European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

DOI: 10.46827/ejpe.v11i7.5702 Volume 11 | Issue 7 | 2024

# A SYSTEMATIC REVIEW ON PHYSICAL ACTIVITY PATTERNS AMONG INDIAN STATES

**Sanjoy Sarkar[1],**
**Sanjib Kumar Bhowmik[1],**
**Ahsan Huda Yumkhaibam[2i]**
[1]Research Scholar,
Department of Physical Education,
Tripura University,
India
[2]Associate Professor,
Department of Physical Education,
Tripura University,
India

**Abstract:**
Physical activity is globally recognized as essential for promoting health and well-being, playing a crucial role in preventing chronic diseases and enhancing quality of life. Physical inactivity is a significant factor in mortality worldwide, contributing significantly to the burden of non-communicable diseases. **Objectives:** The present study aims to systematically evaluate physical activity patterns in Indian states, identifying variations based on age, gender, socioeconomic status, and geographical regions while assessing their public health implications. **Methodology:** The data is collected from published studies reporting physical activity patterns between demographics, socioeconomic factors, and lifestyle choices influencing physical activity levels and behaviours in India. It involves a meticulous search strategy including PubMed, ScienceDirect, Semantic Scholar, Web of Science and Google Scholar, focusing on studies from 2013 to 2024 using keywords Physical activity, Exercise, Walking, Inactivity, and sedentary behaviour, combined with individual state names of India. **Results:** Results from 33 studies reveal significant regional disparities, with urban areas exhibiting higher inactivity rates compared to rural areas. Socioeconomic factors further influence activity levels, with higher inactivity among higher-income populations. Age and gender emerge as critical determinants; younger populations and females, especially in urban settings, exhibit higher inactivity levels. The study concludes that targeted public health interventions are urgently needed to promote physical activity, particularly among vulnerable groups such as women and adolescents. **Conclusion:** Key findings highlight the urgent need for policy measures that address cultural, regional, and socioeconomic

[i] Correspondence: email ahsanhudaybm222@gmail.com

 

barriers to physical activity alongside the promotion of recreational and work-related activity.

**Keywords:** physical activity, inactivity, sedentary behaviour, India

## 1. Introduction

Physical activity is a cornerstone for promoting overall health and well-being, playing a pivotal role in preventing chronic diseases and enhancing quality of life (Anderson & Durstine, 2019) As non-communicable diseases escalate globally, understanding and addressing patterns of physical activity are crucial for effective public health initiatives.

India, with a population exceeding 1.3 billion, represents a diverse and dynamic landscape where rapid demographic, cultural, and lifestyle changes further complicate the understanding of physical activity trends. This review examines the determinants of physical activity in India, considering its complex socio-cultural and geographical diversity, and aims to inform public health strategies and contribute to policy development tailored to India's unique context. With the increasing influence of modern technological advancements, sedentary lifestyles, and stress, youth in India face growing challenges in accessing physical activity, often leading to adverse health outcomes. Moreover, factors such as urbanization, reduced physical activity in daily life, and shifts in occupational demands have contributed to physical inactivity becoming a prominent risk factor for mortality.

In the 21st century, the perspectives and life experiences of the youth population in India have undergone significant changes due to technological advancements, modern food habits, low levels of physical movement, and stressful lifestyles. Approximately 87 percent of young individuals in developing nations, including India, face challenges related to restricted access to resources, healthcare, education, training, and employment opportunities (CSO, GOV, 2017). Disturbingly, global statistics indicate that a substantial proportion of adults and adolescents, including those in India, fail to meet the recommended levels of physical activity outlined by the World Health Organization (WHO, 2018). Sedentary behaviour, linked to factors such as rapid urbanization, the prevalence of automobiles, and reduced physical demands in occupational settings, has been identified as a significant contributor to the fourth major risk factor for worldwide mortality (WHO, 2014).

Our review acknowledges the gravity of the situation, with non-communicable diseases becoming a leading cause of death globally. The anticipated increase in annual NCD mortality from 38 million in 2012 to 52 million by 2030, as highlighted by the WHO (2014), underscores the urgency of addressing physical inactivity as a vital risk factor.

The World Health Organization recommends specific guidelines for physical activity, emphasizing its critical role in preventing various health conditions, especially cardiovascular diseases and diabetes (WHO, 2010). However, despite these recommendations, evidence suggests a widespread lack of adherence to physical activity guidelines globally.

The study aims to bridge existing gaps in the literature by synthesizing diverse findings, addressing regional disparities, and considering methodological nuances. The study will provide valuable insights into the current landscape of physical activity in India, inform evidence-based strategies for promoting active lifestyles, and contribute to the ongoing discourse on public health policies and intervention strategies. The multifaceted exploration of physical activity in the Indian context is crucial for developing effective strategies to mitigate the health challenges associated with sedentary behaviours and foster a healthier future for the nation.

