

**NUTRITION EDUCATION :
A CASE STUDY AT MOHLABETSI HIGH SCHOOL**

PAULINAH THEMBENI MASHOPANE SIHLANGU

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By

PAULINAH THEMBENI MASHOPANE SIHLANGU

**Primary Teachers Course (Rehlahlilwe College of Education) Teachers Certificate in
Homecraft (Mokopane College of Education), Secondary Education Diploma (Vista);**

BPaed (UNIZUL); B.ED (UNIZUL);

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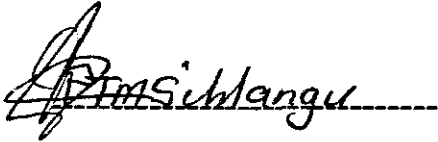
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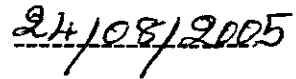
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DECLARATION

I, Paulinah Thembeni Mashopane Sihlangu, do hereby declare that this dissertation, “**Nutrition Education : A case study at Mohlabetsi High School**” is the outcome of my research conducted at the place called Dennilton in a school called Mohlabetsi Senior Secondary School, under the supervision of Doctor ET Dlamini. All sources that I have used and quoted have been indicated and acknowledged by means of complete references.



PTM SIHLANGU



DATE

ABSTRACT

The case study explored the knowledge and understanding of nutritional issues by Mohlabetse Senior Secondary School grade 12 learners. The information was collected through a test that was administered to the learners under test conditions. The test consisted of multiple choice type questions, short answer questions and definition of terms. Analysis of the results were limited to multiple choices questions because they cover a wide portion of the syllabus, and the definition of terms because they could help the researcher determine whether the learners are learning with understanding or not. The second tool used in the research was a hands on-activity where the subjects determined their Body Metabolic Indices to determine their nutritional status.

The results of the study showed that the learners harbour misconceptions about nutrition issues. For instance, the subjects had problems in defining a list of given terms relating to types of nutrition. The terms referred to different options of feeding. In defining terms the subjects combined words they had heard or used phrases which did not respond to the question asked or did not make sense. Language problems were prominent in the answers the subjects gave. One example was for a subject to define malnutrition as “the impairment of the diet from the body”. Only 35% of the students obtained marks above 50 in the multiple choice questions. The low scores could also be attributed to poor comprehension of the language of instructions that is not their mother tongue.

In terms of the nutritional status of the subjects, weight problems already exist in some of them. Because of the highly active lives of teenagers one does not anticipate weight problems among youth. There were 14.54% students with BMI above 30, that is, subjects that were overmass. Other subjects (9.10%) were obese. If these students do not loose mass and carry their present mass to adulthood, they are at risk. These subjects are an insurance liability and likely candidates for diabetes, hypertension and strokes. That is why nutrition education should be a life learning process. A few subjects (10.90%) were underweight as a result of inadequate food security in their families. It was good that 65.45% of the subjects had normal weight which they were advised to maintain, particularly because obesity is becoming an epidemic among Black Africans.

Recommendation from the study are to the effect that teachers at Mohlabetsi Senior Secondary school need to encourage learners to speak English. The poor English language expression of the subjects in answering questions showed very poor competence in using the medium of instruction to communicate. It was also difficult to determine whether subjects got poor marks out of ignorance or from an inability to express, what they know, in a foreign language. A second recommendation was that it is important to teach learners how to answer questions in complete sentences that makes sense. The third and last recommendation was that all learners need to be empowered with skills to assess their nutritional status in order to stay healthy and avoid future pain.

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CHAPTER ONE

ORIENTATION OF THE STUDY

1.1 INTRODUCTION

As young people are looked upon as the parents and leaders of the future, it is not surprising that nations tend to value their youth and look upon them with pride and expectation. In view of the role that educators play in preparing the youth to make sound and informed decisions about their personal lives in order not to endanger their futures, they are clearly responsible to also ensure that the young people in their charge also receive guidance with regard to nutritional matters. This is all the more necessary because it is accepted that a healthy mind is more likely to develop within a healthy body.

Food is a fundamental requirement for all living beings and natural selection has provided animals with mechanisms to ensure that the impulse to eat arises when nutrients are needed. This, however, does not necessarily hold true for human beings, as cultural and other influences have modified their natural impulses. In addition to this, personal factors, including poor habits, have unfortunately ensured that people, possibly the majority of them, have adopted certain dangerous proclivities, including nutritional preferences that can easily send them to early graves.

Parsonage (1981) stresses the fact that without food human beings will die. Water and food are therefore essential for the continuation of life and for the maintenance of good health and quality of life. Good health is one of the most precious possessions that any person can have. While it is true that we inherit from our parents genetic material that will predispose us to certain illnesses, it is also true that many of our diseases will be caused by poor nutrition that arises

from ignorance or poverty. Polunin (1985) contends that choosing food that does more for you and taking exercise does not only improve one's level of health by staying off illness, it also gives one a good mental feeling that one is taking care of him or herself and that one is someone worth looking after. This study attempts to ascertain the literacy levels of high school students with regard to nutrition.

Home economics educators have the great responsibility of teaching the youth about proper nutrition or diet. A healthy diet is one in which the food you eat contains all the nutrients needed by the body for it to grow, heal and to function normally on a day to day basis. A balanced diet provides energy, and allows one to function at his or her optimum level – free from disease and malaise. Water, although not a nutrient, is an important part of the daily diet as it helps to flush out the toxins in our bodies.

It is an acknowledged fact that many people in Africa are not healthy because of poverty, which leads to poor nutrition. Many diseases are caused by improper diets. In Africa in particular, poverty forces people to live on a staple diet of mealies (maize). This leads to malnutrition, which results in deficiency diseases such as **kwashiorkor** and **marasmus** in children, which are common diseases in Africa. According to Mortmore (1998) under-nutrition results from an overall lack of food. It is characterized by poor growth, lack of energy and poor resistance to infections. Lack of vitamins in the body produces such serious diseases as beriberi, pellagra, rickets and scurvy. For good health and proper mental development it is therefore important to have a balanced diet. One cannot overemphasise the need for proper nutrition for young people in their growing stages, as poor nutrition leads to stunted growth.

Saunders and Myers (1995) confirm that proper nutrition is critical for young and growing people when they state that malnutrition at this stage can cause permanent damage. Even if a starving child is given sufficient food and starts to put on weight, it may still suffer from permanent brain or other organ damage.

People with malnutrition are more likely to get infections and they are less able to fight them off. Simple diseases like colds and influenza can kill people who suffer from malnutrition. People with HIV AIDS are usually advised to eat a balanced diet in order to build up some resistance against opportunistic diseases. According to Mortmore (1998) evidence is coming to light that confirms the involvement of basic nutrition in healing many of the chronic diseases of our time, such as heart diseases, diabetes, arthritis, cancer and many others. The sooner students are able to learn about balanced diets the sooner they will be empowered to make wise choices and to avoid diets that will have a negative impact on their health.

Home Economics educators face the great challenge of educating youth about proper nutrition. They need to be flexible, dynamic and competent, and also possess effective pedagogical skills. In addition to this, they should have wide knowledge of nutrition in order to tackle without fear any question asked by the learners. They must be able to present relevant lessons that address practical matters, such as nutrition during pregnancy, nutrition of lactating mothers, the dangers of bottle feeding, and caring for people, from childhood to maturity. In addition to this, they should address the dangers of expectant mothers taking in alcohol and drugs, which can harm and even deform the baby. Treatment of the issue of alcohol and drugs must be done with the aim of enriching students who are about to enter the world of work and/or independence so that they can start off their adult lives with holistic knowledge of nutrition that will enable them to live rewarding lives and raise healthy families. By equipping students about to leave high school with nutritional literacy, a great contribution can be made towards the upliftment of standards of proper nutrition in rural areas.

Owen (1978) believes that, as a consequence of nutrition education, students should be able to increase their abilities to make wise food choices throughout their lives. They should be able to understand the relationship between food and health and should be equipped to gain more knowledge about nutrients and their

respective properties and roles in healthy living. Such students should also have the ability to evaluate advertising and other claims made about food and nutrition. They should also understand the influence of emotional and cultural factors on food choices and become aware of the role that food can play in aiding them to reach the goals that they set for themselves.

According to Mortmore (1998) when nutritional levels fall below sub-optimum levels, the body's metabolism is affected and this leads to serious illness in the long term. Living cells have been compared to tiny factories requiring a constant influx of raw materials and spewing out a constant stream of waste products, some of which are toxic. Our bodies are able to regulate the concentration of nutrients in our blood. In certain parts of the body, such as the stomach, the environment needs to be acidic so that efficient digestion of food can take place. In all other areas of the body, the acidity or alkalinity of the tissues should remain neutral or within a very narrow range around neutrality.

When nutrients fall below optimum level, the body cells begin to fail to retain a range of nutrients such as minerals within the cells. If poor nutrition continues one eventually finds that the body becomes even less capable of good maintenance and control and soon symptoms of disease manifest themselves. When the immune and the endocrine system are failing, it is easy for opportunistic diseases to develop. The importance of good nutrition can therefore not be neglected if we want to raise a healthy nation.

1.2 BACKGROUND TO THE PROBLEM

Families that have a thorough knowledge of nutrition and practise good eating habits for its members, make an important contribution to the well-being of the society and, as a result, a healthy nation is built. Poorly fed families may produce a nation of retarded children who do not reach their potential. As a result of good health, a nation such as South Africa will be able to contribute more towards the

production of goods and services, which will lead to the alleviation of poverty presently experienced by many communities.

A number of nutritional diseases have increased among Black people. This could be attributed to the change of diet from fruits and vegetables to processed food and high fat diets. Gout is a disease often found among Black people because of the high consumption of meat. It is a disorder which arises when the blood contains increased levels of uric acid. An excess of uric acid is caused either by an increased production of uric acid or by an impairment of kidney function. The disorder tends to run in families but is more common in men. When the concentration of uric acid in the blood is excessive, uric acid crystals may form in various parts of the body, especially in the joints of the foot, knee and hand, causing intense pain and gouty inflammation known as arthritis. The risk of attack according to Toole and Toole (1995) is increased by high alcohol intake, the consumption of red meats and other foodstuffs, and obesity.

These days a lot being said about nutritional therapy, which means using diet to treat and prevent illness and to restore the body to a healthy equilibrium. It is believed that sub-clinical deficiencies are responsible for much of the diseases and weakness in the body. A healthy diet is one in which the food one eats contains all the nutrients needed by the body for it to grow, heal and to function normally on a day to day basis. A balanced diet provides energy and allows one to function at his or her optimum level, free from disease and malaise.

An emerging problem related to poor nutrition is that of over-eating or eating rich foods leading to becoming extremely fat. This condition called obesity occurs when one eats more food than the body burns up. Obesity can lead to serious ailments such as cardio vascular diseases and diabetes. It is therefore important for young people to be taught about proper nutrition from a young age. They would therefore be able to feed themselves correctly and avoid diseases that are

caused by poor nutrition. Knowing how to eat correctly is a life skill that all young people should master as early as possible.

Another consideration in teaching young people about nutrition is that of life insurance. Motsatsoe (2001) reports that obesity discriminates against overweight people, as high insurance premiums are demanded from them when they take out life insurance cover. Industry sources believe that obese individuals are prone or more susceptible to heart-related medical complications. Overweight people suffer from heart attacks more often than those people whose weight is proportional to their heights. There are therefore multiple reasons why young people must be aware of the hazards of poor nutrition.

This study also investigates the extent to which high school students are informed in understanding nutritional issues and it examines their views on health in general. The study furthermore assesses the extent to which they internalize the learning content. The participants in the study comprised high school students of 2002 at the Mohlalatsi Senior Secondary School which is situated 15 kilometers away from the town Groblersdal. The researcher believes that the knowledge gained in the study will be of much help not only to students, but to their future children, friends and immediate families.

It is believed that the research will also be a way of evaluating the educators' success at delivering lessons to the students. If the students perform well in a nutrition test and in the interpretation of practical cookery lessons, the educator will know that the knowledge is grasped by the students and it will be of much help to them because they can apply it to practical situations where informed choice is required.

If the students perform badly in a nutrition test and in practical cookery lessons, it will show that there is a need for the educator to try to use other methods of presentation and to give herself time to deal with the slow learners. The study will

therefore eventually inform the researcher whether certain methods of teaching about nutritional issues are effective or not. If learners know how to respond to questions in a way that shows that they are nutrition-literate, then the teaching is effective.

1.3 MOTIVATION FOR THE STUDY

The researcher was motivated to undertake this study due to her concern about signs of malnutrition seen among Black students and the inadequate knowledge of nutrition that seems to exist among them. It must, however, be appreciated that malnutrition does not necessarily arise from poverty but also from poor choice of food.

