Knowledge, attitude, practices and factors affecting fruit and vegetable consumption in adolescents (GOKWE SOUTH DISTRICT)

Brighton Makumbe

Knowledge, attitude, practices and factors affecting fruit and vegetable consumption in adolescents (GOKWE SOUTH DISTRICT)

BY

MAKUMBE BRIGHTON

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Department of Food Science and Nutrition in the
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Supervisor: ……Mrs Makamure

ABSTRACT

Fruits and vegetable consumption pattern and its factors among adolescents in Gokwe South District were determined. The study drew participants from 2 schools, one from rural settlements and the other from the urban site. A total of 80 participants took part in the stud.40 participants were randomly selected from each participating school. A food frequent questionnaire, a 24 hour recall and KAP questionnaire were used to collect data from the participants. The study indicated a low fruit and vegetable intake among adolescents. Fruits recorded mean servings of 1.1125 per day which is below the required minimum of 2 servings per day. Vegetable recorded a mean serving of 1.325 which is much lower than the minimum recommended servings of 3 per day. The findings indicated vegetable consumption to vary with attitude; home availability of fruits and vegetables and geographical location. Knowledge, availability of fruits and vegetables, geographical location and socioeconomic status all indicated to affect fruit consumption. The findings also show that adolescents have poor knowledge on the recommended intake of fruits and vegetables.

DECLARATION

I, Brighton Makumbe, hereby declare that I am the sole author of this thesis. I authorize the University of Midlands State University to lend this thesis to other institutions or Individuals for the purpose of scholarly research.

Signature _____ Date _____

APPROVAL

This dissertation/thesis entitles “Knowledge, attitude, practices and factors affecting fruit and vegetable consumption in adolescents (GOKWE SOUTH DISTRICT)” by Brighton Makumbe meets the regulations governing the award of the degree of Food Science and Nutrition of the Midlands State University, and is approved for its contribution to knowledge and literal presentation.

Supervisor …….

Date …….

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To my friends and classmates, thank you very much for your help hope the almighty will bless you

I am obliged to Ministry of Health and Child Care (Gokwe South District), Foundation College staff and Chitombo High School staff for their support during the course of the research.

DEDICATIONS

I dedicate this research to God and my parents Mr and Mrs Makumbe

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CHAPTER 1

INTRODUCTION/LITERATURE REVIEW

1.1 Introduction

Gokwe South district lies in the northern part of the Midlands province at the 140 kilometre peg along the Kwekwe – Siabuwa high way and about 350 km to the south west of Harare. The research ought to investigate fruit and vegetable consumption pattern and its associated factors among adolescents in the district.

This chapter seeks to introduce the subject under investigation, the objectives of the study and details on the background of the problem and the statement of the problem.

1.2 Background

There has been a huge increase in new cases of chronic conditions in Gokwe South District in the past 2 years. In 2012, the district recorded 144 new cases of diabetes compared to 50 recorded in 2011. Hypertension new cases were 460 increasing from 278 in 2011 (consolidated district annual T5s- tally sheet summary that shows burden of diseases in the district). This increase might be attributed to poor dietary practices.

With increased urbanization and improved socio-economic development, new lifestyles are being brought up and also new forms of food intake like, fat, sweets and alcohol (Harpham, 1991). These practises bring in new disease patterns and reduced consumption of fruits and vegetables (World Health Organization, 2008) . Less fruits and vegetable dietary patterns has been associated with prevalence and complications of preventable illnesses like increasing cases of diabetes, hypertension and cardio vascular diseases (Heiner Boeing , Angela Bechthold , Achim Bub , Sabine Ellinger, 2012) . Fruits and vegetables are considered

cholesterol free as compared to animal products and thus contributing to lowering the risk of these diseases (Luc Dauchet, 2009) .

The study targeted adolescents in the district. Adolescence is an essential stage for growth and development (Damasceno, jo, Freitas, & Almeida, The association between blood pressure in adolescents and the, 2011). At this stage, the body undergoes various changes which influence an individual's adult life (National Research Council and Institute of Medicine, 2009). At this stage, healthy lifestyles should be established. WHO estimate low consumption of fruits and vegetables as the sixth major risk factor for mortality in the world (Matilda, 2012) .WHO dietary guidelines recommend that adolescents and adults should consume at least five portions (about 400g) of a variety of fruit and vegetables every day (World Health Organisation, 2003). Having knowledge of the number of recommended portions for health benefits has been shown to be a key factor in determining fruit and vegetable intake (Krebs-Smith et al., 1995).

According to the ZIMVAC, 2013 findings, 75% of the population live under the nation poverty datum line. (FEWS NET, 2014), went on to state that the majority of Zimbabweans spend most of their money on staple diet like maize. This leaves very little funds for other basics like health and education. Since fruits and vegetables are readily available and a cheaper way compared to medications; interventions to improve their consumption should be a cornerstone for any public health campaign.

The identification of potentially modifiable variables that affect fruit and vegetable consumption is vital in order to come up with effective interventions to reduce incidences of Non Communicable Diseases (NCDs) in the district

1.3 Problem statement

Consolidated District Tally show that there has been huge increase in new cases of chronic conditions in Gokwe South District In the past 2 years .Low fruit and vegetable consumption might be the cause. Fruit and vegetable consumption pattern is an integrated part of diets known in first world countries but it is uncommon and presumed low among adolescents in Gokwe south District. Factors contributing to these have not been sufficiently explored hence the need to be assessed.

Various Non Governmental Organisations projects in Gokwe South District like Nutrition Gardens are all aimed at increasing fruit and vegetable consumption in the district. These projects are normally carried out in rural areas to diversify food availability in rural areas. However there are no researches to find out if these projects are increasing fruit and vegetable consumption. There is a need to determine the consumption pattern of fruits and vegetables since most community members see the project as for commercial purposes only instead of seeing them as a means of increasing their food diversity as well. A study in America reviewed that rural adults' consumption of fruits and vegetables was below the required (Nawal Lutfiyya , Linda F. Chang , Martin S. Lipsky, 2012)

1.4 Objectives

The researcher ought to

- determine fruit and vegetable consumption pattern among adolescents,
- Find out if fruit and vegetable consumption varies with socioeconomic status, knowledge, attitude, geographical location and availability at home and school.
- identify the knowledge, attitudes and practices of adolescents over fruit and vegetable consumption

1.5 Research question

i. Are adolescents consuming the recommended intake of fruits and vegetables?

ii. Does fruit and vegetable consumption among adolescents varies with;

(a) Socioeconomic status,

(b) Geographical location,

(c) Availability,

(d) Knowledge and

(e) Attitude ?

iii. Are adolescents aware of the recommended intake of fruits and vegetables?

1.6 Hypothesis

Null hypothesis (H_0): fruit and vegetable consumption does not vary with the selected variables

Alternative hypothesis (H_1): fruit and vegetable consumption vary with the selected variables

1.7 Limitations

- The results of the study are limited by the honesty of the participants or their nonbiased participation
- All dietary recall methods rely on the respondent's memory, and this can contribute to inaccuracy.
- The participants were only secondary school going pupils. These may not be true representing adolescents in the district as there maybe difference in fruit and vegetable consumption between the school going and non-going adolescents.
- The exploring of socioeconomic factors was also limited as the actual family economic status is limited by asking the pupils alone.

1.8 Significance of the study

- **To school authorities –** the research could provide schools with opportunities to improve their tuck shops and environment in their range of fruits and vegetables they sale.
- **To the Ministry of Health and Child Care–** The health promotion strategies that could be provided by this research might increase adolescence consumption of fruit and vegetables at an important period of physical growth, and help lay the foundations of healthy eating patterns for life. The study could also challenge nutritionists to promote snacks which are nutritious as well as attractive to adolescents
- **To caregivers and households –** help them make informed decisions in the preparation of meals and purchasing of food
- **Local marketers –** marketers could be challenged to produce foods, especially for adolescents which are nutritious and acceptable to adolescence

1.9 Definition of terms and acronyms

Consolidated district annual T5 register_– tally sheet summary that shows burden of diseases in the district

ZIMVAC - Zimbabwe Vulnerability Assessment Committee

NCDs – Non Communicable Diseases

Summary

This chapter gave a brief direction to the study by clarifying the problem at hand and also giving the background of the problem. The research questions and objectives forming the basis of the study were also given. The chapter closes with a set of assumptions, limitations and delimitations available to the study, opening up for the next chapter which aims at giving

a detailed scope of the subject under study. This will be achieved through literature reviewing of other peoples work and strategies as postulated by various authors

CHAPTER 2

THEORETICAL ASPECTS

2.0 Introduction

This chapter reviews literature relevant to fruit and vegetable consumption patterns, functions of fruits and vegetables in reducing chronic diseases and factors affecting their consumption.

As estimated by WHO, 2011, over 35 million death in 2005 were caused by non communicable diseases (NCDs). These NCDs includes cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases. This figure (World Health Organization, 2011) represented 60% of all deaths that occurred globally. The World Health Organization, 2008 estimated that over the next years, total deaths caused by NCDs are expected to increase by a further 17% if proper interventions are not put in place. In developing countries it is more expensive to treat disease than taking measures to prevent them (Chifamba & Cooper, 2009).This means there should be an intervention that aims to prevent these diseases.

Health diet is one of the major key factors in the prevention of chronic diseases and in the maintenance of health throughout the life cycle (WHO, 2008). According to (Lutfiyya, Chang, & Lipsky, 2012) , at least 5 servings of fruits and vegetables are required per day to meet the body's healthy needs. Vegetables and fruit contain vital human nutrition sources and vital food constituents which have vital roles in the reduction of chronic diseases .A study by various scholars indicated a link between increased fruit and vegetable consumption and decreased risk of coronary diseases (Robinson & Tanya, 2008). A study by the German Nutrition Society showed that an increase in the consumption of fruits and vegetables has positive effects in reducing the risks of hypertension, CHD, and stroke (Heiner Boeing, 2012). 31% of ischaemic heart disease and 11% of stroke has been estimated to be caused by

Low fruit and vegetable consumption (WHO, 2002). Among its objectives to reduce incidences of Non Communicable Diseases in the world, the World Health Organization has also targeted improving fruits and vegetable consumption as one of its priorities (Agudo, 2005).

According to the International Agency for Research on Cancer (IARC) 2003, frequent consumption of fruits and vegetables has been shown to lower the risk of some cancers. Fruit and vegetable help lower cancers related to gastrointestinal tract. It went on to estimate that 20-30% of gastrointestinal tract and 5-12% of all cancers in the world can be prevented by increasing fruits and vegetable consumption.

According to (Whitehead, Ozakinci, Stephen, & Perrett, 2012) , fruit and vegetable convey health benefits via multiple pathways, including the substitution of unhealthy foods. This means they can be used to displace unhealthy foods that people might otherwise eat (Lucan & Sean, 2012). Adverse lifestyle factors are increasing susceptibility to chronic disease particularly in developing nations, meaning that the potentially protective effects of fruit and vegetable consumption will be increasingly important (Whitehead, Ozakinci, Stephen, & Perrett, 2012). This study aims to cover this gap by finding out the fruit and vegetable consumption pattern among adolescents and also determining the factors that affect consumption. According to (Agudo, 2005), fruit and vegetable intake measurement is essential to provide information that aims at increasing health around the world.

Various Non Governmental Organizations' projects in Gokwe South District like Nutrition Gardens are all aimed at increasing fruit and vegetable consumption in the district. These projects are normally carried out in rural areas to diversify food availability in rural areas. However there are no researches to find out if these projects are increasing fruit and vegetable consumption. There is a need to need to determine the consumption pattern of

fruits and vegetables since most community members see the project as for commercial purposes only instead of seeing them as a means of increasing their food diversity as well. A study in America reviewed that rural adults were not consuming the required intake of fruits and vegetables (Lutfiyya, Chang, & Lipsky, 2012).

