# Assessment of healthy lifestyle and physical movement levels among female university students: a cross-sectional study

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ABSTRACT
**Purpose.** This study delves into the healthy lifestyles and physical movement levels of female university students in the union territories of Jammu and Kashmir and the union territory of Ladakh, India. The primary aim of this study was to evaluate the healthy lifestyles and physical activity levels of female university students in these union territories. We sought to identify regional trends and differences in health and wellness among young women in these regions.
**Methods.** We conducted a cross-sectional survey using a snowball sampling technique, gathering online and offline data from participants in urban and rural areas across all universities in these union territories. The survey included responses from 1,377 students aged 20–32 years. We adapted the Healthy Lifestyle Questionnaire (HLQ) to suit the cultural and regional contexts, assessing six key domains.
**Results.** Our results show that female university students in both union territories typically demonstrate low adherence to healthy lifestyle practices and physical activity levels. However, significant disparities were observed between the two regions. Female students from Ladakh were found to be more physically active, better nourished, less stressed, and had healthier habits than their counterparts in Jammu and Kashmir.
**Conclusions.** The study highlights the need for tailored programs that promote healthy lifestyles and physical activity specific to each union territory's needs. Our findings suggest that all six healthy lifestyle components are closely linked and account for 96.9% of the overall healthy lifestyle score variance. Future research should investigate the underlying factors contributing to low engagement in healthy lifestyle behaviours and physical activity in these union territories and investigate the factors contributing to regional differences to formulate effective public health strategies.
**Key words:** healthy lifestyle, physical activity, nutrition, stress management

## Introduction

In this study, the researcher examines health-promoting practices among female university students in the union territories of Jammu and Kashmir and the union territory of Ladakh. The primary aim is to investigate this demographic's lifestyle behaviours and physical movement, focusing on how sociocultural and geographical factors influence their health-related choices.

The study hypothesises that these factors significantly impact nutrition, physical activity, and stress management among female university students. This demographic is particularly relevant due to its unique challenges, including academic workloads, social expectations, and transitioning to independent living.

Existing research highlights that the modern age is dominated by technology, often leading individuals – especially students – to neglect their well-being. University life introduces substantial transitions that can adversely affect food choices and exercise habits [1]. The Jammu, Kashmir, and Ladakh regions present a complex backdrop for this investigation, characterised by diverse cultural zones and geographical features

that influence health practices. Factors such as access to recreational facilities, culturally appropriate diets, and climatic conditions significantly shape higher-education women's physical activity levels and dietary habits [2].

A review of current literature indicates that young women in developing nations struggle to meet recommended physical activity levels due to barriers such as time constraints and safety concerns [3, 4]. Additionally, nutrition is crucial for preventing fatigue and maintaining health; however, female university students are at risk of developing unhealthy eating habits [5, 6]. Furthermore, stress management is essential for overall well-being; many students report experiencing anxiety that can negatively affect their health if not managed effectively [7, 8].

This study aims to fill a gap in the health-related literature by identifying healthy lifestyle behaviours and physical activity patterns among female university students in Jammu, Kashmir, and Ladakh. Utilising an adapted Healthy Lifestyle Questionnaire (HLQ), the research will assess six key domains: physical activity levels, nutrition, stress management strategies, methods for overcoming destructive habits, personal health practices, and the surrounding environment.

By pinpointing specific strengths and weaknesses across these domains, the findings will assist policymakers in designing targeted interventions tailored to this population's unique needs. This work represents one of the first comprehensive efforts to emphasise targeted health promotion for young women in universities within these regions. It advocates collaboration among universities and local stakeholders to create supportive environments encouraging sustainable, healthy lifestyles.

### Material and methods

This research is based on a cross-sectional survey design, capable of determining the current healthy lifestyles and physical activity levels of female university students in the union territories of Jammu and Kashmir and the union territory of Ladakh in India. Concerns about lifestyle behaviours and physical activity were among the focus areas to capture the variations of lifestyle and physical activity among the female students of universities in these union territories.

### Study population and sample

The study's target population was female students from all the universities of Jammu, Kashmir, and

Table 1. Universities and their locations in Jammu, Kashmir, and Ladakh

| University name | Location |
|---|---|
| University of Kashmir (UoK) | Hazratbal, Srinagar |
| University of Jammu (UoJ) | Gujarbasti, Jammu |
| Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K) | Shalimar, Srinagar (Main Campus and all its constituent campuses) |
| Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu (SKUAST-J) | Chatha, Jammu |
| Shri Mata Vaishno Devi University (SMVDU) | Katra, Reasi |
| Islamic University of Science and Technology (IUST) | Awantipora, Pulwama |
| Baba Ghulam Shah Badshah University (BGSBU) | Rajouri |
| Central University of Kashmir (CUK) | Ganderbal |
| Central University of Jammu (CUJ) | Samba |
| Cluster University of Jammu (CUoJ) | Jammu |
| Cluster University of Srinagar CUoS) | Srinagar |
| University of Ladakh (UoL) | Leh Campus and Kargil Campus |
| Sindhu Central University (SCU) | Ladakh |

Ladakh, who were 20 to 32 years old. In order to maximise the participation in the survey of female students from all the universities of Jammu, Kashmir, and Ladakh, the researchers employed the snowball sampling technique of the sampling process, which leveraged referrals from initial participants to recruit additional respondents, ensuring broader participation.

