

A TRAINING PROGRAM FOR CARE GIVERS OF UNDERWEIGHT CHILDREN IN SOUTH AFRICAN SCHOOLS

by

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DEDICATION

This study is dedicated to all the Grade one learners (class of 2007/2008) and Foundation Phase Care Givers at Glenstantia Primary School.

SUMMARY

TITLE	A training program for care givers of underweight children in South African schools
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DEGREE	Magister Atrium

A recent Report Card on Physical Activity and Health in South African Children and Youth 2010 states that at least four major factors place young children at risk: tobacco use, poor diet, lack of physical activity and facing weight challenges, this then including being overweight, underweight, obese or stunted for one's age. One of the areas for action and intervention mentioned in the report card is training of teachers. The aim of this study was to increase knowledge, skill and competence in school teachers (care givers) when dealing with underweight in school children. A training program (train-the-trainer) was designed by the researcher. Under nutrition (underweight) is implicated in more than half of all child deaths worldwide. 25.33% of respondents in this study showed signs of underweight highlighting the importance of such training in schools.

Using the above statistical data the research embarked on the development, implementation and evaluation of a training program for care givers on underweight prevalence in children in South African schools. The intervention research model of Thomas and Rothman was used in the design and development of the training program. A descriptive design with a quasi-experiment one group pre-test-post test was used in this study. A non parametric statistical test was utilized as data was measured on an ordinal scale (Wilcoxon signed rank test).

The care giver training program was implemented over nine weeks consisting of one and a half hour sessions held once weekly. All Foundation Phase teachers were involved in the training (18 Care Givers). The program was implemented with grade

one learners at a traditional primary school in Pretoria with a mixed demography and age groups varying between 6 and 8 years of age. Hundred and fifty learners participated in the pre and post test wherein a non probability sampling method was used.

The study found that the training program for care givers had a statistically significant effect on underweight prevalence in young children. FMEA profiling in this study confirmed that enhancing care giver knowledge, skill and competence contributes significantly to the changes experienced in children's underweight status. BMI levels changed significantly. The percentage underweight children dropped from 25.33% to 15, 33% over time.

It is recommended that this intervention program be implemented and facilitated by teachers (care givers) forming part of a multi-disciplinary education approach in many South African schools.

KEY WORDS

Weight challenges in primary school learners
Underweight
Training program (train-the-trainer)
Care giver
Care giver challenges
Knowledge
Skill
Competence
FMEA profiling
Project outcomes

SAMEVATTING

TITEL	'n Opleidingsprogram vir opvoeders van ondergewig kinders in Suid-Afrikaanse skole
KANDIDAAT	Carin van Dorsten
PROMOTOR	Prof. P.E. Krúger
GRAAD	Magister Atrium

'n Onlangse verslag getiteld "Report Card on Physical Activity and Health in South African Children and Youth 2010" dui aan dat daar ten minste vier hoofkategorieë is wat jong kinders se gesondheid aan gesondheidsrisiko's blootstel. Die kategorieë sluit in rook, ongesonde eetstyl en dieet, gebrekkige deelname aan fisiese aktiwiteit en gewigsuitdagings. Gewigsuitdagings waarvoor Suid Afrikaanse jeug te staan kom sluit in oorgewigvoorkoms, ondergewigvoorkoms, obesiteit en of groeibeperking (stunting). Een van die areas wat in die verslag as voorkoming vir hierdie gewigsuitdagings voorgestel word is opleiding aan opvoeders. Die doel van die studie was dan om kennis, vaardigheid en bekwaamheidsvlakke in onderwysers te verbeter wanneer hulle met ondergewig kinders in hulle sorg werk te bewerkstellig d.m.v 'n indiensopleidingsprogram (Train-the-trainer). Tans dra ondergewigvoorkoms by tot meer as die helfte van alle sterftes onder kinders wêreldwyd. In hierdie studie is bevind dat soveel as 25.33% van die kinders in die studie tekens van ondergewig getoon het. Dit beklemtoon die belangrikheid van 'n opleidingsprogram aan die opvoeders van hierdie kinders.

Statistiese data soos hier bo genoem is deur die navorser aangewend in die ontwikkeling, implementering en evaluering van die opleidingsprogram aan opvoeders van ondergewig kinders in die skool. Die intervensie navorsingsmodel van Thomas and Rothman is gebruik in die ontwerp en ontwikkeling van die opleidingsprogram. 'n Beskrywende ontwerp met kwasi-eksperimentele, een groep voortoets-natoets is in die studie gebruik. Nie parametrisiese statistiese toetsing is

aangewend en data is gemeet aan die hand van 'n ordinale skaal (Wilcoxon signed rank toets).

Die opleidingsprogram aan opvoeders is oor 'n tydperk van nege weke geïmplimenteer. Elke opleidingsessie was een en 'n half uur lank en een maal per week aangebied. Alle grondsaalfase opvoeders was in die opleiding betrokke (n=18). Die program is getoets op graad een leerders wat skoolgaan in 'n tradisionele laerskool in Pretoria met 'n gemengde demografie en ouderdomsgroepe het gewissel tussen ses en agt jaar oud. Een honderd en vyftig leerders het aan die voor en natoetsing deelgeneem en 'n nie waarskynlike metode van insluiting is gebruik.

Die studie het bevind dat die opleidingsprogram aan opvoeders van ondergewig kinders in die skool 'n beduidende invloed gehad het op die voorkoms van ondergewig. FMEA profiele gedoen in die studie het bevestig dat die verbetering van opvoeder kennis, vaardigheid en bekwaamheidsvlakke beduidend bygedra het tot die verandering in die ondergewig status van die kinders. LMI tellings het gedaal vanaf 25, 33% tot slegs 15, 33% oor verloop van tyd.

Die navorser is van mening dat hierdie voorkomingsprogram in werking gestel behoort te word en deur opvoeders in die skool gefasiliteer word; om sodoende deel te word van 'n multi-dissiplinêre onderwysbenadering in Suid Afrikaanse skole.

SLEUTELTERME

Gewigsuitdagings in primêre leerders
Ondergewig
Opleidingsprogram (train-the-trainer)
Opvoeder
Opvoeder uitdagings
Kennis
Vaardigheid
Bekwaamheid
FMEA profiele
Projek uitkomst.

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ACRONYMS

UNICEF:	United Nation's Children's Fund.
MDG:	Millennium Development Goal.
BMI:	Body Mass Index.
FCND :	Food and Nutrition Division report.
FMEA:	Failure Mode and Effects Analysis.

CHAPTER 1

INTRODUCTION, PURPOSE STATEMENT AND GOAL OF THE STUDY

1.1 INTRODUCTION

Many South African School children living in urban areas are facing a health crisis and it might be an unexpected one. Paradoxically, while many children suffer the health consequences of living in an affluent society, too many South African children go to school hungry presenting profiles of an underweight status. This resulting in starting their school careers on the back foot. During 2006 children living in Sekhukhune Limpopo Province alone had statistics indicating that as many as 21% of all children living there might be underweight for their age (Food Security Directive SA, 2006). Sallis and Glanz (2006) states that children today face a health crisis as recent changes in the nutritional environment includes a greater reliance on convenience foods and fast foods, a lack of access to fruits and vegetables and expanding portion sizes. The changes mentioned above contribute to the epidemic of childhood obesity. Furthermore children's diets are high in fat and sugar, low in fruits and vegetables and are low in many essential nutrients. They do not get enough exercise and are spending more and more time in solitary sedentary activities like watching television, playing computer games or play station (Sallis & Glantz, 2006). At the same time that children are enticed by the media to consume high calorie foods and be inactive as mentioned above, the western culture also promotes an obsession with thinness. Girls and boys are dieting at younger and younger ages in order to be thin. Some are stunting their growth in height and compromising their health by restricting their food intake. The prevalence of eating disorders has increased dramatically at the same time that obesity levels among children have reached record heights (Mc Millen *et al.*, 2009).

The sad reality is that it is estimated by the World Health Organisation that as many as two hundred million children under the age of 5 years around the world fail to reach their full potential because of micronutrient deficiencies and inadequate stimulation. In South Africa stunting and underweight in children are considered to be the most prevalent nutritional disorder caused by inadequate intake of proteins,

vitamins and minerals (Labadarios, 2010). One out of three South African children under the age of 6 years is deficient in Vitamin A which is vital for growth, development and a healthy immune system (Badham, 2008).

In Brown (2002) the tremendous costs of food insecurity and hunger among children emerges as scientific evidence demonstrates a direct deleterious link between inadequate food and a variety of poor developmental outcomes. Gundersen and Kreider (2009) identified that food security has a statistically significant positive impact on favourable general health and being a healthy weight. Brown (2002) states that youngsters from food insecure and hungry homes have poorer overall health status as they are sick more often, much more likely to have ear infections, have higher rates of iron deficiency anaemia and are hospitalised more frequently. Gundersen and Kreider (2009) and Nieuwoudt (2008) indicate that going hungry makes children sick. Gundersen and Kreider (2009) and Nieuwoudt (2008) indicate that the casual impact of food security on health has been underestimated

The National Teachers Guide of 2010 commented on the problematic situation with regards to Outcomes Based Education (OBE) in schools today: *"Hunger is a common problem in schools today. When OBE is administered in schools with well trained teachers, average sized classes, good resources and a support system for students such as transport, adequate nutrition, school nutrition programmes and parental guidance OBE can work"* (National Teachers Guide, 2010). In this study the researcher will indicate that many South African school children often start out their day hungry and undernourished. Children in this study often came to school without breakfast or a balanced lunch box or no lunch at all, relying on the school tuck shop and or class mates to supply them with some form of food source for the day. This often leads to lethargy and fatigue early on in a school day making it impossible for these children to concentrate for the duration of a normal school day. Hungry, undernourished children fail to meet basic physical requirements as they just don't have the energy to participate in movement activities (Report card on Physical Activity and Health in South African Children and Youth, 2010). This might leave them at risk impeding on cognitive development and working memory (Rosales *et al.*, 2009). These children's developmental capacities might even be impaired over time (Brown, 2002).

According to Report card on Physical Activity and Health in South African Children and Youth (2010) and Badham (2008) children require all round good, varied and balanced nutrition. Children need large amounts of energy and nutrients to fuel their rapid growth and for the repair and maintenance of muscle, bones and muscle tissue. It is important to know that children have smaller stomachs than adults and therefore they need smaller, more regular meals and a varied and balanced diet.

Healthy eating is vitally important for children as it sets the foundation for health throughout their lives. A panel of leading scientists, convened by the Sports Science Institute of South Africa and sponsored by Discovery Vitality, recently drew up a report card (Report card on Physical Activity and Health in South African Children and Youth, 2010) on the risks that are posed by obesity, the lack of physical activity, unhealthy eating and smoking. Based on research conducted over the last few years the panel gave an overall C grade to South African children in 2007. This grade has now dropped down to a C minus in the 2010 follow up. The ranking was based on the amount of children assessed and observed in this time frame This places South African children and youth at an increased risk for chronic diseases later in life. Food insecure children are believed more likely to suffer from a wide array of negative health outcomes as stated in Report card on Physical Activity and Health in South African Children and Youth (2010) and Gundersen and Kreider (2009).

Food insecure children are also paradoxically at high risk for obesity at the same time that they are at risk for malnutrition and hunger. The diets of poor and food insecure families tend to be especially high in fat and low in fruits, vegetables and dairy products as these families attempt to stretch food money and stave off hunger by purchasing low cost high calorie foods with poor nutritional value (Report card on Physical Activity and Health in South African Children and Youth, 2010). Data from the 2000 National Food Consumption Survey (NFCS) confirms that the majority of South African households live in poverty with a limited variety of foods available in their homes (Schwartz, 2005). This might fuel the nation's obesity problem (Mc Millen *et al.*, 2009). When considering the risks associated with underweight like lowered resistance to infection and therefore likelihood to be locked up in a vicious cycle of recurring sickness and faltering growth a bleak picture is painted. These

risks are often associated with irreversible damage to their cognitive and social development (Richter, 2004; UNICEF, 2006 and One World Food Security Guide, 2009). Richter (2004) and Brown (2002) states that the relationship between hunger, health and learning are of far greater importance than previously realised as food insecurity and hunger also impacts on the emotional and behavioural status of children. Brown (2002) also states that at risk children are more likely to have poorer mental health, be withdrawn or socially disruptive and suffer greater rates of behavioural disorders. In Norris (2011) and Rosales *et al.* (2009) the concept of a “window of sensitivity” during which nutrients may affect postnatal neural development are investigated. This could possibly be related and relevant to aspects under investigation in this study.

The rate of urbanisation in South Africa in the form of net migration from rural areas has also been very rapid since the 1950's. Currently 21 million (57%) of all South Africans live in towns and cities (<http://www.botany.uwc.ac.za>). It is estimated that by 2010 43, 7 million South African people (73%) will be urbanised. These statistics indicate that there will be challenges to the health, food and nutrition security status in South African urban settings. All of these mentioned factors fuel the current problem under investigation: too many South African school children are underweight due to poor nutrition leading to a lack in energy and an inability to participate in physical activities. In this process the nation's obesity problem may be enhanced (Metges, 2009). Report card on Physical Activity and Health in South African Children and Youth (2010, 2007) support this statement and indicate that the risk for obesity in stunted children is nearly two thirds higher than in other children of the same age (children younger than 9 years old).

1.2 MOTIVATION FOR THE CHOICE OF STUDY

In a study on urban food and nutrition security in the developing world UN HABITAT in Nieuwoudt (2008) states that more and more people in the developing world are living in the cities and that this trend is inescapable. A pattern of growth in urban poverty, food insecurity, malnutrition and a shift in their concentration from rural to urban areas that will accompany urbanisation has been steadily happening since the year 2000 (Garrett, 2000).

The United Nation's children's fund UNICEF (2006) in a study on underweight prevalence amongst urban and rural children pointed out that although large disparities exist for underweight prevalence among urban and rural children in the developing world, smaller disparities are found in East Asia and the Pacific, followed by Sub-Saharan Africa and CEE/CIS. This trend confirms Garrett's (2000) remark that growth in urban poverty, food insecurity, malnutrition and a shift in their concentration from rural to urban areas will accompany urbanisation (Nieuwoudt, 2008).

UNICEF (2006) indicates that there is very little difference in underweight prevalence between boys and girls in East Asia, the Pacific, Sub-Saharan Africa and CEE/CIS. Table 1.1 indicate the small difference in underweight between boys and girls in these countries. This aspect is under investigation in this study.

Table 1.1: Differences in underweight prevalence, between boys and girls (United Nations Children's Fund, 2006).

Little difference in underweight levels between boys and girls % children aged 0-59 months who are underweight by gender, 1996-2005			
REGION	BOYS	GIRLS	RATIO
Latin America and the Caribbean	8	7	1.1
Middle East and North Africa	18	16	1.1
Sub-Saharan Africa	29	28	1.0
CEE/CIS	5	5	1.0
East Asia and the Pacific	17	17	1.0
South Asia	44	47	0.9
DEVELOPING COUNTRIES			
	27	28	1.0

The motivation for this study then stems from the problem that urbanised children (boys and girls) in South Africa are facing a health crisis for which society will pay a high price in the long run. Currently limited research on the home food supply exists and a study like this could have important implications for health promotion interventions and programs. (Report card on Physical Activity and Health in South African Children and Youth (2010) and Byrd-Bredbenner *et al.* (2009). Low birth

weight, stunted growth and catch up weight gain during the first two years of a child's life form a dangerous mix as it could set the stage for obesity and health problems later on (Norris, 2011). Pettifor (2006) states that there are two sides to the obesity story: one obese child binges on hamburgers and chips in front of the television and another is fat because his mother could not afford proper food while she was pregnant (Christian, 2010). Current statistics indicate that as many as 17 percent South African children are overweight or obese while stunting as a result of malnutrition is present in 19 percent (Pettifor, 2006) and Report card on Physical Activity and Health in South African Children and Youth (2010). The above is linked to food poverty and under nutrition. Pettifor (2006) states that as many as 43 % households in South Africa might be suffering from food poverty, a stark reality for many South Africans. The effect hereof is that sub optimal diets, inactivity and hunger are found to affect children's ability to learn as poorly nourished children are often tired, apathetic and unable to concentrate (Nansel *et al.*, 2010). Lopez *et al.* (1999) found that society's obsession with thinness have devastating emotional and social consequences for young people of all sizes and socio-economic levels. More and more evidence also suggest that underweight prevalence at a young age can possibly fuel obesity in children later on in life (Norris, 2011).

Many analysts and governments unfortunately seem complacent of urban food insecurity and malnutrition because their countries are not industrialised or highly urban (Garrett, 2000). Garrett (2000) raises an important question in this regard: "As we look to 2020, is such complacency justified? "Why worry now?" The reality is that the geographic centre of poverty has already shifted more poor people already live in the cities. Urban poverty, food insecurity and malnutrition are problems of today and not tomorrow.

Urbanised families' are facing many other problems too. This include the effect food poverty has on the quality of children's lives, the changing face of eating disorders amongst individuals, inadequate dietary standards, lack of physical activity, food insecurity and hunger (Report card on Physical Activity and Health in South African Children and Youth, 2010). These aspects will be discussed in this study as these aspects are vital when training key role players in the needs of underweight children.

The plight of undernourished children is largely invisible as three quarters of the children who die from causes related to malnutrition ranging from mildly or moderately undernourished shows NO outward sign of their vulnerability (UNICEF, 2007).

Gear in UNICEF (2007) states that as South Africa moves forward into the 21st century the long term vision is for all South Africans to seek a society in which sound welfare, health, education and other services are available to all and that these aims could be realised in a competitive rapidly growing economy. Training programs to care givers of malnourished (underweight) children could play a vital part here. In doing so these children's health needs are underlined and this will make their plight a visible one.

1.3 PURPOSE STATEMENT

Bender (2002) states that approaches to primary prevention seek to reduce the sources of stress in individuals and in their social and physical environments, while simultaneously building the services to growth-promoting experiences.

If care givers could use professional knowledge (skill and competence) to develop people's potential and prevent problems from arising then many individuals would be spared destructive experiences viewed by Thackeray *et al.*, (1994). A greater understanding of human behaviour, interrelationships and social phenomena is called for to anticipate problems before they occur (Bender, 2002). The researcher believes that in designing a training program for care givers of underweight children a better understanding of these children's health needs are underlined and this will help make their plight a visible one.

Bender (2002) stresses the need to view schools in the wider context of the society in which they operate. A multidisciplinary and inter-sectored approach should be taken to ensure a holistic, integrated and comprehensive approach which involves education support personnel. This also requires an interdisciplinary approach involving social work, education and other support services. Teamwork and professional co-operation among the different professions are essential for success

(Report card on Physical Activity and Health in South African Children and Youth, 2010).

Life skills education, which offer skills to help people cope with everyday life, have in recent years become a highly popular method of intervention and prevention in school settings trying to support the above mentioned multidisciplinary approach. Bender (2002) believes that the importance of life skills education in the primary school cannot be stressed enough. The main objective of life skills education in the primary school is developmental and preventative in nature as children who have access to life skills education will become empowered to make life changing choices as they grow up (Bender, 2002).

Life skills education has been formally included in all school curricula since 1996, but real efforts have to be made in order to make life skills education more accessible. One way of doing this is to empower and equip care givers with the necessary knowledge, skill and tools to design support programs as to enable them to implement an outcomes based educational approach in this learning area. The researcher believes that in designing a training program for care givers (train-the-trainer) it is a step in the right direction.

In Bender (2002) Consultative Paper No 1 on Special Education: *Building an Inclusive Education and Training System* states that learning programs and materials for life skills education should be developed by appropriately trained personnel, an idea supported by the researcher. In this way the care giver can be an initiator of life skills education and his/her work may become the model on which further life skills education is based.

The need for developmental programs aimed at primary intervention in the school setting has important implications for the practise of care giving in schools. Current demands in South Africa for rapid and significant change require productive and efficient training programs (Report card on Physical Activity and Health in South African Children and Youth, 2010). Careful program development and evaluation are essential for effective ongoing planning to ensure that programs meet the challenge to build new capacities for growth and development for all South Africans, especially

children (Bender, 2002). Esposito *et al.* (2009) states that in combining a multilevel approach with a developmental perspective it can lead to more effective and sustainable strategies in obesity and malnutrition prevention.

In order for life skills education to be successful it has to be assessed against whether the stated objectives or outcomes of the specific life skills program have actually been achieved. The researcher hopes to achieve this goal once the training program is implemented.

Although Life skills education have in recent years become a highly popular method of intervention and prevention in school settings, it does not always keep track with the dynamic parameters of a rapid fast paced and changing society. In designing this train-the-trainer program the researcher trusts that this challenge will be dealt with successfully.

In line with the above the objective of this study (training care givers) was to investigate underweight children's weight-for-age (Body Mass Index) measurements and related fitness indices (muscle tone, flexibility, muscular endurance and cardio-respiratory endurance) with the set cut-off points in the standard normal distribution. These measurements were then compared with children of normal weight distribution within the same age over time. With this information in hand a training program was compiled as to assist key role players – children, caregivers and the school – with underweight as a new phenomenon in South African schools.

The effect that food insecurity has on human performance, physical growth, cognitive development, physical work capacity, health and survival as a result of urbanisation was the aim of this research study in general.

For the purpose of the study research was conducted within the content of a South African state school namely the Glenstantia Primary School. The school is located in the suburb of Constantia Park, Pretoria South Africa. Children with healthy body mass index measurements (BMI) as well as underweight children was involved on a voluntarily basis as the respondents for this study. They are living within the feeding

area of the school. Both male and female respondents were included in the research.

The following were research concerns:

- There are no clear guidelines within the school curriculum for educators and care givers as to develop and design much needed independent life skills programs;
- Generally prescribed programmes within the curriculum are followed, but they are not always found relevant to that specific school community's needs;
- Although many life skills programs are presented throughout primary and secondary schools in South Africa the implementation thereof is usually problematic mostly because of time constraints; and
- The evaluation phase as to determine the effectiveness of a specific programme is then usually also problematic.

The researcher further trusts that the results of this study could promote the principle of caring for one another's well-being and could foster a spirit of mutual support amongst multi-disciplines.

1.4 STUDY OBJECTIVES

The goal of this study was the *development of a train-the-trainer program to care givers of underweight children*. The programme will assist them in dealing with prevalence of and needs in underweight children in South African schools. By doing this not only is provision made for the underweight child's primary needs and support given towards their overall development, but the knowledge (skills and competence) of the caregiver are also enhanced in the process.

The study was guided by the following objectives

- To build a theoretical frame of reference in defining underweight in children; the causes, risks, symptoms and complications of being underweight and to put ideas forward so as to prevent and treat underweight in school-going children in a South African context (Phase 1, literature study);

- To perform a needs assessment in order to understand the needs of care giver's of underweight children and their expectations of a training program for schools (Phase 2, questionnaire and focus group interviews);
- To perform a needs assessment in order to comprehend the needs of underweight children in the school (Phase 2, questionnaire);
- To develop a train-the-trainer program for caregivers in order to support underweight children upon school entry (Phase 3);
- To implement the training program in the school (Phase 3);
- To evaluate the impact of the training program on the key role players (Phase 3); and
- To draw conclusions and make recommendations regarding the program.

1.5 RESEARCH HYPOTHESIS AND RESEARCH QUESTIONS FOR THE STUDY

Thomas and Nelson (1985) describe a hypothesis as an expected result with the essential feature that it must be testable. According to Schick *et al.* (2002) a hypothesis refers to a provisional idea whose merit need evaluation over a time frame. The researcher's work is then to either confirm or disprove the hypothesis (scientific hypothesis). In due course a confirmed hypothesis may then become part of a theory or occasionally may grow to become a theory itself.

Hypotheses are therefore tentative, concrete and testable statements about relations among variables. All hypothesis which is suggested as an answer to a problem has then to be tested empirically before it can be accepted and incorporated into theory (Bender, 2002).

In light of the aim of this study the following research hypothesis was formulated:

If caregivers are trained according to the needs of underweight children the caregiver's knowledge (skill and competence) will be enhanced, significantly influencing the prevalence of underweight in South African school children.

Sub-hypotheses were then formulated from the main hypothesis:

- Training the caregiver in accordance with the needs of underweight children (independent variable) will improve their theoretical knowledge, skill and competence (dependent variable).
- Training caregivers in accordance with the needs of underweight children (independent variable) will influence the prevalence of underweight in South African school children (dependent variable).

The following questions guided the study:

- Were minimum standards in training care givers according to the needs of underweight children met?
- To what extend did program participant's skill, knowledge and competence in dealing with underweight children and their needs change during participation in the program?
- To what extend did the training program influence the prevalence of underweight in South African school children?
- How can the program further be adapted or developed as to increase its effectiveness?

1.6 LITERATURE STUDY

In addition to selecting a quantitative, qualitative or mixed-methods approach the researcher also reviewed the scholarly literature in the field concerned. Literature reviews help researchers limit the scope of their inquiry and they convey the importance of studying a topic to readers (Creswell, 1994).

A literature study was conducted in this study with the following goals in mind:

- (a) To review as much information as possible that was relevant and sufficiently comprehensive to the particular identified problem;
- (b) To summarise the problem in a logically, organised and integrated manner;
- (c) To review previously technically correct research; and
- (d) To review justified criticisms of flaws in previous research.

All the above was to serve the purpose of becoming aware of inconsistencies and hiatuses which may justify further research (Huysamen, 1994).

In the current study the literature review consisted of (a) an examination of selected empirical research (b) reported practice if any and (c) identified 20 caregivers of underweight children in South African schools.

The purpose of the literature study was to establish whether any literature on the subject exists and what the nature of such literature is. The following avenues were explored with the assistance of the subject librarian at the University of Pretoria:

- Computerised databases: CD-ROM database optical and DIALOG-dissertation abstraction on line;
- International periodicals and articles;
- SABINET for all South African journals, books and current completed South African research;
- Literature on training and intervention programs for care givers within the field of physical education and physical sciences;
- Literature on different disciplines including physical education and physical sciences, education, sociology and psychology on a national and international level;
- Presentations at conferences, symposia and workshops;
- Radio and television broadcasts; and
- Newspapers, magazines and periodicals.

According to De Vos *et al.* (2005) intervention researchers must look beyond the literature of their particular field because societal problems do not confine themselves to the various human and social science disciplines. No technology was found within the field of physical education and physical sciences during literature studies about the problem identified for this study.

It seems that there is indeed a need for an intervention program within the field of physical education and physical sciences in order to train care givers who will care for underweight children within a South African school context.

1.7 CONSULTATION WITH SUBJECT PROFESSIONALS

The following professionals were consulted by means of telephone conversations, personal interviews and via the Internet:

- Sister DB Stanley (School Nurse);
- Mrs. Antoinette Zeelie (Head of Department Life Orientation Glenstantia);
- Mrs. Martie Leech (Dietician);
- Mrs. Riatta Eloff (Children Kinetics specialist);
- Mrs Charlotte Claassen (Occupational therapist); and
- Mrs. Dare (Parent).

1.8 FEASIBILITY OF THE STUDY AND ETHICAL ASPECTS

The study was undertaken within the context of a primary school (Glenstantia Primary school). The school is situated within Constantia Park a suburb of Pretoria in Gauteng South Africa. Permission to use the premises was obtained and there were no costs involved for using the school's premises. The school expressed eagerness to gain practical knowledge from the study. This was done in the form of a training program for care givers of underweight children.

It was feasible and possible to reach the goal and objective of the study as caregivers have expressed their willingness to participate in the study prior to the commencement thereof.

All costs of the empirical part of the study such as stationary, study material and assessments was paid for by the school. As the researcher is currently employed at this school it was also feasible to conduct and complete the study according to the set time frame.

Written informed consent from the Gauteng Department of Education, the school, parents, children and caregivers to take part in the research was obtained. The researcher did all in her power to ensure that the participants in the study were protected from physical or emotional harm, discomfort or danger that might arise due to research procedures. All participants were assured that any data collected from or about them will be held in confidence. All participants in the study had the right to

withdraw from the study or to request that data collected about them should not be used. Participants and their parents gave written consent that photos may be taken during the implementation of the training program.

1.9 DESCRIPTION OF THE RESEARCH POPULATION, SAMPLING METHOD AND LIMITATIONS

The term *sample* always implies the simultaneous existence of a population or universe of which the sample is a smaller section or a set of individuals selected from a population as pointed out by Gravetter and Forzano in De Vos *et al.* (2005).

In this study the population is all foundation phase learners and their care givers in the school. The sample were foundation phase learners in grade one and their care givers..

Two major groups of sampling procedures exist: (a) *probability sampling* and (b) *non-probability sampling*. In a probability sample each person in the population has the same known probability of being selected. In a non-probability sample the odds of selecting a particular individual are not known as the researcher does not know the population size or the members of the population (De Vos *et al.*, 2005). In the present study a non-probability sample was used (availability sample). This sample is the most convenient collection of subjects who are available for research purposes. The limitation of the non-probability sample is that it makes generalisation of the research results risky (Bender, 2002).

1.9.1 The research sample

Glenstantia Primary is a traditionally English medium school with a diverse population. Foundation phase learners in grade one were involved in the program. Their ages ranged from 6 to 8 years old. The sample size for learners in this study (n= 150) were representative of the population from which it was drawn. The sample size for care givers in this study (n=18) limited the representativeness of the population from which it was drawn. Despite the possibility that this might limit the general application of the study, the sample was taken in order to obtain in depth information in light of developing and improving program effectiveness within the particular context. This was adequately achieved.

1.9.2 Sampling method

Non-probability snowball sampling will be applied for identifying care givers in this study. Snowballing involves approaching a single case that is involved in the phenomenon to be investigated in order to gain information on other similar persons. The studied person in turn is requested to identify further people who could make up the sample (De Vos *et al.*, 2005). The researcher will proceed with the snowball method until 18 caregivers are identified for the needs assessment, the training program and the sample.

1.9.3 Care givers

The researcher used non probability snowball sampling to select the care givers who fit the criteria for inclusion in the study. The care givers for the focus groups and training program were the same persons. Care givers met the criteria set below.

They:

- Were living in the demographic area of Pretoria, Gauteng South Africa;
- Have taken care of children for at least six months or more;
- Were between the ages of 22 and 35;
- Have completed higher education training in the form of a teaching diploma or degree; and
- Were willing to participate in the study.

1.9.4 Parents

Parents of underweight children who were willing to take part in this research were selected for the focus group according to the following criteria:

- Were a parent of an underweight child;
- Lived in the demographic area of Pretoria, Gauteng South Africa;
- Made use of a care giver for underweight children; and
- Were willing to participate in the study.

1.9.5 The school

Members of the school's management team who were willing to participate in this study were included in the focus groups.