The researcher identified a need to highlight certain causes of malnutrition that most learners may not be aware of. Such causes of malnutrition include:

- 1.3.1 Ignorance, which amounts to not having a thorough knowledge of the three food groups that humans must include in their diets in order to maintain good health.
- 1.3.2 Severe poverty and the inability to purchase nutritional food.
- 1.3.3 Wrong eating habits and choosing incorrect types of foods that lead to malnutrition: a problem that may also be associated with rich people that do not know enough about nutrition.

It is believed that sound nutritional knowledge will not only help students to prevent diseases associated with malnutrition but also assist them in saving

money. Such an approach is believed to be in line with the well-known saying "Prevention is better than cure" – a sentiment that this study underwrites.

1.4 STATEMENT OF THE PROBLEM

This study sets out to establish answers to the following question: How competent are high school students in applying their knowledge of nutrition in responding to questions that test their knowledge, understanding and skills with regard to nutritional issues?

SUB-PROBLEMS

Further questions arising in this regard include the following:

- 1.4.1 How well do high school students understand concepts that refer to nutrition?
- 1.4.2 Do students understand the causes of malnutrition as well as measures that can be taken to correct malnutrition diseases?
- 1.4.3 What misconceptions do students have about nutrition?
- 1.4.4 Are there any discrepancies between the performance of girls and boys in a Home Economic test on nutritional issues?
- 1.4.5 What is the status of the students in terms of their own body mass index?

1.5 AIMS OF THE STUDY

The specific objectives of this study are as follows:

- 1.5.1 To measure the literacy level of high school students on nutritional issues.
- 1.5.2 To find out whether students in the researcher's Home Economics class are able to apply their knowledge to solve the practical problems of nutrition.

- 1.5.3 To identify misconceptions that students might have about issues of nutrition.
- 1.5.4 To ascertain the level of under-nutrition or over-nutrition of students at Mohlabetse High School, so that it could be ascertained whether some of them are at risk in developing nutritional disorders.
- 1.5.5 To ascertain whether there any differences between the achievement of boys and that of girls in a Home Economics test on nutritional issues.

1.6 SIGNIFICANCE OF THE STUDY

- 1.6.1 It is believed that the study will, firstly, provide the researcher with data on which to base future educational programmes at the school with regard to nutrition.
- 1.6.2 It will create an awareness of health consciousness among the high school students themselves and assist in spreading the gospel of nutrition to their fellow students who are not doing the subject, and even to the community in which they live.
- 1.6.3 As far as the educational authorities are concerned, it is believed that the study will highlight for them the importance of teaching Home Economics to both boys and girls and provide them with data that they can use in promoting the teaching of Home Economics to all children.

1.7 DELIMITATION

This study is limited to one high school only, namely the Mohlabetsi Senior Secondary School which is 15 kilometres away from the town of Groblersdal. The school is situated in a rural area where many families are poverty stricken. The Home Economics class consist of both boys and girls. The school has moved a step forward in helping the boys to understand that Home Economics is not only for girls but that it is also very good for boys who want to raise healthy families.

Although the subject Home Economics starts in Grade 8 and is followed up to Grade 12, the problem investigated in this study was restricted to the nutritional

issues covering topics found in the matriculation (Grade 12) syllabus. The reason for conducting this study in Grade 12 is that most of the students, after completion of their Grade 12, will be getting married and starting to bear children. I want them to apply the knowledge of nutrition gained at school in creating healthy families which will be free from most of the diseases which are affecting people today because of poor nutrition.

1.8 LIMITATIONS

It may have been better to base the study on two or more schools in the area, but this was not practically feasible due to the transport problems that exist in rural areas. The research therefore ended up being a “classroom action research project” in which the researcher set out to learn more about the students in the Home Economics class of the school. It is firmly believed that the results will bring improvements in the ways in which the class is handled. Feedback was also obtained on topics in which the learners found difficulties.

Although some of the schools in the area were adequately equipped with Home Economics resources, the problem of burglary at schools impacted heavily on effective teaching in this subject. At the school where this study was conducted, Home Economics resources were stored at the Circuit Office for safety. The equipment had to be ferried between the school and the Circuit Office by the school’s principal when needed for practical work.

1.9 DEFINITION OF TERMS

The definition of terms hereunder is in the interests of clarity with regard to the content of the study. It will hopefully also ensure that the reader has the same understanding of the concepts referred to in this study as that held by the researcher.

1.9.1 HOME ECONOMICS/CONSUMER STUDIES

According to the National Curriculum Statement, Grade 10-12 Draft (2002) Consumer Studies focuses on developing knowledge, skills, attitudes and values in learners so that they may become responsible and informed consumers of food, clothing, housing, furnishings and household equipment using resources optimally and in a sustainable manner. The learner should be able to identify consumer needs for products and services and fulfil these needs through advisory services and small or micro enterprises.

1.9.2 NUTRITION

Stare & McWilliams (1981) define nutrition as the study of the food man eats and the use of this food in the body. Wardlow (1997) describes nutrition as the study of what foods are vital for health and how your body uses nutrients to promote and support growth, maintenance, and reproduction of cells.

1.9.3 MALNUTRITION

Grant (1987) states that malnutrition may include any type of nutritional disorder in an individual and embraces over-indulgence as well as deficiency.

1.9.4 OVER-NUTRITION

Over-nutrition occurs when people consume food in excess of metabolic requirements and where the surplus calorific intake is mostly stored rather than excreted.

1.9.5 ADOLESCENT

Adolescence is defined as a period of rapid growth that is accompanied by an enormous appetite. An adolescent goes through a stage of increased emotional, psychological, social and physical stress (Garrow, 1993). Adolescents are mostly at high school level, while some are already at tertiary level.

The adolescent stage is divided into three divisions, namely:

From 11 - 15 years: early adolescence

From 14 - 16 years: middle adolescence

From 17 - 20 years: late adolescence

1.9.6 DEFINITIONS (Garrow, 1993)

1.9.6.1 Anorexia Nervosa

A state in which the sufferer, usually a female, refuses to eat enough to maintain normal body mass for her height. She claims to want to lose weight in order to be slimmer, and sometimes says that she does not feel hungry.

1.9.6.2 Bulimia Nervosa

Teenagers have a fear of fatness and some develop the habit of vomiting in order to control their mass. Binge eating means eating in an uncontrolled way, which amounts to eating more than the person needs – followed by vomiting.

1.9.6.3 Obesity

An eating disorder, which results from an excess of energy intake over expenditure.

1.9.7 DEFINITIONS (Kirschmann, 1996)

1.9.7.1 Edema/Oedema (Fluid Retention)

Edema is a condition in which excess fluid is retained by the body, either localized in one area or generalized throughout the body. This retention of fluids appears as swelling.

1.9.7.2 Kwashiorkor

Kwashiorkor is a severe malnutritional disease caused by a diet which supplies adequate calories but is deficient of proteins.

1.9.7.3 Marasmus

Occurs when there is a severe shortage of proteins and energy-giving food. There is no swelling but the child has thin arms and limbs.

1.10 ORGANISATION OF THE STUDY

The report of the study will be organised as follows:

CHAPTER ONE :

This chapter first of all highlights the importance of proper nutrition in order to produce a healthy nation. It then provides an outline of the study including the introduction, background to the study, motivation of the study, statement of the problem, aims of the study, significance of the study, delimitation and limitations of the study, definition

of key concepts, the conclusion and, finally, sketches the organisational plan of the study.

- CHAPTER TWO** : Provides a review on literature considered relevant to the study. It includes the conceptual framework on which the study is based.
- CHAPTER THREE** : Will present a discussion of the research methodology.
- CHAPTER FOUR** : Will cover analysis, presentations and discussion of data from the questionnaires completed.
- CHAPTER FIVE** : Will give the summary, conclusions and limitations of the research and recommendations for future research.

CHAPTER TWO

PRIMARY AND SECONDARY NUTRITIONAL DISORDERS

2.1 INTRODUCTION

Many poor people are affected by different types of diseases that could be corrected by access to a balanced diet. Poor choices of food affect peoples' health and lead to unnecessary early deaths. This chapter will cover some causes of malnutrition, the signs of malnutrition and the remedy thereof. The literature survey is intended to emphasize the fact that poor nutrition leads to deficiency diseases that can be prevented by balanced diets.

Traditionally the father's role was that of head of the family and breadwinner. The mother's role was to be the housewife, to bear children and to look after the family. Each family was given a large piece of land to live on. As the rainfall was usually sufficient to provide in limited needs, both parents practiced subsistence farming whereby different types of crops were planted and consumed. They also had a large variety of stock, including cattle, goats, sheep and chickens. The children grew up leading healthy lives, as if nutrition was known. The basic diet included green vegetables, cereals, meat and wild fruits.

Later on, due to the expansion of the population and because of the scarcity of rain, large pieces of land were divided into small plots. It then became difficult to practice subsistence farming and stock farming. Fathers decided to search for jobs in the industrial areas in order to provide an income in the form of cash. They came home once a month, or sent money home. Mothers tried their best to find food for the children. Each family had approximately eight to twelve children and because money earned by fathers was seldom sufficient for their families' survival needs, many children suffered malnutrition. Malnutrition was also caused by a shortage of essential nutrients in the staple diet of maize porridge on which families often survived.

The researcher believes that a lack of nutritional knowledge among our people, mostly due to poor education and poverty, was mostly responsible for complicated nutritional problems that often led to unnecessary deaths. In order for

the country to be productive and for communities to have bright futures with healthy leaders, education is important. If all school leavers have a sound nutritional knowledge, their families and communities would most likely understand that the slogan “Prevention is better than cure” is also applicable to nutritional diseases.

Picton (1988) stresses the fact that everyone needs food to survive. The ways in which people cook and serve the food that they eat depends on where they live and on their religious and/or cultural backgrounds. Each country has its own staple food that mostly consists of available cereals, plants or vegetables. What people eat also reflects their lifestyles and what they can afford. It has been said that some people eat to live while others live to eat. People who eat to live are particular not only about what they eat but also about how much they eat.

The body is a collection of cells that form organs and tissues. The cells are constantly being replaced, and this is more easily seen in, for example, a person’s hair, skin, and nails – organs that are exposed to damage. The health of any society is directly linked to its value system, cultural condition, socio-economic and political set-ups. Good nutrition provides the human body with optimum health, which leads to better achievement in school, a feeling of vitality and an attractive strong body. These are the rewards of good nutritional practices. It must also be remembered that what one eats can affect how one thinks and acts, and whether one is alert or sleepy, sad or elated, or whether one can study efficiently or not. We have often hear of children from rural areas who attend school without having had good breakfasts and who consequently suffer from very poor attention spans.

The researcher believes that the foundations for a healthy and productive future generation can be laid by focussing on high school students’ understanding of nutritional issues. Grade twelve students doing Home Economics at Mohlabetse Senior Secondary School are fortunate in being given a chance to learn about

nutritional issues and because Nutrition is a broad topic, their curriculum is broken down into sub-topics that include the following: the three food groups, diet at different stages of life, balanced diet and drawing up of a menu, evaluation of a menu and the importance of eating breakfast. They also discuss critical issues such as the portrayal of women only (and not men) in Home Economics textbooks. It is important to discuss the stereotype that Home Economics is a “female” subject, whereas it is very important for all human beings to understand the value of good nutrition. It is also important that all students completing High School should understand how to feed themselves and their future families in a healthy way.

2.2 NUTRITION EDUCATION

As a consequence of nutrition education, a student should increase his/her ability to make wise food choices throughout life, understand the relationship between food and health, gain knowledge of nutrients and their roles in the body, and develop the ability to evaluate advertisements and other claims made about food and nutrition. The learners should understand the influence of emotional and cultural factors on food choices and become aware of the role that food can play in aiding them to reach goals they set for themselves. Proper nutrition ensures that one is alert and has a brain that functions normally. Learners must also gain knowledge of career opportunities in the field of food and nutrition. Students, parents and staff members should all be involved in nutrition education programmes for the sake of promoting health education (Owen, 1978).

2.3 NUTRITIONAL DISORDERS IN THE LIFE SPAN

2.3.1 PRE-MATURITY AND BIRTH DEFECTS

Grant (1987) states that when a baby is born prematurely, the parents may feel that the child is in some ways different from others and that he or she will not

develop properly. The parents experience feelings of guilt and unworthiness. Blame may furthermore be projected upon the infant, who may become disliked for having brought shame on the parents. Grandparents often contribute to the already strained relationships between the marital partners by holding either the wife or husband as primarily responsible. Thus the prevention of pre-maturity and of birth defects may be an important health measure. Good nutrition before pregnancy is of vital importance. Malnutrition due to the lack of one or more nutrients from the diet, or because the diet includes too much of one or more nutrients, leads to poor health. These are issues that learners need to know about and understand because many high school teenagers fall pregnant before completing school.

