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Research Article

Knowledge and perception of secondary students on food labels and safe nutrition in Kwara state, Nigeria

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A B S T R A C T

Food labels and safe nutrition are important concepts in national food security. The knowledge and perception of these concepts is critical to building a sustainable food system and reducing prevailing hunger and malnutrition among students who depend largely on road side fast and junk foods. This study assessed the knowledge and perception of secondary students on food labels and safe nutrition in Kwara state. The study adopted a cross sectional primary data collected through the use of a well-structured questionnaire subjected to expert opinion for validity and test-retest for the reliability (r = 0.86) of the instrument. A multi stage random sampling technique was used to select 1080 secondary students. The data collected were analysed using descriptive and inferential statistics such as logit and multinomial logistic regression model with significance level at P<0.05 where relevant. The study found that parent education, school curriculum and access to basic amenities are important factors influencing the knowledge of food labels and safe nutrition among secondary school students. Hence, we recommend that effort should be geared toward the incorporation of issues on food safety and label in secondary school curriculum.

Introduction

The nutritional wellbeing and health status have been proven to affects students' performance and assimilation rate during class activities (Taras, 2005, Huskisson, *et al*., 2007, Lengha, 2014, Asmare *et al*., 2018, Espino-Díaz *et al*., 2020). As child nutrition is fundamental to the well-being and future productivity of the child (Amolegbe, 2020). Nutritional wellbeing and health are known to be causally related as a healthy person can learn and work effectively or efficiently (UNICEF, 2006, 2011, 2019; Clark *et al*., 2020, WHO, 2021). In Ngeria, many students rely mostly on junk foods and fast food while in school for their breakfast and lunch (Otemuyiwa & Adewusi, 2012, Obasi, *et al*., 2019, Oluwakemi & Adebayo, 2020), as issues of malnutrition and hunger among secondary school students remain an important issue of concern (Oladele, 2011, Adekunle & Christiana, 2016, Matemilola, 2017, Adeyeye *et al*., 2017, Adebisi, *et al*., 2019). This is why the federal government of Nigeria and some state government implemented the school feeding programme in some pilot schools in Nigeria where students were given foods while in schools.

The sustainability of school feeding programme is threatened given the financial cost, insecurity, political instability, and various economic shocks (Bundy, 2009, Verguet *et al*, 2020, FAO, 2020). For example, the advent of the COVID-19 pandemic, limited oil reserve, inflation, and declining price of oil have negatively affected the government capacity to scaleup the school feeding programme (Mohammed, 2019, Al-Samarrai *et al*, 2020, Moseley & Battersby, 2020, Mohamed *et al*, 2021). Similarly, the restriction of the school

feeding program to pupil during school hour to enhance education performance may be ineffective to address child malnutrition (Amolegbe, 2020). Therefore, students still depend on ready to eat foods or food away from home as they spent majority of their time in school or while the parent are busy with the daily job. Hence, it is paramount to know the knowledge and perception of student on food labels and safe nutrition. As these has implication on sustainable national food security.

Generally, the concept of food labels and safe nutrition have become an important food policy discussion among policy practitioners and experts locally and internationally (WHO, 2001, Mozaffarian *et al*., 2018). This is because it is one of the ways of avoiding food poisoning and enhancing national food security. Likewise, the rate of malnutrition and hunger among the rural populace can be reduce (Webb *et al*., 2018). Food label is the small note on the package of most fast food and junks to help consumers be aware of the manufacturing and expiring date of the food products, the nutritional components, the registration of the manufacturer among others (de Morais Sato *et al*., 2019). Similarly, food nutrition label provides the nutrition information about the product that helps consumer to make good choices between foods (Nurliyana *et al*., 2011).

In Nigeria, the National Agency for Food and Drug Administration and Control (NAFDAC) has been saddled with the responsibility to ensure standardization through specifications, regulations, and guidelines for the production, importation, exportation, sale and distribution of food, drugs, cosmetics, medical devices, bottled water, and chemicals as well as the registration of food, drugs, bottled water and chemicals among others (Omojokun, 2013, Nnachi *et al*., 2022). Despite their effort over the years, there are still many food producing agencies of different scale of production that do not have good food labels, substandard food products, and expired food in Nigeria open and retail markets. Thus, consumers most especially school students are at the risk of food poisons and food related diseases. It is therefore a necessary condition for the students to know and develop good awareness and attitudes towards food labels and safe nutrition.

