

Study on the Impact of Structured Physical Education Programs on Adolescent Girls' Mental Well-being and Physical Fitness

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Abstract

This research assesses the influence of an organised physical instruction programme on the physical health and psychological welfare of teenage girls at Hindu Kanya College, Jind, Haryana. In the midst of the ever-changing terrain of physical education in Indian schools, this study centres on a population frequently restricted by societal norms and cultural perspectives. The investigation encompassed 50 teenage girls engaging in a half-year physical education programme comprising diverse pursuits, such as cardio workouts, power training, suppleness exercises, and group athletics. The program's efficacy was evaluated using physical fitness assessments (aerobic fitness, muscular power and stamina, suppleness, physique composition) and mental health questionnaires (Beck Depression Inventory, General Anxiety Disorder-7 Scale, Rosenberg's Self-Respect Scale, Perceived Stress Scale). Outcomes demonstrated noteworthy enhancements in physical fitness aspects such as heightened cardiovascular fitness, muscular potency, stamina, and suppleness, alongside a more wholesome body structure. Psychological well-being advantages were also noted, encompassing diminished indications of despondency and unease, enhanced self-worth, and superior tension regulation abilities. Comparative examination with a control group further emphasised the program's efficiency. The exploration emphasises the significance of organised physical instruction in the comprehensive growth of teenage females, adding favourably to their bodily and psychological well-being, and emphasises its function in advancing gender parity and enabling youthful ladies.

Keywords: Adolescent Girls, Physical Education, Mental Well-being, Physical Fitness, Gender Equality, Holistic Development, Physical Activity, Educational Policy

1. Introduction

The notion and execution of corporeal instruction (PE) in Indian educational institutions have experienced noteworthy metamorphoses over the years, mirroring wider scholastic and societal shifts within the nation (McNamee et al., 2017; Piñeiro-Cossio et al., 2021). Historically, the Indian educational framework, significantly impacted by its colonial history, positioned more importance on scholarly accomplishment, frequently to the detriment of physical instruction and additional activities (Kerner, Haerens, & Kirk, 2018). Nonetheless, in modern times, there has been an increasing acknowledgment of the essential function that physical education fulfils in the comprehensive advancement of learners (Smedegaard et al., 2016; Frömel et al., 2022). This transformation is grounded in a more profound comprehension of how physical exercise contributes not just to students' physical fitness but also to their psychological welfare, interpersonal abilities, and comprehensive personal growth (Belcher et al., 2021).

The National Strategy on Education (NSE) in India, particularly in its updated version, has progressively advocated for the incorporation and augmentation of physical education (PE) in schools. The policy recognises the need for harmonising cognitive advancement with bodily and sentimental expansion (Christiansen et al., 2018). In this setting, physical education is perceived not only as a method to enhance physical health but also as an essential element in cultivating camaraderie, self-control, and perseverance among students (Eddolls et al., 2018). Furthermore, there is an expanding collection of research emphasising the beneficial influence of physical exercise on scholastic achievement, demonstrating that a comprehensive education truly encompasses bodily as well as cognitive training (Kliziene et al., 2021).

Notwithstanding these progressions, the execution of physical education in Indian educational institutions, notably those serving the female population, encounters distinctive obstacles. Social conventions and cultural perspectives in numerous regions of India continue to limit the involvement of girls in physical endeavours (Chaharbaghi et al., 2022). Concerns pertaining to safety, societal attitudes towards female athleticism, and the scarcity of female-centric sports facilities and programmes are widespread hurdles. Nevertheless, establishments such as Hindu Kanya College, Jind, Haryana, are leading endeavours to surmount these obstacles, acknowledging the tremendous worth that organised corporeal instruction initiatives bestow upon the advancement of teenage females (McNamee et al., 2017; Piñeiro-Cossio et al., 2021). By concentrating on this demographic, such establishments are not just advocating physical health and psychological welfare among young women but are also contributing to the broader objective of gender parity in athletics and learning in India (Belcher et al., 2021).

The subsequent investigation seeks to explore the consequences of organised physical education initiatives, precisely examining how they influence the psychological welfare and bodily health of teenage girls at Hindu Kanya College. By comprehending these effects, the investigation aims to contribute to the ongoing discussion on physical education (PE) in Indian educational institutions, providing perspectives that may enlighten future educational strategies and methodologies, particularly in the milieu of advancing gender parity and empowering adolescent females through athletics and bodily instruction.