2.3.2 THE FETUS

The infant may be born with low birth mass because it has not grown normally during the gestational period of normal duration. Some low weight problems are, however, caused by mothers who smoked during pregnancy and who subsequently run a risk of having a natural abortion, a miscarriage or a stillbirth. A baby who is born at the correct time may still be physically and mentally underdeveloped. Mothers who take alcohol may cause the infant to have a small head circumference and small eyes that are close together, a flat nasal bridge, or a short nose and thin upper lip. None of these symptoms can be corrected at a later stage. One of the most important precautions that pregnant women can take is to abstain from all kinds of alcohol and drugs.

To increase the chances of giving birth to a normal baby, good nutrition needs to be followed. Food needs to be chosen from the three food groups in order to prepare a balanced diet for all three meals, and even snacks need to be nutritious. Brasel (1985) states that maternal nutritional status during pregnancy is important to maternal and foetal welfare. The author states that maternal undernutrition occurring before or during pregnancy or both, is probably the most common cause

of foetal growth retardation in the world. He also states that foetal growth retardation is related to neonatal mortality.

2.4 MALNUTRITION IN INFANTS AND YOUNG CHILDREN

Infants and young children are the most vulnerable of all with regard to nutritional problems. Prominent among these problems are protein energy malnutrition (PEM), various vitamin deficiencies, iron deficiency and obesity. Poor growth is certainly the earliest manifestation of nutritional disorder in the foetus, and in infants and young children. The displacement of traditional breastfeeding by bottle feeding in developing countries has had especially disastrous consequences for child nutrition (McLaren, 1981).

The following are some of the forms of protein energy malnutrition found among infants and young children. These nutritional disorders are highlighted because they are prevalent among malnourished children in rural areas. They are also the main causes of death among children under five years of age.

2.4.1 KWASHIORKOR

This is due to famine conditions, mostly resulting from deficiency of proteins. This is often the disease that the first child gets when the next child is on the way. Early weaning of the child increases the danger of kwashiorkor occurring. It may also be caused when children are fed a diet of primary starches and sugars. Symptoms of kwashiorkor include changes in the skin and hair, retarded growth, diarrhoea, loss of appetite and nervous irritability. Oedema also occurs whereby the face, hands and legs of the child become puffy (moon face).

2.4.2 SCURVY

Scurvy is a malnutrition disease caused by a diet that is deficient in vitamin C. Symptoms of adult scurvy include swelling and bleeding of the gums, tenderness of joints and muscles, rough dry discoloured skin and poor healing of wounds.

2.4.3 MARSAMUS

Marasmus is a disease that occurs when there is a severe shortage of protein and energy-giving food. Signs of marasmus are as follows: A child looks like a little old man or woman. The child is very thin and very much underweight for his or her age. There is loose skin on the body, legs and arms. The shapes of the bones show. There is lack of activity and the child does not want to play or to move about. The child makes a low whimpering sound from time to time. Marasmus can be prevented by good nutrition.

2.4.4 NIGHT BLINDNESS

This is a type of disease resulting in children who are not given a balanced diet. Usually the children lack vitamin A, which prevents the retina of the eye to adjust to dim light. If the condition continues the result will be blindness.

2.4.5 RICKETS

Rickets manifests itself in bones that become softened, so that they bend easily. Children with rickets commonly have "knock-knees" or "bandy legs." The head, chest, spine and pelvis may also become misshapen, the latter often resulting in girls having difficulties in childbirth when they grow up. The way to prevent rickets is to allow children to play in the sun without much clothing and to feed them a good mixed diet.

2.4.6 PROTEIN-ENERGY MALNUTRITION IN RELATION TO THE DEVELOPMENT OF THE BRAIN AND LEARNING CAPACITY

Ritchie (1983) states that research in recent years suggests that severe malnutrition in early childhood may result in a brain with reduced mental capability. It seems that in such children the ability of the brain to work properly is not always fully regained even when the child has been treated with a good diet over a long period of time and when all signs and symptoms of protein-energy malnutrition have disappeared. Some research workers concluded that although these deficiencies may not result in serious mental backwardness, the damage may be enough to limit the children's ability to reach the intelligence which their heredity would have made possible. Poor nutrition in many Black families result in children who fail to compete successfully in the field of education when compared to other races not severely affected by malnutrition.

Poor nutrition has a damaging effect on children's learning capacity. As noted above, a malnourished child does not have the energy to be curious and to run about and observe, listen and ask questions. He is likely to sit listlessly doing nothing. When such a child goes to school he or she will be at a disadvantage, as he or she will know less than their friends. If children in school do not concentrate and if they do not have enough energy to make them anxious to learn or to take part in active projects, such children are often drop-outs from school, not being able to keep up with the class, because they do not have enough vigour even though they may be genetically intelligent.

2.4.7 THE SIGNIFICANCE OF GOOD NUTRITION

The diseases caused by malnutrition may be cured by good feeding and not by witchdoctors, as some of the uneducated parents of children at the Mohlabetsi School believe. The best food for building infants' bodies is breast milk from their mothers. Breastfeeding should continue for a long period, even up to 2 years old if possible. Parents who space their children and give them plenty of good food and

attention before the next pregnancy starts, are not likely to have children with protein and energy malnutrition.

Young children who are well fed with plenty of food rich in building materials are likely to grow up being bright, strong and able to learn well at school. The money spent on school uniforms, textbooks, school funds etc will not be wasted.

2.5 THE ADOLESCENT

This is a period of emotional, social as well as physical maturation. This stage is affected by a number of diseases including neurosis nervosa, obesity, dental caries, Hiv/Aids etc. Some of the diseases will be discussed because of their seriousness among our teenagers. Problems of mass control during adolescence, for example bulimia, anorexia nervosa and obesity will also be discussed.

2.5.1 PROBLEMS OF WEIGHT CONTROL DURING ADOLESCENCE

2.5.1.1 Anorexia Nervosa

The normal desire to look good and to be beautiful among high school students is of great importance. However, for some students this natural desire becomes distorted. According to McLaren and Rotunda (1981) about 95% of those with eating disorders are females between the ages of twelve years and twenty-five years. Anorexia exists because the sufferer has a fear of being fat. It is thought to be the most dangerous of the eating disorders, because 10% of these individuals die an early death. Wasting of the muscles occurs as protein is being used for energy. Dangerously low blood pressure, dehydration from laxative use, weak resistance to infection from lowered immunity, heart attacks and heart damage from potassium deficiencies, digestive tract immobility and degeneration are some life-threatening side effects of the disease.

2.5.1.2 Bulimia Nervosa

Bulimics will binge eat and then throw up the food in order to keep calories from becoming incorporated into their systems, which they fear will make them fat. Sometimes bulimics take large amounts of laxatives. People with bulimia are generally neither very thin nor large.

Bulimia is different from anorexia in that there is more control over how much food is consumed. When bulimics vomit, they may lose many of the nutrients the body needs to stay healthy. Laxatives also have this effect. Also, according to Sanders and Myers (1995), the physical execution of vomiting on a regular basis can put a lot of stress on the body. A healthy body leads to a healthy mind and a longer life span. Some bulimics are aware that what is happening is not right and that there is a need to eat to remain alive.

2.5.1.3 Obesity

Obesity is the eating disorder in which more energy units are consumed than are used. The excess is stored as fat. An individual who is 20% over-mass is obese. Obesity is an eating disorder that occurs among both the rich and the poor. It can result in early death through heart disease; high blood pressure, respiratory problems, diabetes etc. Obesity leads to many chronic complications that reduce the quality of life of affected individuals. Mass may be decreased by consuming little of a balanced meal per day. An adolescent needs to increase strenuous physical activities and exercises in order to burn some of the calories.

2.6 GERIATIC NUTRITIONAL PROBLEMS

McLaren (1981) stresses the fact that for a variety of reasons the aged may be especially vulnerable to developing nutritional deficiencies. The reason for this is mostly social isolation that causes people who stay alone to lose interest in cooking balanced meals. Sometimes, after preparing the meal, she/he does not have the appetite to eat the meal. This may compromise the immune system of the aged and may also lead them to early death. The aged may also be disturbed by the following problems: mastication being difficult due to poor dentition or ill-fitting dentures, ignorance of what constitutes a balanced diet, poverty, mental disturbance and physical disabilities. Genetic disorders are included and people, starting at a young age, need to be aware of all the nutritional problems that may occur across a life span.

2.7 ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS)

It is believed that Aids is caused by the Human Immuno deficiency Virus (HIV). The immune system, which protects the body against germs, bacteria, viruses and cancers, is destroyed by the HIV virus. This condition is worsened for individuals who give up on life and stop consuming nutritious meals. This happens when affected people conclude that there is no remedy for HIV/AIDS and when they wish they could die immediately.

HIV and AIDS can be prevented by having a permanent, faithful relationship with one person and by taking sensible precautions like always using a strong sheath if having a casual sexual relationship and not sharing an injection needle with another person. Affected people are advised that contracting HIV/AIDS does not necessarily mean that they will die soon. By taking simple precautions, such as

consuming a balanced diet during all three meals per day and nutritious snacks in between, affected people may live and enjoy life for a further reasonable number of years just like any other people, as long as they are faithful in eating balanced diets.

2.8 ANTHROPOLOGICAL STUDIES OF FOOD HABITS

Martorell (1983) states that cultural factors may also play a role in nutrition and health problems. These factors may, for example, determine how food is distributed within the family circle. In many traditional African Tribal societies it has been the custom for the menfolk to get preferential treatment in the distribution of meat and other nutritious foods, the aim being to show respect to the head of the family. The mother and children consume the remaining small amount of food which is often not nutritious. The pregnant and lactating mothers are also not taken into consideration as far as nutritious food is concerned. The weaned children are also given plenty of starchy food and less protein food, because starchy food is cheaper than protein food. That is why kwashiorkor, marasmus, oedema and night blindness disturb the growth and development of many children. Nutrition education would do a great deal in teaching both boys and girls that for healthy living, both men and women need a balanced diet.

2.9 MISCONCEPTIONS

In every group of people, customs have arisen concerning food that should be eaten and that which should not be eaten. Although there is little or no scientific basis for these taboos, they are rigidly held so that change is likely to be resisted. These taboos or misconceptions often create malnutrition. Some groups of people believe that children are not supposed to be given meat, eggs and peanuts. It is believed that by giving them the above mentioned food they will be encouraged to steal. Coconut milk is also taboo for children as it is believed to make them unintelligent. The bride, on arrival at the husband's family home, is given

instructions to follow. She is not allowed to consume milk, peanut butter, eggs etc. especially during the pregnancy period, as it is believed that the foetus will undergo unwanted changes in growth and development. Scientifically, the expectant mother needs milk, in particular for its calcium content, which is good for the growth of bones. Eggs would supply the mother with proteins for the growing baby. Following taboos could lead to the malnutrition of both the mother and baby. Lessons on nutrition are therefore important for learners in order allow them to distinguish between facts and fiction, and between what is based on fact and what is merely an unscientific taboo.

As a consequence of widespread malnutrition, the parents of malnourished children suffer unhappiness because their sons or daughters are sick and perhaps likely to die. It has also been pointed out that if a child who was severely malnourished during the first years of life survives until adulthood, he may grow up being a weakling, incapable of hard work, either physically or mentally. An additional consequence is that when a child becomes severely malnourished and has to be admitted to the hospital, the mother has to neglect the rest of her family while she cares for the sick child. The other family members may suffer from her absence. The malnourished children will not grow into a strong workforce or strong and intelligent men and women needed to develop the country. Such children will have less resistance to infection than well-fed children. All these factors combine to form communities that are poverty stricken and unable to help themselves. The result is a vicious cycle.

2.10 NUTRITION EDUCATION

Although it is difficult to change a custom that is deeply ingrained as part of the culture, the researcher did her part by conveying knowledge of good nutrition to students taking Home Economics in Grades eight to twelve. The focus of imparting nutritional knowledge was on grade twelve students as they were adults ready to leave school. The aim was that of trying to empower learners with

accurate nutrition information so that they could make informed choices. For one to have a healthy, happy long life, one must have a thorough knowledge of good nutrition and practise that by preparing balanced breakfasts before going to school and following it up with a balanced light lunch as well as balanced main meals. Such a diet must be given to all human beings, starting with the children. By so doing we will be limiting the different types of diseases which affect people who consume unbalanced diets.

