilities of the Free State.

The knowledge, attitudes and practices of health professionals and mothers / caretakers are not sufficient to ensure that the PEM Program is implemented according to the criteria of the program as set out in the Free State Malnutrition Policy.

1.6.Outline of the dissertation

The information described in this dissertation, will be presented as follow:

- ☆ Chapter 1 Problem statement
- ☆ Chapter 2 Literature review: Malnutrition amongst children
- ☆ Chapter 3 Literature review: Nutrition intervention programs to address malnutrition
- ☆ Chapter 4 Methodology
- ☆ Chapter 5 Results
- ☆ Chapter 6 Discussion of results
- ☆ Chapter 7 Conclusions and recommendations

Chapter 2

Literature review

Malnutrition amongst children



(FSDOH, 2005)

2.1.Introduction

According to Brundtland (2000), nutrition is a key element in any strategy to reduce the global burden of disease. Hunger, malnutrition, obesity and unsafe food all cause disease, and better nutrition will translate into large improvements in health among all.

Protein energy malnutrition (PEM) in children younger than five years is a serious public health problem and is one of the most common reasons for infant mortality in Sub-Saharan Africa (Botma and Grobler, 2004). In developing countries most of the child deaths, impaired physical growth and inadequate social and economical development, are associated with PEM (Torun and Chew, 1999, p. 964).

PEM occurs when inadequate amounts of protein, energy or both are provided through dietary intake to satisfy the body's needs. It includes a wide spectrum of clinical manifestations preceded by protein and energy deficits. The severity and duration of macro-and micronutrient deficiencies, the age of the child, the cause of deficiency and the prevalence of other nutritional or infectious diseases, contributes to the severity of PEM. The severity of PEM ranges from growth retardation or weight loss to specific clinical syndromes like kwashiorkor, marasmus and marasmic-kwashiorkor (Torun and Chew, 1999, p. 963; Hansen, 1993; Waterlow, 1992).

2.2. Categories of malnutrition

Malnutrition takes many forms, which often appear in combination and contribute to each other (Kean, 1998). Children are most vulnerable to nutritional deficiencies due to rapid growth and their reliance on others (Cataldo *et al.*, 2003, p.81).

The term “malnutrition” refers to a number of nutritional disorders that can be categorized as follows:

- *Underweight* which refers to acute malnutrition and is characterized by low weight-for-age (Saloojee and Pettifor, 2001, p.123).
- *Stunting* which is caused by long-term food inadequacy, and is characterized in children by short height-for-age (Rolfes *et al.*, 2006, p.197; Manary and Solomons, 2004, p.179; Saloojee and Pettifor, 2001. p.123).
- *Wasting*, is categorized in children by thinness for height and is mainly caused by current severe food restriction (Manary and Solomons, 2004, p.178-179; Saloojee and Pettifor, 2001. p.123).
- *Secondary malnutrition* which refers to the condition that result from the incapability to successfully make use of the food that is eaten because of some other factor, such as sickness or diarrhea (Cataldo *et al.*, 2003, p.81).
- *Overnutrition* which refers to the condition that result from consuming more energy than is expended by the human body (Saloojee and Pettifor, 2001, p. 117).

The term “Protein Energy Malnutrition” (PEM) refers to the inadequate consumption of protein, energy or both (Hansen, 1993; Waterlow, 1992, p.1). PEM inhibits proper growth and is most often poverty-related. The primary indicator

of acute malnutrition is low weight-for-age, or underweight, which affects about one third of children in eastern, central and southern Africa (Kean, 1998). Underweight is the indicator most commonly used in the primary healthcare setting to identify malnutrition.

The classification of malnutrition is based on anthropometric measures which are measured against standard norms formulated by the USA's National Center for Health Statistics (NCHS) and recommended for international use by the World Health Organization (WHO) (Naidoo *et al.*, 1993).

Underweight can be defined as a deviation from the expected weight-for-age (Cataldo *et al.*, 2003, p.81). In the PHC setting, underweight is identified by comparing the weight-for-age of a child to the percentile lines indicated on the Road to Health Chart (RTHC) (Waterlow, 1992, p.213) (refer to figure 2.1. for an example of the RTHC). A weight-for-age below the 3rd percentile (-2 Standard Deviations (SD) from the NCHS median) indicates underweight (Cataldo *et al.*, 2003, p.81).

Stunting is usually considered as a milder, chronic form of malnutrition. However, the condition of children who are stunted can rapidly worsen with the onset of complications such as diarrhea, respiratory infections and measles (WHO, 1999). Growth failure in the form of stunting can easily be overlooked due to a child's normal appearance. However, when compared to children that are the same age, stunted children are much shorter (Rolfes *et al.*, 2006, p. 197).

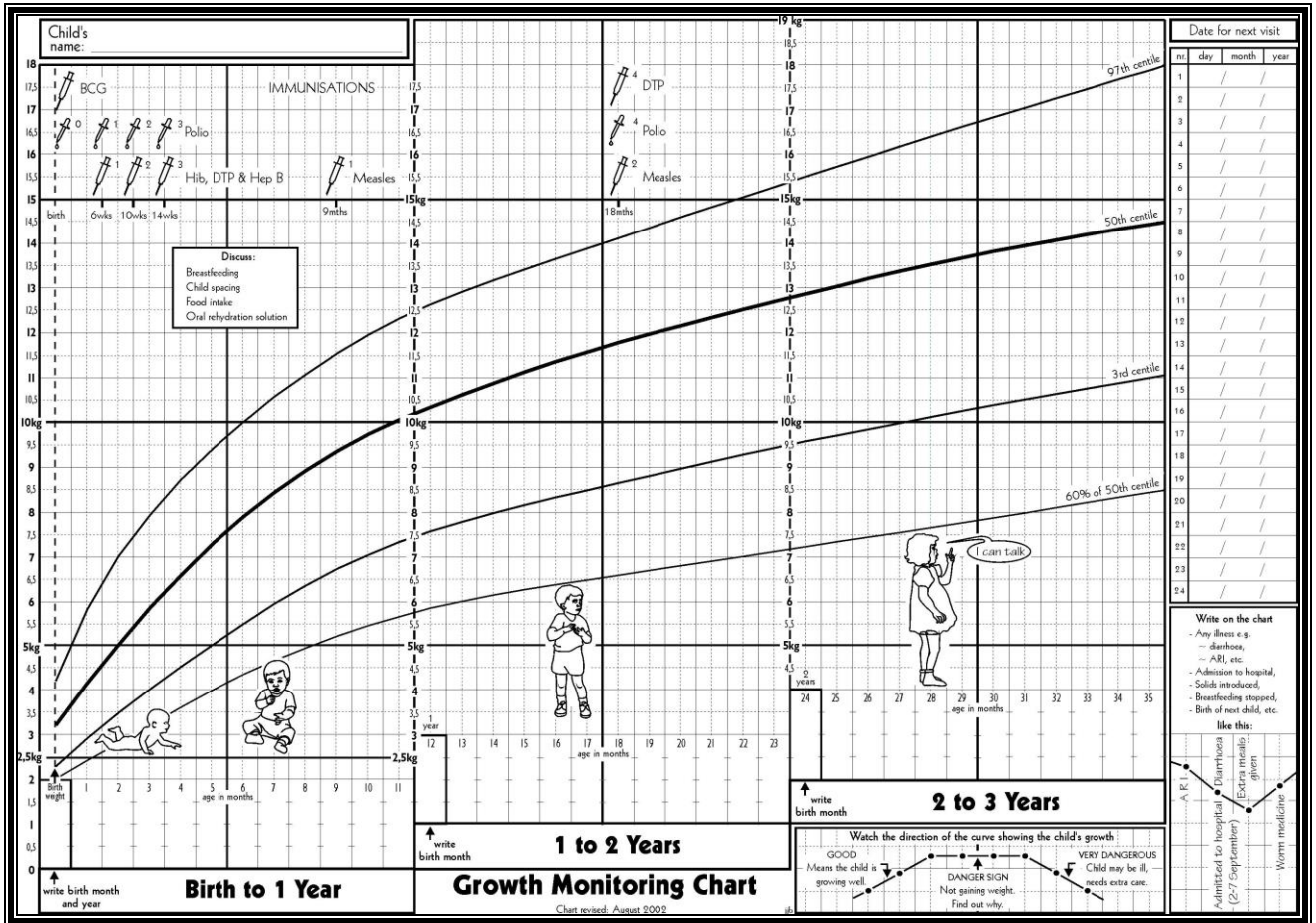


Figure 2.1: The Road to Health Chart (RTHC) as used to determine underweight (weight for age below the 3rd percentile) and severe underweight (weight for age below 60% expected weight) in children 0-60 months in the PHC setting.

Wasting can be defined as a deficit of greater than 2 Standard Deviations (SD) below the median of normal weight-for-height (Manary and Solomons, 2004, p.178-179) and is the result of a recent severe episode of malnutrition.

PEM does not include primary micronutrient deficiencies such as iron, iodine and vitamin A which are separate public health problems (Saloojee and Pettifor, 2001, p. 117-118), but often occur in combination with PEM.

2.2.1. Severe malnutrition

Severe malnutrition refers to wasting which can include marasmus, kwashiorkor and marasmic-kwashiorkor (PEM). Weight-for-age below 60% of expected weight is an indication of marasmus and a weight-for-age below 80% of expected weight together with the presence of oedema is an indication of kwashiorkor (Manary and Solomons, 2004, p.178-179).

2.2.1.1. Marasmus

Marasmus is a result of a diet low in energy and protein, which is sometimes balanced, but overall inadequate according to the child's nutritional needs (Vis and Brasseur, 1997). Marasmus has been defined by the Wellcome Trust Working Party in 1970 as a weight-for-age of less than 60% of the international NCHS standard (Manary and Solomons, 2004, p.180). Marasmus can be identified by generalized muscular wasting and absence of both subcutaneous fat and oedema (Torun and Chew 1999, p.973). As far back as 1924, the American Textbook of Pediatrics (1924, as referred to by Hansen, 1993) described marasmus as "a severe nutritional disturbance characterised by emaciation and weakness of the body. The temperature is subnormal; the pulse is slow and breathing irregular". A marasmic child has muscle wasting with the absence of oedema and skin lesions where the weight loss is more evident (refer to figure 2.2) (Vis and Brasseur, 1997).

2.2.1.2. Kwashiorkor

Kwashiorkor develops as a result of an unbalanced diet low in proteins and generally affects children between 18 months and 2 ½ years (Vis and Brasseur, 1997). The Wellcome Trust Working Party defined kwashiorkor as weight-for-age of less than 80% of the international NCHS standard and the presence of oedema (Manary and Solomons, 2004, p.180). As far back as 1933, Williams (1933, as referred to by Waterlow, 1992, p.1) described kwashiorkor “as the condition amongst children 1-4 years of age, with oedema, wasting, diarrhea, sores of mucous membranes, desquamation of skin on legs and forearms, fatty liver and uniformly fatal unless treated”. The clinical description of a child with kwashiorkor is a child who is unhappy and irritable, with no appetite, whose hair is dull, who has persistent diarrhea, is swollen with oedema (usually on the feet, eyelids, face and legs) and has skin lesions and depigmentation (refer to figure 2.2) (Vis and Brasseur, 1997).

2.2.1.3. Marasmic-kwashiorkor

Marasmic-kwashiorkor refers to the condition of severe wasting together with oedema. The prognosis is worse than that of either marasmus or kwashiorkor (Manary and Solomons, 2004, p.180). The main features are the oedema of kwashiorkor, together with or without the skin lesions; and the muscle wasting and decreased subcutaneous fat of marasmus. When oedema has cleared during early treatment, the appearance of the child resembles that of marasmus (Torun and Chew, 1999, p.975).

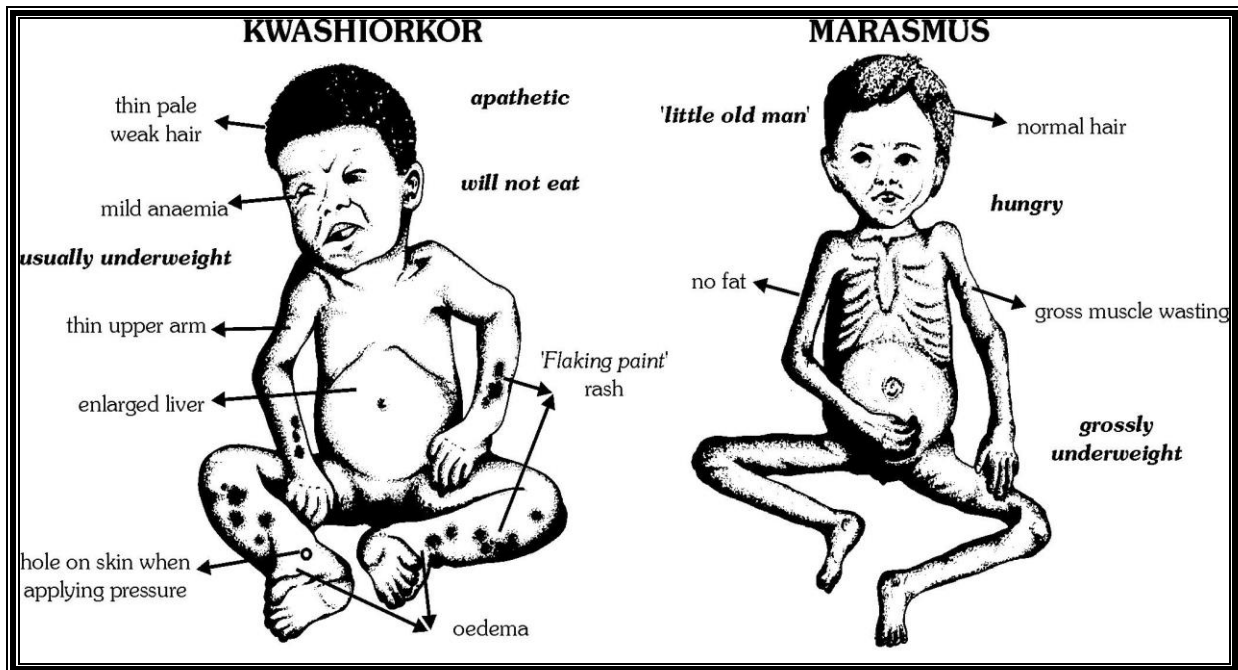


Figure 2.2: Characteristics of Kwashiorkor and Marasmus
(Vis and Brasseur, 1997).

2.3. Classification of the severity of malnutrition

Various classifications have been used in developing countries to quantify the extent and severity of undernutrition and to select beneficiaries for nutrition intervention programs (Naidoo *et al.*, 1993).

The WHO Global Database on Child Growth and Malnutrition uses a z-score cut-off point of less than -2 standard deviations (SD) to classify low weight-for-age (underweight), low height-for-age (stunting), and low weight-for-height (wasting) as moderate undernutrition and less than -3 SD to define severe undernutrition. The cut-off point of more than +2 SD classifies high weight-for-age as overweight in children (see table 2.1 below) (Pelletier, 1995).

The nutritional status of the child can also be classified according to weight-for-height, height-for-age and oedema as moderate malnutrition or severe malnutrition (table 2.2). In cases where a child's weight-for-height is below -3 SD or less than 70% of the median NCHS (termed "severely wasted"), or where the child has symmetrical oedema involving at least the feet (termed "oedematous malnutrition), this child is severely malnourished and should be admitted to hospital (WHO, 1999).

Another classification which is commonly used is the classification according to clinical signs (see table 2.3) which is based on the WHO classification of 1971 (Passmore and Eastwood, 1986, p. 281).

Currently, marasmus (loss of weight and severe underweight), is diagnosed when the weight is less than 60% of the 50th percentile (the standard, or NCHS median). The Wellcome classification has adopted this criterion (table 2.4). The clinical diagnosis of kwashiorkor centers on the presence of oedema with or without flaky paint dermatosis and ulcerations. The Wellcome classification of PEM, where weight and oedema are the main criteria, is the simplest way to distinguish between the various syndromes (Hansen, 1993).

Table 2.1: Definitions of the different categories of malnutrition
(Pelletier, 1995)

Term	Description
Underweight	Weight-for-age < -2 SD of NCHS/WHO reference values, or < 80% of median weight-for-age
Stunting	Height-for-age < -2 SD of NCHS/WHO reference values, or < 90% of median height-for-age
Wasting	Weight-for-height < -2 SD of NCHS/WHO reference values, or <80% of median weight-for-height
Severe malnutrition	Severe wasting < -3 SD of reference (<70% weight-for-height), or severe stunting < -3 SD of reference (<85% height-for-age), or the presence of oedema of both feet, or clinically visible severe wasting
Overweight	Weight-for-height > +2 SD of NCHS/WHO reference values

Table 2.2: Classification of malnutrition according to weight-for-height, height-for-age and oedema (WHO, 1999, p.4)

	Classification	
	Moderate malnutrition	Severe malnutrition
Symmetrical oedema	No	Yes (oedematous malnutrition)
Weight-for-height	$-3 \leq \text{SD score} < -2$ (70-79%)	SD-score < -3 (<70%) (severe wasting)
Height-for-age	$-3 \leq \text{SD score} < -2$ (85-89%)	SD-score < -3 (<85%) (severe stunting)

Table 2.3: Classification of PEM (FAO/WHO)
(Passmore and Eastwood, 1986, p. 281, Table 29.1)

Form of PEM	Body weight as % of standard (50 th percentile)	Oedema	Inadequate weight-for-height
Kwashiorkor	80-60	+	+
Marasmic-kwashiorkor	< 60	+	++
Marasmus	< 60	0	++
Nutritional dwarfing	< 60	0	minimal
Underweight child	80-60	0	+

Table 2.4: Wellcome classification of severe protein energy malnutrition (Hansen, 1993)

Weight-for-age (% of expected weight-for-age according to NCHS)	Oedema present	Oedema absent
80-60	Kwashiorkor	Undernutrition
<60	Marasmic-kwashiorkor	Marasmus

Yet another classification system which can be used to identify PEM is the GOMEZ classification, (described in table 2.5) which categorizes the weight-for-age of a child according to its deviation from expected weight-for-age (Garrow and James, 1993, p. 441).

Table 2.5: The GOMEZ classification for PEM (Garrow and James, 1993, p. 441 Table 30.1)

% of weight-for-age	Classification
90-109	Normal
75-89	First grade or mild malnutrition
60-74	Second grade or moderate malnutrition
≤60	Third grade or severe malnutrition

Lastly, PEM can also be classified according to the severity of the disease, the duration thereof and the predominant nutrition deficiency (table 2.6). This classification is useful for the diagnoses and treatment of PEM in the public health sec-

tor. The duration of the disease is classified as acute (underweight), chronic (stunting) or acute with a chronic background (wasting). Severe PEM will be confirmed by clinical characteristics and biochemical data (Torun and Chew, 1999, p. 971–972).

Table 2.6: Classification of PEM according to severity of disease, its duration and predominant nutrient deficiency (Torun and Chew, 1999, p. 971).

Severity of PEM	Duration	Main deficit
Mild PEM	Acute	Energy
Moderate PEM	Chronic	Protein
Severe PEM	Both	Both

2.4. The prevalence of malnutrition

2.4.1. Globally

PEM in children younger than 5 years is currently the most important nutritional disorder in Asia, Latin America and Africa (De Onis *et al.*, 2004; Hansen, 1993). PEM and micronutrient deficiencies affect millions of adults and children in developing countries (Pelletier, 1995). In 2005 the WHO (2005) reported that an estimated 130 million children were globally underweight. In developing countries 10.8 million children are prevented from growing to their full potential because of persistent undernutrition. Malnutrition is globally responsible for 54% of all child deaths (WHO, 2005). In Africa between 1990 and 2000, the number of chil-

dren that suffered from underweight increased from 26 million to 32 million (WHO, 2005). De Onis *et al.* (2004) projected that in Africa the prevalence of undernutrition amongst children younger than 5 years of age will increase from 24% to 26.8% in Africa in 2015, whilst a global decrease from 26.5% to 17.6% are expected. Although an overall improvement in the global situation is expected in 2015, neither the world as a whole nor the developing world will be able to achieve the Millenium Development Goals (De Onis *et al.*, 2004).

2.4.2. South Africa and the Free State

Malnutrition, together with acute respiratory infections and diarrheal diseases, are the most common reasons for infant and young child mortality in South Africa (SA). According to the SA Demographic and Health survey (DHS) that was conducted in 1998, the infant (0-11 months) mortality rate for South Africa was 45.4 deaths per 1000 live births and 36.8 deaths per 1000 life births for the Free State. Together with this, the DHS indicated that the mortality rate for children younger than five is 59.4 and 50 deaths per 1000 life births for South Africa and Free State respectively (DOH, 2004).

According to the results of the NFCS (1999) the prevalence of underweight (weight-for-age < -2 SD of NCHS median) amongst children 1-3 years and 4-6 years was 20,4% and 9,9% respectively in the Free State (Labadarios, 1999). At that time 39% of children, age 1-3 years, in the Free State were stunted, whilst 31% of all children age 4-6 were stunted. Botma and Grobler (2004) found that the prevalence of underweight amongst children younger than 5 years of age in Motheo District, one of the districts of the Free State, was 10.41%.

The NFCS of 1999 showed that at least 21,6% of children between the ages of 1 and 9 years old are stunted, indicating chronic past undernutrition. Younger children (1-3 years of age) are most severely affected as well as those living on commercial farms and in tribal and rural areas. Underweight (a weight-for-age below the 3rd percentile of the NCHS median) affects 10,3% and severe underweight (weight-for-age below 60% of expected weight) 1,4% of children of 1-3 years of age. Wasting, an indicator of acute current undernutrition, is not common in South Africa and shows a prevalence rate of 3,7% of children between 1 and 9 years old (Labadarios *et al.*, 1999).

Children in rural communities were nutritionally at a significantly greater risk for malnutrition than children living in urban areas. The prevalence of wasting amongst children living in rural communities was 12%, while that of children living in urban areas was 7%. The prevalence of stunting for these children was 27% and 16% respectively for urban and rural areas (Labadarios *et al.*, 1999).

In urban areas, the prevalence of underweight amongst children living in informal housing is higher than that of children living in formal housing. When mothers are well educated, the prevalence of underweight amongst their children are lower (DOH, 2003).

2.5.Causes of malnutrition

PEM manifests itself as a complex disease with social, developmental as well as nutritional dimensions (Kean, 1998). In 1990 the United Nations Children's Fund (UNICEF) developed a conceptual framework, explaining the accepted causes of

malnutrition as an outcome of interrelated, complex, basic, underlying and immediate causes (figure 2.3) (UNICEF, 2004; Mason *et al.*, 2003).

Immediate causes of malnutrition include inadequate dietary intake, disease and poor psycho-social care, whilst basic causes are inadequacies in educational, political and economic systems and problems with the availability and control of resources. The underlying causes include insufficient food available to families (household food insecurity), inadequate care of women and children, traditional food customs and taboos for women and children, insufficient healthcare and an unhealthy environment (UNICEF, 2004; Kean, 1998; Naidoo *et al.*, 1993).

2.5.1. Immediate causes

The immediate causes of PEM include inadequate dietary intake, psycho-social stress, trauma and disease (WHO, 2004).

From the nutritional point of view, apart from poor maternal nutrition education, poor breastfeeding and other infant feeding practices, energy deficiency is of prime importance as one of the major causes of PEM. This often results from consuming too little food, especially energy dense foods. Furthermore, major diseases such as diarrhea, acute respiratory infections, measles, HIV and AIDS, tuberculosis, communicable diseases as well as other co-existent nutrient deficiency diseases, perpetuate PEM (Torun and Chew, 1999, p. 964; DOH, 2004).

A severe shortage of food, which causes malnutrition in households and communities, inhibit intellectual and physical development of children. Children who had nutritional and psychosocial deficits in their first 2 years of life, have an

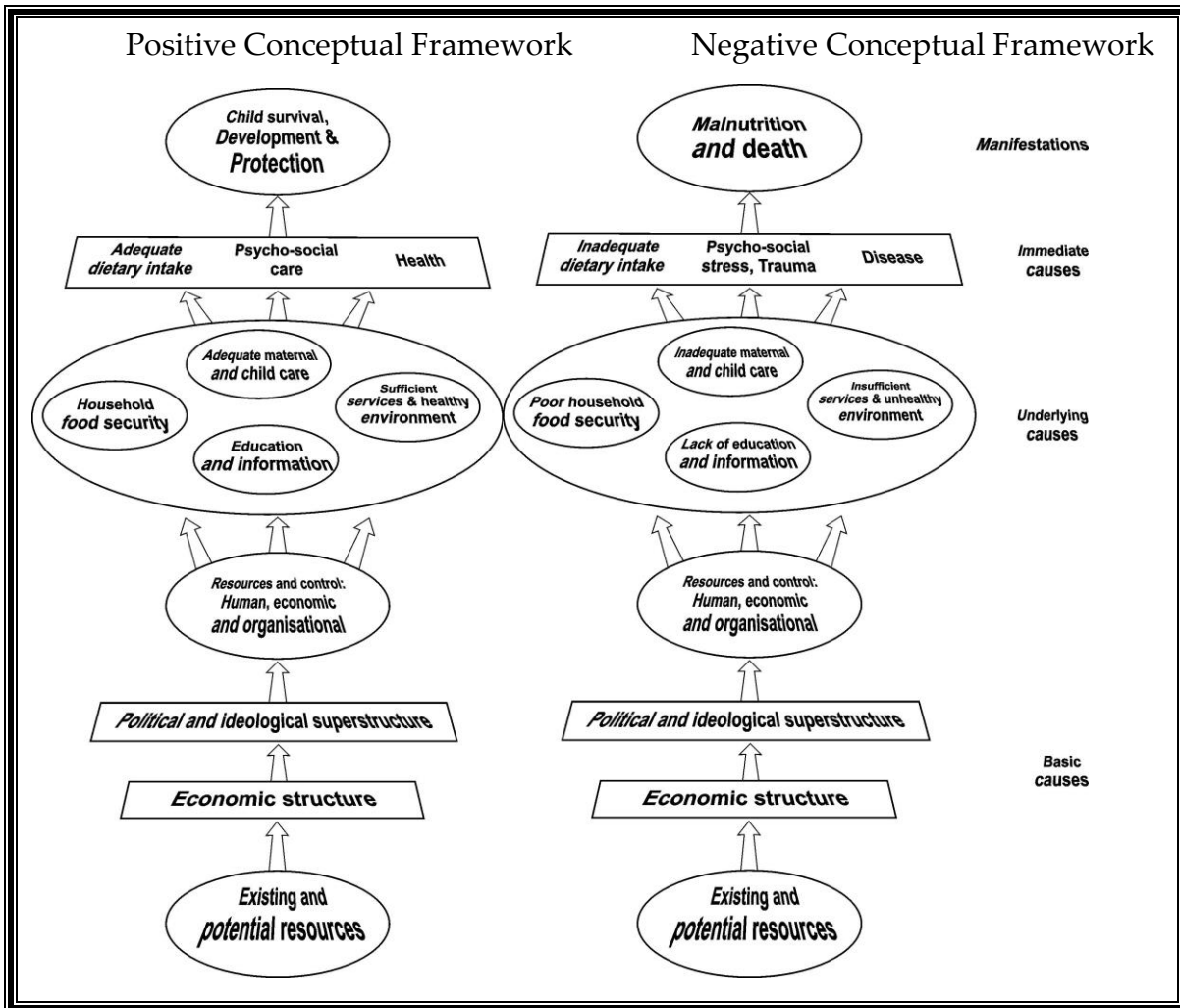


Figure 2.3: The UNICEF Conceptual Framework (*positive / negative*)
(UNICEF, 2004)

increased risks for lifelong impairment and disability. Nutritional deficiencies and a lack of physical stimulation create a vicious cycle in which a lack of the one results in further deprivation in the other. Both nutritional status and stimulation can improve when nutrition and psychosocial interventions are integrated. Key public mental health interventions, psychosocial support and nutrition interventions should be integrated in such a way that food security and caregiver-child relationships are strengthened. Nutrition education sessions should not only fo-

cus on nutrition, but also include topics of responsive parenting, proactive stimulation and appropriate responses (WHO, 2006b).

2.5.2. Underlying causes

Underlying causes of malnutrition include poor household food security, inadequate maternal and child care, lack of education and information and insufficient services and unhealthy environments (UNICEF, 2004).

Household food security depends on access to food, as well as the availability and utilization of food. Four factors are determinant: seasonal fluctuations in food availability, quality of the family diet, intra-household distribution of food and cultural beliefs and customs (Kean, 1998; Naidoo *et al.* 1993).

It has been determined that nutritional stress is highest during the wet season and just before the harvest, because food supplies are low and energy expenditures are high. The quality of the food intake of the family are determined by the amount of protein, energy and essential vitamins and minerals, which are provided in relation with the nutritional needs for each individual. In many homes a cultural belief exists that women eat last and least, despite the fact that they work longer hours and are responsible for all food preparation. African women consume less protein and fewer micronutrients than African men. Nutritional stress can be compounded by beliefs and taboos that limit the intake of foods that contain important nutrients, particularly during pregnancy (Kean, 1998).

Another concern rising in especially developing countries is the increase in obesity amongst poor households, where under- and over nutrition exist side-by-side (Le Gales-Camus, 2006). Undernutrition is not the foremost form of human malnutrition in populations any more. Under- and over nutrition co-exist within the same nation, urging policies and protocols to address both forms of malnutrition simultaneously. These double burden households are mainly found amongst populations of African countries (Uauy and Solomons, 2006). This double burden of disease is due to “nutrition transition” which refers to changes in body composition patterns, diet and physical activity brought on by complex interactions between economic, demographic and environmental factors. In developing countries, nutrition transition is mainly identified by a shift from consuming energy-poor plant based diets in combination with intense physical activity, to energy-dense processed foods and animal products, sedentarism and high prevalences of communicable diseases, including obesity. The driving forces of these changes include urbanization, economic development, educational and healthcare improvements, market globalization and technological advancements, among others (Popkin, 2002).

Other underlying causes of malnutrition include high birth rates and inaccessibility of healthcare services, inadequate care, poor caring practices and lack of appropriately trained health personnel (Kean, 1998).

2.5.3. Basic causes

Naidoo *et al.* (1993) indicated that undernutrition is largely the result of poverty arising from interrelated social and political factors (basic causes of malnutrition), which include:

- Under- and unemployment
- The pressure of a growing population on land which may be maldistributed
- Low productivity of agriculture
- Uneven distribution of income and food consumption
- Poor environmental sanitation
- Illiteracy, and
- Cultural deprivation.

According to Hansen (1993), malnutrition is largely the result of poverty, overpopulation, lack of education and other socio-economic factors (figure 2.3.) such as landlessness and migrant labour (Kean, 1998).