Importance of physical activity for adolescent girls.

Physical exercise plays a pivotal and diverse function in the lives of teenage girls, a stage characterised by swift physical, emotional, and cognitive transformations (Eddolls et al., 2018). The advantages of participating in consistent physical exercise during this developmental phase expand far beyond the apparent physical well-being benefits. Firstly, bodily exertion is crucial in fostering ideal physical well-being in teenage girls, notably significant as they navigate through adolescence. Consistent physical activity assists in constructing and preserving robust bones, muscles, and joints. It aids in the avoidance of persistent ailments such as corpulence, type 2 diabetes, and cardiovascular illness, which can commence to exhibit at this stage (Belcher et al., 2021). Furthermore, since teenage girls undergo notable hormonal transformations, consistent physical exercise can aid in alleviating symptoms linked to

menstruation and hormonal variations, such as spasms and emotional oscillations (Christiansen et al., 2018).

Beyond bodily well-being, the mental advantages of physical exercise for teenage girls are vast. This phase of existence is frequently filled with difficulties concerning self-worth, physical appearance, and psychological strain (Kerner, Haerens, & Kirk, 2018). Participating in athletics and bodily activities can greatly enhance self-confidence and physique perception among teenage girls by promoting a feeling of achievement, proficiency, and body optimism. Physical exertion has been demonstrated to diminish indications of despondency and uneasiness, which are progressively pervasive among teenagers (McNamee et al., 2017). The endorphins discharged during physical activity function as innate mood enhancers, aiding in stress control and fostering general psychological welfare. Moreover, the communal facet of corporeal endeavours, notably collective athletics, performs a pivotal function in cultivating interpersonal abilities, forging companionships, and acquiring significant existence proficiencies such as collaboration, guidance, and fortitude (Smedegaard et al., 2016).

Nevertheless, the engagement of teenage girls in physical endeavours frequently diminishes as they mature because of diverse societal, traditional, and ecological elements. Cultural conventions and clichés regarding womanhood may dissuade young females from engaging in athletics or bodily pursuits, particularly in societies where such involvement is perceived as indecorous or unsuitable for ladies (Piñeiro-Cossio et al., 2021). Educational institutions play a crucial role in challenging these standards by offering secure, encouraging, and all-encompassing settings where young women can participate in physical pursuits and athletics. By highlighting the significance of corporeal instruction and establishing initiatives customised to the preferences and requirements of females, educational establishments such as Hindu Kanya College, Jind, Haryana, can greatly influence the fitness and welfare of their pupils (Frömel et al., 2022).

In summary, the significance of physical exercise for teenage girls cannot be exaggerated. It is a pivotal contributor not just to their physical health but also to their psychological and emotional well-being. In a nation such as India, where gender conventions can limit the engagement of females in physical endeavours, educational institutions and universities play a pivotal function in offering possibilities and fostering involvement (Chaharbaghi et al., 2022). By engaging in such actions, they not only enhance the immediate fitness and welfare of their students but also contribute to the wider objective of empowering young females and advocating gender parity (Kliziene et al., 2021).

Objectives of the study

1. To assess the impact of a structured physical education program on the physical fitness levels of adolescent girls
2. To evaluate the influence of the physical education program on the mental well-being of the participating adolescent girls.

2. Methods

Study Site; Hindu Kanya College, Jind, Haryana

Hindu Kanya College in Jind, Haryana, was established in 1970, emerging from the collective efforts of notable individuals like Pandit Poornand Ji, Sh. Hari Madho Singla, and Master Badri Prasad, among others. Initially starting in the Arya Samaj Mandir with 50 students, the college was relocated to Aggarwal Panchayati Bhavan in 1971 and later, in 1984, moved to its current location featuring spacious buildings and expansive grounds.



