

Assessment of Healthy Diet and Physical Activity Among Students of Mekelle University, Northern Ethiopia: A Cross-Sectional Study

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Introduction: The promotion and maintenance of a healthy lifestyle remains a persistent challenge globally. As a result, the deleterious effects of chronic diseases are escalating globally. But, nevertheless healthy diet and physical activity practices are not yet assessed among university students in Ethiopia. Therefore, this study was aimed at assessing healthy diet and physical activity among Mekelle university students from September 2019 to June 2020.

Methods: We used cross-sectional study design and the study was carried out at Mekelle University among undergraduate students. Data collected by using normalized and pre-tested questionnaire. Binary logistic regression model was used to identify factors associated with diet and physical activity. Multivariable analysis was used to determine significant predictors of healthy diet and physical activity.

Results: The practice of healthy diet and physical activity was 68.20% (poor), 31.75% (good) and 59.70% (poor), 40.3% (good), respectively. This study showed that college (AOR: 0.69, CI: [0.034-0.137], AOR: 0.20, 95% CI: [0.104-0.391]) and parent's resident (AOR: 1.331, 95% CI: [0.156-0.698]) were significant predictors of healthy diet practice of study participants, whereas gender (AOR: 3.909, 95% CI: [2.549-5.993]) and year of education (AOR: 0.411, 95% CI: [0.204-0.826]), college (AOR: 0.358, 95% CI: [0.212-0.604]), were significantly associated with physical activity practice.

Conclusion: The study revealed that the majority of the study participants were poor in both healthy diet and physical activity practices.

Keywords: healthy diet, physical activity, university students, Mekelle, Ethiopia

Introduction

Practicing of healthy diet and regular physical activity is prominent part of healthy life style which have significant mental and physical health benefits. Currently, lifestyle has become an important predictor of health status. For instance, the World Health Organization (WHO) has declared that 60% of an individual's health-related quality of life depends on his/her lifestyle.¹

Non-communicable diseases are increasing globally and resulted a deleterious effect. Unhealthy diet and physically inactive have been strongly associated with these diseases.^{2,3}

WHO global health status (2014) reported that in 2012, alcohol consumption was responsible for about 5.9% (3.3 million) deaths globally and 5.1% of disability-adjusted life years (DALYs). By the same taken, insufficient physical activity has

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contributed to 3.2 million deaths and 69.3 million DALYs each year. It also showed that cardiovascular disease due to unhealthy life style was attributed for 46% (17.5 million) deaths by 2012. Of these deaths, about 7.4 million were due to heart attacks (ischemic heart disease) and 6.7 million were due to strokes.⁴

Many studies have shown that an unhealthy diet and physical inactivity increase the risk of diabetes, osteoporosis, obesity and cardiovascular diseases.^{5–10}

Several international reports have indicated that non-communicable diseases affect not only adults but also starting to affect the younger generations.^{11–14} For instance, study conducted among Palestinian students at An-Najah National University revealed that the prevalence of overweight and obesity was 26.2%, with a significant increase among males 36.4%) compared with females 19.1%. The prevalence of metabolic syndrome among obese and overweight was 28.6%.¹³ Another study conducted in Ghana to assess the prevalence of pre-hypertension and hypertension and its related risk factors among undergraduate students in a Tertiary institution showed that twelve 2.2% of the students were hypertensive, whilst pre-hypertension was prevalent in 26.1% of the students.¹²

It is obvious that most young adult population is university students. These students subjected to mutable transitional period of new independence life expecting to be self-reliant but, nevertheless are prone to engage in different tasks which are considerable contributors to unhealthy lifestyles.^{15,16}

Numerous studies have shown that university students often have poor eating habits. For instance, finding from both Western and Arab countries have indicated that university students are not taking healthy diet and not following the recommended level of physical activity.^{15,17–20}

Although there are increasing efforts to make university students practice healthy promoting behaviors particularly following recommended diet and regular physical activity,^{21,22} there have been no reported healthy Campus initiatives. It has been also noted that there is no known study that has assessed the healthy diet and physical activity practice of university students in Ethiopia. Therefore, this study aimed to assess healthy diet and physical activity practices among students of Mekelle University from September 2019 to June 2020. Findings of the current study are expected to direct efforts and actions toward enhancing the health of those in need.

Methods and Materials

Study Design, Area and Period

Cross-sectional study design was carried out to assess the practice of healthy diet and physical activity among study participants at Mekelle University, from September 2019 to June 2020. Mekelle University is one of the largest public universities in Ethiopia.