The knowledge and perception of the roles of food labels and safe nutrition as well as precautionary consciousness of individuals are critical to building a sustainable food system and reducing prevailing hunger and malnutrition among children particularly secondary school student who depend largely on road side fast and junk foods. In Nigeria, many people are not taken cognisance of the issue of food labels and safe nutrition as people mostly relied on road side foods such as junks, fast foods, and drinks especially in urban areas (Danilola *et al*, 2019). Similarly, children particularly students depend largely on these type foods as they consumed mostly junks such as biscuits, gala, carbonated drinks, flours products, among others basically during school hours which takes more of the available daily hours (Asiegbu *et al*., 2017, Alamu *et al*., 2020). In Kwara state for instance, secondary school students spend an average of 8 hours 30 minutes (8:00am to 4:30pm) in school and many of them relies on this kind food for maintenance during school hour. Hence, having the knowledge and a good perception of the food labels and safe nutrition can go a long way to help compliment the effort of the government on food feeding program and its sustainability.

Nonetheless, there are limited studies that have explored the issues of food safety and labels in Nigeria. For instance, previous scholars have explored the awareness and influence of consumer food label (Asouzu & Iheme, 2020, Danilola *et al*., 2019), effect of school feeding program on education and health outcomes of school children (Wang & Fawzi, 2020) malnutrition and hunger among children (Asiegbu *et al*., 2017, Omotesho *et al*., 2019, Alamu *et al*., 2020), examined the determinant of children labour and food security (Oladokun *et al*., 2020, Owoo, 2021), assessed knowledge and attitudes towards food labels among students in higher institution (Ezeh & Ezeh, 2016) but there is no or little information on the knowledge and perception of secondary school students on food labels and safe nutrition in Kwara state. Hence, this study assessed the knowledge and perceptions of the secondary school students on food labels and safe nutrition in Kwara state, Nigeria, Specifically, the objectives of the study were to: identify level of awareness of the food labels, examine the perception of the effect of food labels on safe nutrition, and examine the factors influencing the knowledge of food labels and safe nutrition among secondary school students in Kwara state. The rest of this paper is structure as follows; section 2 presents the methodology while the results and discussion are presented in section 3, the conclusion and recommendations are finally presented in section 4.

Methodology

Study Area

The study was conducted in Kwara State Nigeria. It is one of the states in the north central geo-political zone of the country. It is located on the latitude 4.02^{0}N to and longitude 14.02^0 w to. The state share boundaries with Niger to the north, Kogi, Osun, and Ekiti to the west, Oyo to the south and the republic of Binin to the east. According to the National Bureau of Statistics (NBS, 2017) the state population is projected to be about 3.2 million people in 2016. The state is dominated by Yoruba tribe of different dialects and small proportion of Nupe, Baruba, Tiv and Fulani tribes among others majorly in the northern part of the state. The two dominant religions in the state are Islam and Christianity. The map of the state is shown in Figure 1. According to Keke-Shittu *et al.* (2019), Kwara state is one of the poorest states in Nigeria with high number of malnutrition and stunted growth among children.

Figure 1. Map of Kwara State.
Source: Google Map, 2022

The study relies on descriptive research design as it highlights the knowledge, perception, and behaviour of students on issues related to food labels and safe nutrition. The populations for the study are students in secondary schools while the target population are secondary school students in the senior category in government schools. The respondents were selected using a multi stage sampling techniques. The first stage involves a random selection of 6

local government areas out of the 16 local government areas in Kwara State. Three major communities were randomly selected in each of the local government area and this is the second stage while the third stage involves a purposive selection of 2 public schools in each of the selected communities. Lastly, the fourth stage involves a random selection 30 students (disproportionate to size) in senior secondary class category from each of the school selected. A total 1080 students were selected and surveyed for this study Primary data was used for the study and it was collected through the use of a well-structured questionnaire. The questionnaire was developed to collect data on student biodata, social class, school hour consumption pattern, the knowledge and perception about food labels and safe nutrition, their consciousness and use of food labels. The reliability and validity of the instrument was done using test retest and expert and content validity respectively. The instrument has a r of 0.86 which indicated that the instrument was reliable.