2.6. Impact of malnutrition on communities, individuals and countries

Failure to grow adequately is the first and most important manifestation of PEM (DOH, 2004).

The impact of malnutrition on individuals, households, communities and economics of countries is enormous. Because many of the effects of malnutrition are cumulative over a lifetime, children who are malnourished often enter adulthood with diminished mental and physical capacities. The long-term effect is an in-

creased burden of disease and decreased labour productivity, which hamper countries' overall growth and development (Kean, 1998).

Mild to moderate malnutrition reduces people's capacity for normal growth, development and function. The effects can be subtle and, many times, invisible. That is why malnutrition is called the silent emergency (Kean, 1998).

2.7.Malnutrition and HIV and AIDS

HIV and AIDS is globally a growing problem. More than 68% of people living with HIV and AIDS are found in developing countries, with an estimation of 1.7 million HIV infected people who live in Sub-Saharan Africa (USAID and WHO, 2007). In 2007 the USAIDS, WHO and Reference Group on Estimates, Modelling and Projections estimated that 33.2 million people worldwide were living with HIV and AIDS, 2.5 million people were infected with HIV and 2.1 million died due to AIDS (USAIDS and WHO, 2007).

In South Africa, 18.8% of South Africans aged 15-49 are infected with HIV and 235 000 children aged 14 years or younger are living with HIV and AIDS. HIV prevalence among antenatal clinic attendees is 30.2% and about 4.9 million people between the age of 15 and 49 years are infected with HIV (DOH, 2006).

The HIV and AIDS pandemic contributes significantly to childhood malnutrition. Malnutrition is a general denominator complicating HIV and AIDS and plays a significant and independent role in the mortality and morbidity of people living with HIV and AIDS. The nutritional status of a person suffering from HIV plays

an important role in the delay and progression of HIV infection. For the majority of South Africans living with HIV infection, maintaining and achieving a healthy nutritional status is vital in delaying the progression of HIV infection and postponing the time until treatment with anti-retroviral medicines becomes necessary (DOH, 2006, p.13-16).

Malnutrition is one of the major complications of HIV infection and a significant factor in advanced disease. In resource-constrained settings, HIV infection combined with pre-existing malnutrition places a tremendous burden on people's ability to remain healthy and economically productive (WHO, 2006a).

The relationship between HIV and AIDS and malnutrition is cyclical (figure 2.4.). Malnutrition is often due to inadequate food intake, increased nutrient requirements and a weakening in the immune system. Because of the weaker immune system, the body has less ability to fight other infections, which results in repeated opportunistic infections and malignancies. These repeated infections in their turn contribute to poor nutrition and malnutrition, and so the cycle continues. HIV infection on the other hand, contributes to an inadequate food intake due to poor nutrition, malabsorption and altered metabolism. The synergistic effects of malnutrition and HIV have similar affects on the human body. Both conditions affect the ability of the immune system to fight infection and contribute to the general health and well-being of the human body (DOH, 2006, p. 16-17; WHO, 2006a).

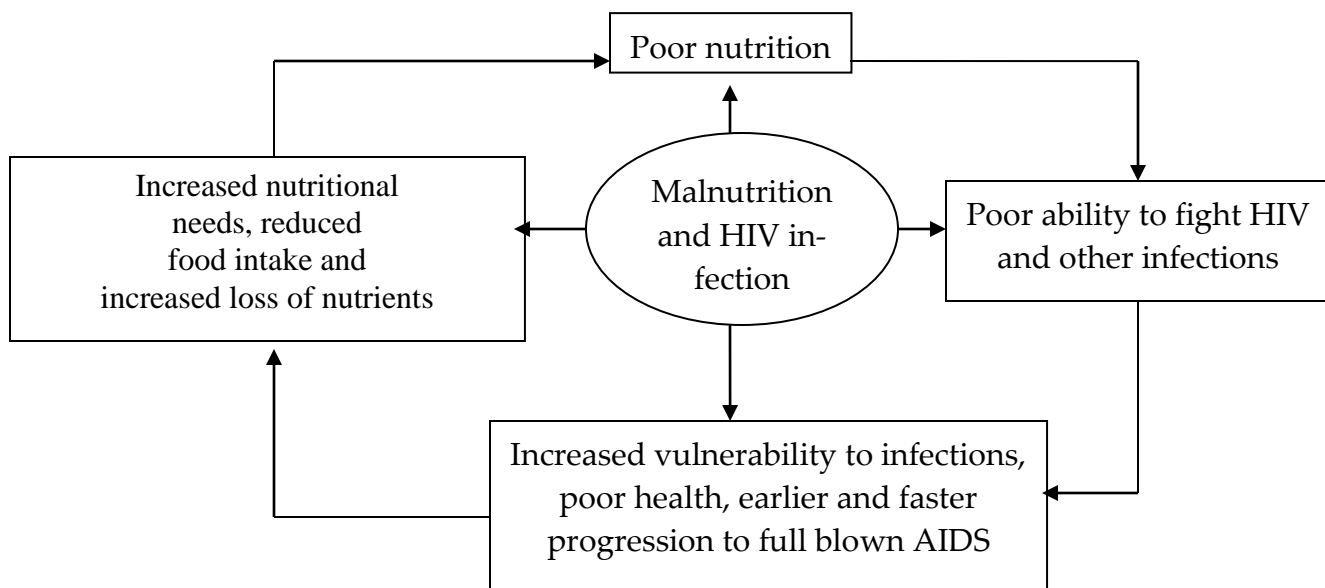


Figure 2.4. The vicious cycle between HIV infection and Nutrition
(DOH, 2006, p.17)

The vicious cycle that exists between HIV and malnutrition has the following results (DOH, 2006, p. 17):

- Weight loss, the most common and often disturbing symptom of HIV, reported in 95 percent to 100 percent of all patients with advanced disease
- Loss of muscle tissue and body fat
- Vitamin and mineral deficiencies
- Reduced immune function and competence
- Increased susceptibility to secondary infections
- Increased nutritional needs because of reduced food intake and increased loss of nutrients leading to rapid HIV disease progression

Apart from breaking the vicious cycle, good nutrition is important to help keep the body's mucosa healthy, which may help protect against HIV transmission (DOH, 2006, p.30, WHO, 2006a).

2.8.Solutions for the problem of malnutrition

It is of the utmost importance that malnourished children, their families and their communities are provided with the necessary home care to support optimal growth and development of children younger than 5 years of age (Botma and Grobler, 2004).

The triple A approach, illustrated in figure 2.5, has been proposed by UNICEF in 1992 as part of the strategy to achieve nutrition goals. The triple A approach is based on a process of problem assessment, analyses of the causes of the problem and action to solve the specific problem. The process of assessment, analysis and action can concentrate more specifically on applicable actions each time it is repeated, which allows solutions for new problems to be included as they become relevant (UNICEF, 1992).

The South African Department of Health has adopted the UNICEF conceptual framework (figure 2.3), to explain the causes of malnutrition, as well as nutrition programming as an ongoing process of assessment, analysis and action, the so-called Triple-A Cycle, at all levels in any given context (DOH, 2004).

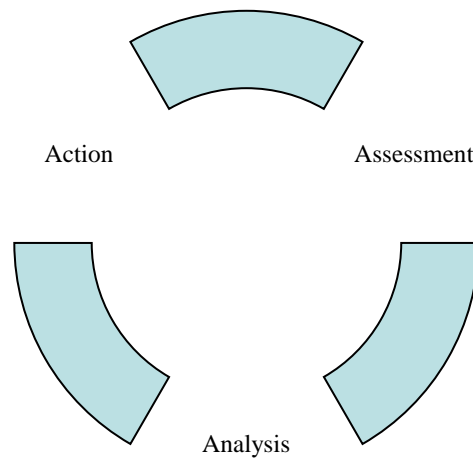


Figure 2.5: The triple A cycle (UNICEF, 1992)

Within this context nutrition problems can be identified and relevant nutrition interventions implemented. In communities where the prevalence of malnutrition amongst children is high, supplementary food aid is one of the nutrition interventions that can make a significant impact on the health and nutritional status of communities.

Chapter 3

Literature review: Nutrition Intervention Programs to address malnutrition



(FSOH, 2006)

3.1.Introduction

The first and most important goal with food supplementation will always be the prevention of PEM. Most interventions aimed at addressing malnutrition are based on the “Health for All by the Year 2000” Declaration, which is based on the Declaration of Alma Ata (1978), which states that health is a fundamental human right. Part of this Declaration, and an important policy element, is the improvement of nutrition and access to food. As early as 1981 WHO indicated that because of its multiple causes, malnutrition is often considered “everybody’s concern, but no-one’s responsibility” (Waterlow, 1992).

In 2000, the Millennium Declaration was adopted by the Heads of State. This Millennium Declaration comprises of eight goals which should globally be reached by 2015. These eight Millennium Development Goals (MDGs) were build on agreements reached in the 1990s at United Nations conferences. These MDGs are committed to decrease poverty and hunger, tackle ill-health, gender inequality, lack of education, lack of access to clean water and environmental degradation (WHO, 2000b). It is vital to address in particular MDG 1, Target 2, to contribute to the reduction of people suffering from hunger. All sectors should promote the Global Strategy on Infant and Young Child Feeding, as well as optimum foetal growth, the proper management of undernutrition, micronutrient intake for children under 5 years of age and food fortification (Le Gales-Camus, 2006).

An essential component in the fight against malnutrition is the development of policies created to address health and economic management. These policies should address the decline in the production of main food sources in developing

countries which threatens the sustainability of nutrition interventions. Policy changes should focus on addressing over- and undernutrition simultaneously, since this combination of malnutrition, occurs widely in developing countries (Lipton, 2001).

In addition to the INP and PEM Program, the Integrated Management of Childhood Illnesses (IMCI) program, as developed by UNICEF and WHO in 1995, is also implemented at PHC facilities. The IMCI is aimed at improving case management skills of healthcare workers in order to strengthen the health system and improving family and community practices to reduce infant and young child mortality rates through early diagnosis and treatment of malnutrition amongst children under five years of age (WHO, 2000a, p. 15).

3.2.Types of Nutrition Intervention Programs

In 1999, the WHO developed a standardized protocol to assist health workers in the management of severely malnourished children and reduce the high mortality associated with the condition. The WHO strategy for the management of the child with severe malnutrition is divided into three phases. These are:

- *Initial treatment:* life-threatening problems are identified and treated, specific deficiencies are corrected, metabolic abnormalities are reversed and feeding is commenced;
- *Rehabilitation:* intensive feeding is started to recover lost weight, emotional and physical stimulation are provided, the mother or caregiver is trained to continue care at home, and preparations for discharge of the child are made; and

- *Follow-up*: following discharge, the child and the child's family are followed up to prevent relapse and assure the continued physical, mental and emotional development of the child (Saloojee and Pettifor, 2001, p.127).

The management of malnutrition at PHC facilities, in the hospital setting and at household and community level, will be discussed in the following section.

3.2.1. Primary healthcare facilities

Waterlow (1992) described the basic strategy for achieving Health for All as PHC, which is considered to be an integral part of both the health system and the social and economical development of a community. Operationally, PHC includes eight essential elements, which include (Waterlow, 1992):

- Education on health problems
- Promotion of adequate food supplies and proper nutrition
- Adequate supply of safe water and basic sanitation
- Maternal and child healthcare, including family planning
- Prevention and control of locally endemic diseases
- Immunization against major infantile diseases
- Appropriate treatment of common diseases and injuries
- Provision of essential drugs

In order for governments or other agencies to deliver these eight essential elements of PHC, the primary healthcare system needs to be properly used and accessible. The interventions that are used to decrease the prevalence of malnutrition are covered by the UNICEF acronym GOBI-FFF: growth monitoring, oral

rehydration, promotion of breastfeeding, immunization, female education, family planning and food (Waterlow, 1992).

Both the INP and IMCI, are interventions that are aimed at identification and management of children who are nutritionally compromised (Kruger *et al.*, 2005, p.1-26). At clinics the IMCI protocol for classification of sick children according to the IMCI general danger signs, is used for the caring of outpatient sick children (WHO, 2000a, p. 15). In South Africa, the INP and IMCI should be implemented as an important part of the overall PHC and District Health System (DHS) approach. Nutrition interventions at health facilities aim to strengthen strategies to promote and address nutritional problems. The IMCI aims to prevent diseases through immunization, improved nutrition and exclusive breastfeeding. It also focuses on the importance of improving relevant family, community and broad care practices as well as care provided through the health system (DOH, 2003, p.11).

Most malnourished children are assessed and treated at PHC facilities. Therefore it is of utmost importance that training of health professionals and protocols should focus on skills and competencies to assess and treat malnourished children in this setting (Kruger *et al.*, 2005, p.1-26). Effective and proper clinical record keeping forms a major part of the basic principle of clinical care for children that suffer or are at risk for malnutrition (Kruger *et al.*, 2005, p.1-26).

3.2.2. At hospital level

Children that suffer from malnutrition are often referred from PHC facilities to hospitals for treatment. Because malnourished children are at risk of several life-threatening diseases such as hypoglycemia, hypothermia, serious infections and severe electrolyte imbalances, careful assessment, special treatment and management, with regular feeding and monitoring, should be included in their treatment at hospital level. This treatment should be well organized and provided to clients by specially trained healthcare professionals. Recovery may take a few weeks and discharge from hospital must be planned with great care in order to provide outpatient care and follow-up (WHO, 2000a, p.80). Relatives and caretakers should also be involved in the treatment of the emotional and physical stimulation of the client from the initial start of the treatment (Torun and Chew, 2005, p.982-983).

Approximately a third of all children suffering from severe malnutrition, which are admitted to hospital, die within the first 24 hours after admission. After 1-3 days, twenty six percent of these children die and eighteen percent during day 4 to 7. Of these deaths, 60% of the children were underweight-for-age before admission to the hospital and 33% severely malnourished (Kruger *et al.*, 2005. p. 1-26).

Adequate availability of facilities and trained healthcare workers should be available for the effective preparation of appropriate feeds and to feed malnourished children regularly during the day and night. Accurate scales should be available for the weighing of malnourished children and records should be kept

of the feeds that were administered, in order to monitor the progress of the child (WHO, 2000a, p. 81).

The WHO guidelines have introduced some novel recommendations for the management of severely malnourished children. These include:

- A similar dietary approach being proposed for both marasmus and kwashiorkor;
- The use of specially prepared feeds, which provide 75 kcal or 315 kJ / 100 ml for use during the initial phase of treatment and 100 kcal or 420 kJ / 100 ml for use during the rehabilitation phase once appetite has returned.
- The use of pre-mixed sachets of minerals (containing potassium, magnesium and other essential nutrients) and vitamins which are mixed with the diet. This replaces the need for the provision of individual minerals and vitamins separately; and
- A modified low-sodium oral rehydration solution (ReSoMal) for rehydration of malnourished children (Saloojee and Pettifor, 2001, p.127).

The WHO guidelines for routine treatment consist of 10 steps together with prescriptive actions (Saloojee and Pettifor, 2001, p. 128). These ten steps are:

- 1) Treat / prevent hypoglycemia
- 2) Treat / prevent hypothermia
- 3) Treat / prevent dehydration
- 4) Correct imbalance of electrolytes
- 5) Treat infections
- 6) Correct deficiencies of micronutrients (vitamin and minerals)
- 7) Start cautious feeding, then
- 8) Rebuild wasted tissues (catch-up growth)

- 9) Provide stimulation, play and loving care, and
- 10) Prepare for follow-up after hospital discharge

The last stage of the treatment begins 2-3 weeks after admission. During this time, the child should be eating adequate amounts of food and gain weight (To-run and Chew, 2005, p.982). Before discharging a malnourished child from hospital, continuing care or follow-up should be arranged with PHC or community health workers, as far as possible. Carefully planned outpatient care is necessary to complete the rehabilitation process of the malnourished child and to prevent relapse. On discharge, the child should be referred to a nutrition rehabilitation center, local clinic or health worker in writing. This written discharge note should contain information on the weight on discharge, feeding recommendations and the expected action from the healthcare worker (WHO, 2000a, p. 9-88).

3.2.3. At household level

Before discharge, a mother / caretaker should be educated in feeding and stimulating her child to prevent relapse. Because of the delay in mental and behavioural development of the malnourished child, the mother / caretaker should also be educated on how to stimulate her child's mental and behavioural development at home (WHO, 2000a, p.81).

Another area of education to the mother / caretaker should focus on appropriate feeding practices for the child that is being treated at home. It is important for this child to receive small, frequent, energy dense meals with a high energy and protein level. These meals should be provided to the child five times a day, containing more or less 420 kJ and 2-3 g per 100 g food. Locally available foods

should be used. Breastfeeding should be encouraged and continued when applicable (WHO, 2000a. p.87-91).

The mother / caretaker should be advised to take the child to the local clinic for follow-up. Children, who are underweight-for-age, should be followed-up every 30 days. This follow-up consists out of weighing the child, reassessing feeding practices and counseling the mother / caretaker further on feeding and nutrition practices. The mother / caretaker must continuously be reminded of the next visit for immunization and weighing. The mother should also be counseled on when to return to the clinic (WHO, 2000a, p.120-122).

In a case where a child presents with malnutrition, it is an indication of a health or nutrition problem within a household. Therefore, it is of importance for healthcare workers to also screen the other household members for malnutrition or their risk for becoming malnourished. Because of this, nutrition interventions and rehabilitation programs should not be limited to the malnourished child only, but should focus on the prevention and treatment of all the health and nutrition problems existing within the household (Torun and Chew, 2005, p.985).

Adequate evidence exist that at household level, family planning strategies including fewer children per family, later first births and wider child spacing can improve the nutritional status of household members (Lipton, 2001).

3.2.4. At community level

The prevention and control of malnutrition should be addressed using a multi-sectoral approach. At a national and provincial level, malnutrition can only be decreased in an atmosphere of short- and long-term political commitments and effective strategies to alleviate the underlying causes of malnutrition (Torun and Chew, 2005, p.985).

Education programs and other nutrition intervention programs should be developed and focused on the community as a whole. Community leaders and civic action groups can be used as an entry point to reach the community. Nutrition intervention programs should emphasize the promotion of breastfeeding, appropriate use of weaning foods, nutritional alternatives using traditional foods, personal and environmental hygiene, feeding practices during illnesses and early treatment of diarrhea and other diseases (Torun and Chew, 2005, p.985).

Food-based nutrition interventions such as vegetable gardens and nutrition education, offer a sustainable approach to reduce malnutrition and other micronutrient deficiencies. However, these projects have often been poorly evaluated in third world countries (Jones *et al.*, 2005, p.198-208).

Family planning strategies will not only decrease the prevalence of malnutrition at community level, but will also impact on reducing the rapid increase on economic growth rates and lower the income inequality. By addressing family planning, poverty will be reduced, as well as the prevalence of malnutrition (Lipton, 2001). PEM can also be eliminated by an increase in rates of employment, self-employment and production of food at rural and urban level. Another strategy

that can be used is to decrease the unequal distribution of agricultural land so that more food sources can be produced and availability of food amongst more households can be increased (Lipton, 2001).

All community-based nutrition intervention programs must include the community's own evaluation of their nutritional needs and their feelings toward personal participation in addressing these needs (Torun and Chew, 2005, p.986). Ways should be found to establish community-based growth monitoring clinics to identify children who are at risk for or who are already malnourished (DOH, 2003, p. 11).

3.3.Nutrition education

Nutrition education is regarded as the primary intervention for the prevention and treatment of malnutrition (DOH, 2003, p.13-19). Nutrition education programs should focus on the individual, the family and the community (Torun and Chew, 2005, p.985).

Nutrition education should focus on improving household food security, the protection, promotion and support of exclusive breastfeeding for 6 months, safe infant feeding practices in the context of HIV and AIDS, appropriate complementary feeding practices, growth monitoring and the prevention of growth faltering. Other topics which should receive attention include the consumption of micronutrient rich foods and vitamin A supplementation, food preparation and hygiene, dangers of smoking and alcohol consumption during pregnancy, appropriate nutrition during pregnancy and lactation (DOH, 2003, p. 13-19). In addition to these topics, Pierce and Gardner (2006, p.18) have suggested that mothers

/ caretakers should also be educated on the use, importance and interpretation of Road to Health Charts, household vegetable gardens and sanitation and clean water.

Nutrition interventions providing health education and income generating services to clients, improves the knowledge, attitude and practices of mothers / caretakers with malnourished children, leading to a decrease in malnutrition rates (Agboatwalla and Akram, 1995). Health education not only changes the awareness and knowledge of community members, but can also successfully alter health practices which reflect in reduced incidences of malnutrition, diarrhea, fever and respiratory tract infections (Agboatwalla and Akram, 1995; Akram and Agboatwalla, 1992). Nutrition education should form an integral part of primary healthcare programs and mothers especially should be targeted (Naidoo *et al.*, 1993). This health education should be client-specific and must address the needs as identified by the client (Botma and Grobler, 2004).

Although nutrition education programs are more sustainable over the long-term, changing practices can take a long time. It is important that nutrition education programs be supported by a food supplementation program in the management of children with malnutrition (Pant *et al.*, 1996).

3.4. Supplementary feeding

Nutrition programs that have the most significant global effect on reduction of nutrition, are those targeted at food insecure pregnant women and children under 3 years of age (Schroeder, 2001, p.416-417). The focus should be especially on children aged six months to two years in order to prevent growth faltering (Saloojee and Pettifor, 2001, p. 124-125). It is in these populations and these age groups that nutrition interventions have the greatest potential for benefit. Programs that will effectively promote child growth should have various characteristics, which will build around promoting weight gain amongst children and pregnant women and promoting healthy growth of young children through behaviour change, integration between community-based projects and health services and political and local commitment (Schroeder, 2001, p.416-417).

Of the several direct interventions against malnutrition, supplementary feeding is the most frequently employed in poor countries. If properly designed, implemented and integrated with other services, the allocation of supplementary foods can contribute significantly to the alleviation of malnutrition (WHO, 2003). According to United States Agency for International Development (USAID) (2006) however, it is estimated that one third to one half the ration of food supplements, which are taken home, may be substituted for the home diet and sharing with others. Food supplementation programs should thus be seen as short-term measures to achieve certain nutritional and health objectives, while long term programs are being implemented to alleviate the root causes of malnutrition (Naidoo *et al.*, 1993).

Gutierrez *et al.* (1998) found that a feeding supplementation program for 12-24 months temporarily minimized severe nutritional deficiencies but was not sufficient to recover and maintain normal growth. However, Fernandez-Concha *et al.* (1991) indicated that a home nutritional rehabilitation program could provide an inexpensive, reproducible method useful for the treatment of malnourished children in 0-3 year old children in the third world.

Currently in South Africa, there are three government-based schemes, which focus on children and their families. These include the PEM Program, Community-based Nutrition Programs (CBNP) and NSNP (NICUS, 2005).

Through the implementation of the PEM Program in the PHC facilities of the Free State Department of Health, underweight children younger than 5 years and underweight pregnant women and lactating women are identified. These clients then receive supplements that consist of a combination of the following products according to age and individual needs: enriched maize meal, enriched protein drink, acidified or soya formula and multivitamin syrup (DOH, 2003).

The clients should receive these supplements for a minimum of three months and a maximum of six months. Household insecure clients are referred to the Social Welfare Department for social grant support. These clients also receive vegetable seeds in order to establish vegetable gardens (DOH, 2003).

Refer to Table 3.1. for a summary of the food supplements that are provided to clients of the PEM Program in the Free State (FSDOH, 2002).

Table 3.1. Summary of food supplements provided to malnourished children in the Free State

Target group	Food supplement type	Quantity per month
Non-breastfeeding infants, 0-6 months	Acidified infant formula or soya-based infant formula Vitamin A supplement	2-5 tins per month, depending on the age of the child 50 000 International Units (IU) (1 dose)
Underweight children >6 months – 60 months	Enriched, lactose free protein drink and Enriched maize meal per child per month Vitamin A supplement	1 kg per child per month 2 kg per child per month 100 000 IU (1 dose on 9 months) 200 000 IU (1 dose every 6 months from 12-59 months)
All PEM Program clients	Vegipack (vegetable garden seeds – summer or winter)	1 pack with the first visit

Nationally, the following types of supplements are recommended for malnourished children (DOH, 2003, p. 20-21):

- For children below 6 months: cow's milk-based infant formula or soya-based infant formula

- For children 6-60 months: Full cream milk and enriched maize meal

In an ideal situation, the mother / caretaker of a malnourished child should be referred for participation in a Community-based program to address the long-term alleviation of household food insecurity, which is a contributing factor to the child being malnourished (DOH, 2003, p.5).

In order to eradicate malnutrition, partnerships between various public departments, the private sector, non-profit organizations (NGO) and faith-based organizations (FBO) should be established to address the underlying causes of malnutrition (Pierce and Gardner, 2006, p.21-25).

Chapter 4

Methodology



(FSDOH, 2005)

4.1.Introduction

The implementation of the PEM Program is dependant on the attitudes, perceptions and knowledge of the nursing staff, mothers / caretakers and dieticians towards it, due to the fact that they are the ones who are responsible for the implementation, monitoring and evaluation of the program (DOH, 2003).

4.2.Study design

The research comprised a cross-sectional descriptive study.

4.3.Population and Sampling

The distribution of public healthcare services is undertaken according to the municipal demarcation. The Free State province is divided into three regions, namely The Eastern, Southern and Northern Regions. Within these three regions, there are five districts: Fezile Dabi, Xhariep, Motheo, Thabo Mafutsanyana and Lewjelephutswa districts. Each district is divided into 3-5 sub-districts.

Due to the vast distances between small rural areas, manpower in the healthcare facilities in the Free State is not equally distributed. This leads to an unequal distribution of the nutrition services amongst the 238 public healthcare facilities. Nutrition services are available in 88 of the healthcare facilities.

The professional nurses, mothers / caretakers and children who were included in the research were those who were available at the healthcare facility on the spe-

cific day on which the facility was visited by the researcher and the fieldworkers. The dieticians who were included in the sample included all the district dieticians and community service dieticians.

The PEM Program records, which are kept in the healthcare facilities, were used to obtain the information required for completing the questionnaire related to the anthropometric information (Addendum 3).

The sample size was determined through randomized proportional sampling. Thirty percent of the total numbers of PHC facilities in the Free State were included in the sample size. The sample consisted of 71 PHC facilities, 26 facilities where nutrition services are available and 45 where nutrition services are not available. Healthcare facilities from all 5 the districts in the Free State were included in the sample size. See Addendum 1 for the names and allocation of clinics, per district, which have been included in the main study.

When a city or town had more than one PHC facility (e.g. Bloemfontein has 12) a random sample of the requested number of facilities was made (e.g. 4 in Bloemfontein) as follows: number all 12 facilities, then 12 numbers were thrown into a hat and 4 numbers drawn. These 4 clinics were included in the sample.

Although a total of 71 PHC facilities were initially identified to be included in the sample, only 51 could be included. The reasons for this was that the PEM Program was not implemented at some of the PHC facilities and secondly that no children 0-60 months were visiting that facility on the day the facilities were visited by the fieldworkers.

4.4.Operational definitions

In order to meet the objectives set for the study, the following variables were included:

4.4.1. Retrospective data

4.4.1.1.Implementation of the PEM Program

For the purpose of this study implementation was described as the actions undertaken by health professionals in order to meet the criteria for PEM Program as described in the Free State Malnutrition Policy.

The criteria of the PEM Program are identified by:

- Including the correct target groups
- Adhering to the set entry and exit criteria
- Providing the correct type and amount of nutritional supplements
- Correct ordering and stock control of nutritional supplements
- Referral of clients to various related role-players, e.g. social development services

4.4.1.2.Completeness of the RTHC

For the purpose of this study the completeness of the RTHC was defined by the following:

- The RTHC is completed with each visit of the child to the clinic
- The weight of the child is plotted on the RTHC with each visit to the clinic

- The weight dots are connected to one another
- The calendar of the RTHC starts with the birth month of the child
- The weight of the child is plotted in the correct month column of the calendar

4.4.2. Prospective data

4.4.2.1. Involvement of nutrition services

For the purpose of this study, involvement of nutrition services is described as the availability and accessibility of dietetic and nutrition services, delivered by dietitians and nutrition auxiliary personnel, at PHC facilities.

4.4.2.2. Growth status of children under 5 years and mothers / caretakers participating in the PEM Program

For the purpose of this study, the following anthropometric parameters were included:

- Weight-for-age (children <5 years)
- Body Mass Index (BMI); (Mothers / Caretakers)

For the purpose of this study, BMI was used to determine underweight in mothers / caretakers and weight-for-age to determine underweight in children younger than 5 years.

- Weight-for-age (children younger than 5 years):

A weight for age below the 3rd percentile of the NCHS median is an indication of underweight. Weight-for-age below 60% of expected weight is an indication of severe malnutrition which is known as marasmus (WHO, 1999). The percentiles on the national RTHC as indicated in Figure 4.1 were used to identify underweight and marasmus.

- Body Mass Index (BMI); (Mothers / Caretakers):

BMI in the mothers / caretakers refer to:

Weight (kilograms)

Height² (meter)

BMI was interpreted as follows (Laquatra, 2004, p.1186):

Interpretation	BMI Range
Underweight or WHO malnutrition	<18,5 kg / m ²
Normal weight	18,5 – <25 kg / m ²
Overweight	25 - <30 kg / m ²
Obese	≥30 kg / m ²

4.4.2.3. Knowledge of professional nurses and mothers / caretakers regarding the PEM Program

For the purpose of this study, the knowledge of health workers and mothers was determined by comparing the answers to the following questions against the criteria described in the Free State Malnutrition Policy.

Professional nurse

- “Who is the target group for the PEM Program?”
- “What supplements are being given to PEM Program clients?”
- “What is the primary intervention of the PEM Program?”
- “To whom do you refer underweight clients with a low socio-economic background?”

The mother / caretaker

- “Which supplement should this child receive?”
- “How much of these supplements should this child receive?”
- “For how long should this child receive these supplements?”
- “Have you received any education on how to prepare the supplementation?”
- “Are the supplements the only food that you give your child to eat?”

4.4.2.4. Attitudes and practices of professional nurse and mothers / caretakers regarding the PEM Program

Attitudes and practices included the following:

- Do mothers / caretakers think that supplements are necessary for the malnourished child and that it contributes to the general well being of this child?
- Does the professional nurse also examine family members of a malnourished child for malnutrition?
- “How many people in the household are sharing in the supplements?”
- “Are the supplements the sole food source for the malnourished child?”
- “What food is available at home?”

