# Knowledge of Students Attending a High School in Pretoria, South Africa, on Diet, Nutrition and Exercise

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## ABSTRACT

**Objective:** The objective of this study was to ascertain the knowledge of students on the composition of a healthy diet, daily nutritional requirements and the importance of regular exercise. **Method:** A cross-sectional survey using a self-administered questionnaire with closed and open-ended

questions to assess students' knowledge on diet, nutrition and exercise was conducted. The study group were students of Tswaing High School in Pretoria, South Africa, who were in attendance on a particular day when the study was conducted and who consented to participate in the study. Only 500 students of the school participated in the study.

**Results:** Results showed that 77% of the students do not have adequate knowledge on diet, nutrition and exercise while 23% of the students showed satisfactory knowledge. Approximately 26% and 16% of the students reported that they participated in rigorous and moderate exercise respectively. The study also showed that the majority of the students were however not engaged in physical activities.

**Conclusion:** Students at Tswaing High School do not have adequate knowledge on nutrition, diet and exercise. Their views on what exercise entails were found not to be satisfactory. Programmes/ information or seminars that could assist to inform students on the importance of diet and exercise are therefore suggested.

Keywords: Exercise, informal settlement, knowledge, nutrition, unhealthy lifestyle

# Conocimientos de los Estudiantes que Asisten a una Escuela Secundaria de Pretoria, África del Sur, Acerca de las Dietas, la Nutrición y los Ejercicios

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### RESUMEN

**Objetivo:** El objetivo de este estudio fue determinar el conocimiento de los estudiantes sobre la composición de una dieta saludable, los requisitos nutritivos diarios, y la importancia de realizar ejercicios de forma regular.

*Método:* Se realizó un estudio transversal usando una encuesta auto-administrada con preguntas cerradas y abiertas, a fin de evaluar el conocimiento de los estudiantes sobre las dietas, la nutrición y los ejercicios. El grupo del estudio estuvo formado por estudiantes de la Escuela Secundaria Tswaing en Pretoria, África del Sur, que estaban presentes el día cuando se llevó a cabo el estudio, y estuvieron de acuerdo en participar en dicho estudio. Sólo 500 estudiantes de la escuela participaron en el estudio.

**Resultados:** Los resultados mostraron que el 77% de los estudiantes no tienen conocimientos adecuados sobre la dieta, la nutrición y los ejercicios, mientras que el 23% de los estudiantes mostraron conocimientos satisfactorios. Aproximadamente el 26% y el 16% de los estudiantes reportaron haber participado en ejercicios rigurosos y moderados respectivamente. Sin embargo, el estudio también mostró que la mayoría de los estudiantes no participaban en actividades físicas.

**Conclusión:** Los estudiantes en la escuela secundaria de Tswaing no tienen conocimientos adecuados sobre nutrición, dieta y ejercicios. Se halló que sus opiniones sobre lo que los ejercicios implican, no

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eran satisfactorias. Por lo tanto, se sugieren programas de información o seminarios que puedan ayudar a informar a los estudiantes acerca de la importancia de la dieta y los ejercicios.

Palabras claves: Ejercicios, asentamiento informal, conocimientos, nutrición, estilo de vida no saludable.

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### **INTRODUCTION**

It has been predicted that globally, deaths from lifestyle related diseases could increase up to 77% by 2020 and that most deaths could possibly occur in the developing regions of the world (1). The main lifestyle-related diseases that are reported as threats to human life include cardiovascular diseases, cancers and Type-2 diabetes. It has been shown that there is a relationship between the prevalence of these diseases and unhealthy diets and physical inactivity (2).

In South Africa, the burden of lifestyle or non-communicable-disease risk factors is high. It is estimated that about 6-million people are living with hypertension and 4million with diabetes mellitus; 7-million are reported as smoking-related cases and 4-million had hyperlipidaemia. It has also been shown that about 56% of the South African population has at least one of these risk factors and that 20% is at high risk for non-communicable diseases. It is believed that lifestyle changes coupled with medical care can reduce the projected burden of these diseases (1, 3).

It has been reported that over 55% of South Africans aged between 15-64 years of age are at risk of developing chronic lifestyle related diseases and 16.5% are at high risk for various chronic lifestyle diseases (4). Because of the high risk of developing chronic lifestyle diseases, the South Africa population, particularly the youth, is in need of public health education and intervention strategies. Health promotion by advocacy of healthy diets and the significance of physical activity is important for the country so that the rate of morbidity and mortality due to chronic lifestyle diseases can be significantly reduced. Health promotion programmes need to be planned and prepared in a way that the needs of target groups in the community can be addressed. However, according to Steyn and Temple (3), an essential part in the prevention and management of diseases of lifestyle is the promotion of healthy lifestyles that would include the promotion of non-smoking, eating a healthy balanced diet and an active engagement in organized physical activities.