## 2. Methodology

This systematic review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2022 guidelines. A thorough search strategy was formulated utilizing electronic databases, including PubMed, Semantic Scholar, ScienceDirect, Google Scholar, and Web of Science, to locate relevant studies published from 2013 to 2024. The search terms used were 'Physical activity', 'Exercise', 'Walking', 'Inactivity', 'Sedentary behaviour', combined with individual Indian state names to capture region-specific data. The studies reviewed include diverse populations from urban and rural settings, as well as various cultural and socioeconomic contexts. Data from selected studies were extracted and synthesized to explore patterns of physical activity and identify the factors influencing these patterns in different demographic groups, including age, gender, and socioeconomic status.

### 2.1 Inclusion Criteria

1) Studies conducted within India, focused specifically on physical activity.
2) Studies that defined and measured physical activity clearly, including leisure, occupational, and transportation-related physical activity.
3) Studies that reported demographic variations such as age, gender, and socioeconomic status.

### 2.2 Exclusion Criteria

1) Studies conducted outside of India.
2) Studies published which is not published in English.
3) Studies which is inadequate or unclear methodologies and findings.
4) Duplicate studies or those with overlapping data.

### 2.3 Quality Assessment Criteria

The quality of each study was evaluated using the PRISMA 2022 checklist, focusing on study design, sample representativeness, measurement validity, and overall transparency. Studies rated as low quality were excluded from the main analysis and were only considered in sensitivity analyses.

### 2.4 Data Extraction Process

Two independent researchers performed initial screening of titles and abstracts based on the inclusion and exclusion criteria. Disagreements were resolved by a third researcher. Full-text reviews were conducted for the final selection of studies, and key findings from each study were systematically recorded and categorized based on study design, population demographics, and physical activity patterns.

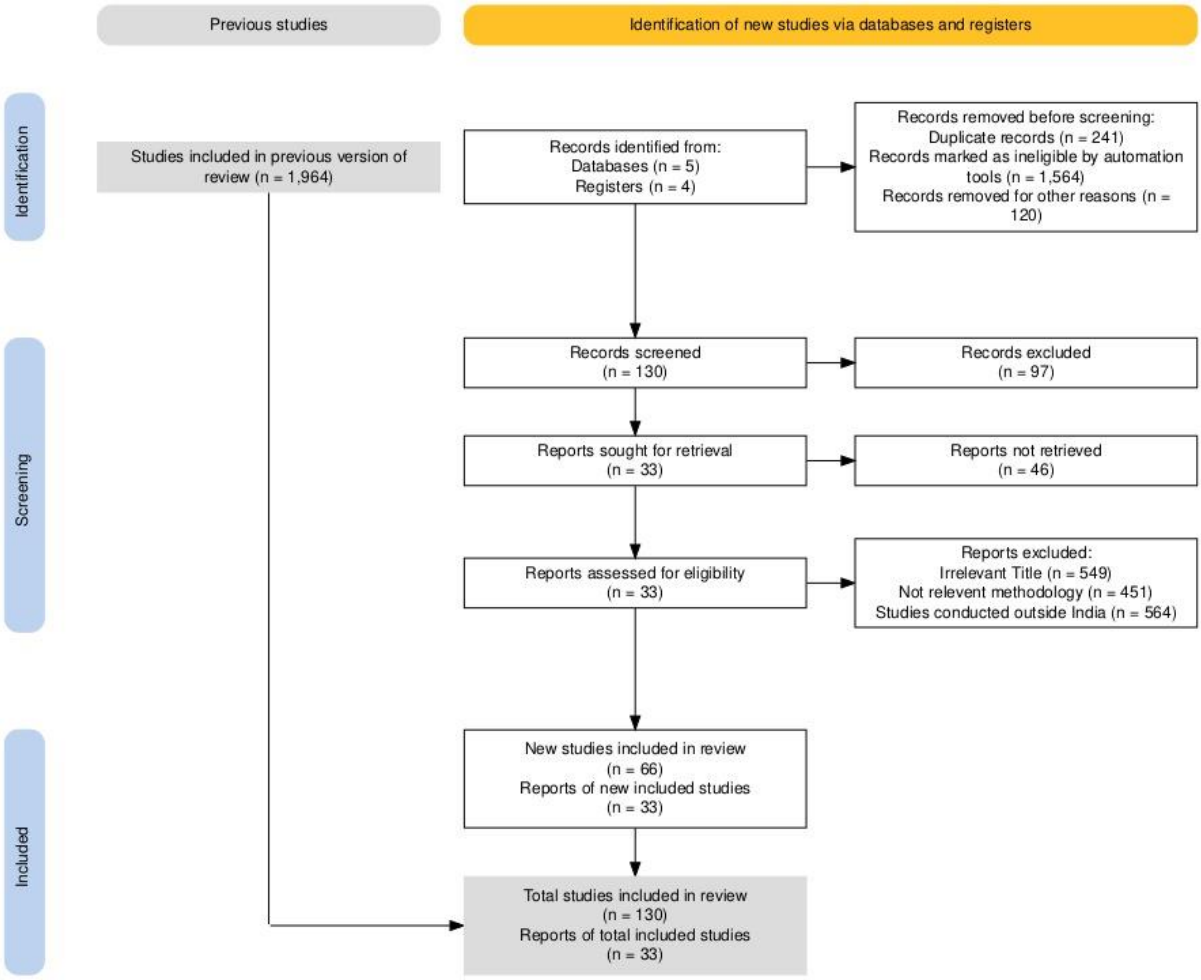


**Figure 1:** Flow Chart of The Included Studies

## 3. Results

This review analyzed 33 studies, each of which provided insights into physical activity patterns across various states and demographic groups in India. Significant variations in physical activity were found based on geographical location, age, gender, and socioeconomic status.

