Innovations

The Levels of Physical Activity and Activity Preferences among College Students in North Gondar, Ethiopia

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Abstract

Introduction: *Participating in moderate or vigorous physical activities continuously is very important to maintain health and prevent overall morbidity and mortality associated with Non-Communicable Diseases (NCDs).* ***Objective:*** *This study aimed to investigate the physical activity levels and activity preferences of college students in North Gondar, Ethiopia.* ***Method:*** *A cross-sectional survey design was conducted among 201 college students in north Ethiopia. In a proportionate stratified random sampling technique, gender strata were used. A modified International Physical Activity Questionnaire (IPAQ) was utilized to collect relevant data. The results were expressed in MET-minutes/week (Metabolic Equivalent of Task).* ***Results:*** *The results of this study revealed that the most preferred activity by college students was volleyball (n=154, 76.6%) while weightlifting (n=5, 2.5%) was rated the least. The majority of males primarily played volleyball (n=96, 47.8%) while walking (n=82, 40.8) is the choice of most college female students. Per the MET score calculated, 54.7%, 28.9%, and 16.4% of the college students were physically inactive, moderately active, and vigorously active respectively.* ***Conclusions:*** *Understanding physical activity levels and preferences will greatly aid in developing a comprehensive physical fitness program for college students to achieve the recommendation of the World Health Organization's minimum weekly physical activity level. Moreover, the physical activity levels and preferences of college students observed in this study may be used to deliver supplementary, appropriate, and interesting opportunities for those who might otherwise be overlooked by "one-size-fits-all" physical activity advancement policies.*

Keywords: 1.*Activity preference,* ***2.****College students, 3.Level of Activity, 4.Physical Activity, 5.North Ethiopia.*

Introduction

Involvement in regular moderate or vigorous physical activity markedly decreases the risk of all-cause and cardiovascular-disease mortality and confers other health benefits. Efforts to decrease the prevalence of inactivity in the population will have a greater impact if they are tailored to the needs and preferences of the community (1). Also, reduces the risk of coronary heart disease, high blood pressure, diabetes, osteoporosis, obesity, and colon cancer (2). Therefore, increasing participation in regular physical activity has been a public health priority in several developed countries like the United States of America, the United Kingdom, and New Zealand (3). In low-resource countries, various systems are in transition, such as transportation, lifestyle, dietary, and technological reliance, which may contribute to the development of Non-Communicable Diseases (NCDs). This transition may have dire consequences for the health systems of low-income countries, which are already struggling with a high prevalence of infectious diseases and road traffic injuries (4). Evidence

suggests that the majority of youth and adults in low-income countries fail to meet the current global physical activity guidelines (5).

In sub-Saharan Africa, higher socioeconomic status and living in an urban area were associated with greater engagement in sedentary behaviors including screen time) among children and youth (6). Even more surprising are the relatively low rates of active transportation to and from school observed in population-based samples of youth in many low-income countries in Africa (7). This suggests that although privately owned cars are relatively scarce in these countries, a large proportion of the inhabitants routinely use other forms of motorized travel.

Physical activity improves overall well-being even though one in every four adults does not meet the global recommendations for physical activity (8). Evidence shows that nearly 5 million mortality per year could be prevented if the global population was more active (9). More evidence depicts that insufficiently active people have a 20% to 30% increased risk of death compared to sufficiently active people (10). According to (11), more than 80% of the world's adolescent population is insufficiently physically active. Considering the benefits of physical activity for health promotion and disease prevention, the World Health Organization recommends 150 to 300 minutes of over at least 5 days a week of moderate-intensity of aerobic physical activity (12). Additionally, WHO recommends at least 75 up to 150 minutes per week of vigorous-intensity type of physical activity at least 3 days a week for adults (18-64 years) (9). Besides, the physical activity guidelines for Americans (13) recommend accumulating 30 minutes or more of moderate-intensity physical activity on most, preferably all days of the week. However, the majority of the adult population globally fails to meet this guideline and maintains a sedentary lifestyle.

Previous research on the physical activity preferences of students revealed that female adolescent students more frequently preferred swimming, basketball, and volleyball (14), while male students preferred basketball, swimming, cycling, and wrestling. According to (15), walking, jogging and gardening were the most preferred physical activities for both sexes.