Globally, schools have been requested to participate in combating the mortality and morbidity rate of adolescents by promoting the practice of healthy lifestyles and equipping them with skills necessary for adopting healthy lifestyles (2, 5). It is estimated that adolescents presently constitute approximately 20% of the world's population and it is projected that by the year 2025, their number will increase by over 30% (6).

Adolescence is regarded as a transition period between childhood and adulthood and is considered to be an ideal age period where adolescents can be taught how to adapt and consolidate sound dietary habits. Improving adolescent's nutritional behaviour is therefore an investment for good health and could also provide the potential for correcting nutritional inadequacies and perhaps even for catch-up growth. As adolescence is regarded as a period of rapid growth, some of the adolescents can be helped to catch-up with a growth deficit of childhood in a school setting (6–8).

Despite an increased focus on diet, nutrition and exercise for adolescents in South Africa over the last few years, the dietary intake of adolescents in the country remains a major cause of concern with increasing numbers of youths consuming foodstuffs which are high in fat and sugar contents on a daily basis (8). Poor nutrition, obesity and low levels of exercise not only have an immediate impact on the health of adolescents but also contribute to adult susceptibility to diseases, such as diabetes and coronary heart disease (4, 9). It has been suggested that the solution to poor nutrition, obesity and lack of exercise lies in changing these behavioural patterns so that adolescents become more active and more knowledgeable about healthy diets and nutrition (10).

No doubt, urbanization has played a major role in demographic and epidemiologic transition of the South African population (3, 11-15). Urbanization results in social change that has a remarkable effect on diet particularly in the developing world (12, 14).

Schools offer many opportunities that promote healthy dietary and physical activity lifestyles for children and youths. It is also considered to be a potential access point for engaging parents and community members in preventing school-age children's and adolescents' malnutrition in all its forms (under-nutrition, micronutrient deficiencies), obesity and other nutrition-related chronic diseases. The universality of the school setting for gaining access to children makes it highly relevant to global efforts to combat the increasing public health problems of the double burden of under- and over-nutrition (16).

#### **Problem Statement**

It is believed that adolescents in South Africa are exposed to a variety of foods of which they do not have information on what, how much and which food to eat so as to improve/ maintain a healthy dietary lifestyle. They are also exposed to different sporting activities but they do not know the significance of participating in those sporting activities. Inadequate knowledge on nutrition, diet and the value of regular exercise has detrimental effects on their health and such effects could become irreversible if not urgently addressed. In making these adolescents aware of the dangers of unhealthy eating and physical inactivity, it is important to assess their level of knowledge about diet, nutrition, as such knowledge could contribute to a reduction of mortality and morbidity due to lifestyle diseases which has become a public health issue.

Adolescents in Winterveldt in Pretoria are continuously exposed to risk factors/behaviours such as malnutrition and physical inactivity, violence, crime, physical abuse, alcohol and drug abuse on a daily basis. Also, Winterveldt youths are not exempted from the high number of people dying in this region due to HIV/AIDS. Most of the parents in the area are unemployed and cannot afford to provide their children with a balanced diet. Some of the parents, who are employed, do not stay with their children, and this may contribute to lack of guidance and information on the value of adequate nutrition and exercise.

Tuck-shops at schools in the area are privately owned and sell fizzy drinks, sephatlo (white bread with atchaar, fried chips and polony), sweets and ice-pops to the students during lunchtime on a daily basis. This kind of meal is made up of a high fat and sugar content and contains processed meat. Tuck-shop owners are not informed on what to sell to the students and an awareness of food safety is also not observed. Due to convenience, the students tend to buy their food from such street vendors. They do not know when and how the food was prepared. According to Akeke et al (17) "attitudes and practices" studies are generally used to acquire information that would be required in the design of health promotion and health education intervention programmes that could have an impact on knowledge, alter attitudes and behaviour or practices that are considered as risky. Hence, the purpose of the present study was to conduct an assessment on the students at Tswaing High School with reference to their knowledge and practices as regards diet, nutrition and exercise in order to prepare relevant health promotion programmes as we are of the opinion that health education interventions can play a major role in the prevention of lifestyle diseases among these adolescents.