2.1 Importance of fruits and vegetables in preventing chronic diseases

Clinical and biological investigations on fruits and vegetables have shown that they have protective effect against Chronic Heart Diseases (Dauchet L. , Amouyel, Hercberg, & Dallongeville, 2006). Fruits and vegetables have micro- and macro-constituents that helps in keeping the body healthy and reduce risk factors of CHD, such as hypertension, dyslipidemia, and diabetes. (Dauchet L. , Amouyel, Hercberg, & Dallongeville, 2006)

The capability of fruit, vegetables, and grains to combat the risks of cardiovascular disease and cancer (Hu, 2003), has been attributed to their dietary constituents. Plant foods contain vital constituencies like carotenoids, tocopherols, ascorbic acid and various antioxidant phytochemicals like flavonoids and phenolics. These constituencies have antioxidant properties. According to (Pellegrini, Salvatore, Valtuen'a, Bedogni, Porrini, & Pala, 2007), antioxidants play an important role in the prevention of chronic diseases. (Willet, 1991) and (Pellegrini, Salvatore, Valtuen'a, Bedogni, Porrini, & Pala, 2007) also states that oxidant properties of plant constituencies also provide protection against gastric cancer and inflammatory processes (Pellegrini, Salvatore, Valtuen'a, Bedogni, Porrini, & Pala, 2007)

Fruit and vegetables are also rich in vitamins and minerals. The body needs these to perform a variety of functions well. An example is the role of B vitamins in helping the body process energy from food and help in the prevention of anaemia. Vitamin A has also vital functions in strengthening the body’s immune system (Pellegrini, Salvatore, Valtuen'a, Bedogni, Porrini, & Pala, 2007). Fruits and vegetables are also good sources of vitamin D and vitamin C.

Vitamin D helps in the maintenance of healthy teeth and bones. Vitamin C helps in keeping cells and tissues healthy (Pellegrini, Salvatore, Valtuen'a, Bedogni, Porrini, & Pala, 2007). In a study in Netherlands, higher plasma vitamin C was associated with higher HDL cholesterol and lower triglycerides concentrations in both man and women (Broekmans, KloÈpping-Ketelaars, Kluft, van den Berg, Kok, & van Poppel, 2001)

Fruits and vegetables are also high fibre food products. Fibre helps to maintain a healthy gut and digestive system. Diets rich in foods containing fibre, such as fruits and vegetables, has been shown to have positive effects in the reduction of coronary heart disease risks. According to (Dauchet, Amouyel, & Dallongeville, Fruits, vegetables and coronary heart disease, 2009), dietary fibre promotes elimination of cholesterol through the faeces. Fruits and vegetables are low in fat and have high water and non digestible fibre content; increasing fruit and vegetable intake, therefore, lowers the energy density of meals (Dauchet, Amouyel, & Dallongeville, Fruits, vegetables and coronary heart disease, 2009)

One study, by (Kahleova, et al., 2013) found that a diet rich in fruits and vegetables increases insulin sensitivity in diabetes patients.

The major Interventions to reduce diabetes involve improving nutrition and reducing obesity (Stoto, Behrens, & Rosemont, 1990). An Increase in the consumption of fruits and vegetables is vital in the maintenance of body weight at an appreciable level.

2.2 Standardization

As recommended by WHO, the minimum recommended dietary intake for fruits and vegetables sis 400g. The method of preparation influences energy density of fruits and vegetables (Agudo, 2005). This standard however is difficult to measure at community level. The World Health Organization, (2008) postulated the need for individuals to consume about

5 servings of combined fruits and vegetables per day (at least 2 servings of fruits and at least 3 servings of vegetables.

2.3 Importance of determining adolescents eating habits towards fruit and vegetables consumption

Most of Ministry of Health's interventions towards adolescents focus on HIV and other related diseases, less emphasis have been put on adolescent's nutritional health. This means there is still a gap in terms of chronic disease prevention at adolescent stage.

Increased fruits and vegetable consumption at adolescence stage has been associated with healthy adulthood (Damasceno, jo, Freitas, & Almeida, The association between blood pressure in adolescents and the consumption of fruits, vegetables and fruit juice – an exploratory study, 2011). He went on to state that when healthy eating habits are established at adolescent stage, they usually continue in adulthood. This means establishing healthy habits at adolescent stage has more significant effect in health over lifetime. Adolescence is a stage where key phases can be easily modified as compared to adulthood. It is a good idea to instil good habits at adolescence. At adolescent stage, there is a greater room for adolescents to improve their lives. Although adolescence appears to be a healthy stage, adolescents are practicing unhealthy behaviours that affect their future health (Lule, Rosen, Singh, Knowles, & Behrman, 2000).

Improving health in adolescents has a substantial influence on health status and also helps reduce incidences of acute and chronic diseases hence improving life expectancy (National Research Council and Institute of Medicine, 2009). This is a stage where damaging behaviours provides an opportunity to be found out and enough interventions in adolescents will have lifelong benefits of establishing a healthy lifestyle (National Research Council and Institute of Medicine, 2009). Many youth at adolescent develop un-healthful habits, which put them at risk of acquiring chronic conditions that have negative effect contributing to poor

health in their future years. The leading causes of chronic conditions can easily be prevented at adolescent stage (Health People 2020, 2014).

According to (World Health Organization, 2011), Between 20 and 40 per cent of the world's youth are overweight or obese, and rates continue to increase due to physical inactivity and unhealthy diets. It also states that 75% of obese adolescents usually remain obese in their future, putting them at risk of acquiring cancers, stroke, heart disease, and type 2 diabetes. (Sawyer, Ambresin, Bennett, & Patton, 2014) , Also state that around 20% of adolescents have a severe chronic condition and the percentage is expected to increase.

A range of health issues need to be identified and addressed in adolescents' lives. Moreover, adolescence is a critical period for developing habits and skills that create a strong foundation for healthy lifestyles and behaviour over the full life span (National Research Council and Institute of Medicine, 2009).

Adolescence is arguably the best chance to build positive health habits and limit damaging ones. Adolescence is a time when the influence of peers and parents, as well as the targeted marketing of unhealthy products and lifestyles, is significant.

According to (Damasceno, jo, Freitas, & Almeida, The association between blood pressure in adolescents and the consumption of fruits, vegetables and fruit juice – an exploratory study, 2011) , diets combining vegetables and products with low levels of fat contribute to the primary prevention of Hypertension, if they are started in childhood and adolescent stage.

Adolescence thus is a time of tremendous opportunities, but there are daunting challenges and complexities inherent in helping young people develop practices and relationships that they can carry into their adult lives. (National Research Council and Institute of Medicine, 2007)

The study targeted secondary school going pupils. Schools are one of environmental factors that affect adolescents' health. Given that the majority of adolescents spend most of their

time at school, schools are the right place where policies should be implemented and promote health habits among young adults (Briefel, Wilson, & Gleason, 2009).

A number of frameworks have been used in trying to understand nutrition behaviours of adolescents. The Health Belief Model is one of the mostly used to predict fruits and vegetable consumption among adolescents. The theory is based on the assumption adolescents will take a health action like frequent consumption of fruits and vegetables if they feel by doing so they are avoiding a negative health condition (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012), (Becker, 1974). In order to come up with a nutrition intervention towards adolescents, it is required to assess the individuals' perceived susceptibility, perceived barriers, perceived benefits of taking action and cues to action (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012).

2.4 Factors associated with fruit and vegetable consumption among adolescence

Several studies have linked availability, socioeconomic status, knowledge, attitude and practices to fruits and vegetable consumption.

2.4.1 Demographic differences

There are several demographic variables that affect fruits and vegetable consumption among adolescents (Schroeter, House, & Lorence, 2007). These variables include age, gender and BMI. A study by the Centers for Disease Control and Prevention, (1995) shows that differences in fruits and vegetable consumption pattern exist between various age groups. The study found that youth aged 18 to 24 years ate fewer vegetables.

Various studies in nutrition indicated different nutrition practices exist between males and females. Several studies found out that woman consumed more fruits and vegetables than man (Wardle, Haase, Steptoe, M, Jonwuites, & Bellisle, 2004) and (Zansky, Norton, Crim, & Henao, 2012). A study on the undergraduate students at University of Zimbabwe suggested

that females consumed a greater variety of food, including the infrequent types by comparison with men (Chifamba & Cooper, 2009). However, the study was focusing on the overall nutrition intake of the students. A study in North Carolina showed that males consume more fruits and vegetable compared to females (Ward, 2012). The difference in fruits and vegetables consumption among males and females maybe due to cultural differences. Some culture believe that energy dense foods represents masculinity and power hence are said to be of man while nutrition dense products like fruits and vegetables are said to symbolize lightness and femininity hence for women (Ward, 2012).

2.4.2 Socioeconomic and fruit and vegetable consumption

Socio-economic factors assume to shape food habits and food choice among individuals. They provide better opportunities and affordability to purchase healthy food (Lallukka, Pitka¨niemi, Rahkonen, Roos, Laaksonen, & Lahelma, 2010) and (Kamphuis, Giskes, Bruijn, Wendel-Vos, Brug, & van, 2006). In a study in Finland, when income was higher, consumption of fruit and vegetables was higher irrespective of the level of education (Lallukka, Pitka¨niemi, Rahkonen, Roos, Laaksonen, & Lahelma, 2010). Another study suggests that people from lower socioeconomic position backgrounds are associated with consumption of more energy dense, poor nutritious foods. Usually healthy foods are more expensive than energy dense foods (Drewnowski & Specter, 2004). This means those on higher income can afford to buy healthy foods.

2.4.3 Lifestyle, attitude and fruits and vegetable consumption

Lifestyle factors are among the factors that affect fruit and vegetable consumption. In a study in Australia, smoking men tended to have a low fruit and vegetable consumption pattern (Wang & Worsley, 2014). The study assumed low consumption might be due to unhealthy food practices by smokers. A study in Arkansas and Florida found out that eating out of home

had a negative effect on fruit and vegetable intake among college students (Schroeter, House, & Lorence, 2007).

Cox D. N, (1998) also found out that there is strong association between attitude and fruits and vegetables consumption.

2.4.4 Availability

Available is one of the major factors that affect the consumption of fruits and vegetables (Othman, Karim, Karim, Adzhan, Halim, & Osman, 2012). Having access to stores that sell fruits and vegetables and other healthier foods may increase their consumption among adolescents and adults (Centers for Disease Control and Prevention, 2013). When nutritious foods are readily available, it increases their consumption among individuals (Kathleen, Connie, Leslie, & Frank, 2009).In a study by Perera T, 2012 ,non availability of fruits and vegetables at the proximity of students was seen as the major barrier in students meeting their daily recommended intake. In a study by (Neumark-Sztainer, Story, Resnick, & Blum, 2006), home availability was found to have a major impact on fruits and vegetable consumption among young adults.

Most youth spend most of their time at school. Accessibility of fruits and vegetables at school has significant effect on adolescents' consumption of fruits and vegetables. A study in California showed that adolescents with access to fruits and vegetables during the school day reported eating more (Keihner, et al., 2013). The study also found that pupils that grow fruits and vegetables in their gardens eat more fruits and vegetables than their peers who do not grow fruits and vegetables.

A study to predict within-country household Food Expenditure Variation found that people in rural communities consume less fruits and vegetables and have poor quality diets (Verma, Hertel, & Preckel, 2011).

2.4.5 Knowledge

Many studies found out that knowledge plays an important role in the consumption of fruits and vegetables (Salehi, Eftekhar, K, Tavafian, Jazayery, & Montazeri, 2010). Studies have also shown that increasing knowledge has a major effect in improving nutrition behaviours of adolescents (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012).

