

## Nutritional knowledge, attitude and practices of adolescents towards healthy eating in secondary schools in Sheema municipality, Sheema district, Uganda.

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### ABSTRACT

Healthy eating practice promotes good health, growth and intellectual development in addition to prevention of nutritional related diseases. A good interventional stage in the life cycle is adolescence because it gives a chance to acquire knowledge. The study was aimed at investigating nutritional knowledge, attitude, and practices of adolescents towards healthy eating in secondary school in Sheema municipality, Uganda. In this study, a cross-sectional survey design was conducted, structured questionnaire was used to collect data; informed consent was obtained from a school head teacher. A sample size of 361 participants was studied. Data analysis was carried in STATA 14.2; descriptive statistics were carried out followed by logistic regression. From this study, most adolescents (85%) were between 16-17 years and majority were male (51.2%). About 50.1% and 49.9% had good and poor nutritional knowledge on healthy eating, respectively. Students who got information from health workers were 8.4 times more likely to have good nutritional knowledge than those who got it from other sources. Approximately 50% of the students had negative attitude towards healthy eating while 56% had bad eating practices. This implies that adolescent students had poor nutritional knowledge, poor attitude and possessed poor eating practices. There is therefore the need for continuous health education programs about healthy eating and associated benefits among secondary students in Uganda.

**Keywords;** Students, Healthy eating, Nutritional, Knowledge, Adolescence

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### INTRODUCTION

Man has lived for more than 600 million years, at first he got food by gathering and hunting [1]. It was found that gathered vegetable foods were the primary source of survival for most of the hunter-gatherer societies, whereas an emphasis on hunting occurred only in the highest latitudes [1]. By the 20<sup>th</sup> century, most hunter-gatherers had disappeared, with many of those who remained having displaced to marginal environments [2; 3]. They used to get micronutrients from animal foods and wild plants that had relatively low carbohydrates content, protein intake was elevated at the expense of carbohydrates which helped them to avoid diseases like obesity, coronary heart disease, and type 2 Diabetes [2]. In those years eating was communal, and meal time especially when to eat meat was considered a big festival. They took some time while eating and took

time to chew food well as food was largely including raw plant leaves, roots and insects as well as fresh meat [1].

After some time of raw materials cooking was invented, "Cooking was the first attempt to process food and it was necessary to render vegetable foods assimilated and all subsequent procedures were purely for the sake of convenience" [1]. Cooking resulted in increased use of carbohydrate just because of increased availability and easy preparation [1]. Wine, honey and young fat dogs were consumed only by the aristocrats, while pork and domestic animals were taboos to many citizens as stated by Jensen and quoted by [1]. Fresh dried and salted fish was the chief source of protein and beef was eaten sparingly [4; 1].

Later, agriculture was innovated and some people got easy access to food although

some people refused to dig and remained as gatherers in the forests in high lands [1]. After that industrialization started processing of grains, fruits and grapes with fermentation producing alcohol, a compact substance of high caloric value [3]. Also professional millers, bakers and farmers all came together, the use of wheat increased very fast, millers learnt that further refining made cereals finer, lighter and whiter bread that stripped much protein from the grain was not of vital nutritional importance, so long as adequate supplies were received [1].

In china, "processing of rice made it more palatable and digestible and less prone to spoilage However, processing removed the outer cover and protein content was also removed and this led to nutritional deficiencies that occurred in many Chinese for years before their true nature was discovered" [1].

Currently due to agriculture, cooking innovations, industrialization and globalization, there has been a change in eating habits, from communal eating, taking time to chew food, vegetable and fruit eating to consumption of junk foods that can easily be accessed and are convenient to prepare and eat, this has led to taking in much sugars than the body can use [5; 6].

Healthy eating starts with breast feeding where the child is given breast milk rich in all nutrients needed by the body. Then special food preparations special attention for the baby follows and then the child starts to eat food with rest of the family members (communal eating) [7]. As the child goes to school the eating environment changes as he/she is exposed to different foods and different cultures thus nutritional knowledge on healthy eating is now important for this child [8].

#### **Statement of the problem**

Healthy eating practices during adolescence is the major requirement for physical growth, psychological development and cognitive performance, as well as well as prevention of diet related chronic diseases [9]. Having good nutritional knowledge and positive to healthy eating play a role in the prevention of several chronic diseases [10].

Although the Ministry of Education and Sports in Uganda has Health science, Biology and Nutrition Education [11; 12] as subjects in secondary schools and the government has also put School Health Programs (SHP) in secondary schools that include nutrition education as the major component and schools preparing meals for students, little has been done to solve bad nutritional habits in adolescents. Adolescents have continued to take a lot of sugary drinks, alcohol, fast foods, disliking natural foods, and some skipping meals which are risk factors to non-communicable diseases [13; 14; 15]. There is paucity of literature on why adolescents behave in such manner and this makes the current research on nutritional knowledge, attitude and practices of adolescents towards healthy eating in secondary schools in Sheema municipality Uganda relevant.

#### **Aim of Study**

To investigate nutritional knowledge, attitude, and practices of adolescents towards healthy eating in secondary schools in Sheema Municipality, Uganda.

#### **Objectives of the study**

- i. To evaluate nutritional knowledge and associated factors on healthy eating among adolescents in secondary schools in Sheema Municipality, Western Uganda.
- ii. To assess the attitude of adolescents towards healthy eating in Sheema Municipality, western Uganda.
- iii. To document practices of healthy eating among adolescents in secondary schools in Sheema Municipality, western Uganda.

#### **Research questions**

- i. What is the nutritional knowledge and associated factors on health eating among adolescents in secondary schools in Sheema Municipality in Western Uganda?
- ii. What is the attitude of adolescents towards healthy eating in Sheema Municipality western Uganda?
- iii. What are practices of healthy eating in adolescents in secondary schools in Sheema Municipality?

### **Justification of the study**

Sheema Municipality is among the new Municipalities formed in Uganda. Like any other new Municipality, many schools are mushrooming and many businesses are coming up near those schools, school canteen operators and food vendors are also increasing in those schools. Most of the foods sold are unhealthy. Unhealthy diet leads to many diseases later in life and the costs treatment of those diseases are high. The disabilities caused by those diseases are mostly irreversible and losses of lives occur even after spending much money and time on a patient. The study will contribute to the little information on healthy eating available

and the risk of getting diseases associated with unhealthy eating will be reduced.