1.10 DEFINITIONS OF KEY CONCEPTS

As food insecure individuals have poor physical stamina that leaves them open to infection the following concepts will be defined:

- **Nutrition**

Nutrition can be defined as “...all the processes used by adults and children to take in food and to digest, absorb, transport, utilize and excrete food substances” (Marotz *et al.*, 1997:6). Food is essential for health as it supplies essential nutrients for energy, growth, development, normal behaviour, resistance to illness and infection as well as tissue repair (One World Security Guide, 2009).

- **Nutrients**

The components or substances found in foods are called *nutrients*, e.g. carbohydrates (Marotz *et al.*, 1997). The body needs more nutrients during certain stages of life particularly in infancy, early childhood, adolescence, during pregnancy and while breast feeding (Huybrechts *et al.*, 2009).

- **Under nutrition in children**

Malnutrition can result from either *under nutrition* or over nutrition. Both conditions are caused by an imbalance between the body's need for and intake of essential nutrients and this imbalance results in deficits in weight for age (Barness, 1981).

As weight gain is related to caloric intake and frequency of eating composition of the food are vitally important. In under nutrition children's intake of essential nutrients such as carbohydrates, proteins, vitamins, minerals and fat is far less than required for adequate growth and development. This is primarily caused more because of an inadequate access to food by certain categories of individuals and households in a population rather than a shortage of food as found in the Food Security Directive SA (2006). This is important as underweight children are more susceptible to infection and illness as their mental and physical development is affected and a higher incidence of degenerative disease often results from it (Gundersen & Kreider, 2009).

- **Underweight in children**

The term *underweight* refers to a human who is considered to fall under the expected weight-for-height range for chronological age group. The definition is usually made with reference to the body mass index (BMI) and or waist circumference measurements. A child below the 5th percentile on the body mass index is considered underweight, as 95% of the age group has a higher BMI (UNICEF, 2006).

1.10.1 Health related fitness indices

As exercise testing is a low-risk method of diagnostic, prognostic and functional evaluation the following fitness indices were measured in this study:

- **Body Mass Index (BMI)**

BMI is a formula that is used to estimate how much body fat a person has, based on his or her weight and height, and by taking the chronological age of the person measured into consideration. The BMI formula uses height and weight measurements to calculate a BMI number ($wt/ht \times ht$). This figure is subsequently plotted on a chart to show whether a person is underweight, at risk of becoming overweight or overweight (UNICEF, 2006 and Sullivan, 2004). Each BMI chart has eight percentiles lines for 5th, 10th, 25th, 50th, 75th, 85th, 90th and 95th percentiles. A child below the 5th percentile on the body mass index is considered underweight since 95% of the age group has a higher BMI (UNICEF, 2006 and Sullivan 2004).

- **Muscle tone**

Muscle tone is the continuous and passive partial contraction of the muscles. It is the muscles ability to work against gravity and to execute smooth movements. Children with low muscle tone are the “floppy” ones who have difficulty maintaining any posture without external support (Cagnon, 2006). A standardised test (**plank**) for determining muscle tone expressed in seconds was used.

- **Flexibility**

Flexibility is the maximum ability to move a joint through a range of motion. It depends on a number of specific variables including distensibility of the joint capsule,

muscle temperature and muscle viscosity. Flexibility is assessed as it prevents injury and maintains comfort after exercising. The sit-and-reach test, expressed in centimetres was used as a diagnostic tool to assess flexibility (Mahler *et al.*, 1995).

- **Muscular endurance**

Muscular endurance is the ability of a muscle group to execute repeated contractions over a period of sufficient time to cause muscular fatigue or to statically maintain a specific percentage of maximum voluntary contraction (MVC) for a prolonged period of time (Mahler *et al.*, 1995). The 60-second sit-up (best of 10) and maximum number of push-ups (best of 10) that can be performed without rest was used to evaluate endurance of the abdominal muscle groups and upper body muscles respectively (Mahler *et al.*, 1995).

- **Cardio-respiratory endurance**

Cardio-respiratory endurance is defined as the ability to perform large-muscle, dynamic, moderate to high intensity exercise for prolonged periods. The performance of such exercise depends on the functional state of the respiratory, cardiovascular and skeletal muscle systems. Cardio-respiratory endurance is considered health related because (a) low levels of fitness have been associated with markedly increased risk of premature death from all causes and specifically from cardiovascular disease, and (b) higher fitness is associated with higher levels of habitual physical activity, which is in turn associated with many health benefits (Mahler *et al.*, 1995). The three minute step test was used to determine cardio-respiratory endurance.

1.10.2 Other related concepts

As care givers will be trained and the effects of urbanisation will form the backdrop of this study, the following related concepts are defined here:

- **Care giver**

A *care giver* can be defined as a person who is responsible for attending to the physical, emotional and social needs of another person who often is dependent and cannot provide for his or her own needs. In Calitz (2004) a care giver provides a

child with affection and firm guidance. Care givers are furthermore responsive to children's questions and achievements. In this study caregivers will be educators at Glenstantia primary school.

- **Urbanisation**

Urbanisation is the increase over time in population or extent of cities and towns. Urbanisation has profound effects on the ecology of a region and on its economy. Urban sociology also observes that people's psychology and lifestyles change in an urban environment (<http://en.wikipedia.org/wiki/Urbanization>).

- **FMEA profiling**

In this study a project management approach was executed in training the care givers. FMEA profiling was used as diagnostic tool in order to determine possible failures within the training program presented to the care givers in this study. From Langford (2007) a failure mode and effects analysis (FMEA profile) is a procedure for analysing potential failure modes within a system/programme. With this information in hand the effects that failures can have on a system/programme can be analysed. If these failures are detected early on corrective action can follow quickly saving time and money spent on projects (Langford, 2007).

- **Train-the-trainer programs**

A train-the-trainer approach as training tool was used in this study. Leaser (2008) said the following: *"In today's competitive global business climate, companies looking to improve their gross margins and productivity and looking for ways to boost employee performance and effectiveness, skills development and training programmes may help organisations achieve corporate objectives and enhance overall corporate culture."* In designing the training program the researcher hopes to make a contribution to care giver performance, effectiveness and skills development within the school and in this process helping underweight children in South African schools.

1.15 CONTENTS OF RESEARCH REPORT

Chapter 1 is the general introduction to serve as the contextual and theoretical framework of the study. This chapter includes the purpose statement, motivation,

goal, definitions and research methodology of the study. The remainder of the dissertation is divided into the following six chapters:

- Chapter 2 is devoted to a literature study on the young child in crises as a result of transition (the urban millennium);
- Chapter 3 is devoted to a literature study on the developmental tasks of young children when growing up normally as well as the effects that food insecurity could pose on the developmental tasks of these young children;
- Chapter 4 gives special attention to the role of the care giver and care givers in crises as the locus of poverty, food insecurity and malnutrition keeps on changing in urbanised settings;
- Chapter 5 focuses on the training program (methodology);
- Chapter 6 reports on the empirical study of the research theme: A training program to care givers of underweight children;
- Chapter 7 outlines the conclusions and recommendations of the study.

CHAPTER 2

YOUNG CHILDREN IN CRISIS: THE TRAGEDY OF TRANSITION

2.1 INTRODUCTION

Many young children might be at risk due to a phenomenon of epic proportions. Brockerhoff (2000) states that the population explosion that characterised much of the 20th century will be replaced by another dramatic demographic transformation, this being urban population growth of an unprecedented scale. According to Brockerhoff (2000) it can be expected that by 2015 the number of cities in developing countries will reach 400 for cities with 1 million or more residents. This is more than quadruple the number of cities in 1975. In Nieuwoudt (2008) UN HABITAT statistics indicate that 2007 was a landmark year in the studying of human settlement patterns as for the first time ever there were as many people around the world living in cities as there were in rural areas.

Brockerhoff (2000:7) states that “...*future population change in the developing world is likely to pose different challenges in different regions of the world eventually*”. According to Nieuwoudt (2008) and Brockerhoff (2000) the challenge in Sub Saharan Africa is that urban growth will be fuelled by rural poverty placing urbanised settings under pressure as resources and access to food will become more difficult. The One World Food Security Guide states that despite the political commitment to reduce world hunger the number of people lacking access to the minimum diet has risen from 824 million in the baseline year 1990 to 1.020 billion in 2009 (One World Security Guide, 2006). This calls for urban development planning by small locales making it a continued priority. According to Tacoli (2000) urban food and nutrition security depends on strong links between urban and rural areas (rural-urban interdependence). This is important as urbanisation transforms land use and farming systems, patterns of labour force participation, infrastructure requirements and natural resource systems in and around cities.

For the purpose of this study it is important to note that making a living across the rural-urban divide include that relatively settled migrants in urban areas often support newly arrived migrants and secondary school students from their extended families

often placing additional demands on the already taxed household. In addition many families also prefer to keep in contact with their rural ties because keeping a rural base provides a safety net to cope with times of economic hardship or political violence. In many cases those who migrate semi-permanently remain closely in touch with their relatives back home so that when they have to work long hours in the urban environment the children can go stay with relatives in the home village for extended periods of time (Tacoli 2000).

Figure 2.1 designed by the researcher represent the process of transition or the urban millennium as it is more widely known and described in literature (UNICEF, 2006). Its tragic consequences on mankind worldwide and more specifically on South African families today will be presented in this chapter.

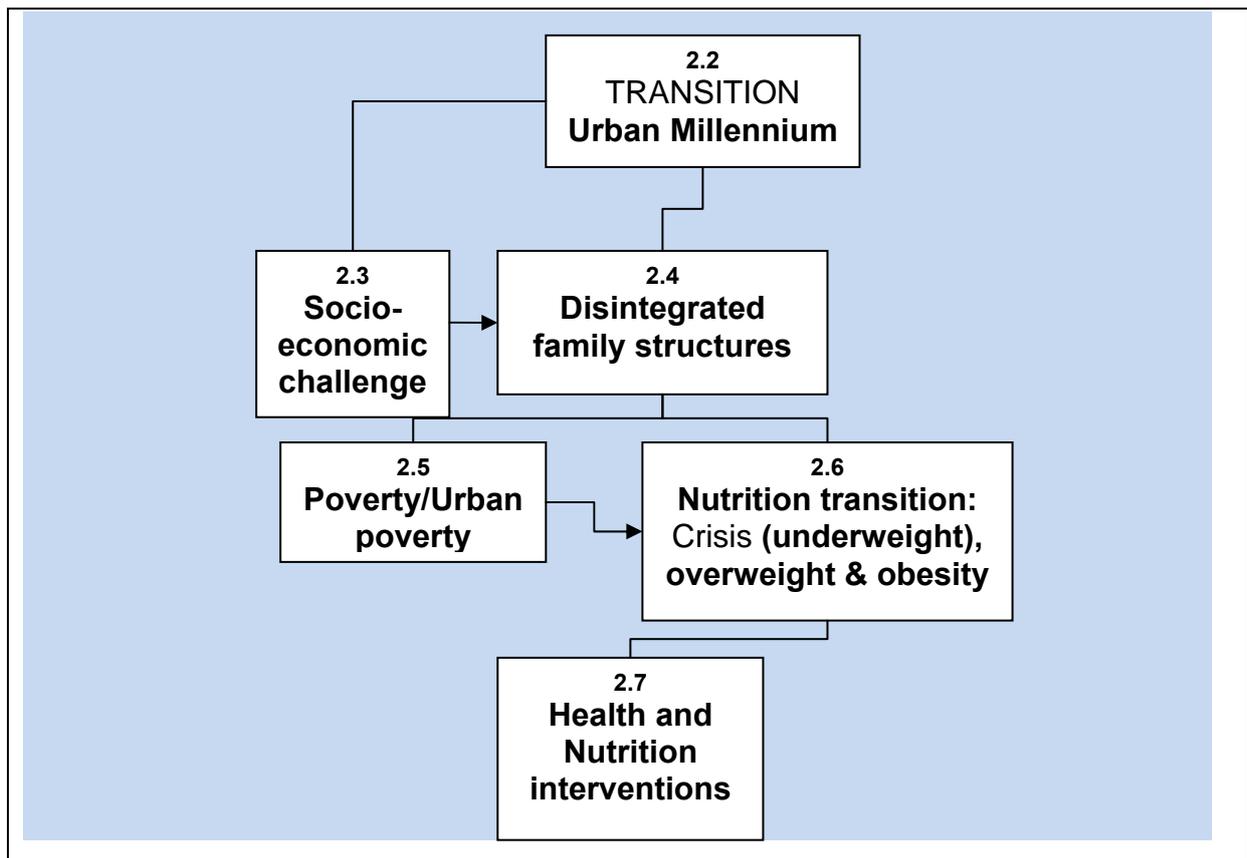


Figure 2.1: Transition and the urban millennium: the consequences to families living in urban settings (Van Dorsten, 2010).

From Figure 2.1 each one of the factors named transition, the disintegration of family structures, poverty in general, urban poverty, urban food insecurity resulting in

underweight prevalence among children and the value of health interventions will be discussed as to underline the importance of relevant interventions. In this study the training program for care givers of underweight children within the South African school context will be the intervention investigated.

2.2 TRANSITION AND THE URBAN MILLENNIUM

According to the UNICEF (2006) the majority of people will be living in towns and cities sometime in the midst of 2025. This then is referred to as the arrival of the *urban millennium*. Furthermore it is also estimated that 93% of urban growth will occur in Asia and Africa due to net migration from rural areas.

By 2050 over 6 billion people two thirds of humanity will be living in towns and cities (Harris, 1992; Batten, 1995; Haddad *et al.*, 1999). By the year 2030 the number of people living in cities in Africa alone is estimated to triple in number from 251 million to 864 million (Ruel *et al.*, 1998). The total in developing countries is expected to more than double from 1.7 billion to 4.1 billion at the same time.

The challenges of this transition being:

- The socio economic challenges instilled on families in urban settings;
- Many disintegrated family structures might result as families struggle to survive the urban millennium;
- Resulting poverty in urban communities;
- Urban food insecurity resulting in underweight leading to overweight and obesity as a result of catch up weight gain, bringing forward the health crisis under investigation in this study; and
- The challenges set to health and nutrition interventions or programs.

2.3 SOCIO ECONOMIC CHALLENGES

According to De Haan (2000) urbanisation will proceed in the coming decades and will continue to provide opportunities as well as challenges to residents of as well as migrants to urban areas. De Haan (2000:10) states that "*labour is all people's greatest asset and that the labour market should increasingly become a key determinant of wealth in general*". Unfortunately this is not always the case as the quality of work opportunities, low wages, precarious working conditions and insecure

job tenure are crucial constraints to the improvement of livelihoods of urban dwellers and poverty might be intensified and hereby shifting the primary location of destitution from rural to urban areas (Food Security Directive SA, 2006).

Wilson (2006) states that poverty is the primary reason for food insecurity as inadequate wages and benefits limit the ability of families to give their children consistently adequate food, housing, medical care and other basic necessities. These families often find themselves confronted with monthly or weekly food shortages as other household expenses reduce the amount of income available to purchase food (Wilson, 2006). This aspect will be investigated in the training program and commented on.

In an attempt to address the nutritional status and needs of children living in rapidly expanding urban settings the following related issues will be discussed here:

- Is the locus of poverty and malnutrition changing because of urbanisation?
- Urbanised settings and food distribution in the third world;
- Nutritional data on childhood malnutrition in South Africa; and
- Urbanised settings and standards in South Africa.

2.3.1 Is the locus of poverty and malnutrition changing due to urbanisation?

In order to answer this question it is necessary to look at changes in urban and rural populations over time and presented in Table 2.1 and 2.2. In Table 2.1 data will reveal the situation in Africa and Table 2.2 will assess the situation in 8 selected countries over time.

When interpreting the data put forward in Table 2.1 the numbers are striking as it indicates that we can be sure that the number of people living in the developing world will increase rapidly in the next 20 years to follow (Nieuwoudt, 2009 and Haddad *et al.*, 1999).

Table 2.1: Changes in urban and rural populations by region, including Africa from 1975-2025 (Haddad *et al.* 1999).

Region/Country	Level of urbanization (% of total population in urban settlements)			Urban Population			Rural Population		
				(millions)			(millions)		
	1975	2000	2025	1975	2000	2025	1975	2000	2025
World	37.8	47.4	58.9	1.543	2.89	4.736	2.538	3.201	3.303
More developed regions	69.9	76.1	82.6	733	903	1.008	315	284	213
Less developed regions	26.7	40.5	54.7	809	1.986	3.729	2.223	2.918	3.09
Africa	25.2	37.8	52	104	310	752	310	510	702
Asia	24.6	37.6	52.4	593	1.387	2.508	1.813	2.302	2.277
Latin America and Caribbean	61.2	75.4	82	196	388	566	124	127	123

The Food Consumption and Nutrition Division (FCND) of the International Food Policy Research Institute further indicates that many analysts also believe that because of rapid growth in urbanised settings the locus of poverty and under nutrition is also gradually shifting from rural to urban areas indicated in Table 2.2.

When looking at the summarised data in Table 2.2 the data show that in 5 of 8 countries the absolute number of poor and the share of poor people living in urban areas are increasing over time (Bangladesh, Ghana, China, India and Nigeria). For 7 of the 8 countries the share of poor people in urban areas is increasing. The only country for which the share of poor people in urban areas was decreasing was Indonesia over the 1990 to 1993 period. It seems that even in these relatively short periods of time poverty is increasing in absolute and with relative importance (Haddad *et al.*, 1999). Although Sub Saharan Africa is not represented here the information is still relevant to the current problem under investigation. According to Landman (2003) approximately 40% or 18 million from 45 million people in South Africans are living in poverty.

**Table 2.2: Changes in urban and rural poverty over time, 8 selected countries
(Haddad *et al.* 1999).**

Country	Survey year	Rural poverty incidence	Population year	Rural population (000s)	Number of rural (000s)	Urban poverty incidence	Urban population (000s)	Number of urban (000s)	Share of poor in urban areas
		%			%			%	
Bangladesh	1983	60.36	1985	86.043	51.936	50.78	13.267	6.737	11.48
Bangladesh	1991	62.96	1990	92.565	58.279	45.24	17.2	7.781	11.78
China	1988	32.7	1990	852.6	278.8	6.7	302.705	20.281	6.78
China	1995	28.6	1995	851.501	243.529	8	368.723	29.498	10.8
Colombia	1978	38.4	1980	9.568	3.674	12.1	16.957	2.052	35.83
Colombia	1992	31.2	1990	9.785	3.053	8	22.811	1.825	37.41
Ghana	1987	41.85	1985	8.691	3.637	27.3	4.146	1.132	23.73
Ghana	1992	33.9	1990	9.932	3.367	26.5	5.087	1.348	28.59
India	1977	50.6	1980	530.005	268.183	40.5	158.851	64.335	19.35
India	1993	36.66	1995	680.129	249.335	30.51	248.875	75.932	23.34
Indonesia	1990	23.1	1990	126.889	29.311	10.3	55.923	5.76	16.42
Indonesia	1993	16.5	1995	127.513	21.04	5.2	69.947	3.637	14.74
Nigeria	1985	49.5	1985	57.541	28.483	31.7	25.527	8.092	22.12
Nigeria	1992	36.4	1990	62.489	22.746	30.4	33.664	10.234	31.03
Pakistan	1984	49.3	1985	71.034	35.02	38.2	30.162	11.522	24.76
Pakistan	1991	36.9	1990	81.159	29.948	28	37.982	10.635	26.21
Pakistan	1991	36.9	1990	82.905	30.592	28	39.029	10.928	26.32

According to Harris (1992) the forces contributing to urban growth are strong with higher urban wages reflecting the higher productivity of labour in cities where economies of scale and agglomeration have made households and enterprises more productive. Although this productivity growth is beneficial it has not solved the massive urban problems of the developing world and serious issues of urban poverty and deteriorating urban environment remain.

Harris (1992) points out that in 1988 some 330 million urban residents, which is about a quarter of the total urban population by that time, already lived in poverty.

Unfortunately it is hard to obtain reliable numbers on the growth of urban poverty and under nutrition and their share in national poverty and under-nutrition. For example the World Bank (1996:1) states “...current estimates of the number of the poor

indicate that poverty remains a rural phenomenon, but that future projections show that the number of urban poor will exceed the number in rural areas by early next century” and concluded that urban poverty will become the most significant and politically explosive problem in the next century.

According to Ruel *et al.* (1998) the conditions of urban poverty and the switch from subsistence to a money based economy change the conditions of care for children in dramatic ways which may be negative. Given that behaviours of care giving along with food security and availability of health services are known to play a significant role in the nutritional status of children the effects of urbanisation on care giving is a major concern. Abandoned urban and street children attest to the breakdown of family care for at least some families (UNICEF, 1990).

2.3.2 Urbanised settings and food distribution in the third world.

According to Potter and Salau (1992) it is found in most poor households within Third World countries the need to find fuel for lighting and cooking masks the fact that food is still the most fundamental requirement of individuals. In a study conducted on urban food distribution systems in the Third World it was found that most activities of the household unit are still structured around food acquisition, preparation and consumption. It is also still often found that personal and societal mores are closely connected with dietary patterns (Potter & Salau, 1992).

A point of interest to the current study is the findings in a study on urban food distribution systems in the Third World. It was found that poor families are forced into devoting more than three-quarters of their income to food purchases. When food is furthermore expensive then both the quality and quantity of the food available to the poor starts declining (Food Security Directive SA, 2006). It becomes problematic when the opportunity to compensate for this through subsistence cropping, which is increasingly the case in urban areas, is lost a downward spiral of nutrition and health compounds. Other knock-on effects are:

- An early substitution of a starchy diet in the place of breast milk;
- Imported cereals displacing root crops from many urban diets in Africa;

- Westernization of dietary preference, affecting the breakfast menu considerably;
- The expansion of fast food outlets, bringing about nutritional problems, as junk food becomes the norm. For example “...*despite the fact that many African countries have coconut, papaya and banana trees heavy laden with fruit , kitchens are dominated by canned meats and rice, doughnuts and pancakes heavy with sugar*” (Potter & Salau, 1992:12).

Whilst food dependency is evident on the one hand – the Pacific Islands for example local foods are valued less than imported goods – food scarcity in certain areas (towns) for certain groups (the poor) and for certain foods (fresh fish, meat and vegetables) are rife. Bulk foods in these areas are usually white flour, milled rice and sugar which are lower in fibre and vitamins than traditional crops.

2.3.3 Nutritional data on childhood malnutrition in South Africa

The question asked here is: Is the number of young, underweight children living in urban areas in South Africa increasing and do they represent an increasing share of the total population of young underweight children in the world?

Data from the United Nations’ report card on nutrition (2006) will be used to answer this question. According to this report card it is estimated that under nutrition contributes to the deaths of about 5.6 million children under the age of five worldwide and that 146 million children in the developing world is currently underweight for his or her age.

Africa, sub-Saharan Africa and South Africa at an impasse:

- When looking at Africa and sub-Saharan Africa the picture is bleak: ...” *little improvement has been seen in sub-Saharan Africa, where underweight remained roughly the same over the 1990-2004 periods*” (UNICEF, 2006:4).
In fact given this lack of progress and due to population growth the total number of underweight children actually increased in sub-Saharan Africa.
- “*The Eastern/Southern Africa region as a whole has shown no improvement at all since 1990 in proportion of children who are underweight. The absolute*

number of underweight children has actually increased in the region over the past 15 years” (UNICEF, 2006:4).

- *“South Africa at 12% has a lower proportion of underweight children than any other nation except Swaziland”. Unfortunately South Africa has progressively been going backwards with its proportion of underweight children rising by an average of 5.6% a year since 1994-1995” (UNICEF, 2006:3).*
 - According to the Report card on Physical Activity and Health in South African Children and Youth (2010) South Africa has made great strides in human development since its transition to democracy stating that *“Children and youth are the country’s greatest resource in meeting current and future health challenges. These include high rates of cardiovascular disease, such as heart attacks and strokes, diabetes, cancer, early death due to accident and injury as well as infectious diseases”*. Over half of deaths worldwide are caused by chronic diseases and they explain nearly 40% of deaths in South Africa (Report card on Physical Activity and Health in South African Children and Youth, 2010).
 - Data from the 2000 National Food Consumption Survey (NFCS) confirms that the majority of South African households live in poverty with a limited variety of foods available in their homes (Food Security Directive SA, 2006).
 - Further one out of two children enjoyed an energy intake of less than two thirds of their bodily requirements (Food Security Directive SA, 2006).
- Although disaggregated statistics indicate large disparities between children living in rural areas and children living in urban areas, underweight prevalence in urban informal settlements in many developing countries still gives cause for concern (UNICEF, 2006). Harris (1992) states that despite the efforts of governments and donors the numbers of urban poor continue to increase as a result of demographic growth and constrains on productivity and therefore on the growth of employment and incomes with constrained access to services resulting. Harris (1992) indicates that the physical manifestations of urban poverty are evident in all cities in the developing world including South Africa were vast neighbourhoods of squatters live outside the legal framework of the city.

UNICEFS' report card on nutrition (2006) further indicates that in the developing world one out of every four children less than five years old are also possibly underweight. When applying these statistics the following startling numbers start appearing highlighting the idea that young developing children living in urban feeding areas are indeed facing a health crisis.

- 0, 9325 billion children living in the developing world could potentially be underweight by year 2025 (UNICEF, 2006).

When using Food Consumption and Nutrition Division (FCND) statistics for the year 2025 for urban areas in Africa the numbers could look like this:

- 188 million African children could possibly be underweight by the year 2025 and 175, 5 million in rural areas (UNICEF, 2006).

Even closer to home the impact might be as follows:

- 28% of the numbers for Africa might represent the number of underweight children in sub-Saharan Africa thus indicating a number of 52, 64 million children potentially underweight in urban areas and 49, 14 million children potentially underweight in rural areas by year 2025 (UNICEF, 2006).

Furthermore 12% hereof might represent the number of underweight children in South Africa leaving us with a number of 6, 3168 million children potentially underweight in urban areas and 5, 8968 million children in rural areas by year 2025. In Sekhukhune district in The Limpopo Province alone as many as 21% of all children living there are underweight for their age (Food Security Directive SA, 2006).

The situation in Africa and South Africa can be summarised as follows: *“Despite the obvious efficiency advantages of cities, the negative consequences of urbanisation for low income groups are overwhelming. Simply, many city dwellers in developing countries live in crushing poverty”* (Nieuwoudt, 2008:2). In South Africa urban poverty has become particularly problematic as macroeconomic adjustments are taking place resulting in reduced subsidies to food, water, transport and energy in

urban areas (Nieuwoudt, 2008). This coupled with the shifting demand for labour and transitional unemployment has reduced urban real incomes. According to Harris (1992) lower-middle class groups has been affected the most pushing the lower income category until the resumption to growth leads to improved opportunities for employment, higher productivity and increased wages.

Harris (1992) states that broad channels link adjustment to the incidence of poverty in the city as wages are cut and prices of goods and products rise faster than wage increases. This results in a reduction in public health and education with a disproportionate impact on the poor. Wilson (2006) states that low income families may find themselves confronted with monthly or weekly food shortages because other household expenses reduce the amount of income available to purchase food. According to Wilson (2006) the family budgets of most low income families lack the flexibility to respond to increases in heating expenses, rental increases, medical emergencies or other unexpected demands. Inflation in these costs or an unforeseen emergency can precipitate an economic crisis in these families that could potentially lead to food insecurity or hunger (Wilson, 2006).

2.3.4 Urbanised settings and standards in South Africa

It is clear that South-Africa as a developing country will not escape the urban poor situation as set out. It is also unfortunate that not all people living in cities and cities in South Africa enjoy the same standard of living.

It is often found in cities that some people live in grand houses with many rooms and plenty land space whilst other people might live in modest houses and or town houses on very small pieces of land or with no land at all. Many urban people unfortunately also dwell in informal settlements and townships made up of closely built shacks and in the process straining the already overused resources of the city, according to Nieuwoudt (2008) and Gold (1982).

Figure 2.2 designed by the researcher summarises urbanised settings and standards in South Africa as discussed so far:

- (i) According to Van der Berg *et al.*, (1994) Urbanisation in the form of net migration from rural areas has been very rapid since the 1950's. It is

estimated that as many as 73% of all South Africans will reside in the cities by 2010 (<http://www.botany.uwc.ac.za>) Poverty in the cities is a real problem as employment opportunities do not always grow fast enough to accommodate these new city dwellers and as a result the level of urban deprivation is on the rise (World Bank, 1996). As many as 38 % of South Africans could be unemployed, aggravating the problem even further (World Bank, 1996),

- (ii) It is estimated that under nutrition contributes to the deaths of about 5.6 million children under the age of five worldwide at present. As many as 146 million children in the developing world are currently underweight for his or her age Report card on Physical Activity and Health in South African Children and Youth (2010) and UNICEF (2006).
- (iii) The impact hereof on SA schools will be investigated.

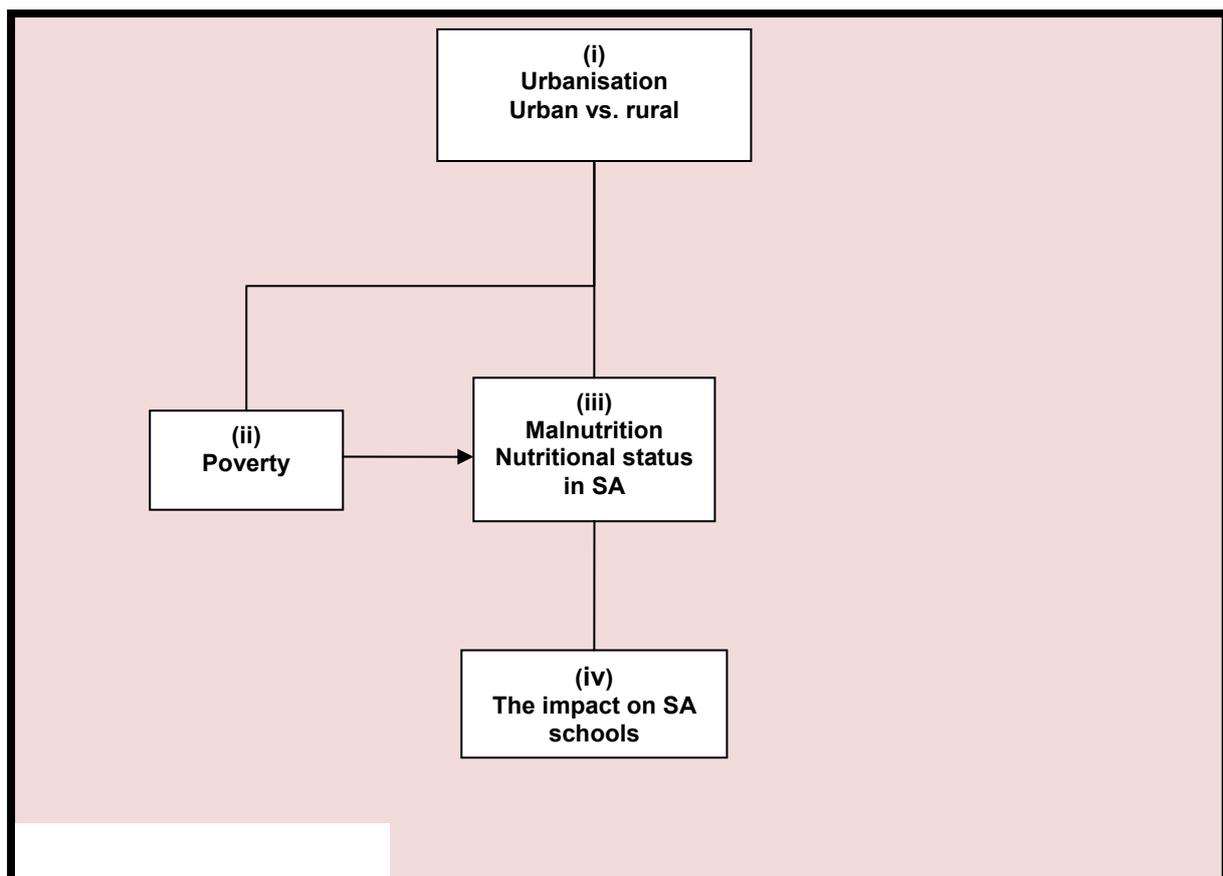


Figure 2.2: Urbanised settings and standards in South Africa, a summary (Van Dorsten, 2010).