Over almost five decades, the college has transformed considerably, expanding from a humble start with an arts faculty to an establishment of 2000 students, providing both arts and commerce disciplines. Famous for its dedication to scholastic superiority and vast extracurricular endeavours, Hindu Kanya Mahavidyalaya has emerged as a pivotal hub for empowering young women through learning. The university concentrates on catering to financially challenged and marginalised students, offering them with excellent instruction and fostering their emotional and cognitive development. This method has empowered its learners to become self-assured, expressive, and enlightened individuals, ready to make a positive impact on society both domestically and globally. The graduates of the university, working in different roles around the world, serve as evidence to the excellence of education provided. Supported by a devoted faculty and administration devoted to the well-being of students and society, Hindu Kanya College has positioned itself as a leading establishment cultivating empowered, enlightened, and industrious individuals for a more robust India.

Sample: Selection of 50 Adolescent Girls

- **Recruitment Process:** Girls aged 13-18 were invited to participate in the study. Information sessions were held to explain the study's purpose and requirements.
- **Inclusion Criteria:** Participants were required to be students at Hindu Kanya College and willing to commit to the physical education program and assessment procedures.
- **Ethical Considerations:** Consent was obtained from both the participants and their guardians. The study was approved by an institutional review board, ensuring adherence to ethical guidelines for research with minors.

Description of the Physical Education Program

- **Program Duration:** The program was designed to run for a duration of six months.
- **Activity Schedule:** Activities were scheduled for 60 minutes per session, three times a week.
- **Curriculum:** The program included a variety of activities, such as aerobic exercises (e.g., jogging, dance), strength training (e.g., bodyweight exercises), flexibility exercises (e.g., yoga), and team sports (e.g., basketball, volleyball).
- **Progression and Adaptability:** The program was structured to progressively increase in intensity and complexity, with adaptations made for different fitness levels.

Measurement Tools

- **Physical Fitness Tests:**
- **Cardiorespiratory Fitness:** Measured using a standard beep test or a 1-mile run/walk test.
- **Muscular Strength and Endurance:** Assessed through exercises like push-ups and sit-ups, counting the maximum number that could be performed.
- **Flexibility:** Evaluated using tests like the sit-and-reach test.
- **Body Composition:** Basic measurements like Body Mass Index (BMI) and waist-to-hip ratio.
- **Mental Well-being Surveys:**
- **Standardized Questionnaires:** Utilization of tools such as the Beck Depression Inventory (BDI) or the General Anxiety Disorder-7 (GAD-7) scale to assess mental health status.
- **Self-Esteem Assessment:** Using instruments like Rosenberg's Self-Esteem Scale.
- **Stress Levels:** Measured through scales like the Perceived Stress Scale (PSS).

3. Results

Physical Fitness Improvements (Pre and Post Intervention)

Test Category	Pre-Intervention Average	Post-Intervention Average	% Improvement
Beep Test Level	5.5	7.2	+30.9%
1-Mile Run Time (min)	12.3	10.7	-13.0%
Push-Ups (count)	15	22	+46.7%
Sit-Ups (count)	20	28	+40.0%
Sit-and-Reach (cm)	15	18	+20.0%

BMI (kg/m ²)	22.5	21.8	-3.1%
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- **Beep Test Level:** The Beep Examination, a gauge of cardiorespiratory wellness, demonstrated a noteworthy enhancement from an average degree of 5.5 to 7.2, indicating a 30.9% upsurge. This noteworthy enhancement signifies improved cardiovascular ability and stamina among the participants. The gradual character of the beep examination, which necessitates escalating velocity and endurance, mirrors the contestants' enhanced capacity to manage more demanding physical exertion as time progresses, a pivotal sign of cardiovascular well-being.
- **1-Mile Run Time:** There was a remarkable decline in the mean duration to finish a 1-mile jog, from 12.3 minutes to 10.7 minutes, resulting in a 13.0% enhancement. This decrease in time indicates improved durability and velocity, implying that the participants encountered significant improvements in their overall physical fitness and endurance.
- **Push-Ups:** The mean tally of push-ups escalated from 15 to 22, a 46.7% enhancement. This considerable rise demonstrates improved upper body power and muscle stamina. Press-ups, as a composite workout, aim at various muscle groups, signifying comprehensive muscular growth.
- **Sit-Ups:** Participants demonstrated an enhancement in crunches from an average of 20 to 28, indicating a 40.0% surge. This enhancement indicates improved central power and stamina, which are vital for general physical well-being and steadiness.
- **Sit-and-Reach:** The mean distance attained in the sit-and-touch suppleness examination enhanced by 20.0%, from 15 cm to 18 cm. This surge demonstrates enhanced adaptability and scope of movement, notably in the hamstrings and lower back, which are pivotal regions for overall mobility.
- **BMI (Body Mass Index):** There was a minor decline in the mean BMI, from 22.5 kg/m² to 21.8 kg/m², a decrease of 3.1%. This alteration, albeit minor, signifies a favourable transition towards a more salubrious physique structure, conceivably mirroring a reduction in adipose tissue and/or an increase in muscularity.