4.4.2.5. Referral practices within the PEM Program

The practices of referral of clients to stakeholders were identified by asking:

- “What other health professionals are involved in the treatment of the child?”
- “Will health professionals refer clients to community-based services / projects?”

4.5. Pilot study

The main reason for conducting the pilot study was to determine whether the questions were clear and whether fieldworkers would be able to understand and complete the questionnaires in full.

The pilot study was also conducted beforehand to:

- ensure that the study could be implemented in the PHC facilities
- determine whether the requested information and clients would be available at the facilities, and
- determine defects in the questionnaires and to rectify these before the actual survey starts (e.g. are the questions all understood?).

The pilot study was conducted at Matlakeng Clinic, situated in Zastron, Xhariep district. This clinic was excluded from the sample for the main study.

All questionnaires and activities were piloted. Professional nurses, mothers / caretakers and children younger than 5 years were targeted for inclusion in the pilot study.

On completion of the pilot study, the need to rephrase some questions was identified. No problems were experienced in conducting the interviews and obtaining the data from the PEM Program registers. However, conducting the interviews was time consuming; 30 minutes to complete an interview with the Professional Nurse and 45-60 minutes to conduct an interview with the Mother / Care-taker.

The questionnaires were adapted according to the shortcomings identified. Changes made to the questionnaires are listed in Addendum 2.

4.6. Techniques

4.6.1. Retrospective data

4.6.1.1. Questionnaires

Structured questionnaires were developed to collect retrospective data from the PEM Program registers and RTHC. Questionnaires were developed in collaboration with various role players of the nutrition section of the Free State Department of Health. Each member of the task team had to ensure that challenges that are encountered with the implementation of the PEM Program are included in the questionnaire.

Required retrospective information was obtained from files in the PHC facilities by the researcher and fieldworkers (Addendum 3).

4.6.2. Prospective data

4.6.2.1. Questionnaires

The prospective data was obtained through interviews between the researcher / fieldworkers and the target groups. The questionnaires related to knowledge, practices and attitudes for the professional nurse and mother / caretaker were completed during these interviews (Addendum 4 and 5).

The questionnaire completed by dieticians was self-administered. An electronic copy of the questionnaire for dieticians was sent to dieticians via e-mail or deliv-

ered by hand. The dieticians were expected to print a hard copy of this questionnaire, complete it within one week (five working days) and fax or post the completed questionnaire back to the researcher (Addendum 6).

4.6.2.2. Weight

An electronic scale was used to weigh mothers / caretakers and children. This scale was calibrated by the fieldworkers by weighing a 1 kilogram packet of enriched maize meal. Fieldworkers ensured that the scales were zeroed and placed on a flat surface before children and adults were weighed. Mothers and children were required to take off shoes and excessive clothing before weighed and nappies of babies were removed before they were weighed. The weight was only read once as soon as the electronic reading was stable. Weight was measured to the nearest 0,1 kg (Lee and Nieman, 2003, p.167).

4.6.2.3. Height

The height of mothers / caretakers was determined using a stadiometer. Mothers / caretakers was required to take off their shoes and to stand straight-up against the meter stick with heels flat on the floor, and shoulders, chin and neck straight. Height was measured to the nearest 0,1 cm (Lee and Nieman, 2003, p.225).

4.7. Validity

Validity is defined as the capability of measuring equipment to measure what is intended to be measured (Monsen, 1991, p. 71).

In order to ensure the validity of data collected using the questionnaires, inputs from experts in the field of child health, dietetic services and nutrition were included.

In order to ensure the validity of anthropometric measurements collected, calibrated, electronic scales was used to determine weight and stadiometers were used to determine height.

4.8. Reliability

Reliability refers to the degree to which measurements and data are free from errors and therefore guarantee dependable results (Monsen, 1991, p.71).

Reliability of continuous results was ensured through utilizing trained field workers and structured questionnaires. By using interviews with participants to collect data from Professional Nurses and Mothers / Caretakers, the reliability of the data was also enhanced. The reason for this being that this method has been proven to ensure a higher response rate (80-85%) than self-administrative questionnaires (Babby, 2001).

To ensure reliability of the data only one person, namely the researcher, coded the questionnaires.

Ten percent (10%) of the completed retrospective questionnaires, collected from the PEM Program registers by health professionals and dieticians were re-completed by the researcher. Where the answers to the questions asked differed

with more than 20%, the question was considered unreliable and the results excluded.

4.9. Measurement and Methodology errors

Measurement and methodology errors have been limited through the following:

- Training of all field workers on the terminology and content of the questionnaires.
- Introduction statements before the interviews with health workers and mothers / caretakers and dieticians focused on the purpose of the survey and the importance of answering honestly
- Ten percent of the completed data, collected from the PEM Program registers, were re-administered by the researcher to ensure reliability.
- One calibrated scale per district was used to weigh children and mothers / caretakers.
- Field workers were divided into categories for the collection of data by using specific questionnaires, example the dieticians and nutritionists collected data from the PEM Program register, community service dieticians collected data from the RTHC and weighed the children and auxiliary workers interviewed mothers / caretakers.
- Field workers visited the identified PHC facilities only once for one day to collect the data to ensure that clients were not included in the sample size more than once.

4.10. Ethical consideration

Before commencing the research, the research proposal was approved by the Ethics Committee of the Faculty of Health Science at the University of the Free State (ETOVS number: 29/05).

Informed consent was obtained from mothers / caregivers of children younger than 5 years of age (Addendum 8). The informed consent forms were available in Afrikaans and English. Community developers and nutrition auxiliary personnel translated the form verbally into South Sotho, Xhosa, Tswana and Zulu, according to the participant's language preference. The participants understood that participation was voluntarily and that they would not be discriminated against if they chose not to participate.

Confidentiality of data collected from participants was ensured by using numbers as identifiers rather than names.

Children with severe malnutrition identified in the study were referred to the sister in charge of the PEM Program for the necessary management.

4.11. The role of the researcher and the fieldworkers

4.11.1. The role of the researcher

The researcher was responsible for the development of the questionnaires, training of all fieldworkers on the data collecting procedures, pilot study (refer to figure 4.2), assistance with data collection, recommendations and feedback sessions with managers in the public health sector.

4.11.2. The role of the fieldworkers

The field workers that assisted with the collection of data included:

- Managers, dieticians, nutritionists and auxiliary workers from the Nutrition Section from the Free State Department of Health
- Community health workers, assisting with the DOTS and Home-based care programs
- Community service dieticians



Figure 4.2: The researcher weighing a baby during the pilot study

The community health workers were used as translators during interviews with mothers / caretakers. The managers in the health sector informed the sister in charge of the PHC facilities that the researcher and the fieldworkers visited the facilities to collect the data for the research.

Dietitians, nutritionists, community service dietitians and auxiliary workers from the Nutrition Section assisted the researcher in the collection of the data through interviews, growth monitoring and collecting data from the PEM Program registers (see figure 4.3).



Figure 4.3: A dietitian and community health worker conducting an interview with a mother

4.12. Data collection process

The process, which was followed in the planning and implementation of the study, is summarized in figure 4.4.

Prior to the study, approval for the research project was obtained from managers of the Department of Health: Free State, as well as from the Research Evaluation Committee (School of Allied Health Professions, Faculty of Health Sciences, University of the Free State) and the Ethics Committee of the Faculty of Health Sciences. Presentations were given during managers' meetings where all managers from different organizational structures could be reached. Written information notices were handed to these managers for distribution to the PHC facilities which were selected for participation in the research project. The presentation mainly focused on the purpose and objectives of the survey, which PHC facilities are involved in the sample size, the dates on which each facility will be visited, dates and venues for the training of the field workers, and inputs from their side.

Training sessions were arranged within the five districts of the Free State for the training of the field workers. The purpose of these training sessions was to ensure that field workers are familiar with terminology in the questionnaires, information to be collected, how questions should be asked without prompting the respondent for a correct answer and the action plan for the collection of data within the province. The researcher conducted these training sessions.

Officials from the Department of Health within the various districts were used for the collection of data within the district where they are functional. This approach was more cost-effective.

The field workers visited the PHC facilities as identified in the sample size for one day and mothers / caretakers who had brought their children to the facility were interviewed. On that same day the health professionals were interviewed and the data from the RTHC and PEM Program register collected. All children

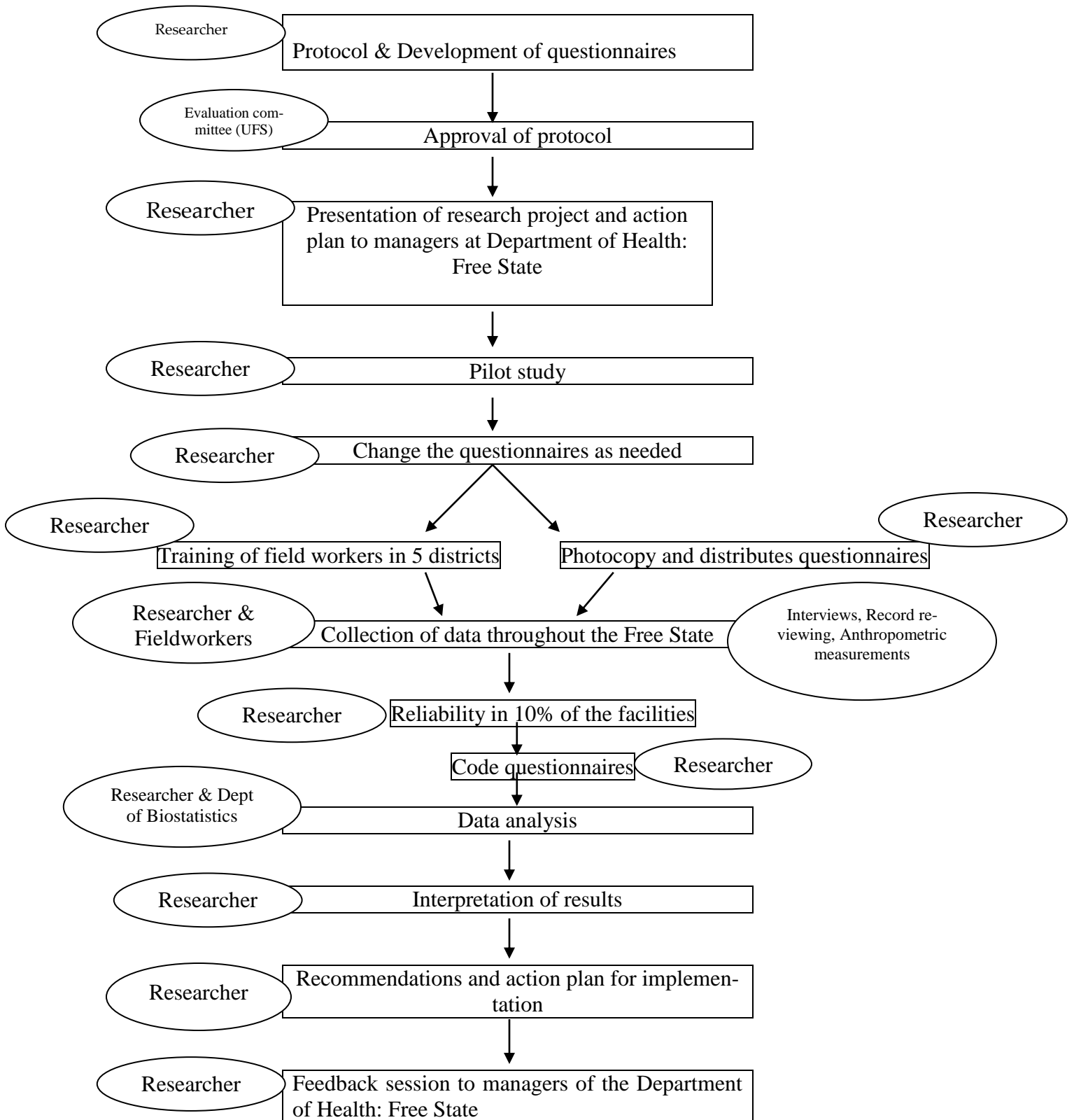


Figure 4.4: Flowchart of the study process

who are at that specific facility were weighed by the field workers and the weight was noted on the provided form (Addendum 7).

Questionnaires were distributed to all dieticians involved in the rendering of services at the chosen PHC facilities electronically via e-mail or by hand. Hard copies of the completed questionnaires were faxed back to the researcher within one week (five working days) or handed to the researcher in person (Addendum 6).

Trained field workers were used as translators to conduct interviews with mothers / caretakers, if the need arose. Field workers were divided into categories for the collection of data by using specific questionnaires, example the dieticians and nutritionists were collecting data from the PEM Program register (Addendum 3), Community service dieticians were collecting data from the RTHC and weighed the children (Addendum 7) and Auxiliary workers interviewed mothers / caretakers (Addendum 5).

Two questionnaires were used during the collection of the data by trained field workers in order to interview:

- The identified health professional responsible for rendering the service (see Addendum 4 for the questionnaire)
- The mother / caretaker of the child < 5 years (see Addendum 5 for the questionnaire).

A questionnaire on the referral of patients to and from dieticians and the availability of dietetic / nutrition services at identified PHC facilities, was completed by

dieticians or district nutrition managers and submitted to the researcher (see Addendum 6 for the questionnaire).

A data form, was used to collect retrospective data from the order form and PEM Program register (Addendum 3) and the RTHC (see Addendum 7).

Addendum 7 was also used to collect data on anthropometry of children < 5 years, visiting the health facility on the day when the research team was present.

The data was collected within a period of three months (1 July to 30 September 2005) throughout the province. Completed questionnaires were submitted to the researcher within two weeks after the collection of data was completed.

The completed questionnaires were coded by the researcher and analysed by the Department of Biostatistics, Faculty of Health Sciences. Feedback was given to managers from the Department of Health, dieticians and sisters in charge of the PHC facilities, included in the sample.

Action plans were drafted to implement the recommendations and sent to all role-players for inputs. The finalized action plan will be submitted to the Free State Department of Health for implementation.

4.13. Statistical analysis

Descriptive statistics namely means and standard deviations or medians and percentiles for continuous data and frequencies and percentages for categorical data, were calculated per group.

4.13.1. Knowledge and practices of healthcare workers and mothers / caretakers of the PEM Program

Percentages and frequencies were used to describe categorical data, medians, percentiles and percentiles to describe continuous data.

4.13.2. Anthropometry

The Epi-Info Computer Version 5 was used to analyze anthropometric variables. The data for anthropometric measurements are analyzed for mothers / caretakers and children younger than 5 years. The data was categorized as Body Mass Index (weight kg / height m²) for mothers / caretakers and weight for age (W/A) according to the cut-off points as discussed under point 4 under Operational Definitions for children. For each group, the categorized variables were described by frequencies and percentages.

4.13.3. Associations between variables

The associations between knowledge and anthropometric data was calculated and described by means of 95% confidence intervals.

Chapter 5

Results



(FSDOH, 2006)

5.1. Introduction

The main focus of the research was based on the Free State implementation guidelines and policies for the implementation of the PEM Program (Addendum 9). Challenges with the implementation of the PEM Program as identified by experienced dietitians and nutritionists were also included in the research.

In order to determine the reliability of the retrospective data, ten percent (10%) of the PEM Program register questionnaires that were completed by the fieldworkers was re-completed by the researcher. A difference of more than 20% was considered as unreliable and the results excluded. For this research, none of the data that was re-collected by the researcher differed with more than 20%. Thus, the data that is indicated in the tables below are considered to be reliable.

5.2. Background information of the sample

The total number of 51 fixed PHC facilities was included in the sample of which 14 were located in Motheo, 6 in Xhariep, 11 in Fezile Dabi, 9 in Thabo Mofutsanyana and 11 in Lejweleputswa. According to the interviewed health professionals (including dietitians and professional nurses), the PEM Program was implemented in all these facilities.

A total number of 43 professional nurses were included in the sample and 15 dietitians. Most (93.02%) of the interviewed professional nurses were females and their age varied between 65 and 29 years with a mean age of 43 years.

A total number of 43 PEM Program registers were evaluated at the PHC facilities, included in the sample. The purpose of evaluating the PEM Program register was to obtain information on the implementation practices. According to the statistics obtained from the PEM Program summary register, a median of 4 clients per health facility were participating in the PEM Program.

A total number of 399 mother and child pairs were weighed by the field workers during their visits to the PHC facilities. The children that were weighed were between the ages of 1 month and 60 months, with a mean age of 9 months. The current weight of these children varied between 2.3 kilogram and 18.5 kilogram, with a median weight of 8 kilograms.

The nutritional status of the mothers / caretakers was determined by the calculation of their BMI. The BMI of the 399 mothers / caretakers varied between 14.17 kg/m² and 46.38 kg/m² with a median of 25 kg/m².

A total number of 46 mothers / caretakers of children participating in the PEM Program were interviewed. Thirty one (31) of these interviewed persons were the mothers / parents of the children. In 7 cases (15.22%) the mother / caretaker indicated that both she and her child received food supplements. For the remaining percentage, only the children received food supplements.

Most of the children (54.35%) received the food supplements for more than 3 months. The median period for the children receiving the food supplements was 7 months. The maximum period for provisioning of food supplements was 24 months.

Eighty percent (80%) of the children participating in the PEM Program were initially breastfed for a median period of 5 months. At the time of the interview, 5 mothers were still breastfeeding their children.

5.3. Retrospective data

The retrospective data that was collected included the evaluation of the criteria of the PEM Program as identified by the target groups, entry and exit criteria, type of food supplements issued to clients and quantities issued, the ordering and stock control of food supplements, primary and secondary interventions of the program and referral of clients to various related role-players.

Although the target group for the PEM Program included both children and adults, for the purpose of this study, only the implementation of the PEM Program amongst children younger than 5 years was evaluated.

Other retrospective data that was collected included the involvement of dietetic and nutrition services at primary healthcare level.

5.3.1. Involvement of dietetic and nutrition services in the implementation of the PEM Program

5.3.1.1. Officials responsible for the implementation of the PEM Program

As seen in Table 5.1, nutrition personnel were appointed in only 9 PHC facilities involved in the implementation of the PEM Program. In 25% of the PHC facilities the PEM Program was implemented by the Sister in charge of the clinic and in

20% of the cases the PEM Program was either implemented by a professional nurse, responsible for Child Health in the clinic or not implemented at all.

Table 5.1: Officials responsible for the PEM Program at PHC facilities as reported by professional nurses

Parameter	Number (N)	Percentage (%)
<i>Who is responsible for the implementation of the PEMP in this clinic?</i> (n=43)		
1. Yourself	11	25.58
2. Nutrition auxiliary officer (SASO)	5	11.63
3. Pharmacists / assistant	1	2.33
4. Dietician	4	9.3
5. Other	9	20.93

5.3.1.2. Referral of hospitalized PEM Program clients on discharge

As seen in Table 5.2, 93.33% of children who were admitted to hospital due to malnutrition were referred to the local clinic for participation in the PEM Program at clinic level when discharged from the hospital. In most of the cases, these children were referred to the local clinic for participation in the PEM Program by dieticians.

In 60% of cases, patients were issued with food supplements (which will last them for a month) after being discharged from the hospital. In 33.33% of cases, patients did not receive food supplements with discharge because no supplements were available. In some cases, patients were issued with enough food supplements to last for 2 weeks. Patients who were situated on farms and rural areas were issued with a one month supply of food supplements, whilst patients living in urban and semi-urban areas received food supplements that would last for 1 week.

Forty six percent (46.67%) of the dieticians, included in the sample, indicated that clients who were admitted to hospitals for treatment of malnutrition were not referred to them for nutrition interventions and dietary support.

5.3.2. Evaluation of the implementation of the PEM Program against the criteria set out in the Free State Malnutrition Policy

5.3.2.1. Target groups for the PEM Program

Most of the interviewed professional nurses were aware of the target groups for the PEM Program. Apart from children younger than 5 years of age, underweight pregnant and lactating women and elderly persons were identified as targets for food supplementation, as seen in Table 5.3. Other target groups that were identified by the professional nurses included people living with HIV and AIDS and debilitating conditions.

5.3.2.2. Availability of food supplements at PHC facilities

As seen in Table 5.4 in most of the cases (86.67%) dieticians indicated that food supplements are not always available at the health facilities. The reasons for this being that food supplements are not ordered and delivered on time, constraints in budget allocations hamper the procurement of adequate amounts of food supplements and even though food supplements are ordered and procured on time, they cannot be delivered to the PHC facilities due to a lack of transport.

Table 5.2: Referral of PEM Program clients as reported by dieticians, professional nurses and mothers / caretakers

Parameter	Number (N)	Percentage (%)
<i>Are children admitted to hospital for malnutrition referred to the PEMP at clinic level after discharge?(n=15)</i>		
1. Yes	14	93.33
2. No	1	6.67
<i>Who refers the child to the clinic?(n=15)</i>		
1. Doctor	8	53.33
2. Nurse	8	53.33
3. Dietician	10	66.67
4. Other	-	-
<i>For how long are supplements, issued to a client at discharge, suppose to last the client? (n=15)</i>		
1. One week	1	6.67
2. One month	9	60
3. Other	5	33.33
<i>Are malnourished clients admitted to hospital referred to you? (n=15)</i>		
1. Yes	8	53.33
2. No	7	46.67
<i>Is the mothers supplemented with PEMP products? (n=399)</i>		
1. Yes	7	1.75
2. No	392	98.75
<i>To whom do you refer underweight clients with a low socio-economical background? (more than one answer can be indicated); (n=43)</i>		
1. Social welfare	36	83.7
2. Community structures	3	6.98
3. Poverty alleviation / Income generating projects	8	18.60
4. NGO's / FBO's / CBO's	4	9.3
5. Dietician	16	37.21
6. Do not refer	1	2.33
7. Other	5	11.63
<i>Do you get referrals of underweight clients for the PEMP from the hospitals? (n=43)</i>		
1. Yes	33	76.74
2. No	10	23.26

Table 5.3: Target groups for the PEM Program as reported by professional nurses

Parameter	Number (N)	Percentage (%)
<i>Who is the target group for the PEMP? (n=43)</i>		
1. Children < 5 years	40	93.02
2. Underweight pregnant women (BMI < 18.5)	32	74.42
3. Underweight lactating women (BMI < 18.)	30	69.77
4. Underweight elderly people (BMI < 18.5)	33	76.74
5. Other	21	48.84

Table 5.4.: Availability of food supplements at PHC facilities as reported by dieticians

Parameter	Number (N)	Percentage (%)
<i>Are supplements always available at the health facilities? (n=15)</i>		
1. Yes	1	6.67
2. No	1	6.67
3. Not always	13	86.67
<i>What are the reasons for interruptions in the provisioning of supplements to clients? (n=15)</i>		
1. Not ordered on time	10	66.67
2. Not delivered on time	7	46.67
3. Budget allocation not enough	2	13.3
4. Other	8	53.33

5.3.2.3. Ordering of food supplements

As indicated in Table 5.5 it was indicated by dieticians that most (66.67%) of them were responsible for ordering the PEM Program supplements at district level, whilst 60% of sisters in charge were responsible for the ordering of the PEM Program supplements at clinic level.

According to 58.14% of the interviewed professional nurses, the sister in charge of the clinic was responsible for the ordering of the food supplements, whilst

66.67% of the dieticians included in the sample size, were of the opinion that the food supplements should be ordered by the dietician.

On the other hand, 58.14% of the professional nurses at clinic level and 60% of the dieticians indicated that it was the responsibility of the sister in charge of the clinic to order the food supplements. At 5 of the clinics, it was found that no one took the responsibility of ordering food supplements for that specific health facility.

Only 36 (83.72%) professional nurses, responsible for the ordering of the food supplements, indicated that food supplements had been ordered before the 5th of each month. Although 74.42% of these officials indicated that food supplements were ordered on a monthly basis, only 69.77% ordered food supplements the previous month.

5.3.2.4. Recording of information on the PEM Program registers and control register

According to the Free State Malnutrition Policy, the expiry date of the food supplements, weight of the patients and entry criteria should be indicated on the PEM Program register and control register, as part of the management of the program, as well as the progress of the client. As seen in Table 5.6, the expiry date of the food supplements was recorded on the register in 23.26% of the cases. Around sixty seven percent (67.44%) of the control registers contained the entry criteria to the PEM Program. Most of the clients (93%) were weighed with each follow-up visit to the clinic; however this weight was only recorded in 86% of the control registers.

Table 5.5: Ordering of food supplements as reported by dieticians and collected through the order form and PEM Program Register

Parameter	Number (N)	Percentage (%)
<i>Who is responsible for the ordering of PEMP supplements? (more than one answer can be indicated); (n=15)</i>		
1. District office nutrition personnel	3	20
2. Dietician	10	66.67
3. Sister in charge of the clinic	9	60
4. Sister in charge of the PEMP at clinic level	7	46.67
5. Other	1	6.67
<i>Are PEMP supplements ordered before the 5th of each month? (n=43)</i>		
1. Yes	36	83.72
2. No	7	16.28
<i>Have supplements been ordered for the previous months? (n=43)</i>		
1. Yes	30	69.77
2. No	13	30.23
<i>How often are supplements ordered? (n=43)</i>		
1. Monthly	32	74.42
2. Two monthly	3	6.98
3. Three monthly	1	2.33
4. Other	7	16.28
<i>Who is responsible for ordering the PEMP supplements? (n=43)</i>		
1. District office nutrition personnel	0	0
2. Dietician	1	2.33
3. Sister in charge of the clinic	25	58.14
4. Sister in charge of the PEMP at clinic level	14	32.56
5. Other	5	11.63

In only 24 (55.81%) of the PHC facilities did the number of participating clients in the PEM Program recorded in the PEM Program summary register tally with the number of clients indicated in the control register. In 53.49% of the clinics, the quantity of food supplements issued to the participating clients was recorded on both the PEM Program summary register and control register.

According to Table 5.6, the availability of statistics for all the categories was a challenge, but mostly for clients suffering from anemia (44.19%), relactating in-

fants (41.86%) and cancer patients (39.53%). It seems that statistics for underweight children 12-60 months were mostly available on the completed order form. In 65.12% of the cases the diagnosis of the client of the entry criteria for entering the client into the PEM Program was always indicated in the control register. The evaluated control registers did not indicate the diagnosis or the entry criteria.

5.3.2.5. Monitoring of the PEM Program

As part of monitoring the implementation of the PEM Program at the health facilities, 66% of the stock control registers and PEM Program registers were monitored on a monthly basis, as indicated in Table 5.7. This monitoring was conducted by the dieticians and community service dieticians within the districts at most of the facilities.

5.4. Prospective data

5.4.1. Growth monitoring of mothers / caretakers and children younger than 5 years

5.4.1.1. Anthropometric status of children younger than 5 years

A total number of 399 mother and child pairs were weighed by the field workers during their visit to the PHC facilities. The children that were weighed, were between the ages of 1 month and 60 months, with a mean age of 9 months. The weight of these children varied between 2.3 kilogram and 18.5 kilograms, with a

median weight of 8 kilograms. Of these 399 children who were weighed by the field workers, only 82.41% had gained weight since being previously weighed.

Table 5.6: Recording of the information on the PEM Program and control registers

Parameter	Number (N)	Percentage (%)
<i>Is the expiry date of the supplements recorded on the PEMP register? (n=43)</i>		
1. Yes	10	23.26
2. No	33	76.74
<i>Is the entry criteria to the PEMP indicated on the control register? (n=43)</i>		
1. Yes	29	67.44
2. No	8	18.6
3. Not always	6	13.95
<i>Are clients weighed with each follow-up?(n=43)</i>		
1. Yes	40	93.02
2. No	2	4.65
3. Not always	1	2.33
<i>Is this weighed recorded on the control register? (n=43)</i>		
1. Yes	37	86.05
2. No	5	11.63
3. Not always	1	2.33
<i>Does this number of participating client correlate with the control register? (n=43)</i>		
1. Yes	24	55.81
2. No	19	44.19
<i>Where is the quantity of supplements issued to the client recorded? (n=43)</i>		
1. Only PEMP summary register	6	13.95
2. Only control register	11	26.58
3. Both	23	53.49
4. Neither	3	6.98
<i>For which of target group is statistics not available on the completed order form? (more than one answer can be indicated); n=43</i>		
1. Relactating infants	18	41.86
2. Underweight, non breastfed infants	9	20.93
3. Underweight children, 12-60 months	8	18.6
4. Children 12-60 months with marasmus	11	25.58
5. Children 12-60 months with kwashiorkor	11	25.58
6. HIV positive children	14	32.56

Parameter	Number (N)	Percentage (%)
7. Pregnant and lactating women	13	30.23
8. TB patients	11	25.58
9. HIV positive patients	11	25.58
10. Low HB (anemia)	19	44.19
11. Cancer patients	17	39.53
12. Geriatrics (Elderly)	13	30.23

Is the diagnosis / entry criteria indicated on the control register? (n=43)

1. Always	28	65.12
2. Never	5	11.63
3. Sometimes	10	23.25

Table 5.7: Monitoring of the PEM Program as reported by dieticians

Parameter	Number (N)	Percentage (%)
<i>How often is the stock control register and PEMP register monitored?(n=15)</i>		
1. Weekly	0	0
2. Monthly	8	53.33
3. Bimonthly	1	6.67
4. Quarterly	6	40
5. Other	-	-
<i>Who is responsible for monitoring the PEMP in the district? (more than one answer can be indicated); (n=15)</i>		
1. Dietician	15	100
2. Nutrition Auxiliary Officer (SASO)	3	20
3. Local Area Manager	2	13.33
4. Other	15	100

(table 5.8). The median weight gain for them was 1.2 kilogram. The maximum weight loss of 8.3 kilogram (median 1.2 kilogram) amongst 37 of the weighed children is of concern. Fourteen percent (14.29%) of the children included in the sample size had a weight below the 3rd percentile, whilst 8.27% of them had a weight below 60% of expected weight-for-age. The weight of sixty children (15.04%) was constant for about 2 months, for a maximum of 7 month and a minimum of 1 month. Only 49 (12.28%) of these children, whose weight was constant for more than one month, have been referred for participation in the PEM Pro-

gram. These PEM Program clients have been participating in the PEM Program for a maximum of 47 months, with a median of 2 months.