1) **Geographical Variations:** Urban areas consistently reported higher levels of physical inactivity compared to rural regions. For example, in Kerala, inactivity levels were notably high (65.8%), while urban centers like Chandigarh reported slightly lower rates.

2) **Gender Differences:** Across nearly all studies, females were more inactive than males. For instance, in Tamil Nadu, 76.2% of women were reported as physically inactive, while 63.3% of men exhibited similar behaviour. This trend held true in both urban and rural populations.
3) **Age Group Patterns:** Adolescents and young adults showed particularly high inactivity levels. For instance, a study in Kerala reported that 36.5% of female college students were inactive. Older adults, particularly those over 45, were also identified as having high inactivity levels, with the prevalence of physical inactivity increasing with age.
4) **Socioeconomic Impact:** Socioeconomic factors were strongly linked to physical inactivity. Higher-income populations exhibited higher inactivity levels, particularly in urban regions. For example, 80.6% of people in high-income groups in Aligarh reported being inactive during leisure time.

These results underscore the need for targeted public health interventions addressing regional, gender, and socioeconomic disparities.

**Table 1:** Characteristics of 33 included studies on Physical Activity in India

| **Author** | **Population Age, Gender & Region** | **Study design** | **Instrument** | **Main results** |
|---|---|---|---|---|
| (Ranasinghe *et al.*, 2013) | (2003-2005)<br>N = 44,491;<br>Age 15–74 years;<br>Male: 21,871<br>Female 22,620;<br>Urban and rural<br>6 States in India,<br>(2007-2008)<br>N = 38,064;<br>Age 24–64years;<br>Male: 16,891,<br>Female: 21,173;<br>Urban and rural<br>7 states in India, | Meta-analysis<br>Year up to 2012<br>India | Global Physical Activity Questionnaire (GPAQ)<br>International Physical Activity Questionnaire | Inactivity ranged from 18.5% - 88.4%, with urban areas showing higher inactivity. |
| (Anitha Rani & Sathiyasekaran, 2013) | N = 1842; Age: 14 years;<br>Boys: 895<br>Girls: 947<br>Chennai, Tamil Nadu | Cross-sectional study | International Physical Activity Questionnaire | 15.6% inactive, 43.4% minimally active, 41.0% HEPA active. |

| | | | | |
|---|---|---|---|---|
| (Ahamed R, 2013) | N = 640; Age: 18 - 65 years; Males: 300 Females: 340 Aligarh, UP | Cross-sectional study 2007 to June 2008) | STEPwise questionnaire | 32% work-related inactivity, and 80.6% leisure inactivity. Inactivity increased with age and was higher in rural areas. |
| (Gulati *et al.*, 2014) | N = 1,680; Age: 3-11 years; (Chennai, Hyderabad, Kolkata, Bengaluru, Mumbai, New Delhi & Surat) | Cross-sectional study | OBEY-AD project | 21% inactive, significant correlation with socioeconomic status and fruit/vegetable consumption. |
| (Anjana *et al.*, 2014) | N = 14227; Age: 20 above years; (Tamil Nadu, Maharashtra, Jharkhand and Chandigarh) | Stratified multistage design | GPAQ | Less than 10% participate in recreational physical exercise. |
| (Aslesh *et al.*, 2016) | N = 240; Age:15-65 years; Male: 128 Female: 112 Kerela | Cross-sectional study | GPAQ | 65.8% low physical activity, higher among single and unskilled labourers. |
| (Katapally *et al.*, 2016) | N = 6130; Age: 13-15 years; India | Observational study | The 2016 Indian Report Card 2003 and 2007 on Physical Activity for Children and Youth | Recommended physical activity levels did not achieve most of the children. |
| (Tripathy *et al.*, 2016) | N = 5400; Age: 18–44 years; Punjab | Multistage stratified | Hindi-translated version of the WHO STEP Surveillance (STEPS) questionnaire (version 3.1) | 90% report no leisure-time activity. Rural females report lower vigorous activity than males. |
| (Manoj, 2017) | N = 2947 students; Mean age of male: 19.44 years Mean age of female: 19.35 years; Male: 1153 | Survey study | IPAQ | 30.02% of male students and 36.5% of female students classified as inactive. |