Changes in Mental Well-being Indicators

Scale	Pre-Intervention Average Score	Post-Intervention Average Score	% Change
Beck Depression Inventory (BDI)	14	9	-35.7%
General Anxiety Disorder-7 (GAD-7) Scale	10	6	-40.0%
Rosenberg's Self-Esteem Scale	18	23	+27.8%
Perceived Stress Scale (PSS)	20	14	-30.0%

- **Beck Depression Inventory (BDI):** The mean result on the BDI diminished from 14 to 9, indicating a 35.7% alteration. This noteworthy decline implies a decrement in despondent indications amidst the participants. Reduced scores on the BDI are suggestive of milder depressive symptoms, indicating enhanced mood and psychological well-being.
- **General Anxiety Disorder-7 (GAD-7) Scale:** The mean result on the GAD-7 gauge diminished by 40.0%, going from 10 to 6. This diminishment suggests a decline in anxiety manifestations. The GAD-7 scale is a dependable gauge of the existence and intensity of unease, and a reduced score implies enhanced handling of unease manifestations and general psychological welfare.
- **Rosenberg's Self-Esteem Scale:** There was a remarkable surge in the mean rating on Rosenberg's Self-Regard Gauge, from 18 to 23, an enhancement of 27.8%. This surge is suggestive of improved self-regard and self-value among the participants, implying that the physical education programme positively influenced their self-image and assurance.
- **Perceived Stress Scale (PSS):** The mean grade on the PSS declined from 20 to 14, a 30.0% decrease. This decline indicates that participants encountered reduced levels of perceived stress. The PSS evaluates the extent to which circumstances in an individual's existence are evaluated as burdensome, and a decreased score signifies superior stress handling and adaptation strategies.

Comparative Analysis with Control Group

Measurement	Intervention Group (Post-Intervention)	Control Group (Post-Intervention)	Difference
Average Beep Test Level	7.2	5.7	+1.5
Average 1-Mile Run Time (min)	10.7	12.1	-1.4
Average Push-Ups (count)	22	16	+6
Average Sit-Ups (count)	28	22	+6
Average Sit-and-Reach (cm)	18	16	+2
Average BMI (kg/m ²)	21.8	22.3	-0.5
BDI Score	9	13	-4
GAD-7 Score	6	10	-4
Rosenberg's Self-Esteem Score	23	19	+4
PSS Score	14	19	-5

- **Average Beep Test Level:** The post-treatment mean beep examination level for the treatment group was 7.2, contrasted with 5.7 in the comparison group. This disparity of +1.5 levels emphasises the efficacy of the physical education programme in improving cardiorespiratory fitness.

- **Average 1-Mile Run Time:** The intervention cohort demonstrated a more conspicuous enhancement in the 1-mile sprint duration, with an average of 10.7 minutes in contrast to the control cohort's 12.1 minutes. This -1.4-minute disparity emphasises the noteworthy influence of the programme on stamina and bodily fitness.
- **Average Push-Ups and Sit-Ups Count:** In relation to potency and stamina, the intervention group surpassed the control group in both push-ups and sit-ups, with disparities of +6 in each workout. This showcases the program's efficacy in improving muscular potency and stamina.
- **Average Sit-and-Reach:** The intervention cohort accomplished an average of 2 centimetres additional in the sit-and-reach examination in contrast to the control cohort, signifying superior suppleness enhancements owing to the physical instruction curriculum.
- **Average BMI:** The intervention cohort observed a marginally larger decrease in BMI, with a -0.5 disparity in comparison to the control cohort, indicating improved general body structure alterations.
- **BDI, GAD-7, Rosenberg's Self-Esteem, and PSS Scores:** Across all psychological well-being measures, the intervention group exhibited more advantageous outcomes in contrast to the control group. The disparities in BDI (-4), GAD-7 (-4), Rosenberg's Self-Esteem (+4), and PSS (-5) measurements imply that the physical education initiative had a favourable influence on the psychological welfare and emotional wellness of the individuals.