### **Significance of the study**

The results from the study will help;

1. Students to access more proper information on healthy eating and nutritious foods from qualified persons in the schools.
2. The school administrators to put better policies on foods and drinks to be sold in the school canteens.
3. The ministry of education to emphasize and train more special teachers for health education.
4. To serve as reference data for future evaluations and reformations towards more effective nutrition interventions.

### **METHODOLOGY**

#### **Research design**

A cross-sectional survey design was adopted to evaluate nutritional knowledge, attitude and practices of adolescents towards healthy eating in secondary schools in Sheema municipality.

#### **Study area**

The study area was Sheema Municipality, Sheema district, South Western Uganda. It was part of the former Bushenyi district. Sheema Municipality has 4 divisions; Kashozi division, Kabwohe division, Kagango division and Sheema central division. The main economic activity is animal and crop agriculture from which farmers obtain income for school fees and scholastic materials of their children. There were 21 secondary schools in those divisions. Out of 21 secondary schools 07 were government aided and 14 were privately owned schools.

#### **Target population**

The study population consisted of adolescents aged (13-17 years) in 21 secondary schools, among these schools were 14 private and 7 governments aided. Among these secondary schools two were single sex with one public school for boys and one for girls and the remaining 19 were mixed secondary schools.

#### **Sample size determination**

The sample size was determined by using a website called OpenEpi which is epidemiologic statistics for public health, where the sample population was entered,

at confidence interval of 95% , 361 was got [16]. Therefore total sample size of 361 of adolescents was considered.

#### **Sample size**

The study population comprised of 361 students from 21 secondary schools.

#### **Sampling technique**

All the 21 secondary schools were considered, which were later stratified into 7 government and 14 private secondary schools. Stratified sampling was also used to group schools into mixed and single sex schools. Stratified sampling was also used to stratify adolescent by sex in mixed schools and this helped in getting both sexes represented in mixed secondary schools. Simple random sampling was used to select the number of adolescents per sex in each school.

#### **Inclusion and Exclusion criteria**

##### **Inclusion criteria**

All adolescents between 13-17 years in senior 2 and senior 3 attaining secondary education Sheema Municipality were included. These adolescents were included in the study because they were old in the school and had mastered the culture and programs of the school and those for whom the head teacher had consented for their participation.

##### **Exclusion criteria**

Adolescents in senior 2 and 3 who were new in the school were excluded because they were fresh in the school and had not mastered the culture of the school.

All adolescents that never signed assent form.

#### **Data collection**

A self-administered questionnaire was used to collect the primary data from adolescents, the researcher found that adolescents in secondary schools knew how to read and write and had time to fill the questionnaires. The questionnaire involved a number of questions set under each objective of the study. The adolescents filled the questionnaire and returned them to the researcher for data analysis. This helped the researcher to collect quantitative data concerning nutritional knowledge, attitude and practices of health eating among adolescents in secondary schools in Sheema Municipality.

#### **Research instrument**

A Self-administered questionnaire with structured questions was used to collect data. The questions in this questionnaire were adopted from [17] and modified to fit the level of secondary school adolescents.

#### **Data quality**

In data quality control the instrument used was tested for validity and reliability.

#### **Validity**

In order to ensure validity of the instrument, two questionnaires were given to two experienced researchers, to measure the relevance of each question in the instrument to the objectives of the study. Each item that was rated on the scale of very relevant (4), quite relevant (3), somewhat relevant (2) and not relevant (1) was noted. Validity was determined using Content Validity Index (CVI).  $CVI = \frac{\text{sum of items rated 3 or 4 by both experienced researchers}}{\text{total number of the items in the questionnaire}}$ . The CVI of 0.76 was got, and this made the instrument valid.

#### **Reliability**

To ensure reliability, the questionnaires were pretested in 3 secondary Schools in Nyakayojo division region in Mbarara Municipality. The results were run through STATA 14.2 then the reliability coefficient of the instrument was determined using Cronbach's coefficient Alpha and the value was 0.81 was got therefore the questionnaire was reliable.

#### **Data processing**

Crude data was sorted, cleaned and entered in Microsoft excel.

#### **Data analysis**

Analysis was done per objective using STATA 14.2.

#### **Ethical consideration**

##### **Confidentiality**

All responses were kept confidential and completed questionnaires kept under lock and key.

##### **Informed consent**

Since the study participants were secondary school adolescents, they were found at school. The school head teacher gave administrative clearance to allow the study to be conducted in his/her school, then later the assent form was given to adolescents for filling before the questionnaires were given out that were returned to the researcher after signing.

##### **Human rights**

Participants are allowed to decide to take part in the study and to pull out from the study willingly with no penalties at any time.

##### **Justice**

All adolescents in secondary schools in Sheema Municipality who are in senior 2 and 3 between 13 to 17 years had equal chances of being selected to participate in the study. Both sexes were represented. This was possible since simple random sampling was used.

##### **Autonomy**

Participation in the study was totally voluntary, in that a participant accept to fill a given questionnaire and they left question that he/she would decide not to answer. Participants were at liberty to pull out from the study whenever they felt like leaving, without penalties.

##### **Benefits and Risks**

The search was a step towards future studies intended to provide solutions aiming at promoting healthy eating and preventing future diseases that may result from unhealthy eating habits like overweight and Obesity, underweight, deficiency conditions and associated comorbidities in Sheema municipality and the Southwestern region at large. There were no expected serious dangers in taking an interest in the study.

## RESULTS

**Socio demographic characteristics of adolescents in secondary schools in Sheema municipality, Western Uganda**

The result in table 1; showed that the majority of the adolescents were aged 16-17 years with the p-value of 0.021 which showed that age of respondents was statistically significantly related to healthy eating. Most of the respondents were males with the p-value of 0.231 which showed no statistical significant relationship between gender and healthy eating. Concerning the status of student,

majority were boarders. The status of the student was found to be significantly related to healthy eating at p value = 0.001. With respect to religion, most of the respondents were Protestants. There was a statistical significant relationship between religion and healthy eating at p value = 0.036. Regarding to class of the adolescents, most of them were in senior two with the p-value of 0.059 that indicated that there was no statistical significant relationship between the classes of adolescent and healthy eating.

