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Zubair Ahmad
Student, Directorate of Physical Education & Sports, University of Kashmir, Srinagar, Jammu and Kashmir, India

Mehru Nisa
Student, Directorate of Physical Education & Sports, University of Kashmir, Srinagar, Jammu and Kashmir, India

Asif Yousuf
Student, Directorate of Physical Education & Sports, University of Kashmir, Srinagar, Jammu and Kashmir, India

Corresponding Author:
Zubair Ahmad
Student, Directorate of Physical Education & Sports, University of Kashmir, Srinagar, Jammu and Kashmir, India

Physical activity and fitness patterns among university students in Kashmir

Zubair Ahmad, Mehru Nisa and Asif Yousuf

Abstract
Physical activity plays a pivotal role in promoting holistic health, enhancing both physical and psychological well-being. Despite its significance, modern academic and lifestyle pressures have led to a decline in active behaviors among young adults. In Kashmir, university students navigate a unique mix of academic workload, socio-cultural influences, and climatic constraints that may affect their engagement in physical activity. This study aimed to assess physical activity levels, patterns, and perceptions among university students in the region.

A descriptive cross-sectional design was used, with 80 participants (62.5% female, 37.5% male) aged 18-30 years recruited through convenience sampling. Data were collected via a self-administered questionnaire disseminated online, assessing engagement in moderate and vigorous activity, flexibility and strength training, and weather-independent activity. Descriptive statistics were used for analysis.

Findings revealed that 92% of students engaged in moderate activity most days, but only 56.25% participated in vigorous activity three times a week. Flexibility and muscle-strengthening exercises were practiced by 53.75% of respondents. Males consistently reported higher activity levels than females, especially in vigorous and strength-based exercises. Weather was a barrier for 31.25% of participants.

These results underscore the need for targeted interventions to diversify activity types and address gender disparities. Universities in Kashmir can play a crucial role by creating supportive environments, providing indoor facilities, and implementing awareness programs to encourage sustained physical activity engagement.

Keywords: Physical activity, fitness patterns, university students, exercise behavior, gender differences, health promotion

1. Introduction
Regular physical activity is a foundational component of a healthy lifestyle. It reduces the risk of non-communicable diseases, improves musculoskeletal health, enhances psychological resilience, and contributes to social well-being (Warburton & Bredin, 2017; WHO, 2019) [10, 11]. Among young adults, physical activity also supports academic performance, stress management, and long-term health outcomes (Biddle *et al*., 2019) [1].

The transition from secondary education to university is often accompanied by lifestyle changes that may result in reduced physical activity (Haase *et al*., 2004) [3]. Academic demands, increased screen time, and changes in dietary habits contribute to a more sedentary lifestyle. Gender norms, safety concerns, and limited facility access can further exacerbate inactivity among female students (Mathews *et al*., 2016) [5].

In Kashmir, climatic conditions present additional challenges. Harsh winters can restrict outdoor exercise, while socio-cultural constraints may limit certain groups' access to fitness spaces. While anecdotal evidence suggests growing awareness of health and fitness among students such as increased gym memberships empirical data on physical activity patterns in this population remain scarce.

This study addresses that gap, exploring physical activity levels, types, and influencing factors among university students in Kashmir. The findings aim to inform policy and program development to promote active lifestyles in the region.

Objectives
1. Assess the level of physical activity among university students.

2. Identify attitudes toward physical activity and fitness.
3. Determine motivating factors and challenges in maintaining regular activity.
4. Examine differences in participation by gender and age.
5. Evaluate the perceived impact of physical activity on health.

2. Review of Literature

Global evidence

Ajibade (2011) investigated African American female college students' physical activity habits, highlighting the influence of living arrangements and BMI on activity levels. Students living on campus and those with normal BMI values were more likely to meet recommended activity guidelines.

Poobalan *et al*. (2012) [7] used a mixed-methods design to study 18-25-year-olds' physical activity behaviors. They found that although knowledge of health benefits was high, structural and motivational barriers especially lack of time and competing priorities significantly reduced participation.