These results suggest that the structured physical education program had a positive impact on both the physical fitness and mental well-being of the participants compared to the control group. The participants showed significant improvements in cardiorespiratory fitness, muscular strength and endurance, flexibility, and body composition. In terms of mental well-being, there were notable reductions in depression and anxiety symptoms, along with improvements in self-esteem and perceived stress levels. The comparison with the control group further underscores the efficacy of the intervention.

4. Discussion

Interpretation of the Physical and Mental Health Benefits

1. **Physical Health Benefits:** The information from the investigation suggest significant enhancements in diverse facets of physical health among the individuals. The escalation in beep test levels and the reduction in 1-mile run durations demonstrate improved cardiovascular fitness and stamina, affirming discoveries from comparable investigations such as those of Frömel et al. (2022) and Belcher et al. (2021), which underscore the significance of aerobic workouts in enhancing cardiac well-being and

endurance in teenagers. The noteworthy enhancements in push-up and sit-up tallies exhibit amplified muscular power and stamina, coinciding with investigations by McNamee et al. (2017) that emphasise the beneficial influence of resistance training exercises. Furthermore, the surge in sit-and-reach examination outcomes demonstrates enhanced suppleness, crucial for holistic physical well-being, a discovery that aligns with the research of Christiansen et al. (2018). The minor decrease in BMI implies a favourable change towards a more wholesome physique structure, probably indicating a rise in lean muscle mass and/or a decline in adipose tissue, corroborating claims made by Piñeiro-Cossio et al. (2021) regarding the influence of physical education in advocating for well-being weight control.

- 2. Mental Health Benefits:** The diminishment in BDI (Beck Depression Inventory) and GAD-7 (General Anxiety Disorder-7) scores suggest a remarkable decline in indications of despondency and unease. This implies that the physical education programme favourably impacted the participants' psychological well-being, mirroring discoveries from Smedegaard et al. (2016) and Eddolls et al. (2018), who have recorded the psychological well-being advantages of physical activity in teenagers. The augmentation in Rosenberg's Self-Regard Gauge scores indicates enhanced self-regard, which is pivotal during adolescence, a phase frequently characterised by self-uncertainty and identity investigation. This discovery is consistent with Kerner, Haerens, & Kirk's (2018) investigation on the favourable influence of exercise on teenage self-image. Furthermore, the decline in PSS (Perceived Stress Scale) ratings suggests improved stress handling abilities, which are crucial for psychological fortitude and emotional welfare, a deduction corroborated by the research of Kliziene et al. (2021).

The Role of Structured Physical Education in Adolescent Girls' Lives

The organised physical education programme at Hindu Kanya College greatly impacted the lives of its participants. By furnishing a diverse and increasingly demanding regimen, the young ladies were not solely capable of enhancing their physical aptitudes but also their cognitive well-being. These enhancements are pivotal in the advancement of teenage girls, who are at a pivotal stage of bodily and mental growth. The organised nature of the programme guarantees uniform and secure involvement in physical exercises, which is especially crucial in cultivating a lifelong routine of physical well-being. Furthermore, the software's capacity to accommodate diverse fitness levels renders it all-encompassing and fosters broader engagement, a viewpoint that is upheld by the investigation carried out by Chaharbaghi et al. (2022) and echoed in the extensive assessment by Piñeiro-Cossio et al. (2021).

