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**Effect Of ICT -Integrated Counselling On Nigerian Athlete Attrition, Health, And
Performance In Physical Education**

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Abstract:

This study examined the effect of ICT-integrated counselling interventions on athlete attrition, health outcomes, and performance in physical education programmes. It investigated whether integrating digital counselling platforms with structured psychosocial support could reduce dropout rates while enhancing athletes' physical and psychological well-being and overall performance. A mixed-methods quasi-experimental design, using a non-equivalent control group pre-test–post-test approach, was adopted. The population comprised student-athletes, physical education teachers, and coaches in selected secondary schools and universities. A sample of 300 participants was selected through a multi-stage sampling technique involving stratified, purposive, and simple random methods. Data were collected using validated instruments: Athlete Attrition Scale (AAS), Health and Well-being Questionnaire (HWQ), Sports Performance Rating Scale (SPRS), and ICT-Counselling Utilization Checklist (ICUC), with reliability coefficients ranging from 0.76 to 0.89. Data collection was conducted in three phases: pre-test, a 12-week ICT-based counselling intervention, and post-test. Quantitative data were analyzed using descriptive statistics, t-tests, regression analysis, and ANOVA, while qualitative data were analyzed thematically. Findings showed that ICT-integrated counselling significantly reduced athlete attrition ($\beta = -0.51$, $p < .05$), improved health outcomes ($\beta = 0.59$, $p < .001$), and enhanced performance ($\beta = 0.54$, $p < .001$). The observed effect sizes were moderate to large, indicating substantial practical significance. Significant differences were also found between intervention and control groups. The study concludes that ICT-integrated counselling is an effective and scalable strategy for improving athlete retention, well-being, and performance. Keywords: ICT-integrated counselling, athlete attrition, health outcomes, sports performance, physical education

Introduction:

Sport participation within physical education programmes plays a pivotal role in promoting physical fitness, psychological well-being, social development, and talent identification among young people. In contemporary educational systems, schools and universities increasingly recognize sports as a vehicle for holistic development, integrating structured physical education into formal curricula to enhance both academic and non-academic outcomes. Beyond physical benefits, sport participation fosters discipline, teamwork, emotional regulation, and resilience, all of which are essential for lifelong development (Eime, Young, Harvey, Charity, & Payne, 2021; Howie, Daniels, & Guagliano, 2022).

Despite these benefits, athlete attrition—defined as the premature withdrawal of individuals from organized sports—remains a persistent global challenge. Attrition is particularly pronounced among student-athletes in secondary and tertiary institutions, where academic pressures, psychological stress, injury risks, and environmental constraints often undermine sustained participation. Recent studies indicate that dropout rates in youth and collegiate sports continue to rise, largely due to burnout, anxiety, lack of motivation, and inadequate psychosocial support systems (Isoard-Gauthier, Trouilloud, Gustafsson, & Guillet-Descas, 2022; Madigan, Curran, & Hill, 2021).

Athlete burnout has emerged as a critical predictor of attrition. It is characterized by emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation. Contemporary research highlights that burnout is closely associated with chronic stress, overtraining, and maladaptive perfectionism, which collectively diminish athletes' motivation and engagement (Gerber, Colledge, & Brand, 2023; Li, Ivarsson, Stenling, & Yang, 2024). Without adequate intervention, burnout significantly increases the likelihood of withdrawal from sport participation.

In recent years, the integration of Information and Communication Technology (ICT) into education and sports systems has introduced innovative opportunities for enhancing athlete support. ICT tools—including mobile health applications, wearable fitness trackers, online counselling platforms, and data analytics systems—have been widely adopted to improve performance monitoring, injury prevention, and mental health support (Baca, Dabnichki, Heller, & Kornfeind, 2022; Meng, Zhang, & Liu, 2023). These technologies enable real-time feedback, personalized interventions, and continuous monitoring of athletes' physical and psychological states.

However, despite these advancements, the application of ICT in sports counselling and athlete retention strategies remains underdeveloped, particularly in developing countries. Structural barriers such as inadequate infrastructure, limited digital literacy, and insufficient institutional support continue to hinder effective implementation (Adewale & Nwosu, 2024). Ayena and Ogunsanya (2026) reported that ICT integration significantly enhances sports psychology support services and is strongly associated with improved administrative efficiency.

Counselling interventions have long been recognized as essential for addressing the psychological and emotional challenges faced by athletes. Traditional face-to-face counselling approaches, however, are often constrained by accessibility, scalability, and timeliness. ICT-integrated counselling offers a transformative alternative by combining psychological support with digital accessibility, enabling athletes to receive real-time, personalized, and continuous care. Emerging evidence suggests that digital mental health interventions can significantly improve psychological resilience, reduce stress, and enhance performance outcomes (Reardon, Hainline, Miller Aron, & Baron, 2022; Watson & Kissinger, 2023). Nevertheless, empirical research examining the effectiveness of ICT-integrated counselling in reducing athlete attrition and improving health and performance outcomes remains limited, thereby necessitating further investigation.

Empirical Review:

Athlete Attrition and Burnout in Sports: Athlete burnout remains a central determinant of sports attrition, commonly conceptualized as a multidimensional syndrome comprising emotional exhaustion, reduced sense of accomplishment, and sport devaluation. It typically emerges when athletes are exposed to prolonged stressors that exceed their coping capacities. While there is broad consensus on the role of burnout in predicting dropout, variations exist in the magnitude and pathways of this relationship across contexts.

Empirical studies consistently report a positive association between burnout and dropout intentions. For example, Isoard-Gautheur *et al.* (2022) identified psychological distress, excessive training demands, and performance pressure as significant predictors of burnout among youth athletes. Similarly, Gerber *et al.* (2023) found that high stress levels combined with inadequate recovery increase the likelihood of withdrawal behaviours. However, these findings are not entirely uniform, as some studies suggest that contextual factors such as coaching style, team climate, and institutional support can moderate the burnout–attrition relationship.

A systematic review by Li *et al.* (2024) further identified predictors such as perfectionism, sleep disturbances, anxiety, and low intrinsic motivation. While these findings align with Self-Determination Theory, which emphasizes intrinsic motivation as a key driver of sustained participation, they also highlight inconsistencies regarding the relative influence of individual versus environmental factors. Moreover, Madigan *et al.* (2021) demonstrated that psychological interventions—particularly cognitive-behavioural and mindfulness-based approaches—significantly reduce burnout symptoms. However, the effectiveness of these interventions often depends on accessibility and continuity, which are limited in traditional face-to-face delivery models.

In the African context, emerging studies reveal similar patterns but with additional structural constraints. For instance, Adewale and Nwosu (2024) reported that inadequate institutional support and limited access to psychological services exacerbate burnout and attrition among student-athletes in sub-Saharan Africa. Similarly, Adebayo and Salami (2022) found that Nigerian university athletes experience high levels of stress and burnout due to academic–sport role conflict and insufficient counselling services. These findings suggest that while burnout is a universal phenomenon, its impact may be amplified in resource-constrained environments.

Overall, the literature demonstrates a strong but context-dependent relationship between burnout and athlete attrition. While psychological interventions are effective, their traditional delivery limits scalability, underscoring the need for innovative, accessible, and technology-driven solutions.

ICT and Digital Interventions in Sports Psychology: The integration of ICT into sports psychology has gained increasing attention due to its potential to enhance performance monitoring, mental health support, and intervention delivery. Digital platforms facilitate continuous interaction between athletes and support personnel, thereby improving responsiveness and personalization of interventions. Despite these advantages, the effectiveness of ICT-based interventions varies depending on design, user engagement, and contextual factors.

Empirical evidence generally supports the positive impact of ICT-based psychological interventions. Meng *et al.* (2023) reported that mobile-based mental health applications significantly improve emotional regulation and motivation among athletes. Similarly, Watson and Kissinger (2023) found that online counselling platforms enhance accessibility and engagement, particularly among digitally literate populations. However, some studies indicate that the effectiveness of digital interventions may be limited by user adherence, technological barriers, and lack of integration with existing support systems.

Wearable technologies and data analytics further expand the scope of ICT in sports by enabling real-time monitoring of physiological and psychological indicators. Baca *et al.* (2022) highlighted that such technologies can detect early signs of fatigue and stress, potentially preventing burnout and injury. Likewise, Reardon *et al.* (2022) emphasized that technology-supported mental health programmes improve psychological outcomes and reduce stigma associated with help-seeking. Nevertheless, concerns remain regarding data privacy, ethical use, and the potential over-reliance on technology without adequate human support.

In developing regions, particularly in Africa, the adoption of ICT in sports counselling remains uneven. Adewale and Nwosu (2024) identified infrastructural deficits, limited funding, and low digital literacy as major barriers. Supporting this, Okeke and Iwundu (2023) found that although Nigerian athletes show positive attitudes toward digital interventions, actual utilization remains low due to accessibility challenges and lack of institutional frameworks.

In synthesis, while ICT-based interventions demonstrate considerable potential, their effectiveness is contingent upon contextual readiness, technological infrastructure, and user engagement. This highlights the need for context-specific, integrated approaches that combine digital tools with traditional support systems.

Health Outcomes and Performance in Sports Contexts: Athlete health outcomes are closely linked to both psychological and physical well-being, with growing evidence indicating that these dimensions are interdependent rather than isolated. Psychological distress has been shown to negatively affect immune function, injury recovery, and overall performance, while effective psychological support enhances resilience, emotional regulation, and physical recovery.

Empirical studies provide substantial support for the role of psychological interventions in improving health and performance. Howie, Daniels, & Guagliano (2022) found that athletes receiving consistent psychological support exhibit improved well-being, reduced injury risk, and enhanced performance. Similarly, Park and Jeon (2023) reported that psychological skills training significantly improves concentration, motivation, and competitive outcomes. However, some inconsistencies exist regarding the extent to which psychological improvements directly translate into performance gains, suggesting the influence of moderating variables such as training intensity and environmental conditions.

Digital health interventions further extend these benefits by enabling continuous monitoring and personalized feedback. Meng *et al.* (2023) observed that athletes using digital monitoring systems demonstrate better stress management and performance consistency. In the African context, Ogunleye and Adeyemi (2022) reported that access to structured psychological support significantly improves both well-being and performance among Nigerian student-athletes, although such services remain limited.

Despite these advancements, a major limitation in existing literature is the tendency to examine attrition, health, and performance as separate constructs. This fragmented approach restricts the development of comprehensive interventions capable of addressing the multifaceted needs of athletes. Consequently, there is a growing call for integrated models that combine psychological counselling, ICT tools, and performance monitoring systems within a unified framework.

Overall, the literature underscores the interconnected nature of athlete attrition, health outcomes, and performance, while highlighting the need for holistic, technology-enhanced interventions that can simultaneously address these dimensions.

Theoretical Framework:

This study is grounded in an integrated theoretical framework that combines Ecological Systems Theory, Cognitive Behavioural Theory (CBT), and Self-Determination Theory (SDT) to explain how ICT-integrated counselling influences athlete outcomes. Rather than operating independently, these theories collectively provide a multi-level explanation linking digital counselling interventions to psychological mediators (motivation and stress regulation) and, ultimately, to athlete attrition, health outcomes, and performance.

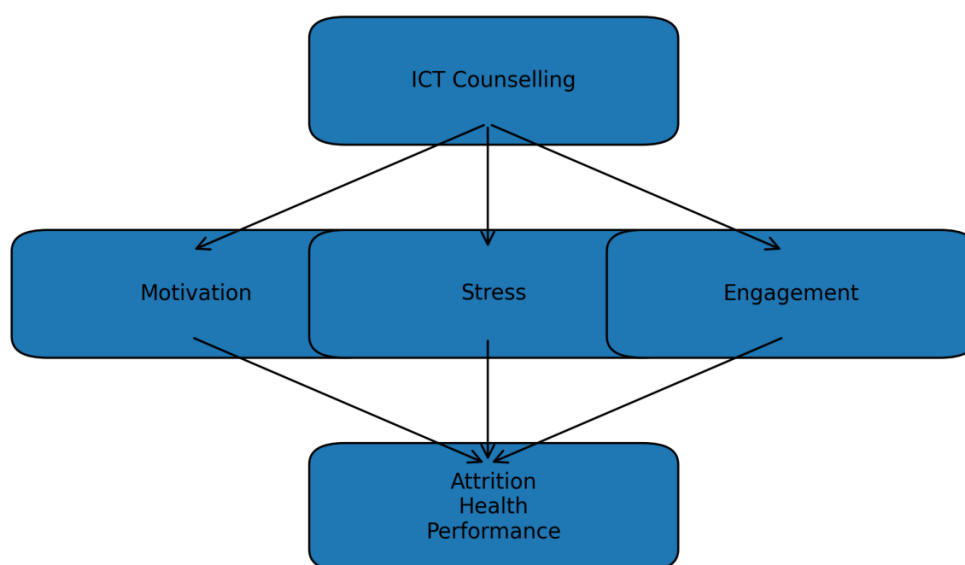
Ecological Systems Theory: Ecological Systems Theory conceptualizes athlete development as a product of dynamic interactions between individuals and their environments, including coaches, peers, institutions, and broader socio-cultural systems. Within this framework, athlete attrition is not solely an individual outcome but the result of systemic interactions involving academic demands, coaching practices, and access to support services. ICT-integrated counselling extends the ecological model by functioning as a connective platform that links athletes to multiple support systems across contexts. By enhancing accessibility to counselling and feedback mechanisms, ICT reduces environmental barriers and strengthens support structures, thereby influencing psychological states such as stress and motivation that are critical to sustained participation.

Cognitive Behavioral Theory (CBT): CBT provides a mechanism for understanding how ICT-integrated counselling influences athletes' psychological processes. It posits that maladaptive thoughts contribute to negative emotional states and behaviours, such as anxiety, burnout, and withdrawal. ICT-based CBT interventions utilize digital modules, real-time feedback, and self-monitoring tools to help athletes identify and restructure negative thought patterns. This process reduces psychological stress and enhances coping strategies, thereby improving emotional regulation and resilience. In this study, stress reduction is conceptualized as a key mediating variable through which ICT counselling impacts health outcomes and performance.

Self-Determination Theory (SDT): SDT explains how motivation is developed and sustained in sports contexts. It emphasizes three basic psychological needs: autonomy, competence, and relatedness. ICT-integrated counselling supports autonomy through self-paced engagement, enhances competence via continuous performance feedback, and strengthens relatedness through ongoing interaction with counsellors and support networks. By satisfying these needs, ICT interventions foster intrinsic motivation, which is essential for long-term engagement and reduced attrition. Thus, motivation serves as a second critical mediator linking ICT counselling to athlete outcomes.

Conceptual Model of the Study: The theoretical integration of Ecological Systems Theory, CBT, and SDT is operationalized in this study through a mediation model in which ICT-integrated counselling influences athlete outcomes via psychological processes. Specifically, ICT counselling is expected to reduce stress (CBT pathway) and enhance motivation (SDT pathway), which in turn affect attrition, health outcomes, and performance within the broader ecological context.

Figure 1: Conceptual Framework of ICT-Integrated Counselling Interventions and Athlete Outcomes in Physical Education Programmes



The figure presents the conceptual model guiding the study on ICT-integrated counselling interventions in physical education programmes. The independent variable is ICT-integrated counselling, which influences three key mediating variables: motivation, stress management, and engagement. These mediators explain the psychological and behavioural mechanisms through which the intervention operates. Improved motivation and engagement, alongside reduced stress, are expected outcomes of effective ICT-based counselling support. In turn, these mediating factors directly influence the dependent variables: athlete attrition, health outcomes, and performance. Specifically, increased motivation and engagement, coupled with reduced stress, are expected to lower attrition rates while enhancing both physical and psychological health and improving overall athletic performance. Overall, the framework illustrates a pathway model in which ICT-integrated counselling does not act directly alone, but operates through psychological and behavioural processes to produce improved athlete outcomes in physical education settings.

Synthesis of Literature and Research Gap: The reviewed literature demonstrates that athlete attrition, health outcomes, and performance are interconnected phenomena influenced by psychological factors such as stress and motivation. While traditional counselling interventions have shown effectiveness in addressing these factors, their impact is often constrained by limited accessibility, discontinuity, and lack of integration across support systems. ICT-based interventions offer a scalable alternative, yet existing studies largely examine isolated outcomes or single intervention components, resulting in fragmented evidence.

Moreover, there is a notable contextual imbalance in the literature, with most empirical studies conducted in high-income settings, thereby limiting the applicability of findings to developing countries where infrastructural and socio-cultural conditions differ significantly. In addition, few studies adopt a theoretically integrated approach that simultaneously explains how digital counselling influences multiple athlete outcomes through identifiable psychological mechanisms.

This study addresses these gaps by proposing and empirically testing a conceptual model that links ICT-integrated counselling to athlete attrition, health outcomes, and performance through the mediating roles of stress and motivation within the Nigerian physical education context. In doing so, it advances a holistic and context-sensitive framework for understanding and improving athlete development.

Problem Statement:

Athlete attrition remains a persistent challenge in physical education programmes, particularly among student-athletes in secondary and tertiary institutions. Despite increased investment in sports development, many athletes withdraw prematurely due to psychological, academic, and social pressures, including burnout, performance anxiety, low motivation, and inadequate psychosocial support. This trend has significant consequences, as it not only disrupts individual athlete development but also undermines the broader objectives of physical education programmes aimed at promoting lifelong participation, well-being, and optimal performance.

While counselling services are recognized as essential in addressing athletes' psychological needs, their delivery within physical education settings remains largely traditional, fragmented, and insufficiently responsive to contemporary demands. At the same time, advances in Information and Communication Technology (ICT) offer opportunities for more accessible, continuous, and personalized counselling interventions. However, the application of ICT-integrated counselling in sports contexts is still limited, particularly in developing countries where infrastructural and capacity challenges constrain implementation. Furthermore, existing research has largely examined athlete attrition, health outcomes, and performance as isolated variables, with limited attention to their interrelationship within a unified intervention framework.

Consequently, there is a critical need for an integrated, evidence-based approach that leverages ICT to deliver effective counselling interventions capable of simultaneously addressing athlete attrition, health outcomes, and performance. This study addresses this gap by investigating the effect of ICT-integrated counseling interventions on these outcomes within physical education programmes, with the aim of providing data-driven strategies for improving athlete retention and overall development.

Hypotheses:

1. ICT-integrated counselling interventions have no significant effect on athlete attrition in physical education programmes.
2. ICT-integrated counselling interventions have no significant effect on athletes' health outcomes (physical and psychological).
3. ICT-integrated counselling interventions have no significant effect on athletes' performance in physical education programmes.
4. There is no significant difference in attrition, health outcomes, and performance between athletes exposed to ICT-integrated counselling interventions and those who are not.