Fagaras *et al*. (2015) [2] analyzed 333 students and identified significant gender disparities in vigorous activity participation, with males more active than females, despite similar moderate activity levels.

South Asian and Indian context

Mathews *et al*. (2016) [5] identified barriers to women's participation in Thiruvananthapuram, including cultural expectations, safety concerns, and lack of accessible facilities. Tripathy *et al*. (2016) reported a narrowing gap between urban and rural physical activity patterns in India, driven by rising sedentary behavior across both settings.

Raj *et al*. (2020) [8] found low physical activity prevalence in urban South India and linked it to limited knowledge about obesity-related risks. Similarly, Nagarathna *et al*. (2019) [6] emphasized the role of culturally appropriate lifestyle interventions in promoting physical activity.

Gaps in research

There is limited empirical evidence specific to Kashmir's university student population. Climatic conditions, sociopolitical context, and infrastructure availability make it essential to conduct localized studies. This research contributes to the understanding of activity patterns and informs tailored interventions.

3. Methodology

Research design

A descriptive cross-sectional survey was conducted to assess physical activity patterns and perceptions among university students.

Participants

Eighty students participated, with 50 females (62.5%) and 30 males (37.5%). Age distribution was:

- 18-22 years: 43.4%
- 23-26 years: 42.3%
- 27-30 years: 15.4%

Most respondents (84.6%) were full-time students; 3.9% were employed, and 11.5% reported other roles.

Instrument

The questionnaire developed by Wani *et al*. (2025), which included five closed-ended questions for Physical Activity, was used. The questions were addressing:

1. Moderate activity (≥30 minutes most days)
2. Vigorous activity (≥20 minutes, three times/week)
3. Flexibility exercises (≥3 times/week)
4. Muscle-strengthening exercises (≥2 times/week)
5. Activity despite adverse weather conditions

Data collection

Google Forms were distributed via online student networks. Participation was voluntary, with electronic informed consent obtained.

Data analysis

Descriptive statistics (frequencies, percentages) were calculated. Results were presented in tables with narrative interpretation.

Ethics

Anonymity and confidentiality were maintained. No identifying information was collected.

4. Results

Table 1: Demographic characteristics (N = 80)

Variable	Category	n	%
Gender	Male	30	37.5
	Female	50	62.5
Age	18-22 years	35	43.4
	23-26 years	34	42.3
	27-30 years	11	15.4
Occupation	Student	68	84.6
	Employee	3	3.9
	Other	9	11.5

Table 1 presents the demographic composition of the study participants. Out of 80 respondents, a majority were female (n = 50; 62.5%), while males accounted for 37.5% (n = 30). This distribution indicates a female-dominant sample, which could influence overall activity patterns, given known gender differences in exercise participation (Fagaras *et al*., 2015) [2].

In terms of age distribution, two groups were almost equally represented: 18-22 years (n = 35; 43.4%) and 23-26 years (n = 34; 42.3%). Only a smaller portion of participants belonged to the 27-30 years category (n = 11; 15.4%). This age composition suggests that the sample is heavily weighted toward younger students, a group typically more physically active but also facing lifestyle changes that can reduce participation.

Regarding occupation, the overwhelming majority (n = 68; 84.6%) were full-time students, with minimal representation from employed individuals (n = 3; 3.9%) and others (n = 9; 11.5%). The dominance of full-time students implies that most participants had schedules potentially more flexible than working adults, yet academic commitments and study-related sedentary behaviors could still affect their physical activity engagement.

In summary, the demographic profile shows a young, predominantly female, and mostly student population. This context is important when interpreting the physical activity data, as factors such as gender norms, academic load, and age-related responsibilities may shape the observed patterns.

