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CONSUMPTION OF FRUITS AND VEGETABLES AMONG STUDENTS IN BURKINA FASO: BETWEEN KNOWLEDGE AND PRACTICE

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ABSTRACT

This study aimed to assess the knowledge and level of fruit and vegetable (F&V) consumption among students at the Institut Supérieur de Technologies de Ouagadougou. It was conducted from March 5 to June 5, 2025, and included 400 students selected using Schwartz's formula. Data were collected through KoboCollect and analyzed with SPSS 16.0, focusing on sociodemographic characteristics, nutritional knowledge, F&V consumption, and accessibility. The participants had an average age of 22.31 ± 2.9 years, with a predominance of females (sex ratio 0.8). Most were first-year undergraduate students (39.5%), single (89.5%), and of middle socioeconomic status (76.5%). Although 77% had heard of dietary diversification, only 21% possessed nutritional knowledge. Consumption levels were very low: 95.25% of students did not meet the recommended five daily portions, and 82% considered F&V too expensive. Purchases were mainly made at local markets, and 71% reported having access to nutritional information. During periods of stress, nearly half reduced their consumption. Factors associated with low consumption included being female, having a master's level education, limited nutritional knowledge, and low socioeconomic status. The study highlights the need to intensify nutrition education and improve the financial accessibility of F&V to promote healthier dietary practices within university settings.

Keywords: Assessment, knowledge, fruits and vegetables, students, Burkina Faso

INTRODUCTION

The consumption of fruits and vegetables is an essential element in maintaining good health. Rich in antioxidants, they help eliminate free radicals responsible for many degenerative diseases. Epidemiological data also demonstrate a positive association between adequate fruit and vegetable consumption and a reduced risk of conditions such as atherosclerosis, certain cancers, diabetes, arthritis, and cellular aging (Kaur C., Kapoor H.C., 2008). In Burkina Faso, the 2021 National Nutrition Survey revealed that fewer than 20% of adults meet the minimum recommended intake. Furthermore, according to the analysis of WHO STEPwise (STEPS) data collected in 2014, approximately 81% of Burkinabè aged 15 to 64 reported consuming fewer than five servings of fruits and vegetables per day (ENN, 2021).

In the city of Ouagadougou, studies confirm this trend: a survey conducted in 2018 by the Ministry of Health showed that more than 75% of urban households reported low consumption, mainly for economic or cultural reasons.

Young people show a clear preference for proteins, sugary drinks, and fast food. Fresh F-V are rarely mentioned among the foods they prefer to eat most. An analysis of their criteria for food choices shows that when adolescents are free to choose their foods, taste and availability remain the main determining factors. Health considerations are relegated to the background (Keller, 2021).

This low level of consumption is concerning, as it is associated with an increased risk of noncommunicable diseases (NCDs) such

as hypertension, diabetes, cardiovascular diseases, obesity, chronic malnutrition, and a decline in quality of life.

According to Amiot C. et al. (2008), the availability and access to food stores, as well as food prices, are environmental factors that influence the consumption of F-V.

An exploratory study conducted in Burkina Faso identified factors such as seasonality, cereal-based dietary habits, lack of nutritional awareness, and inadequate consumption infrastructure as limiting fruit and vegetable intake (Carrico C., 2022).

Studies on fruit and vegetable consumption in the general population exist. However, those conducted in university environments are rare in the literature, particularly in the context of Burkina Faso. Hence the importance of this study, which aims to contribute to improving the orientation of nutritional intervention strategies within universities. This study consisted of assessing the level of knowledge and consumption of F-V among students, describing their sociodemographic and economic characteristics, evaluating their knowledge and consumption levels of F-V, and identifying the factors associated with low F-V consumption.

1 MATERIALS AND METHODS

1.1 Study Type and Study Period

This was a cross-sectional study with descriptive and analytical aims, conducted over a period of three months, from March 5 to June 5, 2025, across the various campuses of the Institute of Science and Technology of Ouagadougou (IST).

1.2 Study Population / Inclusion and Exclusion Criteria

The target population consisted of students enrolled at the Institute of Science and Technology (IST), both in daytime and evening programs, with an estimated total of 6,500 learners.

All students regularly enrolled on the different IST campuses, present at the time of the survey—regardless of their level or field of study—and who freely provided informed consent were included in the study.

Conversely, students who refused to participate, those who were mobile or absent, as well as individuals with specific dietary regimens, mental disorders, or metabolic diseases such as diabetes or hypertension, were excluded from the survey.