### SUBJECTS AND METHODS

This is a cross-sectional survey using a self-administered questionnaire with closed and open-ended questions to collate information on knowledge of diet, nutrition and physical exercise of students at Tswaing High School, Winterveldt, Pretoria, South Africa.

All students who were present at the school and who are bonafide students of Tswaing High School on the day and time of the study qualified to participate in the study. A total of 500 students participated in the study.

All students who were willing to give their consent and who were present at the school on the day of study were eligible to participate. In the case of underage students, consent was sought and obtained from parents. Ethical approval for the study was obtained from the Research, Ethics and Publications Committee (REPC) of the School of Public Health, University of Limpopo (ref NSPH/ST2006/15). Permission to conduct the study was requested and received from Mabopane Area Project Office and the Principal of Tswaing High School. Consent letters were issued at the school to students and the investigators explained the content of the consent letters to the students. Students were given a date to return the consent letters after which the investigators collected the signed consent forms. The students were then given a date on which the study was to be conducted.

A questionnaire developed by Whati *et al* (18) termed "nutrition knowledge questionnaire for 13-19 year olds" and based on the food-based dietary guidelines was used to evaluate knowledge of students who attended the Tswang High School in Winterveldt, Pretoria on diet, nutrition and exercise. This is considered to be a valid and reliable nutrition knowledge questionnaire that was developed for urban South African adolescents participating in the Birth-to-Twenty Cohort Study (18).

There are eleven guidelines and these eleven guidelines were used to determine the diet, nutrition and exercise knowledge of the students attending the Tswaing High School. It has been suggested that the guidelines should form the basis/benchmark of nutrition education in schools' Nutrition Programmes and the national education curriculum of the Department of Education (12).

Students answered questions that were based on these eleven South African Guidelines and these eleven guidelines are: (1) enjoy a variety of foods; (2) be active; (3) make starchy foods the basis of most meals; (4) eat plenty of fruits and vegetables; (5) eat dry beans, peas, lentils and soya often; (6) meat, fish, chicken, milk and eggs can be eaten every day; (7) eat fats sparingly; (8) use salt sparingly; (9) drink lots of clean and safe water; (10) if you drink alcohol, drink sensibly and (11) use sugar sparingly. Each student was requested to complete the questionnaire by answering each question based on the eleven guidelines.

In addition, the investigators designed a questionnaire with questions on three other variables namely: sitting (time spent in sitting before the television, playing games on the computer), walking (either as an organized exercise or doing domestic work or other activities) and the extent of physical activity that students are engaged in on a daily basis.

The questionnaire was in English which is the medium of instruction at the school and questions were formulated in simple language. The questionnaire was completed in the classroom and students were asked to complete the questionnaire anonymously to ensure confidentiality. They were also asked to answer the questions honestly so as to get a true reflection of their knowledge on diet, nutrition and exercise practices. The students completed the questionnaire under the supervision of their teachers. Only questionnaires that were correctly and completely filled in (485) were used for statistical analysis. The SPSS version 11.0 Windows Student Programme was used to analyse the data and the results are presented in frequencies, mean, figures and tables. Furthermore a norm referenced performance rating scale (Table 1) for the nutritional

 Table 1:
 Norm referenced performance-rating scale for the nutrition knowledge questionnaire

Stanine Perfomance	Score (%)	Interpretation		
1	< 34	Very Poor		
2-4	34-51	Fair/below Average		
5	52-57	Good/Average		
6-9	58-75	Very Good/Above Average		
9	76 +	Excellent		

Source: Whati et al, 2005

knowledge questionnaire was used. The knowledge of students in this study was categorised according to the norm referenced performance-rating scale (18).

### RESULTS

Only 485 of the distributed questionnaires were correctly completed and were used for statistical analysis. There were 209 (43.3%) males and 276 (56.7%) females at Tswaing High School who participated in the study.

When classified according to their grades, there were 41.6% grade 10 students, 25% grade 11 students and 33.4% grade 12 students who participated in the study. The majority of the participants were from grade 10 followed by grade 12 and then lastly by grade 11 (Fig. 1).



Fig. 1: Total number of learners according to their school grades

In this study, 56% of students were 18-year olds, 21% were 17-year olds, 18% were 16-year olds and 5% were 15-year olds. The mean age of participation in the study was 17



years (Fig. 2). Only 81% of the students who participated in

the study reside in Winterveldt. This indicates that the

Fig. 2: Classification of participants according to age and gender.

majority of students who are attending school at Tswaing High reside in Winterveldt.