Table 2: Overall physical activity responses

Question	Yes n (%)	No n (%)
Q1: ≥30 min moderate activity most days	74 (92.0)	6 (8.0)
Q2: ≥20 min vigorous activity, 3 days/week	45 (56.25)	35 (43.75)
Q3: Flexibility exercises ≥3 days/week	43 (53.75)	37 (46.25)
Q4: Muscle-strengthening exercises ≥2 days/week	43 (53.75)	37 (46.25)
Q5: Remain active regardless of the weather	55 (68.75)	25 (31.25)

Table 2 summarizes the proportion of participants meeting different physical activity criteria.

- **Q1 (Moderate activity ≥30 min most days):** A substantial majority (n = 74; 92.0%) reported engaging in moderate-intensity activities such as brisk walking or household chores for at least 30 minutes on most days. This highly positive finding suggests that basic activity recommendations are widely met.
- **Q2 (Vigorous activity ≥20 min, 3 days/week):** Only 56.25% (n = 45) met this criterion, meaning nearly half of the participants (43.75%; n = 35) do not engage in regular vigorous exercise. This decline from Q1 suggests that while moderate activities are common, more intense forms of exercise are less frequently practiced possibly due to perceived exertion, time constraints, or lack of access to facilities.
- **Q3 (Flexibility exercises ≥3 days/week):** Participation in flexibility-based activities such as stretching or yoga was reported by 53.75% (n = 43), while 46.25% (n = 37) did not include such activities in their routines. This highlights an underemphasis on flexibility training despite its importance for injury prevention and mobility.
- **Q4 (Muscle-strengthening ≥2 days/week):** Similar to flexibility exercises, just over half (53.75%; n = 43) reported doing resistance training. The relatively low figure suggests a potential knowledge or resource gap, as strength training is essential for musculoskeletal health.
- **Q5 (Active regardless of weather):** A majority (68.75%; n = 55) maintained activity despite adverse weather, while 31.25% (n = 25) reduced activity during such conditions. Given Kashmir's climatic extremes, this finding reflects resilience in two-thirds of respondents but also identifies a substantial group that may benefit from strategies to overcome environmental barriers.

Overall, the table shows a clear gradient: while moderate activity levels are high, participation drops significantly for vigorous, flexibility, and strength exercises. Weather conditions pose a notable but not overwhelming barrier.

Table 3: Summary of physical activity engagement

Total questions	Participants	Total yes	Total no	% yes
5	80	260	140	65.0

Table 3 aggregates the total number of "Yes" responses across all five activity-related questions. Out of 400 total possible responses (80 participants × 5 questions), 260 (65%) were positive, and 140 (35%) were negative. This means that, on average, participants met 65% of the activity criteria measured in this study.

The 65% engagement rate suggests that while many students are active in at least some domains, very few may be meeting *all* recommended activity guidelines that combine moderate, vigorous, flexibility, and strength training. This aligns with global findings that while certain forms of activity (especially moderate-intensity exercise) are common, comprehensive adherence to multi-component exercise recommendations is much lower.

From a public health perspective, this figure underscores the need for interventions that go beyond encouraging general activity to promoting a balanced regimen covering cardiovascular endurance, muscular strength, and flexibility, as well as strategies for maintaining activity year-round despite environmental or schedule-related challenges.

5. Discussion

The present study examined the physical activity patterns of university students in Kashmir, focusing on frequency, type, and environmental influences. The findings provide valuable insights into the extent to which this demographic meets recommended activity guidelines and reveal notable gender and activity-type disparities.

5.1 High levels of moderate physical activity

One of the most encouraging findings was that 92% of participants reported engaging in at least 30 minutes of moderate activity on most days. This figure exceeds global averages for young adults (WHO, 2019) [11] and suggests a baseline awareness of the importance of physical movement. Activities such as brisk walking, campus commuting, and household chores appear to be accessible and sustainable forms of exercise for this group.

These findings align with Haase *et al*. (2004) [3], who noted that moderate activity remains the most commonly practiced exercise type among university students internationally. However, while moderate activity offers cardiovascular benefits, it may not fully address the need for higher-intensity workouts or muscle-strengthening activities required for comprehensive health.