Source and Study of Population

All under graduate Mekelle university students were taken as source population whereas students unable to attend due to serious health problems or other considerable issues were excluded from the study.

Sample Size Determination

The sample size was determined by using the formula $[n = [(Za/2)^2 * P (1 - P)]/d^2]$ by considering 95% confidence level of $Za/2 = 1.96$, margin of error 5%, proportion (p) of 50% and the final sample size was 422. Due to the sampling technique was involved multistage a 1.5 design effect was used. The required sample was 633.

Sampling Technique and Sampling Procedure

The best fitted sampling method was multi stage simple random sampling where each selected college was divided in to departments. And then each department was divided in to classes and sample was taken from each class using simple random sampling method.

Data Collection Tool and Technique

Research assistants collected the data by using normalized self-administered questionnaire. The questionnaire includes two sections. The first section included questions to ask about demographic characteristics.¹⁸

The second section contained 17 questions (9 questions for healthy diet and 8 questions for physical activity) to assess the healthy diet and physical activity of the students. The tool for measuring the healthy diet and physical activity practices of college students was developed by Walker, Sechrist, and Pender.²³ Participants indicated the frequency in which they participate in each using a four-point scale ranging from 1 (never) to 4 (routinely). Students who scored above the mean score for healthy diet and physical activity questionnaire were considered as a good and those who scored below the mean score were considered as poor.

Data Quality Control

The tool used to assess healthy diet and physical activity among students was standardized.²³ The questionnaire was first prepared in English and translated into Amharic, the national language. Pre-test was carried out on five percent of the total sample size before the actual data collection.

Data Processing and Analysis

Data were analyzed by using SPSS version 21.0. Binary logistic regression model conducted to assess predictors of diet and physical activity among study participants at a P-value<0.05, 95% confidence interval and odds ratio.

Ethical Consideration

We have confirmed that our study is conducted in accordance with the declaration of Helsinki. We got ethical clearance and approval from the institutional review board of Mekelle University. Moreover, written informed consent was obtained. All the participants were voluntary to give written informed consent and obtained. Their privacy and confidentiality were kept in a ways we used coded and self-administered questionnaire. Moreover, we have informed the participants about the aim, method anticipated risks and benefit of the study. Furthermore, we have informed the study participants that they have full right not to fill the questionnaire.

Results

Socio-Demographic Characteristics of Study Participants

Among the total 633 study participants, more than 50%, 389 (61.5%) were males, of which 283 (44.7%) had poor healthy diet practice and 195 (30.8%) had poor physical activity practice. The Median age of the participants was 20.00 (IQR=±3).

The result revealed that 131 (20.7%) of the participants were in the monthly support category of <300 ETB with a median income of 300.00 ETB (IQR=±500), of those 113 (17.9%) and 73 (11.5%) had a poor healthy diet and physical activity practice, respectively.

This result showed that about half, 323 (51.0%) of the students came from rural areas, 289 (45.7%) and 165 (26%) of them had poor healthy diet and physical activity practice respectively. Besides, the result indicated that the majority, 620 (97.9%) of the students were currently living in their dorms.

Regarding father's and mother's occupation, more than half, 526 (83.1%) of the respondent's fathers were employed. And 353 (55.8%) of the student's mothers were unemployed (Table 1).

Healthy Diet Practice

According to this result, 208 (32.86%) of the students were sometimes and 157 (24.8%) were never made an effort to select foods without too much oil. The result also indicated that 352 (55.6%) of the students were some times and 135 (21.3%) never ate 2–4 serving of fruit each day. Moreover, 484 (76.5%) of the students were sometimes eating 3–5 servings of vegetables each day. Furthermore, among the total study participants, 252 (39.8%) were never and 173 (27.3%) were sometimes taken at least 1500 cc of water daily (Table 2).

Physical Activity Practice

The result showed that among the total study participants, 398 (62.9%) were never and 180 (28.4%) were sometimes followed a planned exercise program. This result also revealed that 351 (55.4%) of the students were sometimes and 155 (24.9%) never exercised rigorously 30 min at least 3 times per week.

Moreover, the result indicated that 314 (49.6%) of the students never and 144 (22.7%) sometimes took part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling). Furthermore, the result revealed that only 45 (7.1%) students were routinely and 65 (10.2%) often participated in a physical fitness class at school weekly (Table 3).

Overall Assessment of Healthy Diet Practice and Physical Activity

The result indicated that 432 (68.2%) and 378 (59.7%) of the study participants had poor diet practice and physical activity respectively (Figure 1).

