

ASSESSMENT OF DIETARY HABITS AND THEIR INFLUENCE ON SERUM LIPID PROFILE AMONG YONG ADULTS FROM PALESTINE

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ABSTRACT

Introduction: Hyperlipidemia increases the risk of many diseases including coronary artery disease and atherosclerosis. Nutritional knowledge may act as a deterrent against unhealthy nutrition trend which is strongly associated with hyperlipidemia. We aim to evaluate the dietary habits and their influence on serum lipid profiles among university students. **Methods:** This study was an analytical descriptive design that started in June and finished in September 2018. A total of 200 students (100 males and 100 females), aged between 18-22 years were evaluated. Sociodemographic data and health-related data situations, lifestyle practices, and eating habits of the study population were reported by an interview questionnaire. The biochemical evaluation for total cholesterol (TC), low-density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (HDL), and Triglycerides (TG) was carried out. A significant result means that the P-value for the hypothesis tests was less than 0.05 at confidence intervals 95%. **Results:** Male students were more likely to be healthier eating habits compared to female students in terms of regular breakfast intake, regular lunch intake, and regular dinner intake. The majority of students (67.5%) eat two to three meals per day. Most students (60.0%) thought that eating meats, vegetables and other variety of foods are the keys to point of a balanced diet. On the other hand, the prevalence of hypercholesterolemia was significantly higher in male students than females and, the prevalence of elevated LDL was higher in female students than males. **Conclusion:** Despite the students having some unhealthy eating habits, however, their eating habits were non significantly associated with a higher prevalence of the three hyperlipidemias.

Keywords : Eating habits, Lipids profile, Students, Gaza Strip.

Introduction

The major cause of death in developed and developing countries were the cardiovascular disease (CVD) (van Minh et al., 2003). The risk factors for CVD i.e. hyperlipidemia, sedentary lifestyle and unhealthy eating habits are originating in the childhood and may develops in the adulthood (Ericksson et al., 2001). Hyperlipidemia has been criminalized as a potential risk in coronary heart diseases (CHD), atherosclerosis, diabetes mellitus (Al-Taher, et al., 2017). Metabolic Syndrom is the main risk factor for CVD & DM (Altaher, et al., 2019a). According to the American Diabetic Association (ADA) Lipid profiles (LP) are blood test used to determine the blood levels of Triglycerides (TG), total cholesterol (TC), low-density lipoprotein (LDL), and high-density lipoprotein (HDL) (ADA, 2013). For CHD diagnosis and monitoring; the LP test is used (ADA, 2013). The increased in saturated fats consumption especially cholesterol leads to elevated TC, which resulting in increased danger of CVD (Ye and Kwiterovich, 2000). Animal or vegetable originally saturated fats adhere to the blood vessel wall by forming a clot and blocking blood flow (Ighosotu and Tonukari, 2010). It is important to mention that foods with elevated fiber content, such as fruits and vegetables, have been reported to be useful in reducing plasma TC concentrations, while foods with low soluble fibers are ineffective in lowering of plasma TC levels (Ericksson et al., 2001). However, there are numerous genetic influences on the metabolism of lipoproteins that can make certain people in the same population "nutritional responsive" or "non-responsive" to fat consumption (Ye and Kwiterovich, 2000). Data gathered from a LP test can help to recommend modifications in

lifestyle and dietary behaviors to take the lipids and lipoproteins serum concentrations back to the normal range and thus will reduce the occurrence of CVD (Altaher, et al., 2016). The ongoing urbanization of the developing countries including Palestine state has bring accelerated changes in the lifestyle and the dietary behaviors (namely; typical Mediterranean diet) among the university students toward consumption of fast food and, high caloric diets pattern and inactive lifestyle. These changes have a strong impact on the onset of CVD diseases and other chronic diseases related to urbanization. Dietary awareness of Palestinian college students can survive as a protective measure to the fast-food trend among them, which in order contributes to decreasing CVD risks among the students. Nationally, there have been no prior studies linked to this subject to date, and this is the first-time college young students in Gaza Strip have participates in this type of studies. In many countries around the world, there have been several studies dealing with this topic. These surveys, however, have disclosed, inconclusive or contradictory findings, and this is due to variations in the type of food consumption and nutritional patterns from country to country. However, this study aimed to assess the dietary habits and their influence on serum lipid profile among college students from Khanyunis, Palestine.