Methodology:

This study adopted a mixed-methods quasi-experimental research design, specifically a non-equivalent control group pre-test–post-test design, to examine the effect of ICT-integrated counselling interventions on athlete attrition, health outcomes, and performance in physical education programmes. The design enabled comparison between an experimental group exposed to the intervention and a control group receiving conventional support, while qualitative data provided deeper insights into participants' experiences. To strengthen internal validity, key confounding variables such as age, gender, type of sport, and baseline performance levels were controlled through stratification and statistical adjustment during analysis.

The population comprised student-athletes, physical education teachers, and coaches in selected secondary schools and universities. A sample of 300 participants was selected using a multi-stage sampling technique involving stratified, purposive, and simple random sampling. Participants were assigned into two groups: 150 in the experimental group and 150 in the control group. A priori power analysis (G*Power, $\alpha = .05$, power = .80, medium effect size $f^2 = 0.15$) justified the sample size as adequate to detect statistically significant effects. Effect size considerations were incorporated to ensure that findings would demonstrate not only statistical significance but also practical relevance.

- **Intervention Protocol:** The ICT-integrated counselling intervention was implemented over a 12-week period using a structured protocol. Participants in the experimental group engaged in:
- Weekly counselling sessions (2 sessions per week, 60 minutes each) delivered via mobile and web-based platforms (e.g., WhatsApp, Google Meet, and a customized learning management system).
- Digital CBT-based modules focusing on stress management, cognitive restructuring, goal setting, and performance anxiety reduction.
- Motivational enhancement activities grounded in Self-Determination Theory, including self-paced tasks, goal tracking, and feedback mechanisms.
- Wearable and self-report monitoring tools for tracking physical activity, mood, and stress levels.
- Continuous feedback and interaction with counsellors through instant messaging and scheduled virtual check-ins.

The control group continued with conventional physical education activities without structured ICT-based counselling. Intervention fidelity was ensured through standardized session guides, monitoring logs, and periodic supervision of facilitators.

Instrumentation: Data were collected using four instruments: Athlete Attrition Scale (AAS), Health and Well-being Questionnaire (HWQ), Sports Performance Rating Scale (SPRS), and ICT-Counselling Utilization Checklist (ICUC). The AAS and HWQ were adapted from established scales in sports psychology literature, while the SPRS and ICUC were researcher-developed to reflect context-specific performance indicators and ICT engagement. All instruments underwent content validation by experts in sports psychology, counselling, and educational technology, and construct validity was established through exploratory factor analysis.

Reliability was determined using Cronbach's alpha coefficients: AAS (0.81), HWQ (0.89), SPRS (0.76), and ICUC (0.83), indicating acceptable internal consistency.

Data Collection Procedure: Data collection was conducted in three phases: pre-test, intervention, and post-test. Baseline data were collected using AAS, HWQ, and SPRS for both groups. The experimental group then participated in the 12-week ICT-integrated counselling programme, while the control group received no structured intervention. Post-test assessments were conducted using the same instruments. Additionally, qualitative data were collected through interviews and focus group discussions with selected participants from the experimental group.

Data Analysis: Quantitative data were analyzed using descriptive and inferential statistics. Paired sample t-tests assessed within-group changes, while independent sample t-tests compared differences between groups. Analysis of Covariance (ANCOVA) was further employed to control for baseline differences and confounding variables. Multiple regression analysis determined the predictive influence of ICT-integrated counselling on outcome variables. Effect sizes (Cohen's d and R²) were calculated to assess the magnitude of observed effects. All hypotheses were tested at the 0.05 level of significance.

Qualitative data were analyzed using thematic analysis involving transcription, coding, and theme development. This provided contextual explanations for quantitative findings.

Ethical Considerations: Ethical approval was obtained from the relevant institutional authorities. Participants provided informed consent, and confidentiality, anonymity, and voluntary participation were ensured throughout the study.

Results:

Hypothesis 1: ICT-integrated counselling interventions have no significant effect on athlete attrition in physical education programmes.

Table 1: Regression Analysis of ICT Integrated Counselling on Athlete Attrition

Variables	B	SE	β	t-value	p-value	95% CI
(Constant)	3.215	0.412	-	7.80	.001	-
ICT Counselling Intervention	-0.642	0.118	-0.51	-5.44	<.001	(-0.87, -0.41)

The regression model showed that ICT-integrated counseling significantly predicted reduced athlete attrition [$\beta = -0.51$, $t(298) = -5.44$, $p < .001$]. The effect size indicates a large practical effect, while the model explains 26% of variance in attrition outcomes. Therefore, the null hypothesis was rejected.

Hypothesis 2: ICT-integrated counselling interventions have no significant effect on athletes' health outcomes.

Table 2: Regression Analysis of ICT Counselling on Health Outcomes

Variables	B	SE	β	t-value	p-value	95% CI
(Constant)	2.876	0.365	-	7.88	.001	-
ICT Counselling Intervention	0.711	0.104	0.59	6.83	<. 001	(0.51, 0.92)

ICT-integrated counseling significantly improved athletes' health outcomes [$\beta = 0.59$, $t(298) = 6.83$, $p < .001$]. The effect size reflects a large practical effect, with 35% of variance explained. The null hypothesis was rejected. This means that ICT-integrated counseling interventions significantly improve athletes' health outcomes.

Hypothesis 3: ICT-integrated counselling interventions have no significant effect on athletes' performance.

Table 3: Regression Analysis of ICT Counselling on Performance Outcomes

Variables	B	SE	β	t-value	p-value	95% CI
(Constant)	2.541	0.398	-	6.38	.001	-
ICT Counselling Intervention	0.635	0.112	0.54	5.67	<. 001	(0.41, 0.86)

ICT-integrated counseling significantly enhanced athlete performance ($\beta = 0.54$, $t(298) = 5.67$, $p < .001$). The effect size indicates a large effect, with 29% variance explained. The null hypothesis is rejected. This means that ICT-integrated counseling interventions have a significant effect on athletes' performance.

Hypothesis 4: There is no significant difference between athletes exposed to ICT-integrated counselling interventions and those not exposed.

Table 4: Independent Samples t-test of Groups Differences

Variable	Group	Mean	SD	t-value	df	p-value	Cohen's d
Attrition	ICT	1.82	0.64				
	Control	2.67	0.71	-4.92	298	< .001	0.63 (moderate)
Health Outcomes	ICT	3.98	0.58				
	Control	3.12	0.66	5.76	298	< .001	0.86 (large)
Performance	ICT	4.05	0.61				
	Control	3.21	0.69	5.21	298	< .001	0.79 (large)

Significant differences existed between groups across all variables ($p < .001$). The ICT groups consistently showed lower attrition and higher health and performance outcomes. Effect sizes ranged from moderate to large, confirming strong practical significance. The null hypothesis was rejected. This indicates that there is a significant difference between the two groups in terms of attrition, health outcomes, and performance.

Qualitative Results:

All interviews and focus group discussions conducted with participants in the ICT-integrated counselling group were audio-recorded and transcribed verbatim to ensure accuracy and completeness. The data were analyzed using a thematic analysis approach involving three stages: open coding, axial coding, and selective coding. During open coding, 42 meaningful units were identified and subsequently organized into 15 categories at the axial coding stage. These categories were further refined into four major themes during selective coding, reflecting the underlying mechanisms through which ICT-integrated counselling influenced athlete outcomes.

The first theme, enhanced motivation and goal commitment, revealed that participants experienced increased drive and consistency in their sports engagement due to features such as goal-setting tools and progress tracking. The second theme, improved stress management and emotional regulation, showed that athletes developed better coping strategies for managing anxiety and performance pressure through digital counselling sessions and guided interventions. The third theme, increased engagement and continuous support, highlighted the importance of constant accessibility to counsellors and resources, which fostered a sense of connection and reduced feelings of isolation. The fourth theme, performance enhancement through feedback and monitoring, indicated that real-time data tracking and structured feedback improved athletes' self-awareness, enabling them to refine their skills and improve performance outcomes.

Overall, the qualitative findings demonstrate that ICT-integrated counselling operates through key psychological and behavioural mechanisms—namely motivation enhancement, stress reduction, and sustained engagement—which collectively contribute to reduced athlete attrition, improved health outcomes, and enhanced performance. These insights complement the quantitative results by explaining how and why the intervention was effective, thereby reinforcing the study’s conceptual framework and providing a more comprehensive understanding of the impact of ICT-integrated counselling in physical education programmes.

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Overall, the qualitative findings demonstrate that ICT-integrated counselling operates through key psychological and behavioural mechanisms—namely motivation enhancement, stress reduction, and sustained engagement—which collectively contribute to reduced athlete attrition, improved health outcomes, and enhanced performance. These insights complement the quantitative results by explaining how and why the intervention was effective, thereby reinforcing the study’s conceptual framework and providing a more comprehensive understanding of the impact of ICT-integrated counselling in physical education programmes.

Discussion of Findings:

The findings revealed that ICT-integrated counselling interventions have a significant negative effect on athlete attrition, indicating that increased exposure to digital counselling reduces dropout rates among athletes. This finding is consistent with sport-specific literature emphasizing the role of psychological support in sustaining athlete engagement. For instance, sport psychology research shows that structured psychological interventions reduce burnout and withdrawal tendencies by enhancing coping strategies and motivation (Madigan *et al.*, 2021; Isoard-Gautheur *et al.*, 2022). Furthermore, Ayena and Ogunsanya (2026) reported that ICT integration significantly enhances sports psychology support services and is strongly associated with improved administrative efficiency. The effectiveness of ICT integration in this context can be explained by its capacity to provide continuous, accessible, and personalized support beyond the limitations of traditional face-to-face counselling. Real-time communication, progress tracking, and feedback mechanisms likely strengthened athletes' sense of accountability and connection, thereby reducing disengagement.

However, this finding should be interpreted cautiously. Some studies suggest that digital interventions alone may not sustain long-term engagement without human interaction or institutional support (Reardon *et al.*, 2022). In addition, variability in user engagement and digital literacy can moderate outcomes, meaning that ICT tools are most effective when integrated within a broader support system rather than used in isolation. Thus, the reduction in attrition observed in this study is likely driven not only by the presence of ICT tools but by how they facilitated consistent psychosocial support and interaction.

The study further demonstrated that ICT-integrated counselling interventions significantly improved athletes' health outcomes. This aligns with evidence that psychological skills training and mental health support enhance both emotional regulation and physical well-being in athletes (Gerber *et al.*, 2023; Howie *et al.*, 2022). The mechanism underlying this effect can be linked to improved stress management, better recovery practices, and increased self-awareness facilitated through digital monitoring tools. ICT platforms often incorporate features such as guided relaxation, cognitive restructuring modules, and wellness tracking, which collectively contribute to improved psychological states and, indirectly, physical health.

Nevertheless, counter-evidence exists. Some research indicates that digital health interventions may produce only modest effects when not tailored to individual athlete needs or when adherence declines over time (Baca *et al.*, 2022). Additionally, excessive reliance on technology may introduce issues such as data fatigue or reduced intrinsic motivation if athletes become overly dependent on external feedback systems. Therefore, while the positive health outcomes observed are robust, they are likely contingent on sustained engagement and appropriate integration of technology with human support systems.

The findings also indicated that ICT-integrated counselling interventions significantly enhanced athlete performance. This result is supported by sport psychology literature demonstrating that psychological readiness—comprising confidence, focus, and emotional control—is a key determinant of performance outcomes (Park & Jeon, 2023; Sienkiewicz *et al.*, 2021). ICT tools likely contributed to performance improvements by reinforcing psychological skills training through consistent feedback, self-monitoring, and goal-setting features. These tools enable athletes to translate psychological preparation into actionable performance strategies, thereby bridging the gap between mental training and physical execution.

Importantly, the mechanism of action here is not technological per se, but psychological enhancement mediated by technology. ICT platforms amplify the frequency and quality of psychological interventions, allowing athletes to practice skills such as visualization, self-talk, and emotional regulation more consistently. However, some studies caution that performance gains from digital interventions may plateau without complementary physical training and coaching input, suggesting that ICT should be viewed as an augmentative rather than standalone performance tool.

Finally, the study found significant differences between athletes exposed to ICT-integrated counselling and those who were not, with the intervention group demonstrating lower attrition, better health outcomes, and higher performance levels. This finding reinforces evidence from quasi-experimental and intervention-based studies that integrated psychological support systems yield superior outcomes compared to conventional approaches (Reardon *et al.*, 2022). The superiority of the ICT group can be attributed to the combined effects of accessibility, personalization, and continuity of care, which are often lacking in traditional counselling models.

However, it is important to acknowledge potential confounding factors. Differences in motivation, baseline psychological readiness, or institutional support between groups may have contributed to the observed outcomes. Additionally, the novelty effect of ICT interventions may temporarily boost engagement and performance, raising questions about long-term sustainability. Future longitudinal studies are therefore needed to determine whether these benefits persist over time.

Conclusion:

This study examined the effect of ICT-integrated counselling interventions on athlete attrition, health outcomes, and performance in physical education programmes. The findings demonstrate that integrating Information and Communication Technology (ICT) into counselling services provides a practical and scalable approach to addressing persistent challenges in athlete development. Specifically, ICT-enabled counselling significantly reduced athlete attrition by offering accessible, flexible, and continuous psychological support, thereby helping athletes manage stress, sustain motivation, and remain engaged despite academic and social pressures.

The study also established that ICT-integrated counselling significantly improves athletes' health outcomes and performance. The intervention enhanced psychological well-being—manifested in reduced anxiety, improved emotional regulation, and better coping strategies—while simultaneously supporting physical health through monitoring and self-regulation practices. These improvements translated into enhanced performance, as athletes developed greater focus, resilience, and confidence through consistent psychological skills training, feedback, and performance tracking facilitated by digital tools.

Furthermore, significant differences were observed between athletes exposed to ICT-integrated counselling and those who were not, with the intervention group demonstrating lower attrition rates, better health outcomes, and higher performance levels. These findings underscore the effectiveness of ICT-integrated counselling as a multidimensional and superior approach to athlete support. Overall, the study highlights the potential of ICT-driven counselling systems to transform physical education programmes, particularly in resource-constrained contexts, by improving accessibility, scalability, and sustainability of athlete support services.

Recommendations:

Based on the findings of this study, the following recommendations are proposed to enhance athlete development, reduce attrition, and optimize the integration of ICT in counselling within physical education programmes:

- First, there is a need for institutional adoption of ICT-integrated counselling systems across schools and universities. Educational administrators and sports authorities should prioritize the establishment of digital counselling platforms that provide real-time psychological support, performance feedback, and health monitoring. Such systems will ensure that athletes receive continuous and personalized support beyond traditional face-to-face interactions.
- Second, investment in ICT infrastructure is essential. Governments and institutional stakeholders should allocate adequate funding for the provision of digital tools such as mobile counselling applications, wearable fitness devices, online therapy platforms, and sports analytics systems. Reliable internet connectivity, data management systems, and user-friendly platforms are critical for the effective implementation of ICT-integrated counselling.
- Third, capacity building for professionals should be emphasized. Coaches, sports psychologists, physical education lecturers, and counsellors must be trained in the use of digital tools for counselling and athlete monitoring. Continuous professional development programmes should focus on digital literacy, online counselling techniques, data interpretation, and ethical management of athlete information.
- Fourth, integration of ICT into physical education curricula is strongly recommended. Curriculum planners should incorporate digital health education, psychological skills training, and technology-based performance monitoring into physical education programmes. This will equip athletes with the skills needed to effectively engage with ICT tools for self-regulation and performance improvement.

- Fifth, institutions should promote athlete-centered support systems by leveraging ICT to provide individualized counselling interventions. Digital platforms should be designed to adapt to athletes' unique needs, allowing for personalized feedback, goal setting, and progress tracking. This approach will enhance motivation, autonomy, and long-term engagement in sports.
- Sixth, there is a need to establish policies and ethical guidelines governing the use of ICT in sports counselling. Issues related to data privacy, confidentiality, informed consent, and responsible use of digital tools must be clearly addressed to ensure safe and ethical practices.

Finally, stakeholders should encourage collaborative partnerships between educational institutions, technology developers, health professionals, and sports organizations. Such collaborations will facilitate the development of innovative, context-specific ICT solutions tailored to the needs of athletes in different environments, particularly in developing countries.

Implications of the Study:

Implications for Theory: This study makes significant contributions to theoretical development by extending the application of established psychological and educational theories within a digital context. It reinforces the relevance of Ecological Systems Theory by demonstrating how ICT-integrated counselling functions as an interactive system connecting athletes to multiple support environments. It also strengthens Cognitive Behavioural Theory (CBT) by showing that digital platforms can effectively deliver cognitive restructuring interventions and behavioural modification strategies. Furthermore, the findings advance Self-Determination Theory (SDT) by illustrating how ICT tools enhance autonomy (through self-paced engagement), competence (via feedback and performance tracking), and relatedness (through continuous interaction with counsellors). The study therefore provides a conceptual bridge between traditional psychological theories and modern digital interventions, offering a more integrated framework for understanding athlete behaviour and development.

Implications for Practice: From a practical perspective, the study highlights the transformative potential of ICT-integrated counselling in sports and physical education. It demonstrates that digital interventions can significantly improve athlete retention, health outcomes, and performance, thereby providing a more effective alternative to conventional counselling approaches.

For practitioners, this implies a shift toward technology-enhanced service delivery, where counselling is not limited to physical sessions but extends to continuous, real-time engagement. Coaches and sports administrators are encouraged to adopt data-driven approaches to athlete management, using ICT tools to monitor progress, identify risks, and implement timely interventions. The findings also emphasize the importance of holistic athlete support systems that integrate psychological, physical, and performance dimensions. This approach moves beyond fragmented interventions and promotes a more comprehensive model of athlete development.

Implications for Policy: The study has important implications for policy development in education and sports sectors. Policymakers should recognize ICT-integrated counselling as a strategic priority for enhancing athlete development and sustaining sports participation. Policies should support funding for digital infrastructure, training programmes, and research initiatives focused on technology-driven interventions. Additionally, national and institutional policies should promote the standardization of ICT use in sports counselling, ensuring quality assurance, ethical compliance, and equitable access. This is particularly important in developing countries, where disparities in access to technology may affect implementation.

Implications for Future Research: While this study provides valuable insights, it also opens several avenues for further investigation. Future research should consider longitudinal studies to examine the long-term effects of ICT-integrated counselling on athlete development and retention. Such studies would provide deeper understanding of sustainability and long-term impact. There is also a need for experimental and quasi-experimental designs to establish causal relationships and validate the effectiveness of specific ICT tools and interventions. Comparative studies across different regions and populations would further enhance generalizability. Moreover, future research should explore the role of emerging technologies such as artificial intelligence, virtual reality, and machine learning in sports counselling. These technologies have the potential to further personalize interventions and improve predictive capabilities.