It was reported that 32.6% of the parents of the adolescents attending school at Tswaing High School were unemployed. There were 15.3% of families where both parents were employed (Fig. 3).



Fig. 3: Students' responses on who is working in the family.

Results showed that 17.9% of the students prepared or cooked food for the family. It was observed that 47.8% of the students responded that their mothers were the ones who prepared food for the family. Fathers, elder brothers and male students did not play a major role in the preparation of meals. Only 9.5% of male students prepared or cooked food for the family and only 1.9% of the participants' elder brothers helped in preparing food for the family. According to the students' responses, only 1.2% of the fathers played a role in preparing meals for the family and this might be partly due to the impact of urbanization or single parenting (father alone in this instance).

The investigators analysed the responses of the students on their knowledge of nutrition by categorising the questions into eleven South African Food-Based Dietary Guidelines (FBDGs). The questions were categorised according to the guidelines and the responses of the students on each guideline was analysed. Responses of students on each guideline are presented as percentages. Table 2 shows the

Table 2: Responses of learners classified according to guidelines

Guidelines and percentage	Number of Students and Responses n = 485							
Guideline 1	12	13	20	33	35	44		
Percentages	12.3	33.1	45.6	61	50.5	41.8		
Guideline 2	10	18	22	25				
Percentages	54	38	67	57				
Guideline 3	03	08	31	38	40	42	49	
Percentages	31.2	44.3	10.5	11.8	18.4	22.3	15.6	
Guideline 4	06	11	17	21	36			
Percentages	22.5	73.3	56.4	20	36,7			
Guideline 5	47	50	52					
Percentages	27.2	63	12.3					
Guideline 6	02	14	19	29	39	46	51	
Percentages	26.7	15.6	30.2	17.9	12.3	53.8	8.5	
Guideline 7	07	15	37	41	43	48		
Percentages	54.1	21	17.7	48.7	26.1	66.2		
Guideline 8	05	16	24	30				
Percentages	82.1	39.2	36	76				
Guideline 9	04	23	26					
Percentages	35.6	54.6	77.7					
Guideline 10	09	27						
Percentages	21	52.8						
Guideline 11	01	28	32	34	45			
Percentages	65.6	49.7	73.3	46.9	62.8			

percentages of the students responses. The lowest percentage of students' performance on each guideline is 8.5% (Guideline 06). The students' knowledge on meat products is very poor. The highest performance is 82.1% (Guideline 08). Students know that "one is not allowed to add extra salt to cooked food". It shows that they know the danger of excess consumption of salt on a person's health. Students performed well on guideline 02, 08, 09 and 11, averagely on guideline 01, 04, 07 and 10 and poorly on guideline 05, 03 and 06.

### Guideline One: Enjoy a variety of foods

On the question of whether eating different kinds of foods is healthier, there were 61% responses which showed that 61% of students at Tswaing High School have the knowledge that it is healthier to eat a variety of foodstuffs.

### Guideline Two: Be active

On guideline 2, students were asked if they were engaged in regular organized physical activities. Students in this guideline performed below average. Their responses were about 35%.

# Guideline Three: Make starchy foods the basis of most meal

In this guideline, there were the highest responses (44%) on the question that tested the students' knowledge on healthy eating and staying well.

### Guideline Four: Eat plenty of fruits and vegetables

The question on whether it was usually necessary to wash vegetables before cooking them; the response was high (70.5%).

# Guideline Five: Eat dry beans, peas, lentils and soya bean often

It was shown that 63% of students know that eating legumes such as beans or lentils is healthy but do not have information on the health benefit of legumes on individuals.

# Guideline six: Meat, fish, chicken, milk and eggs can be eaten everyday

Students responses were very low.

## Guideline Seven: Eat fats sparingly

Students knew that they must limit the daily intake of fatty food. Responses showed that 66.2% of the students had adequate knowledge on the daily intake of fatty food including meat.

### Guideline Eight: Use salt sparingly

Students knew that salt must be used sparingly and also that the human body needs only a small amount of salt to remain healthy.

### Guideline Nine: Drink lots of clean, safe water

Most of the students knew that it was not all kinds of water that is safe for drinking purpose.

### Guideline Ten: If you drink alcohol, drink sensibly

The students believed that drinking a lot of alcohol caused weight loss and that alcohol must be taken sensibly.

### Guideline Eleven: Use sugar sparingly

Responses of students showed that they knew about using sugar responsibly.