The universities from the union territories of Jammu and Kashmir and the union territory of Ladakh involved in the study, along with their respective campuses, are listed in Table 1.

A total of 1,377 valid responses were collected, while an additional 136 responses were excluded due to incompleteness or casual entries.

Table 2 presents the demographic distribution of the respondents across the universities in Jammu, Kashmir, and Ladakh. The majority of the respondents were from the universities located in Kashmir (694), followed by the respondents from the universities located in Jammu (620) and the universities situated in Ladakh (63). The University of Kashmir had the highest representation (295 respondents), while Sindhu Central University in Ladakh had the least (3 respondents).

Table 2. Demographic details of respondents by region

| Region | University name | Respondents |
|---|---|---|
| Jammu | University of Jammu (UoJ) | 220 |
| | SKUAST-J | 110 |
| | SMVDU | 83 |
| | BGSBU | 69 |
| | Central University of Jammu (CUJ) | 59 |
| | Cluster University of Jammu (CUoJ) | 79 |
| | Total | 620 |
| Kashmir | University of Kashmir (UoK) | 295 |
| | SKUAST-K | 165 |
| | IUST | 96 |
| | Central University of Kashmir (CUK) | 55 |
| | Cluster University of Srinagar (CUoK) | 83 |
| | Total | 694 |
| Ladakh | University of Ladakh (Leh Campus) | 28 |
| | University of Ladakh (Kargil Campus) | 32 |
| | Sindhu Central University (SCU) | 3 |
| | Total | 63 |

This distribution highlights the regional variation in respondent participation, reflecting the diverse educational landscape of the three regions. The female respondents' lower participation from the universities in the union territory of Ladakh is because of the low enrollment of students in the universities in Ladakh due to the lower population in the union territory.

Instrument

The Healthy Lifestyle Questionnaire (HLQ) was used as the primary instrument to measure various lifestyle domains. This questionnaire was adapted explicitly for cultural and regional relevance, covering six key domains: Physical Activity, Nutrition, Managing Stress, Avoiding Destructive Habits, Personal Health Habits, and Protecting the Environment.

The instrument was assessed for reliability. The results showed Cronbach's alpha values greater than 0.93, indicating a high internal consistency level. A pilot study was conducted in early 2023 with 50 participants to assess the clarity and appropriateness, resulting in minor revisions to enhance comprehensibility.

Data collection

Data was collected over ten months, from January 1, 2024, to October 31, 2024. Two primary methods were used to reach the respondents:

Online mode. Google Form links were disseminated through social media platforms, including WhatsApp, Facebook, and Instagram, ensuring accessibility for students across all regions.

Paper-Based mode. Physical copies of questionnaires were distributed directly to the students in direct contact with the researchers and in areas with limited internet access, particularly in rural and remote locations.

Scoring and categorisation

The instrument adopted for this study, the Healthy Lifestyle Questionnaire (HLQ) comprises six domains: Physical Activity (4 questions), Nutrition (4 questions), Managing Stress (4 questions), Avoiding Destructive Habits (4 questions), Personal Health Habits (2 questions), and Protecting the Environment (2 questions). The responses for each question in each domain are coded as 1 for 'yes' and 0 for 'no'. The total score for each domain was determined by summing the responses to all the questions within that domain.

To categorise the healthy lifestyle and physical activity levels in each domain as low, moderate, or high, the total score range for each domain is divided into equal intervals to create three categories:

Low. Representing participants with scores in the lower one-third of the total possible score range.

Moderate. Representing participants who scored in the middle third of the overall range.

High. Representing participants who scored in the upper one-third of the range.

The specific scoring and categorisation for each domain are as follows in Table 3.

Table 3. Scoring and Categorisation for Healthy Lifestyle Questionnaire (HLQ)

| Domain | No. of items | Score range | Low | Moderate | High |
|---|---|---|---|---|---|
| Physical Activity | 4 | 0–4 | 0–1 | 2–3 | 4 |
| Nutrition | 4 | 0–4 | 0–1 | 2–3 | 4 |
| Managing Stress | 4 | 0–4 | 0–1 | 2–3 | 4 |
| Avoiding Destructive Habits | 4 | 0–4 | 0–1 | 2–3 | 4 |
| Personal Health Habits | 2 | 0–2 | 0 | 1 | 2 |
| Protecting the Environment | 2 | 0–2 | 0 | 1 | 2 |

Rationale for categorisation

Using equal intervals ensures a simple and interpretable method for classifying participants. This approach facilitates comparisons across domains and regions while maintaining consistency in scoring.