It should be noted that malnutrition is often caused by ignorance, especially in rich families that consume more food, often of the wrong type, than their bodies can cope with. Poor people, on the other hand, should realise that poverty is not necessarily the cause of malnutrition as balanced meals can be prepared from cheaper foods chosen from the three main groups of foods.

Changes may be affected by means of publicity in the mass media, which is an effective form of conveying information about nutrition. Carefully designed nutrition education programmes can be organized and carried out by all teachers in all the grades. Children can be taught about the nutritional value of food, preferably in relation to the cost of these foods. It is worth emphasizing that fresh fruits are nutritionally superior to and often cheaper than popcorn and other prepared foodstuffs.

Kirschmann (1996) also stresses the fact that knowledge of nutrients and their functions in the body is necessary for understanding the importance of good nutrition. The six nutrients, carbohydrates, fats, proteins, vitamins, minerals and water are present in the food we eat and contain chemical substances that function in one or more of the following ways. They furnish the body with heat and energy, they provide the body with the material for growth and repair of body tissue, and they also assist in the regulation of body processes.

2.11 DRAWING UP OF A MENU

During lessons the students are given hands-on experiences on preparing meals. The researcher demonstrates to the students on how to prepare and cook smaller dishes like rice and spaghetti; making baked dishes, preparing eggs and custard, and how to make fruit and vegetable salads. They also learn to fry sausages, how to stew pears, and to bake scones, cakes, biscuits etc. Later on students are given dishes to prepare, cook and serve. This is done in order to enable them to apply the knowledge and skills learned during the theory lessons to a practical situation.

The learners are taught about the points to remember when compiling a menu. They also learn about writing out of menus, the evaluation of the menu and the serving of a meal. The foods need to be listed in the order in which they will be served; the beverages are listed last. The kinds of food chosen must produce a nutritious, attractive and balanced meal. Students are taught how to serve the meal prepared by them. Students are also taught how to set a table for one person for a formal five-course meal, using the menu they planned themselves.

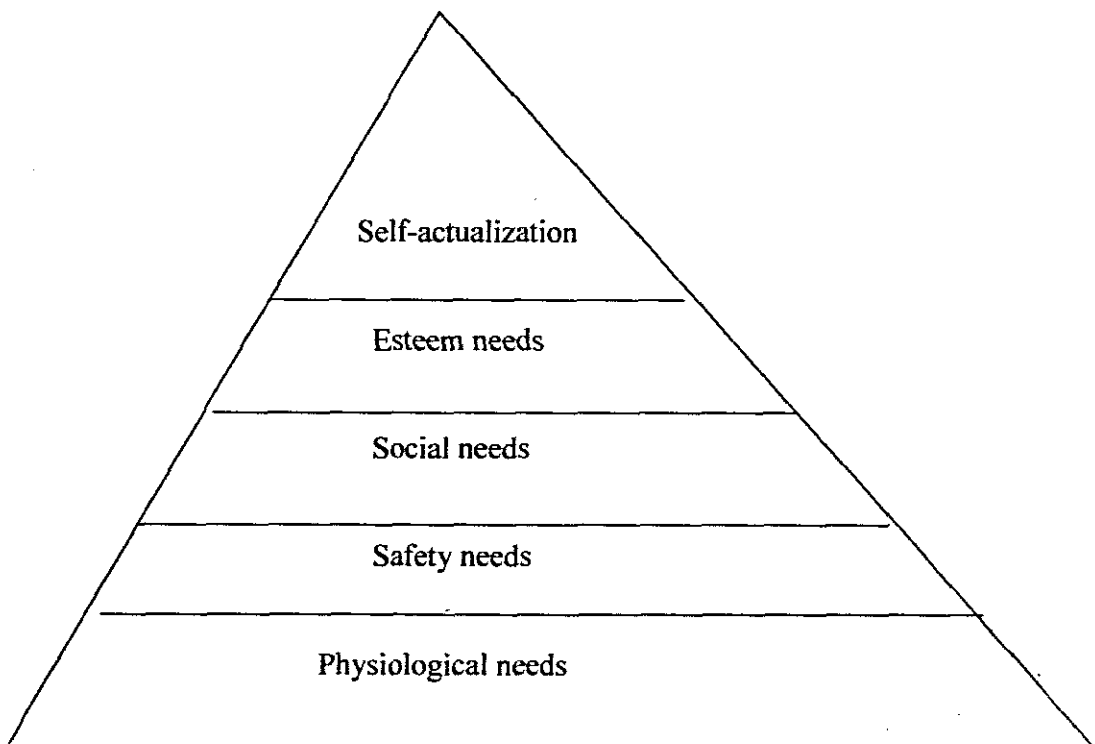
2.12 EVALUATION OF A MENU -

The learners are taught the following points in the evaluation of a menu:

1. The order of writing the menu has to be followed
2. The suitability of the meal for the occasion.
3. The choice of dishes to be appropriate
4. The three basic food groups are represented
5. The food prepared should be suitable for the season
6. Financial considerations
7. Planning all resources necessary to prepare and serve the meal

2.13 MASLOW'S HIERARCHY OF NEEDS

Maslow's hierarchy of needs as cited by Lowenberg, Todhunter, Savege and Lubawski (1979) stresses the importance of food. According to Maslow, individuals and families work towards satisfying their most pressing needs before they move to the next highest need. Maslow presented the human needs in a triangle.



2.13.1 PHYSIOLOGICAL NEEDS

Lowenberg *et al.*, (1979:28) stress the fact that food is fundamental for individual survival. When a person is really hungry his or her need for food dominates their entire being. In the extremities of hunger, one thinks only of oneself – having forgotten even the family and the loved ones. It is useless to ask people to think of anything else until their hunger is satisfied or at least to the extent that they are again feeling physically comfortable.

Maslow (1970) states that for a man who is extremely and dangerously hungry, no other interest exist, but food. He dreams food, he remembers food, he thinks of food, he is motivated only by food, he perceives only food and he wants only food. During a hunger strike one sees a demonstration of a powerful commitment to an idea.

2.13.2 SECURITY

Once survival needs are assured, people begin to worry about food security that is not just what we will eat today, but also what will we eat tomorrow, next week, next month etc. Security needs can be met through storage of food.

2.13.3 BELONGINGNESS

When physiological and safety needs are fulfilled, we can progress to meeting love, belongingness and affection needs. Food is frequently used to meet such needs as evidenced by the use of food as rewards or gift or to show membership of a particular socio-cultural group. Traditionally, American woman have expressed love of family through careful selection, preparation and serving of meals.

2.13.4 SELF-ESTEEM

Pride in food preparation may be reflective of this. People enjoy being praised for the quality of the food they prepared. Preparation of food has long been used as an expression of individual creativity. Chefs who can create beautiful and delicious foods are well rewarded in modern society. We have seen that food is commonly used as an expression of maternal love.

2.13.5 SELF –ACTUALISATION

Self-actualisation is expressed by the innovative use of food, new recipes and food experimentation. It only occurs if a person has self-confidence and is not afraid of failure. Food becomes a personal trademark – a source of personal satisfaction and achievement.

2.14 PORTRAYAL OF ONLY WOMEN AND NOT MEN IN HOME ECONOMICS TEXTBOOKS

Women have always looked after the home in the absence of the father. They have borne children and done all the household work such as cleaning the house, washing clothes, ironing, cooking etc. Girls were not supposed to attend school; it was said they must be taught all about the housework tasks since they are going to be married and take over the work of the home. Only boys were sent to school and it was believed that boys were to search for work in order to support their families and to pay lobola for their girl friends. Fortunately things have changed in South Africa where all human beings are now treated equally. All careers are now open to women and there are no careers reserved for men only. The process of transformation is slow but changes do occur, particularly as we now see male students doing Home Economics.

In Home Economics textbooks, only girls are still portrayed performing household tasks and preparing food for the males. Bouer and Nell (1986) stress the fact that the homemakers make a contribution to their husbands, children and society through the effective management of their homes. The mental health and security of the family depend on the love and security they experience in the home. It is the homemaker's responsibility to create this atmosphere of love and security. The mother has a role to play as an educator for her children. She has to teach them the skills and knowledge that they will need to function as competent adults in society. A woman devotes time to the care and well-being of her family

and provides for their physical as well as emotional needs. There is however no reason why the male cannot do the same. In some families where women earn more than their husbands, the males have to look after the children while the women work. Males therefore need the skill for preparing nutritious food for their families.

2.15 EVALUATION OF NUTRITION INFORMATION

There is a great deal of literature that is available for people to read about nutritional issues. Some of the literature is written by credible nutrition practitioners, but other literature comes from people who want quick money. People who do not critically evaluate what they read end up by being robbed by quick money-making scams. People who are prepared to die to lose weight are mostly subject to these scams. Wardlaw (1997) advises that before being gullible and accepting suspect information, one should give honest answers to the following questions:-

1. Has there been scientific testing of the issue?
2. Are the authors recognized practitioners in the field about which they are writing?
3. Are there explanations for contradictory findings?
4. Is there bias in the article, in favour of a product, device or belief?
5. Has the information been researched repeatedly, or is it based on a single study?

The ability to identify reliable sources of nutrition information and to distinguish between fact and fiction should be a major goal of any nutrition student.

According to Mortimore (1998) sub optimum nutrition affects the body's metabolism and leads to serious illness in the long term. Sound knowledge about

nutritional issues help learners to make informed decisions about their choices of food.

2.11 CONCLUSION

In this chapter the researcher highlighted the importance of proper nutrition throughout the life cycle of a human being. It became very clear that poor nutrition at each stage in the life cycle has negative consequence. For instance, babies whose diets lack proteins are prone to develop kwashiorkor; teenagers who undernourish themselves get anorexia nervosa; and adults who over-eat become obese. Two of the negative consequences of obesity are high blood pressure diabetes and kidney problems. A healthy body leads to a healthy mind, while a healthy mind enables human beings to think clearly and to solve the problems they encounter in their lives in a logical way. Nutritional literacy also makes sure that people are able to make informed choices about what they eat.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The literature study in chapter two focused on the various aspects of nutrition that a learner should be aware of so that he/she can make informed decisions. The research design focused on the suitability of the methods used to collect data for the research. Schoefer and Lamm (1996) state that selection of a research design is a critical step for researchers and that it requires creativity and ingenuity. It is not easy to study human beings because they are affected continuously by their environments. The methods used to collect data have to be unobtrusive and allow people to respond to surveys, questionnaires or tests as honestly as possible.

Educators are often so busy doing what they do in their daily school activities that they hardly stop to systematically evaluate their teaching as being effective or not. In this study, the researcher wanted to evaluate grade twelve results in order to ascertain how the study of consumer science is impacting on the learners' knowledge and understanding of nutritional issues.

Both quantitative and qualitative methods of research were used to get a complete picture of what Mohlabetse learners gained from learning consumer science.

3.2 QUANTITATIVE METHOD

Quantitative research involves quantified data that is usually subjected to statistical analysis. In this study, the researcher collected data on the learners' understanding of nutritional issues by giving the learners a test. There were thirty eight grade 12 learners all attending school at Mohlabetse High School in

Dennilton. All the learners, both boys and girls, were doing Consumer Science as part of their curriculum. A total of thirty-nine (39) learners took the test. The majority of the Consumer Science learners were girls, who constituted 67,44% of the sample. Male students constituted 32.56% of the sample.

The larger sample of girls in the research was understandable because in the African culture a subject like Consumer Science is still perceived as more suitable for girls. However, it is also interesting that there are boys who, in spite of stereotypes about career choices, choose to do Consumer Science. Sjoberg and Imsen (1988) writing on observed differences between girls and boys, note that there are differences in science and technology achievement scores and in the fields of science preferred by each gender. Among some of the differences noted by Sjoberg and Imsen among boys and girls are:

- Girls in general seem to be more interested than boys in the social, ethical, cultural, historical and aesthetic aspects of science and technology.
- Girls have a greater interest than boys in science when it is connected to the human body and to people, their health and their needs.
- Boys in general seem to be more interested than girls in mechanical and electrical aspects of science and technology.

The pattern shown by differences between girls and boys seem to suggest that girls are more person-oriented than boys. Girls enjoy giving service and 'taking care of other peoples' needs. They are socialised that way to be able to take care of their future families.

During the research, a Consumer Science test was used to explore the learners' knowledge. The test was divided into multiple choice type questions and structured questions. The multiple choice questions were objective and had only

one correct answer (Appendix 1). A wrong choice gave the researcher insight into the learner's thinking. The structured questions were open ended and allowed learners to define terms used in nutrition and to show whether they understood them or not. The use of English language is crucial in structured questions because a poor grasp of language might not help the learner to explain succinctly what he/she wants to say. The test was written under normal test conditions with an invigilator who let the learners write for 2 hours.