Finally, more studies should focus on context-specific challenges in developing countries, including infrastructural limitations, cultural factors, and digital literacy barriers. Addressing these issues will ensure that ICT-integrated counselling interventions are both effective and inclusive.

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Promoting Positive Behavior Through Physical Education: A Study on Teaching Strategies and Student Engagement Across Educational Levels

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Abstract

This study observed and investigated how teaching strategies in Physical Education (PE) promoted positive behavior through student engagement across junior high, senior high, and college levels. Guided by Self-Determination Theory (7,11), it examined and answered questions on how autonomy-supportive instruction, cooperative learning, and structured feedback could influence students and motivate them with prosocial conduct. Using a quantitative descriptive–correlational design (6, 8, 9), Self-Determination Theory was the guiding framework for the study, and it adopted a quantitative descriptive correlational design to collect the data from teachers and students of PE. The results showed that students who experienced supportive and inclusive PE environments demonstrated higher motivation, greater participation, and stronger values such as respect, teamwork, and emotional control. The findings supported past evidence that models-based cooperation and accountability were associated with increased social skills and positive behaviors (1,3,4,5). In other words, institutional factors, such as facilities, curricula, and recognition programs that aligned with the values the teachers were collectively there to teach, also influenced these results (2,10,12,13). This study demonstrated that students’ participation acted as a key mechanism that connected teaching practice with positive behavior. The findings emphasize that the active involvement of students is the link between the teachers' strategies and the positive behavior thus the paramount social skills - autonomy, cooperation, and constant feedback that underlie moral development. Keywords: Physical Education, Teaching Strategies, Autonomy-supportive instruction etc.

Introduction and Rationale

In every corner of the globe, school is not a place just for students to engage in learning math, science, and language. It is a community where young people begin the process of becoming responsible, compassionate young adults once they are provided with the opportunity. While there are countless subjects that engage in this growth, Physical Education (P.E.) occupies a special place. Physical Education is more than just running faster or jumping higher. Physical education is about creating character, sharing success as part of teamwork, and developing respect and emotional strength that lasts a lifetime.

Picture the typical P.E. class: students are not simply competing or being active; students are engaged in the process of working together, celebrating each other's successes, and in difficult times, dealing with failure graciously. These are not things you can turn on and off; these moments, while often viewed as incidental times, are significant opportunities for teachers to teach positive behavior and social values. When students are engaged in the value of making decisions, supporting each other, and self-reflecting, they are learning life skills (empathy and patience), resilience, and the essence of sportsmanship not just in the gym or on the field, but for the rest of their lives.

Creating this space, however, is becoming increasingly challenging. As students, particularly in junior and senior high school, grow older, their social and motivational challenges become more complex. Junior high students often deal with self-identity and social acceptance. Students in senior high school are experiencing additional academic pressures on top of social acceptance. And finally, students in college, while looking for independence.

Research indicates that teachers, and how they approach their pedagogy, have a tangible impact on participation and behavior. Student autonomy means involving students in some decision making about their tasks cooperative learning means working together in different groups toward the same goal and providing timely and constructive feedback are some of the teaching strategies that have the potential to engage students in meaningful participation and positive behavior. When students feel valued, capable, and developed positive relationships with their peers and the teacher, they are more likely to demonstrate patience, empathy, respect, and emotional regulation.

However, there remains a great deal of uncertainty. How do these areas of teacher pedagogy result in authentic and genuine longstanding positive behaviors in students? Does one achieved impact differ among different students' ages? How do schools and teachers change their approach in a way that promotes not just physical activity but moral and social development as well?

The Philippines is particularly compelling to explore this avenue, as a country's cultural values and limitations can affect how physical education classes are taught at schools. Furthermore, it often presents some challenge for teachers to engage students to create a safe environment. Nevertheless, teachers are within the potential capabilities of engaging students into behaviors around kindness, cooperation, and respect, all of which are foundational to changing attitudes and actions in our societies.

According to Li, W., & Zhang, Y. (2022) "The Influence of Cooperative Physical Education on Social Competency and Morality in Middle School Youth." The research identified cooperative activities in P.E. were beneficial for increasing social competency, moral reasoning, and prosocial behavior. The findings indicate that pedagogy designed to foster teamwork, provide autonomy supportive environments, and demonstrate resiliency-based pedagogy can improve students' positive social behaviors. This proposed study seeks to interrogate these questions more. First, we would like to understand how teachers engage which we are defining as teaching engagement, the likelihood of a student being engaged, and how teachers foster active engagement among their students.

Theoretical Framework Self Determination

Social Cognitive Theory by Bandura emphasizes observational learning, self-efficacy, and the reciprocals between personal, behavioral, and environmental factors in motivation and engagement. The core premise of Bandura's theory is that an individual's beliefs in their efficacy (self-efficacy) directly impacts their motivation to engage and sustain behaviors, including engaging in physical activities.

This aligns with the principles of Self-Determination Theory, which states the facilitation of satisfying students' basic psychological needs of autonomy, competence, and relatedness which supports internal motivation and increases engagement and positive behaviors. When a teacher creates a safe learning atmosphere which promotes student autonomy (through choices), competence (through appropriately challenging and worthwhile tasks, feedback, and role modeling), and relatedness (creating opportunities for belonging through the teacher-student or student-student interactions), the teacher will facilitate students' self-efficacy. In Bandura's words, self-efficacy beliefs are "one of the determinants of effort, perseverance, and resilience." Furthermore, the research reflects supportive teacher behaviors, especially those that provide psychological support from autonomy and competence, will positively influence student self-efficacy which influences participation, cooperation, and emotional engagement in physical education. To be clear, controlling or authoritarian teaching styles will undermine self-efficacy and motivation, which reflects Bandura's base theory that all beliefs about self are impacted by environmental cues and plausible modeling.

The Local Context And Need For Pedagogical Focus

The Philippines had produced research indicating that Physical Education (PE) teachers play a significant role in influencing student motivation and behavior. Research showed that participation in an environment that was perceived to be supportive was a robust predictor of attitudes and students' participation and behavior towards Physical Education as a subject. For college students, teachers that provided social support and feedback on skill development were major predictors of engagement. Evidence also showed a connection between interest in Physical Education and engagement in school in general, showering greater influence in establishing a positive environment to enhance school culture. This research reinforces the need for teachers to deliver specific strategies to help develop social cooperation, growth and self-discipline and not just focus on physical skills.

Research Gaps

Despite increasing interest in providing a holistic education there remain gasps in the research focused on Physical Education (PE) and the development of positive behavior. Most of the Physical education conducted continues to study fitness, motor skills, and performance without specifically examining how to entertain methods of teaching, or pedagogies, support or teach positive behavior (i.e., respect, empathy, citizenship and responsibility). More recently, there has been research to highlight the potential for moral and prosocial development in Physical Education. For example, participation in sports has been shown to cultivate prosocial behavior in junior high students. In addition, studies that have included an intervention with a teacher-led approach have shown improvement in respect and team citizenship. There has been research focused on teaching pedagogies that teach citizenship and prosocial behavior aligned with self-esteem and cultural confidence through civic Physical Education integrated. Similarly, the sport education model has promoted cooperation and motivation within contexts. While these are positive steps with emerging findings, very few studies have framed teaching strategies and positive behavioral development linking to student engagement. This is an important area of future inquiry as there are minimal studies that compare levels of engagement with teaching and behavior across age groups. Most studies will point to an engagement as an outcome, and rarely, an important mechanism to link strategies prosocial and moral behavior. Prior to this shortcoming in the literature, the existing Physical Education research shows that some teachers create an engaging climate that influences engagement, but researchers failed to explicitly investigate engagement with the nexus of prosocial or moral tasks. More direct investigation of the mediating, superordinate role of engagement is needed to better understand what engagements mean in a sense of behavior or student acting according to pro-social or moral outcomes.

Purpose Of The Study

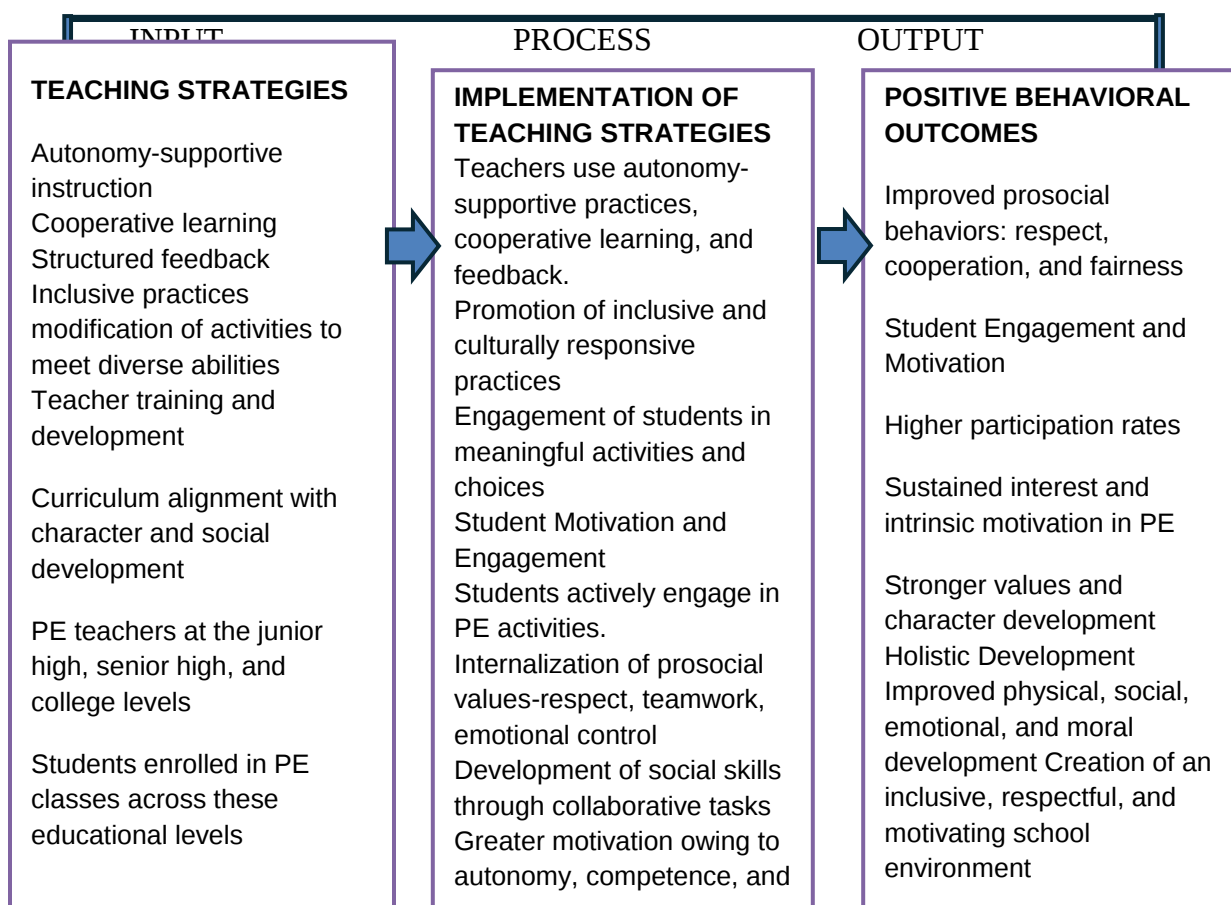
Addressing these areas of need, this research studied and investigated how teaching strategies in the subject area of Physical Education facilitate positive behavior through student engagement at different levels of education. This study used a quantitative descriptive correlational research design that assessed how teaching strategies in the subject area of Physical Education facilitate positive behavior through student engagement. A quantitative approach has been taken for this research because it allowed for the collection of numerical data that can statistically analyzed revealed relationships and patterns between variables. The purpose of the study is to assess the strategies that encouraged more engagement and examine them. The goal of this research is to clarify the mediating role of student engagement and how the correlation between teaching properties and positive behaviors is completed in the subject area of Physical Education.

Statement Of The Problem

This study is intended to determine the role of pedagogical strategies of teaching Physical Education (PE) in promoting positive student behavior by student engagement across Educational Levels. It specifically seeks to answer the following questions.

1. How do different teaching methods in Physical Education such as autonomy-supportive instruction and cooperative learning change the learning environment that encourages positive behavior in students?
2. How, if at all, does the involvement/engagement of students influence the results related to the above-mentioned teaching methods that lead to positive behavior in Physical Education?
3. Regarding positive behavior as a result, how the impact of teaching strategies and student participation/engagement vary, if at all, by educational level (junior, high school, senior high school, and college)?

CONCEPTUAL FRAMEWORK



SIGNIFICANCE OF THE STUDY

For Students

The outcomes of this study will positively impact students with a more engaging and friendly PE environment that enhances physical fitness in addition to moral and social development.

For Physical Education Teachers

This research offers evidence-based strategies for teaching effective instruction - autonomy support, cooperative learning, and explicit feedback - that suggest positive outcomes from a student engagement perspective along with positive behavior. The identified conclusion will assist teachers in implementing strategies to improve their pedagogical practice with students and engage them in a more inclusive and motivating manner.

For School Administrators and Policy makers

The study speaks to various levels of institutional support, including resources and facilities, values education, and recognition programs to promote positive behavioral outcomes, to highlight areas to promote policies that support character development in PE programs as another aspect of holistic development of the students.

For Curriculum Developers

The study provides sample teaching strategies that are age appropriate and culturally responsive strategies that support the psychological needs of students. Curriculum developers may want to consider these recognized strategies within their PE curriculum design in consideration of students located at various levels within the educational framework.

For Future Researchers

The study fills an existing gap in literature by establishing a clear connection between an instructor's teaching strategies, engaged students, and motivated or engaged sport participants.

Review Related Literature

Traditionally, physical education (PE) has been accurately viewed as an opportunity for promoting fitness and motor development. Recently, however, researchers have claimed that PE also plays an important role in students' social competencies development, moral education, and pro-social behaviors (Li & Zhang, 2022). Through this literature review of recent studies, I will demonstrate how PE can serve as a useful context for character education and social emotional learning.

Sport-based Social-Emotional Learning (SEL) Programs

In their meta-analysis, Nguyen and Lee (2022) found that sport-based social-emotional learning (SEL) programs implemented within PE have a direct impact on students' social development, such as enhanced emotional regulation skills and less aggressive behaviors. They claim that social-emotional learning structured into sports allows for the development of skills such as empathy, cooperation, and ethical decision-making.

2. Literature Review of Foundational Pedagogical Models (Post-2020 Evidence)

The available research shows systematic, thorough evidence for the effectiveness of some pedagogical models to promote behavioral and affective outcomes.

2.1. The Teaching Personal and Social Responsibility (TPSR) Model Effectiveness

In 2020, the youth in the TPSR model for promoting responsible behavior was validated as an effective strategy.

There is a significant increase in the implementation of the TPSR model, which has been demonstrated in the meta-analysis of the adolescent students' social responsibility with a MD=0.19 and personal responsibility (Mean Difference (MD=0.23). Additionally, supporting these results have been reported as a strong positive effect on product outcomes (Hedge's $g=0.337$) related to social and emotional development.

Through meaningful social interactions with adults and peers, with the help of TPSR programs to develop emotional regulation skills, opportunities were provided to the students.

A sense of self-worth, empathy, and equitable play resulted from participants' improved abilities to recognize, express and control emotions. Higher responsibility levels encouraged by TPSR were also linked to stronger social skills like leadership, cooperation and prosocial behavior.

However, it has been introduced by analyses of TPSR's effectiveness by which there is a critical understanding of the significance of context and implementation quality. The effect size of TPSR on emotional and social outcomes is depending on the publication type (article versus thesis) and country of publication (with notably stronger effects in Turkish studies), according to the moderator analyses.

This suggests that TPSR is a framework whose effectiveness relies on high implementation, fidelity and successful cultural adaptation, rather than a manualized curriculum that proves uniformly effective. To accomplish high- quality delivery that embodies local cultural norms, a factor that often correlates with the focused implementation evident in successful thesis intervention- researchers and practitioners must localize the model. The current research projects developing specific measurement tools to assess accountability and leadership behaviors in new settings, such as Australia, also provides evidence of the importance of fidelity.

2.2. Cognitive Activation Teaching Strategies (CATS)

Another innovative, empirically validated approach that stresses higher order thinking and problem solving within physical activity context is the cognitive activation teaching strategies CATS. Student's physical performance and general health behaviors will be positively predicted by CATS, according to the research on school elementary pupils (12). The main way in which CATS works is through motivation and cognition. A significant finding indicated that the correlation between CATS and favorable outcomes was significantly influenced by in-class variables: classroom engagement, physical education motivation, and notably, physical education self-efficacy (12). Qualitative evidence supported these findings, demonstrating that CATS teachers' implementation of targeted goal setting, incremental challenges, and constructive feedback effectively fostered a "productive struggle" that significantly enhanced intrinsic motivation and collaborative engagement.

The analysis of CATS also revealed a programmatic limitation about affective transfer. The specific pathway from CATS implementation to emotional regulation was found to be statistically non-significant, and emotional regulation did not significantly predict health behaviors within the study population. This suggests that CATS is highly effective at developing competence and engagement. Within the reason framework, it is insufficient on its to build complex self- regulatory and emotional capabilities or to enable transfer of healthy habits outside in the educational environment. For truly holistic and positive behavioral outcomes, a CATS methodology must be combined with synergistic frameworks the directly address the emotional and realms, such as TPSR.

Methodology

The methodology and procedures used in the study to investigate the Promoting Positive Behavior Through Physical Education: A study on Teaching Strategies and Student Engagement Across Educational Levels. This chapter focused on the research method utilized in the studies. Within this chapter was discussion regarding Research design, participants of the study, sampling design, data gathering instrument, data gathering procedure and statistical treatment of data.

Participants

This study involved students from San Mateo Municipal College, including PE teachers, and students from junior high, senior high, college levels. Participants were selected through purposive sampling, active involvement of emphasizing in PE classes and relevant experience.

Research Design And Procedure

The research design was used for this study quantitative descriptive correlational to enhance students' positive behavior engagement through Physical Education at different Education levels and to evaluate the role of teaching strategies in Physical Education. The quantitative format is appropriate for the study as it focuses on collecting numerical data that can be analyzed statistically to help identify relationships and patterns among variables. Creswell and Creswell (6) indicate that quantitative research had a systematic and objective effect on numerical sampling in the use of variables and statistical analysis.