Data analysis

The data collected through the Healthy Lifestyle Questionnaire (HLQ) were analysed, keeping the study's focus in mind and using descriptive and inferential statistics. Descriptive statistics summarised the domain-specific scores and demographic characteristics of the respondents. Inferential statistical techniques included:

Chi-square tests. These tests were utilised to find associations between categorical variables.

Analysis of variance (ANOVA). The analysis focused on comparing the differences in healthy lifestyle domain scores between the Union Territory of Jammu and Kashmir and the Union Territory of Ladakh.

Regression analysis. Conducted to explore significant predictors influencing healthy lifestyle practices.

The statistical analysis for the entire study was conducted using the SPSS software version 29, with a significance level set at $p < 0.05$.

## Results

A thorough check for missing data using frequencies under descriptive statistics revealed no missing or incorrect data across the selected variables. The dataset was complete and consistent, ensuring the reliability of subsequent analyses.

Table 4 summarises the descriptive statistics for each domain of the Healthy Lifestyle Questionnaire. The mean values represent the proportion of respondents who answered each item affirmatively, while standard deviations indicate response variability.

Notable findings include. High mean scores for avoiding destructive habits, such as non-use of tobacco (0.95) and moderate alcohol consumption (0.90).

Lower mean scores for recycling materials (0.20) and engaging in vigorous physical activities (0.28).

These variations highlight differences in healthy lifestyle practices among respondents, providing a foundation for further analysis.

Table 4. Descriptive statistics of variables across healthy lifestyle questionnaire domains

| Domain | Variable | Mean | SD |
|---|---|---|---|
| Physical Activity | I do at least thirty (30) min of physical activity, like brisk walking or household chores, on most days of the week. | 0.63 | 0.48 |
| | I exercise hard, like jogging or cycling, for 20 minutes, 3 times a week. | 0.28 | 0.45 |
| | I perform flexibility exercises (e.g., stretching, yoga) at least three days a week. | 0.32 | 0.47 |
| | I do strength exercises, like push-ups or weightlifting, at least 2 days a week. | 0.28 | 0.45 |
| Nutrition | I eat three balanced meals each day, including breakfast. | 0.66 | 0.47 |
| | I include a variety of food groups (e.g., vegetables, fruits, grains, proteins, and dairy) in my daily diet. | 0.42 | 0.49 |
| | I limit the amount of high-fat and fried foods in my diet. | 0.44 | 0.50 |
| | I consume appropriate calories based on my physical activity levels and avoid overeating. | 0.41 | 0.49 |
| Managing Stress | I can recognise the things that stress me out in my daily life. | 0.73 | 0.45 |
| | I make time to rest and calm down throughout the day to help manage my stress. | 0.68 | 0.47 |
| | I allocate time for family, friends, or activities I enjoy. | 0.75 | 0.43 |
| | I engage in stress-relief practices such as yoga, deep breathing, or mindfulness. | 0.36 | 0.48 |
| Avoiding Destructive Habits | I do not smoke or use any tobacco products. | 0.95 | 0.21 |
| | I do not drink too much alcohol, or I avoid it altogether. | 0.90 | 0.30 |
| | I only take medicines as prescribed by a doctor, and I don't use any illegal drugs. | 0.90 | 0.31 |
| | I only take over-the-counter medicines when I really need them, and I follow the instructions on the label. | 0.73 | 0.45 |
| Personal Health Habits | I brush my teeth twice daily and floss once daily to keep my teeth and mouth clean. | 0.76 | 0.42 |
| | I get enough sleep each night to feel well-rested and alert during the day. | 0.23 | 0.42 |
| Protecting the Environment | I recycle materials such as paper, glass, and aluminum. | 0.20 | 0.40 |
| | I actively participate in environmentally friendly practices such as water conservation, carpooling, and reducing plastic waste. | 0.12 | 0.32 |

Table 5. Descriptive statistics of healthy lifestyle domains categorised as low, moderate, and high