| | | | | |
|---|---|---|---|---|
| | Female: 1794 Kerala | | | |
| (Pengpid & Peltzer, 2021) | N = 72,262; Age: 45 older years; Male: 42.0% Female: 58.0%, India | Cross-sectional study 2017–2018 | Self-reported questionnaires | 23.8% inactive; 55.7% engage in high physical activity. |
| (Dr. Sonu Goel, 2018) | N = 500 students; Age: 18-24 years Chandigarh, India | Cross-sectional survey | GPAQ | Among the participants, 12.8% (n=64) were physically inactive, 10% (n=50) were active, and 76.2% (n=381) were highly active. A higher percentage of females (15.8%) were inactive compared to males (12.1%). The 18-20 age the group had a higher proportion of highly active individuals (77.6%) than the 21-22 age group (76.1%). |
| (Devi *et al.*, 2020) | N = 418; Age: 20-55 years; Both Genders Delhi | Cross-sectional study | GPAQ | Majority had low physical activity (67.9%). Males (32.1%) showed higher moderate activity as compared to females. |
| (Devamani *et al.*, 2019) | N = 6164; Age: 30-64 years; Men 43.9% (2390 urban and 3774 rural). Vellore district, Tamil Nadu | Cross-sectional study Between June 2010 and December 2012 | GPAQ | 63.3% were found to have highly insufficient physical activity in both areas, with a higher prevalence among women. |
| (S. M. Balaji, 2018) | N = 235; Age: 13-17 years; Both male and female. Chennai | Cross-sectional study Nov–Dec 2016 | Modified GPAQ | 63% insufficient physical activity, linked to gender, academic stress, and parental encouragement. |
| (R. Kumari, 2018) | N = 296; Age: 30-50 years; 74 males and females, from both urban and rural areas, Uttarakhand | Community-based cross-sectional study | GPAQ | 85% are involved in vigorous activities at work or recreation. Moderate activity at work was more common in rural areas (167%) compared to urban areas (95%). Walking/bicycling for transportation was more common in rural areas (639%) compared to urban areas (385%). Moderate activity for recreation was more common in urban areas (318%) compared to rural areas (146%). |

| | | | | |
|---|---|---|---|---|
| (Kumar Sharma *et al.*, 2019) | N = 2755; Age: 18-65 years Male:1392 Female: 1363; East Bangalore, Karnataka | Observational study | General Health Questionnaire, Exercise Addiction Inventory | 5.8% risk of exercise addiction, higher in males. |
| (Newtonraj *et al.*, 2019) | N = 267; Age:18-70 years; Tamil Nadu | Cross-sectional study | GPAQ | 22.5% had insufficient physical activity, with work contributing 75% and leisure-time activity only 7%. |
| (Thapa *et al.*, 2019) | N = 945; Age: 15-21 years Female: 31%, Male: 8% Nepal | Cross-sectional study | GPAQ v2 | Adolescents who engage in minimal physical activity are more likely to be female. Approximately 31% of teenagers and 14% of young adults do not meet the recommended levels of physical activity set by the WHO. |
| (Omidvar *et al.*, 2019) | N = 1000; Age: 11-28 years; Female only, Mysore | Cross-sectional design | Standardised Self-reporting Questionnaires | 12.1% engaged in regular physical activity, with a positive impact on menstrual features. |
| (Das *et al.*, 2019) | N = 215; Age: 29 years; Gurugram Haryana | Cross-sectional quantitative study | GPAQ | 50% physically inactive, low workplace activity. |
| (Bhavani & Prabhavathy Devi, 2019) | N = 500; Age: 19-22 years; Male: 500 only Chennai | Descriptive type study | Pre-tested interview schedule | 41.4% engage in physical activity, time constraints are a significant obstacle. |
| (Naik *et al.*, 2020) | N = 3300; Age: 30 above years; Females: 53.6% Males 46.4% Puducherry | Population-based study | WHO STEP questionnaire | 74.9% physically inactive, higher among females. |
| (Podder *et al.*, 2020) | N = 233,805 Both Genders 41.37 ± 13.4 (mean ± standard deviation) India | Survey study | Indian Diabetes Risk Score (IDRS) | 57% not meeting recommended physical activity levels, urban populations more inactive. |
| (Singh *et al.*, 2021) | N = 1130; Aged 18 - 64 years; Males: 502 Females: 628; Punjab | Cross-sectional study | WHO's STEPwise | 56.81% insufficiently active, significant predictors include work status and residence. |