The descriptive piece of this study focuses on common teaching strategies used by Physical Education teachers and how these strategies contribute to students' engagement and positive behavior. "Descriptive research is indispensable in approximating present practices and other reliable means of demonstrating current realities (13). Through this, study attempts to describe the role of Physical education as a class foster behavioral traits like teamwork, respect, discipline within learners at various educational levels.

The correlational part of this design will investigate the connections between one-way teaching methods, the involvement of students, and good behavior. In their book, Gay, Mills, and Airasian (9) state that correlational research determines the degree of a relationship between two or more variables without intervention. This study will find out if instructional strategies (e.g., cooperative learning, game-based learning, and reflective teaching) are used to engage students and produce positive behavioral outcomes are related.

The decision to go for a quantitative research design is a step towards ensuring data analysis is done with great objectivity and precision. Fraenkel, Wallen, and Hyun (8) stated that the use of such statistical methods gives researchers the opportunity to establish significant relationships among educational variables and make their inferences based on empirical evidence.

Sample And Population

This research involves Physical Education (PE) teachers and students across selected schools, which included junior high school, senior high school and college levels. The purpose of this research was to gain an understanding of how varying levels of Physical Education activities can impact student involvement while fostering appropriate behaviors throughout these educational levels.

This research project included a total of 30 participants which consisted of 15 PE teachers and 15 students both from junior high school, senior high school and college. The data collected during consecutive 75 minutes long sessions where teachers and students were selected through purposive sampling to ensure that they had been engaged and participating in Physical Education directly and could deliver meaningful insights into teachers' strategic approaches to pedagogy as well as student behaviors.

Teachers' participants primarily need to hold PE teachers' status and actively teach in the area for at least one year. For the students, they primarily needed to be officially enrolled in a physical education class for at least one semester, which would allow them familiarity with Physical Education teaching strategies.

The source of participants was focused on carrying out contributions on significance with how teacher strategies influence student engagement.

Statistical Treatment Of Data

The following statistical tools and techniques were used to ensure the valid and systematic presentation, analysis, and interpretation of data: Analysis of Fleis Multirater Kappa to get the results of the pilot testing. Weighted Mean was used to determine the average responses of the respondents on the various variables considered in the study.

For verbal interpretation of the computed weighted mean, the following intervals were closely observed:

Weight Limits Verbal Symbols

5	4.50- 5.00	Strongly Agree
4	3.50-4.49	Agree
3	2.50-3.49	Neutral
2	1.50-2.49	Disagree
1	1.00-1.49	Strongly Disagree

The Correlation Coefficient Formula to identify the frequency mean relationship correlation method was used to determine the significance of differences in the assessments on academic performance and interest.

The formula for calculating the mean the formula used:

$$X = \frac{\sum X}{N}$$

Results And Discussion

TABLE 1

Summary of Questionnaire Results by Domain (Based on Total Frequency of Responses Across All Items per Domain)

Domain	WEIGHTED MEAN	Verbal Interpretation
1.Student Engagement & Motivation	4.48	Agree
2.Positive Behavior & Values	4.65	Strongly Agree
3.Teaching Strategies in PE	4.15	Agree
4.Institutional Support	4.08	Agree

Legend: 4.50- 5.00 Strongly Agree;3.50-4.49 Agree;2.50-3.49 Neutral;1.50-2.49 Disagree; 1.00-1.49 Strongly disagree

The data revealed from the questionnaire analysis results in how Physical Education (PE) influences student engagement, motivation, and positive behavior across different educational levels with a weighted mean of 4.48 and the verbal interpretation of agree. The study was conducted in San Mateo Municipal College, Senior high school and Junior high school over all of 30 participants. In student engagement results in PE classes the survey agreed that they enjoy participating in activities, feel motivated by their teachers and find PE lessons meaningful. Additionally, their physical abilities expressed confidence, and a willingness to show respect, cooperate during activities and respectively.

In positive behavior and values students demonstrated an understanding of positive values and commitment such as respect for rules and fair play, emotional control during challenges, and helping classmates with the weighted mean of 4.65 and the verbal interpretation is Strongly agreed. A substantial proportion of student feedback acknowledged from teachers motivated them to recognize and improve the importance of teamwork and discipline.

Teaching Strategies results in frequent use of learning cooperative strategies and providing students with choices with the weighted mean of 4.15 and the verbal interpretation is agreed. They also indicated that they offer regular feedback, incorporate value discussion and formation, and recognize positive behaviors. Accommodate diverse abilities for modifications activities and clear behavioral setting, practices and common practices of expectations.

The institutional support that the data showed in schools provides generally adequate equipment and facilities with the weighted mean of 4.08 the verbal interpretation is agreed. In their PE curriculum most institutions include values education and teacher training support. Recognition programs for collaborative and sportsmanship between PE and guidance offices, of the respondents affirming support.

Student and Professor of San Mateo Municipal College findings that the significant role of effective strategies institutional support in promoting behavior through Physical Education (PE). Through the various educational levels, junior high school, senior high school, college and professors' results of the studies that high level of engagement, motivation, and respect for peers, correspond with the theoretical framework of Self Determination Theory (11). When teachers employ autonomy- supportive methods, such as offering choices and encouraging student input, students tend to exhibit greater intrinsic motivation, active participation and prosocial behavior.

The implications from the study provide a strong argument for the strategic role of instructional practices and institutional support in developing positive student behavior through Physical Education (PE). The findings support and extend existing theoretical and empirical knowledge by demonstrating how teaching practices influenced by Self-Determination Theory (SDT) and social learning principles can create a supportive space for engagement and moral development at different educational levels. Relationship to Other Literature and Trends The study builds upon the previous literature that acknowledges the important role of need-supportive pedagogies in student engagement and social behaviors, all of which are consistent with the finding that autonomy-supportive pedagogies, cooperative learning, and consistent responsive feedback all led to more student engagement and prosocial behaviors in PE. Connections can be drawn with observations of personal and cooperative responses with student cooperation, empathy, or emotional regulation which were also evidenced in the study (Ryan et al., 2017).

Among the mutual student's respect, the use of cooperative learning strategies prominently emerged pedagogical approach, communication and fostering teamwork. Using these strategies also contributes to building a positive classroom climate, not only enhances social learning, but also conducive to character development. Additionally, motivating students to internalize positive behavior traits will provide structured, constructive feedback that will increase self-efficiency and motivation.

Schools that provide adequate facilities in institutional support will strengthen to integrate values education into the curriculum and recognize good conduct and cultivate an environment where sustained and reinforced positive behaviors. The PE and guidance offices highlight a systemic effort to nurture holistic development that presence and promote sportsmanship and collaborative projects. PE, therefore, extends beyond physical fitness - serving as a platform for moral, social, and emotional development aligned with Self-Determination Theory.

In a study, Lee et al. (2022) stressed the impact of autonomy-supportive teaching in physical education (PE) by displaying that giving students options and promoting intrinsic motivation increased students' prosocial behaviors, for example, teamworking and exhibiting respect. Similar to findings, Lee et al. (2022) demonstrated that this teaching style also provides greater student engagement and an improvement in social-emotional learning within ethnically

responsive curricula and culture. Both studies reaffirm that autonomy-support is a pivotal component in fostering positive moral behaviors through physical activity. In addition, a meta-analysis by Zhang et al. (2023) examined the influence of cooperative learning pedagogies in PE across a variety of cultures. The meta-analysis presented similar learning outcomes when they examined the cooperative forms of learning pedagogies that revealed the benefits in social skills in competencies in emotional regulation and conflict resolution. This resonates with your findings that cooperative strategies-built respect and emotional regulation and emphasizes that collaboration is prudent character development. In addition, the meta-analysis demonstrated that the impact of cooperative learning pedagogies was elevated when institutional policy and facilities were supportive, like your findings of institutional supports.

The combination of student-centered teaching practices and robust institutional support results in creating an environment that cultivates not only physical skills, but the additional character traits of cooperation, discipline, and respect. Further, when institutional support systems are in place and educators have the right pedagogical tools, these findings suggest that PE can be an invaluable venue for character education.

Our implications of these findings in San Mateo Municipal College emphasizing the autonomy-supportive and cooperative teaching approaches continue to provide professional development for PE teachers and the moral and communal values present in PE can further reinforce the positive behavior outcomes.

Conclusions and Recommendation

The present research demonstrates that teaching methods in Physical Education, mainly autonomy-supportive instruction, cooperative learning, and operant feedback, are instrumental in increasing student involvement and making positive behaviors observable throughout junior high, senior high, and college stages. The evidence shows that as a result of a supportive and inclusive PE environment, students' motivation, participation, and even prosocial values like respect, teamwork, and emotional regulation are largely elevated.

Moreover, support from institutions such as providing good facilities, integrating values into the curriculum, and having programs for recognition contributes even more to these positive effects. The findings correspond with Self-Determination Theory, which inter alia underlines the significance of satisfying students' psychological needs for autonomy, competence, and relatedness as a means of sparking intrinsic motivation as well as socially responsible behaviors.

For the recommendation for Physical Education Teachers use teaching methods that support student independence by giving them options and asking for their input in order to enhance their motivation and involvement. Develop a supportive atmosphere in the classroom through activities that require cooperation of the group and by having discussions where students can reflect on respect, empathy, and social responsibility. Keep on giving feedback which is not only supportive but also helpful in pointing out positive student conduct and in enhancing their belief in their own abilities.

School Administrators and Policy Makers ensure that the PE department is sufficiently equipped with high-quality facilities and materials that contribute to an engaging and welcoming PE environment for all students. Allow for the incorporation of values and morality through the teaching of PE as a way of educating the student's characters besides providing them with moral and social abilities. Come up with systems that recognize and reward programs that highlight moral behavior, cooperation, and fair play thus creating an atmosphere of respect which is characteristic of ethical society.

Curriculum Developers create physically engaging programs that are suitable for age groups, take into consideration cultural differences and at the same time involve teaching methods which have been proven to facilitate the social and emotional development of the students. Include the use of different methods like cooperative learning and autonomy support to enable the students to be continuously engaged as well as developing their characters.

Next Research it would be valuable to conduct long-term research studies that aim to understand the extended effects of specific teaching methods on student behavior and motivation. Investigate student engagement as an intervening factor in different cultural settings so that you can develop strategies that are sensitive to the culture and effective.

Ethical Approval

This research complied with ethical research protocols, as regulated by The National Teachers College, and the Data Privacy Act of 2012 (R.A. 10173) provisions. The researcher clarified the purpose and the procedure of the study. Participation was voluntary and informed consent was secured. All data will be kept confidential, and anonymity was strictly followed. These will be used for academic purposes only. The researcher ensured that the research instruments were non-intrusive and in consideration of participants' privacy and well-being. No intentional physical, psychological, or emotional harm had occurred. With these measures, the researchers exhibited the highest consideration of ethical standards and academic integrity.

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**Comparative Analysis Of Lower-Limb Isokinetic Strength In Sprinters From Thai
Nguyen, Viet Nam**

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ABSTRACT

This study employed the Biodex System 4 Pro to evaluate lower-limb isokinetic strength in four female youth sprinters from the Thai Nguyen provincial athletics team, who achieved notable results at the 2025 National Youth Athletics Championships. Knee flexion strength was assessed at an angular velocity of 60°/s and compared with data from national-level athletes, international sprinters, and athletes from other sports. The results indicated that knee flexor isokinetic strength of Thai Nguyen sprinters was lower than that of national and international sprinters, as well as athletes from other sports. In contrast, knee extensor strength at 60°/s showed comparable values across Thai Nguyen athletes, national and international sprinters, and athletes from other sports. Furthermore, isokinetic strength variables, including peak torque, total work, and power, demonstrated strong correlations with performance in the 30-m sprint from a standing start and the standing triple jump. These findings suggest that the 30-m sprint and standing triple jump may serve as practical field-based indicators for evaluating lower-limb strength in short-distance sprinters from Thai Nguyen Province. Key words: Sprint; Athletes; Lower extremity strength; Isokinetic strength; Performance testing etc.

METHODS

1. The athlete was seated and properly stabilized on the dynamometer, with appropriate fixation of relevant joints.
2. Participant information was entered into the system, including full name, date of birth, dominant limb, and identification code.
3. The appropriate testing protocol was selected and the device was calibrated according to manufacturer guidelines.
4. A standardized warm-up was performed on the dynamometer, consisting of 3–5 submaximal repetitions at approximately 60–80% of maximal effort. Prior to testing, athletes completed a general warm-up of approximately 10 minutes.
5. The isokinetic test was then conducted. Participants were instructed to perform maximal effort throughout all repetitions at the specified angular velocity.

RESULTS

Based on the testing results of youth sprint athletes from Thai Nguyen Province, Vietnam, the study processed and analyzed the data, yielding the following findings:

1. Current status of isokinetic strength in youth sprint athletes from Thai Nguyen Province

Table 1. Comparison of Knee Flexor Isokinetic Strength at 60°/s Among Athletes from Thai Nguyen Province, National Team Athletes, and International Athletes

Participants	n	Peak torque (Nm)	Time to peak torque (ms)	Relative peak torque (Nm/kg)	Relative total work (J/kg)	Relative mean power (W/kg)
Thai Nguyen provincial short-distance sprinters	04	92.54	494.39	1.68	2.10	1.14
Vietnam national sprinters	04	94.06	483.33	1.65	2.25	1.16
International sprinters (SC Singh, 2010)	12	130.24	394.35	2.00	2.57	1.90
Cross-country running	46	100.13	485.43	1.66	2.12	2.23
Marathon	28	99.64	436.42	1.66	2.00	2.25
Cycling	22	95.95	486.90	1.76	2.76	2.60

The results presented in Table 1 indicate that knee flexor isokinetic strength at 60°/s in short-distance sprinters from Thai Nguyen Province (2025) showed several differences compared with Vietnamese national team sprinters (2017) and international reference data (SC Singh, 2010).

Peak torque in Thai Nguyen sprinters (92.54 Nm) was substantially lower than that of international short-distance sprinters (approximately 37.70 Nm difference in the comparative dataset). However, it was relatively similar to athletes from other sports, including Vietnamese national sprinters, cross-country runners, marathon runners, and cyclists.

Time to peak torque in Thai Nguyen athletes (494.39 ms) was slower by approximately 100.04 ms compared to international sprinters, while showing comparable values to Vietnamese national sprinters and athletes from cross-country running, marathon running, and cycling.

Relative peak torque in Thai Nguyen sprinters (1.68 Nm/kg) was lower than international sprinters (2.00 Nm/kg) by 0.32 Nm/kg, but similar to Vietnamese national sprinters and athletes from other sports.

Relative total work in Thai Nguyen athletes (2.10 J/kg) was lower than international sprinters (2.57 J/kg) by 0.47 J/kg, and also lower than cyclists by 0.66 J/kg. However, it was comparable to Vietnamese national sprinters, cross-country runners, and marathon runners.

Relative mean power in Thai Nguyen sprinters (1.14 W/kg) was lower than international sprinters (1.90 W/kg) by 0.76 W/kg, lower than Vietnamese national sprinters (1.16 W/kg) by 0.02 W/kg, lower than cyclists by 1.46 W/kg, lower than cross-country runners by 1.09 W/kg, and lower than marathon runners by 1.11 W/kg.

Overall, these findings suggest that knee flexor isokinetic strength at 60°/s in short-distance sprinters from Thai Nguyen Province is lower than that of both Vietnamese national-level sprinters and international-level athletes (SC Singh, 2010).

Table 2. Comparative Knee Extensor Isokinetic Strength at 60°/s Among Thai Nguyen Provincial Athletes, National Team Athletes, and International Athletes

Participants	n	Peak torque (Nm)	Time to peak torque (ms)	Relative peak torque (Nm/kg)	Relative total work (J/kg)	Relative mean power (W/kg)
Thai Nguyen provincial short-distance sprinters	04	197.06	478.24	3.67	2.91	2.07
Vietnam national sprinters	04	196.93	450.00	3.41	2.86	2.08
International sprinters (SC Singh, 2010)	12	192.41	537.81	3.02	2.53	2.61
Cross-country running	46	151.95	505.43	2.50	2.97	1.90
Marathon	28	145.67	605.35	2.43	2.80	2.10
Cycling	22	176.64	551.42	2.71	3.11	2.62

The results presented in Table 2 indicate that knee extensor isokinetic strength at 60°/s in athletes from Thai Nguyen Province showed several differences compared with Vietnamese national team athletes and international athletes (SC Singh, 2010).

Peak torque in Thai Nguyen athletes (197.06 Nm) was comparable to that of national team athletes (196.93 Nm) and international athletes. Compared with athletes from other sports, Thai Nguyen athletes demonstrated higher values than cross-country runners (151.95 Nm), marathon runners (145.67 Nm), and cyclists (176.64 Nm), with differences of 45.11 Nm, 51.39 Nm, and 20.42 Nm, respectively.

Time to peak torque in Thai Nguyen athletes (478.24 ms) was slower than that of national team athletes (450.00 ms) by 28.24 ms, but faster than international athletes (537.81 ms) by 59.57 ms. Compared with other sports, Thai Nguyen athletes showed faster values than cross-country runners (505.43 ms), marathon runners (605.35 ms), and cyclists (551.42 ms), with differences of 27.19 ms, 127.11 ms, and 73.18 ms, respectively.

Relative peak torque in Thai Nguyen athletes (3.67 Nm/kg) was higher than that of national team athletes (3.41 Nm/kg) and international athletes (3.02 Nm/kg) by 0.26 Nm/kg and 0.65 Nm/kg, respectively. Compared with other sports, Thai Nguyen athletes also demonstrated higher values than cross-country runners (2.50 Nm/kg), marathon runners (2.43 Nm/kg), and cyclists (2.71 Nm/kg), with differences of 1.17 Nm/kg, 1.24 Nm/kg, and 0.96 Nm/kg, respectively.

Relative total work in Thai Nguyen athletes (2.91 J/kg) was slightly higher than that of Vietnamese national team athletes (2.86 J/kg) and international athletes (2.53 J/kg), with differences of 0.05 J/kg and 0.38 J/kg, respectively. Compared with athletes from other sports, Thai Nguyen athletes showed comparable values.

Relative mean power in Thai Nguyen athletes (2.07 W/kg) was slightly lower than that of Vietnamese national team athletes (2.08 W/kg) and international athletes (2.61 W/kg), with differences of 0.01 W/kg and 0.54 W/kg, respectively. Compared with other sports, Thai Nguyen athletes demonstrated lower values than marathon runners (2.10 W/kg) and cyclists (2.62 W/kg), with differences of 0.03 W/kg and 0.55 W/kg, respectively, and were comparable to cross-country runners.