As a result of the abolition of influx control in 1986 urbanisation in South Africa has also been displaced resulting in semi-urban and peri-urban complexes.

Peri-urban refers to people living within daily commuting distance from urban complexes. Semi-urban refer to un-proclaimed settlements that have more than 5000 inhabitants (Gelderblom & Kok 1994). The above then makes South Africa unique with regard to urbanisation and migration patterns.

According to Gelderblom and Kok (1994) statistics released in 1986 already indicated that the urbanisation level of the non African component of the South African population has already come close to the potential saturation level but continued migration from towns and cities and to metro poles could still be expected (Nieuwoudt, 2008). On the other hand the African rural population and at least the semi-urban former homeland populations would probably migrate in large numbers to towns and cities in the common area South Africa. Table 2.3 shows the average yearly urbanisation and growth in percentage as it was ranked in 2001.

**Table 2.3: Average yearly urbanisation growth as a percentage.
(United Nation's Development Program, 2001)**

Country / Region	1950–1955	1955–1960	1960–1965	1965–1970	1970–1975	1975–1980	1980–1985	1985–1990	1990–1995	1995–2000	2000–2005
<i>Africa</i>	4.50	4.63	4.85	4.68	4.37	4.45	4.38	4.26	4.16	3.91	3.76
<i>Eastern Africa</i>	5.57	5.77	6.08	6.07	6.28	6.56	5.36	5.56	5.31	5.10	4.70
<i>Southern Africa</i>	3.21	3.32	3.00	3.03	2.82	2.64	2.73	2.63	3.50	3.15	2.13
<i>South Africa</i>	3.14	3.23	2.88	2.90	2.66	2.46	2.49	2.29	3.41	3.13	2.09

**Table 2.4: Human Development Index.
(United Nation's Development Program, 2001)**

Country	HDI value	% urban population
<i>Libya</i>	0.783	88.0
<i>Tunisia</i>	0.740	66.2
<i>Algeria</i>	0.704	57.7
<i>South Africa</i>	0.684	57.7
<i>Equatorial Guinea</i>	0.664	49.3

Numbers from UNDP, 2003: "Human Development Index" and the UN "World Urbanization Prospects, the 2001 Revision". The HDI value is calculated from each countries education level, life expectancy at birth and GDP per capita (PPP US\$). The countries are ranked by HDI value

Currently ranked fourth out of five countries with the highest urbanisation levels on the UN Human Development Index (Table 2.4) the problem of rapid urbanisation facing South Africans is clear.

According to Osnabruck (2000) South African cities are facing an immense in-migration of poor rural populations from the former homelands which have been economically and socially neglected during apartheid times. Informal squatter settlements are mushrooming at the outskirts of the great cities to such extend and with such rapidity that leaves very limited scope for sustainable urban planning. More than 7 million people throughout the country might be living in these informal settlements of which as many as 2, 5 million are on the Witwatersrand (<http://www.botany.uwc.ac.za>; Van der Berg *et al.*, 1997).

2.4 THE FAMILY IN THE URBAN WORLD

According to Gold (1982) the family might be the oldest and longest surviving of all human institutions.

According to Gold (1982) it is well documented that in pre-urban societies the family held the dominant position in community life and that in many instances it was synonymous with the community itself. The family remained very much entrenched in the social traditions and authority structure of pre-industrial urban societies for many centuries.

Gold (1982) states that the family is often viewed as a “sacred” institution beyond question or criticism. Ever since the modern urban-industrial revolution however, things started changing and the family has been going through many important organisational and functional changes. The family is no longer the dominant social institution in the social order of the modern urban-industrial community and it has lost many of its traditional functions to competing institutions. In fact the very survival of the family as a key social unit is in doubt and there have been many gloomy predictions of the inevitable decline and disintegration of the family as we know it. It was already projected in the early nineties that the conventional nuclear family of mother, father and young children living together will constitute to just over 25 percent in urbanised households (Gold 1982). Widows, divorced woman, female headed households, woman and girl children are found often to be responsible for keeping communities together (The Food Security Directive SA, 2006).

The consequences hereof on children’s physical, economic, social and psychological well-being is heart breaking and will be presented in the form of a case study, the story of Nicholas a 10 year old African-American living with his family in Englewood Chicago (Corsaro, 2005). This story was published in the *New York Times* in 1993 under the title” Children of the Shadows” capturing the lives of ten children growing up poor in American cities. Although the economic circumstances of Nicholas and his family can be expressed quite simply – they are very poor- his family structure and those of his mother and other adults who care for him are very complex. In the story written by Isabel Wilkerson as scene in which the boy is called from his fourth grade classroom and asked to explain why no one has picked up his younger sister, Ishtar, from her morning kindergarten class resulted as follows: Nicholas explained that his mother a welfare recipient rearing five young children was in college trying to become a nurse and as a result were not home during the day. Further Ishtar’s father was separated from the mother and in a drug and alcohol haze most of the time. His grandmother that he used to live with was at work. His mother’s companion, the father of his mother’s youngest child, was suppose to pick up Ishtar but his whereabouts were unknown to Nicholas. In the end Nicholas simply gave the principal the phone number of his aunt.

In many ways Nicholas is a typical 10 year old boy. He gets average grades; he slides down banisters, shirttail out hoping to become a fireman. But he has many of the responsibilities of a man. He looks after his younger siblings often getting their breakfast each morning and washing clothes at night since the children have so few things to wear. Before going to school himself he drops off the little ones to day care. Nicholas still bent down when his youngest brother John-John began to cry after being dropped off at his day care centre, and assured him that everything was going to be O.K.

The range and severity of problems that young children face are very depressing and often not heard amid the polemic posturing on both sides of the debate on changes in family structure. Furthermore the effects of changes in developing countries because of the effect that poverty has on children's everyday lives are seldom considered (Corsaro, 2005).

2.5 POVERTY AND URBAN SETTINGS

Wilson (2005) in a study on hunger and food insecurity among American children living in cities found that American families who are living at or below the state poverty level are five times as likely to be food insecure than other families.

Wilson (2005) states that inadequate wages and benefits do limit the ability of these families to give their children consistently sufficient food, housing, medical care and other basic necessities (Figure 2.3)

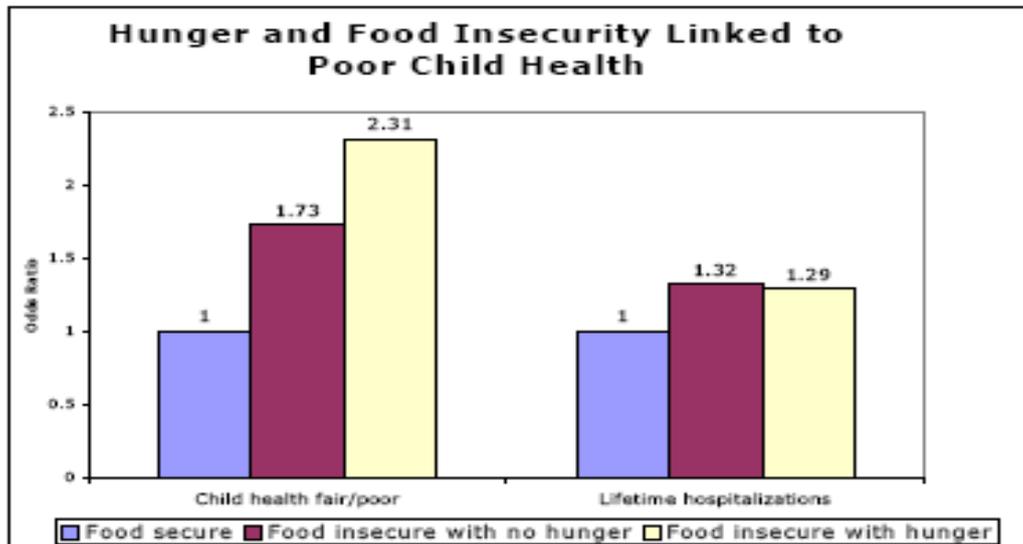


Figure 2.3: Food insecurity and hunger are harmful to the health of young children (Wilson, 2005).

According to Wilson (2005) low income families may find themselves confronted with monthly or weekly foods shortages because other household expenses reduce the amount of income available to purchase food. In sharp contrast it was found that food secure households spend 34% more on food than food insecure households of the same composition. In Sekhukhune district (Limpopo South Africa) as much as 42% expenditure on food constituted the largest share of household expenditure as stated in the Food Security Directive SA (2006).

Although much is being done by large organisations such as the United Nations as to help improve the quality of life of children in the developing world urban poverty in combination with the disintegration of traditional family settings are still leaving a spoor of disaster throughout the developing world including South Africa.

According to Statistics SA (2005) as many as 34, 4% of all South Africans are living below the international poverty line of R174/month resulting in the following:

(i) Health problems among children

- Malnutrition, underweight, thinness, micro nutrient deficiency and hunger. Wilson (2005) and UNICEF (2006) states that because of their rapid growth

as well as their immature immune system young children are extraordinarily vulnerable to short and long term nutritional deprivation. Doctors know that poor nutrition not only stunts growth and learning but also weakens the body's ability to fight infections increasing the risk of poor health and hospitalisations (Richter, 2004 and Thompson & Nelson 2001). In the Sekhukhune district (Limpopo South Africa) as many as 40% of all children living there are stunted in growth due to poor nutrition (The Food Security Directive SA, 2006). As children grow those in food insecure households are at high risk for vitamin and mineral deficits, deficits in cognitive development, behavioural and emotional problems impeding success in school (Report card on Physical Activity and Health in South African Children and Youth, 2010). This aspect will be investigated in this study.

- Lack of vaccinations. Families living at or below the state poverty level often sacrifice medical necessities such as vaccinations resulting in these children being even more susceptible to serious illness and infections (Wilson 2005).
- Poor health care within the family where a balanced lifestyle and realistic views on diet and exercise are not advocated. This is a focus point in this study. Wilson (2005) states that in order to prevent hunger food insecure families often sacrifice the quality of the food they eat. Low nutrient foods with high calories and fat content are inexpensive and will prevent a child from experiencing painful pangs of hunger but these foods will not protect the child from nutrient deficiencies that can put the child at risk for being overweight (Report card on Physical Activity and Health in South African Children and Youth, 2010). In the Sekhukhune district (Limpopo South Africa) as many as 53% household members skipped meals because of a lack of food, 51% of all children living there ate less than they needed to because of a shortage of food and 36% sometimes go to bed hungry because of a lack of money to buy food (Food Security Directive SA, 2006). This in combination with no means to access sporting facilities, limited physical education at school and a general lack of interest among youth to exercise is a major concern leaving children to face health problems such as diabetes from a very young age (Report card on Physical Activity and Health in South African Children and

Youth, 2010 and Mc Millan *et al.*, 2009). Wilson (2005) states that there are other factors to consider too:

- New diseases such as HIV/AIDS. The devastating effects of this disease, particularly in the second half of the decade, are leaving more and more children orphaned and are wiping out generations across the continent (Food Security Directive SA, 2006).
- Escalating child mortality and maternal mortality rates. A lack of essential nutrients (found in a consistent nutritionally adequate diet) impairs the body's ability to heal and decreases immune function causing a child to be more susceptible to illness. With any acute illness most children lose weight and need access to more food to regain lost weight and resume normal weight gain. Because food insecure families cannot provide extra food to regain weight after an illness the child becomes more malnourished and more susceptible to the next infection. The cycle continues resulting in progressive slowing of growth and increased risk of serious illness, hospitalisation and child mortality (Report card on Physical Activity and Health in South African children and Youth, 2010; Christian, 2010 and Food Security Directive SA, 2006).
- Poor sanitation. The general lack of public services such as water, sanitation and refuse disposal in some urban areas is likely to represent an important physical barrier to good caring behaviours (Nieuwoudt, 2008).
- Illness, infection and iron deficiency. Food insecure children have more frequent stomach aches, headaches, ear infections, iron deficiency anaemia and colds (Christian, 2010 and One World Security Guide, 2009).

(ii) **Psychosocial and Behavioural problems among children**

According to The Centre on Hunger and Poverty studies of year 2002 on food insecure children indicate that food insecure and hungry households experience considerable psychological and emotional distress. Food hardship due to limited household resources is associated with greater numbers of behaviour problems in children, including:

- Higher levels of aggression, hyperactivity and anxiety as well as passivity (withdrawn);

- Difficulty getting along with other children; and
- Increased need for mental health services such as counselling and educational services;

(iii) Learning and Academic problems among children

According to One World Security Guide (2009) several studies indicate that children from food insufficient households do not perform as well on certain academic achievements tests as do children from food sufficient households. These children often show signs of:

- Impaired cognitive functioning and diminished capacity to learn.
- Lower test scores and poorer overall school achievement;
- Repeating a grade in school; and
- Increased absences, tardiness and school suspension, affecting their overall academic performance;

The effect that poverty has on the lives of children in Africa will be presented as a case study:

2.5.1 The Kenyan case: a case on poverty

According to Christian (2010) and Corsaro (2005) the main cause of poverty in Africa lies in the severe recession of the 1980's and the resulting debt crisis's that followed. Kenya is a very good example of what is happening in many parts of Africa.

In Kenya as in most developing countries a very large percentage of the population are children: here 59% of the population is under age twenty and more than 27% are younger than five years of age. With its political independence in 1963, which continued until 1980, Kenya's national economy was one of the strongest in Africa. The annual total gross national product growth averaged 9.7% with inflation and unemployment remaining relatively low. After 1980 economic growth then slowed and reached a point of nearly zero growth in the early 1990's. Inflation also increased dramatically to a rate of more than 40% resulting in severe hardships for many citizens.

This economic downturn led the International Monetary Fund, the World Bank and other global financial organizations to demand increasing debt and austerity

programs. The influence hereof was the strongest on the lives of children as nutrition, health, education and other social service programmes were cut back, resulting in mainly:

- Large increases in children living on the streets giving up their education in the process: and
- Alarming increases in child prostitution resulting in sexually transmitted diseases such as HIV/AIDS leaving many orphaned.

The consequences hereof and in combination with structural changes in families are a frightening but real prospect. *“A downward spiral is evident, as more and more children in many of the countries of sub-Saharan Africa find themselves on urban streets in a struggle: not only for the economical survival of their disintegrating family life but also for their own survival because of major socioeconomic changes in western societies”* (Corsaro, 2005:255).

2.6 URBANISATION AND NUTRITION TRANSITION

Below a brief look at the global situation with regard to urbanisation and nutrition transition:

2.6.1 The Global Situation

According to Engel *et al.* (1997) in the Food Consumption and Nutrition Division (FCND) paper number 28 most urban/rural comparisons of nutrition measured by caloric consumption, prevalence of child malnutrition or infant mortality suggest that on average rural conditions are somewhat worse than urban conditions. For countries with accessible data it is found that the low height for age and low weight for age are less common in urban areas although the prevalence of low weight for height is often higher in cities. This will be commented on in this study. Black (2008), Labadarios (2008) and Victora *et al.* (2008) compared urban and rural nutritional status in 14 selected countries. Africa, Latin America and Asia in seven of the fourteen studies reviewed showed the prevalence of malnutrition to be greater in urban areas than in rural areas. This is investigated in this study.

Popkin (2000) states that urbanisation in the developing world has brought a remarkably rapid shift toward a high incidence of obesity and non communicable

diseases such as diabetes and coronary problems at a time when large segments of the population still face under nutrition and poverty related diseases. The term “nutrition transition” is used to describe shifts in diet, physical activity health and nutrition. Nutrition transition can often be traced to higher incomes, the influence of mass media, food marketing and changes in the nature of work and leisure. These aspects will be commented on in this study.

2.6.2 Situation in Eastern and Southern Africa

A data survey from countries in Southern and Eastern Africa was consistent with the global picture. The prevalence of low height for age and low weight for age are higher in rural areas than urban areas in all countries. Low weight for height was equally or more prevalent in the urban areas consistent with the global trend Food Security Directive SA (2006) and found in Engel *et al.* (1997). Transition in nutrition is also evident in Eastern and Southern Africa with shifts in diet, physical activity levels, health and nutrition. These aspects will be commented on in this study.

2.7 HEALTH AND NUTRITION INTERVENTIONS

According to the Food Security Directive (2006) and Wilson (2005) in preventing child hunger, strengthening of state and or privately sponsored nutrition and health programs which support key points in a family’s budget are required. To keep young children healthy programs must be maintained and strengthened. Programs should include those that affect nutrition directly (with resources specifically related to food) and indirectly with resources for housing, energy, and other essential expenses that often deplete the food budget (Report card on Physical Activity and Health in South African Children and Youth, 2010).

The harmful effects of food insecurity and hunger can be prevented or mitigated with stronger policies that improve access to public programs for low wage and impoverished families. In countries that has the capacity to prevent child hunger and its associated health consequences, policy makers have the power and the duty to make informed evidence based policy decisions that protect the health and productivity of the nation’s next generation. Report card on Physical Activity and Health in South African Children and Youth (2010) and Popkin (2000) states that a major first step toward a healthier population is awareness of the problems related to

nutrition transition and secondly to achieve sustainable food and nutrition security through awareness campaigns and policies (Food Security Directive, 2006). Developing countries should continue to develop programs and policies towards agricultural production, nutrition, food marketing and education (Report card on Physical Activity and Health in South African Children and Youth, 2010 and Popkin, 2000). In light of this statement the need to develop training programs for care givers of food insecure underweight children.

2.8 CONCLUSION

This chapter investigated the possibility that young children might be experiencing a crisis as urbanisation is increasing rapidly in all parts of the developing world and more rapidly than in industrialised countries including the sub-Saharan region of Africa. The positive and or negative effect of the urban environment on care giving and child nutritional status is often hypothesised in literature. In Engel *et al.* (1997) the city is often perceived by rural people as an escape from grinding poverty in the rural areas. Some of the misconceptions on city life as found in Engel *et al.* (1997) are mentioned in this chapter of the study. These include perceptions of access to health, sanitation and educational services often held by rural immigrants. Urban dwellers also perceive that the knowledge and education of care givers would be higher and that women's employment opportunities and therefore their autonomy and status within the family might be higher. Better quality of food purchased in the cities is also a common point of view. In reality the urban environment unfortunately and often result in socio-economic changes often leading to structural changes in families such as an increase in female headed households and decline in the authority of parent over child. This was visualised in a case study.

In reality within urban settings time constraints of the mother are greater and traditional supportive practises such as exclusive breast feeding and a 45 day postpartum rest period are often sacrificed in city life. In addition urban dwellers in developing countries confront some of the same health hazards as those who live in industrialized nations: contaminated air, soil, water, poor diets caused by poor eating and exercise habits, both of which combine to increase incidence of non-transmissible diseases including lung cancer and heart disease. Many of these families also fall into a poverty trap placing a huge demand on the overall well being of families as food becomes a bargaining tool for

survival (Food Security Directive SA, 2006). The result is an urban food security problem in the form of malnutrition and underweight resulting (Security Directive SA, 2006).

Other knock on effects investigated in this chapter are the various health, psychosocial, behavioural, learning and academic problems affecting children living in rapidly expanding cities. Furthermore if the “double burden of disease”: the obesity versus thinness scenario” as referred to in this chapter of the study, rings true it is clear that nutrition interventions are a priority in South Africa as it should be in all developing countries. The time to act is now as stated in UNICEF (2006:12) *“Evidence that good nutrition advances not only human but economic development is so strong that policymakers are negligent if they do not promote it by all means within their power. Better nutrition can change a nation’s fortunes, but this can happen only if child under-nutrition is recognised as a problem and a priority and if it is addressed in a comprehensive national policy”* (Harris, 1992:212). Education on sound and sensible nutritional practises should also form part of such development programs (Report card on Physical Activity and Health in South African Children and Youth, 2010 and Potter and Salau, 1992). The researcher hope that the development of a training program to care givers of underweight children in South African schools will contribute to these said development programs.

CHAPTER 3

DEVELOPMENTAL TASKS IN YOUNG CHILDREN

3.1 INTRODUCTION

The focus of this chapter will be on the developmental tasks or milestones of the young child when growing up and the effect that food insecurity/underweight might have on these developmental tasks. An applicable definition of childhood as found in literature would be appropriate here: Childhood can be defined as..." *...the socially constructed period in which children live their lives as a structural form, meaning a category or a part of society, which is the same as a social class within certain age groups*" (Corsaro 2005:3). In this sense children are members or incumbents of their childhoods. For the children themselves childhood is a temporary period. For society on the other hand childhood is a permanent structural form or category that never disappears even though its members change continuously and its nature and conception vary historically (Corsaro, 2005).

As childhood is the link towards adulthood the vital role it plays in the eventual way in which societies will be managed, sometimes for the better and sometimes for the poorer, the many social problems children are faced with today can not be ignored. In the light of this study attention will be given to three social problems and its effect on the quality of children's life's and future. Two of these have been discussed in the previous chapter:

- The effect of socio-economic change and the accompanying changes in family structure: A case study of Nicholas; and
- The devastating effect of poverty: The Kenyan case.

Another contributing factor that runs centrally with these themes is the effect that childhood poverty in industrialised cities (urban food poverty) has on children and their development. From this then the pressing need to develop training programs for care givers as to assist them in the education of children in city schools.

3.2.1 CHILDHOOD POVERTY IN INDUSTRIALISED CITIES (URBAN FOOD POVERTY)

In Ruel *et al.* (1998) no developing country can afford to ignore the phenomenon of urbanisation. Urbanisation will become one of the strongest social forces in coming years especially in developing countries. Within the next 20 years more poor and undernourished people in developing countries will live in the cities than in the rural areas. This means that food insecurity and malnutrition are concerns for regions like Africa and Asia where current levels of urbanisation are still relatively low but growing rapidly. Changes in the size of cities here mainly differ from differences in birth and death rates and net migration from rural areas (Nieuwoudt, 2008). Migration is most important in the early stages of structural transformation such as in Africa.

According to Corsaro (2005) children are not shot on the streets for being poor as is often the case with street children in Brazil, nor are they allowed to be sold into indentured servitude but many are allowed to live in a desperately poor state as their plight is often an invisible one. The majority of children in Western industrialised societies actually live in relative comfort with high aspirations and bright futures (middle to high income groups) which will be the population and sample group under investigation in this study.

However many poor children also do live in the modern industrialised world. A significant number of these children live in impoverished and dangerous environments. Furthermore children's poverty varies across wealthy nations. In fact the richest nation in the world the United States has one of the highest poverty rates. Even worse despite a growing awareness of the problem, the proportion of children living in poverty is on the rise in the United States and in several other Western countries and might even be much higher than it was 25 years ago (Corsaro 2005).

3.2.1 How to deal with poverty and hunger: a South African case study

Some important questions with regard to children's' survivals in the city now arise:

- **Food sources and costs:** Where do the poor get their food and at what cost? In a study investigating security, health and care giving in cities Christian (2010); Food Security Directive SA (2006) and Ruel *et al.* (1998) found that fragmented food

systems lead to inefficient marketing which increase the unit cost of food. The demand pattern of the poor who can only afford to buy small amounts of food at a time, leads to a large number of sellers who sell small amounts of food at a time. This leads to a large number of sellers who sell small quantities of food which subsequently may lead to higher prices per unit than bulk purchases. With economic development supermarkets replace traditional street sellers and central markets. This leads to increased consumption of processed products and generally higher prices. Urban living also increases the amount of food prepared and eaten away from home (Food Security Directive SA, 2006) contributing to the problem under investigation.

- **Incomes:** What are the constraints to earning an adequate income in urban areas?

In The Food Security Directive SA, (2006) and Ruel *et al.* (1998) the urban poor often have low paying, unstable jobs leading to highly variable wages. Women often fare even worse than men in the labour market because they often have less access to better paying jobs in the formal sector and frequently have jobs as unpaid family workers or in the informal sector (Nieuwoudt, 2008). This might have an influence on the type of food these families spend their limited incomes on. This aspect is under investigation in this study.

- **Urban agriculture:** can it improve food security, nutrition and health?

From report card on Physical Activity and Health in South African Children and Youth (2010); Nieuwoudt (2008) and Ruel *et al.* (1998) it seems clear that in some cities urban agriculture is an important coping strategy for households and can potentially make a significant contribution to improving food insecurity and movement passivity. The researcher will attempt to investigate this aspect briefly as it has contributing value to the problem under investigation.

- **Urban diets:** Are they adequate, nutritious, safe and culturally acceptable.

From The Food Security Directive SA (2006) and Ruel *et al.* (1998) it seems that urban diets in general are not nutritionally adequate as street foods are a major feature of urban eating (Report card on Physical Activity and Health in South African Children

and Youth, 2010). These foods are often found to be especially susceptible to microbial contamination creating the risk of epidemics of serious illness.

- **Rural/Urban, inter-urban differentials in childhood mortality, morbidity and malnutrition:** Are urban populations really better off?

From Christian (2010) and Ruel *et al.* (1998) it became clear that there is considerable heterogeneity in poverty, morbidity, mortality and nutritional status in urban areas such that there are often enormous differentials between the poor and the middle to high income parts of a particular city. This aspect will be investigated.

- **Health:** What are the implications of ill health in urban areas?

From Ruel *et al.* (1998) it is clear that labour to the poor is their most important asset where work capacity, performance and productivity of workers are important to earn an income. Micro nutrient deficiency can lead to a situation where workers perform poorly because of decreased working capacity. According to Christian (2010) and Ruel *et al.* (1998) positive associations between wage achievement and nutritional status as indexed by either weight, body mass index, stature or caloric and protein intake have been found. The researcher will comment on this aspect.

- **Child care giving:** What are the threats to adequate child care in urban areas?

From Thompson & Nelson (2001) and Ruel *et al.* (1998) there are a number of threats to adequate child care in urban areas:

- Decreased breast feeding;
- Maternal malnutrition;
- Poor health;
- Reduced capacity to perform care giving activities;
- Reduced response to the child's demand for attention and care;
- Reduced interaction with children and other family members;
- Single parent households with lack of alternative care givers; and
- Inadequate complimentary feeding.

From Report card on Physical Activity and Health in South African Children and Youth (2010) and Christian (2010) the following:

- Increases in childhood wasting and stunting;
 - Intrauterine growth restriction;
 - Micronutrient deficiencies (Vitamin A, iron and zinc);
 - Decreased food availability; and
 - Single parent households with lack of alternative care givers.
-
- **Safety net programmes:** Can they improve food and nutrition security in cities?

The impact of diet on learning is not always limited to low income, hungry or obviously malnourished children. More and more studies are providing compelling evidence that under nutrition even in its milder forms can have detrimental effects on the cognitive development of children (Report card on Physical Activity and Health in South African Children and Youth, 2010). It is found that even short term nutritional deficiencies influence children's behaviour, ability to concentrate and to be able to perform complex tasks (Report card on Physical Activity and Health in South African Children and Youth, 2010 and Brown, 2002).

The researcher believes that both informal and formal safety net programs could be important elements towards creating a comprehensive social strategy in addressing the needs of children living in urban areas. This aspect will be investigated. In order to understand the possible effect that the above aspects discussed might have on the developmental tasks of children when growing up it is necessary to look at a developmental perspective on human development.

3.3 A DEVELOPMENTAL PERSPECTIVE ON HUMAN DEVELOPMENT

The present study included learners in grade one (foundation phase). This is the first year of primary school. These children are in the early childhood development stage of life. The ages of the children included in this study ranged from 6 to 8 years and they mostly came from middle to high income groups.

De Jager (2009) and Bender (2002) indicate that studies on Developmental Psychology and Education are applicable in studies like this as:

- Biological growth and learning interact and this interaction results in the progressive increase in and modification of the individual's behavioural repertoire;
- This process occurs over time wherein life can be viewed as definable and sequential;
- Each stage of development is characterised by definable tasks and skills which should be learned; and
- There are critical or sensitive periods for many developmental tasks. These are points or stages during which the individual is maximally receptive to specific stimuli.

According to Bender (2002) and Thompson & Nelson (2001) these stages may be of finite duration during which certain experiences must occur if the individual is to assimilate them or there may be a period of increased efficiency for the individual to acquire experience. The so called "teachable moment" occurs when the individual is biologically ready, when society requires the achievement of a certain task and the individual is ready to achieve it. Of importance is that:

- (i) Each stage is based on the potential accumulation of experience in prior stages. A later stage of development will be handicapped if the tasks or skills appropriate to a preceding stage have not been mastered; and
- (ii) Psychological adjustment consists of adequately learning and coping with the developmental tasks that is appropriate for a given stage of life (Ottis, 2004).

In Bender (2002) the development of theories based on developmental psychology and the testing of these theories through scientific research do provide valuable information about the needs and functioning of individuals throughout their lifespan. The developmental phases or life periods of humans can be described as the periods taking place in specific stages of the individual's life when his/her physical, cognitive (intellectual), affective (emotional), social, moral and religious abilities develop (De Jager, 2009).

Abraham Maslow in developing the Hierarchy of Needs model in 1940 to 1950 researched these specific stages or periods of time and the distinctive features which are identifiable and predictable in a person's development (Huitt, 1994).