Methods

The research was a descriptive-analytical design that began in June and was completed in October 2018. The total samples of this study were 200 college students, out of them (100 subjects) were males and the other 100 were females, aged between 18-22 years and

collected by simple random method from the University College of Sciences and Technology (UCST)-Khanyunis Governorate, Gaza Strip. Students with chronic disease such as: diabetes mellitus, hypertension, and other diseases were excluded. All formal letter of approval to conduct the study was obtained from related authority and every subject in the study was given a consent form about the study and received the report of the results of their biochemical examinations after the end of the study. The students were requested to complete an interview questionnaire relevant to their eating, drinking, and smoking habits. The questionnaire was adapted from earlier research in which researchers standardized its use among university learners (Yahia et al., 2008). The questionnaire consisted of three items: sociodemographic data (name, age, gender, educational status, etc.), health-related data (following a regime, smoking situation, etc.), and lifestyle practices (eating habits, meal patterns, consumption of fruit and vegetables, and fried food, etc.). Approximately 3 ml venous blood specimen in fasting state (14 to 16 hr.) were withdrawn from each student in a test tube without anticoagulation and the specimens were permitted to clot then the sera were isolated at room temperature by centrifugation using the 80-1 Fuhua, China at 3500 rotate/minute for 10 minutes. Serum was used to measure the concentrations for TC, TG, and HDL by spectrophotometer device (Stat Fax - 1904+, USA) using QCA clinical kit, Spain and the calculation of colorimetric tests for TC, TG, and HDL were performed according to beer's law. While the LDL was calculated by the formula of Friedewald: $[LDL = TC - (HDL) - TG/5 \text{ (mg/dl)}]$ (Friedewald et al., 1972). All

biochemical tests were conducted in the biochemistry laboratory off the University College of Science and Technology – Khanyunis. The SPSS Vr. 22 was used for statistical analysis of data. Descriptive statistics and Chi-Square test were carried out. At confidence interval equal 95.0%; P-value of less than 0.05 for the tested hypothesis was considered statistically significant.

Results

The finding showed that the mean of age among the males group was 21.21 years whereas, the mean \pm SD of age was 21.23 among the females group. However, there is no statistically significant difference between the study subjects with respect to mean of age in years ($P=0.947$). The following table shows the comparative distribution of the study subjects according to their inhabited governorate, education level in university and monthly income (Table 1). After using of Chi-Square Test; there was a statistical difference among the study subjects with respect to education levels in the university, family monthly income and smoking status ($P<0.000$, <0.000 & $= 0.024$ respectively) (Table 1). The table below (Table 2) reveals the student's response to questions related to their dietary practices i.e. eating habits, meal patterns, fried food consumptions, fruits and vegetables intake, meats (white and red) intake, and gas drinks drinking by gender. It shows that the majority of male students (72.0%) Vs. (34.0%) of female students were taking their breakfast regularly ($p<0.000$), and the most of

students (86.0%) Vs. (65.0%) of female students were taking their lunch regularly ($p=0.001$), while (57.0%) of male students Vs. (22.0% of female students were taking their dinner regularly ($p<0.000$). Consequently, male students showed healthier eating habits compared to female students in terms of regular breakfast intake, regular lunch intake and regular dinner intake ($p \leq 0.05$ for all) (Table 2). Also, the majority of students (67.5%) reported eating two to three meals per day. Among males, 69.0% reported eating two to three meals per day as compared to 66.0% females. However, there was a significant gender difference in the number of meal intake ($P = 0.015$) (Table 2). As well as, about 60.0% of students (62.0% male students and 57.0% female students) think that eating of meats, vegetables and other variety of foods are the key to achieve balanced diet (Table 2).