Overall, the findings indicate that knee extensor isokinetic strength at 60°/s in short-distance sprinters from Thai Nguyen Province is comparable to that of Vietnamese national-level sprinters, international short-distance sprinters (SC Singh, 2010), and athletes from other sports

2. Correlation between Isokinetic Strength and Selected Field Tests in Short-Distance Sprinters from Thai Nguyen Province

Association between Isokinetic Strength and Selected Performance Tests in Short-Distance Sprinters from Thai Nguyen Province

Table 3. Correlation between Knee Flexor Isokinetic Strength at 60°/s and Selected Performance Tests in Short-Distance Sprinters

Variable	Peak torque (Nm)	Total work (J)	Mean power (W)	30-m sprint from standing start (s)	Standing triple jump (cm)	3RM back squat (kg)
Peak torque (Nm)	1.00					
Total work (J)	0.97	1.00				
Mean power (W)	0.98	0.99	1.00			
30-m sprint from standing start (s)	-0.97	0.95	0.96	1.00		
Standing triple jump (cm)	0.93	0.87	0.90	0.98	1.00	
3RM back squat (kg)	0.75	0.58	0.69	0.89	0.95	1.00

The results presented in Table 3 indicate that knee flexor isokinetic variables at 60°/s, including peak torque, total work, and mean power, showed very strong correlations with the 30-m sprint from a standing start and the standing triple jump (cm). The 3RM back squat test (kg) demonstrated strong correlations with peak torque and mean power, and a moderate correlation with total work. These findings suggest that the 30-m sprint, standing triple jump, and 3RM back squat tests may serve as practical field-based indicators of lower-limb isokinetic strength in short-distance sprinters.

Table 4. Correlation between Knee Extensor Isokinetic Strength at 60°/s and Selected Field Tests

Variable	Peak torque (Nm)	Total work (J)	Mean power (W)	30-m sprint from standing start (s)	Standing triple jump (cm)	3RM back squat (kg)
Peak torque (Nm)	1.00					
Total work (J)	0.98	1.00				
Mean power (W)	0.97	0.99	1.00			
30-m sprint from standing start (s)	-0.92	0.87	0.84	1.00		
Standing triple jump (cm)	0.88	0.81	0.79	0.98	1.00	
3RM back squat (kg)	0.67	0.48	0.42	0.89	0.91	1.00

The results presented in Table 4 indicate that knee flexor isokinetic peak torque, total work, and mean power at 60°/s showed very strong correlations with the 30-m sprint from a standing start and the standing triple jump (cm), and moderate correlations with the 3RM back squat test (kg).

Total work demonstrated a very strong correlation with the 30-m sprint, a strong correlation with the standing triple jump, and a moderate correlation with the 3RM back squat. Mean power showed a very strong correlation with the 30-m sprint, a strong correlation with the standing triple jump, and a weak correlation with the 3RM back squat. Overall, these findings suggest that the 30-m sprint from a standing start and the standing triple jump may serve as practical field-based indicators of lower-limb isokinetic strength in sprinters, providing useful support for athlete assessment when laboratory-based testing (e.g., Biodex System 4 Pro) is not available.

CONCLUSION

The results of this study indicate that, when comparing knee flexor isokinetic strength at 60°/s in female short-distance sprinters from Thai Nguyen Province with Vietnamese national team athletes, international sprinters (SC Singh, 2010), and athletes from other sports, several differences were observed.

Knee flexor isokinetic strength at 60°/s in Thai Nguyen sprinters was lower than that of Vietnamese national team athletes and international sprinters (SC Singh, 2010).

In contrast, knee extensor isokinetic strength at 60°/s in Thai Nguyen athletes was comparable to that of Vietnamese national sprinters, international sprinters (SC Singh, 2010), and athletes from cross-country running, marathon running, and cycling.

Correlation analysis between peak torque, total work, and mean power at 60°/s and selected field tests (30-m sprint from a standing start, standing triple jump, and 3RM back squat) revealed strong to very strong relationships, particularly for the 30-m sprint and standing triple jump.

Overall, these findings suggest that the 30-m sprint from a standing start and the standing triple jump may serve as practical field-based indicators of lower-limb isokinetic strength in sprinters, providing useful support for athlete monitoring and performance evaluation when laboratory-based testing (e.g., Biodex System 4 Pro) is not available.

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Effect of Selected Yogasanas and Pranayama on Peak Expiratory

Flow Rate of high School Girls.

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Abstract:

The main purpose of the present study was to find out the Effect of selected Yogasanas and Pranayama on Peak Expiratory Flow Rate of high School Girls. To achieve the purpose of the study 80 girls students were selected at random from B. D. E Society School Vijayapura Karnataka India. The age of the participants was 16 to 18 year old only. The selected participants were divided into two equal groups as follows experimental and control groups. Group-1 underwent Yogasana and Pranayama and training. Group-2 act as control group they did not participated any their respective training programme was performed six days/wk training for twelve weeks duration. The selected dependent variables namely post-tests were conducted on the above said dependent variables namely Peak Expiratory Flow Rate it was measured by Peak Expiratory Flow rate method. The difference between the pre-test and post test and post test was considered the effect of respective experimental practices. The collected data were statistically analyzed by using dependent –‘t’ test and ANCOVA. All the above statistically analysis tests were computed at 0.05 level of significance. **Key Words:** Yogasana, Pranayama and Peak Expiratory Flow Rate etc.

Introduction:

Pulmonary function is crucial for overall health, as it involves the efficient exchange of gases, ventilation, and maintenance of homeostasis. Yoga, particularly pranayama (breathing exercises), has been increasingly recognized for its potential benefits on respiratory health. However, the integration of yoga into clinical practice for managing respiratory conditions requires further exploration. Objectives: This review aims to evaluate the impact of yoga practices, with a focus on pranayama, on pulmonary function across various populations. The objectives include identifying patterns in existing research, understanding the physiological mechanisms involved, and providing recommendations for future research and clinical applications.

Methods:

A systematic literature review was conducted using databases such as PubMed, Scopus, and Web of Science. Studies published over the past 20 years that assessed the effects of yoga on pulmonary function in both healthy individuals and those with respiratory conditions were included. Data extraction focused on study design, population characteristics, type of yoga practice, duration, frequency, and measures of pulmonary function. Results: The review found consistent evidence that yoga, particularly pranayama, significantly improves pulmonary function, including increases in Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 second (FEV1), and Peak Expiratory Flow Rate (PEFR). These benefits were observed in both healthy individuals and those with chronic respiratory conditions such as asthma and COPD. The underlying mechanisms include enhanced respiratory muscle strength, reduced inflammation, and better autonomic regulation. Conclusion: Yoga, especially pranayama, shows significant potential as a complementary intervention for improving pulmonary function. The findings support the integration of yoga into clinical practice for respiratory care, though further research is needed to optimize its use, particularly in terms of long-term effects and specific mechanisms. Personalized yoga interventions could be beneficial in enhancing respiratory health and overall well-being.

Methodology:

Subjects for the present study were taken from forty Girls students were selected from B. D. E Society Vijayapura Karnataka, India, at random and their age ranges from 14 to 16 years and all of them healthy and normal. The selected subjects were divided into two groups and designed as Experimental group and Control group forty girls students each. The experimental groups underwent a twelve week of yogasanas and pranayama training. The control group was not allowed to participate in any of the training programmes, except their routine physical education classes. A qualified physician examined the subjects medically and declared that they were fit for the study. The duration of the training period was 12 weeks with six days per week. On every day the training was practiced approximately 45 min 50 under the instruction and supervision of the investigator. The analysis of covariance (ancova) was applied to find out significant difference if any between experimental and control group. In all cases 0.05 level of confidence was utilized to test the significance.

Result of the study:

Table No-4.8 The Analysis of Covariance for pre-test and post-test on Peak Exploratory Flow Rate of Control group and Experimental Group of High School Girls.

Type of test	Control group	Experimental group	Source of variance	Sum of the squares	df	Mean square	F Ratio
Pre Test Mean	329.7250	338.4750	Between	1531.250	1	1531.250	.466
SD	56.86195	57.80559	Within	256415.950	78	3287.384	
Post Test Mean	327.3500	365.0000	Between	28350.450	1	28350.450	10.666
SD	51.67877	51.43081	Within	207317.100	78	2657.912	
Adjusted post-test mean	330.148	362.213	Between	20440.809	1	20440.809	15.105
			Within	102846.509	76	1353.244	

*significance $\alpha = .05$ Table value = 4.0

Table- 4.8 Shows that the pre-test means scores of Peak Expiratory Flow Rate (PEFR) level of control and experimental groups of high school girls students. It is observed that mean scores of pretest of control and experimental groups of high school girls students are 329.7250 and 338.4750 and their standard deviation are 56.86195 and 57.80559 respectively. The obtained 'F' Ratio value is ($F = .466$ 1, 78, $\alpha = .05$). .466 at 5% level of significance, which is very less than the table value ($F = 4.0$), hence the null hypothesis is accepted, it can be concluded that PEFR level between the experimental group and control group found almost similar among the high school girls students.

Further, it is observed that mean scores of post test of control and experimental groups of girls high school students are 327.3500 and 365.0000 and their standard deviation are 51.67877 and 51.43081 respectively. The obtained 'F' Ratio value is ($F = 10.666$ 1, 78, $\alpha = .05$) at 10.666 5% level of significance, which is more than the table value ($F = 4.0$), hence the null hypothesis is rejected and the alternative hypothesis is accepted. It can be concluded that there is significant difference found between the experimental group and control group with respect to PEFR level of high school girls students.

This indicates that PEFR level is more among the control group when compared to the experimental group. Finally, it can be analyzed that Yogasanas Pranayama and Meditation training has made a significant impact on the PEFR level of the girls high school students.

The adjusted post-test means scores on PEFR of the control and the experimental groups are 330.148 and 362.213 respectively. The obtained 'F' Ratio value is ($F = 15.105$, 1, 76, $\alpha = .05$) 15.105 at 5% level of significance, which is much higher than the table value ($F = 4.0$), hence the null hypothesis is rejected and the alternative hypothesis is accepted. It can be concluded that there is a significant difference found between the experimental group and the control group with respect to PEFR level of high school girls students.

Figure-4.8 The Graphical Presentation on Peak Exploratory Flow Rate of Pre test and Post test and Adjusted post test means of Control Group and Experimental Group.

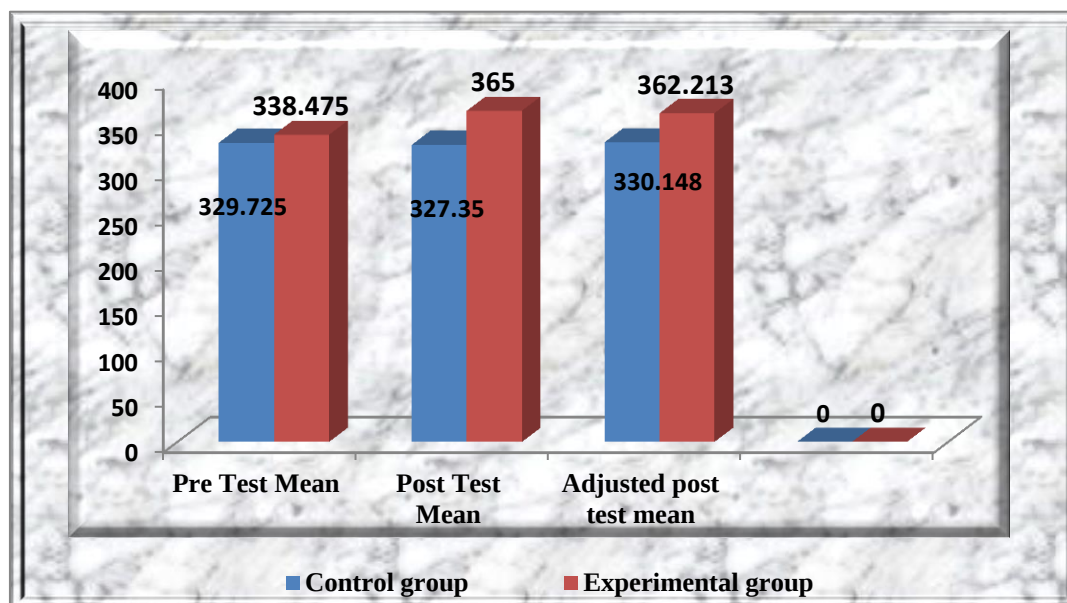


Figure No-4.8 gives a clear picture of the adjusted means of two training groups. Thus, it is inferred that Yogasanas Pranayama and Meditation training is more effective in increasing the Peak Expiratory Flow Rate among the subjects experimental group in compare to control groups.

Discussions on findings:

There is a significant difference in Peak Expiratory Flow Rate in the pre test and the post tests of the experimental and the control groups. Due to Yogasanas, and Pranayama training there is significant difference in the post test experimental group than the control group.

Conclusions:

The Peak Expiratory Flow was increased after the training when compared with the control group.

Reference:

- The results, by and large, were in conformity with the findings of Anurodh Singh at all, Sodhi C., Singh S. and Dandona P.K. (2009),(2009) Chandrabose and Upadhyay, et al., (2008),
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**Running Training Adaptations: Effects Of Continuous And Alternate Pace Running On Selected
Motor Fitness And Physiological -Haematological Variables Among Soccer Player**

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Abstract

The study aims to determine the isolated and combined effect of continuous run, alternate pace run and combined training on the selected motor fitness variable (Muscular Endurance), physiological variable (Breath Holding Time), and hematological variable (Red blood corpuscles) among the male athletes of Bharathidasan University affiliated colleges. The research involved a random subject selection of forty soccer players with age ranging from 17-25 years and had four equally divided groups namely experimental groups A, B, C and control group D with 10 soccer players each. The groups endured the training activities for twelve weeks with a schedule of thrice a week whereas the control group remained with no activities. The data procured in prior and after the training programme was examined with the application of Analysis of Covariance and the fixation of level of significance at 0.05. Scheffe's test was applied at the significance of 'F' ratio in order to evaluate the differences that occur significantly between the paired means. The study revealed that the selected variables of the combined group with the two endurance trainings outperformed the other groups. **Keywords:** Continuous Run, Alternate Pace Run, Muscular Endurance, Breath Holding Time, Red Blood Corpuscles

Introduction

A mission for perfection is often confronted with numerous difficulties. To improve the sports performance the soccer players need to take part in systematic training by the way of scientific method of training. Therefore athletes or players need proper systematic training to improve their performance through different kinds of training.¹ Significant improvement in VO₂ max may not be possible when the runner reaches a plateau. It is, therefore, suggested that more emphasis should be given to improve the anaerobic threshold level of soccer players.² Actual effect of training depends upon several factors such as training loads, means of recovery, assessment of load and performance capacity, sports equipment, nutrition, psychological characteristics and method adopted for imparting theoretical instruction.³ The tendency of the systems of heart and blood vessels, lungs, body temperature regulators, body constituents, and the function of muscles and skeleton upon the capacity of an athlete leads to the enhancement of sports performance.⁴

Continuous running

Continuous running boosts the heart rate to the vicinity of 130 and 160 thumps for a given period of time at a relentless pace or power. The average time span of such running will be more than 30 minutes for a youthful competitor and from 60-120 minutes for an adult. Continuous training structures the reason for all other preparing techniques both anaerobic and aerobic.⁵ Ernst Van Aaken, German physician and coach, is credited with introducing and popularizing this system of training. Ernst Van Aaken's work in this area started in 1920's but received widespread support at the later. Continuous training differs from maximum force constant action of slow time span to minimum-force action of a broadened span, long-slow distance, or "LSD" method. The long distance sprinter keeps up a pace that is simply beneath his dashing pace, despite the fact that this will rely upon the overall distance and the distance of preparation runs.

Alternative pace run

Running for long time at a speed with a variation in progressive stretches in accordance with a plan is Alternative pace run. In general, for a person at slow pace for 1.0 km, the heart rate ranges from 130 to 150 beats per minute while considering fast pace for 0.5 km, the heart rate ranges from 170 to 180 beats per minute. The maximal oxygen intake at a subsequent distance of 1.0 km is stirred up. The alternative pace run supports the consumption of oxygen and the ability of varying speed.

Muscular endurance

Muscular endurance is very important for the football game. A long duration sport is to improve the muscular endurance. Enhancing muscular endurance gives an assortment of wellbeing and fitness, benefits, decreases fatigue, injury, back pain and develop the good posture.

Breath holding time

Breath holding time is the period when one can hold the breath without inspiration and expiration.⁷ It is characterized as a person's capacity to hold the breath, an intended maximal inward breath without exhalation during the period of holding the breath. Breath holding time is the times consumed to keep or without taking the breathing action as much as possible.

Red blood corpuscles

RBCs the non nucleated in the blood are the carriers of oxygen to every part of the body. Their haemoglobin content acts as carrier to all the body tissues. It enhances the rate of action between CO₂ and water 250 times and thus facilitates CO₂ carriage. RBCs are produced in bone marrows and the life span ranges between 90-140 days.

Statement of the problem

The purpose of the study was to find out the Effect of Continuous Running, Alternate Pace Run, on selected motor fitness, physiological and hematological variable of soccer players.

Methodology

The research was designed to discover isolated and combined effect of continuous run, alternative pace run on the selected motor fitness variable (Muscular Endurance), physiological variable (Breath Holding Time), and hematological variable (Red blood corpuscles) among the UCE, Anna university Tiruchirappalli soccer players. For this purpose, forty soccer players from the college were chosen randomly as subjects for the study and their age ranged between seventeen and twenty five years.

Test administration of the selected variables

- i) Sit-ups (Bent knees) to evaluate the muscular endurance of the abdomen.
- ii) Breath Holding Time to estimate the capability of the subjects in holding the breath for an extended period of time.
- iii) Red blood corpuscles count to find out the number of red blood cells in the blood.

Training programme

The experimental groups I, II, III and IV were subjected to twelve week of continuous run (Group I), alternative pace run (Group II), combined training (Group III) and control (Group IV) on three alternative days a week. Each of the training programmes extended from 60 to 90 minutes with a schedule in the morning from 6.00 am to 8.00 am. The control group underwent usual exercises and was devoid of any specific training. The subjects underwent their respective programme under strict supervision prior to and during every session. They experienced a 10 minutes warm up and cool-down exercises which included jogging, stretching, striding and push-ups. A regular self-analysis of the stature of the subject was done during the whole training session and none reported of injuries whereas muscle soreness that occurred in the earlier weeks lowered down in the later period.

Statistical techniques

The design of the experiment and the random group involved forty as subjects who were divided into four groups containing ten each. This study was based on the chosen criterion variables such as motor fitness, physiological, hematological variables namely muscular endurance, breath holding time, red blood corpuscles. The four selected group underwent continuous run, alternative pace run, combined method and controlled training respectively. The study mainly aimed at finding out the effects of different endurance trainings among the subjects on selected criterion variables. The data was obtained from the four experimental groups and the control group at the beginning and after the conduct of the test. The procured data was statistically examined for significant difference using the method of analysis of covariance i.e., ANCOVA. Due to the involvement of the four various groups and at the significance of the F ratio for the adjusted post mean, the post hoc test utilized the Scheffe's test to measure the difference of the paired means.