**Table 1. Background Characteristics of respondents in relation to healthy eating**

Variable	Overall	Healthy eating n (%)	Not healthy n (%)	p-value
<b>Years</b>				
13-15	53(15%)	30(8.3%)	23(6.4%)	0.021
16-17	308(85%)	289 (80.1%)	19 (5.3%)	
<b>Gender</b>				
Male	185(51.2%)	118(63.8%)	67(36.2%)	0.231
Female	176(48.8%)	100(56.8%)	76(43.1%)	
<b>Status of the student</b>				
Boarder	266(73.7%)	180 (49.9%)	86 (23.8%)	0.001
Day	95(26.3%)	25 (6.9%)	70 (19.4%)	
<b>Religion</b>				
Catholic	33(9.1%)	14 (3.9%)	19 (5.3%)	0.036
Anglicans	287(79.5%)	180 (49.9%)	107 (29.6%)	
Muslims	32(8.9%)	20 (5.5%)	12 (3.3%)	
Adventist	5(1.4%)	3 (0.8%)	2 (0.6%)	
Others	4(1.1%)	2 (0.6%)	2 (0.6%)	
<b>Class</b>				
S 2	195(54.0%)	150 (41.6%)	45 (12.5%)	0.059
S3	166(46.0%)	90 (24.9%)	76 (21.1%)	

**Nutritional knowledge on healthy eating of Adolescents in secondary schools**

**Table 2.** The findings from the table below showed that 52% of the adolescents had knowledge that vitamins and minerals cannot provide energy compared to 48% who disagreed with the statement and supported that vitamins and mineral can provide energy. However, the effect was not significant at 95% level of confidence (P-value =0.127).

In terms of eating fruits before meals, only 29% of participants who were adolescents had good knowledge that eating fruits before meals can help reduce weight as compared 71% who disagreed with the statement. Those who disagreed with the

statement they were less likely to have good nutritional knowledge on healthy eating. The association between knowledge on eating fruits before meals and health eating was significant (P=0.001).

In relation to proteins in excess, the study found out those respondents (86%) who said yes that excess proteins are stored in the body lack knowledge on healthy eating compared to 14% who said no that proteins in excess of the bodily needs not stored in the body. Those who said yes were less likely to have knowledge on health eating than those who said no to the statement. The effect was found to be statistically significant at 95% level (p-value= <0.001).

In terms of the importance of cabbage, the survey revealed that students (61%) with knowledge that cabbage is important dietary source of vitamin A had a higher likelihood on health eating than students (35.2%) with no knowledge. The p-value of 0.130 indicated that there was no statistical significance between the two.

Most of the respondents (57%) indicated that serving of red meat is required every day to supply proteins compared to (43%) that had good knowledge and reported that serving of red meat is not required every day to supply proteins. There was no statistical significant relationship knowledge on the serving of red meat and healthy eating (p value=0.013)

In terms of adolescents awareness of health risks associated with poor eating habits, it was established from the survey that students (61%) with knowledge that they are aware of health risks associated with poor eating habits had a higher

likelihood of health eating than those with no knowledge and this effect was not significant (P-value =0.612).

In regards to whether much salt is needed to supply mineral salts to the body, students (48%) who said yes to the statement, had poor nutritional knowledge that much salt is not needed to supply salts compare to 52% that said no to the statement. This relationship was insignificant (P-value 0.612).

Concerning whether whole grain like millet & sorghum are sources of fibers or roughage which help to prevent constipation, the study found out that respondents (58%) supported that whole grain like millet & sorghum are sources of fibers or roughage indicating that they had knowledge as compared to (40%) that disagreed with the statement. The relationship was insignificant (P-value =0.922).

**Table 2. Nutritional knowledge on healthy eating of Adolescents in secondary schools**

Nutritional knowledge	Overall	Not Healthy	Healthy	P Value
Vitamins and minerals cannot provide energy				
No	175(48%)	31(18%)	144(82%)	
Yes	209(52%)	40(19%)	169(81%)	0.127
Eating fruits before meals can help to reduce weight				
No	257(71%)	51(20%)	206(80%)	
Yes	104(29%)	16(15%)	88(85%)	0.001
Proteins in excess of the bodily needs is store in the body				
No	58(14%)	11(19%)	46(81%)	
Yes	303(86%)	53(17.5%)	250(82.5%)	<0.001
Cabbage is important dietary source of vitamin				
No	140(39%)	25(17.9%)	115(82.1%)	
Yes	220(61%)	47(21.4%)	173(78.6%)	0.130
Serving of red meat is required every day to supply proteins				
No	156(43%)	50(32%)	106(68%)	
Yes	205(57%)	18(9%)	187(91%)	0.013
I am aware of health risks associated with poor eating habits				
No	138(38%)	26(19%)	112(81%)	
Yes	220(61%)	43(20%)	177(80%)	0.612
Much salt is needed to supply mineral salts to the body		%		
No	188(52%)	36(19%)	152(81%)	
Yes	173(48%)	36(21%)	137(79%)	0.612
Whole grain like millet and sorghum supply fiber that prevent constipation				
No	144(40%)	32(22%)	112(78%)	
Yes	209(58%)	38(18%)	171(92%)	0.922

**Factors influencing nutritional knowledge of adolescents towards healthy eating in secondary schools**

Table 3. Six variables were found to be statistically significant and these included; gender, class, religion, source of nutritional knowledge, and regular health education program. Females were 1.24 times more likely to have good nutritional knowledge compared to male students (OR=1.24, 95%CI 1.11-3.80) and those who were in S.3 were 1.15 times more likely to have good nutritional knowledge compared to those in S2 (OR = 1.15, 95% CI: .0.12-1.80). Participants whose source of nutritional knowledge was health workers were 6 times more likely to have good knowledge of health eating than whose source was a newspaper (OR=6.04, 95%CI 2.77-20.88). Similarly, students from schools that had regular health education were 9 times more likely to have good nutritional knowledge than those whose schools never had regular health education (OR=9.04, 95%CI 2.77-12.28).