1.3 Sampling Method / Sample

1.3.1 Sample Size

The sample size was determined using Schwartz's formula for cross-sectional studies:

- $n = (Z^2 \times p \times (1 - p)) / d^2$, where:
- $Z = 1.96$ (95% confidence level),
- $p = 0.5$ (estimated proportion in the absence of prior data),
- $d = 0.05$ (margin of error of 5%).

The initial sample size obtained was 384 students. However, after applying the finite population correction for the total population of 6,500 students, the adjusted size was 363. For methodological prudence, this number was rounded to **400 students** to be surveyed.

1.3.1.2 Sampling Procedure

A systematic random sampling method was applied during the study period. The sampling interval (**K**) was calculated using

the formula $K = N / n$, i.e., $6,500 / 400 \approx 16$. A random starting point between 1 and 16 was determined, after which every 16th student present following this point was included in the sample.

This procedure was implemented in strategic areas of the campus, notably classrooms, taking into account peak attendance periods to optimize sample representativeness.

1.4 Study Parameters

The parameters studied included: sociodemographic and economic characteristics, level of knowledge about dietary diversification, students' knowledge of fruits and vegetables, their level of fruit and vegetable consumption, and the accessibility of fruits and vegetables.

1.5 Data Collection

The KoboCollect application was used for data collection through a questionnaire consisting of both closed and open-ended questions, administered directly to students.

1.6 Data Processing and Analysis

A data verification step was conducted, and outliers were corrected. Data entry was performed using EPI Data version 3.1, and analyses were conducted with SPSS software version 16.0. The data collected were presented in the form of texts, tables, and figures using Word and Excel software of the same version.

1.7 Ethical Considerations

Official authorization to collect data was obtained from the IST administration. Oral informed consent was obtained from participants before administering the questionnaire. The study was conducted in strict compliance with ethical principles,

ensuring confidentiality and anonymity of all respondents.

2 RESULTS

2.1 Sociodemographic and Economic Characteristics of the Students

2.1.1 Distribution of Students by Age and Sex

The study results indicate that 221 students, representing 55.25%, were female, compared with 179 students, or 44.75%, who were male, corresponding to a sex ratio of 0.8. Furthermore, 86.75% of the students were 25 years old or younger, while 13.25% were older than 25.

2.1.2 Distribution of Students by Marital Status and Socioeconomic Level

Out of a total of 400 students, 89.5% were single, 10% were married in a monogamous union, and 0.5% were polygamous.

Table I: Distribution of students according to their knowledge about the disease-preventive properties of consuming fruits and vegetables

Fruit and vegetable consumption helps prevent certain diseases	Frequency	Percentage %
Yes	294	73.5
Don't know	106	26.5
Total	400	100

Distribution of students according to their knowledge of the number of fruits and vegetables to consume per day.

The majority of the students, that is 230 (57.5%), knew the recommended number of daily fruit and vegetable servings. However, 147 of them (36.75%) reported a

In our study, 76.50% of the students had a middle socioeconomic status, followed by 20.5% with a low socioeconomic status, and 3% with a high socioeconomic status.

2.2 Students' Knowledge Level Regarding Fruit and Vegetable Consumption

2.2.1 Distribution of Students According to Their Knowledge of the Disease-Prevention Properties of Fruit and Vegetable Consumption

According to the majority of respondents (73.50%), there is a relationship between fruit and vegetable consumption and awareness of their health benefits.

Table I presents the distribution of students according to their knowledge of the disease-prevention properties of fruit and vegetable consumption.

number lower than the five recommended servings, while 23 students (5.75%) stated that they did not know the exact amount to consume. Figure 1 shows the distribution of students according to the number of fruits and vegetables to be consumed per day.