Results and discussions

TABLE I: ANCOVA for the data extracted from the pre and post tests of the training groups of Continuous, Alternate Pace Run, Combined and Control methods on Muscular endurance

(Sit-ups means count in No of attempt per minute)

Test	CNG	APG	CMG	CTG	Source of Variation	Variation in Sum of Squares	Df	Squared Mean	'F' Ratio observed
Pre test Mean	26.4	26.6	26.1	26.7	Between	2.28	4	.570	.074
SD	2.22	3.37	2.60	3.16	Within	345.9	45	7.687	
Post test Mean	28.8	29.7	31.5	26.1	Between	180	4	45	4.345*
SD	2.57	3.77	2.67	4.38	Within	466	45	10.35	
Adjusted post test mean	28.82	29.52	31.81	25.82	Between	215.26	4	53.817	19.331*
					Within	122.49	44	2.784	

*Required table value with significant level at 0.05, degree freedom 4 and 45 and 4 and 44 are 3.20 and 3.21 respectively. B.M., W.G, B.S, W.S are Between Means, Within Groups, Between Sets, Within Sets respectively.(Sit-ups means count in No of attempt per minute)

The data analysis done statistically from the Table I indicates that the mean values of pre-test of the training groups of continuous, alternative pace running , combined and control methods are 26.4,26.6,26.1and 26.7 respectively. The F ratio .074 obtained for pre-test observed to be lesser than 3.20 of table value for the degree of freedom 4 and 45 necessary for significance level at 0.05. The means of post-test of the training groups of continuous, alternative pace running, combined and control methods were found 28.8,29.7,31.5 and 26.1 respectively. The F ratio 4.345 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for significant level specified at 0.05. And the resultant means of the adjusted post test scores of the training of continuous, alternative pace running, combined and control methods were 28.82,29.52,31.81 and 25.82 respectively.

The ratio of F for the adjusted post-test 19.331 was also greater than 3.21 table value for the degrees of freedom 4 and 45 necessary for 0.05 specified as level of significance. The analysis mentioned above shows that the result has a significance of difference of the means of adjusted post-test of all the groups. For post hoc test Scheffe's test as was used in order to identify which specific group had the significant difference and to evaluate which paired means showed significance of difference and also the conclusions are given in Table II.

TABLE II: Scheffe's Method Showing Differences of Paired Means of Adjusted Post-Test on the Variable of Muscular Endurance

(Sit-Ups Means Count in No of Attempt per Minute)

CNG	APG	CMG	CTG	Difference in means	C.I Value
28.82	29.52	-	-	.701	2.40*
28.82	-	-	-	2.20	
28.82	-	31.81	-	2.99*	
28.82	-	-	25.82	2.99*	
-	29.52	-	-	1.49	
-	29.52	31.81	-	2.29	
-	29.52	-	25.82	3.70*	
-	-	31.81	-	.799	
-	-	-	25.82	5.19*	
-	-	31.81	25.82	5.99*	

*Required C.I Value 2.40*at 0.05 level

TABLE III: ANCOVA for the data extracted from the pre and post tests of the training groups of Continuous, Alternate Pace Run, Combined and Control methods on Breath Holding Time(Breath Holding Time means count per minute)

Test	CNG	APG	CMG	CTG	Source of Variation	Variation in Sum of Squares	Df	Squared Mean	'F' Ratio observed
Pre test Mean	37.3	37.5	37.8	37.6	Between	1.480	4	.370	.025
SD	3.59	3.65	4.10	4.24	Within	671.00	45	14.91	
Post test Mean	3.763	3.773	3.523	3.523	Between	448.48	4	112.12	7.701*
SD	.069	.036	.092	.092	Within	655.2	45	14.56	
Adjusted post test mean	43.69	43.91	45.36	37.03	Between	450.505	4	112.626	33.97*
					Within	145.875	44	3.315	

*Required table value with significant level at 0.05, degree freedom 4 and 45 and 4 and 44 are 3.20 and 3.21 respectively. B.M., W.G, B.S, W.S are Between Means, Within Groups, Between Sets, Within Sets respectively.(Breath Holding Time means count per minute).

The analysis of the data done statistically shown in the Table III indicates that the mean of training groups of continuous, alternative pace running ,combined and control methods are 37.3,37.5,37.8 and 37.6respectively. The F ratio .025 for the pre-test was lesser compared to the table value 3.20 for degree of freedom 4 and 45 necessary with a significant level at a specification of 005. The means of post-test of the training groups of continuous, alternative pace, combined, control methods were 43.5,43.9,45.6 and 37.1 respectively. The F ratio 7.701 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for significance level specified at 0.05. The means of adjusted posttest scores of the training groups of continuous, alternative pace running, combined and control methods were 43.69,43.917, 45.356 and 37.03 respectively.

The ratio of F 33.97 for post test scores was greater than 3.21 of table value for degree of 4 and 45 necessary for significance level at 0.05. The analysis mentioned above shows that the means of adjusted posttest measures of the all the groups differed significantly. For post hoc test Scheffe's test as was used in order to identify which specific group had the significant difference and to find out which paired means showed significance of difference and the derived results are given in Table IV.

TABLE IV: Scheffe's Procedure Indicating The Differences Among The Paired Means of Adjusted Post Test on Breath Holding Time (Breath Holding Time Means Count Per Minute)

CNG	APG	CMG	CTG	Difference in means	C.I Value
43.692	43.917	-	-	.226	2.61*
43.692	-	-	-	.913	
43.692	-	44.356	-	1.664	
43.692	-	-	37.03	6.661*	
-	43.917	-	-	.687	
-	43.917	44.356	-	1.439	
-	43.917	-	37.03	6.887*	
-	-	44.356	-	.752	
-	-	-	37.03	7.574*	
-	-	44.356	37.03	8.326*	

*Required C.I Value 2.61*at 0.05 level

TABLE V: ANCOVA for the data extracted from the pre and post tests of the training groups of Continuous, Alternate Pace Run, Combined and Control methods on Red Blood Corpuscles (RBC)

(RBC count means count by millions)

Test	CNG	APG	CMG	CTG	Source of Variation	Variation in Sum of Squares	Df	Squared Mean	‘F’ Ratio observed
Pre test Mean	5.52	5.83	5.80	5.75	Between	.909	4	.227	1.191
SD	.458	.435	.429	.537	Within	8.592	45	.191	
Post test Mean	6.03	6.09	6.29	5.64	Between	2.264	45	.566	4.685*
SD	.346	.347	.144	.529	Within	5.437	45	.121	
Adjusted post test mean	6.12	6.01	6.23	5.61	Between	2.491	4	.623	9.407*
					Within	2.912	44	.066	

*Required table value with significant level at 0.05, degree freedom 4 and 45 and 4 and 44 are 3.20 and 3.21 respectively. B.M., W.G, B.S, W.S are Between Means, Within Groups, Between Sets, Within Sets respectively. (RBC count means count by millions).

The Table V indicates that the mean values of the pretest belonging to the training groups of continuous, alternative pace running, combined and control methods are 5.517, 5.83, 5.80 and 5.75 respectively. The derived F ratio 1.191 for the pretest was lesser compared to 3.20 of table value for degree of freedom 4 and 45 necessary for a level significance specified at 0.05. And the means derived from the scores of posttest of the training groups of continuous, alternative pace, combined, control methods were 6.03, 6.09, 6.29 and 5.64 respectively. The F ratio 4.685 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for a significant level at a value of 0.05. The means of adjusted post-test of the group of continuous, alternative pace running, combined and control methods were 6.124, 6.011, 6.233 and 5.609 respectively. The F ratio 9.407 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for significance level at 0.05. The analysis mentioned above shows that the result has a significant difference of the means of the adjusted post-test of the all the groups. For post hoc test Scheffe’s test was used in order to identify which specific group had the significant difference and to evaluate which particular paired means showed significance of difference and the conclusions are shown in Table VI.

TABLE VI: Scheffe Procedure for Differences Among Paired Means of The Adjusted Post Test On Red Blood Corpuscles (RBC Count Means Count By Millions)

CNG	APG	CMG	CTG	Difference in means	C.I Value
6.124	6.011	-	-	.113	0.37
6.124	-	-	-	.060	
6.124	-	6.233	-	.109	
6.124	-	-	5.609	.515*	
-	6.011	-	-	.174*	
-	6.011	6.233	-	.222	
-	6.011	-	5.609	.402*	
-	-	6.233	-	.049*	
-	-	-	5.609	.624*	
-	-	6.233	5.609	.624*	

*Required C.I Value 0.37 at 0.05 level

DISCUSSION ON FINDINGS

The current study clearly reveals the significant improvement of the combined training group on the chosen variables such as muscular endurance, breath holding time and red blood corpuscles when compared with the groups of continuous, alternative pace run group, combined training and control trainings.

The hypothesis of the study is that the combined training would have significant improvement from base line to post treatment on motor fitness physiological and hematological variables of inter collegiate men athletes. The result of the study indicates that all the motor fitness, physiological and hematological variables improved significantly after the 12weeks of treatment. Hence the investigator's first hypothesis was accepted at 95% of confidence level.

Conclusions

The combined training group showed significant improvement with the influence of motor fitness, physiological and hematological variables in comparison with the groups of continuous training, alternative pace run and control training.

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**Scientific Effect of Physical Relationship with His and Her Partner Before and After
Participating in High-Pressure International Sports Events**

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Abstract

This paper examines the scientific literature on how physical intimacy with a romantic partner before and after high-pressure international sporting and professional events may influence performance, physiological arousal, hormonal balance, and psychological readiness. Long-standing folk beliefs that sexual activity before competition depletes strength and focus are compared against empirical findings from sports medicine, endocrinology, and sport psychology. The review considers effects on both male and female partners, distinguishing pre-event and post-event contexts, and synthesizes evidence on testosterone fluctuation, cardiovascular exertion, sleep quality, anxiety reduction, and relationship bonding. The paper concludes that existing evidence does not support a uniform negative effect on performance and that individual, relational, and contextual factors are more decisive than the act itself. Recommendations for athletes, coaches, and sports medicine practitioners preparing individuals for high-stakes international events are provided, along with directions for future controlled research.**Keywords:** physical intimacy, sexual activity, athletic performance, high-pressure events, testosterone, sport psychology, pre-competition, post-competition recovery

Introduction

Athletes, performers, and professionals who represent their country or organization at high-pressure international events face intense physiological and psychological demands. Alongside training, nutrition, and mental preparation, the question of whether sexual activity with a partner should be avoided or encouraged in the period surrounding such events has been debated for decades among coaches, sports scientists, and athletes themselves (McGlone&Shrier, 2000). This belief, often rooted in tradition rather than evidence, has persisted across cultures and sporting disciplines despite limited empirical support.

The purpose of this paper is to review and synthesize the available scientific literature on the physiological, hormonal, and psychological effects of physical relationships with a partner both before and after participation in high-pressure international events, and to examine how these effects may differ between male and female partners.

Literature Review

Historical and Cultural Beliefs

Traditional sporting culture has long held that abstinence before competition preserves aggression, strength, and focus, a belief traceable to ancient Greek athletic training practices and persisting into modern professional sport (McGlone&Shrier, 2000). Coaches across boxing, football, and combat sports have historically enforced pre-competition abstinence policies, though such policies are rarely grounded in controlled research.

Physiological and Hormonal Effects

Sztajzel et al. (2000) measured cardiovascular and hormonal responses in male athletes following sexual activity the night before a stress test and found no clinically significant reduction in physical performance, cardiac workload capacity, or concentration ability. Similarly, research examining testosterone levels has found that short-term sexual activity does not produce a sustained depletion of circulating testosterone sufficient to impair strength or endurance performance the following day (Boone&Gilmore, 1995). Energy expenditure during typical sexual activity has also been shown to be modest, comparable to light-to-moderate physical activity rather than an exhaustive bout of exercise (Frappier et al., 2013), suggesting that fatigue-based performance decrements are unlikely under normal circumstances.

Psychological and Relational Effects

Beyond physiology, sport psychology research emphasizes the role of emotional regulation and anxiety management in high-pressure environments (Hanton et al., 2005). Physical intimacy with a trusted partner has been associated with reductions in cortisol and perceived stress, improved sleep quality, and increased feelings of security, all of which are relevant to pre-competition readiness (Ditzen et al., 2007). For athletes competing far from home at international events, the presence or contact with a partner may also reduce feelings of isolation, a factor known to affect competitive anxiety.

Post-Event Effects and Recovery

Following high-pressure competition, athletes often experience elevated cortisol and residual physical fatigue. Partner intimacy after competition has been linked in relationship-science literature to oxytocin release, which supports emotional bonding, mood recovery, and stress buffering (Carter, 1998; Ditzen et al., 2007). These effects may support psychological recovery between events, particularly in multi-day international tournaments, although the physical recovery implications require athletes to balance intimacy with adequate rest and hydration.

Gender-Specific Considerations

Most existing studies have focused predominantly on male athletes, leaving a notable gap in research on female competitors. Preliminary findings suggest that hormonal cycles, rather than sexual activity itself, are a more significant determinant of female athletic performance variation (Constantini et al., 2005). Both partners in a couple may experience different psychological benefits, such as reassurance, affection, and reduced pre-competition loneliness, which do not necessarily correspond to differences in physical performance outcomes.

Discussion

Taken together, the literature does not support a consistent or clinically meaningful negative effect of physical intimacy on performance in high-pressure international events. Where negative effects are reported, they tend to be linked to secondary factors such as sleep disruption, emotional conflict, travel fatigue, or excessive physical exertion rather than sexual activity per se. Conversely, positive psychological effects, including stress reduction, improved mood, and relational security, are more consistently supported across the reviewed literature. These findings suggest that blanket abstinence policies enforced by coaches or federations may lack scientific justification and could, in some cases, increase psychological stress by removing an athlete's usual source of emotional support. Individualized approaches that consider an athlete's personal routine, relationship context, and event schedule appear more appropriate than uniform restrictions.

Conclusion

Scientific evidence on physical relationships with a partner before and after high-pressure international events indicates that moderate sexual activity is unlikely to meaningfully impair athletic or professional performance, and may in fact support psychological readiness and post-event recovery through stress and hormonal regulation. Given the limited number of controlled studies, particularly involving female athletes, further research is recommended using larger, gender-balanced samples and objective performance metrics across a range of international sporting and professional contexts. In practice, coaches and sports medicine professionals should avoid rigid, tradition-based restrictions and instead support athletes in maintaining routines, including relational ones, that promote psychological stability before and after competition.

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**Effect Of 12 Weeks Core Strength Training and Hill Running On Lower Body
Explosive Power Among Sprinters Of Osmania University**

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Abstract:

The purpose of the present study was to determine the effect of Core Strength training and Hill running on Lower Body explosive Power among Sprinters of Osmania University. To achieve the purpose of the study, the Male Sprinters were randomly selected from the different Colleges of the Osmania University between the age group was 18 to 25 years. The selected subjects were divided into three groups of 15 each, namely, two experimental groups and one control group. Out of total subjects of 45, 15 Core Strength Training on alternate days another set of 15 underwent Hill Running while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. Vertical Jump Test were used in the Study to assess the leg explosive power. The results of the study reveal that there is a significant improvement on Core Strength Training group and Hill Running group when compared to control group. Key words: Core Strength Training, Hill Running, Explosive Power etc..

INTRODUCTION

For the sprinters, the first and most important aspect of speed is Posture. Sprinting posture is going to be much different than acceleration. During sprinting we are looking to be much more erect through our trunk, we want our head level, hips high, foot contact slightly ahead of our centre of mass, and large range of motions through our limbs. Obtaining this upright, tall

position allows for better freedom of movement, elastic energy production, maximal power production, better relaxation, and efficiency.

Phases of Sprinting

100 Meters divided into a few phases as follows:

- a. Starting Block (set up)
- b. Starting Block Clearance (0-5 meters)
- c. Drive Phase/Acceleration (5-15 meters)
- d. Transition (15-30 meters)
- e. Maximum Velocity (30-60 meters)
- f. Speed Maintenance (60-100 meters)

There are several phases in sprinting, for instance the acceleration phase is the most important phase in a race. During this phase, after the sprinter has left the starting blocks, the athlete increases the length of their stride and decreases the amount of strides taken per second. Male sprinters usually have a stride rate of 4.6 strides per second, with female athletes little less with 4.8 strides per second. Elite sprinters reach their highest speed at around the 60-70-meter distance, in a 100-meter race, for men. Professional women sprinters reach their top speeds at around the 50-60-meter distance. Top runners usually cover 20-30 meters at top speed.

G.Ramu and Sr. Prof. Rajesh Kumar (2025) Effect Of 12 Weeks Circuit Training and Plyometric Training On Leg Muscle Power Among Sprinters Of Telangana State. The purpose of the present study was to determine the effect of Circuit training and plyometric training on Leg Muscle Power among Sprinters of Telangana State. To achieve the purpose of the study, the Male Sprinters were randomly selected from Telangana State and their age group was 18 to 25 years. The selected subjects were divided into three groups of 15 each, namely, two experimental groups and one control group. Out of total subjects of 45, 15 Circuit Training training on alternate days another set of 15 underwent Plyometric training while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. Vertical Jump Test were used in the Study to assess the leg explosive power. The results of the study reveal that there is a significant improvement on Circuit Training group and Plyometric training group when compared to control group

Rajesh Kumar and Erika Zemková (2022) studied the Effect of 12-Week Core Strengthening and Weight Training on Muscle Strength, Endurance and Flexibility in School-Aged Athletes. Ninety male athletes at the age of 12 were randomly divided into three equal groups (30 in each). Group 1 underwent core strengthening training, group 2 underwent weight training, and group 3 was the control. The training was for 12 weeks, with three sessions per week (one hour per session). Prior to and after the training, abdominal strength, endurance, and flexibility were evaluated using the sit-ups test, the Cooper 12 min run test and the sit and reach test. The analysis of variance was used to analyze pre- and post-intervention data. The results showed that both the core strength training group and the weight training group significantly ($p = 0.00$) improved in abdominal strength, represented by the number of sit-ups (from 18.70 3.20 to 22.21 3.50 and from 17.60 3.29 to 21.60 3.63, respectively); endurance, represented by distance covered in 12 min (from 1817 185.78 m to 2008.97 214.79 m and from 1806 237.25 m to 2002.59 83.32 m, respectively); and flexibility, represented by the sit and reach distance (from 23.48 2.75 cm to 25.96 2.38 cm and from 23.66 2.92 cm to 25.86 2.55 cm, respectively) when compared to the control group (from 17.20 3.20 to 16.39 2.69; from 1813 224.69 m to 1778.15 05.28 m; from 23.46 3.06 cm to 21.76 2.56 cm). More specifically, abdominal strength and endurance improved slightly more in the weight training group than in the core strength training group, whilst flexibility increased slightly more in the core strength training group than in the weight training group. These findings indicate that both core strengthening training and weight training are effective in improving physical fitness in school-aged athletes; however, the improvement is to differing extents regarding their endurance, flexibility, and abdominal strength.