2.5 Data collection method

The most often used instruments for measuring fruit and vegetable consumption are food frequency questionnaire and the 24 hour dietary recall (Agudo, 2005). They are all linked to recalling thus problems of recalling may be a limiting factor. FFQ has advantages of being flexible and ease of application (Agudo, 2005)

Conceptual framework

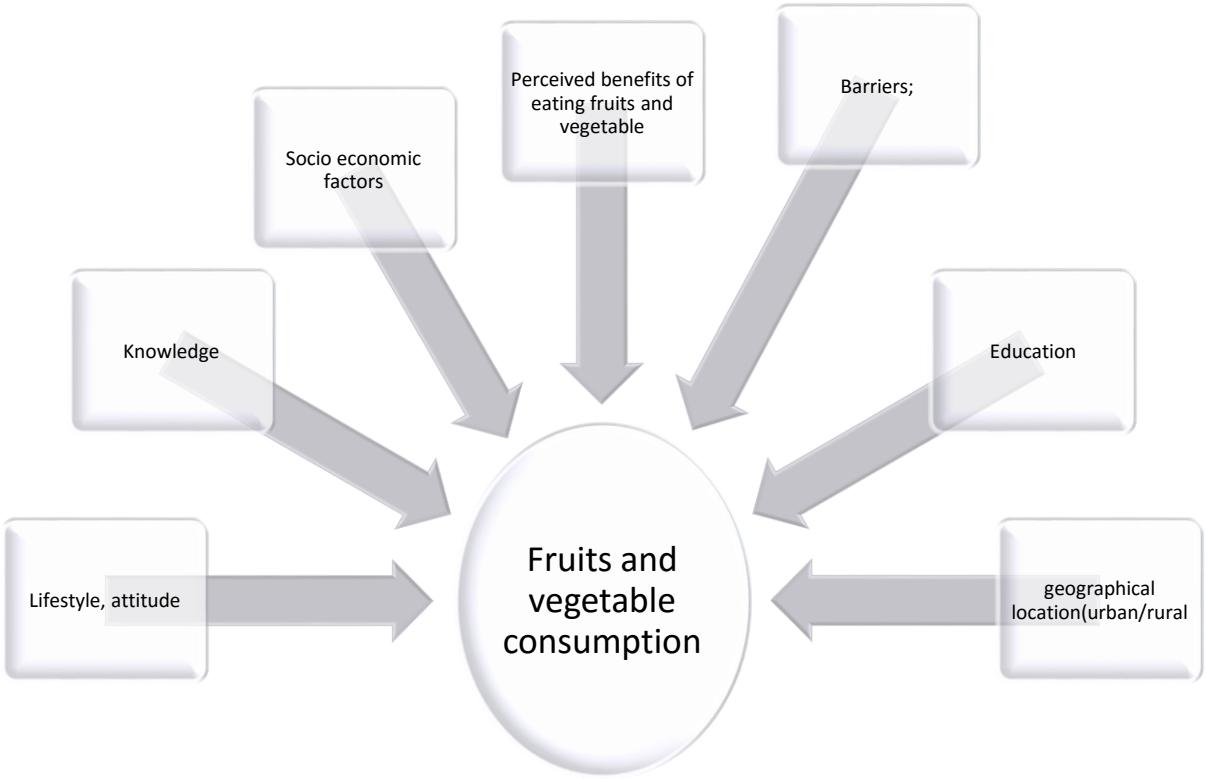

Figure 2.1 ; conceptual framework

Conclusion

The chapter looked at the authoritative works of others on the consumption pattern and assumed factors affecting its consumption. Different authors had given their views on the subject. These will be provided a guide in conducting the research.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter is going to explain how data was collected. This will include the techniques used in the collection of data and in coming up with the sample size. This is done to ensure the method fully answers the research question and objectives

3.2 Research design

The research design according to (Kothary, 2004) is the conceptual structure within which research is conducted. He went on to explain that it constitutes the blueprint of how the data will be collected, measured and analysed.

The study describes the fruit and vegetable consumption pattern among adolescents in Gokwe South District. The study found out the influence of variables: geographic location, availability, knowledge, attitude and socioeconomic status in adolescents' fruit and vegetable consumption.

3.3 Study setting

The study is going to be carried out in Gokwe South District. Gokwe South district lies in the northern part of the Midlands province at the 140 kilometre peg along the Kwekwe –Siabuwa high way and about 350 km to the south west of Harare. The district has thirty eight (39) administrative wards, covering a surface area of 11 257.67 square kilometres and lying in regions 4 & 5 receiving an average rainfall of 100 – 120 mm during the summer season. Gokwe Centre is the main urban site of the district. The study will take one sample from the urban settlement of the district and the other sample will be from the rural side.

3.3.1 Study type

The study is a cross sectional descriptive study. According to , (Neville & Colly, 2007) a cross sectional study looks at similarities or differences between group of people at any one particular time and It involves a close analysis of a situation at one particular point in time to give a ‘snap-shot’ result.

3.3.2 Study population

The population, in this case is pupils who learn at Foundation College and Chitombo High school. The target population was approximately 1000 pupils.

3.4 Sampling

Sampling is essential in the need to attempt to gather opinions that would have a representative effect to the whole group (Neville & Colly, 2007).

3.4.1 Sampling method

According to (Neville & Colly, 2007), there are two ways by which sampling may be done. There is probability sampling and non-probability sampling. He stated that in probability sampling, the researcher will have significant control over who is selected. Convinience Sampling was used in the. The major reason of using convenience sampling was to avoid interfering with pupil’s curriculum studies because it uses less time. Respondents were chosen at the convenience of the researcher. The study included participants from both rural and urban areas of the district. Participants were taken from Foundation College pupils. The other sample was collected from the rural side of the district. Participants will be taken from Chitombo High School, which is located about 90 kilometres from Gokwe urban. 40 participants were taken from each participating school to ensure equal representation of both rural and urban.

3.4.2 Sampling size

A total of 80 participants are going to be enrolled into the study. 40 participants will be taken from each participating school. In coming up with the size, budgetary issues, time constraints were also taken into considerations.

3.5 Data collection tool

Data was collected using questionnaires. This included the use of Food Frequent Questionnaires, knowledge, attitude and practices questionnaire and a 24 hour recall method. A pilot study was conducted with a small group before the main research to assess their value, validity and reliability of the questionnaires. To improve respond rate, pre-contact with the participants was done to inform them about the questionnaires.

A Food Frequency Questionnaire (FFQ) was designed and used in the study to estimate the usual daily fruit and vegetables intake of the respondents. FFQs were distributed among selected school students. Respondents were instructed to indicate the frequencies that best fit their usual diet within a week.

Apart from information on consumption a separate section on demographic characteristics, their knowledge, attitudes and practices over the consumption decision was assessed to obtain an idea on their perceived benefits and food choices in relation to fruit and vegetable consumption.

The questionnaire also included a 24 recall section where participants were required to indicate all the foods they consumed in the past 24 hours.

The questionnaires was collected after completion

3.6 Data presentation and analysis

3.6.1 Data handling and processing

50 questionnaires were distributed to each participating school. After they were filled in, questionnaires were received and checked for completeness before analysis. Only 40 fully completed questionnaires were randomly selected from each participating school to left with 80 questionnaires. Questionnaires that were not completely filled were excluded. Data was manually analyzed for qualitative data. Microsoft excel was used to create graphs for quantitative data.

Conclusion

The chapter outlined the method used by the researcher throughout the research. It also highlighted how the research was designed and carried out. The contents of the chapter include the research design, population, sampling and sampling techniques,

CHAPTER 4

RESULTS

4.1 Introduction

This chapter focus on data presentation and analysis. Data will be presented in form of tables, frequency tables and charts. Data will be analysed using SPSS, one way ANOVA.

Demographic data

The total number of people who took part in the research was 80 of which 37 were girls and boys were 43. The study collected equal number of participants from the rural and urban areas. 65% of the participants were of the age range 12-15 years (N=52) and 35%were between 16-19 years (N=28). Most of the participants' BMI was on the normal range (93% were 18-24). Only 3.75 %(N=3) were underweight and 2.5% (N=2) were overweight.

4.2 Consumption Frequency

4.2.1 Urban Fruit Consumption Frequency Using FFQ

Table 4.1: urban fruit consumption frequency

	RARELY	1 per week	2-4 times per week	Once per day	2-3 times per day
Oranges	5	15(37.5	18(45	2(5	
Peaches	38		2(5		
Mavise (watermelon)	40				
Guava	26	4(10	8(20	2(5	
Mawonde,nyii,nhengeni etc	39	1(2.5			
Pineapples	40				
Matamba	34	6(15			
Tsubvu	36	4(10			
Banana	3	20(50	13(32.5	4(10	
Mango	26	7(17.5	7(17.5		
Apples	26	14(35			
Lemon	28	12(30			
Mauyu	40				
Avocado	31	5(12.5	3(7.5	1(2.5	
100% fruit juices	34	5(12.5	1(2.5		

4.2.2 Rural fruit consumption frequency

Table 4.2: rural fruit consumption frequency

	RARELY	**1 per week**	**2-4 times per week**	**Once per day**	**2-3 times per day**
Oranges	27	8(20%)	5(12.5%)		
Peaches	40				
Vise	25	10(25%)	5(12.5%)		
Guava	34	1(2.5%)	5(12.5%)		
Pineapples	40				
Shumha,nyii,mawonde etc	20	9(22.5	7(17.5	4(10	
Matamba	6	7(17.5	12(30	12(30	**3(7.5**
Tsubvu	24	9(22.5	5(12.5	2(5	
Banana	24	10(25	5(12.5	1(2.5%)	
Mango	22	2(5	7(17.5	7(17.5	**2(5**
Apples	39	1(2.5			
Lemon	27	8(20	5(12.5		
Mauyu	37	2(5	1(2.5		
Avocado	39	1(2.5			
100% fruit juices	40				

Table 4.1 and 4.2 shows the fruit consumption frequency in urban and rural areas of Gokwe South District respectively. Table 4.1 show that the frequently consumed fruits by adolescents in Gokwe urban are bananas (92.5%) and oranges (87.5%). Table 4.2 shows that matamba (85%), mango (45%), banana (40%) and traditional fruits like shumha, nyii,mawonde (40%) are the frequently consumed fruits by adolescents in rural area of

Gokwe South District. The tables also show that daily consumption of fruits is better in rural areas is better compared to urban

4.2.3 Urban vegetable consumption frequency

Table 4.3: urban vegetable consumption frequency

	RARELY	1 per week	2-4 times per week	Once per day	**2-3 times per day**	
GREEN LEAFY VEGETABLES eg rape, tsunga		2(5	15(37,5	10(25	**13(32.5**	
Traditional veg. Eg muchacha, muboora, derere	30	6(15	4(10			
Cabbage	19	14(35	5(12.5	2(5		
Mushroom	40					
Soy	34	5(12.5	1(2.5			
Pumpkin/manhanga	33	10(25	3(7.5	2(5		
Tomatoes			10(25	16(40	**14(35**	
Onions	2		15(37.5	12(30	**11(27.5**	
Carrots	16	16(40	6(15			
Beans	18	22(55				
Cucumber	38	2(5				

4.2.4 Rural vegetable consumption frequency

Table 4.4: rural vegetable consumption frequency

	RARELY	1 per week	2-4 times per week	Once per day	2-3 times per day	
GREEN LEAFY VEGETABLES eg rape, tsunga		18(45	11(27.5	7(17.5	4(10	
Traditional veg. Eg muchacha, muboora, derere		8(20	10(25	17(42.5	5(12.5	
Cabbage	22	13(32.5	5(12.5			
mushroom	37	3(7.5				
Soy	32	8(20				
Pumpkin/ manhanga	5	9(22.5	9(22.5	9(22.5	8(20	
Tomatoes			10(25	17(42.5	13(32.5	
Onions	3	6(15	8(20	16(40	7(17.5	
Carrots	27	5(12.5	5(12.5	23(57.5		
Beans	6	19(47.5	7(17.5	6(15	2(5	
Cucumber	24	6(15	10(25			

Table 4.3 show that all the participants in Gokwe urban indicated they eat green leafy vegetables like rape, covo etc and tomatoes at least once a week. However, only 32.5% consumed them at least twice a day. Other frequently consumed vegetables include beans (55%) and cabbage (52.5%)

Table 4.4 shows that, traditional vegetables like muboora (pumpkinleaves), green leafy vegetables and tomatoes were the most consumed vegetables by adolescence in rural areas of Gokwe South District.