More than a quarter of the world’s adult population (1.4 billion adults) is insufficiently active, worldwide, around 1 in 3 women and 1 in 4 men do not do enough physical activity to stay healthy (16). Evidence shows an increment of insufficient activity by 5% (from 31.6% to 36.8%) in high-income countries between 2001 and 2016 (8). Increased levels of physical inactivity have negative impacts on health systems, the environment, economic development, community well-being, and quality of life. Globally, 28% of adults aged 18 and over were not active enough in 2016 (men 23% and women 32%) (9). This means they do not meet the global recommendation of at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week.

A couple of studies on college students' physical activity levels have currently been conducted. In high-income countries, 26% of men and 35% of women were insufficiently physically active, as compared to 12% of men and 24% of women in low-income countries (11). Low or decreasing physical activity levels often correspond with a high or rising gross national product in low-resource countries (17). The drop in physical activity is partly due to inaction during leisure time and sedentary behavior on the job and at home. Likewise, an increase in the use of "passive" modes of transportation also contributes to insufficient physical activity (18).

However, the results are not conclusive, revealing contradictory results in both high and low-resource countries. For instance, (8) reported a double high level of inactivity in high-income countries compared to low-income countries. However, according to the report by (1) the level of physical activity was low in developing countries compared to developed countries. Therefore, studying the levels of physical inactivity and activity preferences of college students has become a big concern for the world's population, including Ethiopians. Consequently, it is expected to provide the latest knowledge and understanding of the levels and physical activity preferences of college students in North Ethiopia. To the best of the researcher’s knowledge, no prior research has been conducted to investigate the physical activity levels and activity preferences of college students in Ethiopia. Therefore, this study aimed to investigate the physical activity levels and physical activity preferences of college students at Begemidir College of Teachers Education, North Ethiopia.

1.3 Materials and Methods

The study employed a quantitative research approach and a cross-sectional survey design to collect primary data from November 20/2021 to March 10/2022 thereby revealing the levels of physical activity and physical activity preferences of college students at Begemidir College of Teachers Education, North Ethiopia.

Sampling technique and Sample Size

A total of 407 students were registered at Begemider College of Teacher Education (BCTE) in the academic year 2021-2022. Employing a proportionate sampling technique, 201 students were drawn from 6 departments such as language, education, mathematics, natural science, social science, aesthetics, and physical education. Then, the participants of the study were randomly selected from each department until the representative proportional number was obtained. This sampling method was preferred because every member of different strata will get an appropriate and equal chance to select, a more precise representative sample can be obtained, can be employed for both proportional and stratification sampling and the sample represents the desired strata to achieve its objectives (19).

$$n = \frac{N}{1 + Ne^2}$$

Where: n= Number of samples, N = Total population, and e= margin of error which is 0.05. The required sample size is calculated by substituting the values as mentioned in the above formula.

Data Gathering Instruments

This study employed a standardized questionnaire of the Global Physical Activity Questionnaire (GPAQ) (20) and the International Physical Activity Guidelines (IPAG) (11) to collect data regarding students' physical activity levels and their activity preferences.

Data Analysis Techniques

For data analysis, descriptive statistics such as frequency, tables, and percentages were utilized to analyze the demographic characteristics of the respondents. To analyze the data sets on the main items, the Statistical Package for Social Sciences (SPSS.v26, U.S.A) was used. The confidence interval was set at 95% with a significance threshold level of 0.05.

Levels of physical activity

For the current study, all college students' levels of physical activity and scores were measured using the IPAQ short-form guidelines for data processing and analysis (21). The students stated the frequency (days per week) and duration (hours) of walking, and moderate and vigorous physical activity that they engaged in during the week before the survey. All scores were expressed in Metabolic Equivalent of Task units (MET-minutes/week) (22, 23). MET values and the formula for the computation of MET minutes per week are described as follows:

- Walking MET = 3.3 times walking minutes times walking days;
- Moderate MET = 4.0 times walking minutes times walking days;
- Vigorous MET = 8.0 times walking minutes times walking days;
- Total Physical Activity MET score is the sum of walking, moderate, and vigorous MET minutes per week.