Overall, we observed that students responses on the eleven guidelines did not differ significantly (p > 0.05) according to gender and within the groups; however students in the higher grade (grade 12) tend to show better knowledge on nutrition, diet and exercise.

#### **Responses on exercise**

## **Responses on rigorous exercise**

Results indicate that 34.8% of students did not participate in rigorous exercises over the previous 7-days. Only 26.1% of students who stayed next to a soccer field participated in

rigorous exercise for more than 1-day and for over 1 hour. It was reported that 6.9% of the students who stayed next to a soccer field participated for more than 1-day in rigorous exercise that lasted for unspecified minutes and 10.1% of them participated but were not sure/did not know if the exercises lasted for minutes or over 1 hour. This shows that there is a low participation of students in rigorous exercises even if they stayed next to a soccer field.

On the other hand, 21.3% of the students who did not stay next to a soccer field participated in rigorous exercises for over 1 hour for more than one day. Furthermore, 7.5% of the students participated in rigorous exercises that lasted for unspecified minutes and 7.9% of the students participated in rigorous exercises.

### **Responses on moderate exercises**

Students were also expected to give their responses on their participation in moderate exercises over the past 7-days and it was reported that 16.1% of the students who stay next to a soccer field participated in moderate exercises that lasted for over 1 hour/day; 11% of the students participated in activities that lasted for unspecified minutes and 18.3% of the students participated but do not know how long the activities lasted. Students who did not stay next to the soccer field had a tendency to participate more in moderate physical activity when compared to students who stayed next to the soccer field.

### **Responses on sitting**

On the question of time spent by the students sitting, 41.3% of the students who stayed next to a soccer field responded that they sat for hours whilst 15.1% responded that they sat for minutes before getting up and performing some activity and 19.3% were not sure about the time spent sitting.

Responses of students who did not stay next to a soccer field were significantly higher (p < 0.05) than those who stayed next to the soccer field; 46% of students said they had been sitting for hours/day; 13% of students responded that they had been sitting for minutes and 24% of the students had been sitting but did not know/were not sure for how long.

## Responses on information about nutrition and exercise and their rating scale using Norm reference performance rating

It was reported that 24% of grade 10 students, 25% of grade 11 students and 32% of grade 12 students responded that schools were very reliable with regard to the dissemination of information about nutrition and exercise. Other sources such as radio/TV/magazines, parents and peers did not appear to have any significant influence on the respondents. The lowest score that was obtained by the respondents was 8% and the highest score was 38%. A female grade 11 student obtained the lowest mark and two grade 12 students (a male and female) obtained the highest marks. Seventy-seven per cent of the students scored below 50%. Only 23% of the

students appeared to have a satisfactory knowledge on diet, nutrition and physical activity (Fig. 4).



Fig. 4: Marks obtained by individual student on the nutrition, diet and physical activity questionnaire.

According to the norm referenced performance rating scale (18) 82 students were classified as being very poor and 61% (294 students) as being below average on the knowledge of nutrition, diet and physical activity. Thirteen per cent (65 students) were classified as having good knowledge and 9% (44 students) as having very good knowledge on diet, nutrition and exercise (Fig. 4).

### DISCUSSION

This study focussed on whether students at Tswaing High School were well informed on the importance of what a healthy diet, good nutrition and physical exercise should comprise of. From the results obtained, it could be said that the students were not adequately informed about diet, nutrition and physical activities. This probably explains why 77.5% of the students scored below average on questions on knowledge about diet, nutrition and physical activities, suggesting a need for intervention programmes on health education through seminars, workshops and lectures that could address this knowledge deficit. Students need to be informed at school level on the importance of nutrition, diet and physical activity and on how these factors can affect their health status either now or later in adulthood. They need to be made aware that an unhealthy lifestyle could potentially be a risk factor for chronic diseases such as diabetes. It is presumed that this lack of awareness may be associated with parent unemployment status as well as other socio-economic factors.

It was reported that 32.6% of the parents of the adolescents attending school at Tswaing High School were unemployed. The high number of both parents who were not employed could have a significant influence on the students' involvement in physical activities and their knowledge on

diet and good nutrition. The parent's level of education or scarcity of jobs might be the cause of the high level of unemployed parents (18).

Results showed that about 18% of the students prepared or cooked food for the family. This will have an impact on their practices and knowledge on nutrition and diet. There were various reasons why they did not prepare or cook food for the family and one of these was their cultural/traditional belief. Wives/mothers are the ones who are expected to cook or prepare food for the family/husbands. It is our opinion, knowing how to cook or prepare food can affect dietary intake and subsequently nutrition (15).