**Table 3. Factors influencing nutritional knowledge of adolescents towards healthy eating in secondary schools**

Variable	Nutritional Knowledge		cOR(95% CI)	p-value	aOR(95%CI)	p-value
	Good =334	Poor=27				
<b>Gender</b>						
Male	177 (49.0%)	8 (2.2%)	1.00		1.00	
Female	157 (43.5%)	19 (5.3%)	1.04 (0.45-4.74)	0.51	1.241(1.11-3.79)	0.032
<b>Class</b>						
S2	156 (43.2%)	18 (5.0%)	1.00		1.00	
S3	180 (49.9%)	7(1.9%)	1.05(0.12-1.80)	0.12	1.15(1.08-2.77)	0.021
<b>Religion</b>						
Catholic	20 (5.5%)	6 (1.7%)	1.00		1.00	
Protestant	265 (73.4%)	20 (5.5%)	3.33(0.06-1.06)	0.011	0.31(0.9-1.52)	0.003
Others	50 (13.9%)	0	-		-	
<b>Source of nutritional education</b>						
News papers	96 (26.6%)	4 (1.1%)	1.00		1.00	
Health workers	99 (27.4%)	26 (7.2%)	1.03(0.77-58.65)	0.31	6.04(2.77-20.48)	0.016
School nurses	33 (9.1%)	4 (7.2%)	0.34(0.16-51.13)	0.47	2.68(0.14-49.9)	0.11
Others	96 (26.6%)	3 (0.8%)	0.75(0.31-10.15)	0.99	1.15(0.12-11.23)	0.90
<b>Regular Health Education</b>						
No	100 (27.7%)	20 (5.5%)	1.00		1.00	
Yes	123 (34.1%)	108 (29.9%)	1.23(1.65-10.54)	0.015	9.04(2.77-12.28)	0.012

**Attitude of adolescents towards healthy eating**

Table 4. The study revealed 50.6% had positive attitude and 49.4% had negative attitude towards healthy eating. The findings reveal that respondents (65.7%) who were in agreement that healthiest foods do not taste well had a lower likelihood of healthy eating than those (31.9%) who were in disagreement and this effect was deemed not to be significant (OR=0.608, P-value=0.608). Concerning whether respondents don't see any problem with eating fried food, it was revealed that those (25.5%) in agreement had more possibilities of unhealthy eating than those (75.5%) who were in disagreement and the association was not significant (OR=0.82, P-value>0.740). The

study established that students (59%) who supported that few fruits do not satisfy hunger had more chances of unhealthy eating than those (41%) who were in disagreement and this effect was not significant (OR=0.762, P-value=0.614).

In regards to whether respondents are considered rich when they take packed drink daily, the study found that those (55.1%) in agreement had a lower likelihood of healthy eating than those (46.3%) in disagreement and the effect was not significant (OR=0.711, P-value=0.625). Concerning whether reading labels on food is a good practice, the respondents (85.3%) who were in agreement had good attitude and more possibilities of healthy eating compared with those (9.4%) in disagreement. However the relationship



was statistically insignificant (OR=0.919, P-value=0.871). Regards whether students like posho and beans if well prepared, the survey found out that those (87.3%) were in agreement had good attitude on posho and beans if well prepared as compared with 12.7% who disagreed. The effect was not significant (OR=0.850, P-value 0.758). The evidence based on the model findings above indicate that respondents (41.6%) who were in agreement that tastiest foods are the ones that are bad for your health had more possibilities of healthy eating than those (58.4%) were in disagreement with the statement. Those who were in disagreement had positive attitude towards tastiest foods and the effect was not significant (OR=0.844, P-value=0.844). Concerning whether it is better to leave lunch than making a line at the kitchen, the survey established that respondents (14.9%) who supported the argument had negative attitude towards making a line were more likely to engage in unhealthy eating than those (84.1%) who did not

support the statement. Those in agreement were 47.7% more likely to practice unhealthy eating practices compared to those who disagreed. However the effect was not significant (OR=0.533, p-value=0.553).

The findings revealed that respondents (16.6%) who were in agreement that they don't care on the food they eat had a more likelihood of unhealthy eating than those (84.4%) who were in disagreement. These in agreement with the statement were 46.7% less likely to have good attitude towards healthy eating. However the effect was not statistically significance (OR=0.533 P=0.533). Lastly, regarding whether the respondents don't have time in the morning to take breakfast, the survey found that those (42.4%) in agreement were more likely to participate in unhealthy eating than those (59.3%) who were in disagreement and the effect was not statistically significant (OR=0.624, P-value=0.365).

**Table 4. Adolescents' attitude towards healthy eating in secondary schools in Sheema municipality**

Variable	Overall	Healthy eating		OR	P-value
		Not healthy	Healthy		
<b>Most healthy foods do not taste well</b>					
No	115(31.9%)	24(20.9%)	91(79.1%)	1	
Yes	237(65.7%)	44(18.6%)	193(81.4%)	0.608(0.155-2.385)	0.608
<b>I don't see any problem with eating fried foods</b>					
No	164(45.4%)	33(20%)	131(79.8%)	1	
Yes	92(25.5%)	18(23%)	74(28%)	0.827(0.269-2.541)	0.740
<b>Few fruits do not satisfy hunger</b>					
No	129(35.7%)	25(32%)	104(39%)	1	
Yes	213(59.0%)	39(50%)	174(65%)	0.762(0.265-2.191)	0.614
<b>You are considered rich when you take packed foods and drinks everyday</b>					
No	157(43.5%)	29(18.5%)	128(81.5%)	1	
Yes	199(55.1%)	44(22.1%)	155(77.9%)	0.711(0.181-2.793)	0.625

<b>Reading labels on foods is a good practice</b>					
No	34(9.4%)	7(20.5%)	27(79.4%)	1	
Yes	308(85.3%)	60(16.6%)	248(80.5%)	0.919(0.331-2.551)	0.871
<b>I like posho and beans if well prepared</b>					
No	36(10%)	6(16.6%)	30(83.3%)	1	
Yes	315(87.3%)	63(20%)	252(80%)	0.850(0.302-2.392)	0.758
<b>Foods which are tasty are the ones that are bad to your health</b>					
No	129(35.7%)	26(20%)	103(79.8%)	1	
Yes	150(41.6%)	30(20%)	120(80%)	0.844(0.348-2.044)	0.844
<b>It is better to leave lunch than making a long line at the kitchen</b>					
No	315(87.3%)	62(19.7%)	253(80%)	1	
Yes	49(13.6%)	10(20%)	39(79.6%)	0.533(0.168-1.698)	0.533
<b>I get confused to what is health or not healthy</b>					
No	120(33.2%)	21(17.5%)	99(82.5%)	1	
Yes	116(32.1%)	23(19.8%)	93(80.2%)	0.890(0.386-2.054)	0.658
<b>I do not care on the food I eat</b>					
No	293(81.2%)	60(20.5%)	233(79.5%)	1	
Yes	60(16.6%)	10(16.6%)	50(83.3%)	0.533(0.168-1.698)	0.533
<b>No time in the morning to take breakfast</b>					
No	197(54.6%)	39(19.8%)	158(80.2%)	1	
Yes	153(42.4%)	29(19%)	124(81%)	0.624(0.225-1.732)	0.365

### **Practices of adolescents towards healthy eating in secondary school in Sheema Municipality**

From table 5, it was indicated that most of the respondents determines the food they buy from the canteen on what they are used to eat. The p value = 0.267 showed that practices on what determines the food adolescents buy from the canteen was not statistically significant to healthy eating. Majority of the adolescents don't often take soft drinks with p-value=0.051. This indicated that practices on how often take the soft drinks was not significantly related to healthy eating. Very few

respondents eat fruits 3-6 times in a week and 47.1% reported never with p-value=0.015. This indicated that there was a statistical significant relationship between how often adolescents took fruits and healthy eating. 33.8% of respondents take vegetables once a week and 9.4% never. The p value = 0.022 meant that taking vegetables was significantly related to healthy eating. Most 60.4% of the respondents take milk every day, at the p value = 0.028, which indicated statistical significant relationship between taking milk and healthy eating. Most of the respondents 58.7% drink water every day.