4.2.5 Types of vegetables frequently consumed

Most Frequently consumed vegetables by adolescents in urban

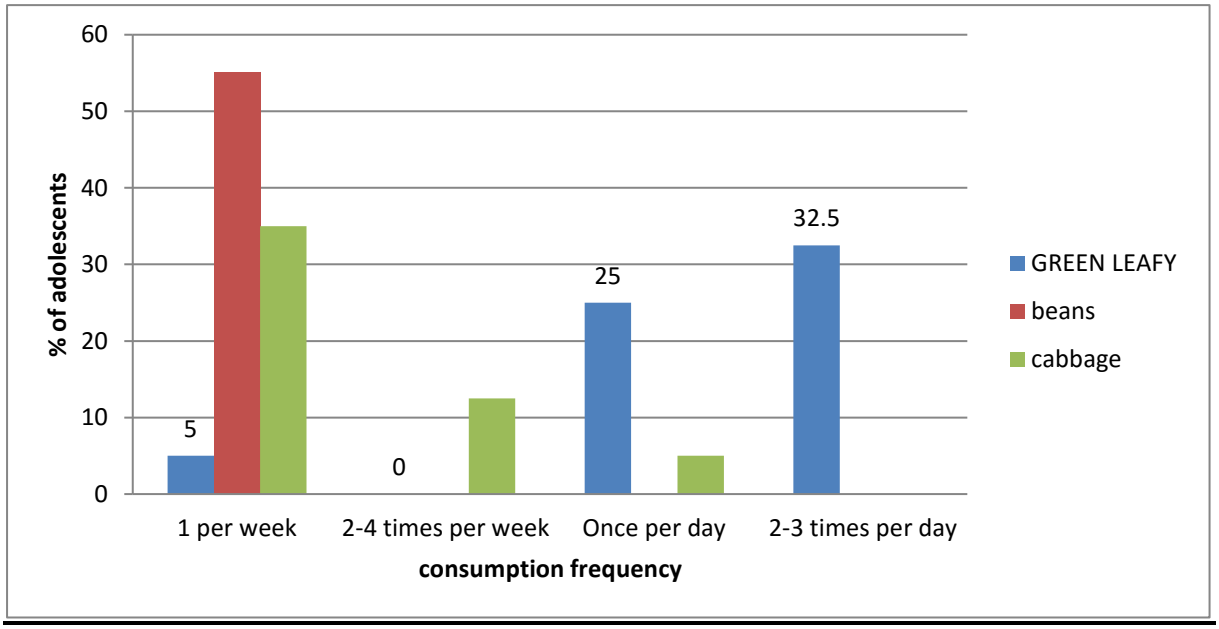

Figure 4.1 ; frequently consumed vegetables by adolescents in Gokwe town

Mostly consumed vegetables in rural site

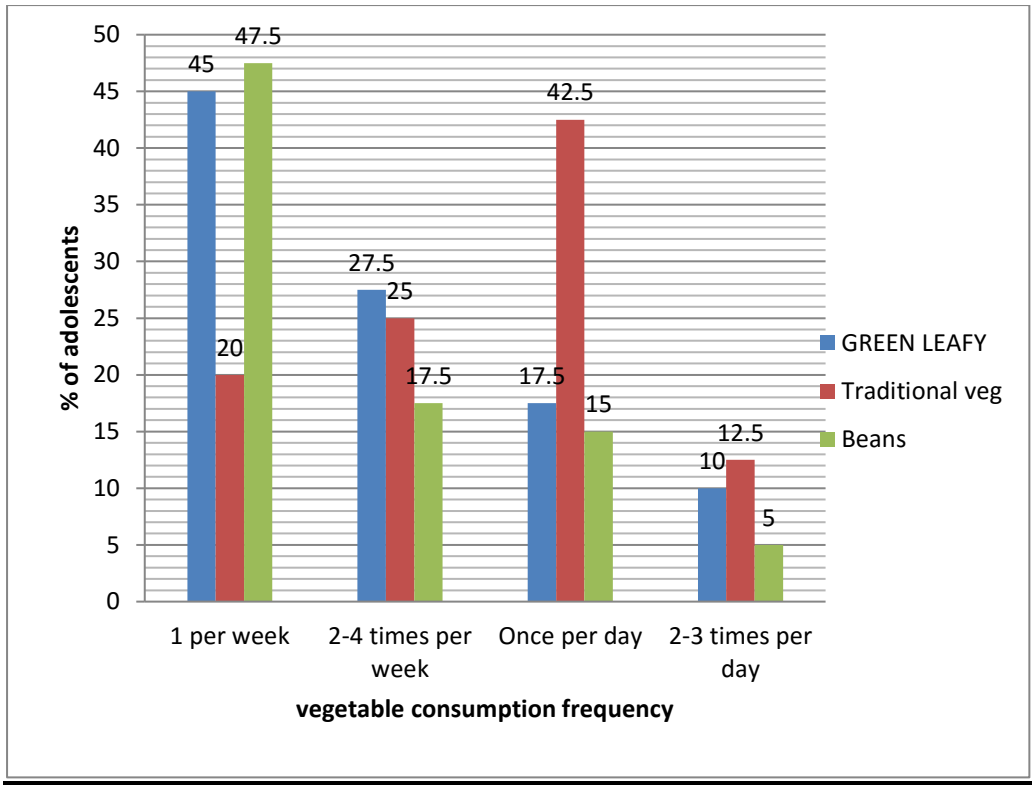

Figure 4.2: frequently consumed vegetables by adolescents in Gokwe rural

A look on the vegetable consumption pattern for adolescence in both rural and urban areas show that most urban adolescents consume most of their vegetables in form of green leafy vegetables (32.5% consumed them at least twice a day)**.** Rural consumption of vegetables shows variety with green leafy vegetables, beans and traditional vegetables being consumed at least twice a day while in urban area, green leafy vegetables are the dominant vegetables being consumed by adolescence.

4.3 Vegetable consumption among adolescents

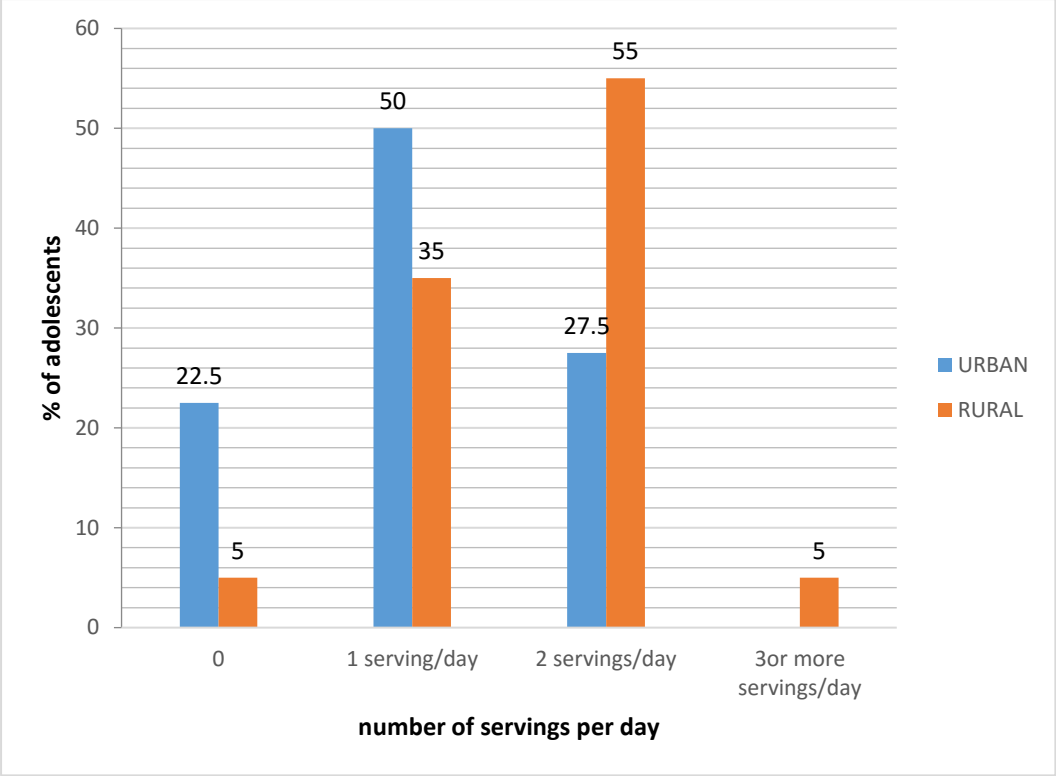

Figure 4.3: daily vegetable consumption servings

Figure 4.3 shows that the majority the adolescents consume vegetables on daily basis (86.25%). However consumption in urban area is so poor. A few are consuming at least 2 servings a day and none is consuming the recommended intake of 3 servings per day. Most rural adolescents are consuming 2 servings. Only 5% of rural adolescents are consuming 3 servings of vegetables a day and none from the urban area is consuming 3 servings of vegetables.

Statistical Analysis on Factors that Affect Vegetable Consumption

Hypothesis

H_0: there is no significant difference between the means

H_0: there is significant difference between the means

Adolescents' knowledge towards vegetable consumption

Table 4.5: descriptive statistics of knowledge mean differences towards vegetable consumption

4.3.1 Knowledge towards vegetable consumption								
Vegetable consumption								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Good	60	1.3500	.65935	.08512	1.1797	1.5203	.00	2.00
poor	20	1.2500	.96655	.21613	.7976	1.7024	.00	3.00
Total	80	1.3250	.74247	.08301	1.1598	1.4902	.00	3.00

Table 4.6: Anova table showing adolescents' knowledge towards vegetable consumption

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.150	1	.150	.270	.605
Within Groups	43.400	78	.556		
Total	43.550	79			

p>0.05. There is no significant difference mean differences (F (1, 78) =0.270, p=0.605,). So we fail to reject the H_0 , therefore the differences between the means are not likely due to knowledge.

4.3.2 Attitude of adolescents toward vegetable consumption

Table 4.7: descriptive statistics mean differences of attitude towards vegetable consumption

Descriptives								
Vegetable consumption								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Good	68	1.4118	.69616	.08442	1.2433	1.5803	.00	3.00
Poor	12	.8333	.83485	.24100	.3029	1.3638	.00	2.00
Total	80	1.3250	.74247	.08301	1.1598	1.4902	.00	3.00

Table 4.8: Anova table showing adolescents' attitude towards vegetable consumption

Vegetable consumption					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3.413	1	3.413	6.632	.012
Within Groups	40.137	78	.515		
Total	43.550	79			

There is a significant difference between the means, $p<0.05$. We reject the H_0. The difference between the means shows that attitude has effect in the mean differences.

4.3.3 Availability

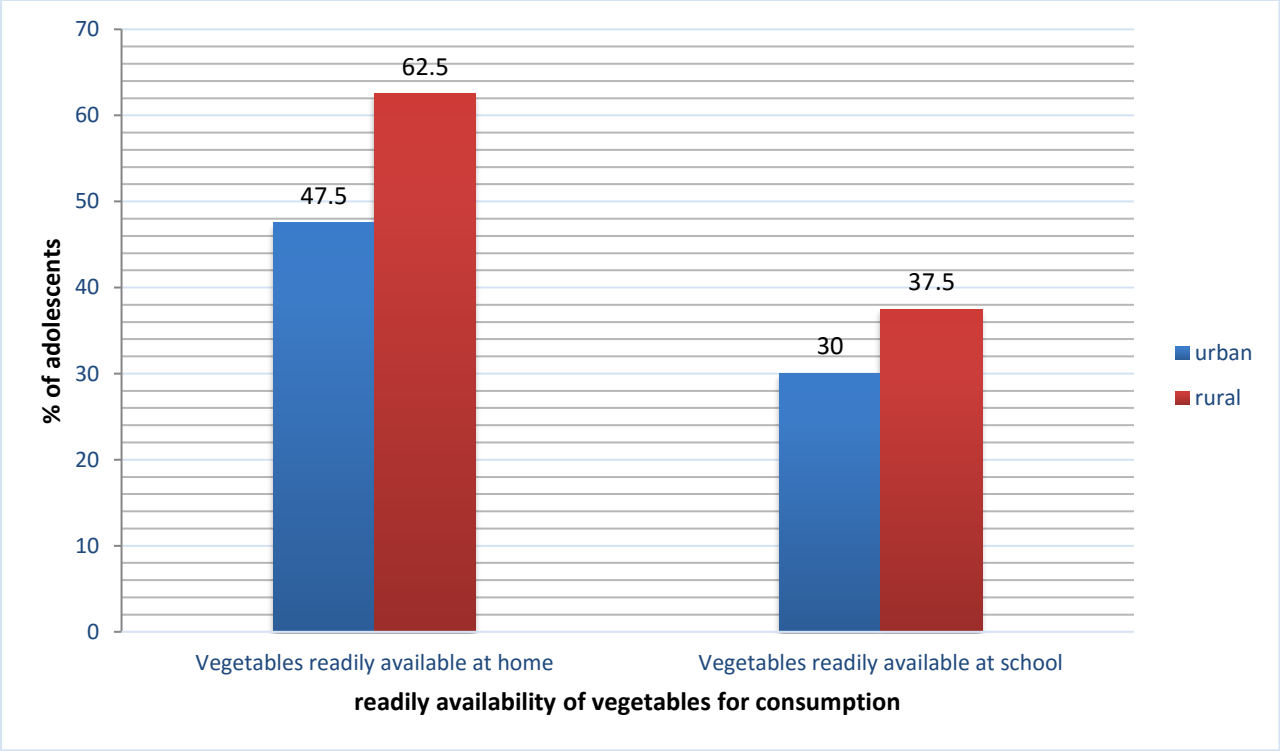

Figure 4.4: Graph to show the adolescents who agreed to the readily availability of vegetables at home and school

4.3.3.1 Effect of Home availability of fruits and vegetables on vegetable consumption

Table 4.9: Descriptive statistics on availability of fruit and vegetables at home towards the consumption of vegetables

Descriptives							
Vegetable consumption							
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	Minimum	Maximum
					Lower Bound Upper Bound		
Available	51	1.4510	.61037	.08547	1.2793 1.6226	.00	2.00
Non available	29	1.1034	.90019	.16716	.7610 1.4459	.00	3.00
Total	80	1.3250	.74247	.08301	1.1598 1.4902	.00	3.00

Table 4.10: Anova table home availability of fruits and vegetables towards vegetable consumption

vegetablecons					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2.233	1	2.233	4.215	.043
Within Groups	41.317	78	.530		
Total	43.550	79			

There is a significance difference in the means, we reject the H_0 ($p=0.043$, $\alpha = 0.05$). The difference between the means may also be due to home availability of fruits and vegetables

4.3.3.2 Effects of School availability of fruits and vegetables on vegetable consumption

Table 4.11: descriptive statistics on fruit and vegetable availability at home towards vegetable consumption

Descriptives							
Vegetable consumption							
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	Minimum	Maximum
					Lower Bound Upper Bound		
Available	22	1.4545	.50965	.10866	1.2286 1.6805	1.00	2.00
Non available	58	1.2759	.81204	.10663	1.0623 1.4894	.00	3.00
Total	80	1.3250	.74247	.08301	1.1598 1.4902	.00	3.00

Table 4.12: Anova table showing school availability of fruits and vegetables towards vegetable consumption

ANOVA					
Vegetable consumption					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.509	1	.509	.923	.340
Within Groups	43.041	78	.552		
Total	43.550	79			

p>0.05, we fail to reject the H_0. There are no significant differences between the means, school availability likely to have no effect on the mean differences. (p=0.340, $\alpha = 0.05$).