The data were analysed using descriptive statistics such as mean, frequency, and percentage. Also, the study adopted the inferential statistics such as correlation coefficient, and logistic regression analysis to model determinants of knowledge and factors affecting perception on food labels and safe nutrition among selected secondary school students. The dichotomous nature of our dependent variable knowledge of the food labels and safe nutrition whether good or poor justifies the choice of logistic regression model. Specifically, the model can be explicitly stated as follows;

$y = f(X)$ where X_i includes student biodata, parent education and school curriculum and y_i = perception of the student i.

Therefore $y_i = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu_i$

Where X_1= age of the student (years) X_2= Gender (Male= 1, Female= 0), X_3= parent education (tertiary education=1, otherwise=0), X_4= parent occupation (employed =1; unemployed = 0), X_5 = access to information (yes=1, no=0), X_6 = access basic amenities (yes=1, no=0), X_7 = school curriculum (taught food label and safe nutrition=1; otherwise, 0)

α_0= intercept, β_1-β_7= slope/coefficient of determination, and μ=error term

Results and Discussion

Gender of the Students

Figure 2 presents the result of the distribution of the students by gender. The result revealed that about 45 percent of the students are female. This might be due to a higher number of enrolments of male student in secondary school than their male counterpart in Kwara state. This result in in tandem with the work Onyekwelu (2019) that a wide gap between male and female enrolment in schools in Nigeria as male students are more dominant in schools. Similarly, our findings align with the report of the National Bureau of Statistics (2018) on women in Nigeria as female enrolment in school was about 46.7 percent in 2017.

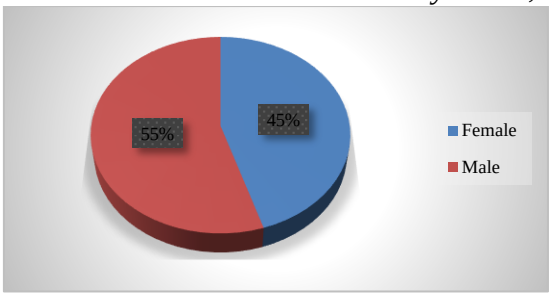

Figure 2. Distribution of the students by gender.

Distribution of the students based on age and class

Table 1 presents the result of the surveyed students by age distribution and about 7.3 percent of the students are above 17 years. Also, the average age of the selected students is about 14 years. And this shows that majority of them are still in their teen or adolescent age which is a period where major development takes place in children (formative age). Similarly, this implies that the most of them are perceived to be matured enough to understand the labels on a food. Figure 3 shows the result of the classification or distribution of the students by their levels and it revealed that about 35 percent of the students are in SS1 while about 38 percent and 27 percent of the students are in SS2 and SS3 respectively. This suggests that most of the students are yet to complete the senior school curriculum for students.

Table 1. Age distribution of the students.

Age	Frequency	Percentage	Mean
12-14	625	57.90	13.8
15-17	376	34.80	
>17	79	7.30	
Total	1080	100.00	

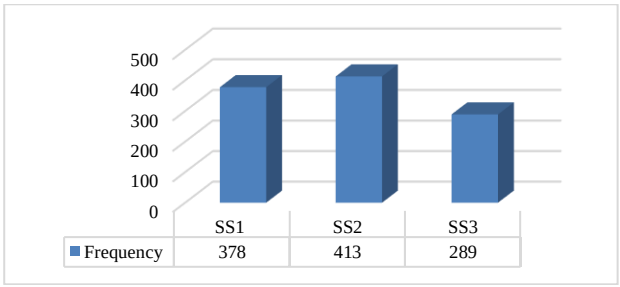

Figure 3: Distribution of the students by their class.

Household and family background of the students

Table 2 shows the result of the household characteristics of the surveyed students and it reveals that most (57.87) are from the household that has at least five persons living together under the same roof and sharing the same port. Likewise, about 63 percent of the students have parent that has no tertiary school education and only few of the students (19.81%) has employed/underemployed parent. In addition, about 28 and 22 percent of the student have parent with artisan and teaching as a profession. The result also reveals that most of the students have parent living in a rented apartment while about 33 percent of them have parent living in their own apartment. Similarly, about 30 and 71 percent of the student believed they have access to good drinking water and road while about 46 percent of them have access to good electricity supply. Lastly, about 75 percent of the surveyed student received information from combination of

sources available to them such as mass media, telephone, and their social networks.