The Hierarchy of Needs theory remains valid today for understanding that a specific behaviour pattern is regarded as characteristic of a particular phase of life. Maslow's Hierarchy of Needs motivational model will be referred to in this chapter. In studying children most theories of child development refer to age bands (ages between which a child is seen as being in a particular stage) as proximate indications of when each stage is most apparent. It is important that these stages are not interpreted as fixed or absolute but should rather be seen as relative to a social context. Development is also a continuous process where each stage builds on the stage(s) before it. This is relevant from conception to death (De Jager, 2009 and Bender, 2002). In this study research was conducted using young children (learners) in the foundation phase of primary school ranging between 6 and 8 years (stage 1 in this study). A brief description as to understand middle childhood (8 to 12 years) better will also be included as to clarify certain key developmental stages (stage 2 in this study). The characteristics of the primary learner are presented in Table 3.1.

3.4 THE FOUNDATION PHASE OR PRIMARY LEARNER.

Children (learners) in this phase are normally of school going age. Children normally start school in grade one aged 6 years old and turning 7. Children normally complete the phase when turning 9.

Table 3.1: Characteristics of the Primary learner from 6 to 9 years old (Ottis, 2004).

Primary	Energetic	Observant	Group player	Distinct
6-9 years	Enjoy challenging activities like running, jumping. Tires easily. Demands	Learns to Read. Enhances vocabulary. Enjoys learning. Wants to	Relate well to children of their own age group. They have a best friend. Enjoy non	Can distinguish between right and wrong. Trustful.

	variation in activities. Very helpful, needs a lot of guidance	learn.	competitive games.	
Health Status	Susceptible to childhood ailments.	Thinking is concrete.	Enjoy pets.	Enjoy stories that are lively and interesting.
	Growth rate slows down.	Memory skills for words are better than for ideas.	Enjoy being recognised. Enjoy imaginary play.	Dependant on role models.

From Table 3.1 the following:

Primary school children aged 6 to 8 years are in a phase of development often coined as the golden years of development. They display lots of energy are observant, think concretely, can distinguish between right and wrong and are trustful. Changing children's health status in this phase of their development can have a huge impact on their overall performance; producing healthier, happier and more secure children (EQ: Self actualisation). It might have the opposite effect when their needs are not met. This will also have a knock on effect in the next phase of development middle childhood 8 to12 years (Ottis, 2004).

3.5 THE DEVELOPMENTAL TASKS OF MIDDLE CHILDHOOD (8 to12 YEARS OLD)

Although the focus group under investigation in this study is the foundation phase learner aging 6 to 8 years old the researcher would like to add the developmental tasks of middle childhood as well. Any gap in the development of the primary learner (6 to 8 years old) will have a knock on effect to the next group of learners, the 8 to12 year olds. These learners are in a very sensitive phase of development in all

categories: physical, cognitive, emotional (affective), social, morally and religiously (De Jager, 2009 and Graig 2007).

By including this age group it will aid in illustrating the interrelationship between the physical, cognitive, emotional (affective), social, moral and religious development in an educational/social context and is therefore included here. The development of the whole person (learner) is promoted (holistic perspective). The development characteristics of these learners will subsequently be discussed.

3.5.1 Physical Development:

From Graig (2007) Middle Childhood is referred to in literature as the period 8 to 12 years old. It is also one of the healthiest periods in life in general terms, as children have fewer illnesses because previous exposure has led to greater immunity in this period. The first year of middle childhood is characterised by a period of steady growth. Girls often have a growth spurt starting between nine and ten years old, and it usually starts at 11 years. As a result, at 11 years of age, girls are generally taller and heavier than boys. The average annual increase in height and weight during this period is 6cm and 2kg respectively. The average height of six year olds is approximately 1.2m now, and most six year olds weigh approximately 20kg. At age 12 years, the average child is approximately 1.5m tall with a weight of 40kg. During middle childhood bones grow longer and this can cause growing pains, especially at night. The arms and legs grow faster than the torso and the centre of gravity descends to the pelvic area. Children grow stronger and the relative strength of boys and girls is similar during this time.

Gross motor skills are well developed at this age and enable children to participate in a range of physical activities. However, children in this age group are more prone to sport injuries as the skeleton and ligaments are still immature. Most of the fine motor skills required for writing develop between the ages of six and seven. At age six or seven, children lose their 20 primary teeth and start to develop permanent teeth. Their new teeth initially look too big for their faces which give them a “buck teeth” look until their facial structure grows (Graig, 2007).

The physical needs of the primary child (6 to 8 years old) are as follows:

- Coping with the steady increase in height and weight;
- Understanding and coping with the steady growth in strength for boys and girls and especially growth spurts in girls;
- A growing awareness of the placement and actions of large body parts and the increased use of all the body parts;
- Improvement in gross motor skills;
- Performance of motor skills singly; and
- Improvement of fine motor skills.

When taking the above into consideration under nutrition might have a definite effect on the physical development of these learners as stunting in growth is a direct result of nutrition deficiency (Report card on Physical Activity and Health in South African children and Youth, 2010). This might also have devastating impact on the period of steady growth as found in middle childhood.

3.5.2 Cognitive Development:

Graig (2007) indicates that it is not a coincidence that formal schooling starts between ages five and seven in many parts of the world. The reason being that at this age cognitive, language and perceptual-motor skills have developed to such an extent that learning becomes easier and more efficient.

Jean Piaget biologist and psychologist and developer of the cognitive development theory called middle childhood the stage of concrete operational thought. Operational thinking at this age becomes less intuitive and egocentric. Children begin to realise that other people also have thoughts and emotions. Thinking becomes more logical and flexible and is no longer limited to the here and now (Graig, 2007).

Mathematical ability develops as they become able to count, add and subtract without the help of visual objects. Evaluation of cause and effect relationships becomes possible. Children can also categorise objects according to colour, size, quantity and class (Graig, 2007).

Children in middle childhood begin to theorise about people and concrete objects but they are still unable to theorise about abstract concepts and relationships. Memory develops considerably during this stage as children start to memorise material and then later apply memory techniques such as categorising material to aid recall. During this stage language skills continue to develop and mature. Children in this age group also master complex grammatical structure such as the passive voice (Graig, 2007).

The Primary child's cognitive needs therefore include:

- Being challenged at concrete level;
- Evaluation of cause and effect relationships; and
- Developing language and grammatical structures.

Under nutrition might have an effect on the cognitive development of these learners (primary and middle childhood). Rosales *et al.* (2009) and Brown (2003) states that scientific evidence in this regard demonstrates a direct deleterious link between inadequate food and a variety of poor developmental outcomes.

3.5.3 Emotional and Social Development:

Craig (2007) indicates that during middle childhood children move into a broader social world of peers, teachers, other adults and the community. They also become more aware of what is socially acceptable and is more influenced by peer pressure.

Their home environment remains the place where their physical needs are met. Here children get to know themselves and learn how to behave towards others. These skills are important for their social and emotional adjustment outside of home (Graig, 2007).

As children spend more and more time at school in this time they are encouraged to become more independent. Social skills are enhanced and self confidence develops as interaction with peers becomes increasingly more important. This interaction strengthens gender roles, attitudes and values. It also becomes more important for children in this period to feel that they are accepted by their peers and that they

belong to a group. Academic performance and athletic ability greatly influences a child's status amongst peers. Acceptance and popularity have a huge impact on a child's self esteem. Unfortunately children can easily feel lonely and rejected and become more vulnerable to bullying by peers when not accepted (Graig, 2007).

Their play becomes more complex and structured. Games have rules which have to be followed closely. Games also become more competitive and teamwork becomes important. Graig (2007) also points out that according to the psychologist Eric Erikson's theory on emotional development children in this age group are faced with a psychological crisis called industry versus inferiority.

This means that children develop a sense of industry and curiosity and are eager to learn. Successful mastery leads to feelings of efficiency. Parents and teachers should therefore provide opportunities to practise these skills. If children however feel that they don't accomplish something they feel inferior.

The emotional needs of the primary learner include:

- Identity formation (who am I?);
- Positive self-concept;
- More independence; and
- A sense of belonging (Ottis, 2004).

The social needs of the primary learner include:

- Experimenting with peer cultures;
- The development of social relationships (Ottis, 2004).

Under nutrition might have a definite effect on the emotional and social development of these learners as they are susceptible to peer pressure and influence (Huybrechts *et al.*, 2009 and Lopez *et al.*, 1999).

3.5.4 Religious and Moral Development:

The religious and moral needs of the primary learner include:

- The ability to distinguish morally; and

- The ability to develop praise and worship skills.

According to Bender (2002) moral development is the degree to which a person internalises and acts in accordance with values (e.g. honesty and respect) which will make up his/her moral code of conduct (customs, manners and behavioural patterns that will meet the standards of society). Ethics on the other hand is the science of morals. As the primary learner need to maintain themselves more in the face of more and stricter rules, regulations and obligations than in their pre-primary years they will be confronted more often by conflicting values especially from the peer group (Ottis, 2004 and Bender, 2002).

In Ottis (2004) and Bender (2002) the primary learner's strongest desire is to be able to distinguish morally between what is right and what is wrong. It is also something they become more capable of doing. During this time religion comprises a personal encounter with truth therefore they pay a high value to trust. Spiritually mature adult role models are critical in this phase as children in this time frame are very dependent on adults that can lead them by example. One way of doing this is through interesting story telling. This will eventually play an important role in there own spiritual awareness and the acceptance of the deliverance principle.

Another strong characteristic in these learners are their ability to learn prayer and to live their religion fully. They are susceptible to lessons on spiritual growth and shows understanding towards religious truths and learning principles. They usually have many questions about the religion they are exposed to. They are very interested in people and therefore spiritual mature adults that can lead by example are critical during this stage. Negative attitudes displayed by the adults in their lives towards religion in this time can have a life long effect on their perception of religion in general (Bender, 2002 and Ottis, 2004).

Making nutritiously wise choices in often difficult circumstance will have a definite effect on the moral development of these learners. This aspect will be commented on.

3.6 THE EFFECT OF FOOD INSECURITY (UNDERWEIGHT) ON THE DEVELOPMENTAL TASKS OF YOUNG CHILDREN

In order to understand the effect that under nutrition (underweight) might have on the developmental tasks of young children Abraham Maslow's hierarchy of needs will be used as a point of reference.

According to Huitt (2004) prior to Maslow, researchers generally focused separately on such factors as biology, achievement or power to explain what energizes, directs and sustains human behaviour.

Maslow's original Hierarchy of needs model was developed between 1943 and 1954 and comprised of only 5 needs. In 1954 Abraham Maslow attempted to synthesize a large body of research related to human motivation and presented it in the form of a hierarchy of needs. Maslow's basic position is that as one becomes more self-actualised and self-transcendent one develops wisdom and automatically knows what to do in a wide variety of situations.

Today this statement is still considered to be one of the most important contributions to the studies of human behaviour and motivation ever (Huitt, 2004). For the purpose of the discussion that will follow the researcher will apply the 1971 model which comprised of 8 needs.

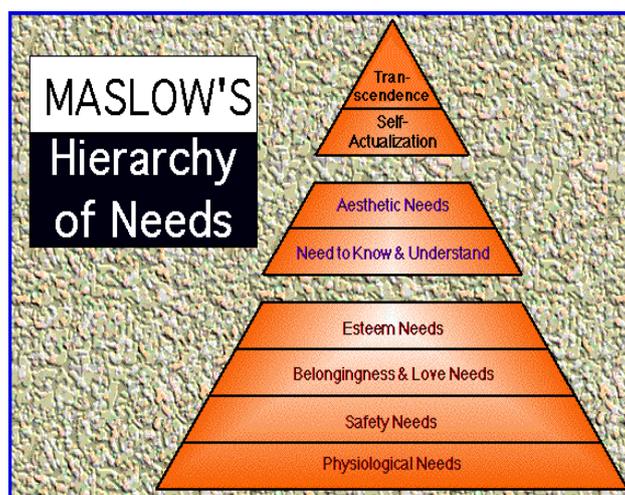


Figure 3.1: Abraham Maslow's hierarchy of needs (Huitt, 2004)

From Figure 3.1 a brief description of the needs hierarchy according to Huitt (2004). Maslow posited a hierarchy of human needs based on two groupings: deficiency needs and growth needs. Within the deficiency needs each lower need must be met before moving to the next higher level.

Once each of these needs has been satisfied or if some deficiency is detected the individual will act to remove the deficiency. The first four levels within the deficiency range are:

- 1) Physiological needs: included here is the very basic need for air, warmth, food, sleep, stimulation and activity. People can die as result of a lack of biological needs and equilibrium;
- 2) Safety/security needs: am I out of danger? This level is more likely to be found in children as they have a greater need to feel safe;
- 3) Belongingness and love needs: to affiliate with others or to be accepted; and
- 4) Esteem needs: to achieve, being competent, to gain approval and recognition (Huitt, 2004).

According to Maslow an individual is ready to act upon the growth needs if and only if the deficiency needs are met. Maslow's initial conceptualisation included only one growth need – self actualisation. Self-actualised people are characterised by:

- Being problem focused;
- Incorporating an ongoing freshness of appreciation of life;
- A concern about personal growth; and
- The ability to have peak experiences (Huitt, 2004).

In 1971 Maslow differentiated the growth need of self actualisation by specifically naming two lower level growth needs prior to the general level of self actualisation and one beyond that level. They are:

- 1) Cognitive needs: to know, to understand and to explore.
- 2) Aesthetic needs: to have symmetry, order and beauty.
- 3) Self actualisation: to find self fulfilment and realize one's potential and

- 4) Self transcendence: to connect to something beyond the ego or to help others find self fulfilment and to realize potential (Huitt, 2004).

The hierarchic theory is often represented as a pyramid with the larger lower levels representing the lower needs and the upper point representing the need for self-actualisation. Maslow felt that human beings have to meet certain basic needs of survival first before people can even think about needs on the higher level. Not until people are satisfied in their most basic needs can they strive towards fulfilling the higher order needs that provide the most intense kinds of spiritual and psychic gratification (Papalia & Olds, 1985). What then are the implications hereof when studying food insecure, underweight children/learners?

3.7 THE FOOD INSECURE CHILD

A brief discussion on the influence of food insecurity on hierarchy needs 1 to 4 will follow.

3.7.1 Hierarchy needs 1 to 4

As physiological needs always come first in a person's search for satisfaction the food insecure child (learner) who is always on the search for satisfaction on the basic level – oxygen, food, water and a relatively constant body temperature - would then not move well in the direction of self-actualisation because of these physiological hindrances. Thus a person gasping for air or suffering from starvation has one overriding motivation: basic survival. Only when survival is assured can he turn his attention to concerns of safety, freedom, fear and pain. With feelings of relative safety he then seeks intimacy in his relationships with family and friends (Huitt, 2004).

In summary the food insecure child (learner) will mostly be problem focussed in the sense that they do not know where their next meal will come from or having to cut back on what they have to eat (physiological needs not met) leaving them with feelings of threat and insecurity (the need to feel safe, belong and self esteem needs not met) (De Jager, 2009).

3.8 THE FOOD INSECURE CHILD

A brief discussion on the influence of food insecurity on hierarchy need 5 will follow.

3.8.1 Hierarchy need: 5

The One World Security Guide (2009) and Lopez *et al.* (1995) the relationship between nutrition and the ability to learn is clearly established. Food insecurity can also restrict brain development resulting in impaired learning and cognitive functioning. Inadequate diet, nutritional deficiencies and hunger have also been shown to decrease attentiveness, motivation and other behaviours critical to school performance as viewed in Rosales *et al.* (2009). This further hinders progress in the needs hierarchy (cognitive needs not met).

3.9 THE DEVELOPMENT OF SELF CONCEPT AND BODILY AWARENESS IN THE FOOD INSECURE CHILD

A brief discussion on the influence of food insecurity on hierarchy needs 6, 7 and 8 will follow.

3.9.1 Hierarchy needs 6,7and 8

According to Huitt (2004) there are a variety of ways to think about the self. Two of the most widely used terms are *self concept* and *self esteem*. Self concept is the cognitive or thinking aspect of self and is related to a person's self image and generally refers to the "... *totality of a complex, organised and dynamic system of learned beliefs, attitudes and opinions that each person holds to be true about his or her personal existence*" (Huitt, 2004:6). Self esteem on the other hand is the affective or emotional aspect of the self and generally refers to how we feel about or how we value ourselves one's self worth.

Franken (1994) suggests that self concept is related to self esteem in that people who do have a good self esteem have a clearly differentiated self concept thus when people know themselves they can maximize outcomes because they know what they can and cannot do. The self concept is not innate but is developed or constructed by the individual through interaction with the environment and by reflecting on that interaction. This dynamic aspect of the self concept and by corollary, self esteem is important because it indicates that it can be modified or changed. Self change

depends very much on the process of self reflection. Within the process of self reflection lies an important aspect of children's development with regard to the self, self concept and bodily awareness.

According to Franken (1994) body image can be directly related to how children feel about themselves. Of note is that internal feelings already exist at birth and are further shaped mainly according to how children are treated. There are several different components of self concept: physical (appearance and ability), academic (numbers and language), social (peer and adult relations) and transpersonal (unknown). The physical aspect of self concept relates to that which is concrete e.g. what do I look like, my height, my weight etc. Problems with body image can often be noted in small children by observing their drawings of themselves. A child with a poor body image will draw himself without body parts, smaller and usually with an unhappy facial expression than he draws other children. This is often the case in food insecure children as reflected in the sketch below (Figure 3.2)

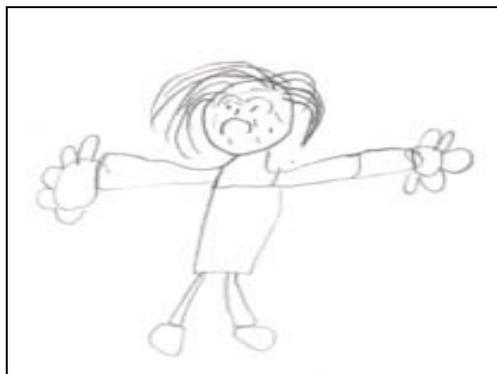


Figure 3.2: Draw-a-person: Byron (7 years old, Body Mass Index 13)

Closely linked to the physical self concept is the academic self concept which relates to how well a child will learn and perform in school (Bender, 2002). In many cases food insecure children under achieves academically (Appendix A).

The social self concept describes how we relate to other people, this concept develops from the view that people have of themselves (Huitt, 2004). Food insecure children usually lack social skills, alienating them from peer groups (Appendix A).

The transpersonal self concept describes how people relate to unknowns (Huitt, 2004). Food insecure children usually display very low confidence levels making it unlikely that they will display skills in which to explore the unknown, a critical life skill growing up in the world today. See academic report (Appendix A).

A learner who has an accurate self concept will be able to take appropriate risks, identify areas where assistance is needed, make realistic predictions about the chances of success or failure and be able to utilise problem solving strategies to resolve difficulties (Bender, 2002).

All people need to find out what their real self is as to become that person and to accept and value themselves for the people they are. The *self* is that element that is the core of personality. Personality is a person's unique totality structure, the way he or she appears to others. The core of the personality is the self concept. *Self knowledge* and *self regard* come about our early experiences in which we gain mastery over the environment. This happens through the high regard of others shown by their expressions of affection, admiration and acceptance and the way people view themselves. Bender (2002) states that children's self concept is characterised by the following essentials:

- Stability. Of importance here is that closely held beliefs about oneself are difficult to change;
- Value. Every belief in the system of beliefs about the self has a **positive** or negative value;
- Generation. The system of beliefs about the self generates success and failures. If an individual fails in an important highly valued ability, this lowers his/her self assessment of other less relevant abilities. Success therefore raises the individual's self evaluation of less relevant skills;
- Uniqueness. No two persons form identical systems of beliefs about the self. It is this uniqueness and diversity which often hampers communication between people as no two people perceive themselves or the world in the same way and they find it difficult to agree about their experiences;
- Dynamics. Every individual constantly endeavours to maintain, protect and enhance the self- this is the motivation underlying the individual's behaviour.

It is personal, inner motivation. For the care giver and the child concerned this attempt to enhance the self concept is the given basic, and dynamic incentive to self actualisation; and

- Point of departure. The self is the basic frame of reference and the central core of the individual. The self is the product of the individual's experiences (especially social experiences) but it also generates new experiences for the individual.

According to Maslow people and things are meaningful, meaningless, important, unimportant, attractive, unattractive, valuable or worthless in terms of their relation to the self. People give meaning to the world in terms of how they perceive themselves (Huitt, 2004).

The congruent person will function at the highest level open to experiences and not defensive. Such a person views people and things accurately, gets along well with others and has a high level of self-esteem. This healthy personality will do well in growing towards self-actualisation (Huitt, 2004).

An important question might be to determine what kind of person does achieve the highest level of self-actualisation? According to Papalia & Olds (1985) Maslow identified sixteen characteristics that distinguished self-actualisers from the average person.

These characteristics are:

- (i) A realistic view point toward life;
- (ii) Acceptance of themselves, other people and the world around them;
- (iii) Spontaneity;
- (iv) A focus on solving problems rather than thinking about themselves;
- (v) A need for privacy and a certain degree of detachment;
- (vi) Independence and an ability to function on their own;
- (vii) An un-stereotyped appreciation of people, things and ideas;
- (viii) A history of peak experiences, which are profoundly spiritual experiences that may be mystical or religious in nature;
- (ix) Deeply loving with intimate relationships with a few people;

- (x) Democratic values;
- (xi) The ability to separate means from ends;
- (xii) A sense of humour that is lively and not cruel;
- (xiii) Creativity;
- (xiv) Lack of conformity;
- (xv) Ability to rise above the environment rather than merely adjusting to it; and
- (xvi) Ability to gain insight into some truth (Huitt, 2004).

The food insecure child will find it nearly impossible to become such a congruent person as they are engaged in a survival battle (self actualisation as a higher order need not met).

3.10 THE SELF AND CULTURE

In order to understand the groups of children that will be studied in this research project better and within their social context, two very opposing cultural dimensions have to be mentioned here: collective and individualistic consciousness. This will be important in the development of the training program.

3.10.1 Understanding collective and individualistic responsibility

According to Kotze (1993) *collective consciousness* has to be understood in terms of experience as people think and behave in certain ways as a result of their experience. Collective consciousness and responsibility can also be put into the following way of reasoning: people who differ in experience will also differ in their ways of reaction to the same situation as they might interpret the meaning of the situation differently.

Individualists give priority to personal goals in preference to the goals of collectives. By contrast, collectives either make no distinctions between personal and collective goals or if they do make such distinctions they subordinate their personal goals to collective goals (Kotze, 1993).

Bender (2002) in a study on life skills programs for learners in the senior phase **states** that culture is to society what memory is to a person. As culture specifies designs for living that have been proven to be effective in the past. Differences in

social behaviour will follow the process of processing and assessment of information from the environment. This basic set of world views or perceptions of black people may be called *collective consciousness* (to be able to survive as a group) as opposed to whites *individualistic consciousness* (survival as a single entity).

Kotze (1993) in a study on collective consciousness claims that children in townships or rural areas generally grow up under circumstances of profound material deprivation and acute insecurity. This is because parents here are generally unable to provide adequately for the needs of their children. These children are forced to survive physically, emotionally and socially largely independent of their parents. Kotze (1993) further indicates that these children learn from strong bonds through which they may find food, a place to sleep and often clothes as well. These children learn very early in life that no single individual is able to provide for one's needs. Survival as an individual or even as a single nuclear family is often impossible and that a collection of individuals (a group) has to be organised into enduring ties in which collectively provide the best chances of survival. In a world without material security their physical and emotional survival can be ensured only in a co-operative action. The outcome hereof is children that develop social maturity as early as 5 to 6 years of age.

The implication for the study at hand is that people in whom collective consciousness is a powerful drive may suffer greatly in a social system dominated by individualistic consciousness as social strategies in childhood breed corresponding social practises in adult life. Care givers need to know this and will subsequently be trained.

3.11 CONCLUSION

In this chapter the developmental tasks of young children as they grow up were investigated and the influence that underweight might have on the primary learner's development in using Maslow's hierarchy of needs were commented on.

Primary school children aged 6 to 8 years are in a phase of development often coined as the golden years of development. They display lots of energy are observant, think concretely, can distinguish between right and wrong and are trustful. A change in children's health status in this phase of their development can have a

huge impact on their overall performance: producing healthier, happier and more secure children (EQ: Self actualisation). It might have the opposite effect when their needs are not met. This status will also have a knock on effect into the next phase of development, middle childhood 8 to 12 years.

The importance of establishing a secure self esteem and bodily awareness in young children were emphasised in this chapter. Particular attention will be given to enhancing esteem needs within food insecure children/learners when training care givers on the needs of these children. In doing so schools and communities will take care in avoiding the devastating effects that poor self esteem and body dissatisfaction can possibly have on children in the developing years. The training program can possibly help all children to feel good about themselves and their bodies. Important questions with regard to children's survival in the city were raised. Questions on aspects such as food sources and costs, incomes, urban agriculture, urban diets, health, child care giving and safety net programs were raised. The study will present newly assembled data that will suggest that the number of food insecure people in urban areas in South Africa is increasing and is accounting for an increasing share of under nutrition and underweight amongst children in urban schools. The need to develop a training program for care givers stem from the above.

The development and implementation of such a program will fall into the overall context of educational support in the process enhancing the principle of service enhancement in the fields of social work and school health: a cross sectional approach supported in many fields of study. In developing the training program the following role players could benefit:

- At the micro level, empowering care givers by providing them with the information, resources and services they need to improve the health of the children in their care;
- At the meso level, strengthening district and community health and nutrition systems; and
- At the macro level, integrating child health and nutrition needs into policies, plans and budgets.

Contextual sensitivity towards the diverse cultures of the South African school population has to be taken into account and great care has to be taken when dealing with collectively conscious children. In doing so schools and communities will be uplifted in being proactive, making wiser choices, coping with peer pressure and helping children in avoiding the devastating effects that poor self esteem and body dissatisfaction might have on their total development. Better nutrition can happen when every level of society individuals, health professionals, communities, governments and the private sector work in partnership. In designing the training program the researcher hopes to make a contribution to the general health status of South African school children.

CHAPTER 4

CARE GIVING IN URBAN SETTINGS: ASPECTS TO CONSIDER

4.1 INTRODUCTION

The discussion that will follow will draw on a conceptual framework which analyses the determinants of child nutrition status in young children in developing countries. The framework was developed by UNICEF during the 1980's. An adaptation of this model (UNICEF, 1990) is presented in Figure 4.1 below.

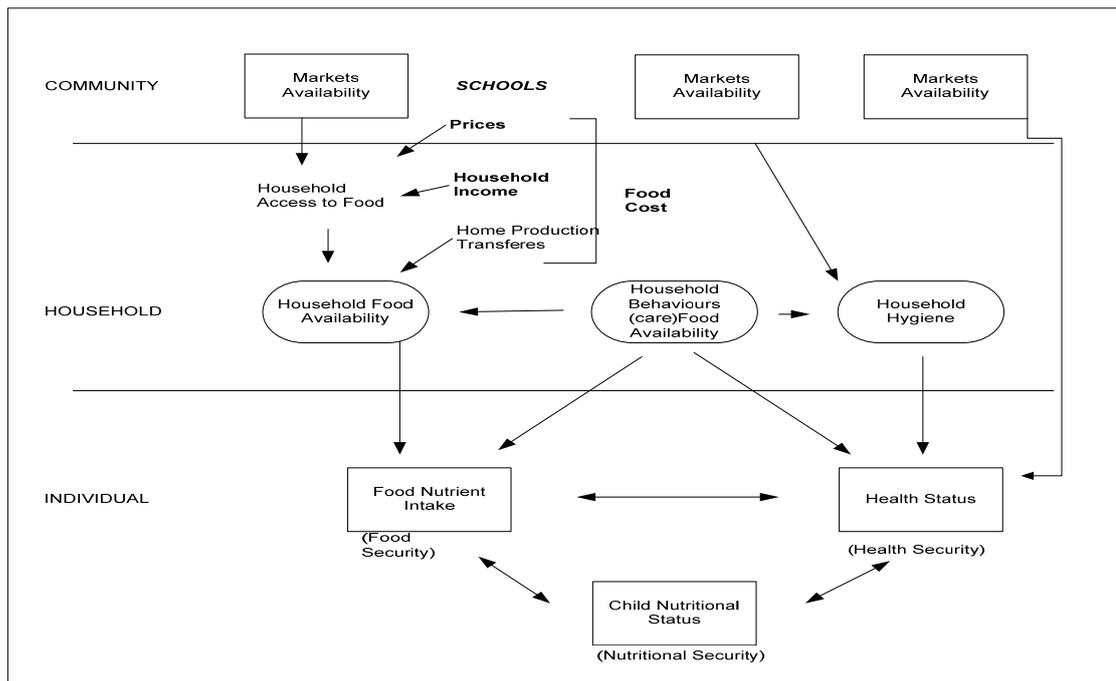


Figure 4.1: Conceptual framework of the determinants of child nutritional status (Ruel *et al.*, 1998)

This framework as presented in Ruel *et al.* (1998) has two important features. It firstly identifies three essential clusters of determinants of child nutritional status namely:

- Food security;
- Adequate care; and
- Health.

Secondly it distinguishes between individual, household and *community factors* that affect child nutritional status. All these factors are necessary conditions for achieving nutrition security and can not be seen in isolation. A brief discussion of these determinants of child nutritional status will follow.

4.2 ESSENTIAL CLUSTERS AFFECTING CHILD NUTRITIONAL STATUS

These clusters include food security, adequate care, health, individual, household, community factors. These factors are of importance to this study as it affects children's nutritional status.

4.2.1 Food security

The first condition for nutrition security is *food security*. According to One World Security Guide (2009); Report card on Physical Activity and Health in South African Children and Youth (2010) and Christian (2010) the availability of food, access to food and risks related to either availability or access are the essential determinants of food security. It is important to know that national food security implies that within a country the amount of food available, if evenly distributed, should be enough to meet people's food needs.

It is also important to know that at the household level a household is considered to be food secure when it has access to the food needed for a healthy life for all its members (Thompson & Nelson, 2001). Adequate meaning in terms of quality, quantity, safety, culturally acceptable and when it is not at undue risk of losing such access (Ruel *et al.*, 1998). The relevance of food security in households and on national level will be commented on in the care giver training program.

4.2.2 Adequate care

The second condition for nutrition security is *adequate care*. Care encompasses a number of critical factors in the development of nutritional well-being among individuals – especially the most vulnerable groups in society- including young children, pregnant and lactating women (Ruel *et al.*, 1998; Richter, 2004 and the Food Security Directive SA, 2006). In this study the researcher will attempt to underline the importance of enhancing secondary child care giver's (educators in schools)' knowledge, attitude, behaviour and skill as more and more children are in

need of nutritional care in schools. Many households within the population of this study might not be able to provide adequate food security to all its members. In this study adequate will refer to quality, quantity, safety and culturally acceptable. Food security should also not be at undue risk of losing such access as stated by Ruel *et al.* (1998). This is an aspect is under investigation.