The results of the test were analysed to compare the scores of all the learners. The pattern of the scores produced showed the competence with which the learners approached their work. It was also possible to compare male versus female learners.

Besides testing the learners on their knowledge of nutritional issues, the learners were also engaged in practical work consisting of finding their Basal Metabolic Indices (BMI). According to Mortimore (1998), body mass index determines whether a person is of normal weight, overweight, obese or underweight. The calculation of BMI is done as follows:

$$\frac{\text{Weight in Kilograms}}{\text{Height in meters squared}} = \text{BMI}$$

This is another research instrument used to indicate the learners' physical nutritional status. Each learner calculated his/her own BMI under the guidance of the researcher. This was an exercise where learners collected empirical data, subjected it to accurate calculation and arrived at evidence which indicated whether they were at risk or not. Both overweight and underweight students could be regarded as at risk and requiring correction of diet. The data collected by fifty-five students on their BMIs constituted numerical or quantitative data that could be suitably portrayed in graphs and tables. The data was analysed in order to summarise and display a pattern of learners' nutritional status.

3.2.1 ETHICAL CONCERNS IN RESEARCH ABOUT A LEARNERS' WEIGHT

The learners of Mohlabetshi consisted of a group of learners who were teenagers, a period when learners are very sensitive as to their bodies. There was therefore, firstly the issue of privacy. The learners were given a private room where they could weigh themselves together with learners whom they were comfortable with, or in privacy. Secondly, on the issue of anonymity, the learners' names were not displayed together with data, except as an indication of gender. Thirdly, the learners were assured that confidentiality about their BIM would be observed and the information about each candidate would not be declared publicly. The code of ethics in research as cited by Schaefer and Lamm (1996) put forth the following basic principles, amongst others:

- Maintain objectivity and integrity in research.
- Respect the subject's right to privacy and dignity.
- Protect subjects from personal harm.
- Preserve confidentiality.

Data collection strategies combined quantitative and qualitative methods. Data collected through quantitative methods are often believed to yield more objective and accurate information because they are collected using standardised methods. They can also be replicated, and, unlike qualitative data, can be analysed using sophisticated statistical techniques (Frechling, Sharp a& Westat, 1994).

3.2.2 DETERMINING WAIST TO HIP RATIO

Another activity that learners were required to do was to measure the circumference of their waists at the umbilicus with stomach muscles relaxed and to measure their hips at the widest point (Appendix 2). The results were calculated to find waist to hip ratio by using the following formula circumference of waist.

Circumference of hips

It was explained that if a person's circumference is greater than 20% above healthy weight, a waist-to-hip ratio exceeding 1.0 in men and 0.8 in women, this suggests upper body obesity. This is associated with an increased risk of heart disease, high blood pressure and diabetes.

These experiments performed by learners on themselves helped them to gather objective information about their nutritional status. The learners could measure, observe and analyse the information gathered. The learners gained skills that they could use later on in life. The constant monitoring of one's weight is an important step toward sustainable living.

The exercise of measuring waist-to-hip-ratio was done to reinforce the subjects' concern about their weights. Even though the activity was carried out and each student confirmed the results of his/her BMI, the results were not analysed.

3.3 QUALITATIVE RESEARCH

The second part of the research instrument, the test, had three structured questions with a total of seventy (70) marks. The learners were expected to explain their answers in short sentences. All the learners had English as a second language, and it was therefore important that they understood the questions and gave coherent and grammatically correct answers. The questions were open-ended and required the learners to display comprehension of concepts. According to Sanders and Mokuku (1994:488) learners display comprehension of concepts if they can do the following:

- know and be able to recognise the name and definition of a concept
- be able to define the concept in their own words
- be able to recognise instances (not previously encountered) of the concept

- be able to distinguish between, classify and know instances of the concept not previously encountered
- be able to apply the concept in new situation

Quantitative modes of analysis are said to provide ways of discerning, examining, comparing, contrasting and interpreting meaningful patterns or themes. Meaningfulness of the data is determined by the particular goals and objectives of the project at hand. In the research the learners' responses were analysed for accuracy in conveying meaning, identification of learners' misconceptions and the extent to which learners displayed competence in using English as a communication medium in response to the questions.

According to Berkowitz (1994: 4-2) in analysing quantitative data the researcher should be asking and re-asking the following questions:-

- What pictures and common themes emerge in responses dealing with specific items? How do these patterns help to illuminate the broader study questions?
- Are there any deviations from these patterns? If yes, are there any factors that might explain these atypical responses?
- What interesting stories emerge from the responses?

3.4 THEORETICAL FRAMEWORK ON WHICH THE RESEARCH IS BASED

The theoretical framework underpinning this study is the model called **constructivism**, which helps the educator to understand the students' learning methods. This theory acknowledges that learning is done by the individual and that learners construct knowledge by interpreting new experiences in the context of prior knowledge (Trowbridge & Bybee, 1996). Vygotsky's work (1968) is a second source for constructivism. He deals with students' conceptions and

educators' conceptions, and how students and teachers might use similar words to describe concepts, yet have different personal interpretations of those concepts.

Constructivist research focuses on identifying students' difficulties in mastering concepts that have been covered in class. Student conceptions that are not consistent with scientific descriptions have been labelled '**misconceptions.**' The reason for wanting to discover misconceptions is to make sure that the educator will play a role in changing the misconceptions so that they are more aligned with those recognized as scientific. In the research, the researcher wanted to determine whether students were mastering their learning in nutrition classes. She also wanted to assess the subjects' nutritional status' as recorded in their BMI results. The collection of data would be useful in strengthening the teaching of nutrition by providing feedback on whether the students are really learning or not.

Constructivist teachers teach in ways that involve learners in practical work and discussion. According to Martin, Sexton, Wagner and Gerlovish (1997) constructivist teachers conduct their classes with the following ideas in mind:

- They advocate hands-on, minds-on learning to promote the interplay of what is already known and what new ideas will be formed.
- Value prior ideas of children.
- Urge students to identify mental discrepancies linked to prior ideas for proper concept formation.

In terms of hands-on, minds-on learning, the researcher required the subjects to master the technique to measure their own BMIs as a strategy to keep track of their own weight status. The test was used to discover whether the learners were mastering the knowledge they had gained on nutrition by maintaining reasonable weights in relation to their heights.

3.5 THE MIXED METHOD APPROACH

The research used the mixed method approach in that part of the data was made up of quantitative learners' results. The second part of the research is qualitative in that it explores learners' understanding of nutritional concepts covered in the grade twelve Consumer Sciences' syllabus. According to Sharp and Frechling (1994), a strong case can be made out for using an approach that combines qualitative and quantitative methods because one can build on the strength of each type of data collection and minimize the weaknesses of a single approach. A multi-method approach to research can increase both the validity and reliability of data. The validity of results is strengthened by using more than one method to study the same phenomenon. This approach is called triangulation and is often mentioned as the main advantage of the mixed method approach.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter will present the results of the study, followed by discussion of the implication of the results. It should be remembered that the study sought to explore the working knowledge of Mohlalabetsi High School consumer science students' on issues of nutrition. Specific issues that the researcher wished to address were:

- To measure the literacy level of the learners on nutritional issues.
- To find out if the learners could apply their knowledge to solve problems or to respond intelligently to test questions.
- To identify misconceptions the students may have had about nutritional issues.
- To ascertain the level of under and over-nutrition of learners at Mohlalabetsi High School so as to ascertain whether any of the students are at risk or not.

The results of the study are presented in the following order:

1. The significance of the present average mass of students after the calculation of their body Mass Indices and analysis of the outcome.
2. The presentation of the content based on test results of the grade 12 learners. The test was used to investigate learners' understanding of nutrition concepts covered in the Grade 11-12 syllabus. The test tested learners' ability to apply their knowledge to a range of situations and to respond appropriately to questions asked.

4.2 ANALYSIS OF THE BODY MASS OF THE STUDENTS

Understanding of the Body Mass Index (BMI) is one way of helping learners to find practical ways of judging whether they are keeping healthy nutritional standards. Also, knowing and being able to calculate their BMI would make students know whether they are at risks or not and enable them to make informed decisions. The Body Mass Index (BMI) is, according to Wardlaw (1997), the currently preferred mass-for-height standard used to define healthy mass. This is calculated as follows:

$$\frac{\text{Body mass (in kilograms)}}{\text{Height}^2 \text{ (in meters)}}$$

The concept of Body Mass Index is convenient to use because the values apply to both men and women. However, any body mass-for-height standard is actually a crude measure because the concern is about being over-fat, and not simply over-mass in setting guidelines for healthy mass.

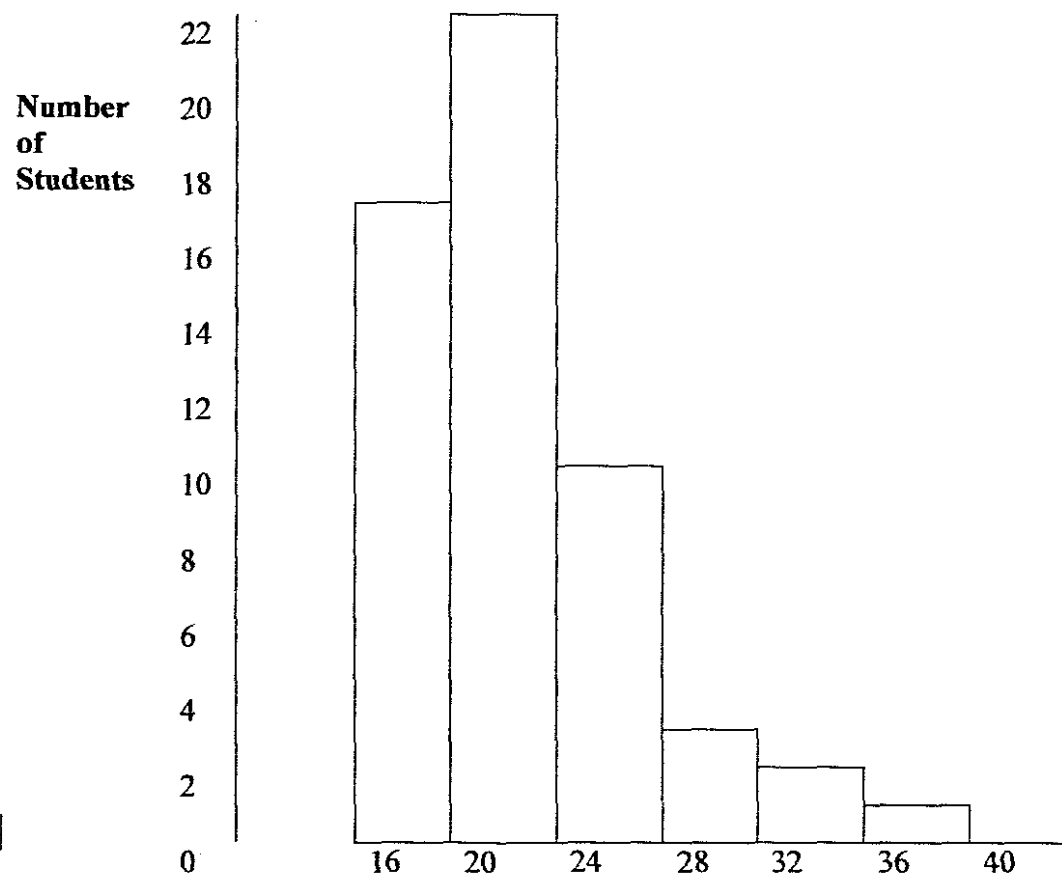
Knowing one's BMI is important because a person will know whether one has a normal mass or is suffering from obesity. All the students in grade 12 were asked to take their masses and heights in order to calculate their BMIs.

The exercise had to be hands on in order for learners to do it practically and to interpret the results themselves. The students were also taught how to use the Body Mass Index Table (Appendix 1) to interpret their own status. It is advisable for learners as adults to keep in their bathrooms a mass scale as well as a Body Mass Index Table. These are useful tools to keep ones mass at normal rates in order to avoid health risks associated with obesity.

The histogram shows clearly that there are students who are already battling with overweight. One never really expects overweight in school-going children because of their active lives. Therefore those learners who already seem to be overweight might experience further weight problems out of school if they adopt a sedentary life style.

The age range for the girls was 17 to 30 years, while the age range for the boys was 24 to 29 years. This range for girls in particular shows how their school lives are usually disrupted by home chores and the usual preference for boys to attend school over girls. In black families the education of girls is not a priority because they get married and leave the home. Girls are therefore considered as not being of economic importance to their immediate families. These are some of the socio-cultural beliefs that impact negatively on girl children. A lot is, however, now being done to address issues of equity.