| Domain | Category | Frequency | Percentage | Mean | SD |
|---|---|---|---|---|---|
| Physical Activity | low | 791.00 | 57.44 | | |
| | moderate | 446.00 | 32.39 | | |
| | high | 140.00 | 10.17 | 1.52 | 0.67 |
| | total | 1377.00 | 100.00 | | |
| Nutrition | low | 573.00 | 41.61 | | |
| | moderate | 600.00 | 43.57 | | |
| | high | 204.00 | 14.81 | 1.73 | 0.70 |
| | total | 1377.00 | 100.00 | | |
| Managing Stress | low | 252.00 | 18.30 | | |
| | moderate | 821.00 | 59.62 | | |
| | high | 304.00 | 22.08 | 2.03 | 0.63 |
| | total | 1377.00 | 100.00 | | |
| Avoiding Destructive Habits | low | 55.00 | 3.99 | | |
| | moderate | 477.00 | 34.64 | | |
| | high | 845.00 | 61.37 | 2.57 | 0.57 |
| | total | 1377.00 | 100.00 | | |
| Personal Health Habits | low | 252.00 | 18.30 | | |
| | moderate | 879.00 | 63.83 | | |
| | high | 246.00 | 17.86 | 1.99 | 0.60 |
| | total | 1377.00 | 100.00 | | |
| Protecting the Environment | low | 1024.00 | 74.36 | | |
| | moderate | 265.00 | 19.24 | | |
| | high | 88.00 | 6.39 | 1.32 | 0.59 |
| | total | 1377.00 | 100.00 | | |

Table 5 categorises responses into low, moderate, and high levels for each lifestyle domain, summarising frequencies, percentages, means, and standard deviations. Key observations include:

Physical Activity. The majority (57.44%) fall into the low category, with a mean score of 1.52 ($SD$ = 0.67).

Nutrition. A balanced distribution, with 41.61% in the low category and 43.57% in the moderate category, yielding a mean of 1.73 ($SD$ = 0.70).

Managing Stress. Moderate practices dominate (59.62%), with a mean of 2.03 ($SD$ = 0.63).

Avoiding Destructive Habits. The high category comprises 61.37% of respondents, with a mean of 2.57 ($SD$ = 0.57).

Personal Health Habits. Moderate responses account for 63.83%, with a mean of 1.99 ($SD$ = 0.60).

Protecting the Environment. A substantial proportion (74.36%) fall into the low category, with a mean score of 1.32 ($SD$ = 0.59).

These results suggest that while participants exhibit strengths in avoiding destructive habits, areas like physical activity and environmental practices require significant improvement.

The chi-square analysis (Table 6) reveals significant associations between regions and healthy lifestyle domains ($p$ < 0.01):

Physical Activity. There is significant regional variation, with Ladakh showing the lowest engagement compared to Jammu and Kashmir.

Nutrition. There are notable differences, with Kashmir having a higher percentage of low nutrition levels.

Managing Stress. Variability exists, with Jammu showing a slightly higher proportion of low scores.

Avoiding Destructive Habits. Ladakh demonstrates a higher tendency to avoid destructive habits.

Personal Health Habits. Moderate practices are predominant in Jammu and Kashmir, with a distinct pattern in Ladakh.

Protecting the Environment. Regional disparities are evident, with Ladakh lagging in high-level practices.

These findings underline the influence of regional contexts on health behaviours and pinpoint the necessity for tailored interventions to promote healthier lifestyles uniformly across the union territories.

The results presented in Table 7 provide an in-depth analysis of the variations in healthy lifestyle domains across the three regions of Jammu, Kashmir, and La-

Table 6. Chi-square analysis of regional differences across domains

| Domain | Chi-square value | df | p-value | Significant association? | Observations |
|---|---|---|---|---|---|
| Physical Activity | 86.853 | 4 | 0.000*** | yes | Significant differences in physical activity levels across regions. |
| Nutrition | 32.684 | 4 | 0.000*** | yes | Regional variations noted in nutrition practices. |
| Managing Stress | 13.806 | 4 | 0.008** | yes | Jammu and Kashmir differ significantly in stress management practices. |
| Avoiding Destructive Habits | 39.97 | 4 | 0.000*** | yes | Ladakh has a higher avoidance of destructive habits compared to the other regions. |
| Personal Health Habits | 44.185 | 4 | 0.000*** | yes | Moderate personal health practices dominate in Jammu and Kashmir. |
| Protecting the Environment | 12.331 | 4 | 0.015*** | yes | Environmental protection efforts vary significantly across regions. |

Table 7. ANOVA results for healthy lifestyle domains across regions

| Domain | Jammu (mean ± SD) | Kashmir (mean ± SD) | Ladakh (mean ± SD) | F | p-value | Significant pairwise comparisons (Tukey HSD) |
|---|---|---|---|---|---|---|
| Physical Activity | 1.50 ± 1.26 | 1.47 ± 1.32 | 2.13 ± 0.63 | 7.83 | 0.00 | Jammu < Ladakh; Kashmir < Ladakh |
| Nutrition | 2.01 ± 1.30 | 1.81 ± 1.35 | 2.46 ± 0.98 | 9.22 | 0.00 | Jammu > Kashmir; Ladakh > Jammu, Kashmir |
| Managing Stress | 2.40 ± 1.30 | 2.61 ± 1.20 | 2.84 ± 0.83 | 6.73 | 0.001 | Jammu < Kashmir; Jammu < Ladakh |
| Avoiding Destructive Habits | 3.50 ± 0.80 | 3.42 ± 0.83 | 3.97 ± 0.18 | 14.00 | 0.00 | Jammu < Ladakh; Kashmir < Ladakh |
| Personal Health Habits | 1.00 ± 0.58 | 0.95 ± 0.61 | 1.44 ± 0.50 | 20.10 | 0.00 | Jammu < Ladakh; Kashmir < Ladakh |
| Protecting the Environment | 0.28 ± 0.56 | 0.36 ± 0.62 | 0.27 ± 0.45 | 3.25 | 0.039 | Kashmir > Jammu |

dakh. Significant regional differences were observed in all domains except for the 'environment' domain, which showed limited variation.