Table 5.8: Anthropometric status of children younger than 5 years

Parameter	Number (N)	Percentage (%)
<i>Did the child's weight improve since the child was last weighed? (n=399)</i>		
1. Weight gain	328	82.41
2. No weight gain	33	8.29
3. Decrease in weight	37	9.3
<i>Is the weight < 3rd percentile? (n=399)</i>		
1. Yes	57	14.29
2. No	342	85.71
<i>Is the weight < 60% of the expected weight? (n=399)</i>		
1. Yes	33	8.27
2. No	366	91.73
<i>Was the weight if the child constant for more than one month? (n=399)</i>		
1. Yes	60	15.04
2. No	339	84.96
<i>Is the child referred to the PEMP? (n=399)</i>		
1. Yes	49	12.28
2. No	350	87.72

5.4.1.2. Completeness of the Road to Health Chart (RTHC)

Almost all of the children (98.75%) had an RTHC. Of these RTHC's, only 2.28% were copies. In most of the evaluated RTHC's the weight of the child had been plotted on the RTHC and the RTHC had been completed with each visit of the child to the clinic. As seen in Table 5.9, the weight dots on 76.14% of the RTHC's had been connected with each other. In 23.6% of the cases, the calendar on the RTHC did not start with the birth month and year of the child, and in 18.78% of the cases, the weight was not plotted in the correct calendar column (table 5.9).

Table 5.9: Completeness of the RTHC of children younger than 5 years

Parameter	Number (N)	Percentage (%)
<i>Does the child have a Road to Health Chart (RTHC)? (n=399)</i>		
1. Yes	394	98.75
2. No	5	1.25
<i>Is the RTHC completed with each visit to the clinic? (n=399)</i>		
1. Yes	371	94.16
2. No	23	5.84
<i>Is the weight of the child plotted on the chart with each visit? (n=399)</i>		
1. Yes	359	91.12
2. No	35	8.88
<i>Are the weight dots connected to each other? (n=399)</i>		
1. Yes	300	76.14
2. No	94	23.86
<i>Is the birth month of the child written in the 1st column of the space provided to make the calendar? (e.g. if the child is born in May month, "May" should be written in the 1st column); (n=399)</i>		
1. Yes	301	76.4
2. No	93	23.6
<i>Is the month in which the child visited the clinic, indicated in the correct column? (e.g. if the child is born in February, and the 1st visit to the clinic is May, "May" should be written in the 4th column and not in the 2nd or the 5th column); (n=399)</i>		
1. Yes	320	81.22
2. No	74	18.78
<i>Is this the original RTHC or a copy? (n=399)</i>		
1. Original	385	97.72
2. Copy	9	2.28

5.4.1.3. Relationship of the interviewed mother / caretaker to the PEM Program client

Of the 399 children that were weighed by the fieldworkers on the day that the PHC facility was visited, only 46 children participated in the PEM Program. Almost seventy percent (67.39%) of the interviewed persons (that participated in

the PEM Program) were the mothers of the children (table 5.10). The remaining 32.61% of the children were brought to the clinic by the grandmother or other caretaker.

Table 5.10: Relationship of the interviewed person to the children participating in the PEM Program

Parameter	Number (N)	Percentage (%)
<i>What is your relationship to the child? (n=46)</i>		
1. Parent / mother	31	67.39
2. Caretaker	6	13.04
3. Other	9	19.57

5.4.1.4. Nutritional status of the mothers / caretakers

The nutritional status of the mothers / caretakers was determined by the calculation of their Body Mass Index (BMI). The median BMI of the 399 mothers / caretakers varied between 14.17 kg/m² and 46.38 kg/m² with a median of 25 kg/m². As indicated in Table 5.11, 35.6% of the mothers / caretakers had a normal weight, whilst 14% of the mothers / caretakers were underweight. Half (50.37%) of the mothers / caretakers were overweight or obese. Of the 28 mothers / caretakers that were underweight, only 7 were referred for participation in the PEM Program.

Table 5.11: BMI (kg/m²) of mothers / caretakers

Parameter	Number (N)	Percentage (%)
<i>BMI Categories of mothers / caretakers (n=399)</i>		
< 18.5 (Underweight)	28	7.02
18.5 to <20 (Lower normal weight)	28	7.02
20 to <25 Normal weight	142	35.59
25 to <30 (Overweight)	107	26.82
≥30 (Obese)	94	23.55

5.4.2. Knowledge of healthcare professionals (professional nurses and dieticians) and mothers / caretakers regarding the implementation of the PEM Program

5.4.2.1. Knowledge of mothers / caretakers regarding the implementation of the PEM Program

According to the perceptions and knowledge of the mothers / caretakers, 50% of the children were supposed to receive a nutritious drink and enriched maize meal, whilst only 65.22% children received these specific food supplements. Almost 18% of the mothers / caretakers did not know which food supplements their children were supposed to receive.

As seen in Table 5.12, most of the mothers knew that they must obtain the food supplements from the health facility once a month. Twenty eight (28) mothers / caretakers did not know for how long their children were supposed to receive the food supplements, whilst 25% of the mothers / caretakers thought that their children should get the food supplements until they were well or until their weight had improved or until the child is 3 or 4 years old.

Tables 5.12 and 5.14 reflect the usage of the food supplements by the child and family and also the perceptions of the mothers / caretakers regarding the nutritional value of the food supplements. The majority of children, who were participating in the PEM Program, were the only household members that consumed the food supplements. Most of the mothers thought that consuming the food supplements were important for their children and that these supplements would contribute to the general well-being of their children. Two of the mothers

were of the opinion that it is not necessary for their children to consume the food supplements. The reasons for this being that one child did not like the taste of the food supplements and because the other child was old enough to consume other food items. Only 3 mothers indicated that the other children in the household shared in the consumption of the food supplements. The median number of other children per household was 3. Table 5.14 indicates that in 26% of the cases, the food supplements were the only food that the child ate at home.

5.4.2.2. Knowledge of health professionals on the implementation of the PEM Program

Table 5.13 includes the knowledge of the professional nurses regarding the implementation of the PEM Program. Of the 43 interviewed professional nurses, most were convinced that the health institutions have an obligation towards the community to rectify underweight and that a strong relationship exists between the prevalence of underweight and poverty. Ninety five percent of them were of the opinion that the PEM Program contributed to the treatment of the conditions amongst underweight children. Six of the professional nurses thought that supplementing clients with food supplementation was the primary nutrition intervention for clients suffering from underweight.

Table 5.12: Knowledge or mothers / caretakers on the implementation of the PEM Program

Parameter	Number (N)	Percentage (%)
<i>Which supplements should this child receive?(n=46)</i>		
1. Infant formula (NAN-Pellargon / Diva Soy)	14	30.43
2. Nutri A	0	17.39
3. Enriched Maize Meal	0	0
4. Mother / Caretaker don't know	8	17.39
5. Nutri A and Enriched Maize Meal	23	50
6. Infant formula, Nutri A and Enriched Maize Meal	1	2.17
<i>How often should this child receive supplements? (n=46)</i>		
1. Once a week	0	0
2. Once a month	34	73.91
3. Other	8	17.39
4. Do not know	4	8.7
<i>For how long should this child receive supplements? (n=46)</i>		
1. Three months	1	2.17
2. Six months	5	10.87
3. Other	12	25.09
4. Do not know	28	60.87
<i>Do you think it is necessary for this child to eat the enriched maize meal and drink the liquids? (n=46)</i>		
1. Yes	38	82.61
2. No	2	4.35
3. Do not know	6	13.04
<i>Do you think that the supplements make a difference to the well-being of this child? (n=46)</i>		
1. Yes	42	91.3
2. No	2	4.35
3. Not sure	2	4.35

Table 5.13: Knowledge of health professionals on the implementation of the PEM Program

Parameter	Number (N)	Percentage (%)
<i>Do you think that health institutions have an obligation towards the community to rectify underweight?(n=43)</i>		
1. Yes	40	93.02
2. No	3	6.98
<i>Do you think that the PEMP contributes to the treatment of the condition of underweight clients? (n=43)</i>		
1. Yes	41	95.35
2. No	2	4.65
<i>What is the primary intervention (first action) of the PEMP? (n=43)</i>		
1. Nutrition education	37	86.05
2. Supplementation	2	4.65
3. Don't know	0	0
4. Other	4	9.3
<i>Do you think that there is a relationship between poverty and underweight? (n=43)</i>		
1. Yes	42	97.67
2. No	1	2.33

5.4.3. Attitudes and practices of health professionals and mothers / caretakers towards the PEM Program

5.4.3.1. Attitudes and practices of mothers / caretakers

Of the 46 interviewed mothers / caretakers, more than half of the clients received the food supplements for longer than 3 months, which were the prescribed period for supplementation according to the Free State Malnutrition Policy. The food supplements were distributed to the PEM Program clients for a median period of 7 months, with a maximum of 24 months. As indicated in Table 5.12, approximately 30% of the clients received infant formula, whilst the rest of the clients received enriched maize meal and a nutritional drink.

Only 4 of the 46 mothers / caretakers whose children were participating in the PEM Program received vegetable seed as part of the PEM Program, however 29 of the interviewed mothers / caretakers had a vegetable garden at home. These women received support from family members and friends to establish the vegetable garden. Only 1 mother reported receiving support from a governmental department (Department of Health) to establish her vegetable garden. No mother received support from community workers to establish a vegetable garden. As seen in Table 5.14, 3 mothers / caretakers had not harvested from the last seedlings; the reason for this being that, at the time of the interview, it was not yet harvesting time. One mother / caretaker received vegetables from a farmer. In cases where no household vegetable gardens were established, mothers / caretakers indicated that reasons for this were the unavailability of funds and seeds to make a vegetable garden.

Eighty percent (80%) of the children participating in the PEM Program were breastfed. At the time of the interview, 5 mothers were still breastfeeding their children. The twenty seven (27) breastfed children were breastfed for a median of 5 months. The reasons for not breastfeeding the children (as reported by the mothers), was mostly because of the health and HIV status of the mother, breast problems such as cracked and sore nipples and because the mother and her child were separated.

Half of the mothers (51.22%) interrupted or stopped breastfeeding after their children had received food supplements. Twenty eight percent (28.57%) of the mothers were advised by nursing staff from the PHC facilities to stop / interrupt breastfeeding for reasons unknown to the mothers. Most of the mothers stopped breastfeeding after feeding the food supplements to their children because the

children refused to continue breastfeeding. One of the mothers was advised by a doctor to stop breastfeeding her child.

Table 5.14, indicates whether the children participating in the PEM Program received adequate amounts and types of food at home, apart from the food supplements. For the evaluation of adequate consumption of food was described by eating foods from all 3 food groups (building, protecting and energy) in one meal. In most cases, the food intake for breakfast and lunch was adequate; however the food intake for supper was mostly inadequate. In general almost half of the children participating in the PEM Program had an inadequate food intake for the day, taking breakfast, mid-morning, lunch, mid-afternoon, supper and late night into consideration.

More than half of the mothers / caretakers took their children to the clinic only for treatment when ill. Other health professionals that were also consulted by the mother / caretaker for medical treatment and advice regarding the health of the child included private doctors, health professionals at hospitals and traditional healers. Only two mothers indicated that they would seek advice from their mothers and grandmothers.

Table 5.14: Practices of mothers / caretakers

Parameter	Number (N)	Percentage (%)
<i>For how long are you or this child receiving these supplements? (n=46)</i>		
1. Week	1	2.17
2. Month	5	10.87
3. Two months	9	19.57
4. Three months	5	10.87
5. Not receiving supplements	1	2.17
6. Other	25	54.35
<i>What kind of supplements does this child receive? (more than one answer can be indicated); (n=46)</i>		
1. Acidified Infant Formula (NAN-Pellargon)	6	13.04
2. Soya Infant Formula (Diva)	8	17.39
3. Enriched Maize Meal	32	69.57
4. Nutritional Drink	28	60.87
5. Other	4	8.7
6. None	0	0
<i>Did you receive vegetable seed as part of the PEMP? (n=46)</i>		
1. Yes	4	8.7
2. No	42	91.3
<i>Do you have a vegetable garden at home? (n=46)</i>		
1. Yes	29	63.04
2. No	17	36.96
<i>Who helped you to establish the vegetable garden? (n=29)</i>		
1. Nobody	6	20.69
2. Family members	19	65.52
3. Neighbour	1	3.45
4. Community workers	0	0
5. Department of Agriculture	0	0
6. Department of Social Welfare	0	0
7. Department of Health	1	3.45
8. Other	2	10.34
<i>Did you have a harvest from the latest seedlings? (n=29)</i>		
1. Yes	26	89.66
2. No	3	10.34
<i>Was this child breastfed? (n=45)</i>		
1. Yes	36	80
2. No	9	20
<i>Did breastfeeding continue after this child has been receiving the supplements? (n=41)</i>		
1. Yes	20	48.78
2. No	21	51.22

Parameter	Number (N)	Percentage (%)
<i>If "no", by whom were you advised to interrupt or stop breastfeeding? (more than one answer can be indicated); (n=21)</i>		
1. Nurse	6	28.57
2. Doctor	1	4.76
3. Community Health workers	0	0
4. Nutrition Auxiliary Officer (SASO)	0	0
5. Dietician	0	0
6. Other	15	71.43
<i>How many people in the household share in the supplements? (more than one answer can be indicated); (n=46)</i>		
1. Only the PEMP client	42	91.3
2. All of the household members	0	0
3. All the children	3	6.52
4. Other	1	2.17
<i>Are the supplements the only food that this child eats? (n=46)</i>		
1. Yes	12	26.09
2. No	34	73.91
<i>Is the food intake of this child adequate or inadequate?(n=46)</i>		
<u>Breakfast and Mid-morning:</u>		
1. Adequate	28	60.87
2. Inadequate	18	39.13
3. Unsure	0	0
<u>Lunch and Mid-afternoon:</u>		
1. Adequate	25	54.35
2. Inadequate	20	43.48
3. Unsure	1	2.17
<i>Is the food intake of this child adequate or inadequate?(n=46)</i>		
<u>Supper and Late night:</u>		
1. Adequate	16	34.78
2. Inadequate	29	63.04
3. Unsure	1	2.17
<i>Who else do you take this child to for treatment? (more than one answer can be indicated); (n=46)</i>		
1. Traditional healer	2	2.35
2. Private doctor	13	28.26
3. Hospital	9	19.57
4. Grandmother	1	2.17
5. Mother	1	2.17
6. Other	25	54.35

5.4.3.2. Attitudes and practices of health professionals

The practices of the professional nurses on implementing the PEM Program are indicated in Table 5.15.

Most of the PEM Program clients received soya-based infant formula or enriched maize meal and a nutritious drink. In ninety percent of the cases the Professional Nurses indicated that they would request mothers / caretakers to bring the children back to the clinic when the child lost weight. It seems as though some of the nursing staff were not sure what to do in the case where the weight of the child had dropped, but was not yet below the 3rd percentile or 60% of the expected weight. If children were underweight-for-age, the majority of the health professionals also examined the nutritional status of the mother and the other children in the household by using the BMI for the mother / caretaker and children older than 5 years of age and weight-for-age for children less than 5 years of age. Only in cases when both the mother and her child were underweight, or when a lactating mother and her infant were underweight, did both the mother and her child receive food supplements.

5.4.4. Training of health professionals and mothers / caretakers related to the effective implementation of the PEM Program

5.4.4.1. Training provided to health professionals

As seen in Table 5.16, ninety three percent (93.33%) of all dieticians working for the Free State Department of Health (n=15) were involved in the training of other health professionals on the PEM Program.

Table 5.15: Practices of health professional with regard to the implementation of the PEM Program

Parameter	Number (N)	Percentage (%)
<i>What supplements are being given to PEMP clients? (more than one answer can be indicated); (n=43)</i>		
1. Acidified formula (NAN Pellargon)	15	34.88
2. Soya formula (DIVA)	31	72.09
3. Enriched Maize Meal	38	88.37
4. Nutritious Drink	38	88.37
5. Other	12	27.91
<i>Will you include a child in the PEMP who has lost weight, but whose weight is not yet under the 3rd percentile or below 60% of the expected weight? (n=43)</i>		
1. Yes	19	44.19
2. No	20	46.51
3. Not sure	4	9.3
<i>Will you include a child in the PEMP with the first drop in weight, or will you request the mother to come back? (more than one answer can be indicated); (n=43)</i>		
1. Will include child in PEMP	4	9.3
2. Will request mother to come back	39	90.70
3. Both	2	4.65
4. Neither / No action	0	0
<i>When a child is underweight, will you examine the nutritional status (weight for age) of other children in the household as well? (n=43)</i>		
1. Yes	28	65.12
2. No	15	34.88
<i>When a child is underweight, will you examine the nutritional status (weight and BMI) of the mother as well? (n=43)</i>		
1. Yes	29	67.44
2. No	14	32.56
<i>How often will it happen that you supplement the mother and her child? (n=43)</i>		
1. Always	0	0
2. Never	5	11.63
3. When both are underweight	21	48.84
4. When the mother is breastfeeding	0	0
5. When the baby is underweight and being breastfed	5	11.63
6. Other	12	27.91

A median number of one health professional per clinic received training on the PEM Program. Of the 43 interviewed professional nurses, only 30 received train-

ing regarding the PEM Program. Thirty four of them indicated that they needed more training on the PEM Program and thirty eight of them indicated that their colleagues also need to be trained on the PEM Program. The professional nurses suggested that in-service training should be conducted and that the focus should be on the entry and exit criteria of the program, how to issue and control the food supplementation stock, criteria for identifying underweight children, when to supplement children of HIV positive mothers, HIV and infant feeding, nutrition education to mothers, how to prepare and feed the food supplements and recording of the PEM Program information on the forms provided. Some of the professional nurses indicated that training should not only focus on the PEM Program, but also on nutrition in general and how to complete the RTHC.

Table 5.16: Training provided to health professionals on the PEM Program as reported by dieticians and professional nurses

Parameter	Number (N)	Percentage (%)
<i>Do you give training on the PEMP?(n=15)</i>		
1. Yes	14	93.33
2. No	1	6.67
<i>Did you receive training on the PEMP? (n=43)</i>		
1. Yes	30	69.77
2. No	13	30.23
<i>Do you need more training on the PEMP? (n=43)</i>		
1. Yes	34	79.07
2. No	9	20.93
<i>Do you think that your colleagues need more training on the PEMP? (n=43)</i>		
1. Yes	38	88.37
2. No	5	11.63

5.4.4.2. Training and education of mothers / caretakers

Only 20% of the mothers / caretakers did not receive any information on how to prepare the food supplements (table 5.19). In most cases, all of the education regarding the preparation of the food supplements was given to the mothers / caretakers by the nursing personnel of the PHC facilities.

Most of the advice that the mothers / caretakers received was on healthy eating guidelines and food choices. Other health advice that the mothers / caretakers received from health professionals included information on continuous breastfeeding, Oral rehydration solution (ORS), hygiene and safety and on the contrary some of them to stop breastfeeding.

Only 36% of the mothers / caretakers received pamphlets or written advice. Of the 17 mothers / caretakers that received pamphlets, only 11 read them. Thirty five percent (35%) of the mothers / caretakers did not understand the messages in the pamphlets. Most of the mothers / caretakers kept the pamphlets and 15% of them read the pamphlets again, whilst 8% of the mothers / caretakers threw the pamphlets away.

5.4.5. Should the PEM Program be improved?

At the end of all the questionnaires, an open ended question was asked to gain information from the participants whether the PEM Program should be improved and how it can be approved. Almost eighty seven percent (86.67%) of all the dieticians included in the sample thought that the PEM Program should be improved.

Table 5.17: Training and nutrition education provided to mothers / caretakers by health professionals as reported by mothers / caretakers

Parameter	Number (N)	Percentage (%)
<i>Have you received any education on how to prepare the supplement? (n=46)</i>		
1. Yes	37	80.43
2. No	9	19.57
<i>Who gave you this education on the preparation of the supplement? (more than one answer can be indicated); (n=38)</i>		
1. Nurse	29	63.04
2. Pharmacists	0	0
3. Nutrition Auxiliary Officer (SASO)	3	6.52
4. Dietician	4	8.7
5. Other	2	4.35
<i>What advice has been given to you at the clinic to improve the health of this child or our own? (more than one answer can be indicated); (n=46)</i>		
1. Continue breastfeeding	14	30.34
2. Oral Rehydration Solution	17	36.96
3. Healthy eating guidelines and Food Choices	22	47.83
4. Other	15	32.61
<i>Were any pamphlets regarding this advice given to you? (n=36)</i>		
1. Yes	13	36.11
2. No	23	63.89
<i>Did you read the pamphlets? (n=17)</i>		
1. Yes	11	64.71
2. No	6	35.29
<i>Did you understand the message of the pamphlet? (n=17)</i>		
1. Yes	11	64.71
2. No	6	35.29
<i>What did you do with the pamphlet? (more than one answer can be indicated); (n=13)</i>		
1. Keep it	10	76.93
2. Read it again	2	15.38
3. Gave it to a friend or a family member	0	0
4. Throw it away	1	7.69
5. Other	0	0

Suggestions for the improvement of the PEM Program included more training of other health professionals in the PEM Program, better organization of the PEM

Program at clinic level, improvement of the transport and referral systems, regular monitoring of the program at the health facilities, implementation of a better system to follow-up defaulters, better record keeping by nursing staff at the health facilities and improved guidelines on entry criteria for HIV and AIDS clients on the PEM Program.

Two dieticians indicated that the outcomes found with the PEM Program, reflected that the PEM Program need not be improved. However they were of the opinion that the program could be strengthened by improved training practices and by improved confidence amongst the implementers on how to implement the PEM Program.

As seen in Table 5.18, less than half of the mothers / caretakers were of the opinion that the services of the PEM Program should be improved. Suggestions for improving the PEM Program are indicated in Table 5.19. Mostly, the mothers / caretakers suggested that the food supplements should be available continuously at the health facilities for those that are in need of them.

Table 5.18: Opinions of health professionals and mothers / caretakers on whether the PEM Program should be improved

Parameter	Number (N)	Percentage (%)
<i>Do you think that the PEMP should be improved?(n=15); (Dieticians)</i>		
1. Yes	13	86.67
2. No	2	13.33
<i>Do you think that the services of the PEMP can be improved? (n=46); (Mothers / Caretakers)</i>		
1. Yes	22	47.83
2. No	24	52.17
<i>Can the services of the PEMP be improved? (n=43); (Professional Nurses)</i>		
1. Yes	38	88.37
2. No	5	11.63

Table 5.19: Suggestions from health professionals and mothers / caretakers for improvement of the PEM Program

Suggestion	Number (N)	Percentage (%)
<i>Mothers / Caretakers: (n=17)</i>		
Clinics should have enough food supplements to give to the PEMP clients	1	5.26
Food supplements should be made more easily available to the public	1	5.26
Food supplements should be given to every person who are in need of food	1	5.26
Food supplements should be available every month	3	15.79
Other supplements because child get nauseas of the food supplements	1	5.26
More supplements should be issued per month	4	21.05
Nutritious drink is too sweet and should be replaced	2	10.53
Mother / Caretaker should be educated on the use of the food supplements	1	5.26
The food supplements should be more beneficial to the child	2	10.53
The enriched maize meal should contain milk	1	5.26
A larger variety of food supplements should be available	1	5.26
Other medicines should be provided and not only food supplements	1	5.26
<i>Dieticians: (n=15)</i>		
More training, better organization at clinic level	3	25.00
Delivery of supplements is a problem	1	8.33
Appoint more dieticians for monitoring and implementation of the PEMP	1	8.33
It would be better if formula could be given to infants 0-12 months seeing that this is the area where most of the problems are experienced	1	8.33
Monitoring on regular basis	1	8.33

Suggestion	Number (N)	Percentage (%)
Better communication	1	8.33
More training and better adherence to the program	2	16.67
Better monitoring and stock control, since defaulters is increasing	1	8.33
Better record keeping is necessary from nursing personnel	1	8.33
<i>Professional Nurses: (n=37)</i>		
By in-service training	4	10.81
Delivery of PEMP supplements on monthly basis	5	13.51
Follow the same approach as TB	1	2.7
Supplements not well accepted (Nutri A)	1	2.7
Proper implementation, since there is a stigma attached to the PEM	1	2.7
Training of health professionals on education of mothers & obtain food supplements in order to implement the program / start vegetable garden project	6	16.22
Train LAY workers and other staff members	1	2.7
Transport and communication must improve	1	2.7
Monitoring of issued products	2	5.41
Home visits and education	3	8.11
Patients with low socio-economic status must be prevented from using the supplements for all the household members	1	2.7
Regular stock available and follow-up of statistics	1	2.7
Encouragement of clients to return monthly for follow-up	2	5.41
Encouragement to the families	1	2.7
All in need who are not underweight should also be included	1	2.7
More correct stats	1	2.7
Formula supplement to PMTCT	1	2.7
Communication and enrollment between clinics in local area	1	2.7
Preparation of supplements at clinic	1	2.7
Appointment of SASO's in all clinics	1	2.7
Rate quarterly so that all sisters know how the PEMP is working	1	2.7

5.4.6. Associations between variables

The following associations between variables were determined:

- Association between the nutritional status of children on the PEM Program versus the nutritional status of their mothers / caretakers
- Association between the prevalence of underweight / malnutrition amongst the weighed children and the completeness of the RTHC
- Association between the weight of the children and adequacy of food intake throughout the day
- Association between weight loss in the children and consumption of the food supplements as the only available food to the children

- Weight loss of the children and sharing of food supplements with other children in the household
- Association between the nutritional status of children and breastfeeding
- The association between weight gain when a vegetable garden is established at home
- The prevalence of underweight amongst the weighed children in PHC facilities where the PEM Program are not implemented

5.4.6.1. Nutritional status of children on the PEM Program versus the nutritional status of their mothers / caretakers

To determine the association between underweight-for-age children and underweight mothers / caretakers, a 2 x 2 table was constructed (table 5.20). More than half of all the mothers / caretakers (52.78%) included in the study, who had a BMI between 19 and 24 kg / m² (normal weight) had children who were underweight-for-age. However, less than 10% of underweight mothers / caretakers (BMI ≤ 18 kg / m²) had children that were also suffering from underweight-for-age. No significant association between the anthropometrical data was found between the nutritional status of children on the PEM Program and the nutritional status of their mothers / caretakers (CI -5.9%; 9.7%).

Table 5.20: Association between the nutritional status of children participating in the PEM Program and the nutritional status of their mothers / caretakers

	Number of mothers / caretakers with BMI ≤ 18 kg / m ² (n=46)	Number of mothers / caretakers with BMI 19-24 kg / m ² (n=46)	Number of mothers / caretakers with BMI >24 kg / m ² (n=46)
Children underweight-for-age (n=399)	7 (9.72%)*	38 (52.78%)	27 (37.5%)
Children normal weight (n=399)	31 (9.48)*	123 (37.61%)	173 (52.91%)

* CI [-5.9%; 9.7%]

5.4.6.2. Prevalence of underweight / malnutrition amongst the weighed children versus the completeness of the RTHC

As seen in Table 5.9, more than 80% of the RTHC were completed in full by health professionals at clinic level. A 2 X 2 table (table 5.21) was constructed to determine the association between the prevalence of underweight-for-age (both a weight-for-age below the 3rd percentile and 60% of expected weight) and the completeness of the RTHC. Only 20% of all children weighed, who were underweight-for-age had incomplete RTHCs. No significant association was found to indicate that children having incomplete RTHCs might be underweight-for-age (CI -15.2%; 0.2%).

Table 5.21: Prevalence of underweight / malnutrition amongst the weighed children vs. the completeness of the RTHC

	Number of children underweight-for-age (n=399)	Number of children with normal weight-for-age (n=399)
Complete RTHC	33 (14.80%)*	190 (85.20%)
Incomplete RTHC	39 (22.16%)*	137 (77.84%)

* CI [-15.2%; 0.2%]

5.4.6.3. Association between the weight of the children and adequacy of food intake throughout the day

The adequate food intake of the child for the day was obtained through a 24-hour recall and categorized in adequate and inadequate food intake according to food groups and the recommended daily portions per group per age group. The 24-hour recall was divided into the following categories:

- Breakfast and mid-morning snack
- Lunch and mid-afternoon snack
- Supper and late night snack

The association between adequate food intake and normal weight for age is shown in the 2 x 2 table below. According to table 5.22, 67% of underweight-for-age children had an inadequate food intake, whilst 69% of these children had an adequate food intake. No significant association was found between underweight-for-age and inadequate food intake (CI -27.5%; 27.4%).

Table 5.22: Association between the weight of the children and adequacy of food intake throughout the day

	Number of children underweight-for-age (n=46)	Number of children with normal weight-for-age (n=46)
Adequate food intake (n=46)	9 (69.23%)*	4 (30.77%)
Inadequate food intake (n=46)	22 (66.67%)*	11 (33.33%)

* CI [-27.5%; 27.4%]

5.4.6.4. Association between weight loss in the children and consumption of the food supplements as the only available food to the children

Weight loss is described by no weight gain and / or decrease in weight. As seen in Table 5.23, only 3 children who had a decrease in weight consumed only the food supplements as a source of food. A large number of children (52.94%) with weight gain consumed the food supplements in addition with other food items. Although 75% of children with weight gain consumed food supplements as the only source of food, no significant association was found between weight gain and consuming the food supplements as the only source of food.

Table 5.23: Association between weight loss in the children and consumption of the food supplements as the only available food to the children

	Number of children with weight gain (n=46)	Number of children with no weight gain (n=46)	Number of children with weight loss (n=46)
Food supplements the only source of food (n=46)	9 (75%)*	0 (0%)	3 (25%)
Food supplements not the only source of food (n=46)	18 (52.94%)*	6 (17.65%)	10 (29.41%)

* CI [-10.2%; 44.9%]

5.4.6.5. Association between weight loss and sharing of food supplements with other children in the household

As seen in Table 5.24, more than halve of the children (59%) who did not share the food supplements with other children in the household, had weight gain. Only 2 of the 4 children who shared the food supplements with the other children in the household had either weight loss or growth failure. Because of the small

sample, no association between weight loss and sharing of food supplements with other children in the household could be determined.

Table 5.24: Association between weight loss and sharing of food supplements with other children in the household

	Number of children with weight gain (n=46)	Number of children with no weight gain (n=46)	Number of children with weight loss (n=46)
Food supplements shared (n=46)	2 (50%)*	1 (25%)	1 (25%)
Food supplements not shared (n=46)	25 (59.52%)*	5 (11.9%)	12 (28.57%)

* Small sample

5.4.6.6. Association between the nutritional status of children and breastfeeding

As indicated in table 5.25, 60% of children that were underweight-for-age were not breastfed at all. In 57% of the cases were breastfeeding associated with weight gain amongst children. No significant association was found between breastfeeding and weight gain (CI -43.9%; 13%).

Table 5.25: Association between weight-for-age and breastfeeding

	Number of children underweight-for-age (n=46)	Number of children with normal weight-for-age (n=46)
Child was breastfed or were still being breastfed	11 (42.31%)*	15 (57.69%)
Child was not breastfed at all	9 (60%)*	6 (40%)

* CI [-43.9%; 13.0%]

5.4.6.7. Association between weight gain when a vegetable garden is established at home

Table 5.26 indicates that in most cases where the mother / caretaker indicated a household vegetable garden was established, children gained weight. However, no significant association could be found between weight gain and the presence of a vegetable garden at home.