Factors Associated with Healthy Diet Practice and Physical Activity

Variables such as college and parent's resident were identified as predictors for healthy diet practice among college students.

Students from CNCS & CBE were less by 31% and 20% to have healthy diet than students from CHS respectively (AOR: 0.69, 95% CI: [0.034-0.137], AOR: 0.20, 95% CI: [0.104-0.391]) (Table 4).

Table 1 Distribution of Socio-Demographic Characteristics of Study Participants with Healthy Diet and Physical Activity (n=633)

Variable	Category	Diet		Physical Activity		Total n (%)
		Poor n (%)	Good n (%)	Poor n (%)	Good n (%)	
Gender	Female Male	149(23.5) 283(44.7)	95(15.0) 106(16.71)	202(31.9) 229(36.2)	42(6.62) 160(25.3)	244(38.6) 389(61.5)
College	CHS CBE CNCS	114(18.01) 189(29.9) 129(20.4)	154(24.33) 20(3.2) 27(4.3)	165(26.1) 145(22.91) 105(16.6)	103(16.3) 64(10.1) 51(8.1)	268(42.0) 209(33) 156(24.6)
Year of education	4 th year 2 nd & 3 rd year 1 st year	18(2.84) 275(43.4) 139(22)	48(7.6) 88(13.9) 65(10.3)	28(4.4) 184(29.1) 120(19)	38(6) 179(28.3) 84(13.3)	66(10.4) 363(56.7) 204(32.23)
Parent's resident	Urban Rural	150(7.9) 282(44.6)	163(25.8) 38(6)	167(26.4) 165(26.1)	146(23.1) 155(24.5)	313(49.45) 320(50.6)
Student's current resident	No-dorm Dorm	7(1.11) 430(67.9)	6(0.95) 190(30.02)	8(1.3) 324(51.2)	5(0.8) 296(46.8)	13(2.1) 620(97.95)
Student's monthly income (ETB)	≥300 ETB <300ETB	319(50.4) 113(17.9)	183(28.91) 18(2.8)	259(40.92) 73(11.5)	243(38.4) 58(9.2)	502(79.3) 131(20.7)
Father's occupation	Employed Un employed	389(61.5) 43(6.8)	159(25.12) 42(6.6)	284(44.8) 48(7.6)	264(41.7) 37(5.8)	548(86.6) 85(13.4)
Mother's occupation	Employed Un employed	141(22.3) 291(46)	135(21.3) 66(10.43)	161(25.4) 171(27.01)	115(18.2) 186(29.9)	276(43.6) 357(56.4)

Table 2 Distribution of Healthy Diet Practice of Regular Under Graduate Students of Mekelle University, Tigray, Ethiopia, 2019 (n=633)

Items	Never	Sometimes	Often	Routinely
Follow a planned exercise program	398(62.9%)	180(28.4%)	38(6%)	17(2.7%)
Perform stretching exercise daily	156(24.6%)	266(42%)	180(28.4%)	31(4.9%)
Exercise vigorously 30 min at least 3 times per week	351(55.5%)	155(24.5%)	80(12.6%)	47(7.4%)
Participate in physical fitness class at school weekly	385(60.8%)	138(21.8%)	65(10.3%)	45(7.1%)
Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	314(49.6%)	144(22.7) %	108(17.1%)	67(10.6%)
Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking)	104(16.4%)	139(22%)	289 (45.7%)	101(16%)
Warm up before rigorous exercise	183(28.9%)	29 (4.6%)	152(24%)	52(8.2%)
Make an effort to stand or sit straight	147(%)	253(%)	178(%)	55(%)

Table 3 Distribution of Physical Activity of Students of Mekelle University (n=633)

Items	Never	Sometimes	Often	Routinely
Follow a planned exercise program	398(62.9%)	180(28.4%)	38(6%)	17(2.7%)
Perform stretching exercise daily	156(24.6%)	266(42%)	180(28.4%)	31(4.9%)
Exercise vigorously 30 min at least 3 times per week	351(55.5%)	155(24.5%)	80(12.6%)	47(7.4%)
Participate in physical fitness class at school weekly	385(60.8%)	138(21.8%)	65(10.3%)	45(7.1%)
Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	314(49.6%)	144(22.7) %	108(17.1%)	67(10.6%)
Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking)	104(16.4%)	139(22%)	289(45.7%)	101(16%)
Warm up before rigorous exercise	183(28.9%)	29 (4.6%)	152(24%)	52(8.2%)
Make an effort to stand or sit straight	147(%)	253(%)	178(%)	55(%)

The likelihood of having healthy diet was 1.331 times more likely higher among students who came from rural areas (AOR: 1.331, 95% CI: [0.156-0.698]) compared to their counterparts.