### Physical Activity

Ladakh exhibited significantly higher mean scores (2.13 ± 0.63) compared to both Jammu (1.50 ± 1.26) and Kashmir (1.47 ± 1.32), as indicated by the significant pairwise comparisons ($p < 0.001$). This suggests that female students in Ladakh are more engaged in physical activities than their counterparts in Jammu and Kashmir.

### Nutrition

Ladakh also demonstrated the highest mean score (2.46 ± 0.98) for nutrition, surpassing both Jammu (2.01 ± 1.30) and Kashmir (1.81 ± 1.35). Interestingly, the female students from the universities of Jammu scored higher than the female students of the universities of Kashmir in this domain, reflecting a moderate nutritional advantage ($p < 0.001$).

### Managing Stress

The female students from the universities of Ladakh (2.84 ± 0.83) reported the highest proficiency in the management of stress, followed by female students from the universities of Kashmir (2.61 ± 1.20) and Jammu (2.40 ± 1.30). The significant differences between the female students from the universities of Jammu and the other two regions underscore the need for targeted stress management interventions in Jammu ($p = 0.001$).

### Avoiding Destructive Habits

Ladakh again outperformed both Jammu and Kashmir in this domain, with a mean score of 3.97 ± 0.18,

compared to Jammu (3.50 ± 0.80) and Kashmir (3.42 ± 0.83). The stark contrast indicates that students in Ladakh exhibit greater discipline in avoiding destructive habits ($p < 0.001$).

### Personal Health Habits

This domain highlighted the most substantial regional disparity, with Ladakh students scoring significantly higher (1.44 ± 0.50) compared to Jammu (1.00 ± 0.58) and Kashmir (0.95 ± 0.61). These findings emphasise Ladakh's relative advantage in maintaining personal health habits ($p < 0.001$).

### Protecting the Environment

While differences were less pronounced in this domain, students from Kashmir (0.36 ± 0.62) scored slightly higher than those in Jammu (0.28 ± 0.56), with Ladakh students (0.27 ± 0.45) trailing marginally behind. The $p$-value (0.039) indicates statistical significance, although with less variability than other domains.

### Summary

The findings reveal that female students from Ladakh consistently outperformed their counterparts in Jammu and Kashmir across most healthy lifestyle domains, predominantly in physical activity, nutrition, management of stress, avoiding destructive habits, and personal health habits. These results underscore the essence of territory-specific healthy lifestyle and physical activity promotion strategies to address disparities and improve well-being among female university students in Jammu, Kashmir, and Ladakh.

Table 8 presents a summary of the regression model's overall fit. The $R$-value of 0.984 indicates a strong positive correlation between the independent variables – specifically, the six domains of the healthy lifestyle questionnaire – and the dependent variable, the overall healthy lifestyle. Values close to 1 suggest a high level of correlation. The $R^2$ value of 0.969 indicates that approximately 96.9% of the variability in the overall healthy lifestyle can be explained by the six domains of the questionnaire. Additionally, the adjusted $R^2$ value

of 0.97 considers the number of predictors in the model and slightly adjusts the $R^2$, reinforcing the model's strong predictive capability. Finally, the standard error of 0.09468 reflects the average deviation between the actual and predicted values, indicating a minimal prediction error and further supporting the model's reliability.

Table 9 evaluates the overall significance of the regression model. The sum of squares for the regression (382.799) represents the explained variation in the dependent variable – overall healthy lifestyle. With 5 degrees of freedom, the mean square value is 76.560. The $F$-value of 8540.208 and a significance level of 0.000 indicate that the regression model is statistically significant. This confirms that the set of independent variables significantly predicts the dependent variable, validating the model's reliability.

Table 10 displays each independent variable's coefficients and individual contributions to the regression model. The unstandardised coefficients shown in the table indicate how much the dependent variable – overall healthy lifestyle – changes with a one-unit increase in each independent variable. For instance, an increase of one unit in nutrition corresponds to a 0.172-unit rise in the overall healthy lifestyle score. On the other hand, the standardised coefficients (beta values)

Table 9. ANOVA Table for Regression Model

| Source | Sum of squares | $df$ | Mean square | $F$ | Sig. |
|---|---|---|---|---|---|
| Regression | 382.799 | 5.00 | 76.56 | 8540.208 | 0.000 |

Only the regression row is shown as per model output. Residual and total values were not reported.