4.2.3 Health

The third condition for nutrition security is *health* which is largely a consequence of adequate prevention and control of diseases. Young children are more susceptible to infectious diseases, malnutrition and poor growth and are likely to suffer long term negative consequences of these insults on their physical, cognitive and reproductive performance in adulthood (One World Security Directive SA, 2006; Huybrechts *et al.*, 2009 and Brown, 2002). Health and nutrition status of young children will be emphasised throughout this study.

4.2.4 Individual, household and community factors affecting children's nutritional status

The above factors are the main components of the study and will be investigated in the care giver training program and briefly introduced here:

4.2.5 Individual factors affecting children's nutritional status

The above factors include food nutrient intake (food security), health status (health security) and child nutritional status (nutrition security) as presented in Figure 4.1 and investigated in the training program.

4.2.6 Household factors affecting children's nutritional status

The above factors include household food availability, household behaviours (care) and household hygiene as presented in Figure 4.1 and investigated in the training program.

4.2.7 Community factors affecting children's nutritional status

The above factors include the availability of markets, services available in the environment and health services available to the community as presented in Figure 4.1 and investigated in the training program.

The researcher added a component to the community factor as a service to the environment in the presented framework (Figure 4.1) namely the role that school's can play in educating care givers on the phenomenon of changing face of nutrition in young children in urban settings. As presented in chapter 2 of this study, many factors lead to the family being challenged and often functioning fragmentally in the cities. Due to this reality many mothers are pressurised to hand over their primary care giving responsibility to a secondary care giver/s, this often being educators in school settings. The need to design a training program for care givers in traditional school settings in South Africa is evident (Freedman & Alvarez, 2010). The changing role that educators have to play towards delivering adequate care and the accompanying responsibility thereof in school settings within the South African context will be the main issue (issue 3 below) discussed here.

Based on the conceptual model (Figure 4.1) four issues of particular importance to the study will follow.

Issue1: Urban diets. The question being whether urban diets are adequate: meaning nutritious, safe and culturally acceptable.

Issue 2: Health. An assessment of the determinants of ill health in urban areas will be presented.

Issue 3: Child care. An analysis of the threats to adequate child care giving in urban areas is the aim here.

Issue 4: Food and nutrition programs. Can these programs improve food and nutrition security in the urban world?

4.3 URBAN DIETS, ARE THEY ADEQUATE?

From Byrd-Bredbenner *et al.* (2009) and Report card on Physical Activity and Health in South African Children and Youth (2010) it seems that urban diets in general are not nutritionally adequate. It is found by these authors that food obtained from street vendors might be a major feature in urban eating patterns (Report card on Physical

Activity and Health in South African Children and Youth, 2010). These foods are often found to be especially susceptible to microbial contamination creating the risk of epidemics or serious illness. This aspect will be investigated.

From various data and studies there is ample evidence that urban diets are quantitatively and qualitatively different from rural diets in all regions of the developing world (Ruel *et al.*, 1998). It is found that rural dwellers tend to eat more cereals especially coarse grains while urban dwellers tend to eat more varied diets with higher levels of animal protein and fats. In Food Directive SA (2006) and Byrd-Bredbenner *et al.* (2009) this difference in composition of urban diets relative to rural diets, do have important implications for the nutrient adequacy of urban dwellers. The implications being as viewed in Christian (2010) and The Food Directive SA (2006):

- Overall *energy intakes were lower* for urban residents than their rural counterparts;
- *Iron and calcium intakes are lower* for urban diets;
- Working women have less time for food preparation and therefore there is a *tendency toward higher-priced, convenience sources of calories*; and
- Urban consumers are more price sensitive than rural consumers and they also *tend to switch between substitute foods* more easily e.g. in times of crises poor urban households might substitute fresh fruit juices with powdered fruit-flavoured drinks resulting in the consumption of “empty calories” (Report card on Physical Activity and Health in South African Children and Youth, 2010).

The health and nutritional consequences of this pattern – especially for young children - will be investigated in the training program.

4.4 HEALTH, WHAT ARE THE DETERMINANTS OF ILL HEALTH IN URBAN AREAS?

Ruel *et al.* (1998) and The Food Security Directive SA (2006) states that it is clear that labour to the poor is their most important asset as work capacity, performance and productivity of workers are important to earn an income. Micro nutrient

deficiency can lead to a situation where workers perform poorly because of decreased working capacity. According to Ruel *et al.* (1998) and Christian (2010) positive associations between wage achievement and nutritional status as indexed by weight, body mass index, stature, caloric and protein intake have been found.

According to Huybrechts *et al.* (2009) and Report card on Physical Activity and Health in South African Children and Youth (2010) it is likely that the health of young children will be affected more directly by characteristics of their physical environment; whereas the social environment will affect them indirectly mainly through the impact on the mental health, physical health and caring ability of their main care giver.

Tanner and Harpham (1995) have summarised urban health problems, their determinants, the risk groups most affected and the actions that should be undertaken by each sector to alleviate the problems. Table 4.1 below presents an adaptation of the urban health problems and their determinants.

Table 4.1: Urban health and hypothesised risk factors (Tanner & Harpham, 1995)

Conditions in children	Determinants
1. Diarrhoeal diseases:	Water, sanitation Hygiene behaviour Nutritional deficiencies Poor immune system
2. Parasitic infections	Water, sanitation Hygiene behaviour
3. Acute respiratory infections	Indoor and outdoor air pollution Crowding/ poor housing quality Nutritional deficiencies Poor immune status
4. Measles	Crowding Poor immune status

	Inadequate access or use of health services
5. Malaria	Housing Stagnant water (poor drainage) Climate
6. Malnutrition*	Food availability, food access Infectious diseases

Conditions in Mothers	Determinants
1. Diarrhoea	Same as for children
2. Acute/Chronic respiratory infections	Indoor air pollution (Cooking stove)
3. Malaria	Greater exposure to water sources through water collection, washing clothes etc.
4. Occupational	Chemical exposure and increased vulnerability during pregnancy
5. Malnutrition* and specific micronutrient Deficiencies	Same as for children Repeated pregnancies, lactation, short inter-birth intervals Higher requirements of iron due to menstrual losses

- *Protein energy malnutrition (PEM) and micronutrient deficiencies.
- Household behaviours related to food acquisition, feeding practises, intra household allocation of resources and food hygiene

From the above (Table 4.1) the main risk factor to urban health is nutritional deficiencies also referred to as the malnutrition-infection deprivation cycle or protein-energy malnutrition as found in Christian (2010) and van Heerden (2010).

According to Tanner and Harpham (1995); Christian (2010) and van Heerden (2010) the malnutrition-infection deprivation cycle (protein-energy malnutrition) can be

described as the inadequate intake of nutrients by people living in developing countries. This might be due to a combination of poverty and household food insecurity, inappropriate feeding practises (including breast-feeding, complementary feeding and intra-household allocation of resources) and poor appetite (Report card on Physical Activity and Health in South African Children and Youth, 2010). Other contributing factors could be malnutrition, infections and or micronutrient deficiencies (Christian, 2010). These aspects will be investigated. Tanner and Harpham (1995) states that factors affecting the utilisation of nutrients are related and could also possibly be linked to the health and nutritional status of the individual. This includes poor absorption of nutrients due to diarrhoea and or parasitic infections and or increased requirements due to poor absorption and intestinal losses or to catabolic processes associated with fever.

According to the Food Consumption and Nutrition Division of the International Food Policy Research Institute in Ruel *et al.* (1998) the inadequate intake of nutrients as determinants of urban nutritional deficiencies are those playing a key role in the malnutrition-infection deprivation cycle, including inadequate nutrient intake and poor utilization of nutrients due to ill health. The inadequate intake of nutrients by young children in developing countries – this then includes South Africa – is due to a combination of poverty and household food insecurity, inappropriate feeding practises, which include breast-feeding, complementary feeding, and intra household allocation of resources (Food Security Directive SA, 2006). Appetites which may be the result of malnutrition, infections and or micronutrient deficiencies also contribute to the cycle.

4.5 CHILD CARE GIVING

An analysis of the threats to adequate child care giving in urban communities will follow.

According to Ruel *et al.* (1998) care is the provision of time attention and support to meet the physical, mental, and social needs of the growing child.

Care then also encompasses a number of critical factors in the development of nutritional well-being amongst individuals. In this study the well being of young

children refers. The following determinants of child care in urban areas will be reviewed:

- Mothers as primary care givers; and
- Alternative caring facilities in the city.

4.5.1 Mothers as primary care givers:

Aspects under review include the:

- Physical health and nutritional status of mothers;
- Mental health of mothers in urban communities;
- Education level of mothers in urban communities;
- Employment of mothers in urban communities; and
- Family support and social networks in urban communities.

4.5.1.1 Physical health and nutritional status of mothers:

Literature indicates that when mothers present with poor health or nutritional status they might have decreased energy levels and reduced capacity to perform certain care giving activities (Richter, 2004). Studies in this regard show that maternal deficiencies in iron and certain vitamins result in less active care giving. Results from an Egyptian study indicate that anaemic women spent substantially less time caring for their children than non-anaemic women and that mothers' with low Vitamin B6 status were less responsive to their infant's vocalization and distress. These mothers were also more likely to request help from older siblings for care giving duties (Ruel *et al.*, 1998). Ruel *et al.* (1998) also stresses that severe maternal malnutrition is also known to be associated with reduced lactation performance which can potentially reduce both milk quantity and quality thus negatively affecting breast feeding, which is one of the most important caring behaviours for protecting the health and nutrition of children in the developing world (Freedman & Alvarez, 2010). Although breast feeding as an aspect of nutrition is not the main aim of the study trainees should have some knowledge in this regard.

4.5.1.2 Mental health of mothers in urban communities

Studies on stress and depression amongst women in developing countries as reflected in Ruel *et al.* (1998) and Thompson & Nelson (2004) do report high levels

of distress among women in developing countries. The phenomenon of urbanization has shown to be associated with mental disorders most probably as a result of changes in the social support and life events of people dwelling in the cities as compared to what life used to be like in the rural areas. Some women in urban settings do become extremely isolated leading to depression and an inability to care for their children properly (Ruel *et al.*, 1998). The care giver training program will present the necessary knowledge in this regard.

4.5.1.3 Education level of mothers in urban communities

Maternal education has been consistently associated with positive child health and nutritional outcomes (Ruel *et al.*, 1998). The mechanisms by which maternal education is beneficial for the child however are not always well understood as stated in Ruel *et al.* (1998).

There is evidence though that in some cases maternal education and socio-economic status interacts so that maternal education influences health through an improvement in child care practises directly. E.g. better use of health care facilities and or the development of enhanced caring skills (Wengreen & Moncur, 2009).

According to Ruel *et al.* (1998) and in Law (2009) maternal education also appears to have a greater effect on children's nutritional status at certain ages. A study on this pointed out that maternal education was significantly associated with height-for-age Z-scores in Mozambique children younger than two years old.

Income on the other hand was important only for older children. In another study conducted in the Philippines used in Ruel *et al.* (1998) showed that maternal schooling had a positive effect on children's energy intake, maternal practises related to hygiene and the use of health services for preventative purposes. These positive behaviours in turn reduced the incidence of diarrhoea among young children. The care giver training program will present the necessary knowledge in this regard.

4.5.1.4 Employment of mothers in urban communities

The characteristics of employment in urban areas may make the provision of adequate caring for children more difficult. Literature states that many women in cities are more active in the informal sector where wages are generally low and hours often uncertain and long (Ruel *et al.*, 1998 and Nieuwoudt, 2008).

The conditions of many urban occupations may be less compatible with child care in that they make it more difficult for a mother to take a child with her if the work is on the street or in an office. Overall the impact of maternal employment on child health and nutritional status appears to be linked not only to income but also to other related factors such as type of work (wage labour and self employment), place of work, length of the working day, the availability and quality or substitute child care and the child's age. Women also tend to return to work soon after children are born (Ruel *et al.*, 1998). In Law (2009) it was found that 60% of mothers with children aged up to 5 years old are in work. The care giver training program will present the necessary knowledge in this regard.

4.5.1.5 Family support and social networks in urban communities

Literature clearly emphasises the importance of family support as a primary source of support to mothers as care givers viewed in Nieuwoudt (2008) and Report card on Physical Activity and Health in South African Children and Youth (2010).

The changes in family structure related to the transition from rural to urban areas and their impact on caring behaviours as well as on the health and nutritional status of family members are well documented in (Lopez *et al.*, 1998; Brown, 2002 and Schwartz, 2005).

Fathers are a potentially important source of support to the mother as care giver both physically and emotionally and the opinions of fathers may have significant consequences to the initiation of certain caring behaviours such as breast feeding (Bray & Brandt, 2007). The availability of fathers as potential source of support will be investigated and commented on.

Of importance is that residents in urban areas develop new networks and will attempt to recreate networks based on the rural ones in an attempt to adapt to the new urban situation (Ruel *et al.*, 1998 and Nieuwoudt, 2008). With structural changes in the family unit support from the core family are fragmented and a shift towards support from other sources such as communities and social networks, especially schools are typical of daily living in cities. This aspect will be discussed.

4.6 UNDERSTANDING MALNUTRITION/UNDERWEIGHT IN CHILDREN

According to the World Health organisation the underlying causes of malnutrition/underweight vary across regions. In many Asian countries poverty, the low status of woman, poor care during pregnancy, high rates of low birth weight, high population densities, unfavourable child caring practises and poor access to health care are underlying causes. Conflicts and natural disasters in many countries have further exacerbated the situation. The increase in the number of malnourished children in Africa also reflects a rapid rate of population growth. In many countries in Africa the devastating effects of HIV/AIDS particularly in the second half of the decade have reversed some gains made in the decade's early years (Thompson & Nelson, 2001).

In Sub-Saharan Africa extreme poverty, inadequate caring practices for children, lack of knowledge, low levels of education, poor access to health services and the rapid rate of urbanisation are among the major factors causing malnutrition/underweight. With a population growth of 310 million to 752 million predicted for urban areas by the year 2025 in this region a call to address these issues is put forward in (UNICEF, 2006; Report card on Physical Activity and Health in South African Children and Youth, 2010 and Christian, 2010).

The International Food Policy Research Institute's Food Consumption and Nutrition Division (FCND) in Ruel *et al.* (1998) released paper number 51 on food consumption and nutrition in developing countries which identified food insecurity, poor health and lack of sufficient emotional support from care givers as the primary causes of malnutrition and underweight. For the purpose of this study attention will be given to

food insecurity, hunger, poor health and lack of emotional support in training programme participants.

4.6.1 Food insecurity and hunger

Food insecurity can be defined as households having limited or an uncertain availability of nutritionally adequate food in (Schwartz, 2005 and One World Security Guide, 2009).

Lopez *et al.* (1998); Mamabolo *et al.* (2006) and Report card on Physical Activity and Health in South African Children and Youth (2010) states that while many children suffer the consequences of over consumption others and sometimes even the same children, might experience food insecurity or hunger. This paradox may be due or at least in part to common contributors to both problems e.g. inadequate access to healthy foods.

Food insecure children are paradoxically at high risk for obesity at the same time that they are at risk for malnutrition and hunger. The diets of poor and food insecure families tend to be especially high in fat and low in fruits, vegetables and dairy products as these families attempt to stretch food money and stave off hunger by purchasing low cost, high calorie foods of poor nutritional value (Report card on Physical Activity and Health in South African Children and Youth, 2010). A recent study conducted in the Limpopo province found that children's diets were typically low in animal protein, high in carbohydrate, low in fat and deficient in certain key vitamins and minerals (Mamabolo *et al.*, 2006).

Mild to moderate malnutrition in children can result in micro nutrient deficiencies, the most common of which is anaemia. Anaemia can cause lethargy, lack of concentration and – depending on the severity of the condition – may well impair cognitive development (Report card on physical activity and health in South African children, 2010). Anaemia also reduces immune function, resulting in increased susceptibility to infectious disease (Badham, 2008 and Christian, 2010).

When left to chance malnutrition that leads to underweight in children can also restrict brain development. This may result in impaired learning and cognitive

functioning in Brown (2002) and Rosales *et al.* (2009). Inadequate diet and lack of physical activity have also been shown to decrease attentiveness, motivation and other behaviour critical to school performance (Pollitt, 1995 and Coe *et al.*, 2006). Schools and communities therefore have vital roles to play in promoting and supporting children as they practise good health habits.

This is important as healthy well-nourished active children will be ready and able to learn a fact well documented in literature compare Brown (2002) and Rosales *et al.* (2009). The outcome of a balanced lifestyle of healthy eating and physical activity not only reduces mortality but improves quality of life.

Improved energy and sense of well being as well as reducing disabilities such as amputations and blindness that result from diabetes, loss of independence due to stroke and osteoporosis, and joint and mobility problems due to unhealthy eating practises are further consequences derived from a healthy balanced way of life (Lopez *et al.*, 1998). One of the keys to improving academic performance is improving the overall health of children through knowledge and training.

A study conducted by the Food Research and Action Centre in America (Wilson, 2005) found that as many as 13.6 million children might be experiencing food insecurity across the American nation. Report card on Physical Activity and Health in South African Children and Youth (2010) indicates that as many as 12% of children living In South Africa were displaying profiles of an underweight status at the time. The target is to reduce this percentage to 5, 6% by 2015.

4.6.2 Poor health: the determinants of ill health in urban areas

Diarrhoea, respiratory infections and malaria are often emphasized in literature as crucial role players in the aetiology of malnutrition as they are important causes of death among young children (Report card on Physical Activity and Health in South African Children and Youth, 2010). This study does not attempt to cover these issues but will focus on nutritional deficiencies such as protein-energy malnutrition, deficiencies in vitamin A iron and zinc which are associated with reduced immunity and increased vulnerability to infections. These deficiencies are found to be the major determinants of ill health in urban areas known as the malnutrition-infection-

malnutrition deprivation cycle first described by Ruel *et al.* (1998). The cycle is particularly acute in its effects on young children living in poor environments. The phenomenon can be summarised as inadequate nutrient intake that leads to malnutrition then resulting in increased vulnerability to infectious diseases as a result of a depressed immune system. Infections in turn further exacerbate poor nutritional status as a result of reduced appetite and food intake, increased intestinal losses of nutrients and increased nutrient requirements in Wilson (2005) and Christian (2010).

4.6.3 Emotional support and children

It is well known that positive interactions are both emotionally and physically important to the overall development of children especially with respect to the child's mother or primary care giver. Some of the specific caring behaviours that have been found to influence children's nutrition include frequent physical contact, a consistent responsive reaction to the child's needs and showing affection to the child (Begin *et al.* (1999) and Richter (2004). Changes in the sources of support for and interaction with children such as transformations in family structure due to migration from rural to urban areas are important to consider in potential health and nutritional consequences.

The International Food Policy Research Institute's Food Consumption and Nutrition Division (FCND) identified specific threats to adequate child care giving in urban areas (Ruel *et al.* 1998). In this study mothers are identified as the primary care giver. Their health and nutritional status, education, employment, family support, social networks and the availability of alternative child care e.g. schools and day care are the determinants of maternal care giving behaviour (Richter, 2004).

4.7 DEFINING MALNUTRITION AND UNDERWEIGHT

In van Heerden (2010) malnutrition can be defined as the outcome of insufficient food intake resulting in an inadequate intake of nutrients. Malnutrition is characterised by repeated infectious diseases. Food insecurity, poor health, poverty and hunger are contributing factors to malnutrition (Begin *et al.*, 1999; UNICEF, 2006 and Freedman & Alvarez, 2010).

Malnutrition includes being underweight for one's age, too short for one's age (stunted), dangerously thin (wasted), and micronutrient malnutrition which is a deficiency in vitamins and minerals (UNICEF, 2006). Although this study will refer to all these components the primary focus will be on the incidence of underweight in school children.

Malnourished children are more likely to die from common childhood ailments such as respiratory infections. For those who survive frequent illness saps their nutritional status locking them into a vicious cycle of recurring sickness and faltering growth (UNICEF, 2006). These children's cognitive abilities might also be affected (Rosales *et al.*, 2009).

4.8 INDICATORS OF MALNUTRITION

Key concepts used in training program participants are:

- **Underweight**

Underweight refers to the proportion of young children falling below minus 2 standard deviations (moderate underweight) and minus 3 standard deviations (severe underweight) derived from the median weight-for-age of the international reference population recognised by the World Health Organisation (UNICEF, 2006).

- **Stunting**

Stunting refers to the proportion of young children falling below minus 2 and minus 3 standard deviations as derived from the median weight-for-age of the international reference population recognised by the World Health Organisation (UNICEF, 2006).

- **Wasting**

Wasting refers to the proportion of children younger than five years falling below minus 2 and minus 3 standard deviations derived from the median weight-for-age of the international reference population recognised by the World Health Organisation (UNICEF, 2006).

- **Micro nutrient deficiency**

Micro nutrient deficiency refers to a deficiency in essential vitamins and minerals particularly of iron, vitamin A and iodine. These vitamins and minerals are vital as it helps support the body in fighting infection and disease as viewed in UNICEF (2006) and in Christian (2010).

4.9 COMPLICATIONS ASSOCIATED WITH MALNUTRITION/ UNDERWEIGHT IN CHILDREN

From Brown (2002) the following adverse consequences of food insecurity and hunger are associated with underweight in children:

4.9.1 Health Status

- Poorer overall health status and compromised ability to resist illness;
- Elevated occurrence of health problems such as stomach aches, headaches, colds, ear infections and fatigue; and
- Greater incidence of hospitalisation.

4.9.2 Psychosocial and Behavioural Complications

- Higher levels of aggression, hyperactivity, anxiety and passivity;
- Difficulty getting along with other children; and
- Increased need for mental health services.

4.9.3 Learning and Academic Performance

- Impaired cognitive functioning and diminished capacity to learn;
- Lower test scores and poorer overall school achievement;
- Repeating a grade in school; and
- Increased school absences, tardiness and school suspension.

4.10 WORLDWIDE STATUS OF UNDERNOURISHED CHILDREN

In a study on hunger and food insecurity done by Wilson (2005) between 33,000 and 37,000 American households had children who went hungry at least once during a typical day. The reason being that families' do not provide adequately as to meet

their children’s dietary needs. Currently malnutrition and specifically underweight in children is implicated in more than half of all child deaths worldwide (Wilson, 2005).

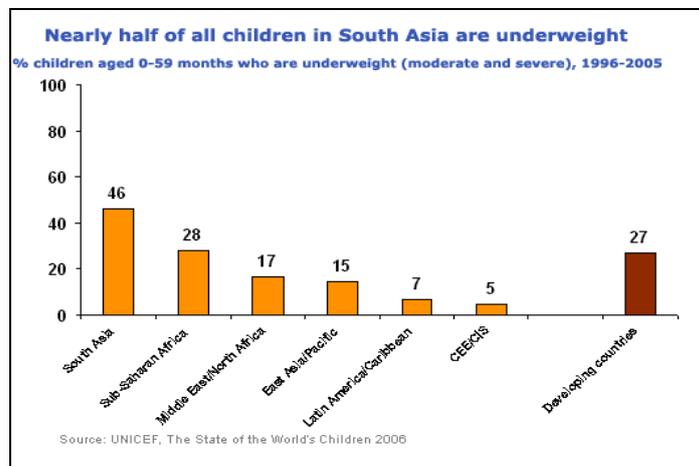


Figure 4.2: Percentage children aged 0 to 59 months who are underweight ranging from moderate to severe from 1996-2005 (UNICEF, 2006)

From Figure 4.2

- More than one quarter (27%) of all children younger than five years underweight in the developing world. This figure accounts for about 146 million underweight children in developing countries. Of these 146 million underweight children nearly three-quarters (73%) live in just 10 countries of which the sub-Saharan region in Africa is one; and
- In sub-Saharan Africa more than one quarter (28%) of children under the age of five years are underweight;

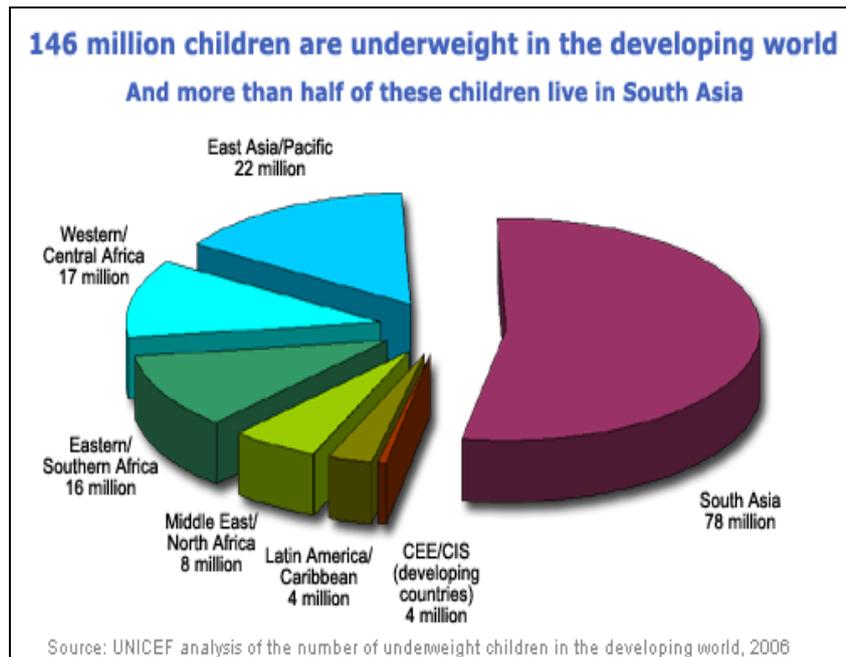


Figure 4.3: Analysis of the number of underweight children in the developing world (UNICEF, 2006).

From Figure 4.3 the following:

- The figure for underweight children in South Africa and Eastern Africa combined alone represent 16 million children.

4.11 ALTERNATIVE CARE GIVING IN THE CITIES

Literature indicates that a common pattern of child care especially in developing countries is for the mother to provide the primary care during a child's first year. Hereafter the caring responsibilities are shared with the child's older siblings or other adult family members. (<http://www.essortment.com>) and Ruel *et al.* (1998). Within cities the availability of older siblings as alternate care givers are however limited as they need to attend school themselves. Studies indicate further that institutional day care is then often found to be a good alternative for child care in urban areas and that these programs do have enormous potential in relieving some of the pressures on working mothers and particularly to the large number of woman in charge of households in urban areas. Unfortunately these centres are often found to be underutilised as many are too expensive especially in low income families living in the cities (Ruel *et al.*, 1998 and Richter, 2004).

Schools are therefore becoming an important role player as the alternate care giving facility as many children come straight from home to attend school in grade R or 1. Care givers have to provide childcare, education and often aid in the nutritional care of children too, the phenomenon under investigation. The next section will cover the characteristics, roles and responsibilities of care givers and educators in such school settings.

4.12 CHARACTERISTICS, ROLES AND RESPONSIBILITIES OF A CARE GIVER IN AN ALTERNATIVE CARE CAPACITY: THE SCHOOL

According to Calitz (2004) and Lakshimpriya and Neena (2008) alternative childcare has become an essential factor for the working mother. This alternate care becomes the link that helps mothers balance the responsibilities of working and family life. Many mothers do ask themselves whether they are neglecting their duties as a mother if they do go back to work again. The researcher agrees with Calitz (2004) and Lakshimpriya and Neena (2008) that a care giver will be a substitute while mothers are working and will therefore not replace the mother. It is still vital though that care givers must have knowledge about the working of the family system such as environmental influences and cultural expectations placed on children in the family. In order to meet the above criteria care givers must have special characteristics, skills and knowledge as children are complex and unique in behaviour (Calitz, 2005). The care giver in an alternative role will be faced with many challenges and need to be able to function competently in such circumstance. In order to address these challenges a training programme was designed.

4.12.1 Characteristics of a care giver when functioning in an alternative care capacity

Calitz (2005) states that care giving entails much more than only to think that children are cute and adorable beings. This is often a mistake made by care givers influencing their successes in this capacity. According to Begin *et al.* (1999) care giver characteristics influence children's nutritional status while controlling for the socio-economic status of the household. What then is distinguishing characteristics of care givers when functioning in an alternative capacity? In an attempt to answer this question some characteristics found in such care givers are listed but will be discussed more in the next chapter of the study.

- Care givers should be willing to learn from others; also from the children in their care;
- Care givers should continually strive to expand their knowledge about children and specifically knowledge pertaining to the children in their care.
- Be willing to accept change in this dynamic environment;
- Be able to adapt a self-monitoring approach, where action plans can be formulated and implemented in the care giving process;
- Be able to present fun filled activities addressing the level of the children in their care;
- Be willing to be open and honest when introducing new concepts and when answering children's questions;
- Be able to praise children as they grow and develop;
- Be able to set time limits, manage time and be able to monitor pressure and stress in children; and
- A developed sense of humour is required.

From Begin *et al.* (1999) the resources that care givers draw on in giving the care stated here include:

- Education;
- Knowledge;
- Beliefs;
- Physical Health;
- Nutritional Status;
- Mental Health;
- Self Confidence;
- Autonomy;
- Control of Resources;
- Reasonable Workload;
- Availability of time; and
- Family and Community Social Support.

4.12.2 Roles of a care giver in an alternative care capacity

When a care giver is actively involved in the care giving process many find that caring for children become an effortless and natural response. Calitz (2005) describes a variety of roles which a care giver must adopt in daily caring:

- The care giver should be warm and nurturing constantly engaging appropriately with the child;
- The care giver must understand that children go through different phases of growth and development and therefore the interactions and environment she provides must evolve as well;
- Every child develops at a different pace with his own interests and preferences. The care giver should be responsive to the individual's needs and preferences of the children in her care;
- Children should be guided to learn positive behaviours. Children should be helped to learn from their mistakes and should be redirected to acceptable behaviour. Clear and consistent limits should direct the infant on decision making skills. Discipline should teach and not humiliate;
- Care givers should actively encourage language and conversation. She should listen to the children encourage them to express themselves verbally, value and respect what they say and should clearly explain the reasons for things. Care givers have to understand the importance of books and reading and actively involve these in the care giving process;
- Teaching materials should evolve in complexity as children grow and develop. Children should be allowed some choices in the activities they engage in so that they can learn to think on their own; and
- Activities should be varied: including individual activities and activities with the care giver as well as quiet and active play, building, make believe, music, movement and art.

The role of the care giver in an alternative care setting will be investigated and commented on by the researcher.