Table 5.26: Association between weight gain and a vegetable garden at home

	Number of children with weight gain (n=46)	Number of children with no weight gain (n=46)	Number of children with weight loss (n=46)
Household vegetable garden established	19 (65.52%)*	3 (10.34%)	7 (24.14%)
Household vegetable garden not established	8 (47.06%)*	3 (17.65%)	6 (35.29%)

* CI [-10.1%; 43.9%]

5.4.6.8. Prevalence of underweight amongst weighed children in PHC facilities where the PEM Program was not implemented

The prevalence of underweight-for-age amongst children who visited the 2 PHC facilities where the PEM Program was not implemented is shown in Table 5.27. A great concern is that 100% of the children that were weighed at clinic A were underweight-for-age. In clinic B all the children had a normal weight.

Table 5.27: Prevalence of underweight amongst children in health facilities where the PEM Program were not implemented

	Clinic A	Clinic B
Child underweight-for-age (n=17)	6 (100%)	0 (0%)
Child with normal weight-for-age (n=17)	6 (54.55%)	5 (45.45%)

5.5. Summary

Most of the PEM Program supplements were ordered by dietitians or the nutrition personnel at district level and by the sister in charge of the facility at PHC level. The main reasons for not having enough food supplements at clinic level was a lack of transport to distribute the food supplements from the district offices or the main storerooms to the health facilities and a delay in ordering of food supplements from the district depot.

Although the implementation of the PEM Program was mostly monitored on a monthly basis by the dietitians, the PEM Program registers were still not completed in full and statistics were still not regularly available. Stats for underweight children 12-60 months were mostly available on the completed order form. The reason for this might be because this is an indicator on the District Health Indicator System (DHIS) used to collect data on National identified health indicators.

Most of the hospitalized children were referred to the local clinic for participation in the PEM Program at discharge with food supplements that will last for one month. In cases where food supplements are not available, clients are discharged without food supplements and referred to the local PHC facility.

Of the 399 children that were weighed, 82.41% of the children gained weight. Fourteen percent (14.29%) of these children had a weight below the 3rd percentile, whilst 8.27% of them had a weight below the 60% of expected weight for age. The weight of 15.04% was constant for a median period of about 2 months. In eighty seven percent (87.72%) of these cases, no nutrition intervention was implemented by health professionals to improve the weight of the child and to prevent malnutrition.

Most of the mothers / caretakers had a normal weight, whilst 14% of the mothers / caretakers had a BMI less than that for normal weight. Half of the mothers / caretakers that were weighed were overweight or obese (50.37%). Of the 28 mothers / caretakers that were underweight, only 7 of them were referred for participation in the PEM Program.

Mainly all of the children had an original RTHC that was completed in full.

Only 4 of the 46 mothers / caretakers whose children were participating in the PEM Program received vegetable seed as part of the PEM Program. These women received support from family members and friends to establish the vegetable garden. The concern is that only 1 mother received support from a governmental department (Department of Health) to establish her vegetable garden.

Eighty percent (80%) of the children participating in the PEM Program was breastfed for an average of 5 months. Reasons for not breastfeeding the children, as indicated by the mothers was mostly because of the health and HIV status of the mother, the mother was suffering from breast problems such as cracked and

sore nipples and because the mother and her child was separated. Half of the mothers interrupted or stopped breastfeeding after their children had received food supplements because of advice given to them by health professionals to stop breastfeeding or the mother's own decision. Some mothers indicated that breastfeeding was stopped because the children refused to continue breastfeeding after being fed the food supplements.

The majority of the mothers / caretakers received information on how to prepare the food supplements by health professionals (mainly nursing staff).

Most of the children, participating in the PEM Program, were the only household members that consumed the food supplements. In 26% of the cases, were the food supplements the only food that the child received at home to eat. In most of the cases was the food intake for breakfast and lunch adequate; however the food intake for supper was mostly inadequate. In general did almost half of the children participating in the PEM Program have an inadequate food intake for the day, taking breakfast, mid-morning, lunch, mid-afternoon, supper and late night into consideration.

Mothers / caretakers received mainly advice on healthy eating guidelines and food choices. Pamphlets on these health messages had not been provided to most of the mothers / caretakers. Those mothers / caretakers that received pamphlets read it and kept the pamphlets to read it again.

The majority of the health professionals were of the opinion that the services of the PEM Program could be improved by increased training of more health professionals, continuous availability of food supplements, improved communica-

tion and transport systems, improved record keeping and regular monitoring of the program at the both the hospitals and primary healthcare facilities.

Chapter 6

Discussion of Results



(FSOH, 2005)

6.1.Introduction

The main objective of the study was to evaluate whether the PEM Program is successfully implemented in PHC facilities of the Free State Department of Health (FSDOH). Throughout the discussion the trends and differences that were observed are highlighted in order to interpret the findings and identify the possible reasons thereof. Limitations of the study are discussed and focus is placed on their possible effect on the results of the study. Where possible, the results of this study have been compared with results of relevant studies of similar nature, as reported in the available literature.

6.2.Limitations of the study

According to Anderson and Olsen (2002), the effect of the survey itself has an influence on the results that are obtained through interviews with participants of a survey. This is known as the Hawthorne effect. It is possible that respondents gave answers to certain questions based on information that they believed would impress the interviewer. In this study, respondents were informed by the fieldworkers that their answers to questions would not be regarded as a right or a wrong answer, and that their eligibility to receive the food supplements would not be influenced by their answers. This was done in an attempt to limit the Hawthorne effect.

HIV status of children included in the study was not known. The impact of HIV and AIDS on children younger than 5 years being malnourished was thus not taken into consideration.

For practical reasons, PEM Program clients that were not visiting the PHC facilities on the day that the facility was visited by the fieldworkers were excluded from the sample. The professional nurses that were involved in the implementation of the PEM Program at facility level that were not available on the day that the facility was visited by the fieldworkers, were also excluded for practical reasons. The sample thus only included a certain part of the clients participating in the PEM Program and professional nurses responsible for implementation of the PEM Program.

Although the target groups for the PEM Program includes both children and adults, only the implementation of the PEM Program amongst children 5 years old and younger was evaluated. Therefore, the results that were obtained will only be relevant to children 5 years old and younger and not all target groups described in the Free State Malnutrition Policy.

Although a total of 71 PHC facilities were initially identified to be included in the sample, only 51 were included. The reasons for this were firstly that the program was not implemented at those particular PHC facilities and secondly that no children 0-60 months were visiting that facility on the day that it was visited by the fieldworkers.

Initially it was planned to compare the results on implementation of the PEM Program between PHC facilities where nutrition services were available and those where nutrition services were not delivered. Despite the fact that most facilities did not have permanent nutrition personnel, dieticians did visit most clinics regularly. Due to the small sample size of PHC facilities where nutrition services were not delivered at all (only 2 facilities), this was not possible.

6.3. Retrospective data

6.3.1. Involvement of dietetic and nutrition services in the implementation of the PEM Program

6.3.1.1. Officials responsible for the implementation of the PEM Program

Limited numbers of nutrition personnel were available at some of the PHC facilities to implement the PEM Program. The implementation of this program was mainly the responsibility of the professional nurses. In a quarter of the evaluated health facilities, the PEM Program was not implemented due to the fact that health professionals were not able to implement the PEM Program. Possible reasons for this may be that trained, skilled nutrition personnel are a scarce skill not only in South Africa, but also in the Free State. In addition, all vacant posts for nutrition auxiliary personnel were declared redundant. Although community development officers and community liaison workers are appointed, these staff members are so overloaded with the implementation of home-based care, TB care, support of people living with HIV and AIDS and other community-based strategic health programs, that they are not continuously available at PHC facilities to take responsibility for implementing the PEM Program. Because the implementation of the PHC Core Package is nurse-driven, it is expected of professional nurses at PHC facilities to implement nutrition interventions as well, since this program forms part of the PHC Core package. The nurses might be unable to implement the PEM Program due to a lack of training, lack of food supplements to distribute, staff shortages and a heavy workload.

As reported in studies conducted in Ethiopia, Sudan, Malawi and Zambia on the implementation of Community-based Therapeutic Care programs, the implementation of nutrition intervention programs should be implemented into existing healthcare facilities, alongside PHC services. By doing so, a more coherent and comprehensive package can be delivered to clients. Although the expertise of dieticians is required to provide technical support in planning, implementing and evaluating therapeutic and supplementary feeding programs, nurses are vital in the implementation of supplementary feeding programs. These nurses should be supported by non-clinical staff to perform measurements, distribute food supplements and supervise the program (Valid International, 2006, p. 17; 42; 61-62).

6.3.1.2. Referral of PEM Program clients

In 93.33% of cases, children who were hospitalized due to malnutrition were referred by health professionals to the local clinic for participation in the PEM Program at clinic level when discharged from the hospital. In a study undertaken by Kruger *et al* (2005) it was found that 59.4% of patients in South Africa were referred to and from hospitals and PHC facilities.

In this study it was found that 60% of hospitalized clients received food supplements upon discharge, which would last them for a month. However 33.33% of the clients who were discharged from hospitals received either enough food supplements to last 2 weeks or no food supplements at all. This indicates that the amount of food supplements issued to clients was not done according to the Free State Malnutrition Policy and varied between those living on farms and in rural areas and those living in urban and semi-urban areas.

In addition, patients who were admitted to hospital with severe malnutrition were not always referred to dieticians for dietetic treatment and counseling. Kruger *et al.* (2005) found similar results in their study and suggested that the co-operation between clinical personnel and dieticians should be strengthened.

Upon discharge, children that participated in the Community-based Therapeutic Care program in Ethiopia, Sudan, Malawi and Zambia, were supplied with a ration of food supplements that were enough to last them until the next follow-up visit (Valid International, 2006, p.96).

6.3.2. Evaluation of the implementation of the PEM Program against the criteria set out in the Free State Malnutrition Policy

6.3.2.1. Target groups for the PEM Program

The WHO (2002) has identified vulnerable target groups for supplementation. These vulnerable groups include malnourished children under 5 years, pregnant and lactating women, twins, orphans, HIV infected and affected people, people suffering from tuberculosis and the elderly.

According to the Free State Malnutrition Policy (2002), the target groups for the implementation of the PEM Program are underweight and malnourished children younger than 5 years, underweight pregnant and lactating women, and underweight individuals over 60 months, including underweight individuals suffering from chronic diseases and underweight elderly persons.

Most of the professional nurses were aware of the target groups for the PEM Program. However, other target groups that were included in the PEM Program at health facility level, which were not included in the Free State Malnutrition Policy were people living with HIV and AIDS and debilitating conditions.

6.3.2.2. Availability of food supplements at PHC Facilities

Food supplements were not always available at the health facilities for distribution to PEM Program clients, due to a delay in ordering and delivering of food supplements, constraints in budget allocations and a lack of transport.

In Uganda, it was found that a lack of transport contributed to delays in the availability of food supplements to those in need thereof (Pierce and Gardner, 2006, p.13). USAID (2007) reported that a constraint on the availability of food supplements at distribution level is due to challenges experienced with the procurement, shipping, storing and distribution of food supplements. Limited funds to procure sufficient food supplements for all those in need thereof were also found to be a constraint (USAID, 2007).

6.3.2.3. Ordering of food supplements

According to the Free State Malnutrition Policy, it is stated that the sister in charge of the clinic should take the responsibility of ordering food supplements before the 5th of each month from the district depot. At district level dieticians are responsible for ordering food supplements in bulk from allocated suppliers. However, the results of this study indicated that there is confusion amongst health professionals about whose responsibility it was to order the food supple-

ments from the district depot and that orders were not placed before the 5th of each month. It was even found in some of the PHC facilities that due to the confusion on whose responsibility it is to order food supplements, no food supplements were ordered for those facilities, resulting in the unavailability of food supplements for distribution to PEM Program clients and the PEM Program not being implemented continuously or at all.

Melito (2007) has described one of the limitations contributing to the inefficiency of the United States Food Aid program, as inadequate coordination between stakeholders and U.S. agencies on logistical matters to identify and track problems regarding the food and delivery programs.

Pierce and Gardner (2006, p.23) found that it was more effective in Uganda to distribute food supplements on a monthly basis to the distribution sites located near a health center than distributing them quarterly. In Ethiopia, Sudan, Malawi and Zambia, food supplements were provided to clients weekly, every two weeks or monthly, depending on the availability of funds and transport for clients to access the PHC facilities (Valid International, 2006, p.65).

6.3.2.4. Recording of information on the PEM Program register and control register

The results of the study indicated that poor recordkeeping at PHC facilities should be addressed. Information requested on the PEM Program register was not recorded in full by the implementers at PHC facilities. The only information that was recorded in most of the evaluated PEM Program registers was the weight of the PEM Program clients. However, this information was not recorded

in full on the control registers. In most cases, the entry criteria and type of food supplements issued to clients were not recorded at all. This indicates that the implementation of the program at PHC facilities is not managed well and that the progress of the patient is not consistently recorded. It would seem that the distribution of food supplements is regarded by implementers as a means of relieving hunger amongst poor clients and not as part of the medical treatment of clients suffering from malnutrition and chronic diseases. According to Kruger *et al.* (2005), more than half (58%) of the required registers and records used to record progress of patients were incomplete, inadequate or missing.

As found by Kruger *et al.* (2005) another challenge in record keeping of data on a daily basis was the recording and availability of statistics for all the categories. This is also an indication of poor management of the implementation of the PEM Program at facility-level. The program is rather considered to be a poverty alleviation strategy.

During the evaluation of the efficiency and effectiveness of the U.S. Food Aid programs, Melito (2007) also found that stakeholders and U.S. agencies did not collect or maintain data that was essential to the management of the implementation of the programs.

Part of the implementation and management of the food supplementation program in Uganda is the weighing of clients on a monthly basis. In an effort to address these problems, quarterly reports are compiled to identify the strengths and the weaknesses of the program (Pierce and Gardner, 2006, p. 23-24).

In studies conducted in Ethiopia, Sudan, Malawi and Zambia it was found that the child's nutritional and medical treatment and progress was recorded on either individual record cards or registers. Information that was mainly recorded on these records included the weight of the child and also the mid-upper arm circumference and height, which was recorded on a monthly basis (Valid International, 2006, p.70).

6.3.2.5. Monitoring of the PEM Program

The results of this study indicated that the PEM Program is not monitored on a monthly basis at most clinics. The only healthcare workers that took the responsibility for monitoring the implementation of the PEM Program at primary healthcare level, were the dieticians.

Melito (2007), described that without adequate monitoring and evaluation, food supplementation programs and available resources cannot be effectively managed and directed to areas where they are most needed. A lack of monitoring contributes to the goals and the objectives of the food supplementation programs not being reached.

6.4. Prospective data

6.4.1. Growth monitoring of mothers / caretakers and children younger than 5 years

6.4.1.1. Anthropometric status of children younger than 5 years

The results of the NFCS showed that in South Africa 10% of children between the ages of 1-9 years are suffering from underweight-for-age. However, less than 1.5% of these randomly selected children had a weight of less than -3SD (severely underweight) (Labadarios *et al.*, 1999).

Of all children weighed in this study, 81.4% gained weight of approximately 1 kilogram since previously being weighed. However, the 22.56% children that did not gain weight were at risk of severe malnutrition, including kwashiorkor and marasmus due to them having weights below the 3rd centile and / or having a weight below 60% of expected weight-for-age. Another challenge that was identified was that 15% of the weighed children had not gained weight for more than one month, but despite this, were not referred for participation in the PEM Program.

Kruger *et al.* (2005) recorded that one of the biggest challenges in preventing the death of malnourished children, is insufficient assessment of failure to thrive and delay in referring children with failure to thrive. Similar results were reported by Botma and Grobler (2004) in Motheo District (Bloemfontein, South Africa), where 10.41% of children younger than 5 years of age that were included in that study, were malnourished. The median weight-for-age was consistently below the 3rd

percentile curve and showed that children visiting the clinics were underweight for their age.

6.4.1.2. Completeness of the Road to Health Chart (RTHC)

Almost all the children participating in this study had an original copy of the RTHC. However, the RTHC's were not completed in full by healthcare workers. This resulted in children not being screened and identified for being at risk for malnutrition or being malnourished. This is in contrast with the results found by Kruger *et al.* (2005), who found that in most cases a RTHC was not available. However, the results of the study conducted by Botma and Grobler (2004) showed that the RTHC was available for 89.74% of all children under the age of 5 years included in their study. In 96% of the cases the correct weight of the children was plotted on the RTHC (Botma and Grobler, 2004).

6.4.1.3. Relationship of the interviewed mother / caretaker to the PEM Program client

More than 10% of children, who visited the clinics included in this study, were referred for participation in the PEM Program. Most of these children were in the care of their mothers, who brought them to the clinics. Other caretakers that brought the children to the clinic included grandmothers. According to Kruger *et al.* (2005), more than half of children (58%) included in their study had a mother as the caretaker of the malnourished child, with grandmothers and fathers recorded as other primary caregivers of children visiting public health facilities within South Africa.

6.4.1.4. Nutritional status of the mothers / caretakers

A large percentage (35.59%) of the mothers / caretakers that were included in this study had a normal weight, according to the calculated Body Mass Index (BMI). However, half of mothers / caretakers that were weighed were overweight or obese, whilst almost 15% of mothers / caretakers that accompanied the children to the health facilities were underweight. Only 25% of the underweight mothers / caretakers were referred for participation in the PEM Program.

According to the results of the NFCS, the prevalence of combined overweight and obesity amongst mothers / caretakers was 17.1% in South Africa (Labadarios *et al.*, 1999). These figures are much lower than those found in mothers / caretakers of malnourished children included in this study.

6.5. Knowledge of healthcare professionals (professional nurses and dieticians) and mothers / caretakers regarding the implementation of the PEM Program

6.5.1. Knowledge of mothers / caretakers regarding the implementation of the PEM Program

More than 80% of the mothers / caretakers were aware of the type of food supplements their children were supposed to receive. Only 18% of the mothers / caretakers had a misconception on which types of food supplements their children should receive.

According to the perceptions of the mothers / caretakers, the period for providing the food supplements to the children, should be longer than three months, until the child is well or until the child is 3 or 4 years. The food supplements that were given to the clients of the PEM Program, however, were shared with family members, mostly other children within the household. In most cases the supplements were the only food given to the child. The goal of supplementing the diet was thus not met.

In Uganda it was also found that food supplements are shared with the other household members, leading to poor weight gain in children. In addition to the food supplements, additional vegetables and starches were also consumed by the clients included in that study (Pierce and Gardner, 2006, p.27).

6.5.2. Knowledge of health professionals on the implementation of the PEM Program

According to the healthcare workers included in this study, all health institutions have an obligation to combat the prevalence of underweight amongst children younger than 5 years, which are associated with poverty and unemployment. Most of these healthcare workers agreed that providing food supplements to children who are suffering from malnutrition, is an essential part of the treatment of underweight children. However, the Free State Malnutrition Policy states that the first nutrition intervention should be nutrition education. This aspect of the program was neglected.

According to Jones *et al.* (2005), nutrition education is the first intervention in addressing malnutrition through food-based nutrition interventions. Nutrition ed-

education contributes to the changing of practices and attitudes of clients towards improved health, nutrition, hygiene and sanitation (Pierce and Gardner, 2006, p.29).

6.6. Attitudes and practices of health professionals and mothers / caretakers

6.6.1. Attitudes and practices of mothers / caretakers

PEM Program clients received food supplements for approximately 7 months. According to the Free State Malnutrition Policy PEM Program clients should only receive supplements for 3 months, after which supplementation can be extended to a maximum period of 6 months depending on the individual client's progress. In Uganda, it was recommended that food supplements be provided to clients for longer than the prescribed 3, 6 and 9 months (Pierce and Gardner, 2006, p.43).

In accordance with the recommendations of the Free State Malnutrition Policy, the type of food supplements that were mostly distributed to children younger than 5 years was infant formula or enriched maize meal in combination with nutritional drinks.

Although the distribution of vegetable seeds to mothers / caretakers of children younger than 5 years which are malnourished or at risk therefore, forms part of the nutrition intervention package, seeds were not distributed. The reasons for this were mostly unavailability of vegetable seeds at PHC facilities and mothers / caretakers not interested in making a vegetable garden at home due to lack of funds and seeds.

For those mothers / caretakers that indicated that they do have vegetable gardens at home, the seeds and support for making these gardens were from family members and not from any governmental departments. The few mothers / caretakers that received seeds and support from governmental departments, received these from the Department of Health.

Vegetable seeds were provided to clients in Uganda as part of the food supplementation program. Clients that received vegetable garden seeds were assisted by community health workers to start household vegetable gardens (Pierce and Gardner, 2006, p.24). Non-governmental organizations (NGO's) and community-based organizations (CBO's) can be used to support the distribution of seeds and practical assistance on starting and maintaining vegetable gardens (Botma and Grobler, 2004). In Ethiopia, Sudan, Malawi and Zambia an Intersectoral link was established with Agricultural interventions to strengthen the establishment of vegetable gardens at community- and household level (Valid International, 2006, p.19-20).

The breastfeeding rate amongst infants included in this study was 80% for a median period of approximately 5 months. However, it was not determined whether this breastfeeding was exclusive. The main reason for infants not being breastfed was the belief amongst mothers / caretakers and health professionals that babies of HIV infected mothers should not be breastfed. Other reasons included mothers suffering from breast problems such as cracked and sore nipples and separation between mothers and their infants and young children. In 2005, Kruger *et al.* (2005) reported that 26% of malnourished children in South Africa are exclusively breastfed and 19% received mixed feeds. Botma and Grobler (2004) found that 86.83% of all mothers in the Motheo district breastfed their babies.

Reasons found by them for interruption or ending of breastfeeding were that the baby refused the breast, the mother did not have enough milk, the mother was ill, the mother passed away, the mother was working, the child was sick, the child was not healthy and the baby did not need breastmilk. In that study the average period of breastfeeding was 12 months (Botma and Grobler, 2004).

In this study a large percentage of mothers interrupted or stopped breastfeeding after their children had received food supplements. This was reported to be due to advice given to mothers by health professionals from PHC facilities to stop / interrupt breastfeeding for reasons unknown to the mothers. It was also reported by the mothers that they stopped breastfeeding after feeding the food supplements to their children because their children refused to continue breastfeeding. Botma and Grobler (2004) found that nursing staff often encourage mothers to use alternative feeding methods for feeding their infants instead of breastfeeding. Nutrition education to mothers / caretakers should encourage mothers to continue breastfeeding and not to use alternative feeding methods, unless medically indicated (Botma and Grobler, 2004).

In general most of the children participating in the PEM Program had an inadequate food intake for the day. In most cases, the food intake for breakfast and lunch was adequate, but the food intake for supper (which is usually the main meal) was mostly inadequate. As part of the NFCS, Labadarios *et al.* (1999) reported that children in the Free State generally had a lower energy intake, irrespective of whether they ate 2 or 3 meals daily.

More than half (54.35%) of mothers / caretakers mainly took their children to the clinic for treatment when ill. However, other health professionals that were also

consulted by the mother / caretaker for medical treatment and advice regarding the health of the child included private doctors (28.26%), health professionals at hospitals (19.57%) and also traditional healers (2.35%). According to Botma and Grobler (2004), 72.21% of mothers / caretakers in Motheo district sought medical advice and treatments from the local clinic, whilst 16.08% sought help from private doctors.

6.6.2. Attitudes and practices of health professionals

In accordance with the recommendations of the Free State Malnutrition Policy, professional nurses mostly requested mothers / caretakers to bring their children back to the clinic when the child had lost weight. However, some of the nursing staff was not sure what to do in cases where the weight of a child had dropped, but was not yet below the 3rd percentile or 60% of expected weight.

In cases where children were underweight-for-age, the nutritional status of the mother and the other children in the household were also examined. In cases where both the mother and the child were underweight, or when a lactating mother and her infant were underweight, both the mother and the child received food supplements. These practices of the health professionals compared well with the recommendations of the Free State Malnutrition Policy.

6.7. Training of health professionals and mothers / caretakers related to the effective implementation of the PEM Program

6.7.1. Training provided to health professionals

Most of the training of health professionals regarding the criteria and guidelines of the Free State Malnutrition Policy was conducted by dietitians. However, only one health professional per clinic was trained on the PEM Program, and professional nurses, who were expected to implement the PEM Program, were often not trained to perform this function.

Seventy nine percent of the interviewed health professionals indicated that they needed more training on the PEM Program and 88% indicated that their colleagues also needed additional training. These health professionals suggested that in-service training should focus on the entry and exit criteria of the program, how to issue and control the food supplementation stock, criteria for identifying underweight children, when to supplement children of HIV positive mothers, HIV and infant feeding, nutrition education to mothers, how to prepare and feed the food supplements and recording of the PEM Program information on the forms provided. Some of them suggested that training should not only focus on the PEM Program, but also on nutrition in general and how to complete the RTHC. Pierce and Gardner (2006, p.14) found that the food supplementation program in Uganda was strengthened and improved through extended training of staff within the field. In studies conducted in Ethiopia, Sudan, Malawi and Zambia it was reported that health staff and managers received ongoing training and mentoring support to build their capacity in implementing and supervising the program. Technical support from dietitians is required to strengthen the skills and capacity of other health professionals in the implementation, supervision and monitoring of supplementary feeding programs (Valid International, 2006, p.41; 42).

6.7.2. Training and education of mothers / caretakers

In Ethiopia, Sudan, Malawi and Zambia it was essential for mothers / caretakers to receive information on how food supplements should be prepared in order for the Community-based Therapeutic Care program to be successful (Valid International, 2006, p.70). In this study twenty percent of the mothers / caretakers, with children participating in the PEM Program, did not receive any information on how to prepare the food supplements from the nursing personnel.

The mothers / caretakers indicated that information and education on healthy eating guidelines and food choices was however, received. Other nutrition education topics that were covered included information on continuous breastfeeding, Oral rehydration solution (ORS), hygiene and safety. Unfortunately some mothers received education on how to stop breastfeeding. As part of the food supplementation program in Uganda, mothers received nutritional education on basic nutrition, growth monitoring, healthy feeding for infants and young children, importance of micronutrients and local food sources, household vegetable gardens, sanitation and clean water and nutrition for people living with HIV and AIDS. Increased practical nutrition knowledge amongst mothers / caretakers, can contribute to improve nutritional status of reproductive women, their infants and young children (Pierce and Gardner, 2006, p.18-19).

Only 36% of the mothers / caretakers received pamphlets or written advice and only 65% of them understood the messages after reading it. According to Botma and Grobler (2004) however, only 27.10% of mothers / caretakers in their study understood the nutrition education provided to them.

6.8. Associations between variables

6.8.1. Nutritional status of children on the PEM Program versus the nutritional status of their mothers / caretakers

Most of the mothers / caretakers with children participating in the PEM Program, had a BMI between 19-24 kg/m² (normal weight).

The findings of this study indicate that 9.7% of the households in this study can be regarded as “double burden” households. A double burden household is defined as the prevalence of overweight / obesity and underweight individuals within one household or family (Townsend *et al.*, 2001; Doak *et al.*, 2005). Deleuze Ntandou Bouzitou *et al.* (2005) found that child undernutrition coexisted with maternal obesity in 16.2% of the households included in their study from Montreal. In this study 7 mother-and-child-pairs were found to be underweight-for-age, thus supporting these findings. According to Mendez *et al.* (2005) the prevalence of overweight amongst women in developing countries, is higher than that of underweight, despite the high prevalence of underweight amongst young children.

6.8.2. Prevalence of underweight amongst the weighed children versus the completeness of the RTHC

Part of the treatment of a child suffering from malnutrition is assessing the child's progress by plotting the weight correctly on the RTHC (WHO, 2000a, p.87). In this study 22% of children that were underweight, had incomplete RTHC's. If health professionals complete the RTHC's in full, children at risk of becoming malnourished or those already suffering from malnutrition can be identified and nutritionally supported to prevent severe malnutrition and death.

6.8.3. Association between the weight of children and adequacy of food intake throughout the day

In this study only 31% of children that had a normal weight-for-age had an adequate food intake for the day (according to the 24-hour recall). A large amount (67%) of children suffering from underweight-for-age was also suffering from hunger due to an inadequate daily food intake. These findings correlate well with the findings of the NFCS (Labadarios *et al.*, 1999) where it was found that children coming from households affected by food insecurity or at risk for hunger, also presented with a lower weight-for-age.

6.8.4. Association between weight loss in children and consumption of food supplements as the only available food for children

According to the findings of this study, 25% of the children that lost weight consumed only the food supplements as a source of food. It is therefore important to emphasize to the mother / caretaker that the food supplements that are provided to the children participating in the PEM Program should be consumed with other food items, preferably a balanced diet. Gillespie (1999) has identified that one of the most common reasons for failure in running successful supplementary feed-

ing programs, was the inadequate intake of additional food sources to the food supplements which were needed to meet the nutrient gap. In a study conducted by Begum *et al.* (2007) in Bangladesh, it was found that weight gain did not occur amongst children when food supplements were provided to them. Acute food shortage and hunger are, however, addressed.

6.8.5. Association between weight loss and sharing of food supplements with other children in the household

Only 2 out of the 4 children who shared the food supplements with other children in the household had lost weight. The small number of children in this group made it difficult to draw any conclusion, though in Ethiopia, Sudan, Malawi and Zambia, additional rations of food supplements were given to households in an attempt to avoid the sharing of supplements with other children in the family (Valid International, 2006, p.81).

6.8.6. Association between the nutritional status of children and breastfeeding

Nearly 60% of the children included in this study that were breastfed had a normal weight-for-age. The mean period for breastfeeding was 5 months, but it is not known how long the period of exclusive breastfeeding was. A concern is that most mothers stopped breastfeeding after food supplements were received. This is in contrast with the Free State Malnutrition Policy that recommends that a breastfeeding mother should be supplemented with food supplements instead of the infant. It would thus seem that health professionals, especially nursing staff

and medical practitioners, are not supporting breastfeeding mothers to maintain and strengthen breastfeeding practices.

6.8.7. The association between weight gain when a vegetable garden is established at home

In 65.5% of cases where a vegetable garden had been established at home, children had a normal weight-for-age. Only 9 children who were underweight-for-age had no access to a vegetable garden established at home. However, having a vegetable garden at home will not necessarily ensure adequate daily food intake for children. In Uganda, Pierce and Gardner (2006) found that attempts to increase food production by means of vegetable gardens contributed to the promotion and improvement of the health and nutritional status of people affected by household food insecurity.