Table 10. Regression coefficients and their significance

| Coefficients | Unstandardised coefficients (B) | Standardised coefficients (Beta) | $t$ | Sig. |
|---|---|---|---|---|
| (Constant) | 0.03 | – | 2.44 | 0.01 |
| Nutrition | 0.17 | 0.42 | 76.15 | 0.00 |
| Physical Activity | 0.17 | 0.40 | 72.63 | 0.00 |
| Managing Stress | 0.17 | 0.39 | 74.49 | 0.00 |
| Avoiding Destructive Habits | 0.16 | 0.24 | 48.27 | 0.00 |
| Personal Health Habits | 0.21 | 0.23 | 47.42 | 0.00 |

The 'Protecting the Environment' domain was excluded from the final model due to its statistical insignificance. Variables are listed in descending order of their standardised Beta coefficients (i.e., strongest predictors listed first).

Table 8. Regression model summary

| Model | $R$ | $R^2$ | Adjusted $R^2$ | Std. error of the estimate |
|---|---|---|---|---|
| 1 | 0.984$^e$ | 0.969 | 0.97 | 0.09468 |

reflect the relative strength of each independent variable's impact on the dependent variable. This revision maintains the original meaning while enhancing clarity and readability. The $t$-values test the significance of each coefficient, while sig. values ($p$-values) below 0.05 confirm that all predictors statistically impact the dependent variable (overall healthy lifestyle). The simplified explanation is as follows:

Nutrition has the most substantial influence on a healthy lifestyle, with a standardised effect of 0.42. This means that eating balanced meals and following proper dietary habits significantly improves overall health.

Physical Activity is the next most important factor, with a standardised effect of 0.40. Regular exercise, such as moderate or vigorous activities, plays a crucial role in maintaining a healthy lifestyle.

Managing Stress has a standardised effect of 0.39, showing that effectively handling stress through practices like mindfulness or taking breaks is essential for overall well-being.

Avoiding Destructive Habits, such as not smoking or drinking excessively, also has a positive effect, with a more minor but significant impact (0.24).

Personal Health Habits like brushing teeth regularly and getting enough sleep contribute to a standardised effect of 0.23.

Finally, the findings confirm that Nutrition, Physical Activity, and Managing Stress are the primary determinants of a healthy lifestyle among the studied population. However, avoiding harmful habits and maintaining personal health routines are also essential contributors.

The findings of this study have important implications for university administrators and policymakers. Since the physical activity levels were found to be low, especially in Jammu and Kashmir, universities should introduce a dedicated 45-minute session of moderate to vigorous physical activity combined with meditation to the daily timetable, similar to a core subject. This should be a credited course to ensure students take it seriously, contributing to their overall academic performance. Additionally, creating accessible recreational spaces and organising structured fitness programs can encourage active participation. Alongside this, awareness campaigns on balanced nutrition and mental well-being should be implemented to address dietary habits and stress management challenges. Tailoring such initiatives to the specific needs of each region can help foster a healthier student community, ultimately enhancing both well-being and academic success.

## Discussion

This study examined female university students' lifestyle and physical activity levels in the union territories of Jammu and Kashmir and the union territory of Ladakh, India. The findings indicate that these students generally maintain low healthy lifestyle practices and physical activity levels. The two territories significantly differ in various aspects of a healthy lifestyle – such as physical activity, nutrition, stress management, avoiding harmful habits, personal health practices, and environmental awareness. This variation highlights how geographical and cultural factors may influence health behaviours among the populations in the Jammu, Kashmir, and Ladakh regions.

Physical Activity

The levels of physical activity among the female students of the universities in all three regions of Jammu, Kashmir, and Ladakh were low. However, the level of physical activity reported by the female students of the universities of Ladakh, although low, was significantly higher than those in Jammu and Kashmir; a trend that can be attributed to the unique occupational demands and active lifestyles characteristic of rural and high-altitude regions like Ladakh. In Ladakh, physical labour is often an integral part of daily life, with many residents engaging in manual work such as farming, herding, and construction, contributing to their higher physical activity levels. The current study supports the previously established literature that postulates that people in rural areas are relatively more physically active because they engage in manual work. Their access to motorised transport is limited, as Daniel et al. [9] and Misra et al. [10, 11] proposed. On the other hand, the present study found that Jammu and Kashmir have comparatively low levels of physical activity, highlighting the need for targeted urban interventions to address the sedentary behaviours that are likely to accompany technological development and a more technologically centred world, as reflected by Anjana et al. [12]. People living in urban developed areas of Jammu and Kashmir must participate in activities requiring movement to counter the effects of a sedentary lifestyle, helping the community live healthy and active lives.