The p value = 0.013 meant that there was statistical significant relationship drinking water and healthy eating. Almost 90% of adolescents eat mandazi in a week only 10% reported never. With the p value = 0.185 showed that, there was no statistical significant relationship between practice on eating madanzi and healthy eating. Majority of adolescents admitted that they ate chapatis at least one in a week. Most of the adolescents showed that they ate fast foods at least once a week with only 13.3% reporting never to have taken fast foods in a week. The p value = 0.454 meant that there was no significant relationship between eating fast foods and healthy eating. Most of the respondents 38.8%

mentioned that they take chai and sugar every day and only 17.2% reported never. The p value = 0.582 indicated that there was no significant relationship between taking chai with sugar and healthy eating. 33% of the respondents never took sweets and the remaining 77% agreed that they eat sweet(s) in a week with the p-value=0.583. The p value = 0.583 showed that there is no statistical significant relationship between eating sweets and healthy eating. Most of the respondents 46% showed that they don't often eat eggs with p= value = 0.237 which showed that there is no significant relationship between eating eggs and healthy eating.

**Table 5. Adolescents' practices of healthy eating in secondary schools in Sheema municipality**

Variable	Overall n (%)	Healthy n (%)	Not healthy n (%)	p-value
<b>What determines the food you buy from the canteen</b>				
Taste	82(70)	70 (85.4)	12 (14.6)	0.267
Colour	2(0.6)	1 (50)	1 (50)	
Band wagon effect	64(17.7)	50 (78.1)	14 (21.9)	
Price	66(18.3)	44 (66.7)	22 (33.3)	
What I find available in the canteen	21(5.8)	16 (76.2)	5 (23.8)	
What we eat at home	27(7.5)	17 (4.7)	10 (2.8)	
What I am used to eat	98(27.1)	50 (50.0)	48 (49)	
<b>How often do you take soft drinks?</b>				
Once a week	125(34.6)	80 (64)	45 (36)	
1-2 times a week	23(6.4)	15 (65.2)	8 (34.8)	0.051
3-4 times a week	32(8.9)	14 (43.8)	18 (56.3)	
Never	173(47.9)	150 (86.2)	23 (13.3)	
<b>How often do you eat fruits?</b>				
Once a week	55(15.2)	40 (72.7)	15 (27.3)	
1-2 times a week	34(9.4)	20 (58.8)	14 (41.2)	0.015
3-4 times a week	23(6.4)	10 (43.5)	13 (54.2)	
5-6times a week	25(6.9)	12 (48)	13 (52)	
Everyday	38(10.5)	13 (34.2)	25 (65.8)	
Never	170(47.1)	150 (88.2)	20 (11.8)	
<b>Taking vegetables</b>				
Once a week	122(33.8)	120 (98.4)	2 (1.6)	
1-2 times a week	37(10.2)	12 (32.4)	25 (67.6)	0.022
3-4times a week	12(7.3)	10 (83.3)	2 (16.7)	
5-6 times a week	99(27.4)	60 (60.6)	39 (39.4)	
Everyday	61(16.9)	35 (57.4)	26 (59)	
Never	34(9.4)	21 (61.8)	13 (38.2)	
<b>Taking milk</b>				
One a week	39(10.8)	25 (64.1)	14(35.9)	
1-2 times a week	25(6.9)	18 (72)	7 (28)	0.028
3-4 times a week	8(2.2)	6 (75)	2 (25)	

5-6 times a week	17(4.7)	15 (88.2)	2 (11.8)	
Everyday	218(60.4)	160 (73.4)	58 (26.6)	
Never	54(15)	34 (63)	20 (37)	
<b>Drink water</b>				
Once a week	64(17.7)	38 (59.4)	26 (40.6)	0.013
1-2 times a week	7(1.9)	3 (42.9)	4 (57.1)	
3-4 times a week	11(3.0)	8 (72.7)	3 (27.3)	
5-6 times a week	57(15.8)	44 (77.2)	13 (22.8)	
Everyday	212(58.7)	130 (36.0)	82 (22.7)	
Never	11(3.0)	5 (45.5)	6 (54.5)	
<b>How often do you eat "mandazi"</b>				
Once a week	108(29.9)	98 (90.7)	10 (9.3)	0.185
1-2 times a week	36(10)	23 (63.9)	13 (36.1)	
3-4 times a week	9(2.5)	5 (55.6)	4 (44.4)	
5-6 Times a week	18(5)	11 (61.1)	7 (38.9)	
Every day	155(43.1)	130 (83.9)	25 (16.1)	
Never	36(10)	23 (63.9)	13 (36.1)	
<b>How often do you eat fast foods</b>				
Once a week	134(37.1)	120 (89.6)	14 (10.4)	0.454
1-2 times a week	60(16.6)	40(66.7)	20 (33.3)	
3-4 times a week	46(12.7)	30(65.2)	16 (34.8)	
5-6 times a week	14(3.9)	10 (71.4)	4 (28.6)	
Everyday	42(11.6)	20 (47.6)	22 (52.4)	
Never	48(13.3)	24 (50)	24 (50)	
<b>How often take chai and sugar</b>				
Once a week	60(16.6)	40 (66.7)	20 (33.3)	0.582
1-2 times a week	41(11.4)	35 (85.4)	6 (14.6)	
3-4times a week	37(10.2)	25 (67.6)	12 (32.4)	
5-6 times a week	20(5.5)	18 (90)	2 (10)	
Everyday	140(38.8)	120 (85.7)	20 (14.3)	
Never	62(17.2)	45 (72.6)	17 (27.4)	
<b>How often do you eat sweets</b>				
Once a week	77(21.3)	60 (77.9)	17 (22.1)	0.583
1-2 times a week	49(13.6)	30 (61.2)	19 (38.8)	
3-4 times a week	41(11.4)	25 (56.8)	16 (36.4)	
5-6 times a week	53(14.7)	34 (64.2)	19 (35.8)	
Everyday	119(33)	100 (84)	19 (16)	
Never				
<b>How often they eat eggs</b>				
Once a week	43(11.9)	29 (67.4)	14 (32.6)	0.237
1-2 times a week	39(10.8)	21 (53.8)	15 (38.5)	
3-4 times a week	37(10.3)	20 (54.1)	17 (45.9)	
5-6 times a week	39(10.8)	25 (64.1)	14 (35.9)	
Everyday	39(10.8)	30 (76.9)	9 (23.1)	
Never	166(46)	130 (78.3)	36 (21.7)	