Table 1: Distribution of the population general characteristics by gender

Variables	Male (N = 100)	Female (N=100)	P-Value
Age (mean±SD)	21.21±1.4	21.23±1.5	0.947
Governorate			0.663
Khanyunies	(60.0%)	(63.0%)	
Rafah	(40.0%)	(37.0%)	
Education level in the university			<0.001
Level 1	(11.0%)	(14.0%)	
Level 2	(20.0%)	(55.0%)	
Level 3	(18.0%)	(10.0%)	
Level 4	(47.0%)	(18.0%)	
Level 5	(4.0%)	(3.0%)	
Monthly income (NIS)			<0.001
< 15000	(30.0%)	(79.0%)	
1500 - < 2500	(43.0%)	(14.0%)	
2500 - < 4000	(24.0%)	(6.0%)	
> 4000	(3.0%)	(1.0%)	
Smoking status			<0.024
Yes	(5.0%)	(0.0%)	
No	(95.0%)	(100%)	

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The unhealthy eating practice was indicated by the fact that the majority (57.5%) of the students reported eating fried food at least three times per week. Among females, 71.0% reported eating fried food daily or three to four times per week compared to 44.0% males. However, there was a gender difference according to eating fried food ($p<0.000$) (Table 2). Concerning to the frequency of gas drinks drinking per week; table 2 indicates that the majority of students (59.0%) drank 1 or 2 cups of gas drinks per week (61.0% of males vs. 57.0% of females). However, there was a gender difference according to the frequency of gas drinks drinking per week ($p=0.001$) (Table 2).

Table 2: Student's response to questions related to their dietary practices

Variables	Gender		Total	P-Value
	Male	Female		
Do you take your breakfast regularly?				0.000
Yes	72 (72.0%)	34 (34.0%)	106 (53.0%)	
No	28 (28.0%)	66 (66.0%)	94 (47.0%)	
Do you take your lunch regularly?				0.001
Yes	86 (86.0%)	65 (65.0%)	151 (75.5%)	
No	14 (14.0%)	35 (35.0%)	49 (24.5%)	
Do you take your dinner regularly?				<0.001
Yes	57 (57.0%)	22 (22.0%)	79 (39.5%)	
No	43 (43.0%)	78 (78.0%)	121 (60.5%)	
How many meals do you eat except snacks?				0.015
One meal	19 (19.0%)	31 (31.0%)	50 (25.0%)	
2-3 meals	69 (69.0%)	66 (66.0%)	135 (67.5%)	
More than 3 meals	12 (12.0%)	3 (3.0%)	15 (7.5%)	
How often do you take snacks apart from regular meals?				0.135
Daily	30 (30.0%)	39 (39.0%)	69 (34.5%)	
3 or 4 times per week	31 (31.0%)	34 (34.0%)	65 (32.5%)	
1 or 2 per week	8 (8.0%)	2 (2.0%)	10 (5.0%)	
rarely	31 (31.0%)	25 (25.0%)	56 (28.0%)	
What type of food do you think you should eat to have balanced nutrition?				0.055
Mainly meats	16 (16.0%)	9 (9.0%)	25 (12.5%)	
Mainly vegetables	22 (22.0%)	34 (34.0%)	56 (28.0%)	
Meats & vegetables	43 (43.0%)	49 (49.0%)	92 (46.0%)	
Other	19 (19.0%)	8 (8.0%)	27 (13.5%)	
How often do you eat fried food?				<0.001
Daily	8 (8.0%)	16 (16.0%)	24 (12.0%)	
3 or 4 times per week	36 (36.0%)	55 (55.0%)	91 (45.5%)	
1 or 2 per week	56 (56.0%)	29 (29.0%)	85 (42.5%)	
How often do you eat fruit and vegetables?				0.542
Daily	1 (1.0%)	2 (34.0%)	3 (1.5%)	
3 or 4 times per week	47 (47.0%)	40 (40.0%)	87 (43.5%)	
1 or 2 per week	52 (52.0%)	58 (58.0%)	110 (55.0%)	
How often do you eat meats (white and red) per week?				0.072
One time	35 (35.0%)	42 (42.0%)	77 (38.5%)	
Two times	55 (55.0%)	43 (43.0%)	98 (49.0%)	
Three times & more	10 (10.0%)	15 (15.0%)	25 (12.5%)	
How many cups of gas drinks do you drink per week? (cup=330ml)				0.001
I don't drink it	12 (12.0%)	32 (32.0%)	44 (22.0%)	
1 or 2 cups	61 (61.0%)	57 (57.0%)	118 (59.0%)	
3 cups or more	27 (27.0%)	11 (11.0%)	38 (19.0%)	
Total	N	100	100	200
	%	100.0%	100.0%	100.0%