| | | | | |
|---|---|---|---|---|
| (Oswal *et al.*, 2021) | N = 1400<br>Age range 25–44 years;<br>North East Region (NER) of India,<br>Assam, Nagaland, & Meghalaya | Cross-sectional study | Structured questionnaire | 62% of participants rarely or never engaged in physical recreational activity. The study revealed a strong relationship between lifestyle practices and gender, age, and household income, suggesting the need for targeted prevention strategies in the region. |
| (Mathur *et al.*, 2021) | N = 1402; Ages 15 - 69 years;<br>India | Cross-sectional study | WHO-STEPs Including Stadiometer (SECA 213) and digital weighing scale (SECA 803) | A national survey in India found that 25.2% of adolescents had insufficient physical activity, 6.2% were overweight, and 1.8% were obese. |
| (Kumar *et al.*, 2021) | N = 454;<br>Ages 17 to 47 years;<br>Male: 37.2%<br>Female: 62.8%<br>Chidambaram, Tamil Nadu, India | Cross-sectional study | International Physical Activity Questionnaire (SF-IPAQ) | 76.2% of the study participants were physically inactive. Females were three times more likely to be physically inactive compared to males. |
| (Kumar Verma *et al.*, 2022) | N = 4586 students; Ages 16 - 35 years;<br>Male: 617%<br>Female: and 383%<br>Varanasi | Cross sectional survey study | (IPAQL) - Long Form | 61.7% of students were physically active; 14.5% fell under the "Inactive" category. |
| (Boro & Saikia, 2022) | N = 72250 older adults<br>Both gender<br>Female: 28.93%, Male: 25.57%<br>Age: 45 and above<br>India | Cross-sectional study | Self-reported questionnaires | In India, 27.39 % of older persons have several morbidities. Among older adults, there is an inverse relationship between multimorbidity and physical activity level. Increased physical activity dramatically reduces older persons' risk of multimorbidity. |
| (Mohanty *et al.*, 2022) | N = 1203<br>Adults<br>Aged 18 years and above<br>Bhubaneswa, Odisha | Cross-sectional survey | IPAQ | 28.1% of the population physically active; factors include social caste and chronic disease status. |
| (Ramamoorthy *et al.*, 2022) | N= 12,000 adults<br>Aged 18–69 years | Cross-sectional survey | GPAQ | The age-standardized prevalence of insufficient physical activity among adults in India were found to be 41.4%. Women and urban residents had a higher prevalence of insufficient |

| | | | | |
|---|---|---|---|---|
| | Both urban and rural regions in India | | | physical activity compared to men and rural residents |
| (Dixit *et al.*, 2023) | N = 342 MBBS students<br>Mean age of 20.86 years (range 18-26 years)<br>Mixed (both males and females)<br>Uttar Pradesh | Cross-sectional study | International Physical Activity Questionnaire Short Form (IPAQSF) | 34.2% were insufficiently active (Category-1); 39.2% were minimally active (Category-2); 26.6% were HEPA active (Category-3).<br>Findings indicate a significant proportion of participants do not meet recommended levels of physical activity, highlighting a public health concern. |
| (Bhawra *et al.*, 2023) | N= 1042, Children and youth; Age: 5-17 years.<br>Pune, Maharashtra | Multi-center cohort study | The India Report 2022 | Urban residents and girls were found to be insufficiently physically active. A study in Chennai showed adolescents engaged in moderate-to-intense physical activity (MVPA) for an average of 25.8 minutes per day, only 38% of young people in Mumbai satisfied the MVPA norms, with a larger number of males and girls not achieving the requirements. |

Source: Compiled by the author, 2024.

## 4. Discussion

The studies consistently highlight high levels of physical inactivity across various states and demographic groups in India. For example, (Ranasinghe *et al.*, 2013) reported an overall inactivity range of 18.5%-88.4%, with significant urban-rural differences. Similarly, (Anjana *et al.*, 2014) found that less than 10% of Indians engage in recreational physical exercise. The prevalence of physical inactivity varied widely, with some regions like Kerala showing disturbingly high inactivity levels (Aslesh *et al.*, 2016) while urban centers like Chandigarh exhibited slightly lower rates (Dr. Sonu Goel, 2018). Age and gender emerge as critical factors influencing physical activity patterns. Younger populations, particularly adolescents and young adults, exhibit high inactivity levels, as shown by (Gulati *et al.*, 2014) and (Manoj, 2017). Gender differences are pronounced, with females generally showing higher inactivity levels compared to males. For example, the study by (Omidvar *et al.*, 2019) highlighted that only 12.1% of young girls engaged in regular physical activity. Furthermore, the trend of increasing inactivity with age is evident in studies by (Ahamed R, 2013) and (Devi *et al.*, 2020).

Socioeconomic status significantly impacts physical activity levels. Higher inactivity is often associated with higher income and social class, as noted by (Ahamed R, 2013) and (Ramamoorthy *et al.*, 2022). Geographical variations are also apparent, with

urban areas generally showing higher inactivity rates compared to rural areas. For example, (Tripathy *et al.*, 2016) found that although physical activity levels were identical, metropolitan females had greater obesity rates than their rural counterparts. Rural populations, particularly in states like Tamil Nadu and Odisha, also exhibit high inactivity levels (Newtonraj *et al.*, 2019)**;** (Mohanty *et al.*, 2022). The implications of physical inactivity for public health are profound. Numerous research works, such as (Pengpid & Peltzer, 2021) and (Boro & Saikia, 2022)**,** demonstrate the correlation between increased levels of physical exercise and improved health outcomes. Physical inactivity is linked to a higher prevalence of chronic conditions, obesity, and poor mental health. The need for targeted health education interventions is emphasized to reduce physical inactivity and its associated health burdens.