After calculation of the total MET score, the physical activity levels of the study participants were divided into three categories: low (sedentary or inactive <600 MET-minutes/week), moderate (≥600 to <3000 MET-minutes/week), and vigorous (≥3000 MET-minutes/week). The total physical activity MET-minutes/week score is the sum of walking, moderate, and vigorous MET-minutes/week. Vigorous and moderate physical

activities for each of the study participants were categorized as fulfilling or not fulfilling the WHO recommendation for physical activity for good health respectively.

Physical activity preferences

To investigate the physical activity preferences of the students, nine types of physical activity lists were given to them. They chose the activities that they most and least preferred to participate in. In addition, they had the chance to choose more than one activity. Furthermore, they were free to add other physical activities if they did not find their preference on the given list. Frequencies, percentages, and graphs were utilized to explore the most and least physical activity preferences of the students.

Results

Demographic Characteristics of Participants

The detailed characteristics of the participants are presented in (Table 1). Out of 201 study participants, 108 (53.7%) were males. Approximately half of the study samples were males. It was observed that most study participants (n=184 or 91.5%) were in the age range of 20 to 30 years. Furthermore, the majority of the students (n=171 or 85.1%) had normal body mass indexes. However, a few students were underweight (n=23 or 11.4%) and overweight (n=7 or 3.5%). No college students were obese. All the students (N = 201) responded to all of the questions with no missing values.

Table 1: Demographic characteristics of the participants (N=201)

Variables		n (%)
Gender	Male	108(53.7)
	Female	93(46.3)
Age groups (Years)	21 to 30	184(91.5)
	greater than 30	17(8.5)
BMI in kg/m^2	underweight (<18.5kg/m2)	23 (11.4)
	Normal (18.50- 24.99 kg/m2)	171(85.1)
	Overweight (25.00-29.99 kg/m2)	7(3.5)

Key:- N= Number, %= valid percent, BMI= Body Mass Index

Physical Activity Preferences of College Students

The overall physical activity preferences are depicted in (Figure 1) and the results revealed that volleyball was the most preferred physical activity, which weighed 76.6%. The others were 68.2% walking, 51.8% football, 39% jogging, 21.4% rope jumping, 19% push-ups, 13 % sit-up, 6.5% stair climbing, and 2.5% weight lifting were observed. Results revealed that volleyball activity (76.6%) and weight lifting (2.5%) were the most and least frequently preferred physical activities by college students respectively.