TABLE 2 : The learners' Body Mass Indices



Analysis of the BMI of the children

TABLE 3 : Body Mass Index of learners in Grade twelve

No. of Students			Body Mass Index
17	30,90%	Student are between	16-20 BMI
22	40.00%	Student are between	20-24 BMI
10	18,20%	Student are between	24-28 BMI
3	5,50%	Student are between	28-32 BMI
2	3,60%	Student are between	32-36 BMI
1	1,80%	Student are between	36-40 BMI

Table two shows the Body Mass Indexes of all learners in grade twelve at Mohlalabetsi High School. The normal range of BMI is 18.5 – 30. A few learners, according to the graph, are over-mass or obese. These students are at risk because obesity is associated with very serious diseases. These learners have to try to lose weight as it is easier for them to do so than to risk being predisposed to serious malnutrition diseases. Classification of the learners BMI indices showed the following classification of the learners' masses.

TABLE 4 : Mass Categories of learners

	Undermass	Normal mass	Overmass	Obese
No of people	6	36	8	5
% of people	10.90	65.45	14.54	9.10

4.3 UNDERMASS INDIVIDUALS

Brown (1999) defined under-massed people as those who have too little body fat, or less than 20% body fat in adult females and 12% body fat in males. They have a BMI below the “acceptable” level.

Some people assessed as under-mass for height are healthy and have a sufficient supply of body fat. People who are naturally thin often have as much difficulty in gaining mass as obese people have losing it. People who are slightly under-mass may even have a health advantage. Wardlow (1997) states that failing health seems to result from a long-standing dietary intake that does not meet nutritional needs.

4.4 AVOIDABLE CAUSES OF UNDERMASS

Brown (1999) states that under-mass is caused by under-nutrition among infants and children from middle and upper-income families, and that it is associated with low-calorie, low-fat diets. Some parents say they implement this sort of diet to help their children form good lifelong eating habits and avoid obesity and heart diseases. However, with teenagers the low calorie intake should not lead to anorexia nervosa where teenagers starve themselves to death.

These days under-mass is a scary concept because it may indicate serious diseases like HIV/AIDS, pneumonia, cancer and diseases like anorexia nervosa. The failure to gain mass during the period of growth has an undesired consequence; it may halt growth in height. Counselling must be effective in getting adolescents to eat and to allow growth in height to proceed (Brown, 1999).

Growth failure, as a result of under-nutrition during infancy, is not regained in later childhood and adolescence. Apart from loss in physical stature, under-nutrition is also associated with poor mental development in young children, poor school achievement in older children, and low interaction with family and environment. Undernourished women have increased obstetric risks, with a

greater likelihood of delivering low birth mass babies (The South African Sugar Association, Nutrition Department).

4.5 IDEAL MASS

Out of the 55 learners, 36 had a normal mass, that is, the majority of the class members had a normal mass. They should try to maintain this mass throughout their lives if they want to maintain a healthy living style and avoid fatal diseases. According to the South African Sugar Association's Nutrition Department, good nutrition refers to 'eating the appropriate kinds and amounts of food for the body's needs. Signs of good nutrition include:

- Healthy mass for height, body frame and age
- Pink, firm gums and pink tongue
- Erect posture
- Alert, good attention span, cheerful
- Healthy pink, firm skin and nails
- Clear, bright eyes
- Clean teeth that are not decayed
- Good resistance to and recovery from infection

All these are good signs for one who wants to lead a productive life and contribute to the development of his community.

4.6 OVERMASS AND OBESITY

Out of the 55 learners, 13 were either over-mass or obese. These are learners at risk, unless they make an informed decision to lose weight. Bennett (1988) mentions the 'survival of the fattest,' and says that some human beings have regarded obesity as beautiful and desirable. Obesity has been prized and seen as attractive for most of recorded history, and in most human societies during the

past century. In these days of HIV/AIDS 'thinness has been seen as unattractive and has been feared because of its association with illness. The South African Sugar Association's Nutrition Department defined over-mass and obesity as individuals who are 10-20% above the optimal mass for their height, age, build and gender. Over-mass does not always mean that the individuals are too fat. Some individuals, especially athletes, weigh more than their optimal mass because they have a lot of muscle. Many individuals, however, weigh more than their optimal mass because they have too much body fat. Obese people are at risk for disease shown in the list below. Wardlaw (1997) and Bennett (1988) also mentioned the very same list of diseases to which obese people are prone.

- Increased risk in surgery
- Non-insulin dependent diabetes
- High blood pressure
- Heart disease
- Arthritis
- Gallstone
- Pregnancy risks
- Premature death
- Various forms of cancer such as cancer of the colon, rectum and prostate gland in men and breast (especially after menopause), uterine and ovarian cancer in women.

Obesity is usually defined as representing a total body fat percentage over 25% in men and 30-35% in women. A body mass index over 27 to 30 also represents obesity. Fat distribution partially determines health risk from obesity. Upper body fat storage distribution (waist-to-hip ratio greater than 1.00 in men or greater than 0.80 in women) suggests higher risks of hypertension, heart disease, and diabetes associated with obesity than does lower body fat distribution. Some subjects are also aware that genetic factors influence the tendency toward obesity. They refer to their fathers, mothers or aunts as being obese. How a person is raised also

influences the tendency toward obesity, because family members often develop similar eating habits and activity patterns.

According to Robinson, Lawler, Chenoweith and Garwick (1990), those in search of a treatment for obesity should remember the following five points.

1. A focus on healthy life style rather than weight loss per se is more appropriate for many potential and current dieters;
2. The body resists weight loss;
3. The emphasis should be on preventing obesity because curing the disorder is very difficult;
4. Weight loss should represent mostly a loss of fat storage and not primarily the loss of muscle and other lean tissues; and
5. Rapid weight loss and quick regain can be harmful to physical and emotional health.

It is very clear that learners should learn to maintain a healthy weight from infancy to adulthood if they are to maintain a healthy lifestyle. It is also obvious from the points outlined above that losing weight is a very difficult process.

4.7 HIGH BLOOD PRESSURE: A SILENT KILLER

High blood pressure is another serious over-nutrition disease. It is caused by plaque that builds up in the arteries. The arteries become less flexible and cannot expand. When vessels remain rigid, blood pressure remains high, and eventually the plaque begins to choke blood supply to the kidneys, decreasing their ability to control blood volume, and in turn obesity is often associated with high blood pressure, especially in women.

Inactivity also encourages the development of high blood pressure. However, if an obese person loses mass and engages himself/herself in regular physical

activities, blood pressure often returns to normal. High blood pressure is sometimes described as a lifestyle disease, which means that it can be controlled by choosing to eat healthy meals and by engaging in regular physical exercise. The eating of excessively rich foods blocks the blood vessels. The learners should develop a habit of maintaining a healthy lifestyle, including exercise and correct eating habits, before it is too late. Existing bad habits in this regard should be corrected.

4.8 UNDERNUTRITION CASE HISTORIES

The researcher interviewed a few students who were under-mass to find out the root causes for their under-nutrition. One of the students indicated that there was never enough food for all of them in the family. The researcher encouraged the learner to start a small vegetable garden that would supply the minerals and vitamins that the body needs. Another student said that they ate food from two groups only, mainly from the energy and protective groups, as the family could not afford body-building foods. The researcher had to highlight to this learner the importance of eating plant products that could supply the family with proteins, for example soya beans, beans and peanuts. The under-mass students included a learner with tuberculosis (TB). One can assume that the nutritional base of the family is not good because if it was they would have been protected from opportunistic diseases like TB. The learner also indicated that she had a very poor appetite. She was advised to see a doctor for advice on what to do in order to make her appetite return.

The researcher also had interviews with over-mass and obese individuals in order to investigate their eating patterns. Most of the over-mass and obese students mentioned that their parents were overweight too. A female student said that she failed to control her mass after the birth of her baby. These learners were helped to think of mass as something within their ability to control by eating wisely and having regular exercise. The researcher stressed the point that good health is one

of the most precious possessions that one can have. While it is true that we inherit our parents' genetic material that will influence our weight and the diseases that we are prone to, it is also true that many of our diseases will be caused by poor nutrition. With scientific knowledge the learners can choose a style of eating that will improve and maintain their health.

4.9 THE SIGNIFICANCE OF OVER AND UNDER-NUTRITION CASE STUDIES

The researcher's interviews with students on nutrition problems highlighted the need for counselling on a one-to-one basis in order to discover and address sources of nutritional problems. The one-to-one interview was a positive step to help learners modify behaviour patterns that led to over-nutrition or under-nutrition statuses. The interviews were based on the premise that excessive food intake is a learned response that can be changed. By means of this concept the individual learns to focus attention on the environmental factors that influence his or her food intake and gradually to modify these so that a change in eating habits and subsequent weight loss occurs.

4.10 CANCER THREAT FOR OBESE MEN

Issues of obesity have been topical these days, with special topics being featured in newspapers. For instance, Bailargeon (2005) in the Star of Tuesday January 2005 reported a new study in Atlanta, in the United States, which stated that the more obese men are, the lower their levels of prostate-specific antigen or PSA. The study showed that obese men had about 30% lower PSA levels than men of normal weight. The significance of the study results is that it is possible that prostate cancer detection may be delayed in overweight or obese men.

4.11 ANALYSIS OF TEST QUESTIONS WITH WHICH LEARNERS EXPERIENCED PROBLEMS

The learners had a number of terms that they had to define. Their definitions indicated whether they understood the terms or not. If the learner could define a term accurately in his own words, then understanding of the term could be assumed. There are cases, however, where learners learn the definitions by rote. The terms that the learners had to define and their responses to these will be discussed below.

The first concept for learners to define in number five was “grazing.” The correct response for the concept grazing is the eating of small amounts of low fat food frequently over a day.

4.12 LEARNERS’ RESPONSES

Some students gave the correct response to the concept, while other students gave the following responses:

Learner A: Grazing is the method of cooking in ‘law’ fat food (careless mistakes).

Learner B: Grazing is the consumption of grass by animals.

Learner C: Grazing is the small amount of fat.

Learner D: Grazing is a small amount of low fat food frequently over a day in three main meals (language problems).

Learner E: Grazing looses the food of low fat.

Learner F: Grazing: a small amount of low fat in the food.

Some of the responses indicated that the learners know the elements of the answer but are unable to express themselves in a manner that yields grammatically correct answers as well as the correct meaning. Student B’s answer was correct

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but not in the context of Consumer Sciences. Students D and E typify linguistic problems that learners experience when taught in a foreign language. For instance, they are not aware when a verb is missing and the result is an incomplete or ridiculous sentence. Learner E, for instance, said that “Grazing looses the food of low fat.” It should have been possible for the learner to reason that the response did not make sense. But because of linguistic difficulties, the learners lack the appropriate vocabulary to describe what they want to convey. It is, however, clear that the learners do not only have grammatical problems, but that this has a negative impact on their ability to comprehend concepts.

The second term to be defined by learners was **malnutrition**. The correct definition that was given to the learners was that malnutrition is an impairment of health resulting from a failure of the diet. The responses from the learners were as follows:

- Learner A: Nutrition food need to be consumed.
- Learner B: It can be the impairment of the diet from the body.
- Learner C: Is eating of food which is not healthy.
- Learner D: Is people who does not take their food well.

All the learners’ responses showed their difficulty in understanding the language in which malnutrition was defined. Learner B shows that he/she does not understand the meaning of the term “impairment.” Learner C misses the point because food that is not healthy needs to be explained in order to show a true understanding of malnutrition. Learner A did not respond to the question as the answer that she gave is not a definition. The learners’ responses indicated the need to train learners to answer different types of questions in an appropriate manner.

The third term the learners had to describe was **under-nutrition**. The correct response should have referred to failing health that results from a long standing

dietary intake that does not meet the nutritional needs of an individual. As in the other definitions the learners did not give valid responses. Frequent responses were as follows:

- Learner A: Is the food that is having the nutrients, that is balanced.
- Learner B: Is the person who does not consume food from the body building groups.
- Learner C: Consuming food containing good nutrients.
- Learner D: A person who does not take in enough food which is required by the body.
- Learner E: Is the smaller nutrients taken by a person.
- Learner F: Means one's body is under-mass
- Learner G: Is a person who consume little amount of food per day.

The answers given by the learners show a tendency to give incomplete answers. For instance, the learners refer to the quantity of nutrients without saying how the nutrients affect the people. There is also lack of analytical skills for learners A and C who cannot see that "under" refers to fewer nutrients. The concept less or fewer is understood by learner G but the effect of less nutrients is not explained. Learners need to be helped during formative assessment to give full answers every time they answer a question. The skill to give full answers does not come naturally to learners but requires to be taught. Teachers, however, rush to finish the syllabus and neglect to teach some of the important skills.