Table 3: Lipid profile levels based on WHO category by gender

Variables	Gender		Total	P-Value
	Male	Female	200 (100%)	
Total cholesterol (mg/dL)				0.000
Less than 200	83 (41.5%)	99 (49.5%)	182 (91.0%)	
200 or more	17 (8.5%)	1 (0.5%)	18 (9.0%)	
LDL (mg/dL)				0.001
Less than 130	55 (27.5%)	78 (39.0%)	133 (66.5%)	
130 or more	45 (22.5%)	22 (11.0%)	67 (33.5%)	
HDL (mg/dL)				0.294
Less than 40	63 (31.5%)	70 (35.0%)	133 (66.5%)	
40 or more	37 (18.5%)	30 (15.0%)	67 (33.5%)	
Triglycerides (mg/dL)				0.352
Less than 150	93 (46.5%)	96 (48.0%)	189 (94.5%)	
150 or more	7 (3.5%)	4 (2.0%)	11 (5.5%)	

The table above (3) illustrates lipid profile levels of students based on WHO category by gender. The prevalence of hypercholesterolemia was significantly higher in male students than females ($P = 0.000$) but the prevalence of high LDL was higher in female students than males ($P = 0.001$). On the other hand, there were no statistically significant differences among the study population according to triglycerides and HDL levels by gender ($P = 0.352$ and 0.294 respectively) (Table 3). The prevalence of high levels of TC, TG or LDL in the different eating habits of students is shown in table 4. Students who take their breakfast regularly have a higher prevalence of high TC (6.0%), TG (3.0%), and LDL (19.0%) levels as compared to those who don't take it regularly. But this difference doesn't reach a statistically significant level ($P < 0.05$ for all) (Table 4). As same as, students who take their lunch regularly have a higher prevalence of high TC (8.0%), TG (4.5%), and LDL (27.0%) levels as compared to those who don't take it regularly. But these differences also don't reach a statistically significant level ($P < 0.05$ for all)

(Table 4). In contrast, students who don't take their dinner regularly have a higher prevalence of high cholesterol (5.0%), TG (3.0%), and LDL (20.0%) levels as compared to those who take it regularly. But these differences also don't reach a statistically significant level ($P < 0.05$ for all) (Table 4). In addition, participants who reportedly consumed 2 or 3 meals except for snacks per day had a higher incidence of high TC (6.5%), TG (3.5%) and LDL (26.0%) levels as compared to those consumed one meal. But these differences also don't reach a statistically significant level ($P < 0.05$ for all) (Table 4). Furthermore, Students who take snacks daily had a higher incidence of high TC (3.5%), TG (2.0%) and LDL (11.5%) levels as compared to those consumed it one to four times per week. But these differences also don't reach a statistically significant level ($P < 0.05$ for all) (Table 4). In the same context, Students who prefer to take sweets as snacks have a higher prevalence of high cholesterol (5.0%), TG (2.0%), and LDL (11.0%) levels as compared to those who don't prefer to take it.