Table 2. Household dynamics of the respondents.

Household characteristics	Frequency	Percentage
Household Size		
>5	455	42.13
≥5	625	57.87
Parental level of education		
No tertiary education	684	63.33
Tertiary education	396	36.67
Occupation of the parent		
Teaching	238	22.04
Artisan	305	28.24
Corporate	165	15.27
Self employed	157	14.54
Unemployed	214	19.81
Nature of housing		
Rented apartment	721	66.76
Owned apartment	359	33.24
Access to basic amenities		
Good drinking water	323	29.91
Electricity	496	45.92
Road	767	71.02
Means of information on food		
Friends	96	8.89
Teacher	53	4.91
Mass media	120	11.11
Combination of option	811	75.09

Consumption Pattern of the Students

Table 3 presents the result of the food consumption patter of the student during the school hour in a week. It reveals that the most dominant nature of food consumed by the students during school hour is carbonated drinks and yoghurt (22.36%), packaged food and groceries (21.39%), and junks and appetizer such as biscuits, sweet and chewing gums (19.10%). While, about 10.14% and 3.43% of the students relies on food prepared by food vendors and from their individual home during the school hour.

Table 3. Consumption pattern of the student during school hour/week.

Source	Frequency	Percentage
Food vendor	358	10.14
Home prepared food	121	3.43
Packaged food and groceries'	755	21.39
Unpackaged food	578	16.38
Fruits	254	7.20
Carbonated drinks and yoghurt	789	22.36
Junks and appetizer	674	19.10
Total	3529	100.00

*Multiple choice/response

School curriculum on food safety and label issues

Table 4 shows the result of students' assessment of the school curriculum contents on food safety and label. The result revealed that majority of the students acknowledge that they have been taught the importance of food and food classes (100 percent), balance diet (about 88 percent), food poison, and its danger (81 percent). While about 39 and 23 percent of the students agreed that they have been taught concept on safe nutrition and food labels respectively. This result generally implies that there is still need for improvement in the secondary school curriculum to encompasses the concepts of safe nutrition and food labels. This is in consonance with the proposition by Adesina *et al.* (2022), UNICEF (2019), and Contento (2007) emphasising the need for educational curriculum for students particularly school children.

Table 4. Assessment of the school curriculum on food safety and label issues.

Item	Yes	No
I have been taught importance of food and it classes	1080 (100.0)	0 (0.0)
I have been taught balance diet and its important	947 (87.7)	133 (12.3)
I have been taught food labels and what to know about it	252 (23.3)	828 (76.7)
I have been taught safe nutrition and its importance	422 (39.1)	658 (60.9)
I have been taught food poison and its danger	875 (81.0)	205 (19.0)

*Figures in parenthesis are percentage

Students' Knowledge on related concepts of food label and safe nutrition

Table 5 provides the result of the students' knowledge on related concepts of food nutrition and this revealed that majority of the students opined that they have knowledge of food poisoning and balance that while about 27 percent of the students have knowledge of the importance and how to read information on food labels. About 38 percent of the students have knowledge of safe nutrition. This is however in tandem with the result in Table 6 and it shows that strong association between school curriculum and knowledge of the students on food labels and safe nutrition. This result is similar to the work of Asouzu & Iheme (2020), and Danilola *et al.* (2019) that reported poor knowledge of consumers on food labels use and safe nutrition.

Table 5. Students' Knowledge on related concepts of food label and safe nutrition.

Item	Yes	No
Knowledge of food poisoning	849 (78.6)	231 (21.4)
Knowledge of importance food information of food labels	296 (27.4)	784 (72.6)
Knowledge of balance diet	907 (84.0)	173 (16.0)
Knowledge Safe nutrition	415 (38.4)	665 (61.6)

*Figures in parenthesis are percentage

Level of knowledge of the students on food labels and safe nutrition

Figure 4 presents the result of the categorisation of the student by their knowledge of food labels information and safe nutrition and it shows that most of the student have low knowledge on food labels and safe nutrition while only about 16 percent of the students have high level of knowledge about the concepts of food label and safe nutrition. This finding is not in consonance with of Adesina *et al.* 2022 that most of the consumers reads and understand the use of food labels as consumers of fast foods in Nigeria are beginning to consciously pay attention to nutritional labels. This deviation might be because the study was conducted in Lagos state with focus on those who are major customers of shopping malls who wight largely be adults and highly literate.