Regarding physical activity gender, year of education and college, were significantly associated with physical activity.

The likelihood of being physically active was almost four times more likely higher among Male students (AOR: 3.909, 95% CI: [2.549–5.993]) compared to females.

First-year students were less by 58.9% to have good physical activity than fourth-year students (AOR: 0.411, 95% CI: [0.204-0.826]). Students from CNCS were less by 64.2% to have good physical activity than students from CHS (AOR: 0.358, 95% CI: [0.212-0.604]) (Table 5).

Discussion

The current study revealed that the majority (68.2%) of the students had poor diet. This result found that 135 (21.3%) of the students never ate 2–4 servings of fruit each day and only 95 (15%) of the students were often ate 3–5 servings of vegetables each day. This result is similar to previous studies conducted in Saudi¹⁷ & United Kingdom²⁴ where, they reported a low intake of fruits and vegetables. In contrast, finding from Chinese students has indicated that students were taken higher amount of fruits and vegetables. This might be described by the fact that the prominent foods in Chinese traditional eating are fruits and vegetables.²⁵

Table 4 Bivariate and Multivariable Analysis Result of Factors Associated with Healthy Diet Practice of Study Participants (n=633)

Variable	Category	Healthy Diet Practice		P-value	COR	AOR[CI]
		Poor	Good			
Gender	Female Male	149 283	95 106	0.172	0.587	1 0.701[0.421-1.168]
Year of education	4 th year 1 st year 2 nd & 3 rd year	18 139 275	48 65 88	0.235 0.120	0.175 0.120	1 0.885[0.281-2.791] 0.405[1.690-3.68]
Student's monthly support (ETB)	≥300ETB <300 ETB	319 113	183 18	0.203	0.278	1 0.712[0.328-1.645]
College	CHS CBE CNCS	114 189 129	154 20 27	0.000* 0.000***	0.078 0.155	1 0.201[0.104-0.391] 0.69[0.034-0.137]
Mother's occupation	Employed Un employed	141 291	135 66	0.381	0.237	
Father's occupation	Employed Un employed	239 193	131 70	0.230	0.662	1 0.309[0.739-2.056]
Student's current resident	Non-dorm Dorm	7 430	6 190	0.442	0.516	
Parent's resident	Urban Rural	150 282	163 38	0.004***	0.080	1 1.331[0.156-0.698]

Notes: **0.000***=significant p<0.000, **0.000***** =significant p<0.000, **0.004*****= significant p<0.004

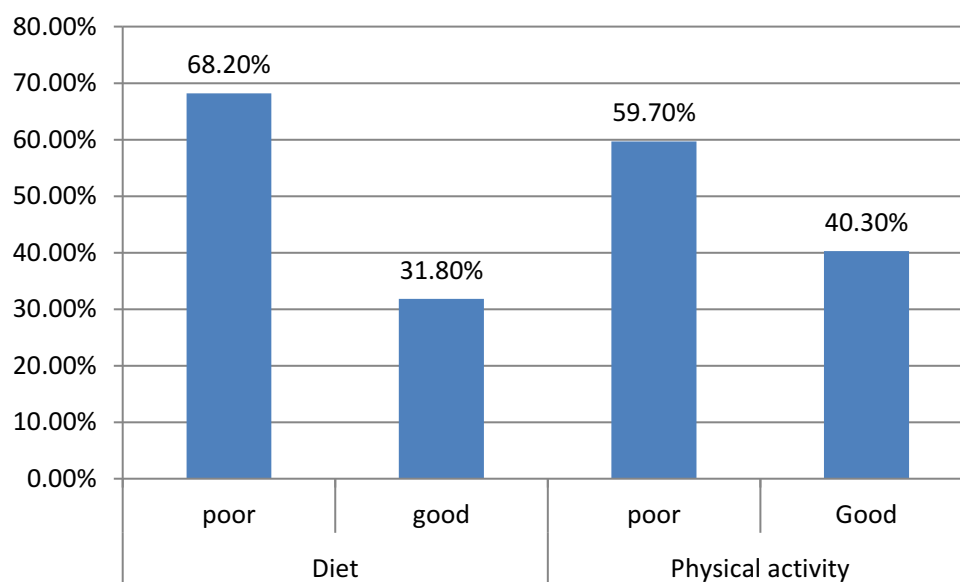


Figure 1 Status of healthy diet and physical activity practices of study participants (n=633).