Table 4: Relationship of Lipid profile levels with eating habits

	Hypercholesterolemia (%)	Hypertriglyceridemia (%)	High LDL-C (%)
Do you take your breakfast regularly?			
Yes	12 (6.0%)	6 (3.0%)	38 (19.0%)
No	6 (3.0%)	5 (2.5%)	29 (14.5%)
P-Value	0.223	0.916	0.455
Do you take your lunch regularly?			
Yes	16 (8.0%)	9 (4.5%)	54 (27.0%)
No	2 (1.0%)	2 (1.0%)	13 (6.5%)
P-Value	0.166	0.616	0.234
Do you take your dinner regularly?			
Yes	8 (4.0%)	5 (2.5%)	27 (13.5%)
No	10 (5.0%)	6 (3.0%)	40 (20.0%)
P-Value	0.563	0.294	0.870
How many meals do you eat except snacks per day?			
One meal	3 (1.5%)	4 (2.0%)	10 (5.0%)
2-3 meals	13 (6.5%)	7 (3.5%)	52 (26.0%)
More 3 meals	2 (1.0%)	0 (0.0%)	5 (2.5%)
P-Value	0.619	0.472	0.060
How often do you take snacks apart from regular meals?			
Daily	7 (3.5%)	4 (2.0%)	23 (11.5%)
3 or 4 times/ week	6 (3.0%)	4 (2.0%)	22 (11.0%)
1 or 2 times/ week	5 (2.5%)	3 (1.4%)	22 (11.0%)
P-Value	0.870	0.914	0.933
What type of food do you think you should eat to have balanced nutrition?			
Mainly meats	2 (1.0%)	3 (1.5%)	17 (8.5%)
Mainly vegetables	10 (5.0%)	4 (2.0%)	22 (11.0%)
Meats & vegetables	3 (1.5%)	2 (1.0%)	14 (7.0%)
Other	3 (1.5%)	2 (1.0%)	14 (7.0%)
P-Value	0.096	0.954	0.053
How often do you eat fried food?			
Daily	9 (4.5%)	7 (3.5%)	32 (16.0%)
3 or 4 times/ week	7 (3.5%)	4 (2.0%)	30 (15.0%)
1 or 2/week	2 (1.0%)	0 (0.0%)	5 (2.5%)
P-Value	0.922	0.310	0.302
How often do you eat fruit and vegetables?			
Daily	8 (4.0%)	5 (2.5%)	39 (19.5%)
3 or 4 times/ week	9 (4.5%)	6 (3.0%)	27 (13.5%)
1 or 2 per week	1 (0.5%)	0 (0.0%)	0.5%) (1
P-Value	0.251	0.707	0.808
How often do you eat meats (white and red) per week?			
One time	5 (2.5%)	4 (2.0%)	25 (12.5%)
Two times	10 (5.0%)	6 (3.0%)	32 (16.0%)
3 times & more	3 (1.5%)	1 (0.5%)	4.0%) (8
P-Value	0.683	0.883	0.908
How many cups of gas drinks do you drink per week? (cup=330ml)			
I don't drink it	2 (1.0%)	1 (0.5%)	13 (6.5%)
1 or 2 cups	11 (5.5%)	9 (4.5%)	38 (19.0%)
3 cups or more	5 (2.5%)	1 (0.5%)	8.0%) (16
P-Value	0.390	0.285	0.436

However, these differences don't reach a statistically significant level ($P < 0.05$ for all) (Table 4). Likewise, consumption of fried food, frequency of fruits and vegetable consumption, frequency of meats consumption per weeks, and the number of gas drink cups drank per week were non significantly associated with the higher prevalence of the three hyperlipidemias ($P < 0.05$ for all) (Table 4).

Discussion

In terms of dietary practices, University students usually do not pursue good nutritional habits. Students at universities often prefer fast food because of its availability and short preparation period compared to conventional food. Fast food e.g. falafel, luncheon meat, sausage pancakes, shawarma, hamburger, etc.. Generally high in fat, TC, simple sugar and calories. In the current study, after comparison of student's dietary practices between males group and females group; the findings showed that the majority of students (53.0%) were taking their breakfast regularly, and the most of students (75.5%) were taking their lunch regularly, while only (39.5%) of students were taking their dinner regularly. However, male students showed healthier eating habits compared to female students in terms of regular breakfast intake, regular lunch intake & regular dinner intake ($p \leq 0.05$ for all). In addition, the majority of students (67.5%) reported eating two to three meals per day. However, there was a significant gender difference in the number of meal intake ($P = 0.015$). Similar result was found by the cross-sectional study that was conducted in students from the Lebanese American University (in Beirut) to evaluate their eating practice. The study found that the majority of students (58.9%) eat meals regularly and (53.3%) of

them eat breakfast daily or three to four times per week (Yahia, et al., 2008). As well, 52.7% of the students eat meals two times per day. However, there was a significant gender difference in the frequency of meal intake in the studied sample ($P = 0.001$) (Yahia, et al., 2008). In contrast to the current study findings, another cross-sectional study by Al-Rethaiaa et al. aimed to determine eating habits among college students in Saudi Arabia. The findings of this research observed that 63.3% of students reported irregular meal intake. In addition, only 49.0% of students intake breakfast daily (Al-Rethaiaa et al., 2010). Furthermore, Most of the students (87.1%) were ate two or three meals per day and these results were in the line with our findings (Al-Rethaiaa et al., 2010). Regarding to the type of food which students think that they should eat to have balanced nutrition, our findings showed that about 60.0% of students think that intake of meats, vegetables and other variety of foods will provide them with a balanced diet. These findings were in line with other researches that indicated that the majority of university students believe it is essential to consume meat, vegetables and other less fatty foods to achieve a balanced diet (Al-Rethaiaa et al., 2010; Yahia, et al., 2008; Davy et al., 2006; Wardle and Haase, 2004). As anticipated, the consumption of fruits and vegetables among the study population was also prevalent, and this behavior should be encouraged and enhanced The energy content of fruits and vegetables is low because it contains more water and fiber than other food kinds. However, adding them to a student diet therefore decreases the total consumption of energy, therefore assisting in management of weight and serum lipids, and lipoprotein (Rolls, et al.,