The learners were also required to describe **over-nutrition**, which refers to nutrients consumed in excess of body needs, or the state in which nutritional intake exceeds the body's needs. The responses from the learners were as follows:

- Learner A: Is the food that is having the unbalanced nutrients.
- Learner B: Is the many nutrients.
- Learner C: Means one's body is over-mass.

Learner D: Is when a person is over-eating food.

Learner B understood the basic idea about over-nutrition but also gave an incomplete answer. Learner C described the implications of over-nutrition but also gave an incomplete answer. Learner C describes implications of over-nutrition and not the definition of the term. Learner D was on the right track but needs to realise that too much food may not be bad for one person but bad for another, depending on the kind of work each person does. English language incompetence seems to be the main cause why learners are not giving complete and relevant answers.

Another term that learners had to define was **vegetarian**. Vegetarians are people who believe that it is unhealthy to eat meat and they refrain from doing so, but they eat animal products. Vegetarianism according to Wardlaw (1997) evolved from a long time ago. Wardlaw (1997) states that historically, vegetarianism was linked with specific philosophies and religions or with science. It is also stated that vegetarians advocated a meatless diet for reasons of physical health, ecological religions and philosophical benefits. As the field of nutrition grows, new information has enabled people to design adequate vegetarian diets. A vegetarian diet of plants only can lead to various nutrient deficiencies and to substantial growth retardation in infants and children if not planned carefully. The learners' responses to what a vegetarian is appear below:

Learner A: Are people who eat vegetables and fruits only.

Learner B: Eat nothing of animal origin e.g. animals and animal products

Learner C: People who eat vegetables

Learner D: People eating vegetables instead of fruits and meat because is their diet.

Learner E: A vegetarian is a person who eats vegetables.

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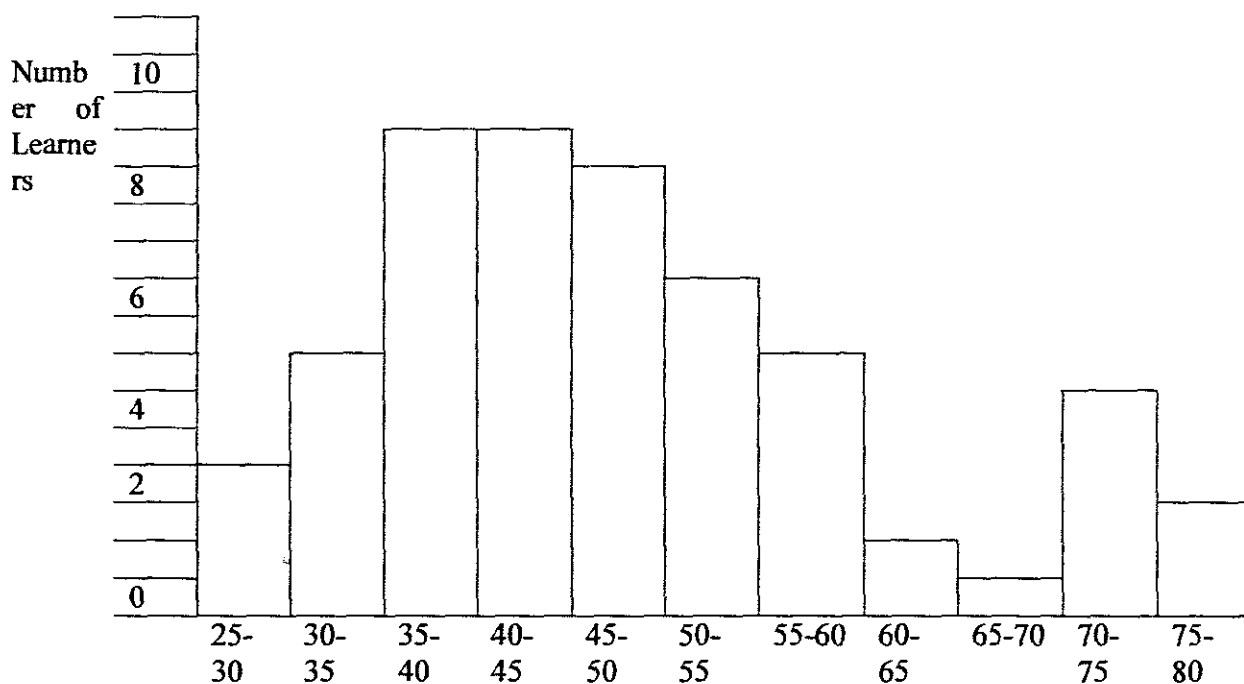
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Learner E: A vegetarian is a person who eats vegetables.

The first portion of the instrument to test the learners' understanding of nutritional issues was a multiple choice test. The following histogram shows how the learners preformed.

TABLE 5: Learners multiple choice question results



Histogram showing learners' multiple choice question results

The multiple choice type questions were completed poorly by the learners. Sixty-five percent of the learners obtained marks that are just under 50%. Thirty five learners (35%) obtained marks above 50%. This was not a very good result because it showed that learners do not understand their work well enough. The language difficulties of the learners were highlighted in the structured questions of the test. However, difficulties could have arisen when learners read the English questions without the benefit of comprehension and therefore couldn't provide the correct answers. The English language problem for learners at the Mohlalabetsi

School is significant and seems to have a very obvious negative impact on their academic performance.

4.13 CONCLUSION

The results of the study show that the learners harbour misconceptions about nutritional issues. For instance, they failed dismally in defining the different terms relating to nutrition. The terms referred to different options of feeding. Learning should lead to mastery of concepts and accurate descriptions of terms. The theory of constructivism states that learning is accomplished by individual interpretation of what one learns and is influenced by what one knows. Engaging learners in discussion is therefore good because it gives the educator opportunities to discover what interpretation learners give to concepts. Remedial activities to address the learning problems can then follow.

Language problems which arise because learners are second language speakers of English also complicated the picture of students' responses, since it was not clear whether learners did not know the answers or could not express themselves accurately in a foreign language. The question of medium of instruction has been a thorny issue in South Africa with some people arguing that learners must be taught in English which is a universal language used throughout the world. There are people who argue that African languages are not well developed and cannot be used to teach science subjects due to the lack of appropriate terms to describe concepts.

The structured questions showed clearly that learners had a problem in expressing themselves in English. Scores in the multiple choice type questions were also low. It could be that learners also struggled with comprehending the questions and

therefore chose wrong answers. A very important outcome of the study is that the learners at the rural high school Mophabetsi are struggling with expressing themselves in English. The result is that they give incomprehensible answers which impact negatively on the scores that they get in examinations. Because of poor language skills the learners are not mastering nutrition issues as well as they should.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The study investigated grade twelve learners' perceptions of nutrition. This is an important topic for people who are future fathers and mothers and for people who still have a whole future lying ahead for them. Some people call information knowledge because it helps one to make informed decisions. Wrong choices made out of ignorance can be very costly health-wise and lead to premature death. Today there is a large population of people who are HIV positive and whose lives can be prolonged for a significant number of years if they receive proper nutrition.

For the learners, the research was a hands-on minds-on experience because they were involved, for instance, in carrying out measurements in order to determine their basal metabolic indices. While on the overage most learners had a normal body mass index, a few learners were battling with weight because their BMI was over thirty. Such learners need to know the kind of diet that will control weight gain. Learners should also realise that a sedentary life encourages weight gain, while vigorous exercises burn calories.

It was highlighted that obesity increases the risk of a wide range of health challenges. In the daily paper, Mercury of 8th January 2004, Coppan, a diabetes expert from Harvard Medical School in the United States, was reported as having indicated that a major outbreak of diabetes in South Africa, coupled to the current HIV/AIDS epidemic, would be catastrophic to the economy. He also stated that the incidence of diabetes among the South African population had reached 'alarming' proportions.

Diabetes used to be very rare among black African populations when their diet consisted of mainly vegetables, and other wholesome foods. Adoption of western style eating involving over-use of fat and salt led to poor nutrition and an increase of lifestyle diseases like hypertension, heart diseases, kidney failure and diabetes.

The study highlights the importance of education so that learners could know and be better informed about how to manage their own lifestyles in order to live better lives. The knowledge about proper diet is important in preventing onset of diseases. As the old adage says, "prevention is better than cure." Diabetes is also a disease that can be managed once you have it. But again, knowledge about how to manage it is important. There are a lot of people who lose limbs as a result of complications from diabetes, which could have been avoided if patients were more educated about how they should feed themselves and exercise regularly.

The performance of learners in the test indicated crucial areas of concern that must be taken care of by the school if effective learning is to take place. For instance, the test on nutrition showed that the learners were not learning to master concepts of nutrition. There were a lot of inaccurate descriptions of concepts showing lack of understanding. In some cases the learners were just combining words and producing incoherent statements. In all respects the learners showed clearly that they memorised their work and tried to reproduce it. This was accomplished accurately, if they memorised well, but in most cases the results of memorisation were not perfect. The problem with memorisation is that one often memorises without understanding and once one word is forgotten, one cannot save himself or herself from embarrassment. This was a lesson for the researcher, who now understands that one needs to make sure that learners are not only repeating what they had heard or read, but that they understand the concepts.

The starting point of the research was to explore Mohlabetse Grade 12 learners' perceptions of nutritional issues. Data was collected by means of a test. Secondly, students were helped to determine their Basal Metabolic Indices and to determine

their weight status. Positive results were that students now know how to monitor their weight in order to make informed decisions. Negative results were that many learners harbour misconceptions about nutrition. The researcher had hoped that her teaching would be effective and that it would lead to nutritional literacy. Miller (1998) defined scientific literacy as consisting of three dimensions as follows:

- An understanding of the norms and methods of science. For example, learners had to learn how to determine their Body Mass Indices and classify themselves accordingly. The activity of determining BMI involves accurate measurement, calculations and interpretation of data.
- An understanding of key scientific terms and concepts. This competency would have been shown when learners described nutrition terms accurately. The learners showed great difficulty in this section indicating they had not understood some of the work. The problem of understanding was also affected by a poor grasp of the medium of instruction.
- An awareness and understanding of the impact of science and technology on society. In this study the learners had to be aware of the effect of malnutrition on their health.

It is the view of the researcher that an assessment that sought to discover the kind of knowledge learners have about nutrition, should assist in the development of programmes concerned with instructional practice in terms of remedial activities. The discovery of misconceptions also helped the educators to identify areas that tend to give learners problems.

5.2 RECOMMENDATIONS ARISING FROM THE STUDY

1. The learning of content in a foreign language proved to be a major obstacle at Mohlalabetsi High School. The school has no power to change the language of instruction. The teachers, however, across the school grades and in all learning areas, could make sure that they used the English language all the time in order to foster the learning of English among students. The more English spoken in the school, the more English expression will improve among learners. Some teachers tend to use vernacular in their teaching and this does not help learners with mastering English.
2. There is also a need to train learners in answering structured questions, particularly making sure that learners give full answers, phrased in full sentences. The learners' answers were captured in incomplete phrases that sometimes did not make sense. There is a need for all the teachers in the school to train learners in the art of answering questions. This exercise could be done after a test has been graded and time could be taken to show learners how to answer questions completely.
3. There is also need to train learners to evaluate their responses to questions and to determine if what they have written made sense. Sometimes learners finish an examination quickly, so that they could leave the room. They seldom take time to revise their responses against what the tests wanted them to do. This results in obviously stupid mistakes that are not being corrected before the test script is submitted.
4. Emphasis should be placed on the fact that, according to Mortimore (1998), there are four main factors that influence one's nutritional status. These are;
 - The quality of food we eat.
 - The quantity of the food we eat.

- The efficiency of the whole digestive process.
- Biochemical individuality.

For instance, an individual whose digestive system is inefficient will not benefit positively from the nutritious food he/she takes in. If digestion is poor, the products will not be absorbed properly. Even if the digestion and absorption of food is good, one still has to deal with whether food nutrients are used effectively by the body. For instance, with diabetes one loses a lot of glucose in the urine and this causes an imbalance of this nutrient in his blood.

The research of nutrition and understanding of nutritional issues by secondary school leavers is necessary in order to help learners to identify deficiencies in their diets as well as the hazards of some of their food choices. For instance, a Learning Outcome for Consumer Studies states that the learner must be able to make **knowledgeable consumer choices of food**, clothing, furnishings and housing within a given socio-economic and cultural context (National Curriculum Statement – Consumer Studies, 2002). One sometimes wonders why people allow themselves to suffer from illnesses that could be prevented. People who have been empowered with knowledge need to use it to protect themselves from future pain. With the meteoric rise of the number of people who suffer from disease caused by poor feeding, it is important to address health issues from childhood to adulthood, which is a life-long learning process. The educators need to present nutritional information in a way that will cater for the needs of the various age groups.