## DISCUSSION

The presentation of the discussion follows the order in which the objectives were stated and possible explanations and views by other scholars.

The overall nutritional knowledge was determined by the total number of questions indicating knowledge that where

answered correctly. The study finding revealed that 49.9% of adolescents had poor nutritional knowledge on healthy eating. The finding are in agreement with the study by [18] which revealed that more than two thirds of adolescents have less knowledge about right eating behaviors

[18].The study finding are also in supported by the one done in United Arab Emirates that revealed that most students (86%) had poor nutritional knowledge [19]. This is likely to be true because most schools do not have health education on the school time table.

It was revealed that the majority of adolescents had poor nutritional knowledge on the fact that eating fruits before meals can that help reduce weight. The study findings are in linewith the one done in Malaysia to found that 32.4% believed that students should take fruits and vegetables only to prevent from being obese [17]. This may be true because fruits are not common in schools canteens and adolescents may be lacking knowledge on their importance.

With respect to specific responses on nutritional knowledge question on whole grain like millet & sorghum being sources of fibers or roughage (40%) had poor knowledge. This is in line with the study done by Elhassan in India which revealed that 52.6% did not know which foods contain fibers [20].This is true adolescents do not have adequate knowledge on healthy foods since the majority of adolescents reported that they do not have regular health education.

Most of the respondents (57%) indicated that serving of red meat is required every day to supply proteins which indicated that they lacked knowledge on the serving of red meat. The study finding are in line with the one done in United Arab Emirates that revealed that most students had poor nutritional knowledge, especially in key areas:, daily nutritional requirements and components of food [19].This true basing on the fact that adolescents do not receive regular health education.

The study findings revealed that female adolescents were 1.24 times more likely to have good nutritional knowledge as compared to males. The above results are similar with the study finding by [18] which revealed that more than two thirds of adolescents especially boys have less knowledge about right eating behaviors [18]. Also Al-yateem and Rossiter reported that girlshad a greater level of knowledge and healthier eating habits than boys in

united Arab Emirates [19].This implies that most adolescents have little nutritional knowledge especially males perhaps because they are not usually involved in food preparation.

The study findings also reveal that students who got nutritional information from health workers were 6times more likely to have good nutritional knowledge of healthy eating compared to those who got the information from newspaper. This is in agreement with study done by [21] in adolescents in Kampala Uganda who found out that “sources of information about nutrition, diet or foods were: books, health care providers, family members and media channels” and he added that “their dietary habits are easily influenced by other individuals and the media” [21].Also the study by Eldridge, Elizabeth and Intern reported that not all nutrition information found on media is inaccurate, so there is a need for people to be provided with science based information [22]. It is true that mostly information got from media is inaccurate because it is usually in form of advertisements of food and most foods advertised contain more calories so if not fully explained it may end up confusing adolescents.

Adolescents who received healthy education were 9.04 times more likely to have good nutritional knowledge than those who had no health education. The findings are in line with study done by Shapu and others 2020 that reported that interventions that include health education can improve on eating behaviour [23]. This implies that health education programs are important sources of nutrition information, so they should be encouraged and even put on school calendar every team as it promotes knowledge and attitude.

As far as attitude of adolescents towards healthy eating is concerned; the study found out that majority of the adolescents had positive attitude towards posho and beans if well prepared. The findings are in line with the study done in Saskatchewan that found out that “most of the schools feed their students on posho and beans which are considered unpleasant, demanding a more dedicated preparation

to become more palatable and accepted” [24]. Also Shaziman and others added that the portion of food served to a child matter [25]. This may be so because most of the students who snack do it when they are hungry. Therefore schools should make sure get skilled workers to make healthful food choices, good at preparing food and provided with enough portion of posho to prevent them from snacking.

Most of the respondents indicated poor attitude towards eating fruits since they reported that few fruits do not satisfy hunger. The study is in line with that done by Nsiah in 2017 that reported that “feeling full is one reason that people stop eating” and added that short-term studies done in adolescents in Ghana indicated that “the volume of food people eat at a meal is what makes them feel full and stop eating, rather than the calorie content of the food” [13]. This may be so because adolescents lack knowledge that fruits are not to satisfy hunger but for nutrients.

The results about adolescents’ attitudes on health eating showed poor attitude in that most of the respondents indicated that healthy foods do not taste well. These results are in line with the study done by [26] which found out that “17.3% of the students indicated that healthy foods were not tasty and nice” [26]. So many adolescent prefer tasty foods which in most cases contain many calories when not used that will risk them to non-communicable diseases, so information for change in attitude is needed.

The study revealed that 42.4% of the respondents did not have time in the morning to take breakfast. The study is in line with one that was carried out in Turkey that involved adolescents aged 14-17 year which found out that “over half of the students 64.4% skip at least one meal a day” [27] and In the study done Abuja municipal in Nigeria found out that (54.0%) students skip breakfast [28]. So time should be located before morning lessons for morning breakfast such that day students can take it to avoid snacking on fast foods.

Most of the respondents showed that they are confused of what food is healthy or not healthy. This reveals that adolescents lack

knowledge of healthy foods. This study is differ from the findings got in Darab city Iran in secondary schools that reported that most participants had sufficient awareness and attitude related to consumption of snacks [29]. So adolescents should be provided with proper nutritional information to change their attitude towards healthy foods.

The findings revealed that very few respondents took fruits and 47.1% reported they had not taken any fruit(s) in a week. This is in line with the study done among Adolescent students in Jordan that found out that 39% rarely ate any fruit [30]. This may be due to the fact that they are not available in the school canteens and even their price is high in addition to not satisfying hunger.