Prof. Rajesh Kumar (2020) studied about the effect of Plyometric and Circuit Training on selected Physical Variables among Sprinters of Hyderabad District of Telangana State. To achieve this purpose, forty five Sprinters in the age group of 16 to 20 years those who have participated in the Hyderabad Open Sprints Athletics Championships at Gachibowli Stadium, Hyderabad for the year 2019 taken as subjects. The selected forty five subjects were divided into three equal groups of fifteen each as two experimental groups and one control group, in which group – I (n=15) underwent plyometric training for three days per week for Twelve weeks, group – II (n=15) underwent the Circuit Training for three days per week for Twelve weeks and group – III (n=15) acted as control who are not participate any training apart from their regular activities. The selected Physical variables such as abdominal strength, speed and leg explosive power were assessed before and after the training period. Sit Up Test, 50 M Dash and Standing Broad Jump are the Tests were used to conduct the pre test and post for Measuring the Physical Variables such as Abdominal Strength, Speed and explosive power of legs. The results of the study it was found that there was a significant difference of performance due to Plyometric and circuit training when compared with the control group.

Methodology

The purpose of the present study was to determine the effect of Core Strength Training and Hill Running on Lower Body explosive Power among Sprinters of Osmania University. To achieve the purpose of the study, the Male Sprinters were randomly selected from Osmania University from the different Colleges and their age group was 18 to 25 years. The selected subjects were divided into three groups of 15 each, namely, two experimental groups and one control group. Out of total subjects of 45, 15 Core Strength Training on alternate days another set of 15 underwent Hill Running while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. Vertical Jump Test were used in the Study to assess the leg explosive power. The results of the study reveal that there is a significant improvement on Core Strength Training group and Hill Running group when compared to control group.

TRAINING PROGRAMME OF CORE STRENGTH TRAINING FOR SPRINTERS – 12 Weeks

DAYS	AM
MON	WARM- UP, ABC DRILLS Plank, Dead Bug, Bird Dog, Glute Bridge
WED	WARM-UP :ABC CO-ORDINATION DRILLS Side Plank, Reverse Crunch, Mountain Climbers, Cool Down
FRI	WARM-UP,ACTIVATION FOOT DRILLS Hanging Knee, Ab wheel Rollout, Reverse Crunch, Front plank COOL DOWN

TRAINING PROGRAMME OF HILL RUNNING FOR SPRINTERS – 12 weeks

DAYS	AM
TUE	WARM- UP ACTIVATION,FOOT DRILLS Short Hill Sprints.
THU	WARM-UP ABC CO-ORDINATION DRILLS Medium Hills
SAT	WARM-UP ACTIVATION FOOT DRILLS Short Hill Sprints + Medium Hills

Vertical Jump Test were used in the Study.

Results and Discussion

The mean difference between the pre and post-test results of control and experimental groups was tested using “t” ratio to determine the significance of the difference exhibited by the experimental and control groups during the training period of 12 weeks.

Table: 1 T-Test Results for Pre-Test and Post-Test Performance on the Vertical Jump Test across Core Strength Training, Hill Running, and Control Groups

Group	VERTICAL JUMP	N	Mean	Std. Deviation	Std. Error Mean	Mean Differences	T- Cal Value	T- Tab Value	df	P- Value
Core Strength	Pre Test	45	51.37	1.790	0.327	4.000	18.205	2.045	44	0.000
	Post Test	45	55.37	1.189	0.217					
Hill Running	Pre Test	45	52.33	1.668	0.305	6.167	24.714	2.045	44	0.000
	Post Test	45	58.50	1.815	0.331					
Control Group	Pre Test	45	51.67	2.123	0.388	0.600	1.964	2.045	44	0.059
	Post Test	45	51.07	1.780	0.325					

The above table shows that vertical jump test performance of selected sprinters in Telangana. for Core Strength Training Group (Experimental Group-I), it is viewed that in the pre-test mean is 51.37, with standard deviation of 1.790 and 0.327 std. error, while the post-test mean significantly increases to 55.37, with standard deviation of 1.189 and 0.217 std. error.

The mean difference in vertical jump Core Strength Group is 4.000. For Core Strength Group, the calculated t-value is 18.205 with 44 degrees of freedom, and the p-value is 0.000, which is less than the significance level of 0.05. This indicates that the calculated t-value is significantly greater than the critical t-value at the 0.05 level of significance. Hence there is a significant difference seen from pre-test to post-test.

Similarly, Hill Running Group (Experimental Group-II) shows pre-test mean of 52.33 with standard deviation of 1.668 and 0.305 std. error and post-test mean of 58.50 with standard deviation of 1.815 and 0.331 std. error, resulting in a mean difference of 6.167 in vertical jump. For Hill Running Group, the calculated t-value is 24.714 with 44 degrees of freedom, and the p-value is also 0.000, confirming a significant difference in performance. Hence there is a significant difference seen from pre-test to post-test.

In contrast, The Control Group shows that, in the pre-test mean is 51.67 with standard deviation of 2.123 and 0.388 std. error. The post-test mean is 51.07 with standard deviation of 1.780 and 0.325 std. error, indicating no significant change in performance.

From the above table we concluded that that both Core strength training and hill running significantly improve explosive power of legs, as evidenced by increased vertical jump heights among sprinters, while the control group shows no notable changes, highlighting the effectiveness of these interventions for enhancing explosive power and athletic performance

Conclusions

It may be inferred that the Core Strength training and hill running showed significant improvement in the performance of speed. However, the control group has no significant improvement in the performance of speed. It is concluded that Core Strength Training Group performed better than Hill Running Group and Control group. Core Strength training helps athlete to build muscle power. Several researches on the different sports disciplines proved that plyometric training activates the stretch reflex mechanism in the muscle and improves the leg explosive strength. In this research, application of a Hill running programme increased overall muscular power, particularly more effectively for sprinters.

Recommendations:

Similar research work should be done on similar set of sports to validate the results. The study also helps the physical educationists and coaches understanding the knowledge and performance of the Sprinters.

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**Effect of 12 Week Continuous Training Method for the Development of Aerobic
Endurance among Long Distance Runners of Osmania University**

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Abstract:

The purpose of the study is to find out the effect of 12 Week Continuous Training Method for the development of Aerobic endurance among long distance runners of Osmania University..The sample for the present study consists of 30 male long distance runners of Osmania university between the age group of 18-25 Years out of which 15 are experimental group and 15 are controlled group. Continuous method of running includes slow continuous running, fast continuous running and slow and fast continuous running were given to experimental group on alternate days for twelve weeks along with general training of long distance and control group were given the general training of long distance running. Pre Test and Post Test were conducted for 12 Min Cooper Test to assess the aerobic endurance of both the groups. It is concluded that due to Continuous method of running there is a improvement of Aerobic endurance among experimental group. It is recommended that the coaches must include the Continuous method of training programs among long distance athletes for development of endurance. Key Words: Endurance, Aerobic endurance, long distance runners etc.

Introduction:

Endurance performances are of different nature indifferent sports. Endurance activities have been found to be of high value for maintenance of good organic health, for increasing the general resistance against infection and for cure and treatment of various diseases and metabolic disorder.

Ömer ZAMBAK, Sermet TOKTAŞ (2024) Effects of Endurance Trainings on Aerobic Performance in Long Distance Runners. This study was conducted in 2019 to evaluate the effects of endurance training, especially on long-distance runners, on the endurance of these athletes. Experimental and control groups were formed in the study and the characteristics of these groups are as follows. The age range of the athletes in the group participating in the experiment was 18-22 and their number was 40 in total. The athletes in the study group were divided into 20 experimental and 20 control groups. Before and at the end of the training period, 30m sprint, Cooper test and subcutaneous fat measurements in three areas performed. And the control group was given free exercise for one day for one hour for 12 weeks. The training period was set as ‘‘4 days in the first two weeks and 3 days in the other weeks’’ for 12 weeks and the experimental group was motivated for willingness before the each studies. In the evaluation, a significant difference was found in developmentally aerobic power, 12min Cooper running, between the control and experimental groups ($P < 0.01$). When we evaluated the experimental and control groups in terms of sprint test, the difference in development between them was found to be significant ($P < 0.01$). The difference between the experimental group and the control group in body fat percentage was statistically significant ($P < 0.05$)

Prof. Rajesh Kumar (2018) Effect of Hill Training and Fartlek Training for development of Aerobic Fitness among Middle and Long-Distance Runners of Hyderabad District in India Aerobic Fitness is vital for middle and long-distance runners. Aerobic fitness is of special importance at the beginning of the preparatory period. The Objective of this study is to determine the effects of Hill Training and Fartlek Training for development of Aerobic fitness among the Middle and long-distance Runners The sample for the study consists of 45 Middle and long-distance runners between the age group of 18 to 20 Years those who have participated in many middle and long-distance events since last 3 Years. The selected subjects were randomly divided into three equal groups of 15 each. Group I is Experimental Hill Training Group, Group II is Experimental Fartlek Training Group and Group III is Control Group. The Experimental Groups were given Training Alternate days for 12 Weeks in addition to their normal practice on other days.

The Control Group were given routine training. The Data were collected in Pre-Test and Post Test for all groups using the 12 Min Run Cooper Test. The collected data were analyzed statistically by using Ancova. The Results of the Study shows that due to Hill Training and Fartlek Training there is a significant development of Aerobic fitness among Experimental Groups. It is concluded that Hill Running and Fartlek Running is beneficial to middle and long-distance runners to stronger the lower body muscles, resistance to fatigue etc. It helps for development of Aerobic Fitness

Methodology:

The purpose of the study is to find out the effect of 12 Week Continuous Method of Training for the development of Aerobic endurance among long distance runners of Osmania University..The sample for the present study consists of 30 male long distance runners of Osmania university between the age group of 18-25 Years out of which 15 are experimental group and 15 are controlled group. Continuous method of running includes slow continuous running, fast continuous running and slow and fast continuous running were given to experimental group on alternate days for twelve weeks along with general training of long distance and control group were given the general training of long distance running. Pre Test and Post Test were conducted for 12 Min Cooper Test to assess the aerobic endurance of both the groups

Results and Discussion:

Table No 1 showing the Paired Samples Statistics of Experimental Group and Control Group of Long distance runners In Pre Test and Post Test in 12 Min Run Cooper Test

12 Min Run Cooper Test		Mean	Std. Deviation	Std. Error Mean	N
Experimental	Pre Test	2668.00	90.468	28.608	15
	Post Test	2740.40	93.223	29.480	15
Control Group	Pre Test	2647.50	74.470	23.550	15
	Post Test	2640.00	76.992	24.347	15

The Experimental Group Pre Test Mean is 2668.00 and Post Test Mean is 2740.40 There is a improvement of Mean from Pre Test to Post Test is 72.40 . That Means due the Hill Running the Control Group has improved a lot.the Control Group Pre Test Mean is 2647.50 and Post Test Mean is 2640.00

There is a decrease in Mean from Pre Test to Post Test is 7.50 due to the general Training of Long distance running. The Result of the Study shows that the Experimental Group has improved a lot compared to the Control Group. It is concluded that due to Hill running there is an improvement of Aerobic fitness among the experimental group.

Conclusions:

It is concluded that due to Continuous Training method there is an improvement of Aerobic Fitness. Aerobic fitness is very much important to the long distance runners. It is recommended that the coaches must include the Continuous Training method to all Long distance for development of aerobic fitness.

Recommendations:

Similar Studies can be conducted among females and in other Sports and games. This study is useful to the Coaches to prepare the conditioning program to improve the Aerobic fitness among long distance athletes.

References:

Dr. Rajesh Kumar (2015) Effect Of Hill Running For Development Of Aerobic Endurance Among Sepak Takraw Players Of Hyderabad district In Telangana Indo – Asian Journal of Multidisciplinary Research (IAJMR) ISSN: 2454-1370 Volume – 2; Issue - 1; Year – 2015; Page: 461– 466

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SPENDING CHARACTERISTICS OF PARTICIPANTS IN RUNNING AND MARATHON EVENTS IN HO CHI MINH CITY

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ABSTRACT

This study describes the spending characteristics of participants in seven community running and marathon events held in Ho Chi Minh City during 2023–2024. Survey data were collected from 1,057 participants on residence, overnight stays, accompanying persons and event-related expenditure. Average spending was VND 1,420,226 per participant, excluding registration fees. Accommodation accounted for the largest share of spending (29.6%), followed by food and beverage (21.8%), local transport (18.3%), shopping (17.6%) and other services (12.7%). Participants residing outside Ho Chi Minh City represented 38.03% of the sample, but their average spending was VND 2,675,000, approximately 4.11 times that of city residents. The findings identify service-demand patterns associated with running events, but they do not estimate net economic impact or value added because substitution, leakage and counterfactual spending were not measured. Keywords: running events; marathon; participant expenditure; sport event; Ho Chi Minh City etc.

INTRODUCTION

Community running and marathon events are increasingly connected with sport tourism, urban services, and participant experience. Unlike many competitions in which spectators are the principal spenders, registered runners often directly incur costs for accommodation, food and beverage, travel, shopping, and related services during their trip. Accurate description of participant spending is therefore an important basis for organizers and public authorities to identify event-related service demand.

Economic-impact studies of sports events caution that observed recorded event-related expenditure does not automatically constitute net economic impact. Resident expenditure must be distinguished from non-local visitor expenditure; potentially displaced or leaked expenditure must be addressed; and amounts already recorded as event revenue should not be counted again (Crompton, 1995; Agha & Taks, 2018; OECD, 2023a, 2023b). Nevertheless, information on residence, overnight stays, and accompanying persons remains practically useful for identifying the structure of participant demand.

In HCMC, data on the spending characteristics of participants in running events have not yet been compiled systematically. This article describes expenditure levels, expenditure composition, and residence-based differences among participants in seven running and marathon events held in HCMC in 2023–2024. It also examines overnight-stay and accompanying-person characteristics associated with event-participation trips.

RESEARCH METHODS

The study used a cross-sectional descriptive design, combining participant survey data with information on the scale of each event supplied by organisers. The unit of analysis in this article is the survey respondent. Throughout the dissertation, event scale is expressed as “participation instances”; because one individual may enter several races, the 78,000 participation instances across the seven events must not be interpreted as 78,000 distinct individuals.

Table 1. Scope of events included in the study

Year	Event	Host location	Event category
2023	VnExpress Marathon Midnight	HCMC	Community running and marathon
2023	Techcombank Ho Chi Minh City International Marathon	HCMC	Community running and marathon
2023	Salonpas Ho Chi Minh City Marathon	HCMC	Community running and marathon
2024	VnExpress Marathon Midnight	HCMC	Community running and marathon
2024	Techcombank Ho Chi Minh City International Marathon	HCMC	Community running and marathon
2024	Salonpas Ho Chi Minh City Marathon	HCMC	Community running and marathon
2024	District 1 Midnight Run	HCMC	Community running and marathon

Source: Compiled by the authors from records of the events studied.

DATA, VARIABLES, AND OPERATIONAL DEFINITIONS

The survey dataset comprises 1,057 valid questionnaires from direct participants. The questionnaire collected residence, overnight stay status in HCMC, number of accompanying persons, and expenditure incurred while participating in the event. Expenditure was classified as accommodation, food and beverage, travel/transport within HCMC, shopping, and other services. Respondents self-reported spending in each category; these amounts were summed to obtain each participant’s total expenditure in the sample.

Registration fees or ticket charges were not included in the expenditure variable. These payments belong to the organiser's direct revenue stream and were monitored in a separate data group in the study. Separating them reduces the risk that a single payment is recorded both as event revenue and again as participant expenditure.

Table 2. Variables used in the study

Variable group	Variable	Operational definition in this article
Participant characteristic	Place of residence	Classified as residing in HCMC or outside HCMC.
Trip characteristic	Overnight stay	Yes/no; self-reported number of nights stayed.
Trip characteristic	Accompanying persons	Yes/no and self-reported number of accompanying persons.
Expenditure	Average expenditure	Total group expenditure divided by the number of persons in the group.
Expenditure	Expenditure composition	Share of each expenditure category in total sample expenditure.

Source: Developed by the authors from the survey questionnaire.

DATA PROCESSING AND ANALYSIS

Results were processed using frequencies, percentages, means, and expenditure shares. Counts and expenditure totals presented in the tables are unweighted survey-sample results. Post-stratification weights based on the participation scale of each event were used primarily for pooled survey-based proportions and means, including the average length of stay. This adjustment aligns event groups more closely with known participation volumes; it does not transform a convenience sample into a fully representative random sample.

Nights stayed and the number of accompanying persons were rounded to two decimal places. Mean expenditure was rounded to the nearest Vietnamese dong, and expenditure shares to one decimal place. The reported 71.63% for participants residing outside HCMC is their share of total participant expenditure recorded in the survey sample, not their share of spending in the entire running-event market in HCMC.

INTERPRETIVE LIMITATIONS

The survey sample was collected at the study events; therefore, its results are most appropriate for describing respondents, after adjustment for the scale of each event. Complete information was not available on income, race distance, ticket type, arrival time, combined trip purposes, accommodation type, or the sharing of expenditure within accompanying groups. These factors may simultaneously affect spending levels.

Self-reported expenditure refers to spending incurred in connection with the trip and event in HCMC. The study does not contain counterfactual data that would fully exclude displaced expenditure, expenditure that would have occurred without the event, or spending that leaked from the locality. Results must therefore not be interpreted as net additional expenditure, profit, value added, or a direct contribution to HCMC GRDP.

RESEARCH RESULTS

PARTICIPANT TRIP CHARACTERISTICS

Of the survey respondents, 655 resided in HCMC (61.97%) and 402 resided outside HCMC (38.03%). This structure indicates that the studied running events attracted both a local market and participants from other localities. It is not, however, the proportion of non-local visitors at all HCMC running events, since individual events differ in timing, race distance, brand, and organisation format.

A total of 402 participants stayed overnight in HCMC. The unweighted sample contained 704 reported nights, equivalent to 0.6660 nights per participant. After post-stratification weighting, the average length of stay was 0.6657 nights per participant, or 0.67 when rounded; among those who stayed overnight, the unweighted mean was 1.75 nights. The two measures must be interpreted separately: 0.67 nights reflects the full sample, whereas 1.75 nights reflects the intensity of stays among respondents who stayed overnight.