4.12.3 Responsibilities of a care giver in an alternative care capacity

In a traditional teaching capacity educators will perform duties related to development and learning in children. Care givers should be organised, creative, understanding, patient, reliable and adjustable. They should be able to handle adversity and should be ready to make quick decisions. They should be full of ideas on what to do with the children while educating and assisting them Care givers should be ready to share these ideas with mothers.

4.12.4 Training care givers

Usually educators are content with the demands and responsibility accompanying the task of education but when they are challenged with additional caring responsibilities such as the nutritional needs of the children in their care more responsibility is added. These responsibilities should ideally be managed and addressed in school's staff development and training programs. Many educators are frustrated, tired and suffer burnout or compassion fatigue due to a shortfall in knowledge and lacking support systems when assisting these children. Many educators indicate that sometimes emotionally demanding interactions such as the nutritional care of children leave them drained and exhausted creating feelings of disinterest in their line of work. Caring for care givers in alternative care giving settings e.g. dealing with underweight in children, has become a necessity in today's caring environment.

4.13 CARING FOR THE CARE GIVER

According to Calitz (2004) and Miller (2010) it is important that counsellors and care givers develop a heightened awareness of signs and symptoms of stress and burn out. Leaving the signs unattended might have far reaching consequences for the individual and impact negatively on the service they provide.

Miller (2010) raised the following concerns with regard to care giver well being:

- Teaching has become very stressful over the last decade as care givers in South African schools face increasing demands and educational challenges on a daily basis;
- South African care givers also bear witness to a multitude of stressful and traumatic events on a daily basis e.g. children diagnosed with HIV,

escalating divorce figures and its consequences (single parent stress and its impact on children), child abuse and neglect;

- Stories about domestic violence, substance abuse within families and trauma such as high jacking, carjacking and armed robbery are often heard; and
- Having to deal with food insecurity and hunger among children are further adding to this list of stressful events experienced possibly causing burn out and leading to compassion fatigue in care givers eventually.

4.13.1 Burn out and compassion fatigue syndrome explained

According to Calitz (2004) burn out or cumulative stress is a state of physical, emotional and mental exhaustion. Burn out can be experienced after a period of time during which your ability to cope with your work environment is lowered. This may be as a result of responses to the ongoing demand characteristic of the daily environment (Calitz, 2004 and Miller, 2010).

Calitz (2004) explains that compassion fatigue is different to burn out as burn out can make you more susceptible to compassion fatigue or it may be experienced separately from burn out. According to Calitz (2004) compassion fatigue results from a repeated preoccupation with the trauma of patients/clients. The impact of hearing and seeing the trauma that patients/clients experience accumulates and can carry emotional costs. Ultimately compassion fatigue results when counsellor's well being has been compromised.

4.13.2 Recognising burn out

There are many ways in which the stress of care givers can manifest itself. The key symptoms to look out for in Calitz (2004) and Selignon (2010) are:

- Feelings of inadequacy;
- Feeling that you do not have the necessary skills to do the required job;
- Lack of self confidence and diminished self esteem;
- Feelings of helplessness, guilt and loss of hope;
- Depression, fearfulness and feelings of distress;
- Avoidance of client needs;

- Increase in self destructive, self soothing behaviours, such as the use of alcohol, drugs or including sleeping tablets;
- Irritability. Lower frustration tolerance and outbursts of anger;
- Diminished sense of job purpose, reduced job satisfaction and decisions to leave the job or profession;
- Lack of desire to go into work and perform work duties and therefore high levels of absenteeism; and
- No longer feeling fulfilled by your career, feeling disillusioned by the reality of what you face in your work and feeling that you have lost touch with your initial reasons for entering the profession.

4.13.3 Preventing burn out

It is important to know that burn out and compassion fatigue can be avoided, managed and reduced viewed in Calitz (2004) and Selignon (2010). Care givers can perform numerous tasks in order to take charge of their vulnerability to burn out and compassion fatigue. Calitz (2004) and Selignon (2010) recommend the following preventative strategies:

- Acknowledge the stressful nature of your work: Feelings of distress in response to your experiences are legitimate and not signs of weakness or lack of professionalism;
- Treat personal trauma: Due to the high incidence of traumatic events in South Africa, it is not unlikely that you can experience personal trauma due to this. Acknowledge these traumas first hand and attend the necessary counselling. Neglect here can make you more susceptible to vicarious or secondary traumatic stress;
- Acquire the necessary skills: Learn, understand and develop personal strategies for coping with professional challenges. Having insight into how and which difficult experiences diminish hope and sense of empowerment is an imperative leading to resolving stressful experiences and accepting your own limitations;
- Boundary setting: Learn to set boundaries in order to protect you from taking on too much responsibility as you will overwhelm yourself in the process and this then leads to burn out/compassion fatigue;

- Ongoing training: You will feel stressed when you are required to perform duties for which you do not have the necessary knowledge, skill and attitude. Attend relevant training sessions in order to equip yourselves to face up to the demands and challenges in your field;
- Self care disciplines: It is your responsibility to develop and maintain good self care behaviours such as a routine of exercise, rest, time for yourself and good nutrition. Acknowledge your achievements, however small, as this will instil a pattern of self care behaviour enhancing future resilience to stressful experiences;
- Periodic assessments of burn out: There are various tools available for the assessment of stress, the symptoms thereof, burn out and compassion fatigue. A good suggestion is to regularly use such a tool independently and or in mentoring meetings. Connecting with others: Mentoring and support is vital strategies in order to reduce stress as you will feel reconnected with a sense of hope and empowerment with which you have entered the care giving profession. Use your mentor more and more effectively; and
- Regular mentoring/ peer mentoring sessions: The aim here is to help you cope with your work and life challenges by encouraging ongoing learning and skill development; it will also provide you with emotional support. Peer mentoring where care givers run their own mentoring groups are available at Glenstantia.

4.14 CONCLUSION

In this chapter the differences in community structure, opportunities and resources available for care in urban and rural areas are highlighted. These differences bring about many challenges to urban community settings such as schools today. The mother as primary care giver and educators in schools as secondary care givers have to work hand in hand in establishing sound care giving practises in the city. Maternal employment outside the home is common practise in urban areas and the potential cost this practise might have on a child's health and nutritional status could be a high one in the long run. As good child care can be beneficial to children's development and augment in the infant's foundations for later success in life, responsible care givers are of immense value to working mothers and their children.

Experienced care givers can help the mother through challenging and confusing moments of parenthood and can be a valued source of parenting advice. In light hereof malnutrition, the indicators thereof and a basic understanding of underweight prevalence in children was discussed. This chapter further highlighted the idea that training and caring for care givers in alternative care settings such as schools have in many ways become a necessity in order to deal with the challenges set by urban life today as stated in Black (2008) *“The key messages here are that the international nutrition system is fragmented and dysfunctional, and reform is needed. The problems are longstanding and embedded in organisational structure, but a concerted effort can provide greater progress and accountability. Progress is possible”*.

Some of the stresses and strains experienced by care givers in schools today were discussed. In order for care givers to function optimally they need to be equipped to deal with possible burnout and compassion fatigue syndrome; a possible complicating factor in modern day school life. Basic prevention hereof was discussed.

This chapter completes the literature study on the presented topic under investigation. Chapter 5 will concentrate on the practical implications of the research topic (methodology) and will be presented as the training program to care givers in South African schools.

CHAPTER 5 METHODOLOGY

5.1 INTRODUCTION

An article titled *Fast Food and the Savvy Consumer* states: “As South Africa moves steadily towards greater industrialisation, urbanisation and Westernisation, many will tick off these developments as markers along the road to modernity and progress. But as is so often the case, change can bring with it some negative by products and unintended consequences” (South African Readers Digest, 2007:1).

Along with changing lifestyles and increasingly advanced technology has come a shift in exercise routines and eating habits (Report card on Physical Activity and Health in South African Children and Youth, 2010). An inescapable reality of this evolving universe is that South Africa has become one of the fastest growing markets for international fast food franchises not to mention a number of successful home grown operations. Much of the fare served up by these outlets is delicious, convenient and reasonably priced. In short a winning formula with the new breed of on-the-go consumer. The easily available supply of fast food is often also rich in fat, simple carbohydrate and salt (Till, 2011). Furthermore children of working parents are found to be more sedentary, were more likely to consume sugary drinks between meals, watches or spends at least two hours watching television or sit at the computer These parents are less likely to mainly snack on fruit and vegetables between meals or to eat three or more portions of fruit a day than children whose mothers never worked (Hawkins *et al.*, 2009 and Till, 2011).

When a growing dependence on this changed eating regime is combined with a sharp decrease in physical activity the nation starts to grow (Report card on Physical Activity and Health in South African Children and Youth, 2010). Although most South Africans and especially children are overweight; there is a flipside to this coin. Many South Africans and especially children are also suffering the consequences of sub-optimal diets, inactivity and food insecurity (early nutritional deprivation) and are growing thinner leading to underweight in children (Norris, 2011). Report card on Physical Activity and Health in South African Children and Youth, 2010 states that as many as 17% of all South African children younger than 9 years could be overweight

and as many as 19% are stunted. When a growing dependence on this changed eating regime manifests a sharp decrease in physical activity and obesity in co-existence with stunting is combined with the phenomenon of food insecurity among South Africans. South Africans are faced with a health crisis of epic proportions Report card on Physical Activity and Health in South African Children and Youth, 2010 and Norris, 2011). Many children show the tell tale signs of this tendency often being tired, unable to concentrate, poor academic performance, an inability to maintain a reasonable amount of physical endurance and a general state of apathy and enthusiasm. The primary goal of the training program at hand was to assist care givers in schools to deal with the phenomenon of underweight.

5.2 PARTICIPANTS

Research was conducted within the content of a South African state school, Glenstantia Primary School in Constantia Park, Pretoria, South Africa. Children with healthy body mass index measurements (BMI) as well as underweight children were involved on a voluntarily basis as the respondents. On average the height, weight and age of the children were as follow: Height (123 cm), weight (20.5 kg) and age (7 years old). They were living within the feeding area of the school. Both male and female respondents were included.

5.2.1 Physical activity

Bosco and Gustafson (1983) maintain that it is recommended that children and adolescents engage in at least 60 minutes of vigorous physical activity per day. Most Glenstantia Primary School learners fail the minimum fitness standards e.g. cannot perform a 3 minute fitness `step test or 1 minute sit up test. Only 20% of the Grade 1 intakes in 2005 were able to meet the minimum standards for body composition, upper body strength and flexibility as to be considered physically fit.

In order to determine the effect of a care giver training program (fitness training and changes in dietary intake in underweight school children) on underweight prevalence in school children the following methodology applied: The sample under investigation consisted of 150 children (n= 90 boys and n= 70 girls) who were categorised into three groups based on their body mass index (BMI) scores: over weight, healthy and under weight. All children were exposed to fitness testing on BMI measurements,

muscle tone, sit-ups, flexibility, cardiovascular scores and push-ups they can complete. The results on these measurements were then compared over time (February 2007 to February 2008) in order to determine whether statistically significant differences occurred within each group.

Figure 5.1 shows an analysis of the number of underweight children in Glenstantia primary school (boys and girls) over time. It also shows that half of the children (54.67%) were considered healthy according to their BMI index. A fifth (20%) was overweight with 25.33% considered as under weight.

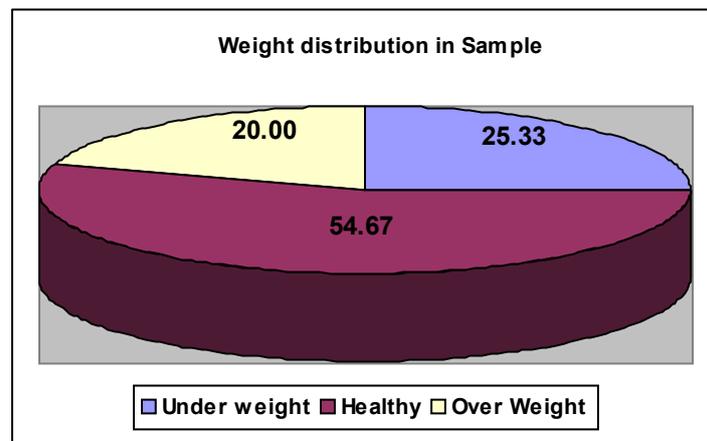


Figure 5.1: Analysis of the number of underweight children in Glenstantia Primary School 2007 (n=150) boys (90) and girls (70).

5.3 STUDY DESIGN

The training program to assist care givers (train the trainer) was implemented in three phases:

- In phase one, care giver knowledge with regard to the research topic was determined using the research questionnaire and focus group interviews. Children had fitness testing done in order to determine the prevalence of underweight in South African school children.
- In phase two care givers was trained on the needs of underweight children in the school, an exercise and dietary intervention program was introduced accordingly.
- In phase three (chapter 6) fitness levels of the learners after implementation of the training program was tested again. FMEA profiling on knowledge, skill

and competence gained by the care givers related to the research topic was done (Chapter 6).

From Figure 5.2 the following can be deduced:

In phase one of the training program care giver (n=18) knowledge on the prevalence and needs of underweight children in South African schools was determined using the research questionnaire and focus group interviews. Foundation Phase learners (n=150, 90 boys and 70 girls) between the ages of 6 and 8 years did fitness tests at the start of the training program (2007) as to determine their health status. These tests included assessment on BMI, muscle tone, flexibility, cardio-respiratory endurance and muscular endurance. The next phase of the training program included training given to care givers on:

- Understanding the needs of underweight children;
- Fitness testing and movement programs in support of underweight children. An exercise program was introduced;
- The importance of food and nutrition programs in support of underweight in children. Dietary changes were made; and
- Strategies to prevent underweight prevalence in children;

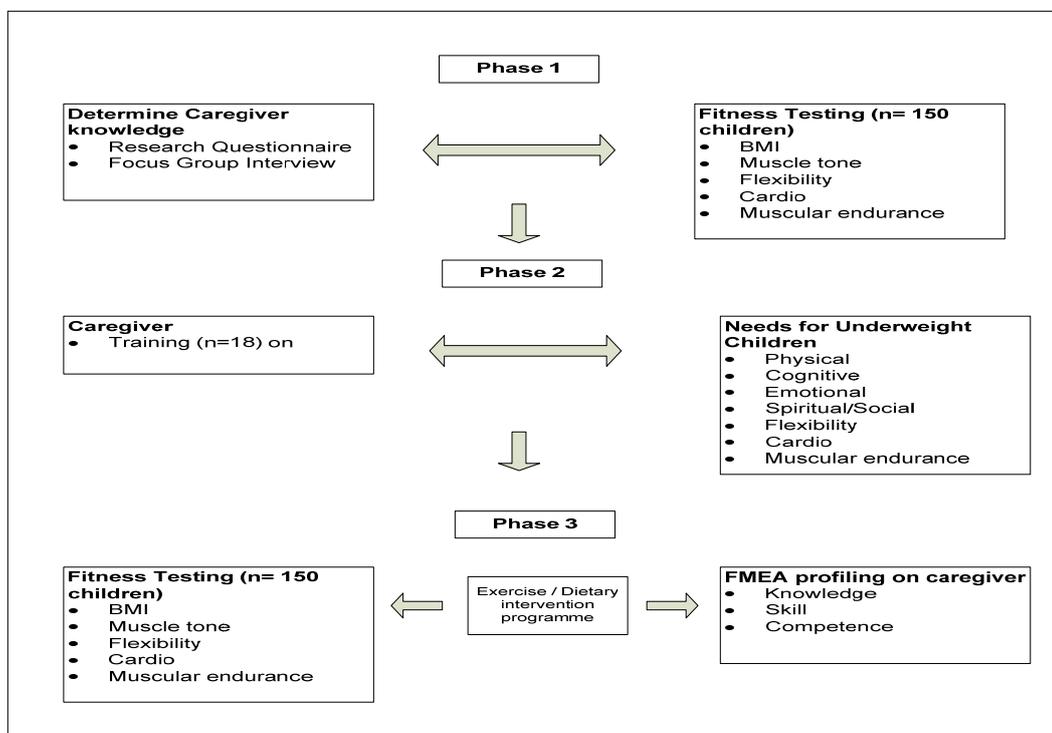


Figure 5.2: Design and Implementation of the care giver training program.

The training program was designed using the modules set out here. This enabled care givers to address the physical, cognitive, emotional, social and spiritual needs of underweight children in the school. In phase three of the training program care giver knowledge, skill and competence when dealing with underweight as phenomenon in South African schools was assessed using FMEA profiling (Chapter 6). Foundation Phase learners (n=150, 90 boys and 70 girls) between the ages of 6 and 8 years that did fitness tests at the start of the training program (2007) was assessed again as to determine their health status after care givers completed the training program.

5.4 RESEARCH APPROACH

In Creswell (1994) a cross-sectional survey can be defined as ..."*information collected at one point in time*". The cross-sectional descriptive survey is therefore often used to describe questionnaire studies (Lewis-Beck *et al.*, 2004).

In Phase 1 of this study a cross-sectional descriptive survey and developmental studies was used as research method in the form of a structured questionnaire..

A combination of quantitative and qualitative research methods was used in Phases 2 and 3. This is because quantitative research excels at summarising large amounts of data and achieving generalisation based on statistical projections.

Qualitative research on the other hand excels at "telling the story" from the participant's point of view, providing the rich descriptive detail that sets quantitative results into their human context.

5.4.1 Quantitative research in the study

The aim of quantitative research in this study was to determine the relationship between one variable, the needs of underweight children (independent variable) and the influence of enhanced knowledge in care givers on the prevalence of underweight in South African school children (the dependent variable) in a population.

Quantitative research designs are either descriptive where subjects are usually measured once or experimental where subjects are measured before and after a treatment. For the purpose of this study the research design was descriptive in nature and cross sectional in design (Hopkins, 2000).

5.4.2 Qualitative research in the study

Qualitative research differs from quantitative research in the sense that time is spent on living with the phenomenon investigated by ways of direct experience (Trochim, 2006). The aim of qualitative research in this study was to excel at generating information that is very detailed. This enabled the researcher to describe the phenomenon – underweight in children - in great detail and comprehensively in the original language of the research participants. Various subject professionals were consulted in this regard.

5.5 RESEARCH METHODOLOGY AND THEORETICAL FRAMEWORK OF THE STUDY

The present study employed combinations of the qualitative and quantitative approaches referred to as triangulation.

5.5.1 Triangulation (methodological combination) as a research approach:

Seale *et al.* (2004) define triangulation as “... [W]here one type of data (usually quantitative) is used to corroborate another type of data (typically qualitative) or when theoretical insights are derived from one type of data which are also put to test on another dataset”

Within the research process classification distinguishes the ways in which qualitative and quantitative research are combined where: (a) is the *importance given* to the qualitative and quantitative approaches in the research investigation and (b) being the *time ordering* or sequencing of the approaches.

As such distinctions are not always possible in practice due to the dominance of one approach; a tripartite classification is suggested in the process of interpreting data. Triangulation is one of these classification methods (Seale *et al.*, 2004).

According to Trochim (2006) the value of triangulation lies in the fact that it guarantees conclusions about which we can be confident. It also provokes a more critical stance in researches towards their work.

What is involved in triangulation is therefore not merely the combination of different kinds of data but rather an attempt to relate different sorts of data in such a way as to counteract possible threats to the validity of analysis.

For the purpose of this study, the value of triangulation involves the following (Creswell, 1994):

- Being complementary as different facets of the phenomenon may emerge,
- Being developmental as the first method is used sequentially to help inform the second,
- Initiation wherein contradictions and fresh perspectives emerge,
- Expansion wherein the mixed methods add scope and breath to the study, and
- Triangulation in the classic sense of seeking convergence of results.

5.6 TYPE OF RESEARCH

The current study employed intervention research. The researcher used one of five related traditions that are particularly useful in conducting intervention research, namely experimental social innovation. According to Rothman and Thomas (1994) the paradigm of experimental social innovation uses quasi-experimental designs to evaluate the effects of treatment programs and other innovations designed to address social problems.

5.6.1 The process of intervention research, design and development models

Intervention research is research directed at developing innovative interventions. These are referred to as intervention design and development models (D&D).

The following phases and selected activities of intervention design and development (D&D) were used from Rothman and Thomas (1994):

- Situation (problem) analysis and project planning.
- Information gathering and synthesis.
- Design.
- Early development.
- Evaluation and advanced development.

As training programs offer skills to help people cope with everyday life this proactive method of intervention will be implemented (Bender, 2002).

The researcher designed, developed, implemented and evaluated the training program for care givers as a new intervention.

5.7 RESEARCH DESIGN

In this study a quasi-experimental one group pre-test, post-test design was used.

This type of design includes a pre-test measure followed by treatment and a post-test for single groups (Creswell, 1994). The study in hand will measure the impact of the training program on underweight prevalence in South African school children. The dependent variables are the knowledge, skill and competence levels of care givers. The independent variable is training care givers on the needs of underweight children in South African schools.

In using this design it will be possible to measure (FMEA profiling) if the training program in any way enhanced knowledge, skill and competence in the care givers understanding of underweight prevalence. In order to measure the influence of the training program on underweight prevalence, fitness test results (Wilcoxon Signed Rank test) will be used to determine if any significant change occurred in the prevalence of underweight amongst South African school children (<http://en.wikipedia.org/wiki/Wilcoxon-signed-rank-test>).

The research design can be represented as follows: (O1 – X – O2) (Bender, 2002).

Where:

O1 = First measurement of the dependent variable (knowledge, skill and competence in care givers and the prevalence of underweight in South African school children).

X = Independent variable, the intervention (training care givers on the needs of underweight children).

O2 = Second measurement of the dependent variable (knowledge, skill and competence in care givers and the prevalence of underweight in South African school children).

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The one-group pre-test design, in which the pre-test (research questionnaire) preceded the introduction of the independent variable (training care givers on the needs of underweight children) were used. A post test (questionnaire and FMEA profiling) followed as to rate knowledge, influencing skill and competence levels in care givers after the introduction of the training program.

The one-group pre-test design, in which the pre-test (fitness testing) and using the Wilcoxon signed rank test as measure to determine the health status of South African school children preceded the introduction of the independent variable: training care givers on the needs of underweight children in South African schools. A post test (fitness testing) and using the Wilcoxon signed rank test as measure to determine the health status of South African school children followed as to rate the influence of the training program on the prevalence of underweight in South African school children (<http://en.wikipedia.org/wiki/Wilcoxon-signed-rank-test>).

5.8 AIM OF THE PROGRAMME

The aim of the program is to train care givers (train the trainer) and related parties on the needs of underweight children in South African schools. In doing so care givers knowledge, competence and skill levels when dealing with the phenomenon of underweight in children will be enhanced and in this process the underweight children, the school and parents will benefit.

5.9 TRAINING STRATEGIES IN PREVENTING UNDERWEIGHT IN CHILDREN:

In order for the exercise/dietary intervention program designed to be of value care givers were trained on:

- How to introduce a physical exercise program to underweight children This is vital in improving health and fitness indices measured; and
- How to assist children and their parents with regard to nutritional choices. This is vital in improving health and fitness indices measured.

5.10 GENERAL FORMAT OF TRAINING SESSIONS TO CARE GIVERS.

Sessions to care givers were presented in group format over 9 weeks lasting an hour and a half.

5.10.1 Intervention time

The intervention started after the initial data collection at the beginning of the first grade in February 2007 and continued for an average of 12 months until the follow-up examination which occurred in February 2008.

5.11 PRE-COURSE QUESTIONNAIRE

A pre-course questionnaire was given to program participants as to assess their knowledge on the research topic prior to the training (Appendix C).

5.12 THE CARE GIVER TRAINING PROGRAMME

In order to be able to comply with the aim of the training program care givers received the following theoretical training:

5.12.1 Understanding the needs of underweight children in the school

In order to address the physical, cognitive, emotional, social and spiritual needs of underweight children in the school care givers need to know that children develop in totality and that development unfolds sequentially. Information needs to flow. If the flow is interrupted barriers to learning occur (De Jager, 2009).

5.12.2 Understanding sequential needs in underweight children

The needs of underweight children were derived from the research questionnaire (Appendix B) including:

(i) Physical needs

- Having access to food;
- Having access to nutritionally healthy food;
- To be fitter; and
- To have a normal weight distribution.

(ii) Cognitive needs

- To learn;
- To think;
- To reason; and
- To experience success.

(iii) Emotional needs

- Having a sound body Image; and
- Having a positive self esteem.

(iv) Social needs

- Fitting in with peers.

(v) Spiritual needs

- Self believe.

In order to understand the effect that under nutrition (underweight) might have on the developmental tasks of young children, Abraham Maslow's hierarchy of needs (compare 3.6 in chapter 3) was used in training care givers.

5.13 RECOGNISING DISTRESS SIGNALS IN UNDERWEIGHT CHILDREN

Based on information obtained from the research questionnaire the following distress signals were identified in the underweight school children. In order to comply with the

aim and outcomes formulated care givers were trained on certain distress signals often found in underweight children:

(i) Physical distress signals

- Tired;
- Lethargic/ Apathetic;
- Lack of energy;
- Weak immune system;
- Stunted growth;
- Poor health/ at risk for chronic disease;
- School absenteeism;
- Often hospitalised;
- Nutrient deficiencies;
- Stomach aches;
- Headaches;
- Ear infections; and
- Colds.

(ii) Cognitive distress signals

- Struggles to learn think and reason;
- Poor reading, language and mathematical skills;
- Concentration problems;
- Repeating grades; and
- Slow in task completion/execution.

(iii) Emotional distress signals

- Higher levels of aggression;
- Hyperactivity;
- Anxiety;
- Passivity (withdrawn);
- Emotional outbursts; and
- Often leaves tasks incomplete.

(iv) Social distress signals

- No or few friends;
- Struggles to make or keep friends;
- Socially withdrawn; and
- Difficulty getting along with other children.

(v) Spiritual distress signals

- Low self esteem, constantly tries to gain approval and recognition;
- Under achieves; and
- Displays low levels of competence.

Information obtained from the research questionnaire was used in compiling this section of the training and supported in van Heerden (2010).

5.14 FITNESS TESTING AND MOVEMENT PROGRAMS IN SUPPORT OF UNDERWEIGHT CHILDREN

Mrs. Riatta Eloff, a child kinetics professional in private practise states that in a world where the modern lifestyle of children are becoming more and more complex and specialised as a result of technology and increasing high expectations biological deterioration, physical decadence, inactivity and laziness are often characteristic of the modern day child. According to Mrs.Riatta Eloff the foundation phase of teaching children cannot be complete without movement programs. Movement in combination with programs where the importance of a balanced eating life style is introduced will pay off in the long run producing happy, healthy and confident children whom are ready to learn (Penedo *et al.*, 2005)

In the training program participants were taught the important role that exercise can play in support of food insecure underweight children as mental and physical health benefits are associated with physical activity (Penedo *et al.*, 2005). Program participants were also instructed on the important role they can play in being actively involved in the school's movement programs as this will enhance training program outcomes. In the training program the underweight child's profiles will be statistically

presented using the Wilcoxon Signed Rank test. This is helpful in identifying the prevalence of underweight in the research sample. In using the statistics derived from the fitness testing, the overall health status of the sample were compared with otherwise healthy children (normal weight distribution) in the sample and presented.

5.15 HEALTH RELATED FITNESS INDICES

As exercise testing is a low-risk method of diagnostic, prognostic and functional evaluation the following fitness indices was measured in this study and statistically analysed using SPSS. Care givers assisted the researcher in the testing. These statistics will be used in training the care givers on the important role that exercise will play in support of underweight children. Fitness testing was done on boys and girls aged 6 to 8 years old.

5.15.1 Body Mass Index (BMI)

BMI is a formula that is used to estimate how much body fat a person has based on his or her weight and height and in taking the chronological age of the person measured into consideration. The BMI formula uses height and weight measurements to calculate a BMI number ($wt/ht \times ht$). This figure is subsequently plotted on a chart to show whether a person is underweight, at risk of becoming overweight or overweight/obese (Mahler *et al.*, 1995).

Each BMI chart has eight percentiles lines for 5th, 10th, 25th, 50th, 75th, 85th, 90th and 95th percentiles. A child below the 5th percentile on the body mass index is considered underweight, since 95% of the age group has a higher BMI (Sullivan, 2004). In this study 150 learners of Glenstantia Primary school where assessed in 2007 (n=150, 90 boys and 70 girls) and the same children (n= 150, 90 boys and 70 girls) where assessed again in 2008.

5.15.2 Muscle tone

Muscle tone is the continuous and passive partial contraction of the muscles. It is the muscles ability to work against gravity and to execute smooth movements. Children with low muscle tone are the “floppy” ones who have difficulty maintaining any posture without external support (Cagnon, 2006). A standardised test (plank) determining muscle tone expressed in seconds will be used in the testing (Cagnon,

2006). In this study 150 learners of Glenstantia Primary school were assessed in 2007 (n=150, 90 boys and 70 girls) and the same children (n= 150, 90 boys and 70 girls) were assessed again in 2008.

5.15.3 Flexibility

Flexibility is the maximum ability to move a joint through a range of motion. It depends on a number of specific variables including distensibility of the joint capsule, muscle temperature and muscle viscosity. Flexibility is assessed as it prevents injury and maintains comfort after exercising. The sit-and-reach test will be used as a diagnostic tool to assess flexibility (Mahler *et al.*, 1995). In this study 150 learners of Glenstantia Primary school were assessed in 2007 (n=150, 90 boys and 70 girls) and the same children (n= 150, 90 boys and 70 girls) were assessed again in 2008.

5.15.4 Muscular endurance

Muscular endurance is the ability of a muscle group to execute repeated contractions over a period of sufficient time to cause muscular fatigue or to statically maintain a specific percentage of maximum voluntary contraction (MVC) for a prolonged period of time.

The 60-second sit-up (best of 10) and maximum number of push-ups (best of 10) that can be performed without rest will be used to evaluate endurance of the abdominal muscle groups and upper body muscles respectively (Mahler *et al.*, 1995). In this study 150 learners of Glenstantia Primary school were assessed in 2007 (n=150, 90 boys and 70 girls) and the same children (n= 150, 90 boys and 70 girls) were assessed again in 2008.

5.15.5 Cardio-respiratory endurance

Cardio-respiratory endurance is defined as the ability to perform large-muscle, dynamic, moderate to high intensity exercise for prolonged periods. The performance of such exercise depends on the functional state of the respiratory, cardiovascular and skeletal muscle systems.

Cardio-respiratory endurance is considered health related because (a) low levels of fitness have been associated with markedly increased risk of premature death from

all causes and specifically from cardiovascular disease, and (b) higher fitness is associated with higher levels of habitual physical activity, which is in turn associated with many health benefits (Mahler *et al.*, 1995). The three minute step test will be used to determine cardio-respiratory endurance (Mahler *et al.*, 1995).