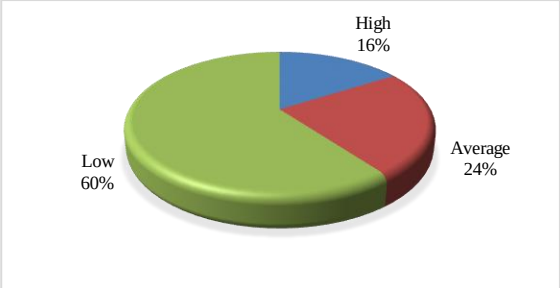

Figure 4. Level of knowledge of the students on food labels and safe nutrition.

Behaviour of the students on food labels and safe nutrition

Table 6 shows the result of the perception of the students on food labels and safe nutrition. The perception was measured using four-point likert type (strongly agreed, agreed, disagree, and strongly disagree) and these were ranked 4, 3, 2, and 1 respectively. The cumulative average for each of the 11 items were generated and those item with mean less than 2.5 were regarded as poor perception of the item while those items having at least 2.5 were regarded as good perception of the item. However, the result reveals that nine out of the 11 items were have mean less the 2.5 which indicated poor perception of the items. This result suggests that there is poor perception of the issues on food labels and safe nutrition among secondary students' in Kwara State Nigeria. This result is in line with the work by Danilola *et al.* (2019) and Omotesho *et al.* (2019) that reported poor attitude of consumers on issues related to food labels and safe nutrition.

Table 6. Behavior of the students on food labels and safe nutrition.

Item	SA	A	D	SD	Mean	Remark
I only eat fruits and food I brings from home during school hour because it is safe	156	220	533	171	2.33	Poor
I know that the food and fruits I buys from food vendor during school hour because is safe	69	156	621	234	2.06	Poor
I do check and read all the information on the labels of the food I consume to know if it is safe	90	243	269	478	1.95	Poor
I know that all the food are safe nutrition	256	136	440	248	2.37	Poor
I perceived that most producers of the junk do not use food labels	337	405	121	217	2.80	Good
I only check NAFDAC number on food labels	109	350	89	532	2.03	Poor
I know that the food and drinks I bought during school have label	292	135	444	209	2.50	Good
I am sure that the food I consumed is a balance diet and safe nutrition	170	224	214	472	2.08	Poor
I only check the nutritional composition of the food label	98	192	467	323	2.06	Poor
I check the whether the sachet or bottled water I drink while in school have NAFDAC registration number	233	220	345	282	2.37	Poor
I know that the water that I drink has manufactured and expiring date	49	131	578	322	1.91	Poor

*SA=Strongly Agree, A=Agree, D=Disagree, SD=Strongly Disagree

Students' perception on food labels and safe nutrition

Figure 5 shows the result of the categories of the student by their perception on food labels information and safe nutrition and this revealed that about 69.5 percent of the students have poor perception of the food labels and safe nutrition while about 30.5 percent have good perception of the food labels and safe nutrition. This result in tandem with the findings that (Kuku-Shittu *et al.*, 2016).

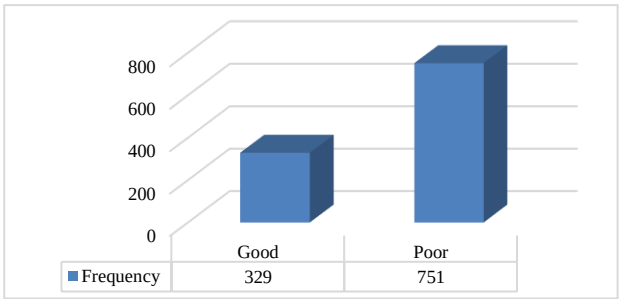

Figure 5. Categories of the student perception on food labels and safe nutrition.

Determinants of perception of secondary school students on food label and safe nutrition

Table 7 presents the result of the logistic model for determinants of perception of secondary school students on food label and safe nutrition. The result of the log likelihood of -653.93 (LR $chi^2(9)$ = 113.77 and the prob>chi2 = 0.00) shows that the model was statistically significant and a good fit. Further, the result reveals that age, gender, parent education, parent occupation, access to basic amenities, and information, as well as school curriculum jointly influence the perception of the student on food labels and safe nutrition.