The findings underscore the necessity for comprehensive policy measures to address physical inactivity. National strategies should focus on promoting active living, particularly among vulnerable groups such as women, adolescents, and the elderly. Initiatives like improving access to leisure facilities, promoting active transportation, and incorporating physical activity into daily routines are very much needed. The studies by (Thapa *et al.*, 2019) and (Bhawra *et al.*, 2023) advocate for increased investment in active living research and the creation of policies aimed at reducing gender-based disparities in physical activity.

## 5. Conclusion

The studies reveal alarmingly high levels of inactivity across various demographics, with disparities based on age, gender, socioeconomic status, and location. Inactivity is widespread among all age groups, particularly adolescents and the elderly, with females generally being less active than males due to societal barriers. Urban areas show higher inactivity rates than rural areas, although leisure inactivity is significant in both. Higher socioeconomic status often correlates with more inactivity.

Physical inactivity contributes to chronic diseases, obesity, and poor mental health, underscoring the need for targeted interventions. Future efforts should focus on tailored policies and promoting active living to improve public health in India.

### 5.1 Limitations

This review faces several limitations. The heterogeneity of study designs and measurement tools complicates consistent comparisons and generalization of findings. The cross-sectional nature of many studies limits the ability to determine causal relationships between physical inactivity and its determinants. Additionally, geographic bias due to the underrepresentation of certain Indian states affects the comprehensiveness of the findings. Variations in defining physical activity across studies contribute to inconsistencies, and the review may not fully capture India's socio-cultural diversity in influencing physical activity.

### 5.2 Recommendations

Future research should standardize study designs and measurement tools to improve comparability and support meta-analyses. Conduct longitudinal studies to establish causal links between physical inactivity and associated factors and to track activity patterns over time. Include underrepresented states and regions to provide a more comprehensive national overview, considering India's socio-cultural diversity in studies and interventions. Use objective tools like accelerometers or pedometers for more accurate physical activity data, reducing self-report biases. Focus on creating environments that support physical activity, such as safe recreational spaces, active transportation, and integrating exercise into school and workplace routines. Address barriers faced by women and vulnerable groups to promote equitable access to physical activity. Encourage collaboration between government, communities, and healthcare providers to effectively implement and sustain these initiatives.

### Acknowledgements

Special thanks to research collaborators and contributors who facilitated this study through insights and field data. The authors wish to express their heartfelt gratitude to all the faculty members and research scholars of the Department of Physical Education at Tripura University for their invaluable support and guidance.

### Conflict of Interest Statement

The authors declare no conflict of interest.

### About the Author(s)

**Sanjoy Sarkar**, Research Scholar, Department of Physical Education, Tripura University, Agartala, India. Author's contribution: manuscript preparation, literature search, data collection, data interpretation, statistical analysis and coordination of research efforts.
ORCID: https://orcid.org/0009-0002-3956-1385
Email: sanjoyathletics@gmail.com
**Sanjib Kumar Bhowmik**, Associate Professor, Department of Physical Education, Tripura University (A Central University), Agartala, India. Author contribution: manuscript preparation and proofreading.
ORCID: https://orcid.org/0009-0008-5222-8572
Email: sanjibbhowmik@tripurauniv.ac.in
**Ahsan Huda Yumkhaibam,** Research Scholar, Department of Physical Education, Tripura University, Agartala, India. Author's contribution: literature search, study design, data collection, data interpretation, statistical analysis, and manuscript preparation.
ORCID: https://orcid.org/0009-0000-8311-5724
Email: ahsanhudaybm222@gmail.com

**References**

World Health Organization. (2014). *Global status report on noncommunicable diseases 2014* (No. WHO/NMH/NVI/15.1). Retrieved from https://iris.who.int/bitstream/handle/10665/44579/9789240686458_eng.pdf?sequence=1

World Health Organization, T. (2010). *Global recommendations on physical activity for health*. Retrieved from https://www.who.int/publications/i/item/9789241599979

NYP/Youth_in_India-2017. Central Statistics Office Ministry of Statistics and Programme Implementation Government of India (Social Statistics Division)

Ahamed R, A. A. S. A. A. A. (2013). Prevalence of physical inactivity in Aligarh: scope for primary prevention Article Cycle Citation. *Ind J Comm Health*, *25*(4), 381–385. https://cabidigitallibrary.org

Anderson, E., & Durstine, J. L. (2019). Physical activity, exercise, and chronic diseases: A brief review. In *Sports Medicine and Health Science* (Vol. 1, Issue 1, pp. 3–10). KeAi Communications Co. https://doi.org/10.1016/j.smhs.2019.08.006

Anitha Rani, M., & Sathiyasekaran, B. W. C. (2013). Behavioural determinants for obesity: A cross-sectional study among urban adolescents in India. *Journal of Preventive Medicine and Public Health*, *46*(4), 192–200. https://doi.org/10.3961/jpmph.2013.46.4.192