6.8.8. The prevalence of underweight amongst the weighed children in fixed clinics where the PEM Program was not implemented

In both clinics where the PEM Program was not implemented, only 6 children were underweight-for-age. The concern here was that for these malnourished children, no action was taken to address their condition. All children visiting PHC facilities should be weighed to screen them for malnutrition or their risk of becoming malnourished.

Chapter 7

Conclusions and Recommendations



(FSDOH, 2006)

7.1. Conclusions

7.1.1. Involvement of dietetic and nutrition services in the implementation of the PEM Program

In this study it was found that the implementation of the PEM Program was mainly the responsibility of professional nurses in PHC facilities. Either limited amounts of nutrition personnel or none were available at PHC level to take the responsibility of or assist with implementing the PEM Program.

Regarding the referral of PEM Program clients, it was found that clients admitted to hospitals for treatment of severe malnutrition, were referred to the local PHC facility for participation in the PEM Program upon discharge. However, these clients were seldom referred by health professionals to dietitians for dietetic support and treatment.

7.1.2. The implementation of the PEM Program against the criteria set out in the Free State Malnutrition Policy

The criteria that were used for comparison of the results of this study against that of the Free State Malnutrition Policy, included the target groups, availability of food supplements at PHC facilities, ordering of food supplements, recording of information on the PEM Program register and control register, and monitoring of the PEM Program.

The target groups, as recommended by the Free State Malnutrition Policy, were correctly identified by health professionals. In addition to the targets as identified in the Free State Malnutrition Policy, people living with HIV and AIDS and

debilitating conditions were also identified as a target group for participating in the PEM Program.

Food supplements were not continuously available at PHC facilities for distribution to PEM Program clients, due to logistical challenges in the procurement, ordering and delivery of food supplements. In most clinics, food supplements were not ordered on a monthly basis before the 5th of each month from the district depot, as required by the Free State Malnutrition Policy. Healthcare professionals were confused about whose responsibility it was to order food supplements from district depots.

Information on the PEM Program register and control register was not completed in full. Due to poor recordkeeping of client and program information, the progress of clients could not be managed well. Statistics were not kept regarding the clients that participated in the PEM Program, which resulted in poor management of the implementation of the PEM Program. The implementation of the PEM Program was not regularly monitored. It was identified by most of the health professionals that the monitoring of the PEM Program was regarded as the responsibility of dietitians.

7.1.3. Growth monitoring of mothers / caretakers and children younger than 5 years

In this study it was found that the majority of the children (82.41%) that were weighed gained weight of approximately 1 kilogram since previously being weighed. Twenty two percent (22%) of children that did not gain weight were at risk of severe malnutrition and had weights below the 3rd centile and / or below 60% of expected weight-for-age. Fifteen percent (15%) of the weighed children had constant weights for more than one month after receiving nutrition education or being referred to the PEM Program.

Almost all the children 5 years old and younger had an original copy of the RTHC. However, these RTHC's were often not completed in full by healthcare workers. Children were not effectively screened and identified for risk of malnutrition or malnutrition.

Most of the children that participated in the PEM Program were in the care of either their mothers or their grandmothers.

According to the BMI, 3.5 out of every 10 mothers / caretakers had a normal weight. Half of the mothers / caretakers that were weighed were overweight or obese (BMI \geq 25 kg/m²). Only 15% of the mothers / caretakers that accompanied the children to the health facilities were underweight (BMI $<$ 18.5 kg/m²).

7.1.4. The knowledge of healthcare professionals and mothers / caretakers regarding the PEM Program

Mothers / caretakers were aware of the type of food supplements their children were supposed to receive. However, the mothers / caretakers had a misconception regarding the period that these food supplements would be provided to their children. Mothers / caretakers were under the perception that the food supplements would be provided to their children until they were well or until their children were 3 or 4 years old. Food supplements that were administered to the clients of the PEM Program were often shared with family members, mostly other children within the household, and were often the only food eaten by the PEM Program clients at home.

Healthcare workers correctly agreed that providing food supplements to children who are suffering from malnutrition, is an essential part of the treatment of underweight children. Eighty six percent of the interviewed health professionals reported that the most important nutrition intervention should be nutrition education, based on the condition of individually assessed children.

7.1.5. Attitudes and practices of health professionals and mothers / caretakers towards the PEM Program

PEM Program clients received food supplements for approximately 7 months. The type of food supplements that were mostly distributed to children younger than 5 years within the PHC facilities were infant formula or enriched maize meal in combination with nutritional drinks.

No vegetable seeds were distributed to mothers / caretakers of children younger than 5 years participating in the PEM Program. In cases where a vegetable gar-

den was established, no support was received from either health professionals or community workers. Lack of availability of vegetable seeds, land and funds were the main reasons provided by mothers / caretakers for not having a vegetable garden.

Eighty percent of children had been breastfed for a period of approximately 5 months, however, the period of exclusive breastfeeding was not reported. The main reason for infants not being breastfed was the belief amongst mothers / caretakers and health professionals that babies of HIV infected mothers should not be breastfed. Mothers were often advised by healthcare professionals to stop or interrupt breastfeeding for reasons unknown to them. Other reasons for interruption and ending of breastfeeding included mothers suffering from breast problems such as cracked and sore nipples and separation between mothers and their infants and young children. It was reported by the mothers / caretakers that breastfeeding was often interrupted or ended after children received food supplements.

Mothers / caretakers were requested by healthcare professionals to bring children back to the clinic if the child lost weight.

Nursing staff were not sure what to do in cases where the child lost weight, but was not yet below the 3rd percentile or 60% of expected weight-for-age. In cases where children were underweight-for-age, the nutritional status of the mother and the other children in the household was also determined to identify malnutrition or the risk thereof. In cases where both the mother and child were underweight, or when a lactating mother and her infant were underweight, both the mother and her child received food supplements.

Most of the children participating in the PEM Program had an inadequate food intake for the day. In most cases, the food intake for breakfast and lunch was adequate; however the food intake for supper was mostly inadequate.

Half of the mothers / caretakers mainly took their children to the clinic for treatment when ill. Medical treatment and advice regarding the health of the child was also sought from private doctors, health professionals at hospitals and traditional healers.

7.1.6. Training of health professionals and mothers / caretakers related to the effective implementation of the PEM Program

The training of health professionals regarding the criteria and guidelines of the Free State Malnutrition Policy was mainly identified as the responsibility of the dietitians. In most cases, only one health professional per clinic was trained regarding the PEM Program. Not all the professional nurses expected to implement the PEM Program were trained. Health professionals indicated that more training about the PEM Program would improve the implementation of the PEM Program. Staff felt that in-service training should focus on the entry and exit criteria of the program, how to issue and control the food supplementation stock, criteria for identifying underweight children, when to supplement children of HIV positive mothers, HIV and infant feeding, nutrition education to mothers, how to prepare and feed the food supplements and recording of the PEM Program information on the forms provided. This training should also include aspects of basic nutrition.

Most of the mothers / caretakers (80%), with children participating in the PEM Program, did receive information on how to prepare the food supplements. Nutrition education given to mothers / caretakers mainly focused on healthy eating guidelines, food choices, breastfeeding, oral rehydration solution (ORS), hygiene and safety. These health messages were not given to mothers / caretakers in writing. One third of all mothers / caretakers that received nutrition education and information materials did not understand the messages on these materials.

7.2. Recommendations

Based on the conclusions of the study, the following recommendations were made:

7.2.1. Management of PEM

The triple A approach should be used to conduct comprehensive evaluation to identify the underlying causes of malnutrition in the Free State, per district. The outcomes of the evaluation can then be used to develop and implement nutrition strategies to address the underlying causes of malnutrition within communities (UNICEF, 1992). Policies and protocols which are developed for the management of PEM, should address a combination of both over- and undernutrition to address the “double burden of disease” in many households (Lipton, 2001). Policies and procedures should ensure that the food supplements reach the most vulnerable target groups – such as household food insecure pregnant women, malnourished children and people living with HIV and AIDS (Melito, 2007, p.3).

Primary interventions to identify and manage children that are at risk for malnutrition should focus on growth monitoring and promotion and nutrition education.

All children younger than 5 years who visit PHC facilities should be weighed in order to identify those that are at risk of developing malnutrition as well as those suffering from malnutrition (Botma and Grobler, 2004). Weighing scales should be accurate and in a working condition (Melito, 2007, p.24). The weight of children should regularly be plotted and recorded on the RTHC. This plotted and recorded weight of the children should be compared with the weight percentiles to determine their nutritional status (Botma and Grobler, 2004; Melito, 2007, p.24).

The nutrition education messages should be client specific and addressed towards the mothers / caretakers of PEM Program clients (Naidoo *et al.*, 1993; Botma and Grobler, 2004). An 18 month calendar can be developed which includes a hygiene, health or nutrition message for each month (Melito, 2007, p.25). Mothers / caretakers of malnourished children should be advised to bring their children to the local PHC facility for follow-up every month (WHO, 2002, p.120-122). Nutrition education that is provided to mothers / caretakers, should focus on the protection, promotion and support of exclusive breastfeeding for 6 months, safe infant feeding practices in the context of HIV and AIDS, appropriate complementary feeding practices, growth monitoring and promotion, prevention of growth faltering, consumption of locally available foods, consumption of micronutrient rich foods and vitamin A supplementation. Establishing of household vegetable gardens, food preparation and hygiene, dangers of smoking and alcohol consumption during pregnancy, appropriate nutrition during pregnancy and lacta-

tion and nutrition for people living with HIV and AIDS and debilitating conditions should also be included (DOH, 2006; Pierce and Gardner, 2007, p.18). Nutrition information and education materials should be adapted in order for mothers / caretakers to understand the messages clearly (Melito, 2007, p.25). Nutrition education programs should be based on recognized evidence of food consumption in South Africa (Labadarios *e al.*, 1999). Love *et al.* (2001) have developed a set of 11 key healthy eating messages, known as the South African Food-based Dietary Guidelines for people older than 7. These food-based dietary guidelines should be incorporated into the nutrition education package not only to promote healthy lifestyles, but also to address the prevalence of over- and undernutrition.

Food and vitamin A supplementation are secondary interventions to treat and manage children that are at risk for malnutrition or who suffer from malnutrition. Food supplements should be provided to those children who have been identified with malnutrition. Identified clients should receive supplements that consist of a combination of the following products according to age and individual needs: enriched maize meal, high energy lactose free drink, acidified / soya formula and multivitamin supplementation (DOH, 2003). Food supplements should be provided to PEM Program clients on a monthly basis for at least 3 months and for a maximum of 6 months. The ration of food supplements should be calculated to make provision for sharing of food supplements with other household members (Melito, 2007, p.23-27). Children should receive vitamin A supplementation according to their age as described in the vitamin A supplementation schedule (DOH, 2003). Vegetable seeds and support should also be provided in order to establish a household vegetable garden (DOH, 2003).

Complete clinical records should be kept to monitor the progress of the PEM Program clients. Effective and proper clinical record keeping forms a major part of the basic principle of clinical care for children that suffer or are at risk of developing malnutrition (Kruger *et al.*, 2005, p.1-26). PEM Program clients should be followed-up every 30 days. This follow-up should consist of weighing the client, reassessing feeding practices and counseling the mother / caretaker on feeding and nutrition practices (WHO, 2000a, p.120-122). Details regarding the nutrition intervention and the client's details should be recorded on the necessary forms / records (Melito, 2007, p.23). Healthcare workers should screen other household members for malnutrition or risk of becoming malnourished. Nutrition intervention and rehabilitation programs should not only focus on the prevention and treatment of malnutrition, but on all the health and nutrition problems present within the household (Torun and Chew, 2005, p.985). Clients participating in the PEM Program and their families should be followed-up to prevent relapse and assure the continued development of the client (Saloojee and Pettifor, 2001, p.127).

Monitoring of the implementation of the program should be improved to ensure proper management and implementation. The effectiveness of the PEM Program can be improved by strengthening the logistical planning, transportation and monitoring of the program. A dietician / nutritionist should be responsible for the development of nutrition intervention programs and the training of staff that will be responsible for implementation thereof. Nutrition staff should visit PHC facilities regularly to monitor the implementation of the program. Recording and analyzing of statistics on a quarterly basis are an essential part of managing and monitoring of the implementation of the program (Melito, 2007, p.4-23).

Household insecure clients should be referred to Social Development for social grant support. Mothers / caretakers of malnourished children should be referred for participation in a community-based program to address the long-term alleviation of household food insecurity (DOH, 2003, p.5). Before a malnourished child is discharged from hospital, continuous care and follow-up of the client should be arranged with PHC facilities or community health workers. On discharge, the child should be referred to the local clinic or community-based nutrition rehabilitation center in writing. This written discharge note should contain information on the weight on discharge, feeding recommendations and the expected action from the healthcare worker (WHO, 2000a, p.88).

7.2.2. Skills development and capacity building of healthcare professionals

Since most malnourished clients are assessed and treated at PHC facilities, it is important that training of health professionals should focus on skills and competencies to assess and treat malnourished children in this setting (Kruger *et al.*, 2005, p.1-26). The implementation of health and nutrition programs can be strengthened through in-service training of healthcare professionals who are expected to implement programs at PHC facilities. More than one healthcare professional per facility needs to be trained to ensure that the implementation, management and monitoring of the PEM Program can continue in absence of trained healthcare professionals (De Villiers *et al.*, 2005, p.531).

7.2.3. Interventions to improve household food security

The prevention and control of malnutrition should be addressed as a multisectoral approach. At a national and provincial level, policies and strategies should be developed in an atmosphere of short- and long-term political commitments in order to alleviate the underlying causes of malnutrition (Torun and Chew, 2005, p.985). Integration between the Integrated Nutrition Program (INP) and Integrated Management of Childhood Illnesses (IMCI) program should be strengthened to improve the identification, referral and follow-up of clients suffering from malnutrition (DOH, 2003, p.5). Nutrition information and education tools and interventions should be based on recognized food consumption data in the province and country (Labadarios *et al.*, 1999). Links should be established between the PEM Program, Community-based Nutrition programs and the National School Nutrition Program for referral of malnourished clients and also to avoid duplication of services rendered to one individual / household (NICUS, 2005). All stakeholders and role players should liaise with each other in order to identify and address transport and delivery problems when they arise (Melito, 2007, p.9).

Ways should be found to establish community-based growth monitoring clinics to identify children who are at risk or suffering from malnutrition (DOH, 2003, p.11). Community-based nutrition rehabilitation centers should be established for referral of malnourished children after being discharged from hospitals (WHO, 2000a, p.9-88). Mothers / caretakers, families and communities of malnourished children should be involved in planning, developing and implementing strategies to address the underlying causes of household food insecurity and malnutrition (Botma and Grobler, 2004; Melito, 2007, p.19). Community-based nutrition interventions should emphasize the promotion of breastfeeding, safe infant feeding practices for infants for people living with HIV and AIDS, appro-

priate use of weaning foods, nutritional alternatives using traditional foods, personal and environmental hygiene, feeding practices during illness and early treatment of diarrhea and other diseases (Torun and Chew, 2005, p.985). Food-based nutrition interventions such as vegetable gardens and nutrition education, offer a sustainable approach to reduce malnutrition and other micronutrient deficiencies and should be strengthened (Jones *et al.*, 2005, p.198-208). Community workers should assist mothers / caretakers with starting vegetable gardens (Melito, 2007, p.24).

7.2.4. Further research

Further research should focus on determining the underlying causes of malnutrition, comparing urban and rural areas. Such studies should also consider gender matters and the effect of HIV and AIDS on nutritional status and food insecurity. Studies should be conducted to demonstrate the impact of food supplements on the nutritional status of target groups that are prone to developing malnutrition as well as people living with HIV and AIDS (Melito, 2007, p.21-22).

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Addendum 1

List PHC facilities within the Free State included in this study

Lejweleputswa District:

1. Phomolong
2. Dealesville
3. Leratong (Allanridge)
4. Bophelong
5. Hoopstad
6. Mmahabane
7. Tsepong
8. Welkom
9. Masilo (Theunissen)
10. Rearabetsoe
11. Winburg

Xhariep District:

12. Winnie Mandela, Rouxville
13. Phekolong; Reddersburg
14. Fauresmith
15. Gariepdam
16. Ethembeni
17. Bophelong

Thabo Mofutsanyana District:

18. Reitumetse (Not implemented)
19. Masebatatso
20. Mamello
21. Maqheleng
22. Hlohlolwane
23. Makeneng
24. Bohlokong
25. Itumeleng
26. Petsana

Fezile Dabi District:

27. Villiersdorp
28. Phekolong
29. Sizia Bantu
30. Lesedi
31. Hillstreet
32. SPS Tsatsi

33. Sedibeng sa Bophela
34. Rammulotsi
35. Tumahole
36. Deneysville
37. Kgotso

Motheo District:

38. Gateway
39. TS Mahlako (Botshabelo)
40. Opkoms
41. Bophelong
42. Sediba
43. Harry Qwala (Botshabelo)
44. Mokwena
45. Langenhoven park
46. Vanstadensrus
47. Excelsior
48. Ikaheng
49. Tweespruit
50. Mafane
51. Thusong

Addendum 2

Changes made to the questionnaires after the pilot study was conducted

- 1) Evaluation of PEMP: Mother or Caretaker
 - Add an option on “Never breastfed” to question 17
 - Add more coding blocks to question 4
 - Begins question 17 with “If yes is answered to question 14: did breastfeeding continue...”
 - Begins question 20 with “If yes is answered to question 19: who gave you this education...”

- 2) Evaluation of PEMP: Dieticians
 - Change wording of question 15 to “How many professionals have you trained on the PEMP per institution?”

- 3) Evaluation of PEMP: Professional Nurse
 - Exclude the need for indicating the name of the professional nurse who will be interviewed.
 - Correct numbering from questions 17-22.

- 4) Information from the order form and PEMP register
 - Insert “(children <5 years)” to question 9
 - Insert “completed order form” to question 12

- 5) Anthropometric evaluation form
 - No changes

- 6) Consent forms
 - No changes

Addendum 3

INFORMATION FROM THE ORDER FORM AND PEMP REGISTER

Please circle the appropriate answer

For office use only

Questionnaire number: _____

(1-3)

Name of fieldworker _____

(4-5)

Date _____

Name of clinic: _____

(6-7)

Sub-district: _____

(8-9)

District: _____

(10)

1. Are PEMP supplements ordered before the 5th of each month?

1. Yes
2. No

(11)

2. Have supplements been ordered for the previous month?

1. Yes
2. No

(12)

3. How often are supplements ordered?

1. Monthly
2. Two monthly
3. Three monthly
4. Other (specify) _____

(13)

4. Who is responsible for ordering the PEMP supplements?

1. District office nutrition personnel
2. Dietician
3. Sister in charge of the clinic
4. Sister in charge of the PEMP at clinic level
5. Other (specify)_____

(14)

(15)

(16)

(17)

(18)

5. Is the expiry date of the supplements recorded on the PEMP register?

1. Yes
2. No

(19)

6. Is the entry criteria to the PEMP indicated on the control register?

1. Yes
2. No
3. Not always

(20)

7. Are clients weighed with each follow-up?

1. Yes
2. No
3. Not always

(21)

8. Is this weight recorded on the control register?

1. Yes
2. No
3. Not always

(22)

9. How many clients (children < 5 years) are participating in the PEMP according to the PEMP summary register? _____

(23-24)

10. Does this number of participating clients correlate with the control register?

1. Yes
2. No

(25)

11. Where is the quantity of supplements issued to the client recorded?

1. Only PEMP summary register
2. Only control register
3. Both
4. Neither

(26)

12. For which target group is statistics not available on the completed order form? (more than one answer can be indicated)

1. Relactating infants
2. Underweight, non-breastfeeding infants
3. Underweight children 12-60 months
4. Children 12-60 months with marasmus
5. Children 12-60 months with kwashiorkor
6. HIV positive children
7. Pregnant and lactating women
8. TB patients
9. HIV positive patients
10. Low HB (anemia)
11. Cancer patients
12. Geriatrics (Elderly)

(27)

(28)

(29)

(30)

(31)

(32)

(33)

(34)

(35)

(36)

(37)

(38)

13. Is the diagnosis / entry criteria indicated on the control register?

1. Always
2. Never
3. Sometimes

(39)

Remarks:

Addendum 4

EVALUATION OF THE PROTEIN ENERGY MALNUTRITION PROGRAM (PEMP): PROFESSIONAL NURSE

Please circle the appropriate answer

Questionnaire number

Date of interview: _____

Name of interviewer: _____

Age of Professional Nurse: _____

Sex of Professional Nurse:

1. Male
2. Female

Name of clinic: _____

Sub-district: _____

District: _____

1. Who is responsible for the implementation of the PEMP in this clinic? (more than one answer can be indicated)

1. Yourself

2. Nutrition auxiliary officer (SASO)

3. Pharmacists / assistant

4. Dietician

5. Other (specify) _____

For office use only

(1-4)

(5-6)

(7-8)

(9)

(10-11)

(12-13)

(14)

(15)

(16)

(17)

(18)

(19)

2. Who is the target group for the PEMP? (more than one answer can be indicated)

- 1. Children < 5 years (20)
- 2. Underweight pregnant women (BMI < 18.5) (21)
- 3. Underweight lactating women (BMI < 18.5) (22)
- 4. Underweight elderly people (BMI < 18.5) (23)
- 5. Other (specify)_____ (24)

3. Do you think that health institutions have an obligation towards the community to rectify underweight?

- 1. Yes (25)
- 2. No

4. Do you think that the PEMP contributes to the treatment of the condition of underweight clients?

- 1. Yes (26)
- 2. No

5. Do you think that clients benefit from the PEMP supplements?

- 1. Yes (27)
- 2. No

6. What supplements are being given to PEMP clients? (more than one answer can be indicated)

- 1. Acidified formula (NAN Pellargon) (28)
- 2. Soya formula (Diva) (29)
- 3. Enriched maize meal (30)
- 4. Nutritious drink (31)
- 5. Other (Specify)_____ (32)

7. Will you include a child in the PEMP who has lost weight, but whose weight is not yet under the 3rd percentile or below 60% of the expected weight?

1. Yes
2. No
3. Not sure

(33)

8. Will you include a child in the PEMP with the first drop in weight, or will you request the mother to come back? (more than one answer can be indicated)

1. Will include child in PEMP
2. Will request mother to come back
3. Both
4. Neither / No action

(34)

(35)

(36)

(37)

9. What is the primary intervention (first action) of the PEMP?

1. Nutrition education
2. Supplementation
3. Don't know
4. Other _____

(38)

10. When a child is underweight, will you examine the nutritional status (weight and BMI) of the mother as well?

1. Yes
2. No

(39)

11. When a child is underweight, will you examine the nutritional status (weight for age) of other children in the household as well?

1. Yes
2. No

(40)

12. How often will it happen that you supplement the mother and her child?

1. Always
2. Never
3. When both are underweight
4. When the mother is breastfeeding
5. When the baby is underweight and being breastfed
6. Other _____

(41)

13. Do you think that there is a relationship between poverty and underweight?

1. Yes
2. No

(42)

14. To whom do you refer underweight clients with a low socio-economical background? (more than one answer can be indicated)

1. Social welfare
2. Community structures
3. Poverty alleviation / Income generating projects
4. NGO's / FBO's / CBO's
5. Dietician
6. Do not refer
7. Other

(43)

(44)

(45)

(46)

(47)

(48)

(49)

15. Do you get referrals of underweight clients for the PEMP from the hospitals?

1. Yes
2. No

(50)

16. Did you receive training on the PEMP?

1. Yes
2. No

(51)

17. Do you need more training on the PEMP?

- 1. Yes
- 2. No

(52)

18. Do you think that your colleagues need more training on the PEMP?

- 1. Yes
- 2. No

(53)

19. If “yes” what type of training is needed?

(54-55)

20. Can the services of the PEMP be improved?

- 1. Yes
- 2. No

(56)

21. If “yes” how?

(57-58)

22. If “no”, why not?

(59-60)

Suggestions / Comments regarding the PEMP:

Thank you



Dankie



Ke a leboha

Addendum 5

EVALUATION OF THE PROTEIN ENERGY MALNUTRITION PROGRAM: MOTHER / CARETAKER

Please circle the appropriate answer

For office use only

Questionnaire number

(1-4)

Date of interview: _____

Name of interviewer: _____

(5-6)

Number of respondent

(same number as number for anthropometry)

(7-10)

Name of clinic: _____

(11-12)

Sub-district: _____

(13-14)

District: _____

(15)

1. What is your relationship to the child?

1. Parent / Mother

2. Caretaker

3. Other (Specify) _____

(16)

2. Is this child or you receiving the supplements?

1. Mother / Caretaker

2. Child

3. Both

4. Neither

(17)

3. For how long are you or this child receiving these supplements?

1. Week
2. Month
3. Two months
4. Three months
5. Not receiving supplements
6. Other (specify) _____

(18)

4. Which supplements should this child receive?

1. Infant formula (Pellargon / Diva Soy)
2. Nutri A
3. Enriched Maize meal
4. Do not know
5. Nutri A and Enriched Maize Meal
6. Infant formula, Nutri A and Enriched Maize meal

(19)

5. How often should this child receive supplements?

1. Once a week
2. Once a month
3. Other (specify) _____
4. Do not know

(20)

6. For how long should this child receive supplements?

1. Three months
2. Six months
3. Other (specify) _____
4. Do not know

(21)

7. What kind of supplements does this child receive? (more than one answer can be indicated)

- 1. Acidified Infant formula (Nan Pellargon) (22)
- 2. Soya Infant formula (Diva) (23)
- 3. Enriched maize meal (24)
- 4. Nutritional drink (25)
- 5. Other (specify) _____ (26)
- 6. None (27)

8. Did you receive vegetable seed as part of the PEMP?

- 1. Yes (28)
- 2. No

9. Do you have a vegetable garden at home?

- 1. Yes (29)
- 2. No

10. If “no”, why not?

(30-31)

11. Who helped you to establish the vegetable garden?

- 1. Nobody (32)
- 2. Family members (33)
- 3. Neighbour (34)
- 4. Community worker (35)
- 5. Department of Agriculture (36)
- 6. Department of Social Welfare (37)
- 7. Department of Health (38)
- 8. Other (specify) _____ (39)

12. Did you have a harvest from the latest seedlings?

- 1. Yes
- 2. No

(40)

13. If “no”, why not?

(41-42)

14. Was this child breastfed?

- 1. Yes
- 2. No

(43)

15. If “yes”, for how long? _____ months

(44-45)

16. If “no”, why not?

(46-47)

17. Did breastfeeding continue after this child has been receiving the supplements?

- 1. Yes
- 2. No

(48)

18. If “no”, by whom were you advised to interrupt or stop breastfeeding? (more than one answer can be indicated)

- 1. Nurse
- 2. Doctor
- 3. Community health worker
- 4. Nutrition Auxiliary Officer (SASO)
- 5. Dietician
- 6. Other (specify)_____

(49)

(50)

(51)

(52)

(53)

(54)

19. Have you received any education on how to prepare the supplementation?

- 1. Yes
- 2. No

(55)

20. Who gave you this education on the preparation of the supplement? (more than one answer can be indicated)

- 1. Nurse
- 2. Pharmacists
- 3. Nutrition Auxiliary Officer (SASO)
- 4. Dietician
- 5. Other (specify) _____

(56)

(57)

(58)

(59)

(60)

21. How many people in the household share in the supplements? (more than one answer can be indicated)

- 1. Only the PEMP client
- 2. All of the household members (indicate number _____)
- 3. All the children (indicate number _____)
- 4. Other (specify) _____

(61)

(62)

(63)

(64)

22. Do you think it is necessary for this child to eat the enriched maize meal and drink the liquids?

- 1. Yes
- 2. No
- 3. Do not know

(65)

23. If “no”, why not?

(66-67)

24. Do you think that the supplements make a difference to the well-being of this child?

- 1. Yes
- 2. No
- 3. Not sure

(68)

25. Are the supplements the only food that this child eats?

- 1. Yes
- 2. No

(69)

26. What else does this child eat?

<i>Meal</i>	<i>Food items</i>
Breakfast & Mid-morning	
Lunch & mid-afternoon	
Supper & late night	

27. Is the food intake of this child adequate or inadequate?
(this part to be completed by the researcher only)

27.1. Breakfast and mid-morning

- 1. Adequate
- 2. Inadequate
- 3. Unsure

(70)

27.2. Lunch and mid-afternoon

- 1. Adequate
- 2. Inadequate
- 3. Unsure

(71)

27.3. Supper and late night

1. Adequate
2. Inadequate
3. Unsure

(72)

28. Who else do you take this child to for treatment? (more than one answer can be indicated)

1. Sangoma (Traditional Healer)
2. Private doctor
3. Hospital
4. Grandmother
5. Mother
6. Other (specify) _____

(73)

(74)

(75)

(76)

(77)

(78)

29. What advice have been given to you at the clinic to improve the health of this child or our own? (more than one answer can be indicated)

1. Continue breastfeeding
2. Oral Rehydration Solution
3. Food choices
4. Other (specify) _____

(79)

(80)

(1)

(2)

30. Were any pamphlets regarding this advice given to you?

1. Yes
2. No

(3)

31. Did you read it?

1. Yes
2. No

(4)

32. Did you understand the message?

1. Yes
2. No

(5)

33. What did you do with the pamphlet? (more than one answer can be indicated)

1. Keep it

(6)

2. Read it again

(7)

3. Gave it to a friend or family member

(8)

4. Throw it away

(9)

5. Other (specify) _____

(10)

34. Do you think that the services of the PEMP can be improved?

1. Yes

(11)

2. No

35. If “yes”, how?

(12-13)

Suggestions / Comments regarding the PEMP:

Thank you



Dankie



Ke a leboha

Addendum 6

EVALUATION OF THE PROTEIN ENERGY MALNUTRITION PROGRAM: DIETICIANS

Please circle the appropriate answer or fill in the information in the appropriate line

For office use only

Questionnaire number

(1-4)

Date of interview: _____

Name of dietician: _____

District: _____

(5)

1. How many primary healthcare facilities (fixed clinics) are there in your district? _____

(6-8)

2. In how many primary healthcare facilities is the PEMP implemented? _____

(9-11)

3. How many hospitals do you have in your district? _____

(12-13)

4. In how many hospitals in your district is the PEMP implemented? _____

(14-15)

5. Who is responsible for the ordering of PEMP supplements? (more than one answer can be indicated)

1. District office nutrition personnel

(16)

2. Dietician

(17)

3. Sister in charge of the clinic

(18)

4. Sister in charge of the PEMP at clinic level

(19)

5. Other _____

(20)

6. How often is the stock control register and PEM register monitored?

1. Weekly
2. Monthly
3. Two monthly
4. Quarterly (3 monthly)
5. Other _____

(21)