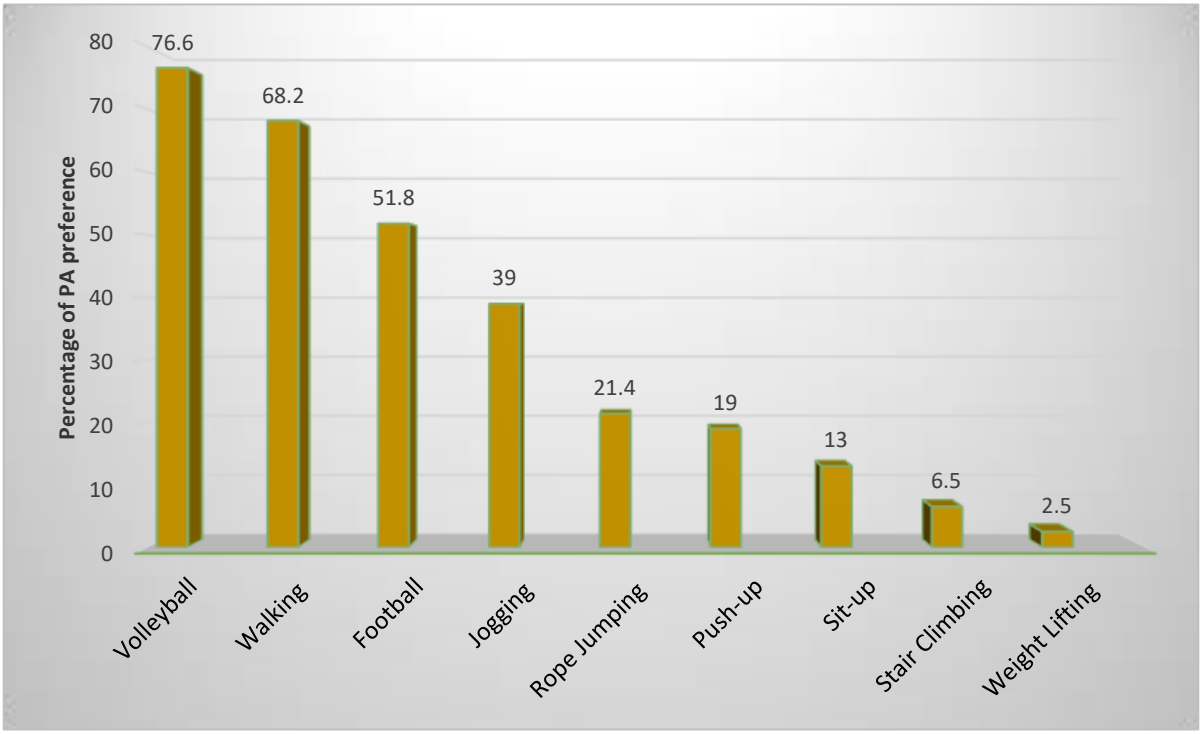

Figure1. Overall activity preferences of college students

Table 2 shows the comparative physical activity preferences of male and female college students. The results showed that volleyball (n=96, 47.8%), football (n=92, 45.8%), and walking (n=55, 27.4%) were reported as the top three physical activity preferences of male college students. Walking (n=82, 40.8%), volleyball (n=58, 28.9%), and jogging (n=32, 16%) were the three most frequently mentioned physical activity preferences by female college students.

Table 2: Gender-wise Physical activity preference f college students (N=201)

No.	Types of PA	Male	Female	Overall PA
		n (%)	n(%)	n(%)
1	Volleyball	96(47.8)	58 (28.8)	154(76.6)
2	Walking	55(27.4)	82 (40.8)	137(68.2)
3	Football	92(45.8)	12(6)	104(51.8)
4	Jogging	26(13)	32(16)	58(39)
5	Rope jumping	18(9)	25(12.4)	43(21.4)
6	Push-up	34(17)	4(2)	38(19)
7	Sit-up	22(11)	4(2)	26(13)
8	Stair climbing	11(5.5)	2(1)	13(6.5)
9	Weights lifting	5(2.5)	-	5(2.5)

The physical activity levels among college students are conveyed in (Figure 2) by employing the metabolic equivalent of task units per minute per week (MET-minutes/week). Results showed that 54.7% of the

students were physically inactive and had not achieved the WHO recommended physical activity guidelines; 28.9% of them were moderately active and only 16.4% of the students performed vigorous activity thereby achieving the WHO physical activity guidelines. The rate of physical activity habit refers to involvement in physical activity one week before the study was conducted.

The findings of this study showed that 54.7% of college students had low levels of physical activity, 28.9% of the participants were more engaged in moderate physical activity and 16.4% of the participants had participated in vigorous physical activity.