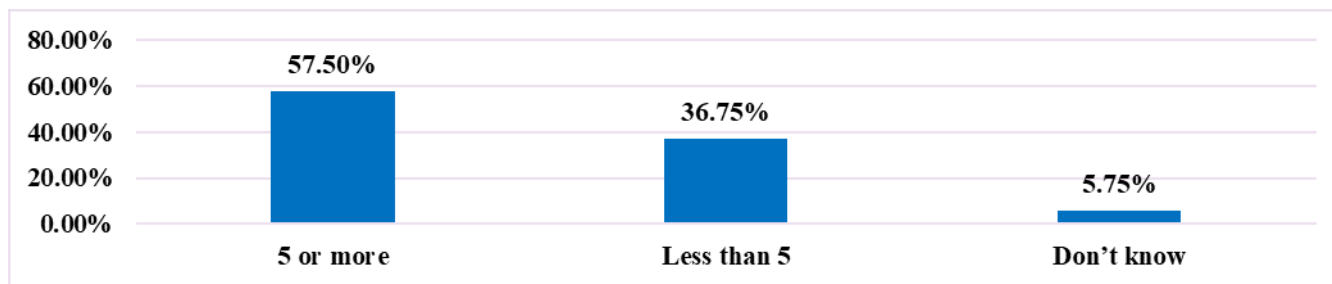


Figure 1: Distribution of students according to the number of fruits and vegetables to be consumed per day

2.3 Level of fruit and vegetable consumption among students

2.3.1 Distribution of students according to the average level of fruit and vegetable consumption

The results showed that 72.25% of respondents consumed less than one portion of fruits and vegetables per day, followed by 16.50% who consumed one to two portions per day. Respectively, 6.50% and 4.75% consumed three to four portions

and five portions per day. Overall, more than 95.25% of respondents consumed fewer than five portions of fruits and vegetables per day, indicating a low consumption level. Only 4.75% of students consumed more than five portions and met the international recommendation. Figure 2 presents the distribution according to the average level of fruit and vegetable portion consumption.

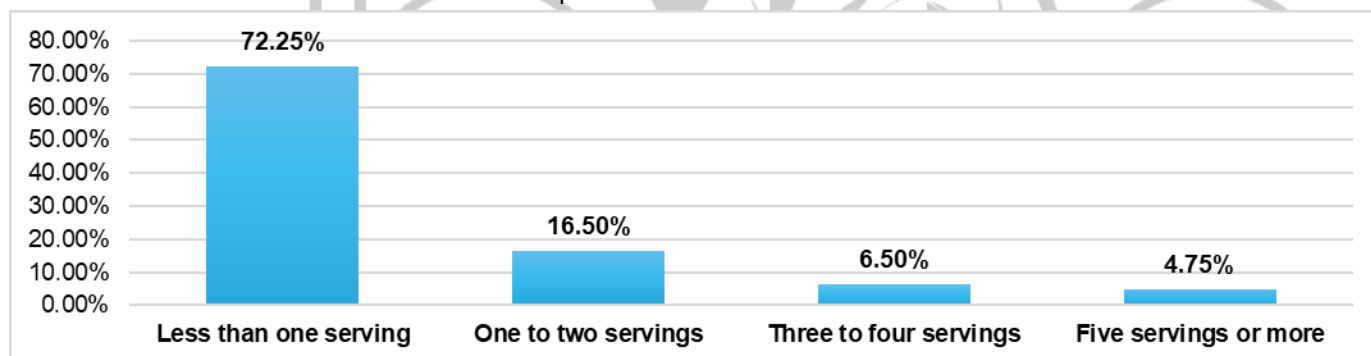


Figure 2: Distribution according to the average level of fruit and vegetable portion consumption

2.4 Analytical study: factors associated with the low daily consumption of fruits and vegetables

3.4.1 Univariate analysis

At the 5% significance level, the univariate analysis revealed a statistically significant association between the low daily consumption of fruits and vegetables and several sociodemographic variables.

- **Female sex** appeared as a risk factor, with a p-value < 0.001, an odds

ratio (OR) of 4.01, and a 95% confidence interval [2.53–6.35].

- **Similarly, being older than 25 years** was associated with the absence of regular consumption, with p < 0.001, OR = 2.41, and a 95% CI [1.35–4.33].
- **Educational level also influenced this behavior:** students enrolled in a master's program had a significantly higher risk of low consumption (p < 0.001, OR = 3.33, 95% CI [1.91–5.78]).

- **Regarding marital status**, living alone was also a risk factor ($p < 0.001$, OR = 3.18, 95% CI [1.66–6.14]).
- **Furthermore, the absence of nutritional knowledge** significantly increased the likelihood of not consuming fruits and vegetables regularly ($p < 0.001$, OR = 2.95, 95% CI [1.80–4.83]).
- **Finally, a low socioeconomic level** was also associated with low daily consumption, with $p < 0.001$, OR = 2.95, and a 95% CI [1.80–4.83]. Table II presents the distribution according to the results of the univariate analysis of factors associated with the low regular consumption of fruits and vegetables.