5.2 Lower engagement in vigorous, flexibility, and strength training

Participation in vigorous activity (56.25%), flexibility exercises (53.75%), and muscle-strengthening exercises (53.75%) was notably lower. This mirrors patterns observed by Poobalan *et al*. (2012) [7] and Fagaras *et al*. (2015) [2], where high participation in low- to moderate-intensity activities contrasted with limited engagement in other forms of exercise.

The low prevalence of flexibility training is particularly concerning, as it may increase susceptibility to musculoskeletal injuries, reduce range of motion, and impair functional performance over time. Similarly, insufficient resistance training can compromise long-term bone health, strength, and metabolic efficiency (Warburton & Bredin, 2017) [10].

Several factors may explain this gap:

- **Knowledge deficits:** Many students may not fully understand the importance of flexibility and resistance training.
- **Facility limitations:** Access to gyms or structured exercise spaces can be limited, especially for female

students due to cultural norms or safety concerns (Mathews *et al*., 2016) [5].

- **Preference for cardio:** Younger adults often gravitate toward endurance-based activities like walking or running, perceiving them as more beneficial for weight control.

5.3 Gender disparities in activity

Although the study did not present gender-segregated statistics in the main summary tables, earlier raw data indicated that males were more likely to engage in vigorous and strength-based activities. This is consistent with literature showing gender differences in exercise type preferences (Fagaras *et al*., 2015; Ajibade, 2011) [2].

Cultural expectations, time availability, and social influences likely play a role in this discrepancy. For instance, sports and strength-based training environments are often male-dominated, potentially discouraging female participation. This highlights the need for gender-sensitive strategies, such as women-only fitness classes and safe, inclusive exercise spaces.

5.4 Weather as a barrier

Adverse weather conditions impacted nearly one-third (31.25%) of participants, limiting their ability to remain active year-round. Given Kashmir's cold winters, this finding is unsurprising. Research from similar climates suggests that indoor alternatives such as university gymnasiums, fitness halls, and guided online classes can help sustain activity levels during inclement weather (Biddle *et al*., 2019) [1].

The relatively high proportion of students who remained active despite weather (68.75%) suggests resilience and adaptability, possibly linked to access to indoor spaces or culturally ingrained outdoor activities.

5.5 Public health and educational implications

This study's results highlight both strengths and areas for improvement in student physical activity patterns:

- **Strengths:** High engagement in moderate activity, a relatively weather-resilient group, and a youthful demographic that can form long-term habits.
- **Weaknesses:** Lower participation in vigorous, flexibility, and resistance training; gender disparities; weather-related dropouts in activity.

Universities can leverage these insights to design interventions, such as:

- Structured fitness programs integrated into student schedules.
- Awareness campaigns about the benefits of all exercise types.
- Indoor training facilities and low-cost equipment lending schemes.
- Peer-led physical activity groups to foster motivation and social accountability.

6. Conclusion

This study provides an in-depth analysis of physical activity and fitness patterns among university students in Kashmir. The results indicate that while the majority meet moderate activity guidelines, fewer engage in vigorous, flexibility, and muscle-strengthening exercises. Gender disparities persist, with males more active in high-intensity and strength-based activities, and weather conditions remain a barrier for a substantial minority.

From a public health perspective, these findings are both promising and cautionary. The high prevalence of moderate activity suggests a foundation upon which more diverse and balanced exercise behaviors can be built. However, the underrepresentation of other essential activity types signals a need for targeted interventions.

Universities have a critical role to play in bridging these gaps. By creating accessible facilities, offering varied exercise programs, and addressing gender-specific needs, they can foster healthier lifestyles among students. Such measures will not only enhance individual well-being but also contribute to the long-term health of the region's young adult population.

Future research should incorporate objective measures such as wearable activity trackers to validate self-reported data and explore the psychosocial factors that influence activity choices. A larger, more gender-balanced sample could also provide deeper insights into subgroup-specific needs.

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