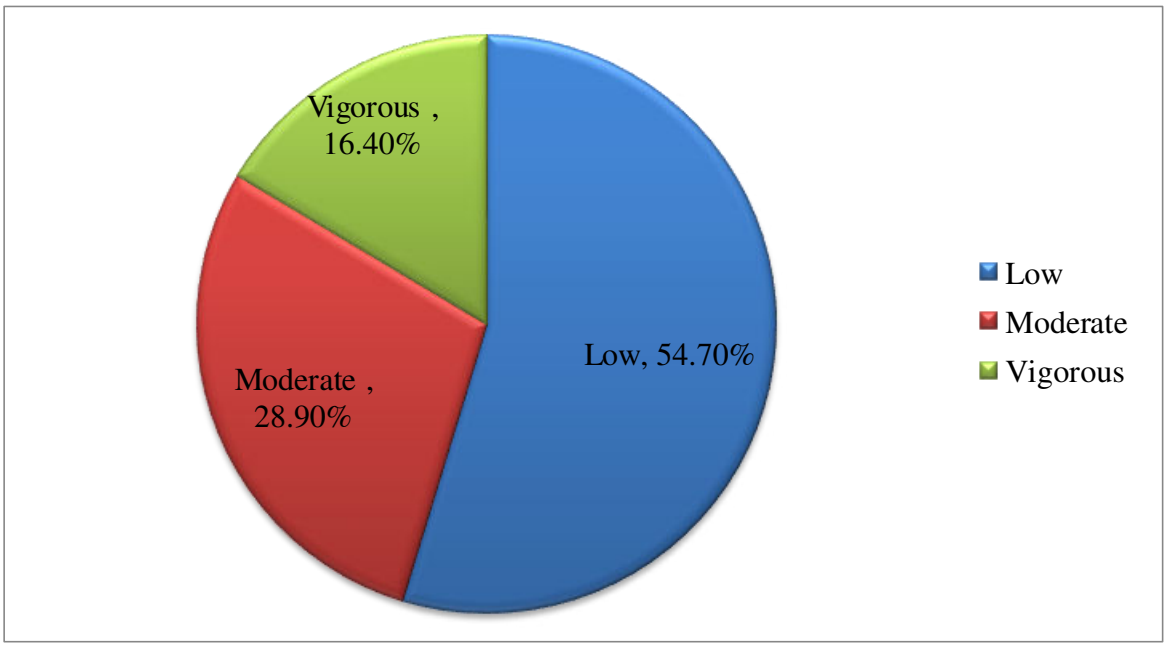

Figure2. The physical activity levels of college students

The comparative physical activity levels of male and female college students are illustrated in (Table 3). The results revealed that 25.4% of male and 29.3% of female college students had low levels of physical activity respectively. Conversely, 10.9% of male and 5.5% of female college students had high levels of physical activity (engaged in vigorous physical activity). Overall, male college students were more physically active than female college students.

Table 3: **Levels of Physical Activity among college students in MET-minutes/week**

Physical Activity Levels by IPAQ	**Self-reported physical activity response frequencies**					
	Male (n=108)	**%**	**Female (n=93)**	**%**	**All (n=201)**	**Total percentage**
Low	51	25.4	59	29.3	110	54.7
Moderate	35	17.4	23	11.5	58	28.9
Vigorous	22	10.9	11	5.5	33	16.4

Notes: n= number of respondents; IPAQ= international physical activity questionnaire; %= percentage

Discussions

The primary purpose of this study was to investigate the levels of physical activity and activity preferences among college students in North Ethiopia. The findings of our study present a novel perspective on the levels of physical activity and preferences of college students, which may assist policymakers in using data on physical activity levels and trends to implement effective non-communicable disease prevention programs. Particular attention should be paid to continuous improvement in the monitoring of physical activity would help to guide the development of policies and strategies to increase activity levels and reduce the burden of non-communicable diseases.

As per the MET score calculated from IPAQ, the results of our study revealed that more than half of the college students (54.7%) had low levels of physical activity (they participated in a minimum total physical activity of fewer than 600 MET minutes per week). This result showed that these categories of college students did not meet the World Health Organization (12, 11) published physical activity guidelines for adults. A study in the Kingdom of Saudi Arabia among universities supports the findings of our study where the pattern of practicing physical exercise showed a significant decrease after college enrolment (24). In their study (24), they discovered that the most common reason for not exercising is time constraints, whereas in our case, low interest makes participation in physical activity difficult due to lengthy study times, an inconvenient environment, and carrying out household routines. Moreover, the study result reported by (25) is in support of our study reporting lower levels of physical activity among university students with the low metabolic equivalent of task (MET).

The results of our study revealed that 28.9% of college students participated in “moderate” physical activity levels and only 16.4% of them adhered to “vigorous” physical activity levels that met the WHO recommendation guidelines for fulfilling good health. The results of our study are consistent with the report by (26) and (27). More evidence shows a decline in the physical activity levels of college students associated with work, transportation, housekeeping, and leisure time at the rates of 35.40%, 21.66%, 7.43%, and 31.66%, respectively (28). However, our finding is in contrast with the study conducted by (29) that described high levels of physical activity (71.3%) among Indian university students. This great discrepancy could be the result of a convenient environment and increased awareness about physical activity among Indian University students compared to college students in the Ethiopian context.