In this study 150 learners of Glenstantia Primary school where assessed in 2007 (n=150, 90 boys and 70 girls) and the same children (n= 150, 90 boys and 70 girls) where assessed again in 2008. The frequencies that emerged from the fitness tests are included in Appendix E.

5.16 RELATIONSHIP OF PHYSICAL ACTIVITY TO HEALTH AND WELL BEING:

Care givers need to know that:

- The overall health status of the research sample is a matter of concern when interpreting the above mentioned results as obtained from the fitness tests;
- Underweight children lack the energy to participate in vigorous physical movement activities and therefore do not always benefit from the many advantages offered by such program and mentioned here; and
- Care givers need to understand that the above will impact on exercise programs offered to underweight children in the school. Exercise guidelines will be discussed as preventative strategy in this study.

Results obtained from the Wilcoxon Signed Rank post-test (Appendix D) will be discussed in Chapter 6.

5.17 EXERCISE PROGRAM FOLLOWED BY THE UNDERWEIGHT CHILDREN

Faigenbaum *et al.* (2002), states that muscular strength can be improved during childhood years. A training frequency of at least 1 to 2 times per week will be beneficial for muscular and strength endurance in 7 year old children specifically (Babin *et al.*, 2001). This will be for children participating in an introductory strength training program as indicated here.

Underweight children followed the following exercise programme (February 2007 to February 2008) in order to improve on fitness and health indices measured (DVD included).

5.14.1 Exercise prescription: Program 1 (day 1)

- Trampoline jumping (3 minutes)
- Super man plank (left and right 1x15 seconds)
- Frog jumps (10metres)
- Stretching (static)

5.14.2 Program 2 (day 2)

- Core training (plank, skating, X- jumps, lunge walks, squats)

5.14.3 Program 3 (day 3)

- Rope skipping (3 minutes)
- Push-ups (3x8)
- Sit-ups (3x15)
- Wheelbarrow walking (15 metres)
- Stretching (static)

(Van Dorsten, 2010)

The exercise program as designed by the researcher was based on exercise prescription found in Nel (2000) as prescribed for children by the Kinetics Association of South Africa.

5.18 EATING HABITS AND UNDERWEIGHT CHILDREN

According to Summerbell, 2009 it is important to balance underweight children's daily eating. If a variety of food in moderation and correct amounts are included on a daily basis their diet can be considered to be healthy. This is often not the case with underweight children and therefore it is essential to train them on the variety in moderation and correct amounts principle. Children's diet was bettered by informing parents on including variety, moderation, and correct amounts into their children's

diet. To be classified into a healthy weight ratio the body need a wide variety of nutrients to supply energy, protein, vitamins and minerals to our bodies. If any of these nutrients is deficient, underweight develops (Ottermann & Gardener 2010). Of importance to this study was the inclusion of high protein foods on training days.

5.18.1 Variety, moderation and correct amounts

Children in the study were encouraged to eat a variety of food in moderation following the correct amounts principle. The food introduced was rich in carbohydrate (bread, potato, rice and cereal), protein (meat, fish, chicken, eggs, legumes, milk, and cheese), fat (peanut butter, avocado, nuts, and seeds), vitamins and minerals (fruit and vegetables) daily. Underweight children often only eat from one or two food groups only making their diet an unbalanced one.

5.18.2 Water

Children in the study were encouraged to drink water often before, after and in between exercises. In Edmonds *et al.* (2009) the positive effects of drinking more water were found in children's cognition ability.

5.19 POST TEST QUESTIONNAIRE

The post test questionnaire as included in Appendix F was completed by program participants at the end of training program. This was done in order to assess knowledge, skill and competence levels of trainees on completion of the training given.

5.20 STATISTICAL ANALYSIS

The collected measurements were captured on a computer and analysed by means of the SPSS package (Statistical Package for the Social Sciences).

5.20.1 Descriptive statistics

Descriptive statistics can be described as follows: "*Descriptive statistics is a medium for describing data in manageable forms*" (Babbie, 1992: 430). Descriptive statistics presented within this study included the number of participants, minimum and maximum values, mean scores and standard deviations. These descriptive statistics

gives the reader an indication of the nature of the data on all variables measured for reference purposes.

Mean score: The mean score is used to describe central tendency. The mean score is computed by adding up all the applicable values and dividing it by the number of cases. The mean scores on all measurements for each group were calculated in order to be able to compare changes in performance over time (Research methods, knowledge base; <http://www.socialresearchmethods.net/kb/statdesc.php>).

Standard Deviation: The Standard Deviation shows the relation that a set of scores has to the mean of the sample. It gives an indication of the distribution of data around the mean on all variables measured. The higher the standard deviation, the more the data is dispersed (Research methods, knowledge base; <http://www.socialresearchmethods.net/kb/statdesc.php>).

5.20.2 Inferential statistics

“Inferential statistics assists you in drawing conclusions from you observations; typically, that involves drawing conclusions about a population from the study of a sample drawn from it” (Babbie, 1992:430).

The Wilcoxon signed-rank test is a non-parametric test that can be used to test two related samples or repeated measurements on a single sample. The Wilcoxon test involves comparisons of differences between measurements. It is often used to test the difference between scores of data collected before and after an experimental manipulation. This test was used to determine whether statistically significant changes took place within each group over time (Wikipedia; http://en.wikipedia.org/wiki/Wilcoxon_signed-rank_test).

5.21 CONCLUSION

This chapter investigated the possibility that South Africa as a developing country is facing many challenges. One of these challenges is food insecurity and hunger within South African households. The adverse consequences of food insecurity on health, psychological, behavioural, learning and academic performance of learners have been stated in this chapter. Data collected in the research process suggests

that the number of food insecure people in urban areas in South Africa is increasing and could account for an increasing share of under nutrition and underweight amongst children in urban schools and therefore the need to develop a training program for care givers.

Community structure, opportunities and resources available for care are different in urban and rural areas bringing about many challenges to urban community settings such as schools. Communities and schools have a vital role to play in bringing about change within the community as to create greater awareness of people's daily needs on the micro level.

The aim of the training program described was to create a greater awareness among role players especially care givers in schools, as to establish the needs in food insecure learners in schools today. Care giver initiatives as described in this chapter are helping to bring about change on the meso level strengthening communities in the process.

Training and caring for care givers in alternative care giving settings such as schools have in many ways become a necessity in order to deal with the challenges such as the influence of urbanisation, structural changes in families and time constraints of the mother set by urban life today. These factors mentioned are the challenges to the nutritional status of school going children in South Africa today. Experienced care givers can help primary care givers (the mother) through challenging and confusing moments of parenthood and can be a valued source of parenting advice.

Better nutrition can happen, when every level of society, individuals, health professionals, communities, governments and the private sector work in partnership. The influence that the care giver training program had on knowledge, skill, and competence of care givers will be described in the next chapter. Post test results on health related fitness indices as obtained from the Wilcoxon Signed Ranks test will also be discussed.

CHAPTER 6

RESULTS AND DISCUSSION

6.1 INTRODUCTION

In order to influence underweight prevalence in South African schools care givers need to display relevant knowledge, skill and competence that can be applied to the phenomenon of underweight in children. In this study care givers underwent a nine week training program covering related aspects as to equip them with the necessary knowledge and skill when faced with the challenge of underweight in children. The training was done according to project management principles in a project needs assessment and outcome format. Information was collected from the research questionnaire, interviews with subject experts and focus group interviews. The influence of the training program on knowledge, skill and competency of the care givers will be determined when applying a failure mode and effects analysis (FMEA profile) to the components of knowledge, skill and competence.

6.2 UNDERSTANDING KNOWLEDGE, SKILL AND COMPETENCE IN TRAINING PROGRAMS

For the purpose of this study the following definitions and or descriptions will apply in clarifying research concepts:

6.2.1 Knowledge

Knowledge is defined by Langford (2007) as:

- Expertise and skills acquired by a person through experience or education;
- The theoretical or practical understanding of a subject;
- What is known in a particular field of study or interest;
- Facts and information acquired; and
- Awareness or familiarity gained by experience of a fact or situation.

Knowledge can be described as the acquisition of complex cognitive processes such as perception, learning, communication, association and reasoning.

6.2.2 Skill

Skill is defined by Langford (2007) as the ability and capacity acquired through deliberate, systematic and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas (cognitive skills), things (technical skills) and or people (interpersonal skills).

6.2.3 Competence

Competence is defined by Langford (2007) as: *...”a cluster of related knowledge and skills that affect a major part of a person’s job (a role or responsibility), that correlates with performance on the job, that can be measured against well accepted standards, and can be improved via training and development”*. Competence in the most generic form can be described as an underlying characteristic which leads to successful performance in a life role.

6.3 PROJECT NEEDS ASSESSMENT AND OUTCOMES: MODULE 1

In this module of the training program project needs were identified and information obtained, using the post test questionnaire (Appendix F). The care givers responded as follows:

- Knowledge on the important role that exercise can play in supporting underweight children. Outcome achieved;
- Active involvement of care givers in movement programs. This outcome was achieved but can be further investigated; and
- Active involvement of care givers in service training programs. This outcome was achieved and can be expanded on.

6.4 PROJECT NEEDS ASSESSMENT AND OUTCOMES: MODULE 2

In this module project needs were identified and information obtained, using the post test questionnaire (Appendix F). The care givers responded as follows:

- Knowledge on basic nutrition principles. Outcome achieved; and
- Knowledge on the important role that food and nutrition programs can play in supporting underweight children. This includes identifying nutritious choices that can be made by children. Outcome achieved.

6.5 PROJECT NEEDS ASSESSMENT AND OUTCOMES: MODULE 3

In this module the following project needs were identified and information obtained, using the post test questionnaire (Appendix F). Care givers responded as follows:

- (i) Knowledge on the importance of preventative action and education in preventing underweight in children. This includes:
- The monitoring of lunch boxes. Care givers are actively involved here. Outcome achieved;
 - Monitoring tuck shop visits. Care givers are actively involved here. Outcome achieved; and
 - Presentations to parents. Care givers indicated that they need more experience in this area.

6.6 FAILURE MODE AND EFFECTS ANALYSIS (FMEA PROFILING) AS PROJECT TOOL

In this study a project management approach were executed in training the care givers. FMEA profiling as training tool to determine possible failures within the training program was used in the project. From Langford (2007) a failure mode and effects analysis (FMEA profile) is a procedure for analysing potential failure modes within a system/program in order to classify the effects that failures can have on a system/program. If these failures are detected early on corrective action can follow quickly saving time and money spent (Langford, 2007).

6.7 A DESCRIPTION OF BASIC FMEA PROFYLING TERMS

The following terms will be used in the profiling of knowledge, skill and competence; as found in Langford (2007).

6.7.1 Function.

A function can be described as the phenomenon under investigation and its purpose within a system or programme.

6.7.2 Failure mode.

Can be described as the manner by which a failure is observed; it describes the way the failure occurs.

6.7.3 Failure cause.

Can be described as are the underlying cause of the failure or which initiate a process which leads to failure.

6.7.4 Failure effect.

Can be described as the effect the failure will have as an end result if not corrected in time.

6.7.5 Corrective action.

Can be described as the way in which a particular failure can be corrected once detected.

6.8 APPLYING FMEA PROFILING TO KNOWLEDGE, SKILL AND COMPETENCE IN CARE GIVER TRAINING

6.8.1 Knowledge

In module 1 of the training program knowledge on the important role that exercise play in support of underweight children were identified as the training need. When applying a FMEA process to this program objective the following profile is drawn; making it possible to determine possible failures, the cause and effect it may have on programme outcomes and corrective action that can be taken.

Profile 6.1 FMEA profile testing knowledge in the training program.

Function	Failure mode	Cause	Effect	Corrective action
Knowledge	Low risk	Program participants have a clear understanding of exercise intervention	Outcome achieved	none

In module 3 of the training program knowledge on dealing with individual, household and community factors affecting children’s lifestyle and nutritional status were identified as the training need. When applying a FMEA process to this program objective the following profile is drawn; making it possible to determine possible failures, the cause and effect it may have on program outcomes and corrective action that can be taken.

Profile 6.2 FMEA profile testing knowledge in the training program.

Function	Failure mode	Cause	Effect	Corrective action
Knowledge	Low risk	Program participants indicated a clear understanding of the factors affecting children’s nutritional status	Outcome achieved	none

In module 4 of the training program knowledge on basic nutrition principles were identified as the training need. When applying a FMEA process to this programme objective the following profile is drawn; making it possible to determine possible failures, the cause and effect it may have on program outcomes and corrective action that can be taken.

In module 5 of the training program knowledge on the importance of preventative action and education in preventing underweight in children were identified as the training need. When applying a FMEA process to this program objective the following profile is drawn; making it possible to determine possible failures, the cause and effect it may have on program outcomes and corrective action that can be taken.

Profile 6.3 FMEA profile testing knowledge in the training program.

Function	Failure mode	Cause	Effect	Corrective action
Knowledge	Low risk	Program participants have a clear understanding of nutrition principles taught	Outcome achieved	none

Profile 6.4 FMEA profile testing knowledge in the training program.

Function	Failure mode	Cause	Effect	Corrective action
Knowledge	Low risk	Program participants have a clear understanding of preventative actions	Outcome achieved	none

6.8.2 Skill

In module 3 of the training program care givers indicated that they require more skill when investigating personal hygiene in children and their home environment. When applying a FMEA process to this program objective the following profile is drawn; making it possible to determine possible failures, the cause and effect it may have on program outcomes and corrective action that can be taken.

In module 1 of the training program care givers indicated that they require more skill when designing and conducting movement programs. When applying a FMEA process to this program objective the following profile is drawn; making it possible to determine possible failures, the cause and effect it may have on program outcomes and corrective action that can be taken.

Profile 6.5 FMEA profile testing skill in the training program.

Function	Failure mode	Cause	Effect	Corrective action
Skill	Medium risk	Not enough experience yet	Partial achievement in program outcome	Gaining experience over time e.g. reading, more support and further training

Profile 6.6 FMEA profile testing skill in the training program.

Function	Failure mode	Cause	Effect	Corrective action
Skill	Medium risk	Not enough field experience	Partial achievement in program outcome	Gaining experience e.g. visits, support and further training

6.8.3 Competence

In module 6 of the training program care givers indicated that they require more competence in designing and conducting work sheets and delivering presentations to parents. When applying a FMEA process to this program objective the following profile is drawn; making it possible to determine possible failures, the cause and effect it may have on program outcomes and corrective action that can be taken.

Profile 6.7 FMEA profile testing competence in the training program.

Function	Failure mode	Cause	Effect	Corrective action
Competence	Medium risk	Not enough experience yet	Partial achievement in program outcome	Support and further training

This will conclude the section on FMEA profiling testing the effect of a care giver training program on knowledge (skill and competence).

Comments on testing the effect of a care giver training program on underweight prevalence will follow.

6.9 TESTING THE EFFECT OF A CARE GIVER TRAINING PROGRAM ON UNDER WEIGHT PREVALENCE IN SCHOOL CHILDREN USING STATISTICAL ANALYSIS

6.9.1 Objectives

The Objective of the study was to determine what the effect of a care giver training program was on under weight prevalence in school children.

6.10 RESULTS

The results of this study will be presented in the following order.

- Composition of the sample;
- Descriptive statistics per group for all pre-test and post-test measurements; and
- Results of the comparison of pre-test and post-test results within groups over time.

The results in Figure 6.1 show that half of the children (54.67%) were considered healthy according to their BMI index. A fifth (20%) was over weight with 25.33% considered underweight.

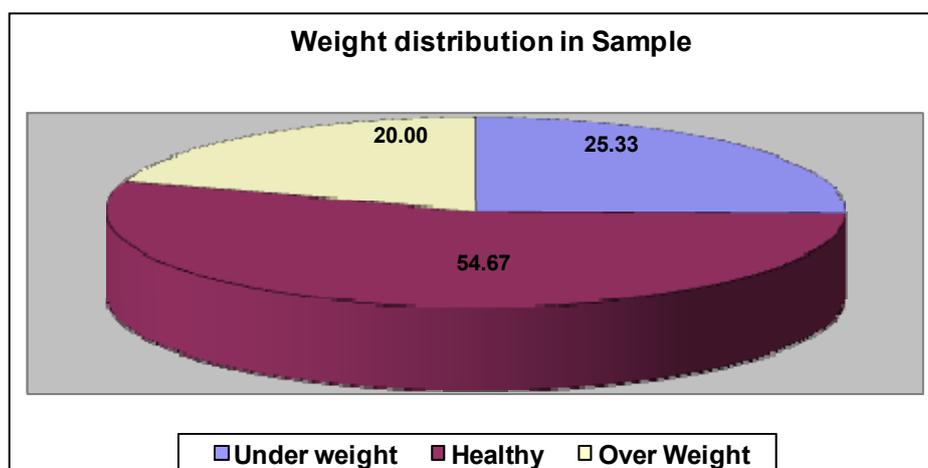


Figure 6.1: Composition of the sample.

6.10.1 Descriptive statistics per group for all pre-test and post-test measurements

The results in Table 6.1 contain the descriptive statistics of all measurements per group. This table can be used for reference purposes on the performance of the three groups on all measurements taken over time. The results of both the pre- and the post-test are presented.

Table 6.1 Descriptive statistics per group over time (Smit, 2008).

BMI Recoded Pre-test		N	Mean	Std. Deviation	Minimum	Maximum
Under Weight	BMI Pre-test	38	12.95	0.65	11.68	13.97
	Muscle tone Pre-test	38	7.37	3.19	0.00	10.00
	Sit-ups Pre-test	38	0.47	1.39	0.00	7.00
	Flex (cm) Pre-test	38	43.00	8.68	20.00	63.00
	Cardio (sec) Pre-test	38	24.66	9.06	6.00	43.00
	Push-ups Pre-test	38	5.16	1.87	1.00	8.00
	BMI Post-test	38	15.94	1.87	12.53	21.18
	Muscle tone Post-test	38	7.18	2.64	2.00	15.00
	Sit-ups Post-test	38	6.87	3.15	1.00	10.00
	Flex (cm) Post-test	38	35.50	5.14	26.00	46.00
	Cardio (sec) Post-test	38	100.11	32.25	10.00	180.00
	Push-ups Post-test	38	7.13	2.72	1.00	10.00
Healthy	BMI Pre-test	82	15.32	0.81	14.04	16.94
	Muscle tone Pre-test	82	6.29	4.19	0.00	12.00
	Sit-ups Pre-test	82	0.67	1.84	0.00	8.00
	Flex (cm) Pre-test	82	39.59	6.43	23.00	57.00
	Cardio (sec) Pre-test	82	27.96	10.80	6.00	56.00
	Push-ups Pre-test	82	5.01	2.11	1.00	8.00
	BMI Post-test	82	15.97	2.52	12.76	26.16
	Muscle tone Post-test	82	7.99	3.38	2.00	15.00
	Sit-ups Post-test	82	7.06	3.14	1.00	10.00
	Flex (cm) Post-test	82	35.95	6.10	22.00	54.00
	Cardio (sec) Post-test	82	111.51	32.18	10.00	180.00
	Push-ups Post-test	82	7.09	2.75	1.00	10.00
	Over weight	BMI Pre-test	30	18.48	1.45	17.00
Muscle tone Pre-test		30	6.00	4.67	0.00	10.00

BMI Recoded Pre-test		N	Mean	Std. Deviation	Minimum	Maximum
	Sit-ups Pre-test	30	0.87	1.76	0.00	6.00
	Flex (cm) Pre-test	30	40.23	8.72	21.00	60.00
	Cardio (sec) Pre-test	30	30.37	10.78	10.00	58.00
	Push-ups Pre-test	30	4.20	1.56	1.00	7.00
	BMI Post-test	30	15.97	2.41	12.31	25.26
	Muscle tone Post-test	30	7.60	3.16	2.00	15.00
	Sit-ups Post-test	30	7.50	2.83	1.00	10.00
	Flex (cm) Post-test	30	35.63	5.39	22.00	48.00
	Cardio (sec) Post-test	30	111.10	30.31	50.00	190.00
	Push-ups Post-test	30	7.27	2.85	2.00	10.00

6.10.2 Results of the comparison of pre-test and post-test results within groups over time

The following section looks at each group of children and compares their performance over time. Table 6.1 was used to determine whether statistically significant changes occurred over time. The results of these analyses are presented in Figures 6.2 to 6.6.

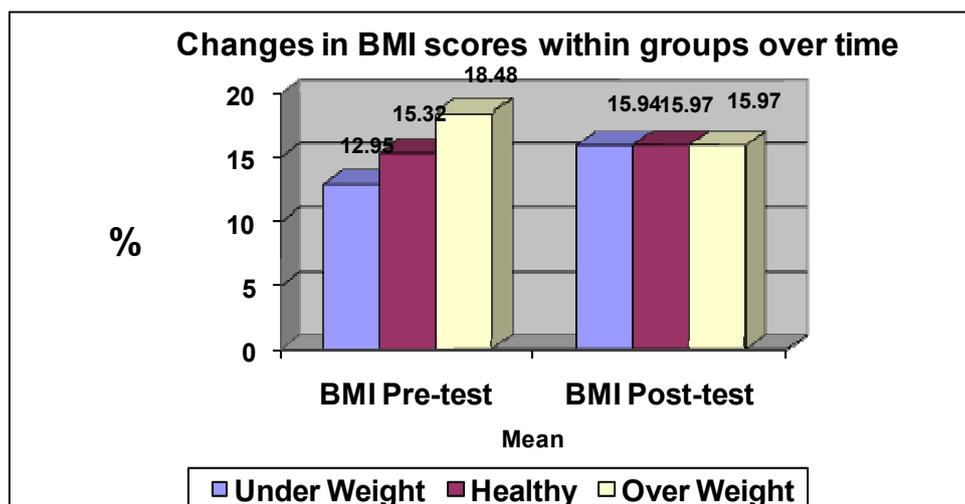


Figure 6.2: Changes in BMI scores within groups over time.

The results in Figure 6.2 give an indication of the BMI scores of the three groups over time. Only two statistically significant changes occurred. The post-test scores

of the under weight groups were higher than the pre-test scores in the majority of cases. The opposite was true for the over weight group where the majority of children had lower BMI scores during the post-test. No statistically significant changes took place in the BMI scores of the healthy group. These differences were significant at the 5% level of significance.

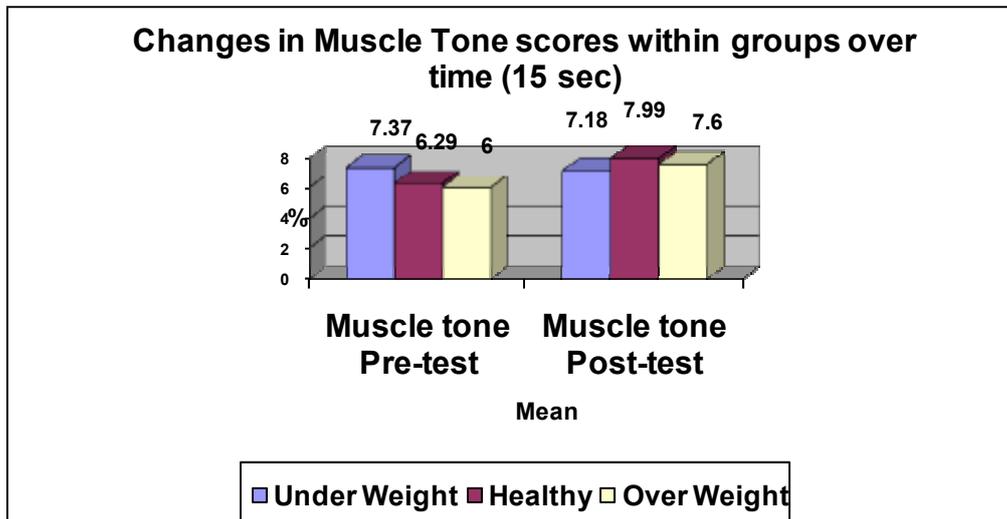


Figure 6.3: Changes in muscle tone scores within groups over time (15sec)

Two statistically significant changes were detected in muscle tone scores. Both the healthy and over weight groups showed a significant increase in muscle tone scores. While the healthy groups' change was significant at the 5% level, the over weight groups' change was significant at the 10% level of significance. The under weight group showed no statistically significant change in muscle tone scores.

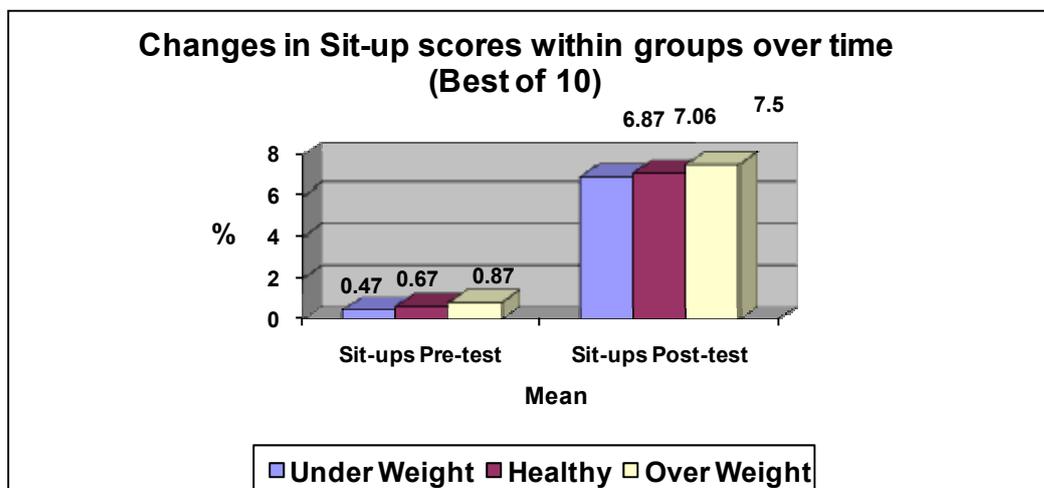


Figure 6.4: Changes in sit-up scores within groups over time (best of 10)

All three groups showed a statistically significant increase in the number of sit-ups they were able to complete over time (Figure 6.4). These differences were significant at the 5% level of significance.

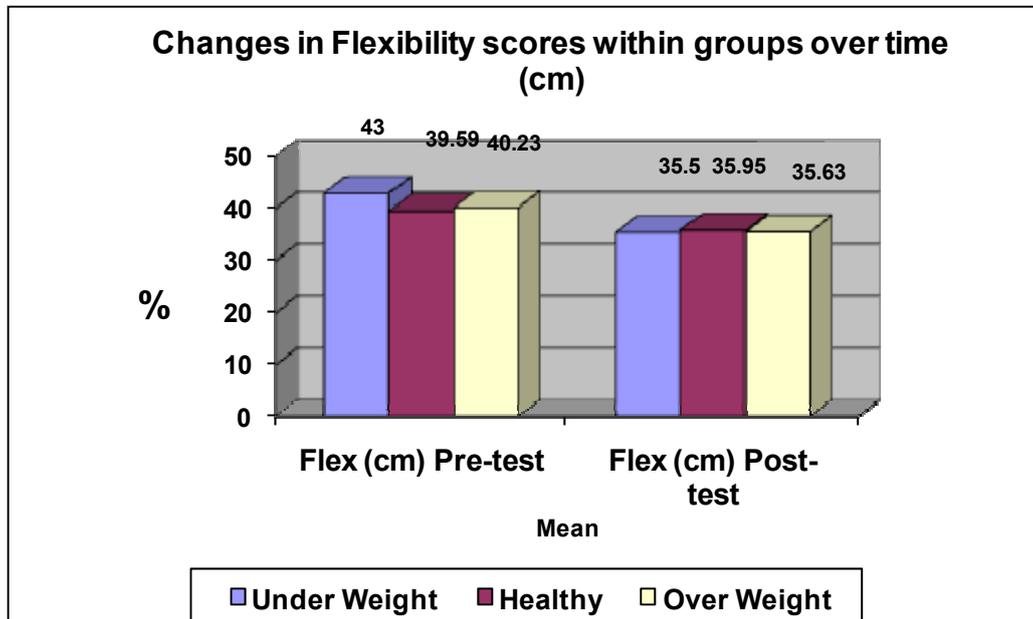


Figure 6.5: Changes in flexibility scores within groups over time, (cm).

All three groups showed a statistically significant decline in Flexibility scores over time. In the majority of cases post-test scores were lower than pre-test scores. These differences were significant at the 5% level of significance.

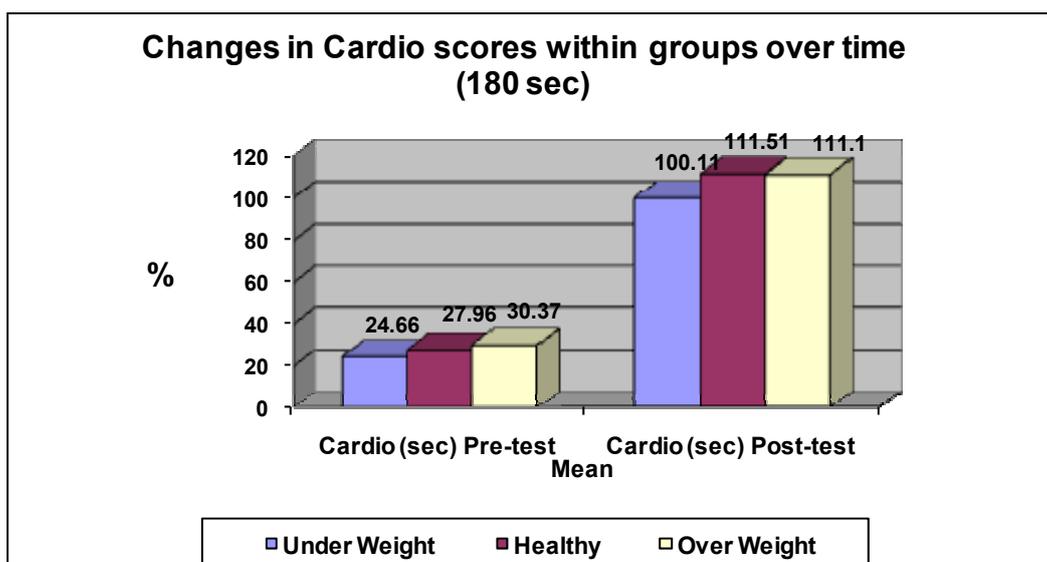


Figure 6.6: Changes in cardio scores within groups over time (180 sec).

The cardiovascular scores of all three groups increased significantly over time (Figure 6.6). These differences were significant at the 5% level of significance.