Anjana, R. M., Pradeepa, R., Das, A. K., Deepa, M., Bhansali, A., Joshi, S. R., Joshi, P. P., Dhandhania, V. K., Rao, P. V., Sudha, V., Subashini, R., Unnikrishnan, R., Madhu, S. V., Kaur, T., Mohan, V., & Shukla, D. K. (2014). Physical activity and inactivity patterns in India - results from the ICMR-INDIAB study (Phase-1) [ICMR-INDIAB-5]. *International Journal of Behavioral Nutrition and Physical Activity*, *11*(1). https://doi.org/10.1186/1479-5868-11-26

Aslesh, O. P., Mayamol, P., Suma, R. K., Usha, K., Sheeba, G., & Jayasree, A. K. (2016). Level of Physical Activity in Population Aged 16 to 65 Years in Rural Kerala, India. *Asia-Pacific Journal of Public Health*, *28*, 53S-61S. https://doi.org/10.1177/1010539515598835

Bhavani, V., & Prabhavathy Devi, N. (2019). Physical Activity Pattern of Male College Students in Chennai. *Shanlax International Journal of Arts, Science and Humanities*, *7*(1), 81–84. https://doi.org/10.34293/sijash.v7i1.508

Bhawra, J., Khadilkar, A., Krishnaveni, G. V., Kumaran, K., & Katapally, T. R. (2023). The 2022 India Report Card on physical activity for children and adolescents. *Journal of Exercise Science and Fitness*, *21*(1), 74–82. https://doi.org/10.1016/j.jesf.2022.10.013

Boro, B., & Saikia, N. (2022). Association of multimorbidity and physical activity among older adults in India: an analysis from the Longitudinal Ageing Survey of India (2017-2018). *BMJ Open*, *12*(5), e053989. https://doi.org/10.1136/bmjopen-2021-053989

Das, S., Das, M., & Ray, S. (2019). A study on physical activity in shift workers in an urban city of India. *International Journal Of Community Medicine And Public Health*, *6*(9), 4026. https://doi.org/10.18203/2394-6040.ijcmph20194012

Devamani, C., Oommen, A., Mini, G., Abraham, V., & George, K. (2019). Levels of physical inactivity in rural and urban Tamil Nadu, India: A cross-sectional study. *Journal of Clinical and Preventive Cardiology*, *8*(1), 13. https://doi.org/10.4103/jcpc.jcpc_32_18

Devi, K. S., Nilupher, Gupta, U., Dhall, M., & Kapoor, S. (2020). Incidence of obesity, adiposity and physical activity pattern as risk factor in adults of Delhi, India. *Clinical Epidemiology and Global Health*, *8*(1), 8–12. https://doi.org/10.1016/j.cegh.2019.03.008

Dixit, S., Ansari, A., Singh, M. K., Kariwala, P., Singh, A. K., Pathak, A., & Dutt Kandpal, S. (2023). 23: Original Article Appraisal of "Physical Activity" Patterns among Medical Students: A Cross-Sectional Study Using International Physical Activity Questionnaire-Short Form (IPAQ-SF) in Lucknow, India 1 2 1 1 3 4 5. *Healthline Journal*, *14*(2), 123–130.

Dr. Sonu Goel, D. M. S. K. P. (2018). Level of physical activity and its relationship with tobacco use among youth: a cross-sectional survey in North India Corresponding Author Citation Monga D, Goel S, Padhy SK. Level of physical activity and its relationship with tobacco use among youth: a cross-sectional survey in Article Cycle. In *North India. Indian J Comm Health* (Vol. 30).

Gulati, A., Hochdorn, A., Paramesh, H., Paramesh, E. C., Chiffi, D., Kumar, M., Gregori, D., & Baldi, I. (2014). Physical Activity Patterns Among School Children in India. In *Indian Journal of Pediatrics* (Vol. 81, Issue 1, pp. 47–54). Springer. https://doi.org/10.1007/s12098-014-1472-x

Katapally, T. R., Goenka, S., Bhawra, J., Mani, S., Krishnaveni, G. V., Kehoe, S. H., Lamkang, A. S., Raj, M., & McNutt, K. (2016). Results from India's 2016 report card on physical activity for children and youth. *Journal of Physical Activity and Health*, *13*(11), S176–S182. https://doi.org/10.1123/jpah.2016-0393

Kumar, P. S., Lakshmi Priya, D. P., Viknesh Ambayiram, A., Felix, A., & Govindarajan Kandasamy, P. K. (2021). Level of Physical Activity among University Students in Urban Chidambaram, Tamil Nadu-A Cross Sectional Study. *Saudi J Med*, *6*(8), 233–240. https://doi.org/10.36348/sjm.2021.v06i08.002

Kumar Sharma, M., N Rao, G., Benegal, V., K, T., A, H., & Thomas, D. (2019). Exercise as an addictive behavior: Implications for building awareness in the community. *Mental Health and Addiction Research*, *4*(1). https://doi.org/10.15761/mhar.1000177

Kumar Verma, A., Singh, G., Patwardhan; Kishor, & Patwardhan, K. (2022). Patterns of Physical Activity Among University Students and Their Perceptions About the Curricular Content Concerned with Health: Cross-sectional Study. *JMIRx Med*, *3*(2). https://doi.org/10.1101/2021.06.10.21258728v1