Table II: Results of the univariate analysis of factors associated with the low regular consumption of fruits and vegetables

Factors	Absence of daily fruit and vegetable consumption		OR	IC 95%	p value
	YES	NO			
Sex					<0,001
Female	116	105	4,01	2,53-6,35	
Male	146	33	1		
Age groups					0,003
> 25ans	25	28	2,41	1,35-4,33	
≤ 25ans	237	110	1		
Level of education					<0,001
Bachelor's level	236	101	1		
Master's level	26	37	3,33	1,91-5,78	
Marital status					<0,001
Living with a partner	17	25	1		
Living alone	245	113	3,18	1,66-6,14	
Nutritional Knowledge					<0,001
Yes	38	46	1		
No	224	92	2,95	1,8-4,83	
Socioeconomic level					<0,001
Low	76	6	8,99	3,8-21,26	
Non low	186	132	1		

Multivariate Regression

At the 5% significance level, the variables that were significantly associated with the low consumption of fruits and vegetables were included in a multivariate regression model, which identified the following associated factors:

- **Sex:** Being female was a risk factor for the absence of regular fruit and vegetable consumption, with $p < 0.001$, OR = 3.68, and a 95% confidence interval (CI95%) = [2.21–6.13].
- **Master's level of education:** Being enrolled in a master's program was a risk factor for the absence of regular fruit and

vegetable consumption, with $p < 0.001$, $OR = 3.44$, and a 95% confidence interval (CI95%) = [1.82–6.52].

- **Lack of nutritional knowledge:** The absence of nutritional knowledge was a risk factor for the absence of regular fruit and vegetable consumption, with $p < 0.001$, $OR = 2.26$, and a 95% confidence interval (CI95%) = [1.30–3.95].

- **Low socioeconomic level:** A low socioeconomic level was also a risk factor for the absence of regular fruit and

vegetable consumption, with $p < 0.001$, $OR = 6.98$, and a 95% confidence interval (CI95%) = [2.87–16.95].

Table III provides the distribution according to the results of the multivariate analysis of factors associated with the low regular consumption of fruits and vegetables.

Table III: Results of the multivariate analysis of factors associated with the low regular consumption of fruits and vegetables

Facteurs	Lack of daily fruit and vegetable consumption		OR	IC 95%	p value
	YES	NO			
Sex					<0,001
Female	116	105	3,68	2,21-6,13	
Male	146	33	1		
Level of education					<0,001
Bachelor's level	236	101	1		
Master's level	26	37	3,44	1,82-6,52	
Nutritional Knowledge					<0,001
Yes	38	46	1		
No	224	92	2,26	1,3-3,95	
Socioéconomic level					<0,001
Low	76	6	6,98	2,87-16,95	
Non low	186	132	1		

3 DISCUSSION

3.1 Sociodemographic and economic characteristics of the students

The study population was predominantly young, with 86.75% aged 25 years or younger and a mean age of 22.31 years, similar to the findings reported by N'Guessan et al. (2018) in Côte d'Ivoire. Females were predominant, with a sex ratio of 0.80, contrary to the 2019 Burkina Faso census (RGPH 2019), which indicated

a male majority in urban higher education. Regarding marital status, 89.5% of the students were single, a result comparable to that of N'Guessan et al. (2018), who reported 93.3% singles. From a socioeconomic perspective, 76.5% of the students had a medium standard of living, 20.5% a low level, and 3% a high level. These findings differ from those of N'Guessan et al. (2018), who reported that 84.5% of their respondents were

unemployed—a discrepancy likely linked to the criteria used to define socioeconomic status.

3.2 Students' knowledge about the benefits of fruits and vegetables

Regarding knowledge of fruit and vegetable consumption, the majority (73.50%) knew that their intake is linked to the prevention of certain diseases. Furthermore, 57.50% of the students were aware of the recommended number of daily portions. These results are consistent with the study by Banwat et al. (2012) conducted in Northern Nigeria, which revealed that 92.4% of participants had “fair” knowledge, 1.2% had good knowledge, and 6.4% had poor knowledge of the nutritional benefits of fruits and vegetables.

The study concluded that, although most participants had an acceptable level of understanding, few possessed in-depth knowledge. This relatively high level of knowledge may be explained by the high education level of the surveyed students. This interpretation aligns with Tiahou et al. (2013), who reported that populations with higher educational attainment have a better understanding of the nutritional benefits of fruits and vegetables and the daily consumption recommendations.