A total of 808 respondents were accompanied by at least one person (76.44% of the sample). The conventional average number of accompanying persons was 1.0842, rounded to 1.08 per participant. This shows that participation trips are often group-based. Accompanying persons may be family members, friends, or supporters, but the study does not yet classify their relationship to the runner or establish precisely which person paid each expense.

Table 3. Residence, overnight stay, and accompanying-person characteristics of the survey sample (n = 1,057)

Item	Number/value	Percentage (%)	Note
Residing in HCMC	655	61,97	
Residing outside HCMC	402	38,03	
Stayed overnight	402	38,03	0.67 nights per participant in the full sample
Did not stay overnight	655	61,97	
Had accompanying person(s)	808	76,44	1.08 accompanying persons per participant
Had no accompanying person	249	23,56	

Source: Participant survey results.

From an organisational perspective, information on overnight stays and accompanying persons matters not only for post-event evaluation. If collected at registration, it can inform forecasts for room demand, travel arrangements, race-kit collection times, waiting areas, experience activities, and associated service packages. It can also prevent organizers from designing an experience exclusively for runners when accompanying groups may occupy an important share of service space at the event.

EXPENDITURE LEVELS AND EXPENDITURE COMPOSITION

Total self-reported event-related expenditure by the 1,057 respondents was VND 1,501,178,882, equivalent to an average of VND 1,420,226 per participant. This is the unweighted sample average across all respondents and includes both low-spending participants and those with accommodation needs or greater use of services. It is neither the minimum cost of entering a running event nor the total amount a runner pays to the organiser.

Accommodation had the largest expenditure share, followed by food and beverage and travel within HCMC. This structure is consistent with running and marathon events: participants may arrive before race day, collect race kits, stay overnight, use food services, travel to the event area, and combine the trip with shopping or experiences. A high accommodation share does not prove that all accommodation spending was caused by the race, since some participants may combine the trip with other purposes.

Table 4. Composition of participants' event-related expenditure (n = 1,057)

Expenditure item	Total amount (VND)	Average (VND/person)	Percentage (%)
Accommodation	444.340.603	420.379	29,6
Food and beverage	327.256.713	309.609	21,8
Travel/transport within HCMC	274.715.357	259.901	18,3
Shopping	264.207.720	249.960	17,6
Other services	190.658.489	180.377	12,7
Total	1.501.178.882	1.420.226	100,0

Source: Participant survey results. Note: Ticket or registration fees are excluded.

Accommodation expenditure averaged VND 420,379 per participant, accounting for 29.6% of total sample expenditure. This item should be examined more closely in subsequent studies because accommodation type, number of rooms used, location, and nights stayed determine the actual extent of linkage with the accommodation sector. Food and beverage expenditure averaged VND 309,609 per participant (21.8%); it is dispersed across many types of service providers and is commonly linked to the period before, during, and after race day.

Travel and transport expenditure within HCMC averaged VND 259,901 per participant (18.3%), while shopping averaged VND 249,960 (17.6%). Both categories reflect the role of venue accessibility and urban experience, but are also influenced by origin location, event timing, individual travel mode, and consumption characteristics. "Other services" represented only 12.7%; without further detail, this category should not be used to infer outcomes for any specific service sector.

EXPENDITURE DIFFERENCES BY PLACE OF RESIDENCE

Average expenditure differed substantially between residence groups. Participants residing outside HCMC reported VND 2,675,000 per person on average—about 4.11 times the VND 650,120 reported by HCMC residents. Although they comprised 38.03% of respondents, non-HCMC residents accounted for approximately 71.63% of total participant expenditure recorded in the sample. This is consistent with the argument that visitors from outside the locality often have additional needs for accommodation, food and beverage, transport, and destination services (Crompton, 1995; Hu et al., 2020; Tzoumaka et al., 2022).

Table 5. Average participant expenditure by place of residence

Participant group	Number of participants	Percentage (%)	Average expenditure (VND/person)
Residing in HCMC	655	61,97	650.120
Residing outside HCMC	402	38,03	2.675.000
Full sample	1.057	100,00	1.420.226

Source: Participant survey results.

In practical terms, this difference indicates that the market outside HCMC merits attention in event-product design. This segment may require clearer information on travel to race-kit collection points, parking, start times, accommodation options, dining, and post-race experiences. Providing this information does not mean that organisers must deliver every service themselves; their central role is to establish linkage mechanisms, quality standards, and feedback channels with local partners.

The result shows only differences observed in the sample and is insufficient to conclude that residence is the sole cause of higher expenditure. Income, registered distance, event type, trip timing, combined tourism purposes, accommodation form, and number of accompanying persons may all influence expenditure, but were not controlled through regression modelling in this study. Interpretation should therefore be limited to a descriptive association between residence, trip characteristics, and spending.

DISCUSSION

IMPLICATIONS OF THE EXPENDITURE STRUCTURE

Accommodation being the largest expenditure category suggests that a running-event trip may extend beyond the competition itself. For event management, this highlights the need to coordinate touchpoints before race day, including race-kit collection, transport information, timing of accommodation, and support for visitors from outside the locality. For urban management, the finding indicates potential linkages between running events and accommodation and food services; however, this potential requires confirmation with booking data, length of stay, and trip-purpose data in future studies.

The 21.8% share for food and beverage and 18.3% for travel indicate that much expenditure is dispersed across everyday services. This is why all observed spending cannot be attributed as new benefit to HCMC. An HCMC resident may change the place or time of spending when participating in a race without increasing total expenditure by the same amount. This cautious interpretation is consistent with Crompton (1995) and Agha and Taks (2018).

ACCOMPANYING PERSONS AND ADDITIONAL INFORMATION REQUIRED

The 76.44% rate of participants with accompanying persons shows that organisers should not treat runners as the only actors in the event experience. Accompanying groups may use waiting areas, food services, sightseeing, and shopping, and they are an important source of feedback on safety, wayfinding, and organisational quality. This article does not estimate their expenditure, however, because spending data and methods for allocating shared expenditure across group members need consistent tracking to avoid double counting.

Future survey questionnaires should add questions on relationship to the runner, residence of accompanying persons, number of nights stayed, individually paid expenditure, and shared group expenditure. For shared items such as hotel rooms or taxis, an allocation rule should be defined before data collection. Without such a rule, adding runner and accompanying-person expenditure together may overstate total expenditure.

IMPLICATIONS FOR EVENT DATA SYSTEMS

A descriptive spending study has lasting value when it helps standardise post-event data. Public authorities and organisers can develop a minimum dataset including participation instances, residence, nights stayed, accompanying persons, registration fees, revenue sources, expenditure by service category, and questions on combined trip purposes. This dataset should be digitised through registration and post-event survey procedures to reduce recall error.

Data should be organised into three layers. The input layer contains information collected directly from registration records, organiser reports, and surveys. The aggregation layer contains combined values such as total and average expenditure. The estimation layer contains indicators that depend on assumptions, such as multiplier-based ripple effects. Separating the three layers prevents an aggregate indicator from being used as evidence for a conclusion that exceeds the scope of the original data, consistent with OECD guidance (2023a, 2023b).

IMPLICATIONS FOR EVENT ORGANISATION

The findings suggest that organisers should regard participants from outside HCMC as an important segment in experience design. Information on residence, arrival time, and accommodation needs can be integrated into registration to facilitate proactive coordination with accommodation, transport, food-service providers, and tourism destinations. The high rate of accompanying persons also demonstrates that the event experience extends beyond recreational runners to family members, friends, and supporters.

Service linkages should be built on actual demand and transparent standards rather than treated merely as promotion. For example, organisers can provide an area-based list of accommodation partners, maps from hotels to race-kit collection points, or waiting areas with water and information for accompanying persons. These programmes should disclose cooperation conditions and provide feedback channels to protect participants.

For public authorities, post-event reporting should clearly describe the survey sample, calculation of means, included and excluded expenditure categories. Statements that an “event generated X billion VND” without specifying data boundaries, counterfactual information, and leakage risks can easily mislead. A more appropriate formulation is “the recorded/estimated scale of event-related expenditure,” followed by an explanation of methods and limitations.

When expenditure data are used in post-event reporting, registration fees should be clearly separated from event-related expenditure; spending by participants and accompanying persons should be separated; and the geographic boundary of spending in HCMC should be specified. These principles limit double counting and prevent observed total expenditure from being interpreted as profit, value added, or a direct contribution to GRDP (OECD, 2023a, 2023b).

CONCLUSION

This study describes the spending characteristics of 1,057 participants in seven running and marathon events in HCMC during 2023–2024. Recorded event-related expenditure averaged VND 1,420,226 per participant, with accommodation accounting for the largest share. Participants residing outside HCMC comprised 38.03% of the survey sample but reported approximately 4.11 times more expenditure on average than HCMC residents and accounted for about 71.63% of total participant expenditure in that sample. The post-stratification-weighted average length of stay was 0.67 nights per participant; 76.44% of respondents had accompanying persons, at an unweighted sample average of 1.08 accompanying persons per participant.

The findings are useful for organising running events and developing service linkages, but they reflect only the seven events studied and participant self-reported data. Further research should test expenditure determinants with suitable models and collect data on costs, displaced expenditure, and leakage rates to enable a more comprehensive assessment of the economic impact of sports events on development.

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**A Study on Comparison of Speed among Soft Ball Players
and Cricketers of Telangana**

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Abstract:

Soft Ball Players and Cricketers need to perform in multiple bursts of speed. Agility being the key component of cricket is a collective coordinative ability that includes speed, balance and coordination and plays an important role in determining a player's performance. The purpose of the present study to find out the Speed among Soft ball Players and Cricketers of Telangana. The sample for the present study consists of 120 Male Soft Ball Players and 120 Male Cricketers of Telangana. The 50 M Run Test is used to assess the speed among Male Soft Ball Players and Cricketers.. The Results of the study shows that Cricketers are having good speed compare to Soft Ball Players : Key Words : Cricketers, Soft Ball Players, 50 M Run, Speed etc.

Introduction:

Soft Ball Players and Cricketers need to perform in multiple bursts of speed. Agility being the key component of cricket is a collective coordinative ability that includes speed, balance and coordination and plays an important role in determining a player's performance. Athletes who work to improve their agility also see improvements in their overall athletic abilities, including in critical areas such as balance and stability, coordination, body control, cognition, and recovery time

Cricket is a bat-and-ball game played between two teams of 11 players each on a field at the centre of which is a rectangular 22-yard long pitch. The game is played by 120 million players in many countries, making it the world's second most popular sport. Each team takes its turn to bat, attempting to score runs, while the other team fields. Each turn is known as an innings. The bowler delivers the ball to the batsman who attempts to hit the ball with his bat away from the fielders so he can run to the other end of the pitch and score a run. Each batsman continues batting until he is out. The batting team continues batting until ten batsmen are out, or a specified number of over's of six balls have been bowled, at which point the teams switch roles and the fielding team comes in to bat

Softball is a variant of baseball played with a larger ball on a smaller field. It was invented in 1887 in Chicago as an indoor game. It was at various times called indoor baseball, mush ball, playground, soft bund ball, kitten ball, and, because it was also played by women, ladies' baseball. The name softball was given to the game in 1926. A tournament held in 1933 at the Fairs purred interest in the game.

Softball is a sport that requires both muscular strength and endurance, and for this reason when training with weights you need to concentrate on developing strong muscles with high endurance capabilities. **Speed** is a key component of Physical fitness which is very important for **Softball** Players for giving the high level of performance in competition. Speed is the performance pre requisite to do motor actions under given conditions in minimum of time. Speed is the ability to move all or part of the body quickly i.e. Speed is the quickness of movement of a limb, whether this is the legs of a runner or the arm of the shot putter. Speed means Relative rapidity in moving, going, etc.; rate of motion or progress: Speed is an integral part of every sport and can be expressed as any one of, or combination of, the following: maximum speed, elastic strength and speed endurance, combination of reflexes and stamina. Speed training is something that

should be done throughout the year- unless there are some points of the season where you don't have to move fast- so little and often is better. Constantly reinforce the quality of execution of your speed

Narahari Jyothi (2025) Comparison of Speed among Cricketers and Soft Ball Players of Andhra University, Visakhapatnam, Andhra Pradesh The Purpose of the study is to find out Speed among Male Cricketers and Male Soft Ball Players of Andhra University, Visakhapatnam, A.P.. The Sample for the Study consists of 30 Men Cricketers and 30 Men Soft Ball Players those who are studying in different Colleges of Andhra University, Visakhapatnam, Andhra Pradesh between the age group of 18 to 25 Years were selected for the Study. 30 M Run Test used for the study. The Mean Values of Cricketers is 4.87 and Soft Ball Players mean values is 4.23. Based on mean values, Soft Ball players were performing better than Cricketers in Speed. In conclusion, for sprint speed and quick, short-distance agility, softball players often outperform cricket players, but cricketers exhibit superior power in specific, repetitive high-velocity actions like fast bowling.

Dr. Sanjay V Deshmukh (2020) Comparative study of fitness components of cricket and softball players. The study was conducted to compare the Agility and Flexibility variables of Cricket and Soft ball male players of Takshshila Mahavidyalaya, Amravati, (MS). A total of forty (40) players, comparing 20 cricket players and 20 Soft ball players of Takshsheela Mahavidyalaya, Amravati, (MS) which were randomly selected for the study. The Subjects were selected by using simple random sampling. The age of the subjects ranged between 18 to 25 years were selected to analyzed Flexibility and Agility of the players of both the games. Agility and flexibility by using standard tests namely 40 yard Shuttle Run and Goniometer were used respectively for the study. The analysis of data using 't'- test for finding the significance difference of Agility and Trunk

Flexibility in- between Cricket and Soft ball male players. On the basis of our study it is concluded that the Agility and Trunk Flexibility of cricket players has significant difference. The result shows that the soft ball players had more agility than cricket players and cricket players had more flexibility than softball players.

Shantanu Singh Kakran and Dr. Manju Arora (2019) studied the selected physical variables between cricket and softball players. A total of 60 male subjects (30 each in softball and cricket) age ranges from 18 to 26 were selected purposively for the study from different region of Madhya Pradesh who have participated in Inter-University tournaments. The data were collected for different physical variables i.e. back strength, hand grip (right and left) and balance (dynamic and static). For the analysis of data, independent t-test has been employed. The level of significance was set at 0.05. The significant difference was found between Cricket and Softball players on dynamic balance. Whereas, insignificant differences were found for other physical variables i.e. back strength, static balance and handgrip strength (right and left) among softball and cricket player.

Purpose of the study:

The purpose of the present study to find out the Speed among Soft ball Players and Cricketers of Telangana.

Methodology:

The sample for the present study consists of 120 Male Soft Ball Players and 120 Male Cricketers of Telangana. The 50 M Run Test is used to assess the speed among Male Soft Ball Players and Cricketers..

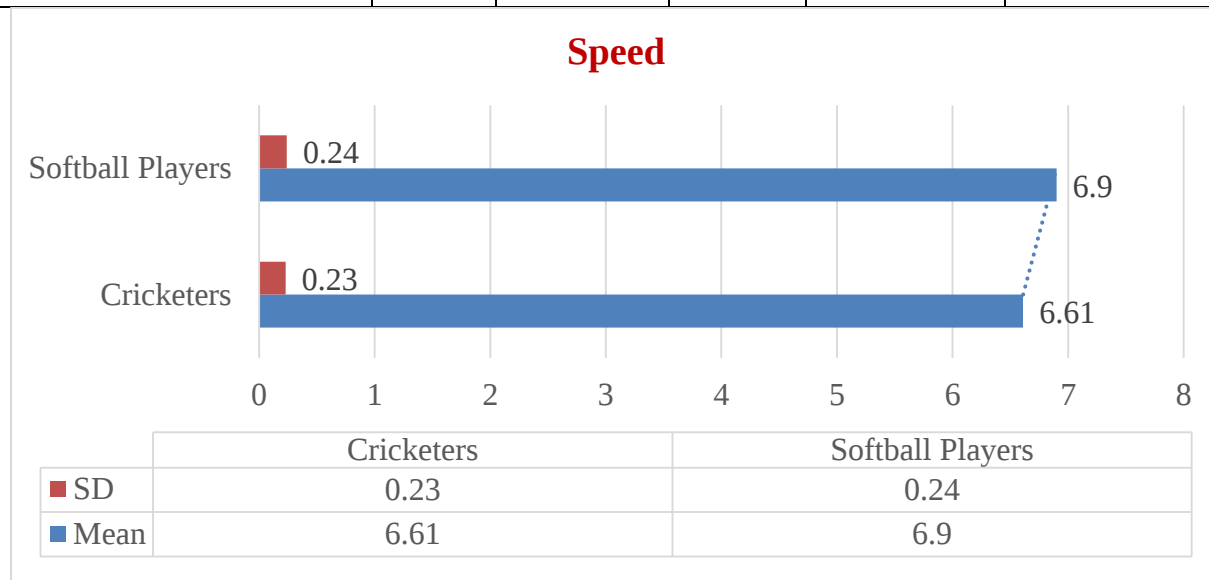
Results and Discussion:

The results of the Study shows that Cricketers are having good Speed Compare to Soft Ball Players. Table-I: Mean values and Independent Samples Test of 50 M Run between Cricketers and Soft Ball Players

Table 1 Comparison of Speed between Cricketers and Softball Players

Group	N	Mean	SD	t-value	p-value
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Cricketers	120	6.61	0.23	-9.351	<0.001**
Softball Players	120	6.90	0.24		



Results of Speed

Table 1 shows the comparison of speed between cricketers and softball players. The mean speed (50 m dash) of cricketers was 6.61 ± 0.23 seconds, whereas softball players recorded 6.90 ± 0.24 seconds. The obtained t -value of -9.351 was statistically significant ($p < 0.001$). Hence, a significant difference existed between cricketers and softball players in speed. Since a lower sprint time indicates better speed performance, the findings indicate that cricketers possessed significantly better sprinting speed than softball players.

Conclusions:

1. Cricketers are having better speed compare to soft ball players cricketers are having abilities such as 5) M Sprint, 10 M Sprint and 20 M Sprint.
2. Sprint training is not all about running fast. It is important to have a good fitness base to build speed upon, and to have the capacity to train regularly.

Recommendations:

1. Similar studies can be conducted on other Events and among females.
2. This study also helps the physical educators and coaches to improve their training regime to excel in Soft Ball and Cricketers.
3. Sprint training session should begin with a series of sprint drills that will help the athlete train the firing patterns for the appropriate muscle groups, and also strengthen those muscles while performing action specific exercises. It is important for Cricketers and Soft Ball Players.

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