4.3.4 Effects of Geographical place on vegetable consumption

Table 4.13: descriptive statistics on mean differences between geographical place towards vegetable consumption

Descriptives								
Vegetable consumption								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
URBAN	40	1.0500	.71432	.11294	.8215	1.2785	.00	2.00
RURAL	40	1.6000	.67178	.10622	1.3852	1.8148	.00	3.00
Total	80	1.3250	.74247	.08301	1.1598	1.4902	.00	3.00

Table 4.14: Anova table showing effects of geographical place of respondents towards vegetable consumption

ANOVA					
Vegetable cons					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.050	1	6.050	12.584	.001
Within Groups	37.500	78	.481		
Total	43.550	79			

There is significant difference between the means. We reject the null hypotheses. The differences between the means are likely due to geographical location (p = 0.01, $\alpha = 0.05$)

4.3.5 Effects of Socioeconomic status towards vegetable consumption

Table 4.15: descriptive on mean differences between socioeconomic groups towards vegetable consumption

Descriptives								
Vegetable consumption								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
UPPER	14	1.2857	.61125	.16336	.9328	1.6386	.00	2.00
MIDDLE	41	1.2195	.72499	.11322	.9907	1.4483	.00	2.00
LOWER	25	1.5200	.82260	.16452	1.1804	1.8596	.00	3.00
Total	80	1.3250	.74247	.08301	1.1598	1.4902	.00	3.00

Table 4.16: Anova table showing socioeconomic status mean differences towards vegetable consumption

ANOVA					
Vegetable consumption					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.428	2	.714	1.306	.277
Within Groups	42.122	77	.547		
Total	43.550	79			

The table shows that there are no significant differences between the means. We accept the null hypothesis. ($p=0.277$, $\alpha = 0.05$). the mean differences are likely not due to socioeconomic status.

4.4Fruit consumption servings among adolescents

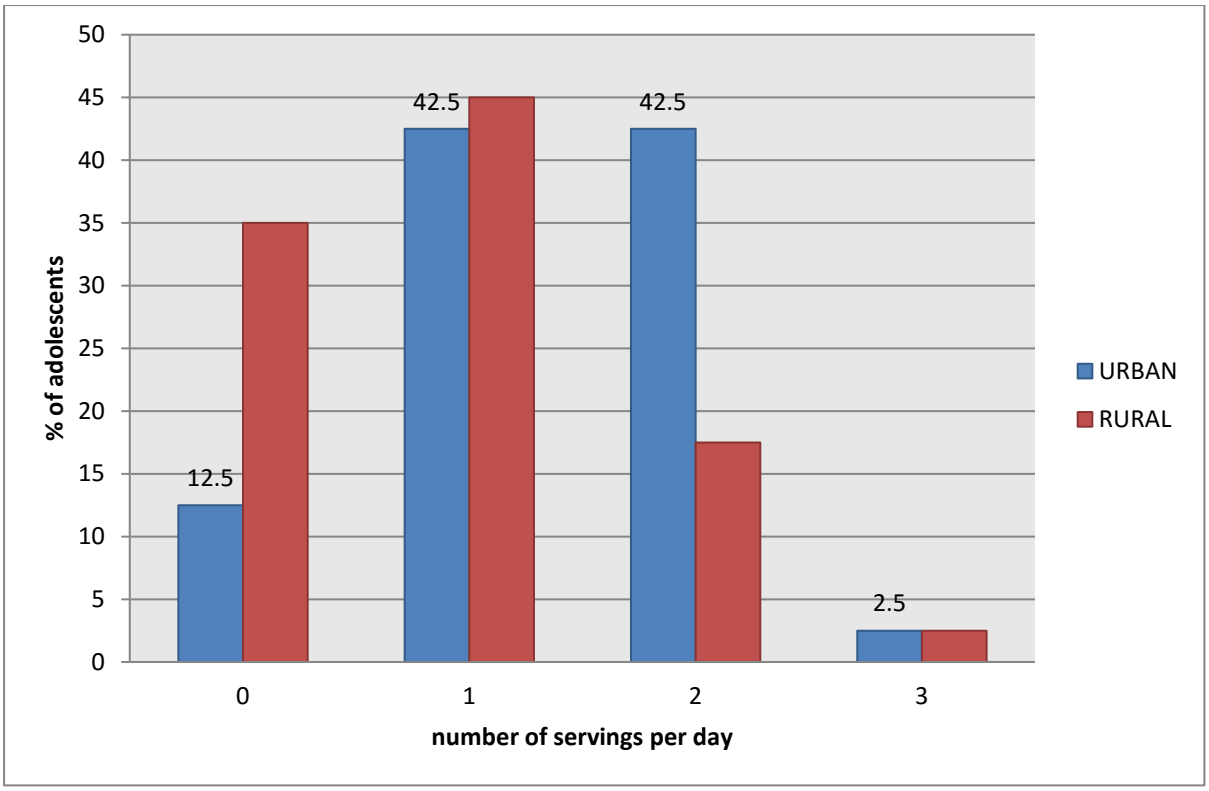

Figure 4.5; daily fruit consumption servings

Figures 8 shows that most adolescents in rural areas (45%) of Gokwe District consume 1 serving of fruits daily while 42.5% in urban areas is consuming 2 servings of fruit per day. 2.5% are consuming at least 3 servings of fruits.

Statistical Analysis on Factors that Affect Vegetable Consumption

Hypothesis

H_0: there is no significant difference between the means

H_1: there is significant difference between the means

4.4.1 Effects of Knowledge towards fruit consumption

Table 4.17: descriptive statistics on mean differences on knowledge towards fruit consumption

Descriptives								
Fruit consumption								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
GOOD	61	.9508	.71708	.09181	.7672	1.1345	.00	2.00
POOR	19	1.5263	.69669	.15983	1.1905	1.8621	.00	2.00
Total	80	1.0875	.74958	.08381	.9207	1.2543	.00	2.00

Table 4.18: Anova table showing knowledge towards fruit consumption

ANOVA					
Fruit consumption					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	4.798	1	4.798	9.454	.003
Within Groups	39.589	78	.508		
Total	44.388	79			

The table shows that there is significant difference between the means, we reject $H_{0,}$ ($p=0.003$, $\alpha = 0.05$). The difference in the means is likely due to knowledge.

4.4.2 Attitude and fruit consumption

Table 4.19: descriptive statistics on mean differences of attitude towards vegetable consumption

Descriptives								
Fruit consumption								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
POSITIVE	68	1.0294	.73242	.08882	.8521	1.2067	.00	2.00
NEGATIVE	12	1.4167	.79296	.22891	.9128	1.9205	.00	2.00
Total	80	1.0875	.74958	.08381	.9207	1.2543	.00	2.00

Table 4.20: anova table showing adolescents attitude towards fruit consumption

ANOVA					
Fruit consumption					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.530	1	1.530	2.784	.099
Within Groups	42.858	78	.549		
Total	44.387	79			

($p>0.05$, $\alpha = 0.05$) hence no significant differences between the means. We accept the H_0. The differences between the means are not likely due to attitude.

4.4.3 Availability

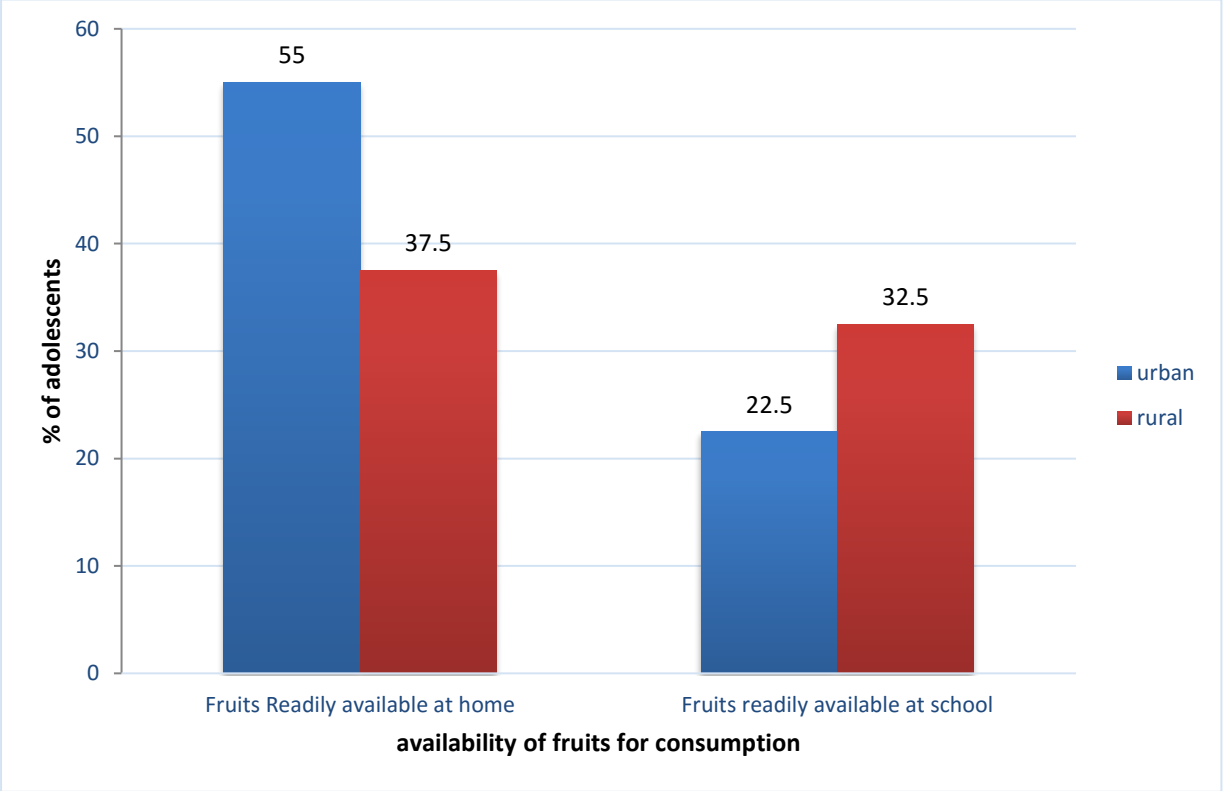

Figure 4.6: Graph showing the % of adolescents who agreed to availability of fruit at home and at school

4.4.2.0 Home availability of fruits and vegetables towards fruit consumption

Table 4.21: descriptive statistics on mean differences of availability of fruits and vegetables towards fruit consumption

Descriptives

Fruit consumption

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Available	52	.9615	.62502	.08667	.7875	1.1355	.00	2.00
Non available	28	1.3214	.90487	.17100	.9706	1.6723	.00	2.00
Total	80	1.0875	.74958	.08381	.9207	1.2543	.00	2.00

Table 4.22: Anova table showing home availability of fruit and vegetables towards fruit consumption

ANOVA					
Fruit consumption					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2.357	1	2.357	4.375	.040
Within Groups	42.030	78	.539		
Total	44.387	79			

We reject the null hypothesis, there is significant differences between the means ($p=0.040$, $\alpha = 0.05$). Home availability of fruits and vegetables is likely to have effects on the mean differences.