As far as practices of healthy eating are concerned, the finding indicated that 52% of respondents admitted that they take soft drinks at least once a week. This is in agreement with study in Niger that reported that “more than three-quarters of them (76.4%) consumed fast food along with soft drinks. 35.2% admitted to taking carbonated drinks within the previous 7days” [28]. In connection to that, the study done in Hong Kong reported that banning of sales of soft drinks in schools and at sports centres or increasing the price of soft drinks might discourage their consumption. This may be because soft drinks are readily available in the canteens and the attitude of being considered rich when you take packed foods daily.

The study also revealed very few adolescents take recommended servings of vegetable with only 16.9% taking vegetables daily. This study is in agreement with the study done in Nigeria that found out that “Only 15% of the participants consumed fruits and vegetables daily” [31]. In addition to that another study done in Jordan in 2017 also found out that “less than half 43% of participants reported eating fresh vegetables daily” [30]. Therefore it may be right that most schools do not provide students with vegetables most likely because the school administration may not aware of the importance of vegetables on health.

Most of the respondents drink water every day. This indicates that many adolescents take water since only 3.0% never took water. This study is in agreement with the one done in USA that 81% of adolescents take water [32,33, 34,35]. This is so because water is readily available in school dining and at the kitchen though there is a need of schools to provide clean and safe water to these adolescents.

Most of the respondents mentioned that they eat mandazi every day. This study is in line with the one done in Egypt in 2014 which found out that about 89.6%, of students consumed bread [36,37,38]. This so because most people eat foods made from wheat because they are readily available in addition to satisfying hunger.

#### CONCLUSION

The study findings showed that adolescents in secondary schools in Sheema Municipality had inadequate knowledge on healthy eating because questions related to poor nutritional knowledge were statistically significant to healthy eating and the majority gave the answers indicating poor knowledge to the statements which were testing knowledge. Also adolescents had poor attitude to healthy food. With practices majority of adolescents reported poor eating practices like not eating fruits, not eating vegetables, taking soft drinks, taking to with sugar, missing breakfast, and eating fast foods were noted however taking water was noted as good practice.

#### Recommendations

We recommend the following:

- i. Introduction and enhancement of health education programs and

Nutrition Education programs in secondary schools by employing health education teachers or hiring public health specialist, in addition to putting health education on school timetable

- ii. Staple foods in schools mostly posho and beans should be well prepared and a big portion should be served to make adolescents satisfied so that they can reduce on snacking.
- iii. Schools should provide safe and clean water to adolescents.
- iv. Sensitizing the adolescents about healthy foods and School administrators should formulate policies that govern the foods to be sold in the school canteen.

#### REFERENCES

1. Voegtlin, W. (1975). The Stone Age Diet. In *Vantage press*.
2. Katharine, M. (2000). Hunter-gatherer diets — a different perspective. *Am J Clin Nutr*, 71(1), 665-667.
3. Lee, R. B. (1965). What Hunters Do for a Living, or How to Make Out on Scarce Resources. In *Man the hunter* (pp. 29-49).
4. Fleischhacker, S., Vu, M., Ries, A., & Mcphail, A. (2011). Engaging Tribal Leaders in an American Indian Healthy Eating Project Through Modified Talking Circles. *Fam Community Health*, 34(3), 202-210. <https://doi.org/10.1097/FCH.0b013e31821960bb>
5. Abdel-hady, D., & Sarraf, B. (2014). Dietary habits of adolescent students in Mansoura .  
*International Journal of Collaborative Research on Internal Medicine & Public Health*, 6(6), 132-144.
6. Ashakiran & Deepthi. (2012). Fast Foods and their Impact on Health. *Journal of Krishna Institute of Medical Sciences University.*, 1(2), 1-9.
7. Das, N., & Lenka, A. (2016). The Prevalence and Risk Factors of Non-Communicable Diseases Among Adolescents . *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 5(3), 129-131. <https://doi.org/10.9790/1959-050303129131>
8. Omran, A. R., & Ghada, A.-H. (2001). Health education for adolescents Guidelines for parents, teachers, health workers

- and the media. In *World Health Organisation* (pp. 1-140).
9. Sarkar, M., Manna, N., Sinha, S., Sarkar, S., & Pradhan, U. (2015). Eating habits and nutritional status among adolescent school girls: an experience from rural area of West Bengal. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) E-ISSN;*, 14(12), 6-12. <https://doi.org/10.9790/0853-141220612>
  10. Roszanadia R, N. M. N. (2011). Health education for adolescents. *International Journal of Dairy Science*, 6(5), 278-286. <https://doi.org/10.3923/ijds.2011.278.286>
  11. Gerda, G. J. (2015). Teachers' perceptions of school nutrition education's influence on eating behaviours of learners in the Bronkhorstspuit District. *South African Journal of Education.*, 35(2), 1-10. <https://doi.org/10.15700/saje.v35n2a1049>
  12. Prelip, M., Erasquin, J. T., Slusser, W., Vecchiarelli, S., Lange, L., & Neumann, C. (2006). The Role of Classroom Teachers in Nutrition and Physical Education. *Californian Journal of Health Promotion*, 4(3), 116-127.
  13. Nsiah-asamoah, C. (2017). Healthy Eating and its Barriers: Perceptions and Practices of adolescents in Ghana. *Advances in Nutrition & Food Science Healthy*, 2(1), 1-10.
  14. Story, M., & Stang, J. (2005). Understanding Adolescent Eating Behaviors. In *Guidelines for adolescent nutrition Services* (pp. 9-19).
  15. Wijnhoven, T., Van Raaij, J., Sjöberg, A., Eldin, N., Yngve, A., Kunešová, Gregor, Rito, A. I., Duleva, V., Hassapidou, M., Martos, Év., Pudule, I., Petrauskiene, A., Sant'angelo, V. F., & Breda, J. (2014). WHO European childhood obesity surveillance initiative: School nutrition environment and body mass index in primary schools. *International Journal of Environmental Research and Public Health*, 11(11), 11261-11285. <https://doi.org/10.3390/ijerph11111261>
  16. Sullivan, K. M., Dean, A., & Soe, M. M. (2009). OpenEpi: A web based Epidemiologic and Statistical Calculator for Public Health. In *Public Health Reports* (Vol. 124, Issue 6, pp. 471-474).
  17. Aung, P. P., Fong, C. S., Azman, K. B., Ain, N., & Zulkifeli, B. (2012). Knowledge, Attitude, and Practice of Healthy Eating Among the 1st and 2nd Year Students of Universiti Malaysia Sarawak (UNIMAS). *2012 International Conference on Nutrition and Food Sciences IPCBEE*, 39(2012), 188-194.
  18. Arazi, H., & Hosseini, R. (2012). A comparison of nutritional knowledge and food habits of collegiate and non collegiate athletes. *SportLogia*, 8(2), 100-107. <https://doi.org/10.5550/sgia.120802.en.100A>
  19. Al-Yateem, N., & Rossiter, R. (2017). Nutritional knowledge and habits of adolescents aged 9 to 13 years in Sharjah, United Arab Emirates: A cross-sectional study. *Eastern Mediterranean Health Journal*, 23(8), 551-558. <https://doi.org/10.26719/2017.23.8.551>
  20. Elhassan, M. R., Gamal, H. E., & Mohammed, G. S. S. (2013). Nutrition Knowledge Attitude and Practices Among Students of Ahfad University for Women. *Indian Journal of Scientific Research*, 4(1), 25-34.
  21. Bari, N. N. (2012). *MASTER THESIS Master's Programme in Food, Nutrition and Health NUTRITION LITERACY STATUS OF ADOLESCENT STUDENTS IN KAMPALA DISTRICT, UGANDA.*
  22. Eldridge, A., Elizabeth, S., & Intern, N. (2017). Can Social Media Impact Our Nutritional Habits? *Family and Community Health Sciences*, 26(3), 1-8.