It was observed that although students knew it was important to eat a variety of foodstuffs, however, they did not know that some foods should be eaten more frequently than others (slightly over 12%) and the need to eat certain kinds of food moderately.

With regards to guideline 02 (be active where students are encourage to participate in daily and regular exercise), 38% of the students responded correctly on the question of what physical activity means to them and 62% of them did not know what physical activity was. This confirms that the students did not have adequate knowledge on physical activity and this probably affected their response on the practice of physical activity (16). It was noted that some of the students could not keep track of time spent on rigorous, moderate walking and sitting activities. We found that students who stayed next to a soccer field might not be engaged in any form of physical activity. This is disturbing especially because of potential health implications.

The students performed well on knowledge of the relationship between healthy diet and physical activity, indicating that they knew that for a person to stay healthy, he/she needed to couple a healthy diet to physical activity. It was also observed that some of the students did not know what physical activity entailed or what it meant to be physically active. This could therefore have a significant impact on their physical activities and health (13, 16).

On the question of a balanced diet, the lowest responses were obtained for their knowledge of a balanced diet (10.5%) but showed better responses on consuming a variety of fruits and vegetables (20%) yet they still did not know what a balanced diet was. This lack of proper knowledge on what constitutes a balanced diet could impact negatively on stu-dents diet and health.

On the question of whether it is usually necessary to wash vegetables before cooking them, the response was high, suggesting that students knew that one had to wash vegetables before cooking them. Knowledge about washing vegetables before cooking them is considered basic hygiene and they were probably taught this basic hygiene practice during hygiene classes. Students however scored low on the quantities of vegetables and fruits that one must eat per day.

On storage, students responses were very low here, suggesting that students did not have adequate knowledge on

these items and equally scored low on storage of meat, fish and chicken. We observed that students knew that fat must be eaten sparingly, however they did not know a menu that contains less fat.

According to Walsh *et al* (13), inadequate food intake is often related to poor nutritional knowledge and practices. This is probably the case at Tswaing High School as evidenced by responses to guideline 03, 05 and 06. These pose a problem on the knowledge and practice of their diet and nutrition. If students did not know that they should make starchy food the basis of most meals, eat dry beans, peas, lentils and soya often and meat, fish, chicken, milk and eggs daily, then health promotion intervention is urgently needed for the study population and also for similar South African populations.

Health promotion strategies could be implemented at school level to make up for the inadequate knowledge that students have on diet, nutrition and exercise. The inadequate knowledge on diet, nutrition and exercise could indirectly or directly contribute to the rate of morbidity and mortality of lifestyle diseases among young people. This was found to be evident in a study as reported by Walsh *et al* (13) in which they reported that training the low-income communities in the Free State and Northern Provinces in South Africa for a period of two years, significantly improved their knowledge of what to eat.

The present study differs from previous studies in that it focussed on high school students. According to the Department of Education of South Africa (10), it is important for students to have knowledge of diet, nutrition and exercise/healthy practices which in turn could improve their wellbeing and reduce the incidence of lifestyle-related diseases in the country especially among the youths.

It has been observed that rapid and unplanned urbanization accelerates changes in traditional diets and physical inactivity, and provides ready access to tobacco products and high-fat foods, which are risk factors for non-communicable diseases. Migrants often settle in informal settlements on the periphery of cities and these living conditions have consequences for the preparation, consumption and hygiene of food particularly for urban blacks (19, 20).

Students who stay in Winterveldt and nearby places fetch water from far places using wheelbarrows. This may explain why there were more students who participated in moderate exercises even though they did not stay next to a soccer field.

The result of this study showed that students did not have adequate knowledge on nutrition, diet and physical activity and their practices were questionable. Efficient and effective policies need to be implemented so as to promote health education.

It is recommended that government departments collaborate in building recreational facilities in rural and semi-rural areas that will encourage students to participate in physical activities. Teachers should be trained on how to deliver health promotion lectures and to inform the students on the importance of nutrition, diet and exercise. Owners of *tuck-shops* and street vendors should be informed on the importance of healthy diet and how they could replace the present high fat, sugar and processed foods with nutritious food.

There was some reluctance from some students to participate in the study and some did not attend school on the day that was agreed upon and offered excuses such as being busy preparing for the year-end examination. Other students did not complete the questionnaire. In our opinion, these limitations did not affect the purpose for which the study was designed.

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