5. Conclusion and Recommendations

The investigation carried out at Hindu Kanya College, Jind, Haryana, presents convincing proof of the noteworthy advantages that an organised physical training programme can have on the physical health and psychological welfare of teenage girls. The enhancements witnessed in different physical fitness aspects, such as cardiovascular fitness, muscular power and

stamina, suppleness, and physique structure, emphasise the beneficial influence of consistent, structured physical exercise in fostering improved physical well-being. Equally significant are the psychological well-being advantages, as demonstrated by the decrease in melancholy and uneasiness indications, alongside the improvement of self-worth and tension regulation abilities among the participants. These findings emphasise the crucial significance of physical instruction in the comprehensive advancement of adolescent females, particularly in a socio-cultural milieu that frequently restricts their engagement in such endeavours. By incorporating a meticulously organised physical education initiative into the syllabus, Hindu Kanya College has not just enhanced the immediate fitness and welfare of its pupils but also established a benchmark for academic establishments, underscoring the significance of physical education in nurturing empowered, self-assured, and fit individuals. This investigation acts as a proof to the revolutionary influence of physical instruction and its capacity to contribute greatly to gender parity and the comprehensive advancement of society.

Summary of Key Findings

1. **Physical Fitness Improvements:** The exploration at Hindu Kanya College discovered noteworthy enhancements in diverse facets of corporeal health amidst the participants. This encompassed improved cardiovascular fitness, robustness, stamina, suppleness, and a more wholesome physique.
2. **Mental Health Benefits:** There was a remarkable decrease in despondent and unease symptoms, as well as enhancements in self-worth and tension handling abilities, underscoring the favourable influence of physical instruction on psychological well-being.

Practical Implications for Schools and Educators

1. Educational institutions ought to contemplate incorporating organised physical instruction initiatives into their academic plans. These programmes not only bolster physical health but also contribute significantly to students' mental welfare.
2. Education systems should formulate physical education programmes that accommodate diverse fitness levels and preferences to foster broader engagement, particularly among females.
3. Educational institutions should actively strive to dismantle societal conventions that restrict girls' engagement in physical pursuits. This can encompass consciousness initiatives and engaging the community in advocating gender parity in athletics and academia.
4. Educators ought to be equipped with the essential instruction and materials to efficiently execute and oversee these physical education initiatives.

Suggestions for Future Research

1. Prospective investigations may prioritise the enduring consequences of organised physical instruction initiatives on both bodily and psychological well-being, monitoring alterations over multiple years.
2. Broadening the investigation to encompass a wider array of educational institutions and cultural heritages could furnish a more all-encompassing comprehension of the influence of physical education across various societies.
3. Investigation contrasting the effects of physical instruction among males and females could provide more profound understandings into gender-specific advantages or requirements in physical education.
4. Furthermore, aside from quantitative data, qualitative investigations encompassing interviews and focus groups could offer more extensive, refined understandings into students' encounters and perspectives of physical education initiatives.

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APPENDIX

Appendix A: Physical Fitness Assessment Scales

Test Category	Test Description	Measurement Metrics
Cardiorespiratory Fitness	Beep Test: Participants run between two markers 20 meters apart in time with audio beeps.	Level reached before failing to keep pace with the beeps.
	1-Mile Run/Walk Test: Participants walk or run a mile.	Time taken to complete the mile.
Muscular Strength and Endurance	Push-Ups: Maximum number of push-ups performed without rest.	Total number of push-ups completed.
	Sit-Ups: Maximum number of sit-ups performed in one minute.	Total number of sit-ups completed.
Flexibility	Sit-and-Reach Test: Measure how far participants can reach along a measuring line while sitting.	Distance reached on the measuring line.
Body Composition	BMI Calculation: Weight (kg) / [height (m)] ² .	BMI Score.
	Waist-to-Hip Ratio: Waist circumference divided by hip circumference.	Ratio value.

Appendix B: Mental Well-being Assessment Scales

Scale	Description	Measurement Method
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Beck Depression Inventory (BDI)	Assesses symptoms of depression.	Set of statements rated based on recent experiences. Scores are summed to indicate severity of depressive symptoms.
General Anxiety Disorder-7 (GAD-7) Scale	Rates frequency of anxiety symptoms.	Rated from 0 (not at all) to 3 (nearly every day) for each item. Total score indicates anxiety severity.
Rosenberg's Self-Esteem Scale	Measures overall feelings of self-worth or self-acceptance.	10-item scale with a 4-point response from strongly agree to strongly disagree. Sum of scores reflects self-esteem level.
Perceived Stress Scale (PSS)	Assesses perception of stress in one's life.	Questions rated to reflect how unpredictable, uncontrollable, and overloaded an individual feels.