Manoj, T. I. and A. K. R. M. (2017). *Physical activity patterns of college students in Kerala*. https://doi.org/10.15740/HAS/IJPE/10.1and2

Mathur, P., Kulothungan, V., Leburu, S., Krishnan, A., Chaturvedi, H. K., Salve, H. R., Amarchand, R., Nongkynrih, B., Ganeshkumar, P., Vinay Urs, K. S., Laxmaiah, A., Boruah, M., Kumar, S., Patro, B. K., Raghav, P. R., Rajkumar, P., Sarma, P. S., Sharma, R., Tambe, M., … Shelke, S. C. (2021). Baseline risk factor prevalence

among adolescents aged 15-17 years old: findings from National Non-communicable Disease Monitoring Survey (NNMS) of India. *BMJ Open*, *11*(6). https://doi.org/10.1136/bmjopen-2020-044066

Mohanty, S., Sahoo, J., Epari, V., Ganesh, G. S., & Panigrahi, S. K. (2022). Prevalence, Patterns, and Predictors of Physical Inactivity in an Urban Population of India. *Cureus*. https://doi.org/10.7759/cureus.26409

Naik, B., Selvaraj, K., Daya, P., & Kar, S. (2020). Are the urban slum population physically inactive? A descriptive study from urban Puducherry. *Journal of Clinical and Preventive Cardiology*, *9*(1), 13. https://doi.org/10.4103/jcpc.jcpc_47_19

Newtonraj, A., Vincent, A., Gowtham, P., Haritha, S., & Ilaveyini, S. (2019). Level of insufficient physical activity among adults in a rural area of South India: A population-based cross-sectional study. *Journal of Current Research in Scientific Medicine*, *5*(2), 105. https://doi.org/10.4103/jcrsm.jcrsm_25_19

Omidvar, S., Amiri, F. N., Firouzbakht, M., Bakhtiari, A., & Begum, K. (2019). Association between physical activity, menstrual cycle characteristics, and body weight in young south indian females. *International Journal of Women's Health and Reproduction Sciences*, *7*(3), 281–286. https://doi.org/10.15296/ijwhr.2019.47

Oswal, K., Kanodia, R., Kharodia, N., Pradhan, A., Gupta, N., Singh, A., Sethuraman, L., Venkataramanan, R., Caduff, C., & Purushotham, A. (2021). Prevalence of use of tobacco, alcohol consumption and physical activity in the North East region of India. *Journal of Cancer Policy*, *27*. https://doi.org/10.1016/j.jcpo.2021.100270

Pengpid, S., & Peltzer, K. (2021). Physical activity, health and well-being among a nationally representative population-based sample of middle-aged and older adults in India, 2017–2018. *Heliyon*, *7*(12). https://doi.org/10.1016/j.heliyon.2021.e08635

Podder, V., Nagarathna, R., Anand, A., Patil, S. S., Singh, A. K., & Nagendra, H. R. (2020). Physical Activity Patterns in India Stratified by Zones, Age, Region, BMI and Implications for COVID-19: A Nationwide Study. *Annals of Neurosciences*, *27*(3–4), 193–203. https://doi.org/10.1177/0972753121998507

Ramamoorthy, T., Kulothungan, V., & Mathur, P. (2022). Prevalence and Correlates of Insufficient Physical Activity Among Adults Aged 18-69 Years in India: Findings From the National Noncommunicable Disease Monitoring Survey. *Journal of Physical Activity and Health*, *19*(3), 150–159. https://doi.org/10.1123/jpah.2021-0688

Ranasinghe, C. D., Ranasinghe, P., Jayawardena, R., & Misra, A. (2013). Physical activity patterns among South-Asian adults: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *10*. https://doi.org/10.1186/1479-5868-10-116

S. M. Balaji. (2018). Intensity of physical activity among school going adolescents in Chennai, South India. *International Journal of Community Medicine and Public Health*, *5*(5), 2094. https://doi.org/10.18203/2394-6040.ijcmph20181729

Singh, H., Singh, S., Singh, A., & Baker, J. S. (2021). Physical activity levels among the adults of Majha region of Punjab, India: A cross-sectional study. *American Journal of Human Biology*, *33*(6). https://doi.org/10.1002/ajhb.23533

Thapa, K., Bhandari, P. M., Neupane, D., Bhochhibhoya, S., Rajbhandari-Thapa, J., & Pathak, R. P. (2019). Physical activity and its correlates among higher secondary school students in an urban district of Nepal. *BMC Public Health*, *19*(1). https://doi.org/10.1186/s12889-019-7230-2

Tripathy, J. P., Thakur, J. S., Jeet, G., Chawla, S., Jain, S., & Prasad, R. (2016). Urban rural differences in diet, physical activity and obesity in India: Are we witnessing the great Indian equalisation? Results from a cross-sectional STEPS survey. *BMC Public Health*, *16*(1). https://doi.org/10.1186/s12889-016-3489-8