2004). On the other side, the unhealthy eating styles were stated by the reality that most (57.5 %) of the students were intake fried food at least three times a week, 59.0 % were drinking 1 or 2 cups of gas beverages a week (61.0 % of men vs. 57.0 % of women) and 67.0 % were eating snacks at least three times a week. There have been gender differences, however, depending on intake of fried food and the frequency of drinking gas beverages per week ($p < 0.000$ & $= 0.001$). Snacks are described as all foods and beverages taken outside of the three primary meals (de Graaf, 2006). While enhanced consumption of snacks is often accused with enhanced incidence of hyperlipidemia, a visible cutting relationship between snacking and hyperlipidemia is still unclear (Spanos & Hankey 2010). A one study discovered a link between obesity and hyperlipidemia with gas beverage intake (Gibson, 2008). Regarding to the associations of dietary habits with hyperlipidemia, to the best of our knowledge, unfortunately, there are no large-scale studies have identified the CVD risk factors especially hyperlipidemia among adult college students in Palestine. Furthermore, considering the absence of adequate sources available in the literature, we could not discover a survey analyzing the impact of gender or nutritional and/or lifestyle patterns on the Palestinian population's hyperlipidemia status. This has prevented us from reaching a significant conclusion on how these parameters interact with hyperlipidemia. As found in the current study, the prevalence of hypercholesterolemia was significantly higher in male students than females, but the prevalence of high LDL was higher in female students than males. Compared with other countries, the prevalence of

hypercholesterolemia in the current study is similar to that in Turkey and the Guadeloupe (Erem et al., 2008; Foucan et al., 2000), but lower than that in England (Primatesta, 2000). This reduced incidence in women may indicate that female sex hormones, particularly estrogen, protect against increased TC or TG levels. This protective function for estrogen has been noted earlier, but is still disputed (Oh & Park, 2015; Li, et al., 2017). Regarding the relationship of LP with eating practices, changed serum TC, LDL, HDL, TGs concentrations are identified as risk factors for CVD and, meal pattern affects these variables (Farshchi, et al., 2004). The present findings found that the irregular meal frequency was not associated with higher lipid profiles levels. This finding in the current study did not coincide with the majority of latest research which reporting that irregular meal frequency causes hyperlipidemia to develop (Farshchi, et al., 2004; Samuelson, 2000; Murata, 2000). Moreover, the results of the present study reported that consumption of fast foods and fried food were none significantly associated with a greater incidence of the three hyperlipidemias. These results do not agree with the results of Kelishadi et al. (2004), which reported a considerable direct correlation between the dyslipidemia of adolescents and the intake frequency of fried foods and fast foods. ($P < 0.05$). The difference in findings between the current study and previous studies stems from the fact that alternation in blood lipid levels need a long-term follow up to be observed in addition to a large number of participants. However, health program must be developed to encourage improve dietary habits, healthier lifestyle, promote exercise, discourage smoking, avoid complications of

diabetes and appropriately handle chronic diseases (Altaher, et al., 2019b).

Conclusion

Male students showed healthier eating habits compared to female students in terms of regular breakfast intake, regular lunch intake and regular dinner intake. The frequency of hypercholesterolemia in male students was considerably greater than in women but the frequency of elevated LDL in female students was greater than in male students. Students eating habits were non significantly associated with higher occurrence of the three hyperlipidemias (TC, TG, LDL)

Recommendation

Despite the eating patterns of students, none were substantially correlated with the greater incidence of the three hyperlipidemias; university students especially males, should benefit from a nutrition and health promotion program to decrease the tendency among them to obesity and dyslipidemia, Furthermore, the finding that most students were unaware of their lipid profile status mandates warrants public education initiatives. In addition, extra screening studies in the same topic with larger sample size is strongly recommended.

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