4.4.2.1 Effects of School availability of fruits and vegetables on fruit consumption

Table 4.23: descriptive statistics on school availability of fruit and vegetables towards fruit consumption

Descriptives								
Fruit consumption								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Available	22	.7727	.42893	.09145	.5825	.9629	.00	1.00
Non available	58	1.2069	.81129	.10653	.9936	1.4202	.00	2.00
Total	80	1.0875	.74958	.08381	.9207	1.2543	.00	2.00

Table 4.24: Anova table showing mean differences of school availability of fruits and vegetables towards fruit consumption

ANOVA					
Fruit consumption					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3.007	1	3.007	5.667	.020
Within Groups	41.381	78	.531		
Total	44.387	79			

$P<0.05$, we reject the H_0. There is significant difference between the means. The differences between the means are likely due to school availability of fruits and vegetables. ($p=0.020$, $\alpha = 0.05$)

4.4.4 Effects of Geographical location on fruit consumption

Table 4.25: descriptive statistics on mean differences between geographical locations towards fruit consumption

Descriptives							
Fruit consumption							
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	Minimum	Maximum
					Lower Bound Upper Bound		
URBAN	40	1.3250	.69384	.10971	1.1031 1.5469	.00	2.00
RURAL	40	.8500	.73554	.11630	.6148 1.0852	.00	2.00
Total	80	1.0875	.74958	.08381	.9207 1.2543	.00	2.00

Table 4.26: Anova table analysing mean differences of geographical location towards fruit consumption

ANOVA					
Fruit consumption					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	4.512	1	4.512	8.827	.004
Within Groups	39.875	78	.511		
Total	44.388	79			

There is significant difference between the means. We reject the H_0. The mean differences are likely due to geographical locations. ($p=0.04$, $\alpha = 0.05$)

4.4.5 Socioeconomic and fruit consumption

Table 4.27: descriptive statistics on mean differences between socioeconomic groups and fruit consumption

Descriptives							
Fruit consumption							
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	Minimum	Maximum
					Lower Bound Upper Bound		
UPPER	14	.6429	.49725	.13289	.3558 .9300	.00	1.00
MIDDLE	41	1.0732	.64770	.10115	.8687 1.2776	.00	2.00
LOWER	25	1.3600	.90738	.18148	.9855 1.7345	.00	2.00
Total	80	1.0875	.74958	.08381	.9207 1.2543	.00	2.00

Table 4.28 : Anova table showing mean differences of socioeconomic status towards fruit consumption

ANOVA					
Fruit consumption					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	4.633	2	2.316	4.487	.014
Within Groups	39.755	77	.516		
Total	44.387	79			

P<0.05, there is significant difference between the means. We reject the null hypothesis. (p = 0.014, $\alpha = 0.05$). Socioeconomic status is likely to have effects on the mean differences.

4.5 Knowledge, attitude and practices

Table 4.29: knowledge on fruit and vegetables

Knowledge	Yes	No
Fruits and vegetables are highly recommended for you.	61	19
Frequent consumption of fruits and vegetables reduce chances of developing chronic diseases like diabetes or hypertension	62	18
Frequent consumption of animal and or refined products contribute to diseases like diabetes, hypertension	66	14
Foods you eat now affect your adult's health	71	9
Recommended fruit and vegetable intake	16	64

Table 4.30 – attitude of adolescents towards fruits and vegetables

ATTITUDE	YES	NO
Would you consider eating more fruits and vegetables if they are readily available?	76	4
Fruits taste good	69	11
Vegetables taste good	55	25
Would you buy fruit if you are given pocket money for lunch or breakfast	64	16
Do you feel that the frequent consumption of fruit and vegetables is good for your health?	75	5

Lifestyle and preferences

Table 4.31: lifestyle of adolescents towards fruit and vegetable consumption

	YES	NO
I take part in exercises often	61	19

i. Eating out frequency

Table 4.32: frequency of eating out

	rarely	1/month	2/month	1/week	2/wk	More than 3 per wk
Urban	8	13	6	9	2	2
Rural	15	11	5	7	2	0
TOTAL	23	24	11	16	4	2

ii. Consumption pattern when eating out

Table 4.33: fruit and vegetable consumption frequency when eating out

	EVERYTIME	**MOST OF THE TIME**	**RARELY**	**NEVER**
Fruits	15	49	11	5
Vegetables	10	33	27	10

Data on what adolescents think are the remedies to fruits and vegetable consumption

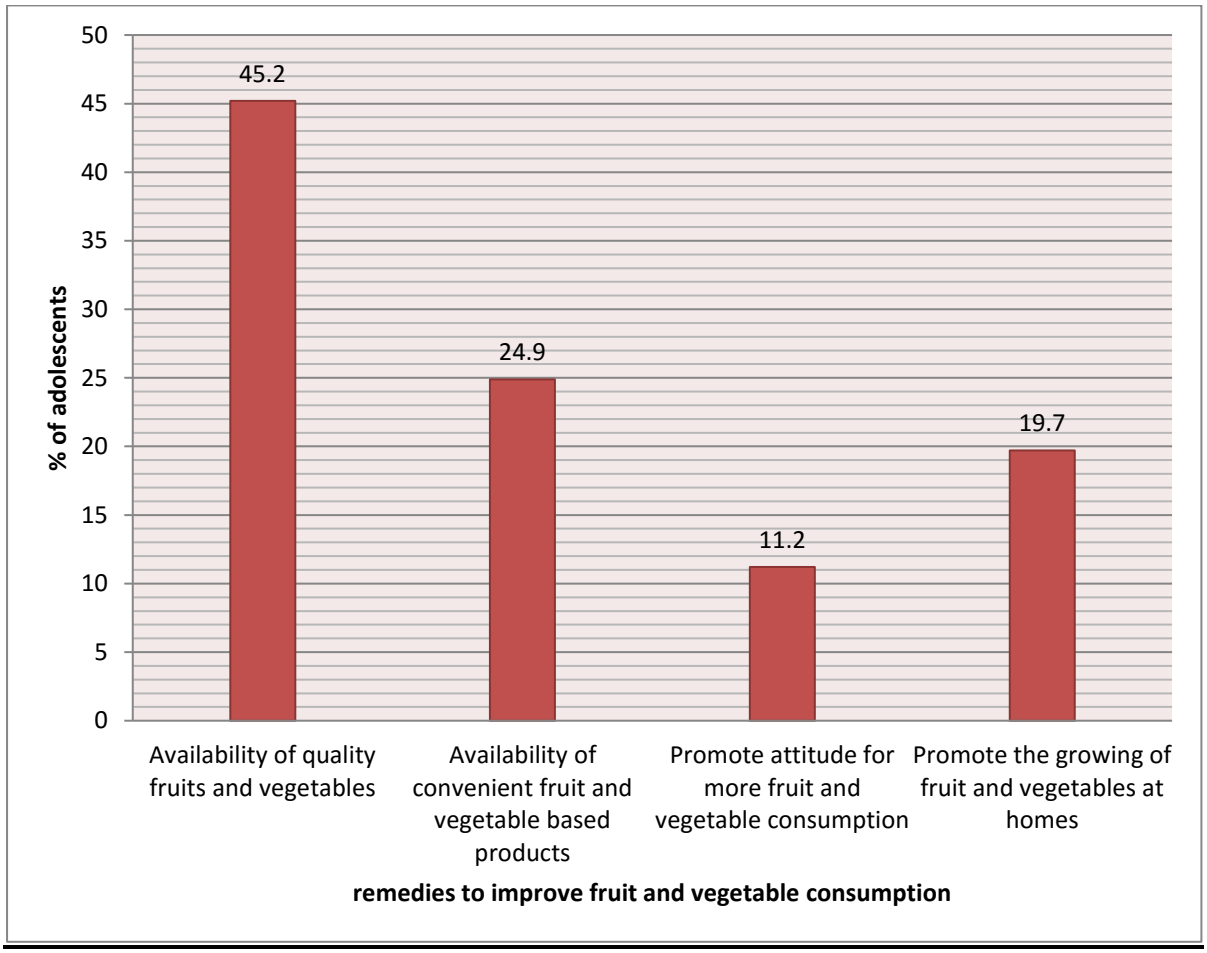

Figure 4.7: adolescents' opinion on remedies to increase fruit and vegetable consumption

45% had the idea that the availability of quality fruits and vegetables will increase the consumption of fruits and vegetables. A number of adolescents also think availability of convenient fruits and vegetable based products will have positive effects to fruit and vegetable consumption.

4.6 Fruits and vegetables grown

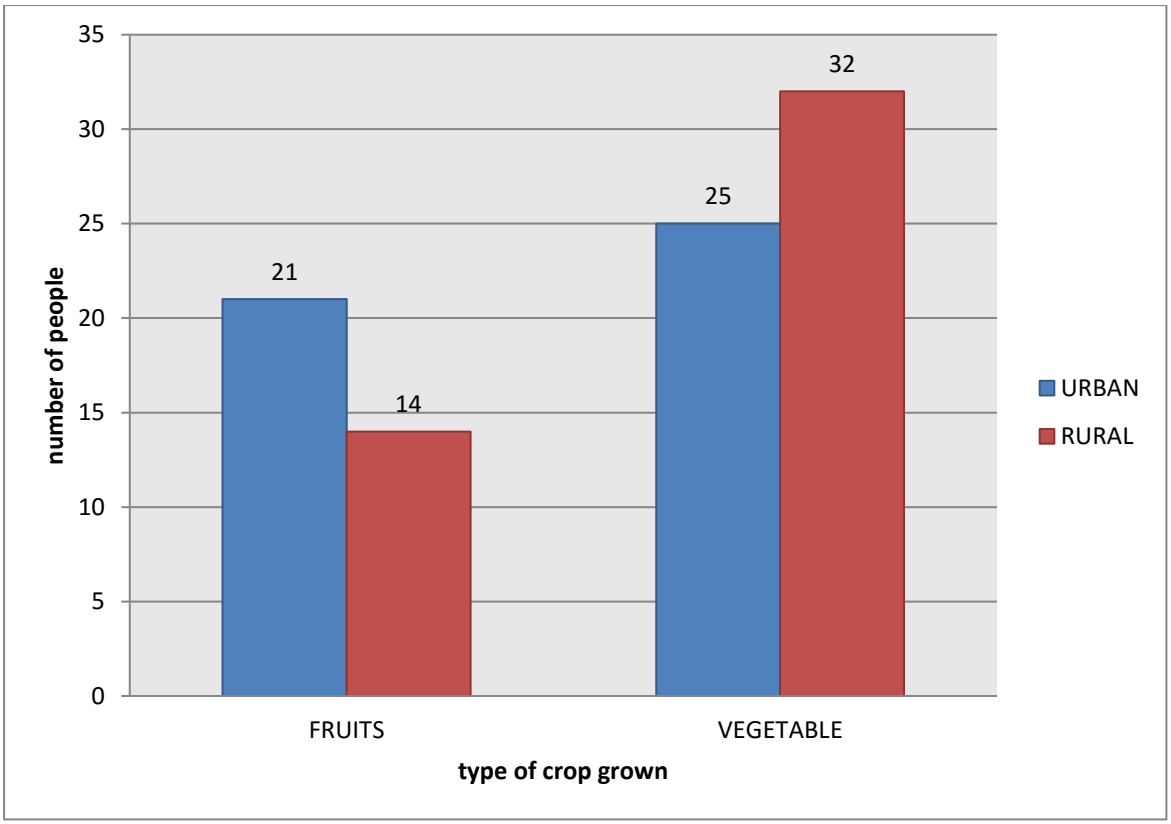

Figure 4.8; data on fruits and vegetables grown

52.5% from urban areas grew fruits at their homes while 35% from rural areas grow fruits. 62.5% in urban areas grows vegetables compared to 80% from rural areas. 75% of the respondents said fruits are not readily available at school