7. Who is responsible for monitoring the PEMP in the district?

(more than one answer can be indicated)

1. Dietician
2. Nutrition Auxiliary Officer (SASO)
3. Local Area Manager
4. Other _____

(22)

(23)

(24)

(25)

8. Are children admitted to hospital for malnutrition referred to the PEMP at clinic level after discharge?

1. Yes
2. No

(26)

9. Who refers the child to the clinic?

1. Doctor
2. Nurse
3. Dietician
4. Other _____

(27)

(28)

(29)

(30)

10. For how long are supplements, issued to a client at discharge, suppose to last the client?

1. One week
2. One month
3. Other _____

(31)

11. Are malnourished clients admitted to hospital referred to you?

- 1. Yes
- 2. No

(32)

12. Are supplements always available at the health facilities?

- 1. Yes
- 2. No
- 3. Not always

(33)

13. What are the reasons for interruptions in the provisioning of supplements to clients?

- 1. Not ordered on time
- 2. Not delivered on time
- 3. Budget allocation not enough
- 4. Other _____

(34)

(35)

(36)

(37)

14. Do you give training on the PEMP?

- 1. Yes
- 2. No

(38-40)

15. What number of professionals per institution have been trained on the PEMP? _____

(41-43)

16. Do you think that the PEMP should be improved?

- 1. Yes
- 2. No

(44)

17. If “yes”, how?

(45-46)

18. If “no”, why not?

(47-48)

Suggestions / Comments regarding the PEMP:

Thank you



Dankie



Ke a leboha

Addendum 7

ANTHROPOMETRIC EVALUATION FORM

(Please note that this form should be completed for all children younger than 5 years in the clinic)

Please circle the appropriate answer

Number of child (same as number of mother / caretaker)

Date _____

Age of the child (months) _____

Name of interviewer: _____

Name of clinic: _____

Sub-district: _____

District: _____

For office use only

(1-4)

(5-6)

(7-8)

(9-10)

(11-12)

(13)

1. Weight of the child?

1.1. Weight now

_____ kg

(14-17)

1.2. Previous weight _____

Date

_____ kg

(18-21)

1.3. Did the child's weight improve since the child was last weighed?

1. Weight gain

2. No weight gain

3. Decrease in weight

(22)

- 1.4. Is the weight < 3rd percentile?
- 1. Yes (23)
 - 2. No
- 1.5. Is the weight < 60% of expected weight?
- 1. Yes (24)
 - 2. No
- 1.6. Was the weight of the child constant for more than one month?
- 1. Yes (25)
 - 2. No
- 1.7. If “yes”, for how long?
- _____ months (26-27)
- 1.8. Is the child referred to the PEMP?
- 1. Yes (28)
 - 2. No
- 1.9. If “yes”, for how long is the child on the PEMP?
- 1. One month (29)
 - 2. Two months
 - 3. Three months
 - 4. Other _____

2. Nutritional status of the mother / caretaker?

2.1. Weight _____ kg

(30-34)

2.2. Height _____ cm

(35-40)

2.3. Is the mother supplemented with PEMP products?

1. Yes

(41)

2. No

3. Completeness of the RtHC:

3.1. Does the child have a Road to Health Chart (RtHC)?

1. Yes

(42)

2. No

3.2. Is the RtHC completed with each visit to the clinic?

1. Yes

(43)

2. No

3.3. Is the weight of the child plotted on the chart with each visit?

1. Yes

(44)

2. No

3.4. Are the weight dots connected to each other?

1. Yes

(45)

2. No

3.5. Is the birth month of the child written in the First column of the space provided to make the calendar?

(eg. If the child is born in May month, “May” should be written in the 1st column)

1. Yes
2. No

(46)

3.6. Is the month in which the child visited the clinic, indicated in the correct column? (eg If the child is born in February, and the first visit to the clinic is in May, “May” should be written in the 4th column and not the 2nd or the 5th column)

1. Yes
2. No

(47)

3.7. Is this the original RtHC or a copy?

1. Original
2. Copy

(48)

Remarks:

Thank you



Dankie



Ke a leboha

Addendum 8

BEVESTIGIGSBRIEF VIR MOEDER OF VERSORGER

Evaluering van die Protein Energie Wanvoeding Program onder kinders jonger as 5 jaar in primere gesondheids fasiliteite in die Vrystaat

Ek bevestig dat:

1. Ek gevra is of ek en hierdie kind kan deelneem in die bogenoemde navorsing.
2. Dit is aan my verduidelik dat:
 - 2.1. Die doel van die studie is om die Protein Energie Wanvoeding Program onder kinders jonger as 5 jaar te evalueer.
 - 2.2. My gewig en die gewig van die kind sal geneem word, sonder om enige pyn te veroorsaak.
 - 2.3. Hierdie navorsing word ook in ander dorpe van die Vrystaat gedoen.
 - 2.4. Die inligting wat ek gee is konfidentieel, maar dit sal anonym gebruik word om die resultate van hierdie studie aan ander navorsers bekend te maak.
 - 2.5. Ek kan direkte toegang tot die resultate van die studie verkry en ek kan die navorser skakel om my aangaande die uitkoms van die kind se resultate te verkry.
3. Dit was duidelik aan my verduidelik dat ek kan weier om aan die studiedeel te neem of dat ek ter eniger tyd die beantwoording van vrae kan stop tydens die onderhoud. Indien dit wel gebeur, sal ek nie op enige manier benadeel word of dit teen my gehou word nie.
4. Geen druk is op my uitgeoefen om aan die studie deel te neem nie en ek neem vrywilliglik deel sonder enige onkoste ten gunste van myself.
5. Die inligting van hierdie bevestigingsbrief is aan my verduidelik in 'n taal wat ek verstaan. Ek is ook die geleentheid gegun om enige vrae te vra aangaande aangeleenthede wat nie vir my duidelik is nie.
6. Ek gee hiermee my toestemming dat ek en die kind kan deelneem in die studie.

Handtekening moeder / versorger

Handtekening veldwerker

Datum

Datum

CONSENT FORM FOR MOTHER / CARETAKER

Evaluation of the Protein Energy Malnutrition Program amongst children < 5 years in Primary Healthcare Facilities in the Free State

I confirm that:

1. I have been asked if this child and I can participate in the above-mentioned research project.
2. It has been explained to me that:
 - 2.1. The purpose of the research is to evaluate the PEMP amongst children < 5 years
 - 2.2. The weight of this child and myself will be measured without causing any pain to the child
 - 2.3. This research is being done in other towns of the Free State
 - 2.4. The information I will give shall be kept confidential, but it will be used anonymously for making known the findings to other researchers
 - 2.5. I can have direct access to the results of the research and that I can contact the researcher who will inform me of the findings on the child.
3. It was clearly explained to me that I can refuse to participate in this research or I can stop answering the questions at any time during the interview. If this was to happen, I will not be disadvantaged in any way and it will not be held against me.
4. No pressure was applied to me to take part in the research and I participate voluntarily without any costs to myself.
5. The information in this consent form was explained to me in a language commonly understood by me. I was also given the opportunity to ask questions on things I did not understand clearly.
6. I hereby agree voluntarily that the child and I can participate in this research

Signed by mother / caretaker

Signed by fieldworker

Date

Date

Addendum 9



FREE STATE PROVINCIAL GOVERNMENT

Health

Ms P. Legolae, Sub-Directorate Child Health & Nutrition: Assistant Manare 7th Floor , St Andrews Centre; 113 St Andrew Street;
PO Box 227, Bloemfontein, 9300. Tel: 051-4301933/4/5/6; Fax: 051-4483077;
[E-mail:katzen@doh.ofs.gov.za](mailto:katzen@doh.ofs.gov.za)

**TO ALL HEADS OF INSTITUTIONS AND
OFFICES OF THE DEPARTMENT OF
HEALTH IN THE FREE STATE**

DIRECTORATE HEALTH PROGRAMS, CHILD HEALTH AND NUTRITION
SUBDIRECTORATE

HEALTH SUPPORT CIRCULA NO.14 OF 2002

RE : POLICY ON MALNUTRITION PROGRAM

- 1. Please take note that the attached Malnutrition Program policy has been approved.**
- 2. The contents thereof should be brought under the attention of all staff concerned.**
- 3. The attached Malnutrition Program Policy replaces previously known Protein Energy Malnutrition (PEM) Scheme Policies**

Ms L.L. Katzen
Senior Manager : Health Programs
21 / 10 / 2002

THE MALNUTRITION PROGRAM POLICY

MALNUTRITION PROGRAM TABLE OF CONTENTS

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1. BACKGROUND

Protein – Energy Malnutrition (PEM) and accompanying micro-nutrient deficiencies are currently important nutritional problems in South Africa, especially in young children. Energy deficiency is the major cause of PEM. It often results from consuming too little food, especially energy-dense foods and other nutrients. Micro-nutrient deficiencies are often accompanying symptoms of PEM and therefore also need to be addressed. Malnutrition is frequently aggravated by infections and diseases. Failure to grow adequately and recover from illness are two of the most important manifestations of PEM.

Since this policy for the treatment of PEM also concentrates on micro-nutrient deficiencies, this program will be referred to as the Malnutrition Program(MP). The purpose of the Malnutrition Program is to reduce and prevent the high incidence of underweight and micro-nutrient deficiencies through education and food supplementation.

2. TARGETING

The target groups of the Malnutrition Program are malnourished individuals or those individuals at risk of becoming malnourished. The main target groups are:

- Underweight infants birth to \leq 6 months
- Underweight infants and children $>$ 6 months to 60 months
- Underweight pregnant and lactating women
- Underweight individuals over 60 months, including underweight individuals suffering from chronic diseases
- Underweight elderly persons

3. PROGRAM PACKAGE

3.1 PRIMARY INTERVENTION

In some cases (especially when a problem is detected in the early stages) primary intervention alone is enough to reverse a developing malnutrition condition. The primary intervention is based on **Nutrition Education** to rectify the problem.

NUTRITION EDUCATION

Nutrition education should be presented on the following topics according to need:

- Breastfeeding, with emphasis on EXCLUSIVE BREASTFEEDING ON DEMAND
- Appropriate complementary feeding: When to introduce complementary feeds, frequency of feeding, energy density of meals, quantities of food per meal;
- Promotion of the consumption of micro-nutrient rich foods
- Food and environmental hygiene and healthy eating habits
- Caring of women and children
- Nutrition during pregnancy and lactation
- Dangers of alcohol / smoking in pregnancy
- Disease specific nutrition education.

See Annexures A – D for specific guidelines

Pp. 16 - 31

3.2 *SECONDARY INTERVENTION*

Secondary intervention entails providing supplementary food for temporary nutrition rehabilitation to target groups who have been identified as malnourished. With the exception of infants aged birth to ≤ 6 months, food products are provided mainly to add energy and certain micro-nutrients to the existing diet of the malnourished person. The patient must be made aware that this is only supplementary to the normal diet (which should be adapted if less than ideal).

PRODUCTS TO BE USED FOR NUTRITION REHABILITATION

MALNOURISHED INFANTS AGED FROM BIRTH TO LESS OR EQUALS TO 6 MONTHS OLD

(only when breastfeeding is impossible)

Issue either of the following :

1 brand breast milk substitute (BMS) – acidified

OR

1 brand breast milk substitute (BMS) - soya milk based

Acidified BMS

- Supply number of tins according to entry criteria (p.7 - 8) and as set out in **Annexure E (p.31 - 34)** for underweight and for relactation.

- Prepare according to mixing and hygienic instructions on the tin

Soya based BMS

- To be used if there is intolerance towards the acidified breast milk substitute
- Supply number of tins according to entry criteria (p.7 - 8) and as set out in **Annexure E (p 32 - 35)** for underweight and for relactation.

- Prepare according to mixing and hygienic instructions on the tin

UNDERWEIGHT CHILDREN OLDER THAN 6 MONTHS UPTO 60 MONTHS

Issue all of the following per underweight client:

1 kg Enriched, lactose free protein drink per child per month

2 kg Enriched maize meal per child per month

MIXING INSTRUCTIONS PER DAY:

PRODUCT	DAILY DOSAGE	WATER (PREBOILED AND COOLED)
Enriched, lactose free drink	30g = 8 level medicine measures	Add 200ml (2/3rd cup) water to the product
Precooked, enriched maize meal	66g = 16 level medicine measures	Add 250 ml (1 cup) water

THE ABOVEMENTIONED PRODUCTS ARE ONLY SUPPLEMENTARY (ADDITIONAL) TO THE NORMAL DIET. THESE PRODUCTS SHOULD BE SUBDIVIDED INTO SMALLER QUANTITIES TO BE ADDED TO AT LEAST TWO TO THREE OF THE DAILY MEALS. IT SHOULD PREFERABLY BE TAKEN TOGETHER WITH THE MEALS FOR THE DAY.

It is important to recommend to the client to also add about 5ml (1 teaspoon) of cooking oil (that is NOT supplied by Malnutrition Program) to the prepared enriched maize meal. This will increase the energy value a little more and add essential fatty acids to the daily diet.

UNDERWEIGHT PREGNANT AND LACTATING WOMEN

Issue all of the following per underweight client:

1 kg Enriched, lactose free protein drink per person per month

2 kg Enriched maize meal per person per month

100 ml Multivitamin syrup per person per month

MIXING INSTRUCTIONS PER DAY:

PRODUCT	DAILY DOSAGE	WATER (PREBOILED AND COOLED)
Enriched, lactose free drink	30g = 8 level medicine measures	Add water to 200ml (2/3rd cup)
Precooked, enriched maize meal	66g = 16 level medicine measures	Add water to get 250 ml (1 cup)
Multivitamin syrup	5 ml per day for 20 days, OR 5 ml for 10 days and 2,5 ml for 20 days.	

THE ABOVEMENTIONED PRODUCTS ARE ONLY SUPPLEMENTARY (ADDITIONAL) TO THE NORMAL DIET. THESE PRODUCTS SHOULD BE SUBDIVIDED INTO SMALLER QUANTITIES TO BE ADDED TO AT LEAST TWO TO

THREE OF THE DAILY MEALS. IT SHOULD PREFERABLY BE TAKEN TOGETHER WITH THE MEALS FOR THE DAY.

It is important to recommend to the client to also add about 5ml (1 teaspoon) of cooking oil (that is NOT supplied by Malnutrition Program) to the prepared enriched maize meal. This will increase the energy value a little more and add essential fatty acids to the daily diet.

ALL UNDERWEIGHT / MALNOURISHED / AT RISK INDIVIDUALS OLDER THAN 60 MONTHS (Including underweight chronically ill and underweight elderly)

Issue all of the following per underweight client:

1 kg Enriched, lactose free protein drink per person per month

2 kg Enriched maize meal per person per month

100 ml Multivitamin syrup per person per month

MIXING INSTRUCTIONS PER DAY:

PRODUCT	DAILY DOSAGE	WATER (PREBOILED AND COOLED)
Enriched, lactose free drink	33g = 8 level medicine measures	Add water to 200ml (2/3rd cup)
Precooked, enriched maize meal	66g = 16 level medicine measures	Add water to get 250 ml (1 cup)

Multivitamin syrup	5 ml per day for 20 days, OR 5 ml for 10 days and 2,5 ml for 20 days.	
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THE ABOVEMENTIONED PRODUCTS ARE ONLY SUPPLEMENTARY (ADDITIONAL) TO THE NORMAL DIET. THESE PRODUCTS SHOULD BE SUBDIVIDED INTO SMALLER QUANTITIES TO BE ADDED TO AT LEAST TWO TO THREE OF THE DAILY MEALS. IT SHOULD PREFERABLY BE TAKEN TOGETHER WITH THE MEALS FOR THE DAY.

It is important to recommend to the client to also add about 5ml (1 teaspoon) of cooking oil (that is NOT supplied by Malnutrition Program) to the prepared enriched maize meal. This will increase the energy value a little more and add essential fatty acids to the daily diet.

4. ENTRY AND EXIT CRITERIA FOR THE FOOD SUPPLEMENTATION PROGRAM

4.1 MALNOURISHED INFANTS BIRTH to ≤ 6 MONTHS

ENTRY CRITERIA

- In cases where the infant's growth is faltering and breastfeeding cannot be established / re-established e.g. The mother has died. Refer to Annexure E for supplementation schedule (p 32-35)**
- Breastfed infant ≤ 6 months not gaining weight (growth faltering): In this case the mother should be assisted to increase her milk production. Supplements are usually not needed. Evaluate the breastfeeding practices and correct where necessary. Supplement the breastfeeding mother. Refer to the following pages:**

- **Entry- and exit criteria for lactating women**
- **Feeding recommendations for underweight lactating women for guidelines on how to increase breastmilk production.**
- **Annexure E, point 1, for more guidelines on how to increase milk production**
- **Breastfed infant \leq 6 months whose weight falls below the third percentile: Evaluate the breastfeeding practices and correct where necessary. If the infant needs to be supplemented, it should only be temporarily (refer to schedule for relactation) while the mother is supported and taught how to increase her milk supply. Refer to Annexure E, p 32.**
- **In cases where breast feeding is contra-indicated and the infant's growth is faltering (a written recommendation of the medical officer or the professional nurse is needed): (Annexure E, p 32. – NON-breastfed infants not gaining weight)**
 - **The mother has a serious medical condition where breastfeeding will put her health at risk, e.g. heart condition or serious systemic disease of the kidney, liver, lungs.**
 - **The mother is addicted to alcohol or drugs.**
 - **The mother is on treatment that is contra-indicated for breastfeeding, namely chemotherapy or radioactive drugs.**
 - **The mother has full-blown AIDS**
- **In cases where the mother is mentally disabled and the infant's growth is faltering.**
- **In cases where the mother has certain infectious diseases and the infant's growth is faltering, or the baby is at risk of being infected with the disease of the mother :**
 - **active Tuberculosis (can breastfeed after RX established)**
 - **untreated streptococcus infection (can breastfeed after treatment)**
 - **a mother who has an active herpes lesion on the breast or nipple, where the baby will come into contact with the lesion, cannot breastfeed on the affected breast; however, her baby can breastfeed after the lesion is healed.**

- **A mother who is HIV+ should be encouraged and supported to breastfeed her baby exclusively or feed heat-treated expressed breastmilk (See Annexure L, p45) if she does not have the means to provide alternative feeding to her baby. The mother's positive HIV status is not an entry criterium for the baby.**

EXIT CRITERIA

- **Sufficient weight gain – defined as three more satisfactory monthly increases in weight (weight gain over a period of three months) after weight has returned to expected percentile for that infant – as long as the infant is ≤ 6 (younger than 6 months or 6 months) months of age. The health worker could follow-up / extend the period, based on the causes of malnutrition.**
- **When the infant is $>$ than 6 months and is still underweight, supply of formula should be replaced with products for malnourished infants ≥ 6 to 60 months.**

4.2 MALNOURISHED INFANTS AND YOUNG CHILDREN ≥ 6 to 60 MONTHS

ENTRY CRITERIA

- **Only when breast feeding cannot be established / re-established in the following cases:**
 - **Growth faltering – defined as no change in weight or an actual decrease in weight between consecutive examinations, usually a month apart**
 - **Any three horizontal or falling monthly values (the growth curve flattens or goes down) even if the weight has not fallen below the 3rd percentile.**
 - **Children whose weight falls under the third percentile and shows clinical signs of malnutrition or a risk for developing malnutrition / poor growth**
 - **It is important at all times to rule out other causes of growth faltering, e.g. TB, worm infestation, etc.**

EXIT CRITERIA

- **Sufficient weight gain – defined as three satisfactory monthly increases after expected weight for that child has been reached. The health worker could extend the period, based on the available information of causes of malnutrition**

4.3 AT RISK PREGNANT WOMEN

ENTRY CRITERIA

- **A pregnant women with a weight less than 50 kg, or underweight(<85% of standard weight-for-height) or height less than 150 cm at the time of conception.**
- **Pregnant women who are underweight when falling pregnant. Underweight is defined as a body mass index (BMI) less than 18,5**

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height}^2(\text{m}^2)}$$

- **Inadequate weight gain during pregnancy**
- **Weight gain of 0,5 kg/month for the first 3 months and \pm 1,5 kg/month in the last 6 months of pregnancy. The health worker should determine if the pregnant woman would regress without supplementation for the duration of the pregnancy**

Other issues to keep in mind:

-Smoking

-Age of the mother (growth takes place until the age of \pm 18 years and therefore normal teenage growth or weight gain must also take place)

-Short birth intervals (before 16 months post partum)

-Anemia (Hb levels less than 11g/dl)

-History of illness and medical problems

EXIT CRITERIA

- **Weight gain of 0,5 kg/month for the first 3 months and \pm 1,5 kg/month in the last 6 months of pregnancy. The health worker should determine if the pregnant woman would regress without supplementation for the duration of the pregnancy**

4.4 AT RISK LACTATING WOMEN

ENTRY CRITERIA

- **Malnourished breastfeeding mothers whose own health is at risk (BMI less than 18,5)**
- **A malnourished mother who breastfeeds exclusively but whose infant's growth is faltering (no weight gain or an actual decrease in weight between consecutive examinations). Evaluate breastfeeding practices and correct where necessary; train and support the mother to increase her milk supply.**
- **In cases where the mother is breastfeeding but the infant's growth is faltering, evaluate the breast feeding practices and supplement the breastfeeding mother. In some cases temporary supplementation for the infant may also be necessary. (refer to infants birth to 6 months)**

EXIT CRITERIA

- **Supplementation should only be given during the exclusive breast feeding period. Exclusive breastfeeding to about 6 months should be encouraged to all breastfeeding mothers.**
- **Women's BMI is higher than 18,5.**
- **In cases where supplementation was supplied to the lactating women to increase milk production, supplementation can be discontinued when milk production has increased satisfactorily for the baby to has gained weight.**

4.5 ALL UNDERWEIGHT / MALNOURISHED / AT RISK INDIVIDUALS > 60 MONTHS (Including underweight chronically ill and underweight elderly)

ENTRY CRITERIA

- **Underweight individuals aged 5 – 18 years, including those with diseases like Cancer, TB or HIV/AIDS, defined as a BMI < 10th centile of BMI for age (use Annexure F)**
- **Underweight individuals over 18 years, including those with diseases like Cancer, TB or HIV/AIDS, with a BMI of 18,5 or less (use Annexure G)**

- **Elderly individuals with a BMI less than 18,5 at (use Annexure G)**

EXIT CRITERIA

- **Satisfactory weight gain until the normal weight for height is reached (BMI= 18,5-25) for individuals over 18 years, and > 10th percentile for individuals 5-18 years. Take in consideration the stature of the individual – not every individual will reach the 50th centile on the BMI.**
- **Weight must be maintained for three months.**
- **Malnourished TB patients can receive supplements until their treatment is completed.**

5. HIV AND THE MALNUTRITION PROGRAM

5.1 CHILDREN AND ADULTS

Although the importance of optimal eating habits for HIV+ persons is recognised, it is important that administrators of the program realise that this program is for the treatment of malnutrition as defined in the exit and entry criteria for the different target groups. Patients with HIV+ status do not qualify automatically to be on the Malnutrition Program. They are only treated with supplements from the Malnutrition Program if they are malnourished as defined in the entry- and exit criteria for the different target groups.

5.2 BABIES BORN TO HIV+ WOMEN

The malnutrition program does not make provision for the supply of Breastmilk substitutes to babies born to HIV+ mothers. A woman who is HIV+ and who is pregnant should be counseled by skilled health care workers and should be given all the necessary information to make an

informed choice regarding the feeding of her baby. The South African Breastfeeding Guidelines for Health Workers as well as UNICEF and the WHO guidelines state that exclusive breastfeeding remains the infant feeding option of choice in all cases where the mother does not have access to safe and affordable alternatives. In other words, the mother should be counseled so that she can make a sensible choice based on sound, correct and complete information, taking into consideration her personal situation. If the mother opts to breastfeed, she must be properly informed on the importance of exclusive breastfeeding, in other words only breastmilk and nothing else, not even water, should be given to the baby. If the mother opts not to breastfeed, she must make provision for her baby's food herself – the malnutrition program can only assist in the treatment of malnutrition as defined in this document.

The malnutrition program also does not automatically include HIV or other orphans. The breastmilk substitutes available are only for underweight infants up to six months (refer to entry- and exit criteria for infants birth to < 6 months, p. 7).

Except for exclusive breastfeeding, Heat treated breastmilk is also an option for the HIV+ mother. Refer to Annexure L, p.45) for more information on this method of providing safe breastmilk to the baby.

6. REFERRAL ROUTE

- Two way referral of patients should be established between the hospital, community health center, clinic and the community within each district.**
- Nutrition education messages and skills training should be strengthened throughout the referral system.**
- Identify groups in the community to be responsible for follow-up of at-risk patients, nutrition education, growth monitoring and capacity building.**

- **Establish two-way communication and information channels between the health facilities and the community.**
- **Link the Malnutrition Program to local food production projects in the community e.g. food gardens with Vitamin A rich produce.**
- **Monitor and evaluate the effectiveness of the referral system through the national nutrition surveillance system and growth monitoring.**
- **Establish a feedback mechanism for information on growth monitoring and indicators between the health facilities and the community e.g. community health days.**

7. MONITORING AND CONTROL REGIME

A good monitoring and control system is an important element for successful program management and evaluation.

A minimum set of data should be collected, processed and used by the health facilities.

The forms that are used in the Free State are:

MP1: Control register

MP1: (Summary)

MP2: Order and delivery form

SEE ANNEXURES attached.

MP1: CONTROL REGISTER:

- This form should be completed by the professional nurse to monitor the distribution of food products. The information can also be used by the community developers for follow-up purposes.
- MP1 form should be completed per client. These forms must be kept in the clinics for follow-up purposes.
- To streamline the completion of the form the Entry diagnosis of the patient can be indicated as:
 - Malnutrition, specified as: Underweight, Kwashiorkor, Marasmus, Micro-nutrient deficiency,
Or as
 - Underweight in the following categories: ANC, Lactation, Low Hb, TB, HIV/AIDS, Cancer, and Geriatrics
- Indicate the age of children from birth to 60 months in months and the age of adults in years
- * The weight in kg should be indicated for the birth-60 months children

In the case of adults the BMI should be used to indicate the nutrition status

- The effectiveness of the nutrition intervention can be monitored via the *outcome* column. Indicate / as weight gain or a positive outcome,
 - as weight or condition that stays the same,
 - \ as weight loss or a negative outcome
- In the *Diagnosis/Comments* column any follow-up diagnosis or comment can be noted e.g. the entry diagnosis was an underweight lactating women and the next month a low Hb. also has to be noted. It can also be used to give a possible explanation for outcome (previous column), especially if outcome was not positive.
- It is important to specify the quantities given to the patient per month of respectively acidified breast milk substitute, soya based breast milk substitute, enriched lactose free protein drink, enriched maize meal and the vitamin supplement. Indicate the number of packets and the packaging size, e.g. 4X500g)

- **It is very important to indicate the food supplement and quantity prescribed at a specific date on the Patient Carrying Card. This will prevent the misuse of the supplementary products.**
- **The professional nurse who has treated the patient and completed the form must sign in the *Signature* column.**
- **On the right hand, lower corner of the page, the patient number must be indicated.**

MP1: (SUMMARY)

This form is used for a summary of each patient on the program for the report month. Information is the same as on the MP1 form, with the only difference that one line is used per patient for the month.

Information is carried over from MP1 forms to the MP1 summary forms by the end of the month.

The MP1 summaries must be sent in monthly as attachments to the order and delivery forms.

8. ORDERING AND DELIVERY

MP2: ORDER AND DELIVER FORM

- **To ensure the timely delivery of food products, orders should be placed by indicating the quantities needed of each food product before the 5th of every month for the next month**

- **The MP2 form should be completed in duplicate and signed by a chief professional nurse and send to the nutrition division of the region. The copy should be kept on file at the clinic to serve as a control for delivery.**
- **At the time of delivery of the food products the following columns should be completed on the copy of the MP2 form: *Received, Date, Signature* of person receiving the food products. The completed copy should be returned to the Nutrition office as means of verifying the delivery.**

Please note that the responsible person at the Nutrition division in each District has the authority to make changes on these forms to suit specific needs of that Nutrition division. Such changes will be communicated to involved staff in affected districts.

9. CONCLUSION

The success and effectiveness of the Malnutrition Program should be evaluated.

Key questions to be evaluated are:

- **Are the supplements constantly available in the health facility?**
- **Is the program reaching the most needy in the target groups?**
- **Is the high prevalence of underweight and micro-nutrient deficiencies reduced, especially in children and women?**
- **Are the families of the program beneficiaries informed on the basic principles of sound eating practices? Can this be attributed to a lack of nutrition education?**
- **Are there effective referral systems between health facilities to other social services and the community based nutrition programs?**
- **What is the impact of the program on breastfeeding rates?**
- **How do communities view the program?**

FEEDING

RECOMMENDATIONS

FOR

CHILDREN



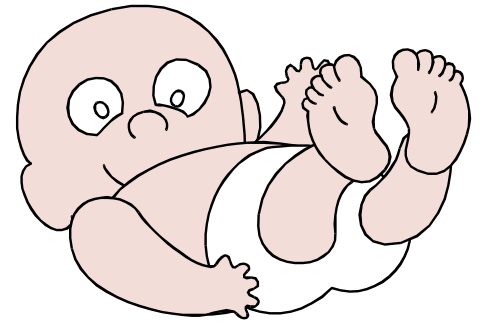
BIRTH TO 6 MONTHS

Assess the child's feeding:

- *Ask questions about feeding practices*

ASK:

- Do you breastfeed your child?
- How many times during the day and night?



4 Breastfeed the child as often as the child wants, day and night, at least 8-12 times in 24 hours
3 Check whether the baby is positioned and latched correctly

- Does the child take any other foods or fluids?

4 Give the child breast milk only, at least 8-12 times in 24 hours
4 Do not give other foods or fluids

- Do you know how to increase your milk supply?

4 Breastfeed on demand
4 Alternate breasts during feeding to ensure that the baby gets fore- and hind milk
4 Offer both breasts at each feeding
4 Nurse baby long enough that the baby receives the rich hind milk
4 Wake up a sleepy baby to breastfeed more frequently
4 If sleepy baby is not suckling effectively, switch baby between breasts more regularly (switch nursing - each breast at least twice at each feeding)
4 Increase breastfeeds during the night
4 Eat, drink and rest adequately to increase milk supply

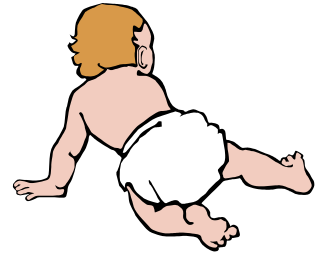
6 MONTHS TO 12 MONTHS

Assess the child's feeding:

- *Ask questions about the child's usual feeding*

ASK:

- Does the child take any other foods or fluids (than breastmilk)?