23. Shapu, R. C., Ismail, S., Ahmad, N., Lim, P. Y., & Njodi, I. A. (2020). Systematic review: Effect of health education intervention on improving knowledge, attitudes and practices of adolescents on malnutrition. *Nutrients*, *12*(8), 1-19. <https://doi.org/10.3390/nu>.
24. Concepts, T. N. (2013). Teaching Nutrition in Saskatchewan Concepts and Resources. *Public Health Nutritionists.*, *15*(11), 1-27.
25. Shaziman, S., Dzulkhairi, M., Rani, M., Nain, K., Hamid, N. A., Noraini, W., Sulaiman, W., Rahman, Z. A., & Abdullah, M. Y. (2017). Assessing Nutritional Knowledge , Attitudes and Practices and Body Mass Index of Adolescent Residents of Orphanage Institutions in Selangor and Malacca. *Pakistan Journal of Nutrition*, *16*(6), 406-411. <https://doi.org/10.3923/pjn.2017.406.411>
26. Heather, M., Pisa, P. T., Feeley, A. B., Pedro, T. M., Kahn, K., & Id, S. A. N. (2018). Dietary Habits and Eating Practices and Their Association with Overweight and Obesity in Rural and Urban Black South African Adolescents. *Nutrients*, *10*(145), 1-18. <https://doi.org/10.3390/nu10020145>
27. Kristo, A. S., Gültekin, B., Öztağ, M., & Sikalidis, A. K. (2020). The effect of eating habits' quality on scholastic performance in Turkish adolescents. *Behavioral Sciences*, *10*(1), 1-17. <https://doi.org/10.3390/bs10010031>
28. Otuneye, A., Ahmed, P., & Abdulkarim, A. (2017). Relationship between dietary habits and nutritional status among adolescents in Abuja municipal area council of. *Niger J Paediatr*, *44*(3), 128-135.
29. Moaadel, Z., Hossainnejad Neyrizi, A., Sharifikia, I., & Abbasi Marandi, K. (2015). The Study of Knowledge, Attitude and Nutritional Practice of Secondary School Students in Darab City, Fars Province, Iran in 2011-2012. *International Journal of School Health*, *2*(2), 1-7. <https://doi.org/10.17795/intjsh-25702>
30. Dalky, H. F., Al Momani, M. H., Al-Drabaah, T. K., & Jarrah, S. (2017). Eating Habits and Associated Factors Among Adolescent Students in Jordan. *Clinical Nursing Research*, *26*(4), 538-552. <https://doi.org/10.1177/1054773816646308>
31. Meland, E., Haugland, S., & Bredablik, H. J. (2007). Body image and perceived health in adolescence. *Health Education Research*, *22*(3), 342-350. <https://doi.org/10.1093/her/cyl085>
32. Partida, S., Marshall, A., Henry, R., Townsend, J., & Toy, A. (2018). Attitudes toward nutrition and dietary habits and effectiveness of nutrition education in active adolescents in a private school setting: A pilot study. *Nutrients*, *10*(9), 091260.
33. Wilberforce Mfitundinda, John Odda and Claude Kirimuhuzya (2022). Evaluation of the hypoglycemic activity of aqueous extract of *Albizia chinensis* (Osbeck) Merr stem bark in streptozotocin-induced diabetic Wistar rats. *INOSR Applied Sciences* *9*(1):39-45.
34. Dalton Kambale Munyambalu, Fardous Abeya Charles and Lazaro Martinez Gilberto Monterrey (2022). Prevalence of Diabetic Peripheral Neuropathy among adults with Diabetes Mellitus attending Kampala International University Teaching Hospital. *IDOSR Journal of Biology, Chemistry and Pharmacy* *7*(1)27-40, 2022.
35. Gloria Nakalema, Yamile Ariaz Ortiz and Agwu Ezera (2022). Prevalence patterns of bacterial urinary tract infections among febrile children under-five years of age at Kampala International University Teaching Hospital *IDOSR Journal of Biology, Chemistry and Pharmacy* *7*(1)41-55.

36. Wilberforce Mfitundinda, John Odda and Claude Kirimuhuzya (2022). Evaluation of the biochemical and histopathological effects of aqueous extract of *Albizia chinensis* (Osbeck) Merr stem bark in streptozotocin-induced diabetic Wistar rats. *IDOSR Journal of Biology, Chemistry and Pharmacy* 7(1):14-26.
37. Dalton Kambale Munyambalu, Fardous Abeya Charles and Lazaro Martinez Gilberto Monterrey (2022). Clinical presentation of Diabetic Peripheral Neuropathy among adults with Diabetes Mellitus attending Kampala International University Teaching Hospital. *IDOSR Journal Of Biochemistry, Biotechnology And Allied Fields* 7(1): 23-34.
38. Gahongayire Solange, Alice Namatovu and Charles Drago Kato (2022). Disinfectant Susceptibility of Bacteria Isolated from Salon Tools in Ishaka Town, Bushenyi District, Uganda. *IAA Journal of Biological Sciences* 9(1):26-38.