Nutrition

The nutritional domain displayed that the female students of the universities of Jammu, Kashmir, and Ladakh fall under the low-to-moderate categories, re-

flecting an average level of nutritional practices among the female university students of these regions. However, a relatively significant difference is that Ladakh performed much better than Jammu and Kashmir. This can be assumed to be due to the different eating habits of the two regions. It can therefore be argued that the region has benefitted nutrition-wise from the consumption of farm-produced foods and home-processed foods. The Ladakhi people's typical diet can also be viewed as a high-altitude diet rich in complex carbohydrates, plant-based foods, and local products like apricots, apples, and nuts. Furthermore, it has low sugar and salt content and increased fibre and fermented foods such as tsampa, chhurpi, and gundruk, improving nutrition and preservation.

On the other hand, the fast-paced urbanisation process, which has occurred over the years in Jammu and Kashmir, has significantly contributed to a decline in the nutritional value of food, affecting the overall nutritional health of the population. These observations are consistent with the study by Singh et al. [13], which showed that women from urban areas are more prone to poor dietary practices than those from rural areas. Indeed, in tackling these nutritional inequalities, there is a need to provide culturally and nutritionally sensitive services in large urban centres [14].

### Managing Stress

The study results reveal that stress management practices among female university students in the Jammu, Kashmir, and Ladakh regions are generally adequate but have room for improvement. While analysing the stress management scores, a vast gap was found between the people of Kashmir and Ladakh, who are comparatively more efficient in handling stress levels than people in Jammu. This seems to explain the difference in the outcomes of stress by the social, cultural, and environmental patterns in Kashmir and Ladakh, which include strong community support systems and traditional coping strategies instilled in them by their forefathers. For example, the unique cultural heritage of the Kashmir Valley and the union territory of Ladakh, particularly the soothing sounds of Sufi music and poetry, provides a powerful outlet for emotional expression and stress relief, allowing individuals to quietly and introspectively release their feelings of stress. Furthermore, the significant influence of religion in the daily lives of the female students of the universities in the Kashmir Valley and the female students of the universities of the union territory of Ladakh has given rise to effective stress-coping and resilience-develop-

ing techniques, such as involving themselves more in prayers and meditation during stressful situations. This serves as a calming balm for the mind and soul, enabling the female students to navigate life's challenges with greater resilience and tranquility. Moreover, the natural landscapes of Kashmir and Ladakh, including orchards, mountains, and water bodies, may contribute to stress reduction and overall well-being through walking, hiking, or simply enjoying nature. All these practices assist in building better stress and resilience practices in the respective regions.

On the other hand, the rise in urbanisation and population density in Jammu may depict an increased stress level. As emphasised in previous studies [13], environmental and cultural factors are the most influential sources of strength to combat stress manifestation. Building and sustaining these environmental and cultural sources intact in the Kashmir and Ladakh regions is key when working on eliminating or reducing stress-inducing factors in Jammu.

### Avoiding Destructive Habits

The female students of the universities of Jammu, Kashmir, and Ladakh exhibited strong adherence to avoiding destructive behaviours, reflecting a positive lifestyle aspect. The region of Ladakh has very few scores on destructive habits, and the observed scores are considerably higher than those of Jammu and Kashmir. This could be due to the region's physical environment, strong cultural values, and little or no exposure to the influences of cities that have sedentary, unhealthy habits. It is worth mentioning that similar trends have been discussed in rural communities where access to substances such as harmful drugs is more limited, attitudes to traditional values are likely enforced, and restraint is practiced regarding vices such as drug addiction, smoking, and alcohol [15]. Thus, since habits differ significantly between urban and rural settings, the state of Jammu and Kashmir needs to launch targeted educational campaigns addressing these problems to change the population's behaviour for the better, both in urban and rural areas.

### Personal Health Habits

The female students of the universities of Jammu, Kashmir, and Ladakh maintain a moderate level of reasonable personal health habits. However, the study shows that these habits are not consistently robust, thus highlighting the potential for targeted awareness campaigns to enhance personal hygiene and healthy

lifestyle practices. The study revealed that female students at the universities of Ladakh had far superior personal cleanliness and dietary habits compared to the female students in the universities of Jammu and Kashmir. This can be explained by the theories concerning traditional medicine and the routine, complex, manual work involved in their everyday lifestyle. This approach probably explains the improved health status evident in Ladakh since it enables female students to balance exercise and herbal remedies. Such observations corroborate previous studies positing that 'lifestyle' practices that are common to rural habitats, including those prevalent in Ladakh, are likely to lead to better health [16]. Considering all the benefits of traditional health practices, it will be helpful for the people of Jammu and Kashmir, living in cities, to use these methods, such as manual labour and herbal treatments, along with modern heal-and-cure therapies to improve health conditions.