3.3 Level of fruit and vegetable consumption among students

After assessing students' knowledge of fruits and vegetables, their actual consumption behavior was evaluated. The results show that 72.25% of the students consume less than one fruit serving per day, and 95.25% consume fewer than the five daily recommended servings, with a slight preference for vegetables. Thus,

despite having generally satisfactory knowledge, students exhibit a low level of consumption.

This trend is consistent with the findings of the 1998 French food surveys, which reported that around 60% of adults consumed fewer than five servings per day (INCA-1, 1998). In Nigeria, Banwat et al. (2012) also observed that more than 69% of their sample had insufficient consumption. Similar findings were reported by Pierre P. et al. (2007) and N'Guessan et al. (2018). This paradox between knowledge and practice may be explained by economic, cultural, or dietary habit-related factors.

The study also identified the main reasons for low fruit and vegetable consumption among students. The most frequently cited barriers were high cost, personal preferences, lack of information, poor accessibility, and low product quality often associated with the use of chemical substances. These findings align with those of N'Guessan et al. (2024), who also mentioned lack of habit and food allergies.

Eating habits acquired during childhood influence consumption in adulthood, as highlighted by the European Nutrition Information Council. The high price of fruits and vegetables compared to energy-dense foods limits their consumption, a result also confirmed by the Louis Bonduelle Foundation (2010). Poor market accessibility—already reported by the Ivorian Ministry of Agriculture—constitutes another major barrier. Finally, the poor quality of available products, due to poor storage conditions and artificial ripening using calcium

carbide, poses a health risk and reduces acceptability.

Participants proposed three main solutions to improve fruit and vegetable consumption: raising awareness about their benefits, reducing costs, and ensuring the availability of quality products. These recommendations are consistent with those of N'Guessan et al. (2018), who also emphasized the role of food vendors. They also echo the conclusions of Tiahou et al. (2013), where Ivorian household heads suggested similar actions to increase national consumption.

3.4 Factors associated with low fruit and vegetable consumption among students

At the 5% significance threshold, variables significantly associated with low fruit and vegetable consumption were included in a multivariate regression model. The analysis identified the following factors: sex, master's level education, lack of nutrition knowledge, and low socioeconomic status.

Being female was a risk factor for the absence of regular fruit and vegetable consumption, with $p < 0.001$, OR = 3.68, and a 95% confidence interval (CI) of [2.21–6.13].

Similarly, having a master's level education was a risk factor for the absence of regular consumption, with $p < 0.001$, OR = 3.44, and CI 95% = [1.82–6.52].

Furthermore, lack of nutrition knowledge was a risk factor, with $p < 0.001$, OR = 2.26, and CI 95% = [1.30–3.95].

Finally, low socioeconomic status significantly increased the risk of low consumption, with $p < 0.001$, OR = 6.98, and CI 95% = [2.87–16.95].

Our findings differ from those of Drabo et al. (2024). In their study on fruit and vegetable consumption among adolescents and young people in Ouagadougou, Burkina Faso, marital status, socio-professional status, level of urbanization, and duration of residence were found to influence consumption.

Regarding sex and education level, our results also differ from those of Pessoa et al. (2015). According to these authors, among the individual variables tested in multivariate models, fruit and vegetable consumption scores were higher among women and associated with education. This difference can be explained by the larger sample size (5,828) and the target population (adults) in their study.

CONCLUSION

Fruits and vegetables are an essential source of micronutrients and play a vital role in maintaining good health. Their consumption is even more important among students, a particularly vulnerable group due to high intellectual demands and, in many developing countries, precarious living conditions. However, the results of this study show that only 4.75% of students meet the WHO recommendations for daily fruit and vegetable intake, highlighting a concerning nutritional situation.

The analysis identified four major determinants associated with this low consumption: lack of nutritional knowledge, low socioeconomic status, master's level education, and sex. These factors underscore the influence of material insecurity and limited nutritional information on students' eating behaviors. Such a situation exposes these young

adults to an increased risk of micronutrient deficiencies and long-term chronic diseases, including diabetes, hypertension, cardiovascular diseases, and certain cancers.

From an operational standpoint, these findings highlight the need to strengthen nutrition awareness efforts and to develop strategies that promote fruit and vegetable consumption within the university setting. Implementing targeted nutrition programs that are accessible and aligned with students' sociocultural realities appears to be a key approach to sustainably improving their dietary habits and preventing related health risks.

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