The result shows that an increase in age of the student will increase the likelihood of the student having a good perception of the food labels and safe nutrition with the odd ratio of 1.19 at 1% p. value. Similarly, a student being female increase the likelihood of the student having a good perception of food labels and safe nutrition with the odd ratio of 1.72 at 1% p. value. The result also reveals that parent education and occupation also increase the likelihood of the student having a good perception of food labels and safe nutrition with odd ratio of 0.39 and 2.03 respectively at 1% p. value. Access to basic amenities and information also increase the student likelihood of having a good perception of food label and safe nutrition with significance at p. value of 1% and 5% respectively. Lastly, the school curriculum also increases the student likelihood of having a good perception of food label and safe nutrition at 1% significance level. This corroborates the findings that perceived confidence in understanding and knowledge of specifics nutrition labels in food selection has effect on nutrition label use (Lim *et al.*, 2015). The study also emphasized that nutrition education might enhance good perception of consumers to read nutrition labels, acquiring skills for inspecting food labels, as well as the benefits of reading food labels (Lim *et al*, 2015). Also, our finding agrees with the work by Lee *et al.* (2016) and Aryee (2019) that parent education and school curriculum on nutrition have effect on knowledge and use of food labels among students. Similarly, USAID (2021), noted that parent level of education has an inverse relationship with children malnutrition and stunting.

Table 7. Determinants of perception of secondary school students on food label and safe nutrition.

Explanatory variable	Odds Ratio	Std. Err.	P>z	Remark
Age	1.19	.041	0.000	**
Gender	1.72	.26	0.000	**
Hhz	.92	.036	0.228	
Parent education	.39	.059	0.000	**
Parent occupation	2.03	.41	0.000	**
Housing	.8448	.13	0.276	
Access to basic amenities	2.19	.32	0.000	**
Access to multiple sources of information	1.16	.18	0.037	**
Curriculum	1.59	.24	0.002	**
_cons	.025	.02	0.000	**
Log likelihood = -653.93	LR $chi^2(9)$ = 113.77	Prob>chi^2 =0.00	Pseudo R^2 = 0.08	

Dependent variable =Perception on food labels and safe nutrition
**Significant at P<0.05

Hypothesis

H_0: There is no correlation between students/curriculum characteristics and knowledge/perception on food labels and safe nutrition.

Table 8 shows the result of the test of correlation among the related variables with students' knowledge and perception on food labels and safe nutrition. This revealed that there is a strong positive correlation (0.78) between the knowledge and perception of the students on food labels and safety, likewise there is a positive correlation (0.54) between school curriculum and knowledge of the students while level of parent education is slightly correlated with both knowledge (0.31) and perception (0.17) of the students on food labels and safe nutrition respectively. In addition, the result reveals that the age of the students positively correlates with perception of the students on food label and safe nutrition while gender of the student also negatively correlates (-0.51) with student's knowledge on food labels and safe nutrition. This agrees with the work of Moerira *et al*. (2021) that found that school education can improve knowledge and attitude but not practice on the use of food label while attitude is a mediator between knowledge and practice. Also, Marietta *et al*. (1999) found that consumers knowledge has positive effect on use of food labels.

Table 8. Test of Relationship.

Variable	Knowledge	Perception	Curriculum	Parent education	Age	Gender
Knowledge	1	0.78	0.54	0.31	0.07	-0.05
Perception		1	0.34	0.17	0.52	-0.51
Curriculum			1	-0.10	-0.34	0.11
Parent education				1	0.05	0.08
Age					1	-0.19
Gender						1

Conclusion and Recommendation

Low level of awareness and poor knowledge of food labels and safe nutrition ethics was observed among secondary students. Many of the students also exhibit wrong attitude towards the use of food labels and do not adhere to safe nutrition practices. Also, the student's perception of the effect of food labels on safe nutrition is poor. Parent education, school curriculum and access to basic amenities are important factors influencing the knowledge of food labels and safe nutrition among secondary school students. As there is a strong association between students' knowledge on the use of food labels or safe nutrition and school curriculum. Therefore, this study recommends that parents should train their children on need to read food labels and the education curriculum in school should be design to address concepts of food safety and nutrition for secondary school students. Lastly, there is a need to consider appropriate methodology to enhance students' knowledge and practice of food labels use and safe nutrition.

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