4.7 Perceived Benefits Of Fruits And Vegetables

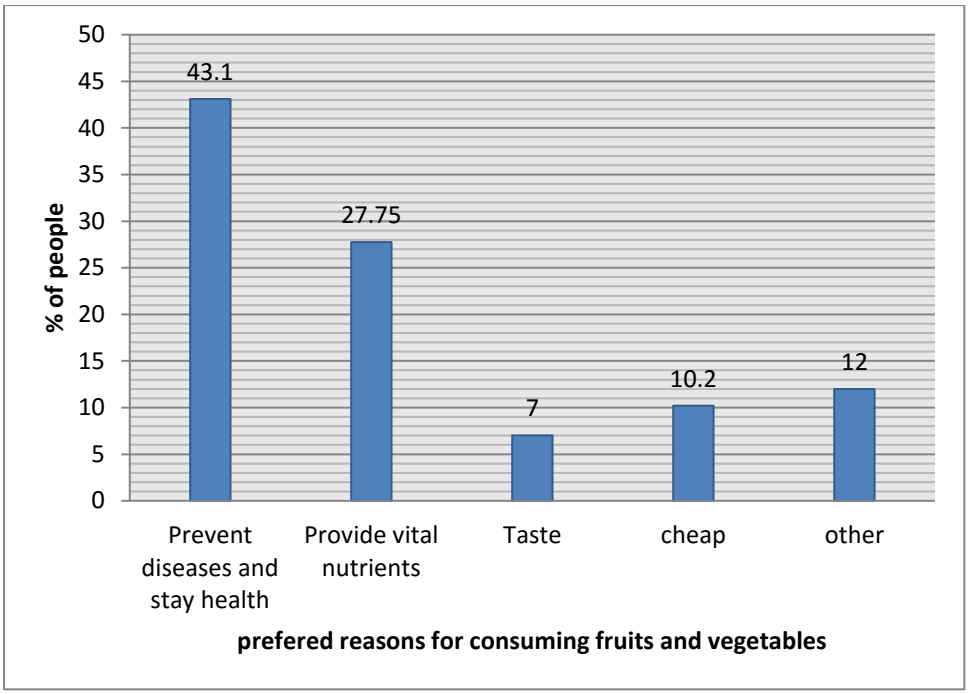

Figure 4.9: reasons by adolescents for consuming fruits and vegetables

On a self-rated questionnaire on the reasons to consume fruits and vegetables, most indicated prevention of diseases(43%) as the main reason for consuming fruits and vegetables . others also indicated fruits and vegetables provide vital nutrients like vitamins.

Fruit And Vegetable Consumption Based On Age Groups

Vegetable consumption among age groups

Table 4.34: table on vegetable consumption among age groups

AGE GROUP	NUMBER	0 servings/day	1 serving/day	2 serving/day	3 servings/day	Mean servings
12-15	52	5	21	25	1	1.423
16-19	28	6	13	8	1	1.142

Table 4.35: fruit consumption based on age groups

	NUMBER	0	1	2	3	Mean servings
12-15	52	13	22	15	2	1.115
16-19	28	6	13	9	0	1.111

Fruit And Vegetable Consumption Based On Gender

Vegetable consumption

Table 4.36: vegetable consumption based on gender

SEX	NUMBER	0 servings/day	1 servings/day	2servings/day	3 servings/day	Mean servings
Girls	37	5	13	17	2	1.432
Boys	43	6	21	16	0	1.2325

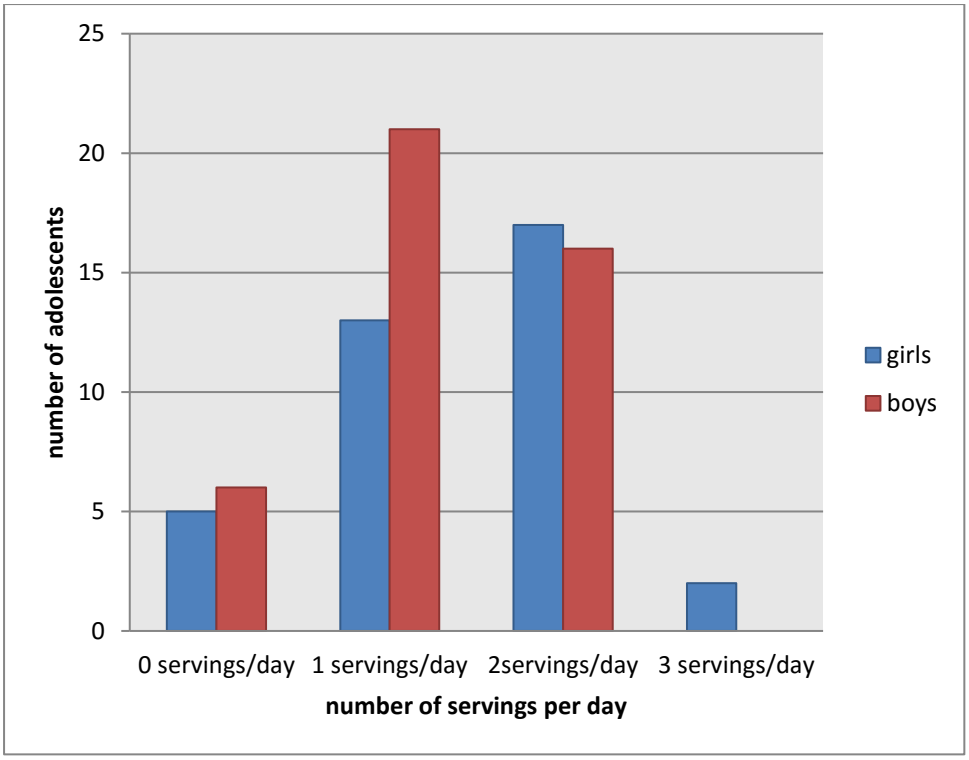

Figure 4.10: graph on vegetable consumption based on gender

The graph shows that girls are consuming more servings of vegetables than boys (1.432 and 1.2325 respectively)

Fruit consumption based on gender

Table 4.37: fruit consumption based on gender

Sex	NUMBER	0	1	2	3	Mean servings
Girls	37	9	12	15	1	1.2162
Boys	43	10	23	9	1	1.0232

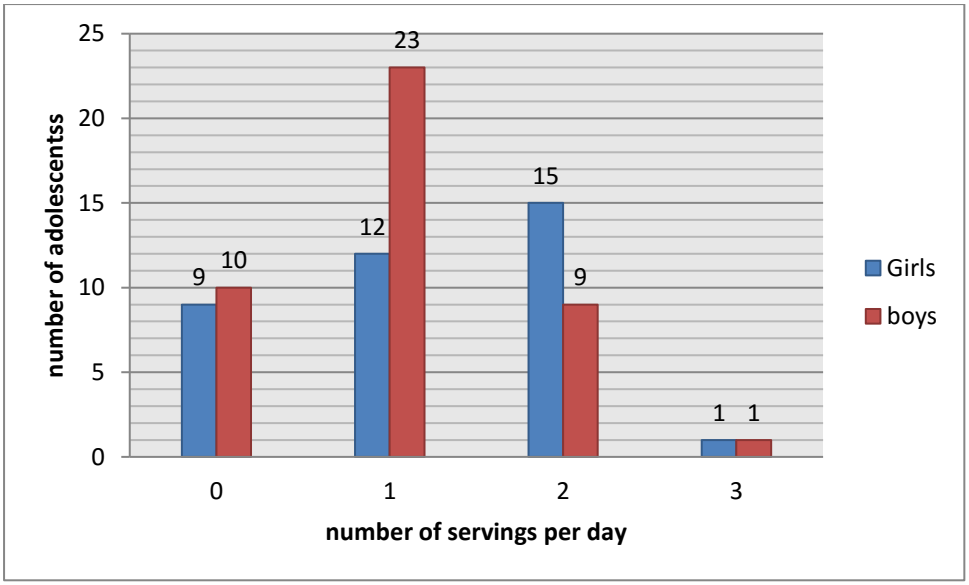

Figure 4.11: graph on fruit consumption based on gender

The table shows that girls consume a mean servings of 1.2162 compared to 1.0232 servings of fruit consumed by boys.

4.8 Discussion

4.8.1 Fruit and vegetable consumption pattern

Low fruits and vegetable consumption was observed among adolescents living in Gokwe South District. The mean servings of vegetables is 1.325 is way below the recommended intake of 3 servings. The mean serving of fruits is 1.0875 which is below the recommended servings of 2 per day. A study done on the adequacy of nutritional levels at 3 orphanage homes in Gweru also found that adolescents and young children were not consuming the recommended servings of fruits and vegetables (Serere, Zengeni, Usai, Chinofunga, & Nyamunda, 2013). A study by the Food and Nutrition Council, 2013 show that 83% of the Zimbabwe population is consuming vegetables but the study did not investigate if they are consuming the recommended servings of vegetables (Food and Nutrition Council, 2013). A study in Norway also showed that the majority of the adolescents were not consuming the rightful quantity of fruits and vegetables (Dzadey, 2009). A study to undergraduate students at University of Peradeniya also reported a mean consumption of 267g of fruit and vegetable

consumption among the students which is far from the recommended intake (Madhujith, 2012).

The study also shows that most adolescents in Gokwe South District are consuming fruits everyday but a few are meeting the recommended intake of at least 2 servings of fruit per day. Matamba, oranges, mangoes and banana are most frequently consumed fruits among adolescents in Gokwe South District.. Most urban adolescents (42.5) are consuming 2 servings of fruits a day while most in rural areas are consuming 1 serving a day (45%). This study show that adolescents in urban area are consuming more servings of fruits per day compared to those in rural areas (average of 1.35 servings/day compared to 0.875 servings/day in rural).A study in Australia also showed that people in disadvantaged areas (rural) tend to eat less fruits than those living in advantaged areas (urban) (Australian Bureau of Statistics, 2012)

Differences in fruit and vegetable consumption were also observed between boys and girls. The study has found that girls in Gokwe South District are consuming more servings of fruits and vegetables than boys. A mean vegetable consumption 1.432 was reported for girls and a mean fruit intake of 1.2162.

4.8.2 Environmental barriers and availability of fruits and vegetables

Fruit and vegetable consumption varied with home availability of fruits and vegetables with adolescents who said fruits and vegetables were readily available consuming more vegetable compared to those who said they were not readily available. The majority of the adolescents from the rural side (62.5%) also indicated vegetables as being readily available at their homes compared to urban (47.5%). This may be the high number of families growing vegetables in rural areas (75%) compared to urban families (62.5%). Results from the ZIMVAC 2013 also show that 70% of households in rural areas get their vegetables from own production (Food

and Nutrition Council, 2013). Adolescents in Gokwe urban may also be affected by urbanization. Increasing urbanization affect most people by shifting them away from primary food production thus changing their dietary behavior towards fruits and vegetables. The other thing may be community nutrition gardens which are mainly in rural areas thus increasing availability of vegetables at rural homes. Adolescents from rural areas also reported to be consuming more traditional vegetables compared to their urban counterparts. This may be due to the fact that these traditional vegetables are readily accessible in rural areas compared to urban areas. Most of these traditional vegetables grow in the rainy season and that is when they are consumed most. They can also be dried and then eaten in dry seasons for example, pumpkin leaves, nyevhe.

Significant differences were also observed on school availability of fruits and vegetables towards fruit consumption ($p=0.020$). The unavailability of fruits and vegetables at schools is still a major obstacle in increasing fruit and vegetable consumption among adolescents. Most adolescents reported unavailability of quality fruits and vegetables near or at their school area thus affecting their consumption. Adolescents spend most of their time at school. Schools is the right place where interventions to increase fruits and vegetables among adolescents should be implemented.

4.8.3 Lifestyle and attitude towards fruit and vegetable consumption

The study found out that the majority of adolescents minimize vegetable consumption when they are eating out. This is consistent with another study in USA (Schroeter, House, & Lorence, 2007). Most of urban adolescents eat out more often compared to rural adolescents. This may be because vegetables are seen as less attractive among young people. Most adolescents prefer eating vegetables as salads. Majority of the adolescents indicated to eat fruits when they eat out but less of vegetables

Significant difference was observed in the Attitude of the adolescents toward vegetable consumption (p=0.012). The majority of adolescents had positive attitude towards fruits and vegetables.. The majority of the adolescents agreed to exercise in order to stay fit. Most adolescents indicated they eat fruits and vegetables to prevent diseases. Most also agreed that the quality of fruits and vegetables mainly affect their consumption. 45.2% indicated that their fruit and vegetable consumption will increase by improving the quality of fruits and vegetables.