The results of our study revealed that female college students (29.3%) had an inactive lifestyle compared to male college students (25.4%). Substantiating the findings of our study (30) reported that adolescent girls were more physically inactive than boys in Peru. However, contrasting the results of our study high level of physical activity was reported for males (72.1%) and females (70%) university students in India with no statistically significant difference between both male~~s~~ and female~~s~~. This might be due to the fact female college students in our study setting take part mainly in household chores, and spend much time studying, doing homework, and sitting in the house.

Concerning physical activity levels, the results of our study depicted that some (17.4%) male college students were engaged in “moderate” physical activity compared to female college students (11.5%). Male college students participated in "vigorous" physical activity at a lower rate (10.9%) than female students (5.5%) did. Complementary to the results of our study, (31) revealed that 47% of the La Guajira, Colombia, adult population has a moderate physical activity level and 31.1% has a vigorous level, with the best levels found in men compared to women.

The findings of our study revealed disparities in physical activity preferences among male and female college students, with volleyball (76.6%) being the most preferred type of physical activity and weight lifting (2.5%) being the least preferred activity among college students. Pieces of evidence by (32) and (33) substantiate the findings of our study reporting a high variation in daily physical activity preferences including work, transport, and recreational physical activities behaviors. However, the finding of our study is contrary to a study conducted by (34) which revealed that an organized exercise program with flexibility (light or moderate-intensity) exercise for 10–30 minutes with a frequency of 1–2 times a week described the

preferences of college students in Malaysia. The difference in our study setting could be that walking activities can be performed to one's ability, at no cost, which the individual can prefer and take part in the local neighborhood. Moreover, walking activities may be interesting to college students in low-resource countries such as Ethiopia because fees are free and can be more easily done during busy schedules and study time than other physical activities that may require facilities and equipment (such as organized exercise comprising football, volleyball, stair climbing, rope jumping, and weight lifting).

Gender-wise, volleyball (47.8%) and walking (40.8%) were reported as the most preferred physical activities among male and female college students respectively. Our findings are consistent with those of (14) who found that physical activities with a fun component were the most desired situation, with walking (66.7%) and swimming (61.7%) being the most preferred activity types. More pieces of evidence show that male college students prefer competitive activities such as football, weight lifting, and jogging (15, 35, 36). Female college students prefer physical activities done at home with people of similar femininity, such as walking, aerobics, cycling, squash, and yoga (14, 37, 38).

Conclusions

To implement effective non-communicable disease prevention programs, policymakers need data on physical activity levels and trends. Continued improvement in the monitoring of physical activity would help to guide the development of policies and programs to increase activity levels and reduce the burden of non-communicable diseases. Similarly, understanding the physical activity levels and preferences of college students might greatly assist in developing a comprehensive physical fitness program for college students to achieve the minimum weekly physical activity recommended by the World Health Organization. Moreover, the physical activity level and preferences of college students characterized in this study may be used to deliver supplementary, appropriate, and remarkable opportunities for those who might otherwise be overlooked by "one-size-fits-all" physical activity advancement policies. Therefore, designing and implementing specific cost-effective physical activity programs based on the preferences of the target group can promote and escalate the physical activity level of college students.

Limitations

This study had several limitations, which must be taken into consideration. The first limitation is that the sample size was only taken from regular students. If this research was included in the extension student's projects, the result might be more generalizable than the current study. Second, the study sampling site was recruited from only one college in North Ethiopia due to the current unrest and civil war in the country; narrowing the possibility of including other colleges. Therefore, the results were only generalized to this limited population group and may not be generalized to other colleges. Therefore, future study is required among other colleges to find more generalizable results for all colleges. If the study includes other colleges, maybe different college students' levels and physical activity preferences can be researched in a broader context and more precise results will be obtained. Fourth, the researchers utilized a cross-sectional research design and this may narrow the results of the study. Applying more advanced methods such as a mixed-method study design might extract full-fledged and relevant information. Lastly, due to the lack of local research, the research mainly depends on foreign research literature. Therefore, this study has its merits, paving the way for further large-scale studies.

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Conflict of Interest

The authors declare no conflict of interest.

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