- 4 *Continue breastfeeding the child as often as the child wants*
- 4 *From about 6 months the baby needs additional food for satisfactory growth, but breastfeeding is still important*
- 4 *Feed child food from the family pot (there is no need to buy special food for the child)*
- 4 *Give child energy dense foods by enriching food with oil, peanut butter and sugar at least once a day*
- 4 **CONTINUE BREASTFEEDING**
- 4 *Give child foods rich in vitamin A, e.g. carrots, spinach, pumpkin*
- 4 *Feed child from his/her own bowl to be able to monitor how much he/she has eaten*
- 4 *Feed child at least 5 times a day- remember children have small stomachs, therefore it is better to increase the number of feeds rather than quantities.*

12 MONTHS TO 2 YEARS

Assess the child's feeding:

- *Ask questions about the child's usual feeding*

ASK:

- Does the child take any other foods or fluids?

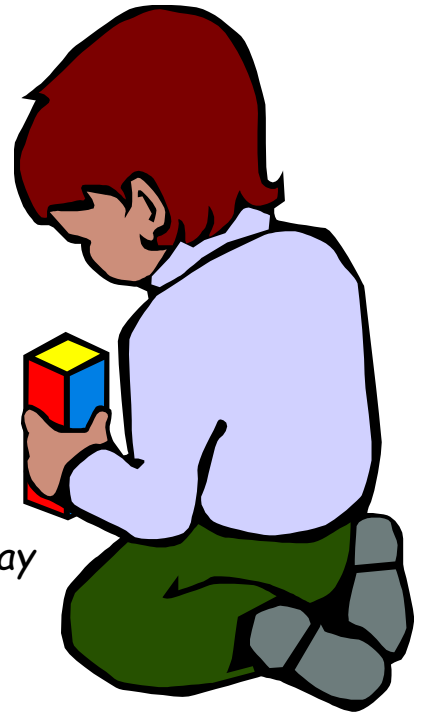


- 4 *Continue breastfeeding the child as often as the child wants - Include enough milk if breastfeeding has been stopped*
- 4 *Feed child food from the family pot*
- 4 *Give child a variety of foods*
- 4 *Dish out for child in a separate bowl to monitor how much food the child has eaten*
- 4 *Give child energy dense, family foods at least 5 times per day*
- 4 *Give Vitamin A rich foods such as mashed green vegetables, carrots and pumpkin*

2 YEARS AND OLDER

Assess the child's feeding:

- *Ask questions about the child's usual feeding*



- 4 *Give nutritious family foods at least 3 times each day*
- 4 *Also give nutritious foods between meals at least twice daily -
Fruit/Bread/Milk/vegetables*
- 4 *If still breastfeeding, continue - ensure an intake of 500 ml milk/day*
- 4 *Be hygiene conscious to reduce infection and disease*
 - *Encourage child to eat with a spoon*
 - *Make sure child washes hands before eating and after using the toilet*
 - *Store left over food in a refrigerator or a cool place in a covered container*
 - *Make sure that garbage is disposed of correctly*

Feeding Recommendation

for a Child who has

Persistent Diarrhoea

- 4 *If the mother is breastfeeding - give more frequent, longer breastfeeds day and night*
- 4 *Give sugar and salt solution*
- 4 *Give tolerable fermented milk products such as yoghurt or 'amasi' in small amounts*
- 4 *Give nutrient dense semi-solid foods*

How to make sugar and salt solution :

1 liter bottle with cooled boiled WATER	$\frac{1}{2}$ teaspoon of SALT	8 teaspoons of SUGAR
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Counseling the Mother if she experiences



Feeding Problems

Counsel the mother, using the guidelines as described.

In addition:

- *If the mother reports difficulty with breast feeding, assess breastfeeding. As needed, show the mother correct positioning and attachment for breastfeeding.*
- *If the child is less than 6 months old and taking other milk or foods :*

4 Build mothers' confidence that she can produce all the breast milk that the child needs

- 4 Suggest giving more frequent, longer breastfeeds, day and night, and gradually reducing other milk or foods

If other milk or feeds need to be continued, counsel the mother to:

- 4 Breastfeed as much as possible, including at night
 - 4 Make sure that an appropriate breast milk substitute is used
 - 4 Make sure milk is correctly and hygienically prepared and given in adequate amounts
 - 4 Ensure that the child finishes prepared milk within an hour
- *If the mother is using a bottle to feed the child :*

- 4 *Recommend substituting a cup for bottle*
- 4 Show the mother how to feed the child with a cup
- *If the child is not being fed actively, counsel the mother to :*
 - 4 Sit with the child and encourage eating
 - 4 Give the child an adequate serving of food in a separate plate or bowl
- *If the child is not feeding well during illness, counsel the mother to :*
 - 4 Breastfeed more frequently and longer if possible
 - 4 Use soft, varied, appetizing, favorite foods to encourage the child to eat as much as possible, and offer frequent small feeding
 - 4 Clear a blocked nose if it interferes with feeding
 - 4 Accept that appetite will improve as child gets better

Follow-up any feeding problem in 5 days

MANAGEMENT OF

PREGNANT WOMEN

WITH MALNUTRITION

OR

***AT RISK OF BECOMING
MALNOURISHED***

*These guidelines could be used at clinic level
(mobile clinic / community health center)*

Pregnant women with Malnutrition

Use this plan to encourage the PREGNANT WOMAN to:

- Visit the antenatal clinic frequently
- Eat a variety of food during pregnancy
- To breast feed her baby after delivery

Visit the prenatal clinic frequently

4 Encourage at least one visit during each trimester; at the end of first trimester, end of second trimester and at 36 weeks of pregnancy.

Eat a variety of foods during pregnancy

4 Include food rich in iron, Vitamin A, calcium and folate in the diet

Breastfeed the baby after delivery

- 4 Encourage the mother to breastfeed her baby exclusively for the first 6 months of life.
- 4 Prepare the pregnant woman to ask for her baby to stay with her after delivery and breastfeed the baby as soon as possible (within 30 minutes) after delivery.
- 4 Explain the benefits of breastfeeding

The following high risk pregnant women should be monitored regularly :

- Low education level
- Single, unemployed women
- Women younger than 18, or older than 40
- Previous pregnancy problems

Treatment of Malnourished pregnant women

Use this plan to motivate the PREGNANT WOMAN to:

- Increase her nutrient intake
- Take iron supplementation if haemoglobin (Hb) level is less than 11g/dL

Increase nutrient intake

- 4 Increase the frequency of meals, e.g. eat 3 meals plus additional small meals between meals.
- 4 Increase the quantity of food at meals.
- 4 Increase the nutrient density of the foods:
 - add a high-energy source such as a vegetable oil (and sugar to food if available)
 - add foods rich in protein and/or micro-nutrient e.g. beans (legumes), peanuts/peanut butter, vegetables, meat/fish/eggs

Give iron supplementation if Hb level is less than 11g/dl :

- 4 Iron and folate supplementation
and
- 4 Multivitamin supplementation

MONITORING :

Monitor the women regularly e.g. after 4 weeks to assess if she gained weight. If she has not gained weight after 3 consecutive measurements, proceed to treat for malnutrition. Once supplementation has started, it should be continued until the pregnant woman has gained sufficient weight namely 0,5 kg per month for the first 3 months and $\pm 1,5$ kg per month in the last 6 months. The health worker should determine if the pregnant woman would regress without supplementation for the duration of

pregnancy, based on the family's circumstances. Refer the family to the community-based nutrition program for inclusion in the community projects.

MANAGEMENT OF

LACTATING WOMEN

WITH

MALNUTRITION

Treatment of Malnourished lactating women

Use this plan to motivate the LACTATING MOTHER to:

- Increase her nutrient intake
- Take iron supplementation if Hb level is less than 12g/dl plus a multivitamin
- Increase her milk production

Increase her nutrient intake

- 4 Increase the frequency of meals, e.g. eat 3 meals plus additional small meals between meals.
- 4 Increase the quantity of food at meals
- 4 Increase the nutrient density of the foods:
 - add a high-energy source such as a vegetable oil (and sugar if available)
 - add foods rich in protein and/or micro-nutrients e.g. dried beans(legumes), peanuts and peanut butter, vegetables, meat/fish/eggs

Give iron supplementation if Hb level is less than 11g/dl

- 4 Iron and folate supplementation.

Go to the Health Worker if any of the following occurs:

- Problems with breast feeding
- Child drinking poorly
- Child is not gaining weight
- Child repeatedly vomits
- Child has watery stools
- Child has fever

Increase milk production

- 4 Make sure the baby is attached for effective suckling at breast feeds.
- 4 Offer both breasts at feeds, several times each, to increase milk production - make sure that the baby gets in enough hindmilk.
- 4 Encourage the baby to feed more frequently and longer, day and night, at least 8-12 times in 24 hours.
- 4 Stop all use of feeding bottles and dummies.
- 4 Increase her own food and fluid intake, if intake has been low.
- 4 Rest as much as possible, and relax during breast feeds to help milk flow.
- 4 Offer breast for comfort if baby is fussy.
- 4 Use local galactagogues (foods or drinks believed to increase milk production)
- 4 Express breast milk between breast feeds and feed expressed breast milk to the baby with a cup.

**MANAGEMENT OF
MALNOURISHED
CHRONICALLY ILL
AND UNDERWEIGHT ELDERLY**

*These guidelines can be used at clinic level
(mobile clinic / community health center)*

Treatment

Use this plan to motivate the CHRONICALLY ILL OR UNDERWEIGHT ELDERLY PATIENT to:

- *Increase his/her nutrient intake if weight loss is observed*

Increase nutrient intake if weight loss is observed

- 4 Increase the frequency of meals, e.g. eat 3 meals plus additional small meals between meals.
- 4 Increase the quantity of food at meals.
- 4 Increase the nutrient density of the foods:
 - *add a high-energy source such as a vegetable oil (and sugar if available)*
 - *add foods rich in protein e.g. dried beans(legumes), peanuts/peanut butter, vegetables, meat/fish/eggs.*
- 4 Supplementation - add multivitamin syrup

MONITORING :

Monitor the chronically ill patient regularly e.g. every month to assess if there is any improvement. Once supplementation has started, it should be continued until the chronically ill patient gained sufficient weight namely BMI greater than 18,5. The health worker should extend the period, based on the family's circumstances. Refer the family to the community-based nutrition program for inclusion in the community projects if necessary.



QUANTITIES OF BREASTMILK SUBSTITUTE TO BE ISSUED TO MALNOURISHED
BABIES ON MALNUTRITION PROGRAM:

1. BREASTFED BABY UNDER 6 MONTHS NOT GAINING WEIGHT: (REFER TO ENTRY- AND EXIT CRITERIA FOR LACTATING WOMEN)

PLEASE NOTE:

In this case the mother should be assisted to increase her milk production. Supplements are usually not needed. To ensure success, the number of breastfeeds should be increased to at least 10 – 14 or more breastfeeds in 24 hours. In practice the baby is receiving supplementary feeding, but in the form of supplementary breastmilk directly from the breast. By putting the baby on the breast more frequently, the baby is receiving more milk in total, and at the same time the mother's breasts are stimulated to produce more milk. After a few days the mother's milk supply will be ample. The mother should now continue to breastfeed on demand, at least 8 or more times in 24 hours.

The position and attachment of the baby on the breast must be evaluated and corrected if necessary to ensure long-term success and prevent nipple soreness.

If the mother is not with her baby 24 hours a day, she should express breastmilk during the times she and her baby is separated, to give a total of 10 – 14 incidents of milk removal when breastfeeds and breastmilk expressions are added up. The expressed breastmilk can be given to the baby when the mother and baby are not together. When they are together, the mother must breastfeed as frequently as the baby is willing to breastfeed (this can be as frequent as hourly or even more often).

2. BREASTFED BABY UNDER 6 MONTHS LOSING WEIGHT OR WEIGHT DROPPED TO UNDER 3RD PERCENTILE

In some of these cases it will be enough to assist the mother with the correct information and support to increase her milk supply within a few days, without using any supplements for the baby (refer to previous point). If supplements are used, they must be restricted to the minimum. **Frequent breastfeeding to remove the milk and stimulate the breasts for optimal milk production is still the most important part of treatment.** The mother can be provided with supplements for herself if necessary (refer to entry- and exit criteria for lactating women).

In cases of relactation (restart milk production after total weaning or increasing milk production after it dropped to a stage where baby is seriously underweight), some

supplementary feeding for the baby will be needed initially until the mother's milk production restarts or has increased satisfactorily. The amount of supplement is decreased gradually until milk production is sufficient for exclusive breastfeeding. **Remember that milk production will only increase satisfactorily by feeding more frequently from the breast.** It is of utmost importance that supplementary feeding for the baby should be decreased daily to stimulate more breastmilk production.

Ideally supplementary feeds for the baby should be given by cup or by breastfeeding supplementer (lactation aid – p.34)

Guidelines on amounts of BMS to use as supplementary feeding in cases discussed under point 2: (TAKE NOTE: There may be cases where even less supplement is needed – in those cases please decrease amounts)

PRODUCT: NAN PELARGON (400g, ACIDIFIED)

	NUMBER OF 400 g TINS TO ISSUE
STAGE OF INTERVENTION (independent of age of baby)	RELACTATION
First 2 weeks	3
2 nd - 4 th week	2
Third week	1
Fourth week	Baby should be back on exclusive breastfeeding. Issue only 1 tin if still needed.
Fifth week onwards	Baby should be back on exclusive breastfeeding

PRODUCT: DIVA INFANT FORMULA (500g, SOY BASED)

	NUMBER OF 500g BAGS TO ISSUE
STAGE OF INTERVENTION (independent of age of baby)	RELACTATION
First 2 weeks	3
2 nd - 3 rd week	2
Third week	1
Fourth week	Baby should be back on exclusive breastfeeding. Issue only 1 tin if still needed.
Fifth week onwards	Baby should be back on exclusive breastfeeding

PRODUCT: INFASOY (500g, SOY BASED)

	NUMBER OF 500g TINS TO ISSUE
STAGE OF INTERVENTION (independent of age of baby)	<i>RELACTATION</i>
First 2 weeks	3
2 nd - 3 rd week	2
Third week	1
Fourth week	Baby should be back on exclusive breastfeeding. Issue only 1 tin if still needed.
Fifth week onwards	Baby should be back on exclusive breastfeeding

Follow mixing instructions on container.

Feed baby on breast as frequently as possible.

Preferably use a lactation aid to stimulate the breasts at the same time the baby is receiving supplement. (See end of annexure - p. 34)

3. **BABIES NOT BREASTFED, NOT GAINING WEIGHT, OR LOSING WEIGHT, OR WEIGHT DROPPED UNDER 3RD PERCENTILE: (REFER TO ENTRY- AND EXIT CRITERIA)**

PRODUCT: NAN PELARGON (400g, ACIDIFIED)

Age of baby	NUMBER OF TINS PER MONTH
1 st and 2 nd weeks	3
3 rd and 4 th weeks	3
2 nd month	4
3 rd and 4 th months	5
5 th and 6 th months	4

PRODUCT: DIVA INFANT FORMULA (500 g, SOY BASED)

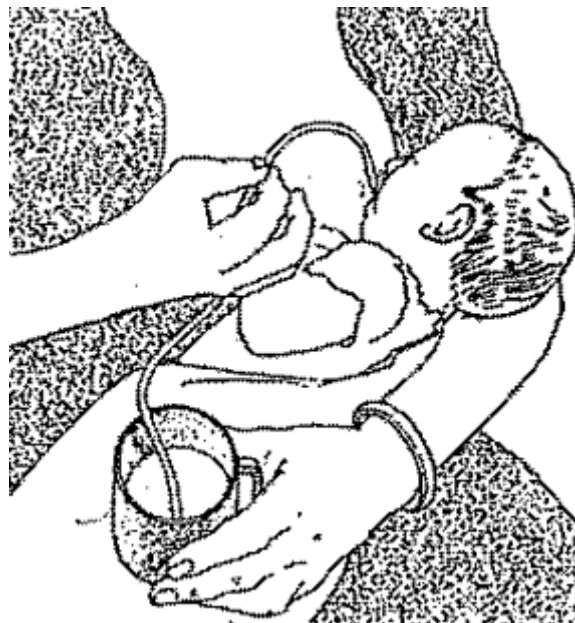
WEIGHT OF BABY UP TO:	AGE OF BABY	NUMBER OF BAGS PER MONTH

2,5 kg	1 - 3 weeks	2
3,5 kg	1 month	3
4,5 kg	2 months	4
6,0 kg	3 - 4 months	4
6,5 kg	5 - 6 months	3
7,0 kg and over	6 months	4

PRODUCT: INFASOY (500g, SOY BASED)

WEIGHT OF BABY	AGE OF BABY	NUMBER OF TINS PER MONTH
2,5 kg	1 - 2 weeks	2
3,0 kg	2 - 4 weeks	2
3,5 kg	4 - 6 weeks	3
4,0 kg	6 - 8 weeks	3
4,5 kg	8 - 10 weeks	4
5,0 kg	10 - 12 weeks	4
5,5 kg	12+ weeks	4

4. HOW TO USE A BREASTFEEDING SUPPLEMENTER



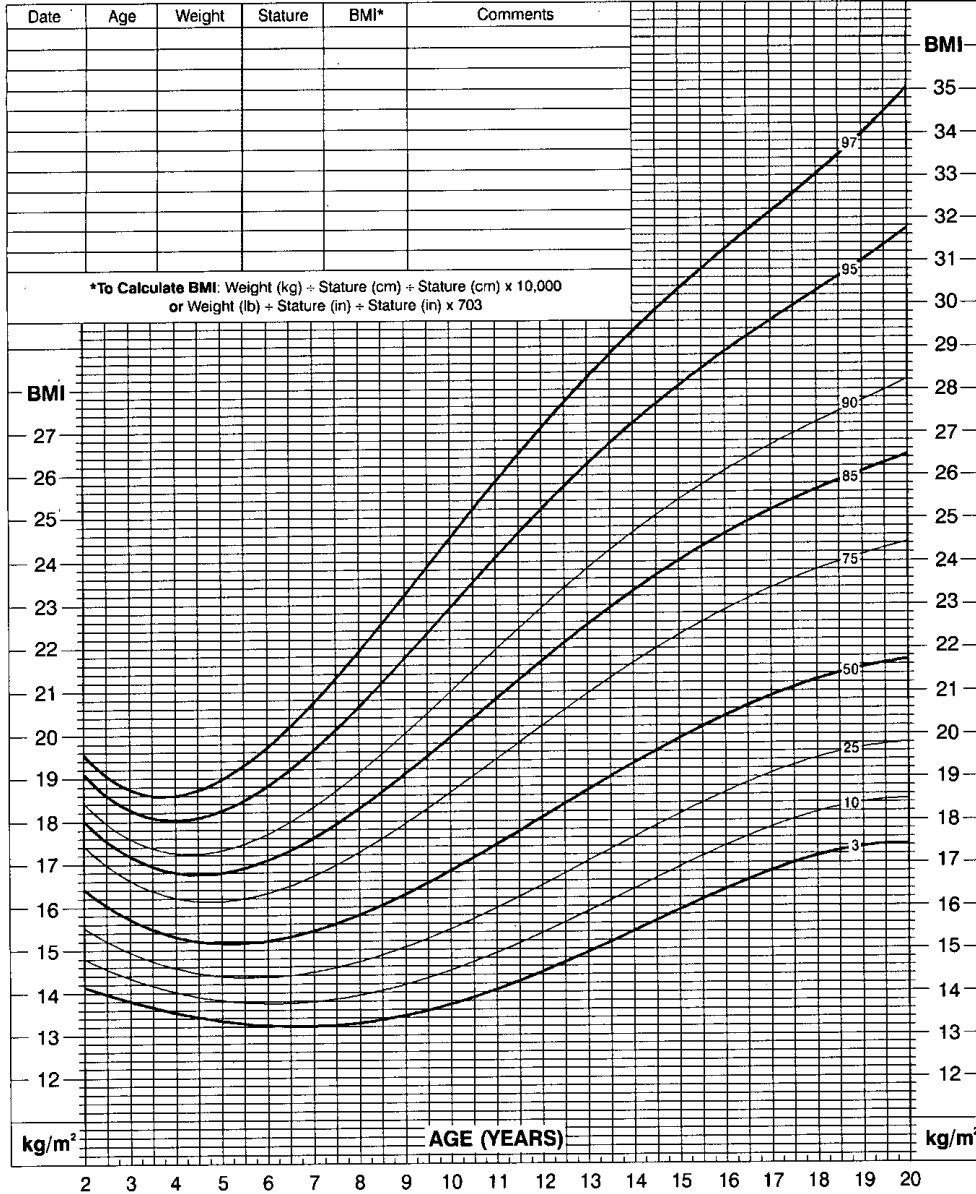
ANNEXURE F 1

BMI centile chart for 2 years to 20 years old, but applicable to the 5yrs - 18 years: Girls

2 to 20 years: Girls
Body mass index-for-age percentiles

NAME _____

RECORD # _____



SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000). <http://www.cdc.gov/growthcharts>



BMI chart > 18 years

ANNEXURE G

BODY MASS INDEX

When the preceding height-body weight tables are not available, an alternative method, viz. the body mass index, can be used.

The body mass index (BMI) is a simple formula to determine whether a person is overweight:

$$\text{BMI} = \frac{\text{Body weight in kilograms}}{\text{Height in metres}^2}$$

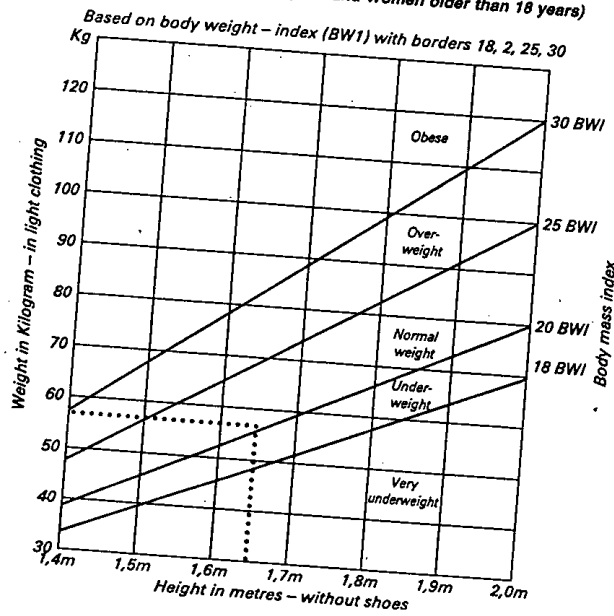
Example: Body weight 56 kg, height 1,65 m

$$\text{BMI} = \frac{56}{1,65 \times 1,65} = 20,6^*$$

Key*

	Body Mass Index	
	Men	Women
Normal weight	20-25	20-24
Overweight	25-30	24-30
Obese	more than 30	more than 30

HEIGHT-BODY WEIGHT CHART (Men and Women older than 18 years)



Adapted from: Timmons-Guide to the Sport Diet:
Karen Inge and Peter Bruckner
First Edition, 1987.

MP 2 : ORDER AND DELIVERY FORM

(PS:COMPLETE IN DUPLICATE)

FOOD SUPPLEMENTS TO BE ORDERED BEFORE THE 5TH OF EVERY MONTH

CLINIC/HOSPITAL: _____ DISTRICT: _____

COMPLETED BY: _____ DATE: _____

PHYSICAL ADDRESS: _____

<i>FOOD SUPPLEMENT</i>	<i>NEED</i>	<i>ISSUED</i> (For Office Use)	<i>RECEIVED BY CLINIC</i> (Amount)
Acidified BMS* (400g tins)	X 400g	X 400g	X 400g
Soya BMS* (500g packets)	X 500g	X 500g	X 500g
Protein/Energy Drink (500g packets)	X 500g	X 500g	X 500g
Enriched Maize meal(EMM)	X 1kg	X 1kg	X 1kg
Multivitamin	X 100ml	X 100ml	X 100ml
Vitamin A 50 000 IU			
Vitamin A 100 000 IU			
Vitamin A 200 000 IU			

(*BMS = Breast Milk Substitute)

SIGNED : _____ (CHIEF PROFESSIONAL NURSE)

NAME IN PRINT: _____

TELEPHONE NUMBER: _____

SEND THE MP 2 FORM TO: The District Dietitian

Tel No. _____

Fax No. _____

STATISTICS

Number of patients who received Malnutrition supplements during the past month:

INFANTS		ADULTS		VITAMIN A	
Relactating infants		Pregnant & lactating		Children: 50 000 IU	
Underweight, no BF		TB		Children: 100 000 IU	
Total infants on BMS		HIV		Children 200 000IU	
CHILDREN		Low HB		Mothers 6-8 wks post partum	
Underweight		Cancer		TOTAL NUMBER	
Marasmus		Geriatrics			
Kwashiorkor		Underweight			
HIV		TOTAL NUMBER			
TOTAL NUMBER					

Form updated June 2002

MP1: Summary Form

PEM1 (SUMMARY)

MALNUTRITION PROGRAM SUMMARY

DISTRICT NAME : _____

TOWN: _____

CLINIC: _____

MONTH: _____

(please attach to PEM2 form for ordering)

Acid = Acidified
BMS = Breast Milk Substitute
Protein Drink = Protein/energy drink
EMM = Enriched Maize Meal
Vit & Min = Vitamins and Minerals

Products issued for the month

Patient number	Name of Patient	Gender (M/F)	Age	Weight /BMI	Last Diagnosis / Comment	Acid BMS (tins)	Soya BMS (tins)	Protein Drink (Bags)	EMM (Bags)	Vit & Min(bottles)	Outcome ↑/→/↓

Signed: _____
(use more than one page if necessary)

Name in print: _____ Summary page:.....

MP2: MALNUTRITION PROGRAM - CONTROL REGISTER

REGION:	
TOWN:	
CLINIC:	
NAME OF PATIENT:	
MALE:	FEMALE:
ADDRESS:	
DATE OF BIRTH:	
PATIENT NUMBER:	

ENTRY DIAGNOSIS	
<u>Malnutrition:</u>	
- Underweight	
- Kwashiorkor	
- Marasmus	
<u>Underweight:</u>	
- ANC	
- Lactation	
- TB	
- HIV	
- Low Hb	
- Chronically ill	
- Geriatrics	

Date	Age (Months/ years)	Weight-Child BMI- Adult	Outcome			Diagnosis/ Comments	Treatment Quantity of Supplements					Signature	
			↑	↔	↓		Acid BMS	Soya BMS	Protein Drink	EM Meal	Vit A / Multivits		

BMI = Weight (kg)
Length²(m²)

Acid = Acidified
BMS = Breast Milk Substitute
EMM = Enriched Maize Meal
Vit & Min = Vitamins and Minerals

FOOD SUPPLEMENTS SPECIFICATIONS

PROTEIN DRINK SPECIFICATIONS

Specifications for enriched protein based energy drink

The product shall be a soy based, lactose free mix in a powdered form that needs to be mixed with water to provide the following nutrients per 100g dry product:

Energy - 1800kJ

Protein - 18g

Fat - 18 -22g

Carbohydrate - 40 - 50g

Dietary fibre maximum 6g

Vit. A - 760 mcg RE

Vit D - 10 mcg

Vit E - 10 mcg TE

Vit. B1 - 1,30 mg

Vit. B2 - 1,65 mg

Vit. B6 - 5,20 mg

Vit. B12 - 3,30 mcg

Folic acid - 330 mcg

Biotin - 130 mcg

Nicotineamide - 17,40 mg

Pantothenic acid - 5,61 mg

Vit. C - 49,5 mg

Choline - 130 mg

Vit. K - 52 mcg

Potassium - 870 mg

Calcium - 870mg

Magnesium - 87,5 mg

Sodium maximum - 365 mg
Iron - 10,1 mg
Zinc - 10, 0 mg
Copper - 2,64 mg
Phosphorus - 870 mg
Iodine - 130 mcg
Manganese - 3,3 mg
Selenium - 21,5 mcg
Molybdenum - 21,5 mcg
Chromium - 21, 5 mcg

The product should contain no artificial sweeteners and preferably no colorants. If colorants are present, it should only be permitted colorants. Only permitted flavors are acceptable.

All dry samples must contain less than 10 coliform organisms / gram, no Salmonella-, Shigella-, Staphylococcus aureus- or E.Coli organisms in a 30g sample and no viable spores of mesophilic Clostridium organisms in a 30 g sample.

Marking :

The containers shall be labelled in accordance with requirements of the regulations promulgated under the Marketing Act and the Agricultural Product Standards Act.

The method of preparation must appear on every container.

ENRICHED MAIZE MEAL SPECIFICATIONS

Specifications for instant enriched maize meal:

The following requirements must be specified in the orders.

Requirements :

- The product must be a maize-based, pre-cooked product that only need the addition of cold or hot water to be reconstituted.

- The product shall be of an acceptable taste;
- The product shall contain no egg protein, no lactose, and no colorants, artificial sweeteners or preservatives;
- The product shall be of the defined quality and hygienic standards and shall comply to the following specifications regarding nutrient content:

The product shall contain the following nutrients per 100 g dry product:

<u>Typical Analysis</u>	<u>g/100g</u>
Protein	12.5
Total Carbohydrates	60.0
Fat	17.0
Energy (kilojoules)	1800.0
Bulk density	0.5
Moisture	8.0
Ash	2.5

<u>Vitamins</u>	<u>g/100g</u>
Vitamin A	399.90 mcg R.E.
Vitamin D	10.00 mcg
Vitamin E	7.35 mg
Vitamin C	45.00 mg
Vitamin B1	0.70 mg
Vitamin B2	0.80 mg
Nicotinamide	9.00 mg
Vitamin b6	0.90 mg
Folic Acid	50.00 mcg
Vitamin B12	0.67 mcg
Biotin	13.33 mcg
Pantothenic Acid	2.00 mg

<u>Minerals</u>	<u>g/100g</u>
Calcium	533.33 mg
Phosphorus	533.33 mg
Iron	10.00 mg
Magnesium	66.67 mg
Zinc	6.67 mg

Iodine	46.67 mcg
Sodium	190.00 mg
Potassium	403.33 mg
Selenium	13.33 mcg

All dry samples must contain less than 10 coliform organisms / gram, no Salmonella-, Shigella-, Staphylococcus aureus- or E.Coli organisms in a 30g sample and no viable spores of mesophilic Clostridium organisms in a 30 g sample.

Marking :

The package shall have the name as well as nutrient content printed on the outside. An expiry date should be printed on the packaging material. Reconstitution instructions should be printed on the packaging.