4.8.4 Knowledge

Knowledge also showed to have effect on fruit consumption. Significant difference in mean servings was observed between those who had good knowledge and those who had poor knowledge towards fruit and vegetable consumption. The study also show that 80% of the students lack knowledge on the recommended intake of fruits and vegetables. The poor knowledge on the recommended intake of fruits and vegetables may be due to poor nutrition education in schools. However the majority of the adolescents had a fair knowledge on the beneficial health effects of fruits and vegetables. This is in line with a study in Sri Lanka which found out that most of students had knowledge on the health effects of fruits and vegetables but lacking knowledge on the recommended intake (Madhujith, 2012). A report by FAO also reported the thin representation and poor teaching of nutrition in school curricula as a major challenge in promoting healthy message to school going pupils (FAO, 2011).

4.8.5 Socioeconomic status

Socioeconomic status was divided into 3 categories, upper, medium and lower class depending on the gargets their families own. Those who own all the gargets were grouped into upper class. The lower comprised those who did not own of the indicated gargets.

Significant differences were observed between the Socioecomical classes fruit consumption. Fruit consumption was high among the upper class compared to the other socioeconomic groups. Although there were significant differences in socioeconomical status towards vegetable consumption, vegetable consumption was high among adolescents of lower socioeconomic status. Those of high socioeconomic status consumed less amount of vegetables compared to those of the lower class. A study by Marie T.Ruel,(2005) shows that fruit and vegetable consumption increase with increasing income. These differences may be attributed to a number of factors which may include different in change of lifestyles between socioeconomic groups and availability. Majority of lower socioeconomic people spend most of their money on basic food products like maize and fruits are usually seen as luxurious hence consumed less among lower socioeconomic people.

4.8.6 Geographical place and fruit and vegetable consumption

The findings show that there is a significant difference in fruit and vegetable consumption between geographical places, (that is urban and rural. Urban adolescents reported mean servings of 1.325 which is higher than what rural adolescents consume (mean servings of 0.85). Rural adolescents (mean servings of 1.6) are consuming more servings of vegetables compared to their urban (mean servings of 1.05). This is in-line with other studies done in other developing and other countries. There are also differences in the types of fruits and vegetables being consumed by rural and urban adolescents. Rural adolescents also reported high consumption of traditional fruits like matamba, nyii compared to those from urban areas. These differences may be due to availability. Exotic fruits are more accessible in urban areas compared to traditional fruits.

Conclusion

The data was collected and manually and statistically analysed. SPSS Anova was used to statistically analyse the data. Tables and graphs were used to present data.

CHAPTER 5

CONCLUSIONS

5.0 Introduction

The chapter will look on the summary of the whole study, recommendations, conclusions and other areas which need further research.

5.1 Summary of the Research

The objectives of the study was to; a) determine fruit and vegetable consumption pattern among adolescents, b) determine which factors are affect fruit and vegetable consumption among adolescents, and c) identify the knowledge , attitudes and practices of adolescents over fruit and vegetable consumption

The study found out that most adolescents consume vegetables but are not meeting the recommended servings. The daily consumption of fruits and vegetables is below the recommended intake

The study found that vegetable consumption in adolescents varies with attitude, home availability and geographical location. Knowledge, home availability, school availability, geographical location and socioeconomic status were all seen to have effects on fruit consumption. Adolescents in urban areas consume more fruits daily compared to rural adolescents. The study also found that knowledge on the recommended servings is low among adolescents. The majority of the students have no idea on the recommended dietary intake of fruits and vegetables. The study also found fruit consumption is high among members of upper socioeconomic status while vegetable consumption is high among members of the lower socioeconomic status.

The findings also show that most adolescents have positive attitudes towards fruits and vegetables. Most adolescents consume more fruits when eating out but less of vegetables.

The study also found that most rural households grow more vegetables compared to urban households. Less availability of fruits and vegetables at schools was seen as a major barrier in adolescents meeting their recommended intake.

5.2 Conclusion

Fruits and vegetable consumption among adolescents is below the recommended 5 servings of combined fruits and vegetables. Attitude, home availability and geographical location showed to affect adolescents' vegetable consumption. Fruit consumption among adolescents was seen to vary with knowledge, home availability, school availability, geographical location and socioeconomic status. Knowledge on the recommended intake of fruits and vegetables is also very low among adolescents.

5.3 Recommendations

The findings show that fruit consumption varies with the availability of fruits and vegetables. The unavailability of fruits and vegetables has a negative impact on fruit consumption. Since the consumption of fruits and vegetables has a vital effect on "future health", it is an important thing for the Ministry of Health and Child Care to work with school administration, school food service staff and others to come up with policies that encourage the sale of healthy fruits and vegetables and limit the sales of unhealthy food stuffs which include foods which contain added sugar and fat for example soft drinks, sports drinks and fast foods within or near school area.

Increasing information on the beneficial effects of fruits and vegetables will be an important intervention in increasing fruits and vegetable intake among adolescents. Since things that have immediate benefits like maintaining body weight at an optimum level, good looking

physical body, and enhancing their sport performance are more appealing to adolescents, it is more efficient to focus on the short term effects since they are more appealing to them.

In the case of eating out, there should be behavioral strategies targeting adolescents to change their attitudes towards eating out. Due to increasing urbanization, demographics and geographical set up, eating out is also on increase. There is need for promotion strategies focusing on improving quality of food, in terms of nutrition away from home. Product development should focus on healthy snacks which are fruits and vegetable based. Food industry should be encouraged to produce fruit and vegetable snacks which are ready for consumption and appealing to adolescents. Most adolescents prefer foods which are convenience, tasty and of appreciable quality. There is also need to come up with methods of preservations which enable seasonal traditional fruits to be available throughout the year. The common drying method being employed in Gokwe is sun drying.

Food marketing and advertising strategies should also favour the promotion of fruit and vegetables among adolescents for example placing of fruit and vegetables where they can be easily seen and less availability of unhealthy food products to increase food choices towards fruit and vegetable consumption.

It appears that respondents will be receptive to increasing fruit and vegetable intake. The fact that adolescent is a dynamic stage where health changes are vital, educational messages can be targeted to adolescents.

Awareness campaigns on the effects of low consumption of fruits and vegetables also help adolescents change their behavior.

Community nutrition gardens should also turn their focus and grow more fruits to increase availability of fruits in rural areas and promote its availability to members of the lower socioeconomic status.

School curriculum programs should also increase nutrition subjects. Increasing knowledge on nutrition is seen as a vital tool in improving nutrition intake among young adult. Schools can also introduce programs like school nutrition programs where schools will be providing fruits and vegetables to pupils during breakfast and lunch times. This program has been used by other countries like America and fruit and vegetable consumption increased in the schools that introduced the program.

Interventions should also target promoting traditional fruits and vegetables in urban areas to increase variety and availability of them. Traditional fruits and vegetables are cheaper hence affordable among the majority.

5.4 Further Research

A number of important findings have been brought up by this research however; there are a lot of questions it cannot answer. Further researches should work on the availability of fruits and vegetables .Since this research has found that most adolescents in had the idea that fruits and vegetables are not readily available at schools, there should be further researches to investigate factors that are affecting its availability at schools.

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APPENDECES

Appendix 1: Research Permission

(see next page)

Appendix 2: cover letter

My name is Brighton Makumbe. I am a 4th year student at the Midlands State university doing a Bachelor Degree in Food Science and Nutrition. Im doing a research on "**Knowledge, attitude, practices and factors affecting fruit and vegetable consumption in adolescents (GOKWE SOUTH DISTRICT)". May you kindly assist by filling in the questionnaire.**

Appendix 3; questionnaire

Questionnaire ID……..……

SECTION A: Food frequent questionnaire

Food Group	**Never**	**Rarely**	**1-3/mnth**	**1/wk**	**2-4/wk**	**1/day**	**2-3/day**
VEGETABLES							
Green leafy vegetables							
Traditional vegetables eg munyevhe, muboora, muchacha							
Cabbage							
Soy							
Hohwa (Mushroom)							
Pumpkin/butternuts							
Tomatoes							
Onions							
Carrots							
Beans							
Cucumber							
OTHER							
FRUITS							
Oranges,							
Peaches							
Watermellon (vise)							
Guava							
Nyii ,shumha,nhengeni,mawonde etc							
Matamba, magwadhi, ,							
Tsvubvu							
Banana							
Mango							
Apples							
Lemon							
Paw-paw							
Grapes							
Avocado							
Mauyu (baobab)							
100% fruit juices							
OTHER							

Thank you for your cooperation.

DIETARY KNOWLEDGE, ATTITUDE AND PRACTICES AND FRUIT AND VEGETABLE CONSUMPTION

Questionnaire ID …… Date of interview……/……/…...

A) PERSONAL INFORMATION

Please tick on the appropriate answer

1) **Sex…..** Male ☐ female ☐

2) **Age Range ….....**12-15 ☐ 16-19 ☐

3) **Household .....**parent ☐ guardian ☐

4) **Parent/guardian occupation.....**

5) **a) Height……..m b) Weight……kg**

B) FAMILY BACKGROUND

1) What is the highest level of education your parent/guardian has?

1. No formal education ☐
2. Primary education ☐
3. Secondary education ☐
4. College/university education ☐

2) Which of the following your family own? Only answer "Yes" if you have them and they work.

i) Television Yes ☐ No ☐

ii) Electricity Yes ☐ No ☐

iii) Tap water Yes ☐ No ☐

iv) Motor car Yes ☐ No ☐

C) <u>KNOWLEDGE AND INFORMATION</u>

1) Please tick on the appropriate answer

KNOWLEDGE	**Yes**	**No**
Fruits and vegetables are highly recommended for you.		
Frequent consumption of fruits and vegetables reduce chances of developing chronic diseases like diabetes or hypertension		
Frequent consumption of animal and or refined products contribute to diseases like diabetes, hypertension		
The type of foods you eat now affect your adult's health		
ATTITUDE	**YES**	**MAYBE**
Would you consider eating more fruits and vegetables if they are readily available?		
Fruits taste good		
Vegetables taste good		
Would you buy fruit if you are given pocket money for lunch or breakfast		
Do you feel that the frequent consumption of fruit and vegetables is good for your health?		

2) At least how many servings of combined fruit and vegetable do you think you should eat a day?

☐ **1serving** ☐ **2 servings** ☐ **3 servings**

☐ **4 servings** ☐ **5 servings**

D) LIFESTYLE, PREFERENCES AND PERCEPTIONS

	YES	**NO**
I take part in exercises often		

1) How often do you eat out?

Once a month ☐ twice a month ☐ once a week ☐

Twice a week ☐ more than twice a wk ☐ rarely ☐

2) When u eat out how often do you consume :

a) Fruits

Every time ☐ most of the time ☐ not often ☐ never ☐

b) Vegetables

Every time ☐ most of the time ☐ not often ☐ never ☐

3) How often do you usually eat fresh fruit?

☐ Never
☐ One day per week
☐ Every day, once a day
☐ Twice a day
☐ Less than one day per week
☐ 2-4 days a week
☐ 5-6 days a week
☐ more than twice a day

4) How often do you usually eat RAWVEGETABLES like cucumbers etc?

☐ Never
☐ One day per week
☐ 5-6 days a week
☐ Every day, twice a day
☐ Less than one day per week
☐ 2-4 days a week
☐ Every day, once a day
☐ every day, more than twice a day

5) What do you think is the best reason why you consume fruits and vegetables

☐ To prevent diseases and stay health
☐ They provide vital nutrients
☐ They have a good taste
☐ They are cheap
☐ Other

6) What do you think may be the most appropriate practice that can make young people increase their fruit and vegetable intake?

☐ Availability of quality fruits and vegetables
☐ availability of convenient fruit and vegetable based products
☐ promoting attitude for more fruit and vegetable consumption
☐ promote the growing of fruit and vegetables at homes

E) <u>AVAILABILITY</u>

1) Please tick on the appropriate answer

	AGREE	DISAGREE
Fruits are readily available at home		
Fruits are readily available at school		
I grow fruits at home		
Vegetables are readily available at home		
Vegetables are readily available at school		
I grow vegetables at home		

24 HOUR DIETARY RECALL TO ASSESS FRUIT AND VEGETABLE CONSUMPTION IN ADOLESCENCE

Write the food you ate in the last 24hours in each of the indicated categories

Questionnaire I.D ……

TIME **e.g 0700hrs**	**FOOD** **e. g sadza and beans** **1 mango**
Morning	
Break fast	
Lunch	
4pm (after school)	
Supper	

Thank you for your cooperation.