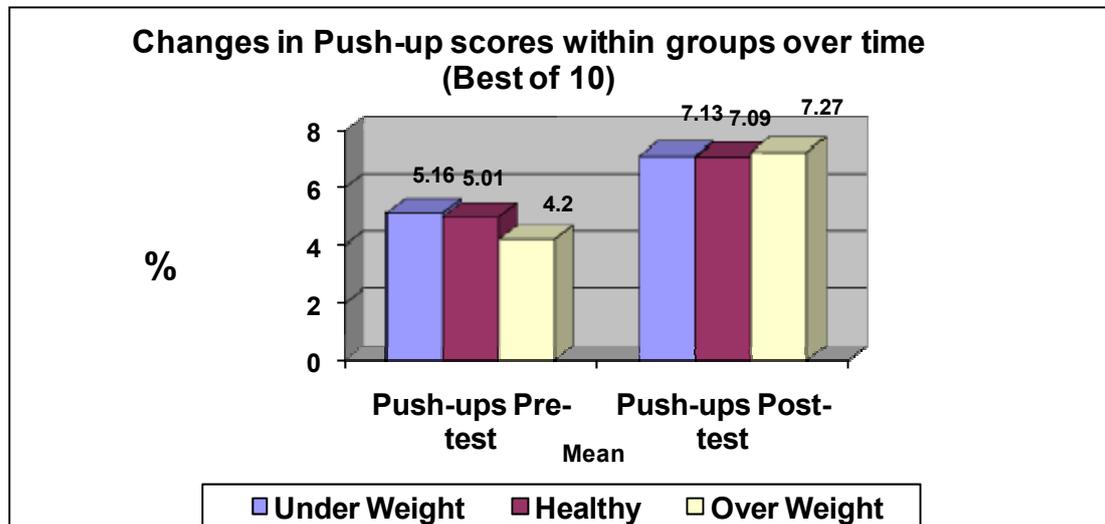


Figure 6.7: Changes in push-up scores within groups over time (best of 10).

The results in Figure 6.7 indicate that all three groups showed an increase in the number of push-ups they could perform. These changes were significant at the 5% level of significance.

6.11 DISCUSSION

Many South African School children living in urban areas are facing a health crisis and it might be an unexpected one. Paradoxically while many children suffer the health consequences of living in an affluent society too many South African children go to school hungry presenting profiles of an underweight status. This could result in starting their school careers on the back foot from a very young age. Sallis and Glanz (2006) and Summerbell (2009) states that children today face a health crisis as that recent change in the nutritional environment including a greater reliance on convenience foods and fast foods, a lack of access to fruits and vegetables and expanding portion sizes are contributing to the epidemic of childhood obesity. Furthermore children’s diets are high in fat and sugar, low in fruits and vegetables and are low in many essential nutrients. They do not get enough exercise and are spending more and more time in solitary, sedentary activities like watching television

playing computer games or play station (Sallis & Glantz, 2006). At the same time they are enticed by the media to consume high calorie foods and be inactive the western culture promotes an obsession with thinness. Girls and boys are dieting at younger and younger ages in order to be thin. Some are stunting their growth in height and compromising their health by restricting their food intake. The prevalence of eating disorders has increased dramatically at the same time that obesity levels among children are reaching record highs (M^c Millen *et al.*, 2009). For a long time obesity and physical inactivity are increasing problems in childhood (Graf *et al.*, 2005). It seems that physical inactivity is also a problem when children are underweight and that school-based interventions in primary school might contribute to counteract this development (Rogers *et al.*, 2005). The motivation for this study stems from the problem that urbanised children (boys and girls) in South Africa are facing a health crisis for which society will pay a high price in the long run. The researcher believes that in designing a training program for care givers of underweight children a better understanding of these children's health needs are underlined and this will help make their plight a visible one.

In learning, development and movement, there are three important things to remember:

- Physical development has a first call on brain activity;
- Physical development (sensory integration, sensory-motor integration and balance) forms the foundation for all later skills – emotional, cognitive and social skills; and
- Physical development happens through movement (De Jager, 2009).

Does this then mean that if a hiccup occurred in a child's developmental process that a delay in reaching physical milestones or a scrambled sequence of milestones reached will impact on children's emotional, social and intellectual development? From De Jager (2009) the clear answer is YES! This answer has tremendous consequences when considering underweight in children.

Millennium Development Goal 1 indicates that there is a fundamental interrelation between poverty and hunger as hunger is often both a consequence and a cause of poverty. In all regions of the world, in the absence of determined public policies,

people who live on low incomes tend to have far worse diets than those who are better off. People who lack adequate nutrition have to struggle harder to avoid or extricate themselves from poverty than healthier well nourished people (UNICEF, 2006). Although the sample under investigation in this research project came from middle to high income grouping children in this sample still demonstrated inadequate dietary intake to meet energy demands set in a school day. Children under investigation in the sample confirmed the trend towards westernised eating patterns and lack of physical activity. This trend contributes to the problem of underweight prevalence in South African schools. Care givers were trained in order to deal with these trends.

According to Senekal (2007) the present-day classification of eating disorders has been expanded and more eating disorders are being added to the list as demographics are shifting. More and more South Africans are affected than ever before Hawkins *et al.* (2009) and viewed in Food Security Directive SA (2006). From Lopez *et al.* (1998:21) the following: *"These children's diets are high in fat and sugar, low in fruits and vegetables, and thus low in many essential nutrients. They do not get enough exercise and are spending more time on solitary, sedentary activities like watching television and playing computerised games. Furthermore they are enticed by the media to consume high caloric foods and be inactive while – in sharp contrast – a culture that promotes an obsession with thinness is put across. Girls and boys are dieting at younger and younger ages in order to be thin. Some are stunting their growth in height and compromising their health by restricting their food intake. The prevalence of eating disorders has increased dramatically at the same time that obesity levels among children are reaching record highs"*.

In this study care givers were made aware of these disturbing trends and research in this study confirmed that paradoxically, while many of the children in the sample do suffer the health consequences of over-consumption and eating disorders (being overweight at a very young age) too many show the signs of sub-optimal diets, inactivity and food insecurity (hunger) leading to underweight as a new phenomenon in South African schools. As many as 25, 33% children were found to be underweight at the start of this study. The tell-tale signs hereof are tiredness, an inability to concentrate, impaired cognitive abilities and a state of apathy (Rosales *et*

al., 2009). The sample investigated complied with these symptoms. According to Lopez *et al.* (1998) the greatest immediate negative consequences of weight related problems in children are psychological and social.

A recent study done in California showed that less than 1% youth in America ate the recommended number of servings from all food groups. 45% of these children met only one or none of the recommendations (Lopez *et al.*, 1998). The same trend might ring true for South African youth, as the number of obese and underweight children are a reality. In this study alone 25, 33% were classified as under weight, 54.67% were classified as healthy and 20% were found to be overweight. Many were found not to have access to fresh fruit and vegetables on a daily basis, primarily relying on the school tuck shop.

Most Glenstantia Primary School learners (the focus group in this study) did not meet the minimum fitness standards set e.g. cannot perform a 3 minute fitness step test or best of 10 sit up test. Only 54.67% of the Grade 1 intakes in the 2007 to 2008 period were able to meet the minimum standards for body composition, upper body strength and flexibility. These fitness indices are important in determining fitness levels in children. This left 45, 33% children in this group at risk. Of the 45.33%, 20% of the children were found to be overweight and 25, 33% were found to be underweight emphasising the need for support. Preventative action in the form of a care giver training program was embarked on. Troiano *et al.* (2008) and Andersen *et al.* (2009) maintain that it is recommended that children and adolescents engage in at least 60 minutes of vigorous physical activity per day. It is not necessary to get the recommended 60 minutes in one episode. Children can take advantage of many opportunities to exercise and be physically active during the day. Klippen (2009) found that children with motor disabilities are at increased risk of compromised bone health due to impaired weight bearing. Poor nutritional status may be an additional risk factor.

According to the Report card on Physical Activity and Health in South African Children and Youth (2010) children in South Africa are less active than ever. Boreham & Riddoch (2001) states that despite their natural tendencies to be active, children have become less physically active recently. Children are expending

approximately 600 kcal days less than their counterparts 50 years ago. In Nel (2000) the factors influencing physical activity levels in children are:

- Television viewing: Children are spending more and more time watching television and playing at the computer. In an American survey (NHANES 111) four or more hours of television watching per day is reported. Similar patterns as obtained from the research questionnaire were found. The average viewing time in South African children were around two to three hours per day;
- Opportunity and availability: They have less opportunity for structured and unstructured physical activity at school, at home and in their communities. Children are often driven to school because parents feel the streets are unsafe. Many communities lack safe places and opportunities for children to play and be physically active. Costs of organised sports and sports equipment are also cited as barriers for some youth as well as lack of transportation to sporting events and play areas. Households where both parents work experience particular challenges in this area;
- Social influence, parents, peers and others: Parents serve as role models and provide opportunity and encouragement for physical activity. Children of parents who are physically active are five times more likely to be physically active than children with inactive parents. Parents who may observe the neighbourhood as unsafe may also limit outdoor play and walking or biking to school. Young children also feel that school promotions and advertising of benefits would help encourage physical activity. Friends, parents and family are main sources of information regarding the health benefits of physical activity. Many South African school children do not have the advantage of these said benefits. The research questionnaire indicated that parents are not involved in time spent doing physical activities with their children;
- Embarrassment and self efficacy: Overweight youth or children' self believe is found to be awkward or they have too few physical skills and therefore too embarrassed to try. Youth are also more willing to participate if physical activities are non competitive and achievable by youth of a wide range of skills and physical abilities. Not liking sports, feeling embarrassed, and feeling too out of shape or weight related issues are also amongst factors

seen as barriers to physical activity. In this study underweight children expressed the same feelings of inadequacy as they lacked the energy to participate in sport and exercise programs. Care givers were trained on this aspect;

- Conflicting priorities: Dating, jobs, homework and lack of time are also frequently cited by youth as barriers to physical activity. In this study a lack of time were indicated as the main contributing barrier to exercise participation. The research questionnaire indicated that many of the children in this study get home late, spending most of their afternoons at the schools after care facility.

Care givers were made aware of the above mentioned factors influencing activity levels in young children. The general lack of physical activity amongst young children is alarming as the establishment of an active lifestyle early on is critical. Not only are habits formed early in life but some of the health risks resulting from inactivity are developed in childhood and can not be reversed Lopez *et al.* (1998) and viewed in Hawkins *et al.* (2009). A sedentary lifestyle substantially increases people's risk for coronary artery disease, stroke, high blood pressure, other cardiovascular conditions and Type 2 diabetes. The risk of some cancers, especially colon cancer, is also associated with low levels of physical activity (Sirard & Pate, 2001). Weight bearing exercise is critical to ensure development of peak bone mass during the first 2 to 3 decades of life in reducing the risk of osteoporosis later in life (Sirard & Pate, 2001). Breakfast is recommended as part of a healthy diet as it is associated with healthier macro and micronutrient intakes BMI and lifestyle (Hoyland *et al.*, 2009).

The aim of this study was to increase knowledge, skill and competence in school teachers (care givers) when dealing with underweight in school children through a training program (train-the-trainer) designed by the researcher. Under nutrition (underweight) is implicated in more than half of all child deaths worldwide. 25.33% of respondents in the study showed signs of underweight highlighting the importance of such training in schools and supported in Van der Horst *et al.* (2007).

Using the above statistical data the research embarked on the development, implementation and evaluation of a training program for care givers of underweight

children in South African Schools. The intervention research model of Thomas and Rothman was used in the design and development of the training program. A descriptive design with a quasi-experiment one group pre-test-post test was used in this study. A non parametric statistical test was utilized as data was measured on an ordinal scale. (Wilcoxon signed rank test).

The Care Giver training program was implemented over nine weeks consisting of one and a half hour sessions, held once weekly. All foundation phase teachers were involved in the training (18 Care Givers). The program was implemented with Grade one learners at a traditional primary school in Pretoria with a mixed demography and age groups varying between 6 and 8 years of age. Hundred and Fifty learners participated in the pre and post test wherein a non probability sampling method was used.

The study found that the training program for care givers had a statistically significant effect on underweight prevalence in young children. FMEA profiling in this study confirmed that enhancing care giver knowledge, skill and competence contributes significantly to the changes experienced. The results indicated that there is a correlation between exercise training, dietary intervention and intervention programs. BMI levels changed significantly (25.33% children were underweight during the pre-test). After implementing the training program this figure came down to 15, 33%.

According to Rogers *et al.* (2005) there are significant differences in motor performance in unimpaired low birth weight (underweight) survivors as reflected in aerobic capacity, strength, endurance flexibility and activity level. From Hands (2008) motor competence is also associated with physical activity in both males and females; this is of importance when analysing anthropometric data as obtained from the Wilcox on Signed Rank pre-test and post test (Appendix B) the following results were obtained:

6.11.1 Body Mass Index (BMI):

In the weight distribution sample half of the children (54.67%) were considered healthy scoring an average of 15.32% on the BMI index. A fifth (20%) was overweight scoring an average of 18.48% on the BMI index and (25.33%) were

considered underweight scoring an average of 12.95% on the BMI index prior to the training program.

When investigating the results in this study the following comparison: The results in Figure 6.2 give an indication of the BMI scores of the three groups over time. Only two statistically significant changes occurred. The post-test scores of the under weight groups were higher than the pre-test scores in the majority of cases. The opposite was true for the Over weight group where the majority of children had lower BMI scores during the post-test. No statistically significant changes took place in the BMI scores of the healthy group. These differences were significant at the 5% level of significance. This result is consistent when compared to literature on the influence of exercise on BMI values. Strength training exercise increase bone mass and lower fat content in the body (Nemet *et al.*, 2005). This result is also consistent when compared to literature on improving muscle mass through dietary intervention. The inclusion of more protein adds to muscle weight (Paizes, 2007). The training program included this aspect in the exercise phase. Care givers monitored the underweight children's eating habits.

6.11.2 Muscle Tone:

The scores for muscle tone (15sec) were as follows:

- 7.37sec on average for underweight children tested;
- 6.29 sec on average for healthy children tested;
- 6.0 sec on average for overweight children tested; prior to the training program.

When investigating the results of this study two statistically significant changes were detected in muscle tone scores. Both the healthy and over weight groups showed a significant increase in muscle tone scores. While the healthy groups' change was significant at the 5% level the over weight groups' change was significant at the 10% level of significance. The under weight group showed no statistically significant change in muscle tone scores (Figure 6.3). Although strength training normally has a significant influence on muscle tone as found in Nel (2000) low birth weight (underweight children) do show lower scores with regard to strength endurance (muscle tone) in general when compared to healthy children's (Rogers *et al.*, 2005).

The training program could be changed in future as to better on the muscle tone scores.

6.11.3 Muscular endurance (sit-ups):

The scores for sit-ups performed (best of 10) were as follows:

- 0.47 on average for underweight children tested;
- 0.67 on average for healthy children tested;
- 0.87 on average for overweight children tested prior to the training program.

When investigating the results in this study all three groups showed a statistically significant increase in the number of sit-ups they were able to perform over time (Figure 6.4). These differences were significant at the 5% level of significance. This result is consistent when compared to literature on the influence of exercise on abdominal strength. An increase in abdominal strength is expected when performing strength endurance exercises such as sit-ups (Lin, 2005). This result is significant as low birth weight (underweight) children can do fewer sit ups in general when compared to healthy children's performance hereof (Rogers *et al.*, 2005).

6.11.4 Muscular endurance (push-ups):

The scores for push-ups performed (best of 10) were as follows:

- 5.16 on average for underweight children tested;
- 5.01 on average for healthy children tested;
- 4.20 on average for overweight children tested, prior to the training program.

When investigating the results in this study the results in Figure 6.7 indicate that all three groups showed an increase in the number of push-ups they could perform over time. These changes were significant at the 5% level of significance. This result is consistent when compared to literature on the influence of exercise on upper body strength. An increase in upper body strength is expected when performing strength endurance exercises such as push-ups (Hoffman *et al.*, 2005). This result is significant as low birth weight (underweight) children normally score low on push-up scores (Rogers *et al.*, 2005).

6.11.5 Flexibility:

The scores for flexibility (45cm) were as follows:

- 43.00 cm on average for underweight children tested;
- 39.59 cm on average for the healthy children tested;
- 40.23 cm on average for overweight group tested, prior to the training program.

When investigating the results of this study all three groups showed a statistically significant decline in Flexibility scores over time (Figure 6.5). In the majority of cases post-test scores were lower than pre-test scores. These differences were significant at the 5% level of significance. In a study by Araujo (2008) similar results on the influence of exercise on being flexible were found. It is recommended in Faigenbaum *et al.* (2005) that children perform moderate to high intensity dynamic stretching exercises prior to the performance of activities that require high power output. The training program can be changed to accommodate this finding. Tighter hamstrings in underweight children are normally found when compared to healthy children with normal weight distribution (Rogers *et al.*, 2005).

6.11.6 Cardio-Respiratory Endurance:

The scores for cardio-respiratory endurance (180 sec) were as follows:

- 24.66 sec on average for the underweight children tested;
- 27.96 sec on average for the healthy children tested;
- 30.37 sec on average for the overweight children tested, prior to the training program.

When investigating the results of this study cardiovascular scores of all three groups increased significantly over time (Figure 6.6). These differences were significant at the 5% level of significance. This result is consistent when compared to literature on the influence of exercise on cardio vascular fitness. An increase in cardio-respiratory endurance is reported after strength and endurance training (Watts *et al.*, 2005). The results are significant as low birth weight (underweight) children normally have lower aerobic capacity (Rogers *et al.*, 2005).

The results in this study show that underweight children can improve on their health status when the correct exercises and diet are prescribed and they do not necessarily have to go through life unhealthy, sick and at risk as so often found in literature (Rogers *et al.*, 2005). Underweight is a genuine and serious problem in

many parts of Africa and elsewhere in the world and many people may not realise that it actually exist beyond the confines of these impoverished areas (Otterman & Gardener, 2010). The results in this study indicate that although a person might appear relatively healthy they could still be suffering from malnutrition resulting in underweight. When children eat too little nutritious food their bodies are stripped from important nutrients leaving them tired and inactive. In the process underweight children struggle to cope with the daily demands of school life and life in general. From the results in this study it became evident that weight bearing exercise in combination with healthy eating patterns are critical to ensure development of peak bone mass during the first 2 to 3 decades in the lives' of underweight children. The training program had a significant influence on some of the fitness indices measured in this study and on BMI scores specifically. The influence that the training program had on knowledge, skill and competence in care givers were discussed.

6.12 SUMMARY OF RESULTS

The current study consisted of three groups of children classified as underweight, healthy and over weight according to their BMI scores. In order to compare the performance of each group over time their original classification was used to test progress even if their BMI score during the post-test would reclassify them into a different group. This was done in order to ensure that the progress of the same group of children is compared from the pre- to the post-test. The sample consisted of 150 children classified as: 25.33% being under weight, 54.67% being healthy and 20% over weight children.

The results of the analysis used to compare each groups performance over time can be summarised as follows. The BMI post-test scores of the under weight groups were higher than the pre-test scores in the majority of cases. The opposite was true for the over weight group where the majority of children had lower BMI scores during the post-test. No statistically significant changes took place in the BMI scores of the healthy group (Figure 6.8 & 6.9).

Two statistically significant changes were detected in muscle tone scores. Both the healthy and over weight groups showed a significant increase in muscle tone scores, while the under weight group showed no statistically significant change.

All three groups showed a statistically significant increase in the number of sit-ups and push-ups they were able to complete from pre-test to post-test.

All three groups showed a statistically significant decline in flexibility scores over time. The cardiovascular scores of all three groups increased significantly over time. It can be concluded that these differences in fitness are related to the intervention program followed and could have potential implications for schools with underweight children in general.

BMI Recoded Pre-test

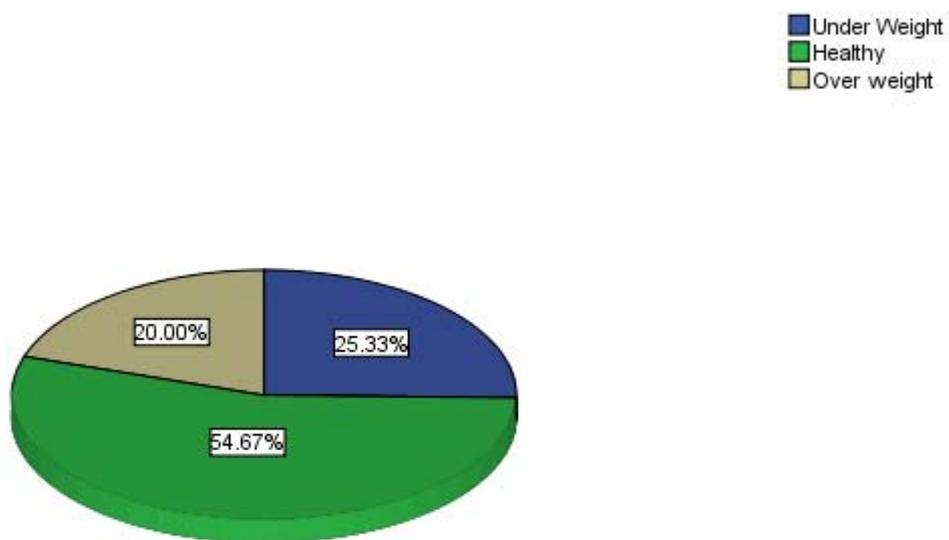


Figure 6.8: BMI recorded pre-test (Smit, 2008)

BMI recoded Post-test

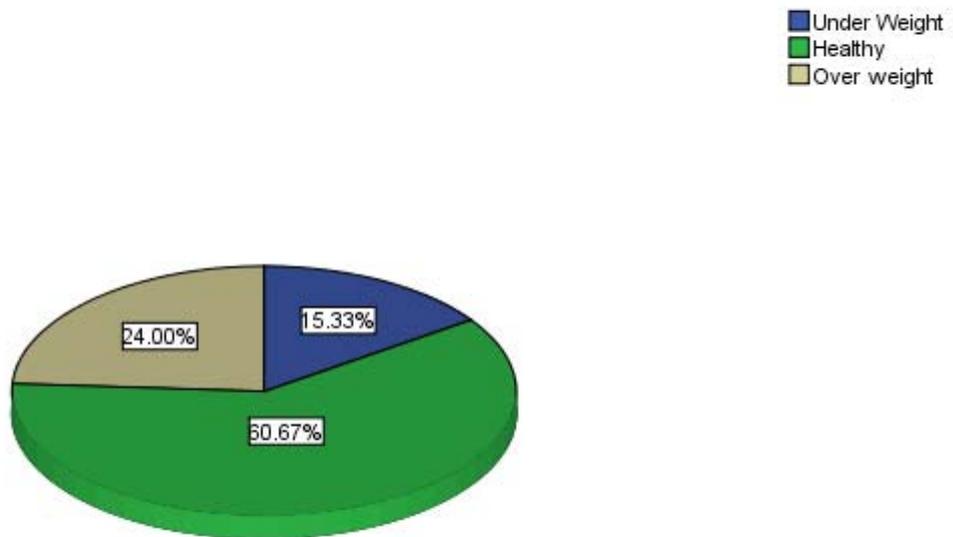


Figure 6.9: BMI recorded post-test (Smit, 2008).

These scores indicate that the training program had a significant influence on some of the fitness indices measured in this study and on BMI scores specifically.

6.13 CONCLUSION

In this chapter the influence of a care giver training program on knowledge, skill and competence levels of care givers were investigated and commented on. The effect that a care giver training program had on the prevalence of underweight in the school were investigated and commented on.

When investigating the influence of the training given on *knowledge* when faced with underweight as phenomenon in primary learners the training program achieved the outcomes stated. When investigating the influence of the training given on *skill* when faced with underweight as phenomenon in primary learners the training program

partially achieved the outcomes stated. When investigating the influence of the training given on *competence* when faced with underweight as phenomenon in primary learners the training program partially achieved the outcomes stated. The value of FMEA as a project tool lies in detecting possible failures, the cause and effect it may have on program outcomes and corrective action that can be taken. FMEA profiling in this chapter indicated that a nine week training program was effective in conveying knowledge on the subject but that more time need to be allocated for training if the development of skill and competence in program participants were to be enhanced.

The scores obtained from the Wilcoxon Signed Rank test indicated that a training program to care givers had a significant influence on some of the fitness indices measured in this study, significantly influencing the prevalence of underweight in children (pre-test BMI in underweight children and post-test BMI in underweight children). In this process the needs of underweight children are addressed as physical needs are closely linked to cognitive, emotional and social needs (Bender, 2002). Compared to the health status of healthy and overweight children underweight children can improve on their health status when the correct exercises and diet are prescribed. They do not necessarily have to go through life unhealthy and sick as so often found in literature (Rogers *et al.*, 2005).

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The value of training programs when specific phenomenon is under investigation can be summarised as:

- Having developmental; and
- Preventative emphasis.

The development and implementation of a care giver training program in educators of underweight children in South African schools complied with the above values. Bender (2002) states that the development and implementation of a life skills curriculum fall in the overall context of the development of education support services. This emphasises the need to view issues of development as interrelated. Training care givers according to the needs of the underweight child complied with this inter-relationship between various multi disciplines e.g. school health, physical education, specialised education, social work, life orientation and psychological services. The training program had a preventative emphasis as it was a way of helping young children and care givers to respond proactively to a situation which requires decisions affecting their lives.

Bender (2002) identifies four task categories whereby care givers can perform when faced with a specific task or problem:

- ❖ Crisis resolution;
- ❖ The solving of identified problems;
- ❖ The development of personal and interpersonal coping skills among all groups in schools; and
- ❖ Early identification and service delivery to populations at risk.

With this study, A *training program to care givers of underweight children in South African Schools* the researcher implemented task category 2 (solving and identifying problems) and 4 (the early identification and delivery of service to populations at risk) of Garvin and Tropman's four task categories. In doing so productive exchanges developed amongst relevant parties included in this study (school, families and

community) enhancing the self esteem necessary to promote desired learning and growth to all persons involved.

7.2 SUMMARISED CONCLUSIONS OF THIS RESEARCH

Some of the many challenges South Africa as a developing country might face with regard to welfare, health, education and other services include:

- Poverty;
- Hunger;
- Eating disorders;
- Food insecurity;
- Low birth weight in children;
- Changes in dietary standards; and
- Changing levels of physical activity.

7.2.1 The challenge

The above mentioned challenges were found to be contributing to the problem researched in this study: underweight prevalence in South African school children.

As South Africa moves forward into the 21st century the long term vision is for all South Africans to seek a society in which sound welfare, health, education and other services are available to all and that these aims could be realised in a competitive and rapidly growing economy (UNICEF, 2006).

The plight of undernourished children is largely invisible, as three quarters of the children who die from causes related to malnutrition ranging from mildly or moderately undernourished shows NO outward sign of their vulnerability. (UNICEF, 2007). Training programs like this one might offer support to care givers of malnourished (underweight) children. In doing so these children's health needs are underlined and this will make their plight a visible one. In this process a valuable contribution towards a society wherein sound welfare, health and education are promoted is put forward.

7.3 RECOMMENDATIONS

With regard to establishing more healthful approaches towards food, health and nutrition security in aid of weight related problems in South African schools and the management thereof, the training program to care givers can and should be extended to the training of children and possibly their parents. With this in mind the researcher would like to convey the following recommendations:

- Weight bearing exercise is critical to ensure development of peak bone mass during the first 2 to 3 decades of life.
- Children should perform moderate to high intensity dynamic stretching exercises prior to the performance of activities that require high power output.
- Children in South African schools need to be trained more on the importance of making healthy food choices in using and understanding the food pyramid. This is relevant and important as the participant questionnaire and interviews with the focus groups in this study indicated that in most households' food are available and children do have access to food, but there seem to be limited access to healthy foods like brown bread, fruits and vegetables. Of importance is that certain food types like red meats, poultry, deep fried foods, pap, white bread, rice and fast foods are more readily available in most household and usually in large quantities This approach could be changed and in the process enhancing a healthier way of eating assisting all children and in particular underweight children more.
- Children in South African schools need to be trained more on the importance of not only making healthy but also making nutritious food choices. This is relevant and important as the participant questionnaire and interviews with the focus groups indicated that in most cases individual's food and nutrient intake, nutritional status and health status can be questioned as many do not eat at least three full meals per day. Many skip breakfast and rely on the school tuck shop for meals; many only eat starchy and fried food often with limited intake of fresh produce.

Changing this approach through training could enhance a healthier way of eating assisting all children and in particular underweight children.

- Children in South African schools need to be trained more on understanding the importance of maintaining healthy food choices made as the participant questionnaire and interviews with the focus groups indicated that many of the children with poor dietary habits are often found to be absent from school due illness and or infections. In changing this through training programs children could be ill and absent less, contributing to a healthier community in the long run.
- An emphasis on healthful approaches to weight management must include the promotion of self esteem and body satisfaction because:
 - ❖ Depression is more related to feelings of weight than weight per se;
 - ❖ Girls who diet have significantly poorer quality diets than non-dieting peers;
 - ❖ Low calorie dieting can have serious health consequences for children such as delayed puberty, stunting of growth in height, reduced bone mass, weakness, fatigue, nausea, constipation, dysmenorrhoea and fainting;
 - ❖ Preoccupation with slimness can lead to eating disorders and abuse of diet medications and related products.
 - ❖ Self imposed dieting has been shown to increase the risk for subsequent excess weight gain.

7.4 CONCLUSION

Preventive intervention in primary schools offers a potentially effective means to improve health and fitness indices in underweight children in so breaking through the vicious cycle of physical inactivity, motor deficits and frustration. In the development of training programs collective consciousness and responsibility in people are promoted. This is a skill necessary in the development of all people from all the many divides of life. The development and implementation of such a program also fell into the overall context of educational support. In this process the principle of service enhancement in the fields of social work and school health, a cross sectional approach supported in many fields of study were emphasised.

In developing the training program the following role players can benefit:

- On the micro level, empowering care givers by providing them with the information, resources and services they need to improve the health of the children in their care;
- On the meso level, strengthening district and community health and nutrition systems; and
- On the macro level, integrating child health and nutrition needs into policies, plans and budgets.

In this research project the researcher tried to instil contextual sensitivity towards the diverse cultures of the South African school population and great care was taken when dealing with collectively conscious children.

In doing so, the researcher hope to uplift schools and communities in being proactive, making wiser choices, coping with peer pressure and helping children in avoiding the devastating effects that poor self esteem and body dissatisfaction might have on their total development.

In designing the training program the researcher hoped to have made a contribution to the general health status of South African school children.

The researcher would like to conclude this research with a thought from De Jager, (2009:1) *“Even when men teach they learn”*.

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