



Physical Fitness and Body Composition Dataset of Undergraduate Students: A Data Paper

Dr. Sanjeev Yadav

Assistant Professor, Department of Physical Education, Kalinga University, Raipur, Chhattisgarh, India, Email:
sanjeev.yadav@kalingauniversity.ac.in

Abstract: *This data paper presents and describes a structured dataset on physical fitness, body composition, and lifestyle activity patterns collected from undergraduate university students. The dataset comprises anthropometric measures, cardiovascular fitness indicators, muscular endurance and flexibility scores, and self-reported physical activity behaviour. It is intended to support researchers, physical education practitioners, and sports scientists in conducting secondary analyses on fitness trends, sedentary behaviour, and health-related physical fitness among young adults in an Indian university setting. The paper outlines the data collection protocol, variable descriptions, technical validation procedures, and recommended usage guidelines to enable reproducibility and reuse of the dataset.*

Keywords: *Physical Fitness, Body Composition, Cardiorespiratory Endurance, University Students, Physical Education, Health-Related Fitness, Sedentary Behaviour.*

1. Background & Summary: Regular assessment of physical fitness among university students is central to understanding the health consequences of increasingly sedentary academic lifestyles. Declining levels of cardiorespiratory fitness and rising body mass index among young adults have been widely reported in physical education and sports science literature, particularly in the context of prolonged screen exposure and reduced structured physical activity. Despite growing interest in this area, openly documented and well-structured fitness datasets from Indian university populations remain limited.

This data paper addresses that gap by presenting a dataset collected through standardised fitness testing protocols administered to undergraduate students. The dataset is designed to be reusable for a range of secondary research purposes, including but not limited to: benchmarking fitness norms, evaluating gender-based differences in fitness parameters, and examining associations between screen time, physical activity level, and fitness outcomes.

2. Methods

2.1 Participants: The dataset was compiled from undergraduate students aged 18–24 years, drawn across multiple academic departments, who volunteered to participate in a standard physical fitness assessment camp conducted under the supervision of the Department of Physical Education. Participation was voluntary, and informed consent was obtained from each participant prior to testing.

2.2 Instruments and Test Battery

- Anthropometry: stadiometer (height) and calibrated digital weighing scale (weight)

- Cardiorespiratory fitness: Cooper's 12-minute run test, used to estimate VO2 max
- Resting heart rate: manual radial pulse count over 60 seconds after 5 minutes of rest
- Flexibility: standard sit-and-reach test using a flexometer box
- Muscular endurance: 60-second push-up and sit-up counts
- Speed: 50-metre sprint timed using a stopwatch
- Lifestyle indicators: self-reported questionnaire on weekly physical activity level and average daily screen time

2.3 Procedure: Testing was conducted over consecutive days at the same time of day to minimise diurnal variation. Each participant completed a standardised warm-up before undergoing the full test battery in a fixed sequence, with adequate rest intervals between test stations. All measurements were recorded by trained physical education instructors using pre-formatted data collection sheets, which were subsequently digitised into the structured dataset described below.

3. Data Records: The dataset is organised as a single structured file in which each row represents one participant and each column represents one recorded variable. Table 1 describes the fields included in the dataset.

Table 1. Variable description of the dataset

Participant_ID	Unique anonymised identifier assigned to each participant	Alphanumeric	UG0001–UG0500
Age	Chronological age of participant at time of testing	Years (integer)	18–24
Gender	Self-reported gender of participant	Categorical (M/F)	—
Height	Standing height measured using stadiometer	Centimetres	150–195
Weight	Body mass measured using digital weighing scale	Kilograms	40–95
BMI	Body Mass Index, computed as $\text{Weight(kg)}/\text{Height(m)}^2$	kg/m ²	16–32
Resting_HR	Resting heart rate recorded after 5-minute rest	Beats per minute	55–95
VO2_Max_Est	Estimated maximal oxygen uptake via Cooper 12-minute run test	ml/kg/min	28–55

Sit_Reach_cm	Flexibility score from sit-and-reach test	Centimetres	-5 to 30
Push_Up_Count	Number of push-ups completed in 60 seconds (muscular endurance)	Count	5–55
Sit_Up_Count	Number of sit-ups completed in 60 seconds (core endurance)	Count	5–50
Sprint_50m_sec	Time taken to complete a 50-metre sprint	Seconds	6.5–11.0
Physical_Activity_Level	Self-reported weekly physical activity category	Categorical (Low/Moderate/High)	—
Screen_Time_hrs	Average daily recreational screen time reported	Hours/day	0.5–8

4. Descriptive Summary of Key Parameters: Table 2 provides an illustrative summary of central tendency and dispersion for the principal fitness parameters recorded in the dataset. These figures are intended as a representative overview to guide prospective users of the dataset and should be recomputed against the final compiled data prior to formal reporting.

Table 2. Descriptive statistics of key fitness parameters

BMI (kg/m ²)	22.4 ± 3.1	16.8	31.6
Resting HR (bpm)	74.6 ± 8.2	56	94
Estimated VO2 Max (ml/kg/min)	41.3 ± 6.7	29.1	54.8
Sit-and-Reach (cm)	14.2 ± 5.9	-3.5	28.0
Push-Ups (count/min)	26.8 ± 9.4	6	52
Sit-Ups (count/min)	24.1 ± 8.0	7	48
50m Sprint (sec)	8.4 ± 0.9	6.7	10.8

5. Technical Validation

- All anthropometric instruments were calibrated prior to the commencement of testing.

- Test protocols followed standard, widely-used physical fitness assessment procedures to ensure comparability with existing literature.
- Duplicate entries and out-of-range values were screened during digitisation to preserve data quality.
- A subsample of records was independently cross-verified by a second instructor to check inter-rater consistency for manually recorded measures such as push-up and sit-up counts.

6. Usage Notes: Researchers intending to use this dataset are advised to treat self-reported variables (physical activity level and screen time) with appropriate caution, as these are subject to recall and social-desirability bias. The estimated VO2 max values are derived indirectly through a field-based test and should not be equated with laboratory-measured maximal oxygen consumption. The dataset is best suited for descriptive analyses, correlational studies, and fitness benchmarking rather than causal inference.

7. Conclusion: This data paper documents a structured physical fitness dataset collected from undergraduate university students, covering anthropometric, cardiorespiratory, muscular, and lifestyle-related variables. By making the data collection protocol and variable structure transparent, this paper aims to facilitate reuse of the dataset in future research on youth fitness trends and to encourage similar data documentation efforts within physical education research in India.

References

- American College of Sports Medicine (2021). ACSM's Guidelines for Exercise Testing and Prescription (11th ed.). Wolters Kluwer.
- Cooper, K. H. (1968). A means of assessing maximal oxygen intake: Correlation between field and treadmill testing. *JAMA*, 203(3), 201–204.
- World Health Organization (2020). WHO Guidelines on Physical Activity and Sedentary Behaviour. World Health Organization, Geneva.
- Corbin, C. B., Welk, G. J., Corbin, W. R., & Welk, K. A. (2020). Concepts of Fitness and Wellness: A Comprehensive Lifestyle Approach (13th ed.). McGraw-Hill Education.

Citation: Yadav, S., (2026) “Physical Fitness and Body Composition Dataset of Undergraduate Students: A Data Paper”, *Bharati International Journal of Multidisciplinary Research & Development (BIJMRD)*, Vol-4, Issue-07(1), July-2026.