5.3 FEMALE LITERACY ON NUTRITIONAL ISSUES

While there is no debate about the importance of both girls and boys gaining literacy on nutritional issues, there is presently adequate evidence that women are still responsible for taking care of the family's diet. Women take care of children as well as the elderly, and are also to a great extent responsible for the food security in the home.

It has been found that there is a correlation in developing countries between low female literacy rates and high infant and maternal mortality rates. Studies have shown that literacy can empower a mother by enabling her to make informed choices that enhance her own and her child's health.

5.4 PRIMARY HEALTH CARE AND FOOD SECURITY

In medical circles there is now a prevailing concept of **primary health care**. The concept of primary health as determined at Alma Ata, Geneva (WHO, 1988: 15). was defined as follows:

Primary health care is essential care based on practical, scientifically sound and socially acceptable methods and technology, made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and the overall social and economic development of the community. It is the first level of contact of individuals, the family and the community with the national health system, bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care service.

The point of interest of the researcher in the concept of primary health care is that of the eight basic components of primary health care as spelled out in section vii of the Declaration of Alma-Ata, one component is the promotion of food supply and proper nutrition. The role of proper nutrition in promoting good health cannot be over-emphasized.

Food security in many Black poverty stricken families is a problem and an important determinant of nutritional status. People are considered “food insecure” when they are unable to obtain sufficient food to meet their dietary needs and food preferences.

According to Savage King and Burgess (1996), an important part of food security is Food and Nutrition Surveillance (FNS). The food surveillance process means:

- Monitoring the supply of food at different points along the food paths, to see and remove blocks quickly;
- Monitoring the nutrition of at risk groups, such as children, to find out where and when there are nutrition problems, and whom they affect. The logical action would be to do something to deal with the problem.

5.5 CONCLUSION

Education of the population on nutrition holds the promise of long-range benefits to the greatest numbers. Nutrition education can be successfully initiated even in preschool and should continue as a planned curriculum until the twelfth grade. In Mohlalabetsi High School, nutrition studies are done from grade 10 to 12. It would be wise to introduce this crucial subject to all the learners in the school. Regardless of one's future career plans, the study of nutrition should first be directed to empowering one's self. This is important because many young people (men and women) live alone and are solely responsible for their own nutritional well-being. Nutrition education applied to the individual also reaches the family. The knowledge and understanding of nutritional issues is also important as the young people establish their own families.

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APPENDIX

NUTRITION AND MASS MANAGEMENT TEST

Nutrition and Mass Management Test

Time : 2 hours

Marks : 100

Instructions

1. All the questions in the paper are compulsory
2. Please write neatly and clearly
3. Number your answers exactly as the questions are numbered

Allocation of marks:

Section A	:	objective questions	30
Section B	:	Nutrition and mass management	70
Total	:		100

Section A : Objective questions

QUESTION 1

1. In each of the following questions, a number of alternative responses are provided. Select the correct response in each case and write only the number and the correct symbol next to it e.g. 1.3.B
 - 1.1 The ----- is a quick and easy assessment tool to use to determine whether a person is below, at or over their body mass range.
 - A. Body mass women's table
 - B. Body mass index table
 - C. Body mass scale
 - D. Body moses index table
 - 1.2 If a person's BMI is more than 30 you can conclude that he/she is -
 - A. overmass
 - B. normal mass
 - C. undermass
 - D. obese
 - 1.3 If a person's BMI is between 25-30.9 that means he/she:-
 - A. overmass
 - B. normal mass
 - C. undermass
 - D. obese

- 1.4. If a person's BMI is between 19-25 the conclusion is that he/she:-
- A. overmass
 - B. normal mass
 - C. undermass
 - D. obese
- 1.5. Food of low fat diet should be consumed by people who want to:-
- A. gain mass
 - B. gain height
 - C. loose mass
 - D. loose mouse
- 1.6. ----- believe that it is unhealthy or contrary to religious rules to eat meat but they consume animal products:-
- A. diabetics
 - B. vegetarians
 - C. vegans
 - D. fruitarians
- 1.7. ----- eat nothing that of animal origin, that is animal and animal products.
- A. fruitarians
 - B. Diabetics
 - C. Vegetarians
 - D. vegans
- 1.8. In a normal family, the ----- has more influence on the children's eating habits
- A. mother
 - B. father
 - C. grandmother
 - D. grandfather
- 1.9. People who carry their excess body fat around their stomach area are commonly referred to as:-
- A. ball shaped
 - B. waist shaped
 - C. apple shaped
 - D. pear shaped

- 1.10 People who carry their body fat around their hips and thighs are commonly referred to as:-
- A. pear shaped
 - B. apple shaped
 - C. waist shaped
 - D. ball shaped
- 1.11 ———— fatness has been shown to increase a person's risk for diabetes, high blood pressure and high blood cholesterol levels.
- A. waist shaped
 - B. pear shaped
 - C. apple shaped
 - D. ball shaped
- 1.12 When the body obtains more energy than it uses, for a long period of time, excess energy will be as body fat. This accumulation of body fat results in:-
- A. undermass
 - B. obesity
 - C. marasmus
 - D. normal mass
- 1.13 ———— change is the main approach to mass management.
- A. starvation
 - B. increase food intake
 - C. dietary increase
 - D. dietary change
- 1.14 ———— is generally low in fat, high in fibres
- A. fruit and vegetables
 - B. Cheese and butter
 - C. Meat and milk
 - D. potatoes and rice
- 1.15 ———— should consume legumes regularly that is beans, peas, lentils and soya products, because she does not consume anything from animal origin.
- A. fruitarian
 - B. Obese
 - C. Vegan
 - D. Diabetics

- 1.16 People who are overmass, may have high blood pressure problems. Reducing ---- intake may lower their high blood pressure
- A. meat
 - B. salt
 - C. milk
 - D. sugar
- 1.17 In order for a person to loose mass, it is recommended that he/she should do----- minutes of activity accumulated per day
- A. 20 minutes
 - B. 50 minutes
 - C. 40 minutes
 - D. 30 minutes
- 1.18 Some fats are needed in the daily diet. However, eating too munch of ----- may result in the development of obesity and heart disease.
- A. unsaturated fats
 - B. saturated fats
 - C. unstable fats
 - D. Melted magarine
- 1.19 Overmass and obese people must avoid snacks having-----
- A. high sugar
 - B. brown sugar
 - C. low sugar
 - D. less sugar
- 1.20----- is necessary for the formation of bones and teeth
- A. iodine
 - B. actin
 - C. calcium
 - D. vitamin A
- 1.21 The normal body temperature of the body is
- A. 36 C
 - B. 37 C
 - C. 38 C
 - D. 39 C

- 1.22 Water is classified as a nutrient because it:-
- A. is not manufactured by the body
 - B. passes unchanged through the body
 - C. releases energy to the body
 - D. cauliflower with white sauce
- 1.23 Which one of the under mentioned dishes is not suitable for a person on a low protein diet
- A. egg and cheese sandwich
 - B. fruit salad and ice-cream
 - C. potato and green pepper salad
 - D. cauliflower with white sauce
- 1.24 vitamin C (ascorbic acid)
- A. Prevent night-blindness
 - B. Facilitates cell division
 - C. Is essential for the building of body tissues
 - D. Is essential for the release of energy
- 1.25 The absorption of calcium in the body is promoted by the presence of sufficient amount of :-
- A. vitamin C
 - B. vitamin D
 - C. vitamin B
 - D. vitamin E
- 1.26 The most important function of sodium chloride in the body is to:-
- A. promote the digestion of food
 - B. improve the flavour of food
 - C. regulate the activity of the thyroid gland
 - D. control the amount of water in the body
- 1.27 The term 'meal plan' refers to:-
- A. the distribution of food intake during the day
 - B. the way in which the energy value of a meal is calculated
 - C. the type of food eaten regularly by a certain group of people
 - D. the distribution of food in meals

1.28 Breakfast should supply at least ----- of the body's daily nutritional needs.

- A. 25%
- B. 35%
- C. 15%
- D. 5%

1.29 Cellulose and Hemicellulose form part of the substance which is called-----

- A. sugar
- B. starch
- C. fibre
- D. dextrin

1.30 Excess carbohydrates in the body are converted to:-

- A. muscular tissue
- B. fats
- C. cellulose
- D. bones

Section B : Nutrition and Mass management

QUESTION 2

2. The following dishes for a summer breakfast were prepared for an overmass daughter.

- Sweetened orange juice
- Oats with cream and sugar
- Fried bacon and egg
- White toast with margarine and jam
- A glass of skimmed milk

Analyse the breakfast dishes and answer the questions that follow.

- 2.1 Give the difference between full cream and skimmed milk (1)
- 2.2 Recommend any three changes that can be made to be breakfast to make it more suitable for an overmass teenager (3)
- 2.3 From the list above, choose any two dishes that add the overmass problem and give a reason for your choice (3)
- 2.4 Which cooking method increases the overmass problem? (1)
- 2.5 Compile a three course menu cards with the dishes recommended in question 2.2 (6)

[14] .

QUESTION 3

3. Annah is an obese office worker who cannot have breakfast because of time. The following is her lunch from the café.

Fried chips

White bread, atjar with raw tomato

A cool drink

- 3.1 Which food group is not included in this meal (1)
 - 3.2 The method of cooking used in the above meal contributes to obesity. Which method of cooking is suitable for good health? Give one reason for your answer. (3)
 - 3.3 List three family factors that influence the planning of meals (3)
 - 3.4 Suggest three ways in which the above meal can be turned into a balanced meal (3)
 - 3.5 Mention three varieties that are provided by fruits and vegetable in meals. (3)
- [12]

QUESTION 4

- 4.1 Snacking in between meals is not necessarily a bad habit. Name two group of people who may benefit from snacks between meals. Give a reason why each group should benefit. (4)
 - 4.2 What are the health requirements for snacks taken between meals? (2)
 - 4.3 Why are vegetables so important in the planning of meals? (2)
 - 4.4 Why should salads be included in the daily menu? (1)
 - 4.5 If a person does not like to eat dairy products e.g. milk, cheese, yoghurt, maas, what other food could he/ she eat for calcium? (1)
 - 4.6 Vitamin C helps with the absorption of iron from fruits, vegetables and cereals products. Which foods are rich in vitamin C?. Mention two types. (2)
 - 4.7 Fibre (roughage) prevents constipation and helps to reduce blood cholesterol levels. List two examples of food rich in fibres (2)
 - 4.8 Even though Margaret takes her lunch box to school, she should have a proper breakfast in the morning. Explain why breakfast is the most important meal of the day. (3)
 - 4.9 Diseases of over-nutrition are prevalent among our South African people. Give four examples of those diseases. (4)
 - 4.10 Two minerals are necessary for growth and maintenance of the body. List these two minerals and give examples of food in which they are found, also indicate which group of people need these minerals the most. (6)
- [27]

QUESTION 5

5. Define/explain the following concepts:-

5.1 Grazing (2)

5.2 Health (2)

5.3 Malnutrition (2)

5.4 Under- nutrition (2)

5.5 Over- nutrition (2)

5.6 Vegetarian (2)

5.7 Vegan (2)

5.8 Food habit (3)

[17]

Grand total : 100

RATE YOUR PLATE

A close look at your weight status determine the following two indices of your body status: body mass index and waist to hip ratio.

BODY MASS INDEX (BMI)

Record your weight in Kilograms : _____ kg
Record your height in Meters (m) : _____ m

Calculate your BMI using the following formula:

$$\text{BMI} = \text{weight (kg)} / \text{height (m)}^2$$
$$\text{BMI} = \text{--- kg} / \text{--- m}^2 =$$

Waist – to hip – ratio

Use a tape measure to measure the circumference of your waist (at the umbilicus with stomach muscles relaxed) and hips (widest point).

Circumference of waist (umbilicus) = _____ cm

Circumference of hips = _____ cm

Calculate your waist- to- hip using the following formula:

Circumference of waist/ circumference of hips
Waist to hip ratio = _____ cm/ _____ cm = _____

INTERPRETATION

1. When BMI is greater than 25, health risks from obesity begin. It is especially advisable to attempt weight loss if your BMI exceeds 30. Does yours Exceed 25?
Yes _____ No _____
2. When a person is greater than 20% above health weight, a waist- to – hip ratio exceeding 1.0 in men and 0.8 in women suggests upper body obesity. This is associated with an increased risk of heart disease, high blood pressure, and diabetes. If appropriate, does your ratio exceed the standard for your gender?
Yes _____ No _____
3. Do you feel you need to pursue a program of weight loss?
Yes _____ No _____

MULTIPLE CHOICE MARK SCHEME

NAME : _____

STUDENT NUMBER : _____

	A	B	C	D	E
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