The present study indicated that only 21 (3.3%) and 55 (8.7%) of the students were routinely limit the use of sugars and foods containing sugars and include dietary fiber respectively. This indicated that students are not choosing diets low in fat. Our present study also revealed that majority of students was eating breakfast, which was similar with the finding similar study in Saudi students.¹⁷

The current study showed that college and parent's resident were significantly associated with the healthy diet. Moreover, students from CBE & CNCs were less likely to have good healthy diet practice than students from CHS. This might be due to the fact that students from College of health science may have good health knowledge.

The present study revealed that students who came from urban areas were less likely to have good healthy diet practice compared with students who came from rural areas. This result is concurrent with the previous study conducted in China.²⁶

Regarding physical activity, the overall practice was 431 (68.3%) poor and 202 (31.9%) good. The present study showed that majority of the students were never follow a planned exercise program. This result was congruent with the study conducted in Saudi.¹⁷ The current study also indicated that the majority of the university students never exercised vigorously 30 min at least 3 times per week. This result was similar to previous studies, which showed inadequate levels of intensive physical activity.²⁷⁻²⁹

The present study revealed that only 45 (7.1%) of the students participated in physical fitness classes at school

weekly. This finding was similar to previous research conducted in the University of Maribor, Slovenia, in southeastern Europe.³⁰ The finding showed that few numbers of participants participated in a physical fitness classes and only 20.2% of the students reported adequate physical activity. The result also showed that the majority (289 (45.7%)) of the students got exercise during usual daily activities. This result was incongruent to previous studies in USA,³¹ Saudi¹⁷ & Malaysia.³² This difference might be due to the University environment factors and socio- economic factors.

In the present study, it has shown that gender, year of education and college were significantly associated with physical activity. The study indicated that male students were more likely to have good physical activity as compared with female students. The result was similar to previous findings from China¹⁶ Japan,³³ Iran³⁴ & Saudi.¹⁷ Furthermore, freshman students were less likely to have good physical activity as compared with fourth-year students. This might be due to fact that freshman students encounter new experiences and responsibilities and, hence may not give special attention to exercise as much as fourth-year students do. In addition to that freshman students have less health knowledge than fourth-year students.

The current study revealed that students from CNCs & CBE were less likely to have good physical activity as compared with students from CHS. This might be due to the fact that these students have good health knowledge.

Table 5 Bivariate and Multivariable Results of Factors Associated with Physical Activity of Study Participants (n=633)

Variable	Category	Physical Activity		P-value	COR	AOR[CI]
		Poor(n)	Good(n)			
Gender	Female Male	202 229	42 160	0.000*	3.360	I 3.909[2.549–5.993]
Year of education	4 th year 2 nd & 3 rd year 1 st year	36 264 131	30 99 73	0.578 0.013**	0.450 0.669	I 0.783[0.331–1.854] 0.411[0.204–0.826]
Student's monthly support (ETB)	≥300ETB <300 ETB	351 80	151 51	0.665		
College	CHS CBE CNCS	100 168 111	109 100 45	0.303 0.000***	0.546 0.372	I 1.293[0.794–2.106] 0.358[0.212–0.604]
Mother's occupation	Employed Unemployed	238 193	119 83	0.303	0.860	
Father's occupation	Employed Unemployed	165 266	98 104	0.418	0.658	
Student's current resident	Non-dorm Dorm	8 421	5 199	0.960	0.756	
Parent's resident	Urban Rural	215 216	98 104	0.746	1.020	

Notes: **0.000***=significant p<0.000, **0.013****=significant p<0.013, **0.000*****=significant p<0.000.

Strength and Limitation of the Study

Our study is the first study to assess healthy diet and physical activity among college students in our country Ethiopia. Moreover, the study findings can be generalized to the population because of the large sample size, sampling procedures, and high response rate of study participants. One limitation was since the tool is self-administered questionnaire, the respondents might not pay full attention to it/read it properly.

Conclusion

The study found that the majority of the study participants were poor in both healthy diet and physical activity. Moreover, the present study showed that college and parent's resident were significantly associated with healthy diet practice. Whereas gender, year of education and college, were significantly associated with physical activity. Who are looking to demonstrate the efficacy of the changes in life style practice and the educational curricula, as well as to engage in collaborative research.

Recommendation

It is imperative to formulate curriculum and counseling services aimed at providing students with awareness, support and empowerment needed to make informed choices pertaining to their health. Moreover, future researches need to conduct this topic with the help of qualitative study.

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Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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