### Protecting the Environment

The study indicates a lack of environmental consciousness among female students at the universities of Jammu, Kashmir, and Ladakh, underscoring the need for environmental education and initiatives within these institutions in these regions. The ecological awareness scores showed a complex picture where Kashmir, though having a slight edge over Jammu and Ladakh, had scores nearer to both these regions. This distinction could be due to the increased awareness of environmental problems among the female students of Kashmir, which has been an active centre of environmentalism and neighbourhood conservation. However, the analyses of the scores in each region indicate concerns that the generally low scores from the three regions suggest the need for improvement in environmental education. According to the previous works that discuss the necessity of including ecology in the curricula of schools and other educational institutions, taking into account the previous studies [17, 18], it is crucial to accentuate this aspect in the regions' educational systems to help improve students' awareness of the environmentally friendly decision-making process and to promote sustained activity in the context of achieving sustainable goals [19, 20].

### Regression analysis

A strong positive relationship was revealed by regression analysis between the independent variables (nutrition, stress management, physical activity, avoid-ing destructive habits, and personal health habits) and the dependent variable (overall healthy lifestyle), with an $R^2$ value of 0.969. This indicates that approximately 96.9% of the variability in the dependent variable is explained by these factors, underscoring their collective impact on healthy lifestyle behaviours. In simple terms, these habits explain 96.9% of what makes a lifestyle healthy.

### Implications for public health

These findings highlight the necessity for region-specific public health strategies in India. Tailored interventions are essential, considering each region's unique cultural, environmental, and lifestyle factors. For example, promoting physical activity in urban areas like Jammu and Kashmir, where lower levels were observed, could be beneficial. Additionally, nutritional programs targeting regions with suboptimal dietary habits are warranted.

### Limitations and future research

The present research provides many valuable insights into the subject, but, as with any research, it also has certain limitations. The study's cross-sectional design means that we cannot draw conclusions about cause-and-effect relationships, and using self-reported data may lead to biases and inaccuracies. Future researchers exploring this area should employ longitudinal research designs and objective measures to validate these findings. Moreover, identifying the characteristics of the regions associated with low levels of healthy lifestyles and low physical activity levels with the differences in health behaviours seen in the present study will be helpful for the further development of effective interventions to promote healthy lifestyles in the regions of interest.

## Conclusions

This research shows that the overall healthy lifestyle and physical activity levels among female students in the age group of 20 to 32 of the universities in the union territory of Jammu and Kashmir and the union territory of Ladakh, which comprises three regions – Jammu, Kashmir, and Ladakh – are low. This indicates a pressing need for targeted interventions to promote healthier lifestyle behaviours and physical activity. Despite some regional variations, the findings underscore a shared challenge across the regions in achieving optimal health outcomes for this demographic.

The study highlighted significant regional disparities in healthy lifestyle behaviours and physical activity across Jammu, Kashmir, and Ladakh, emphasising the profound influence of geographical, cultural, and environmental factors. The findings suggest that Ladakh residents demonstrate superior outcomes in physical activity levels, nutrition, stress management, avoidance of destructive habits, and personal health practices compared to their counterparts in Jammu and Kashmir. These behaviours appear closely tied to Ladakh's unique sociocultural and ecological context.

The regression analysis underscores the collective influence of lifestyle components – nutrition, stress management, physical activity, avoiding destructive habits, and personal health practices – on overall healthy living, with 96.9% of the variance explained by these factors. Such strong associations reiterate the importance of addressing these components through targeted public health policies.

From a public health perspective, region-specific interventions are essential. Strategies promoting healthy lifestyles and physical activity in urbanised settings like Jammu and Kashmir, improving nutritional habits, and enhancing awareness of personal health and environmental stewardship could yield substantial health benefits. Furthermore, the cultural strengths of regions such as Ladakh should be leveraged to reinforce positive health behaviours in other areas.

Future research should explore these regional differences' underlying mechanisms and assess longitudinal trends to inform sustainable, evidence-based interventions. By tailoring public health initiatives to address regional needs, policymakers and health practitioners can foster equitable health outcomes and encourage the widespread adoption of healthy lifestyle practices.

**Ethical approval**

The research related to human use has complied with all the relevant national regulations and institutional policies, has followed the tenets of the Declaration of Helsinki, and has been approved by the Institutional Ethics Committee of the Directorate of Physical Education and Sports, University of Kashmir, Srinagar, Jammu and Kashmir, India (approval No.: EC/DPE&S Protocol #06/2024).

**Informed consent**

All participants were informed about the study's objectives, procedures, and their right to withdraw at any stage without any consequences. Informed consent was obtained from all participants, either electronically via Google Forms or in written form for paper-based responses. Confidentiality and anonymity were strictly maintained, and only aggregated data were used in the analysis.

**Conflict of interest**

The authors state no conflict of interest.

**Disclosure statement**

No author has any financial interest or received any financial benefit from this research.

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