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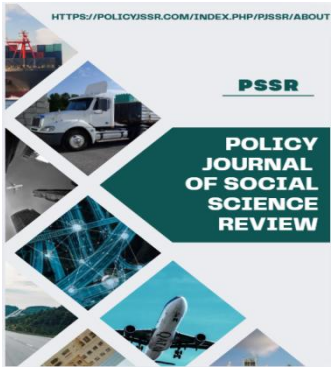

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PHYSICAL ACTIVITY AS AN ANXIOLYTIC STRATEGY IN NON-ATHLETE ADULTS: ASSOCIATIONS WITH TRAIT ANXIETY AND THE ROLE OF BARRIERS AND FACILITATORS

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ABSTRACT

Background: Trait anxiety a stable predisposition to perceive situations as threatening represents a substantial mental health burden globally; yet accessible non-pharmacological strategies for its management remain underutilized. Physical activity is a compelling candidate; however, its effects specifically among non-athlete adults, who face distinct barriers and motivational profiles, are poorly characterized. **Objective:** This study aimed to examine the relationship between physical activity (overall level and its constituent dimensions of frequency, intensity, and duration) and trait anxiety in non-athlete adults, and to identify the barriers and facilitators influencing physical activity engagement as an anxiety-management strategy. **Methods:** A descriptive cross-sectional survey was conducted with 270 non-athlete adults aged 18–50 years (M = 55% male, 45% female) recruited via convenience sampling from community and workplace settings. Trait anxiety was measured using the State-Trait Anxiety Inventory Trait subscale (STAI-T; Spielberger et al., 1983), and physical activity was assessed through a validated self-report questionnaire covering frequency, intensity, and duration. Quantitative data were analyzed using Pearson correlation; qualitative open-ended responses were subjected to thematic analysis. **Results:** Overall physical activity level was negatively and significantly associated with trait anxiety ($r = -.42$, $p < .01$). Among the three dimensions, duration demonstrated the strongest inverse relationship ($r = -.41$, $p < .01$), followed by frequency ($r = -.38$, $p < .01$) and intensity ($r = -.29$, $p < .05$). Thematic analysis identified lack of time and low motivation as the primary barriers, while perceived stress relief and social support emerged as the predominant facilitators. **Conclusion:** Regular, sustained physical activity is meaningfully associated with lower trait anxiety in non-athlete adults, with duration and frequency carrying greater salience than exercise intensity. Interventions targeting time management, social support, and routine formation may enhance physical activity uptake and thereby improve long-term mental health in this population.

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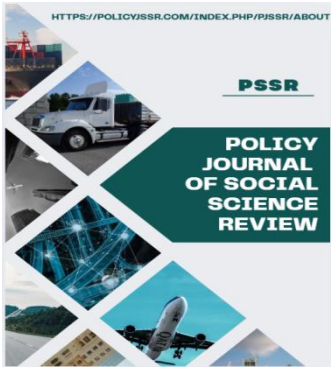

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Keywords: *trait anxiety; physical activity; non-athlete adults; anxiety management; barriers and facilitators; STAI-T*

1. Introduction

Anxiety disorders represent one of the most prevalent and economically burdensome categories of mental illness worldwide, affecting approximately 284 million people globally (WHO, 2019). Within this spectrum, trait anxiety defined by Spielberger (1983) as an enduring disposition to interpret a wide range of situations as threatening and to respond with heightened affective arousal is particularly consequential because of its chronicity and its role as a vulnerability factor for anxiety disorders and depression. Unlike state anxiety, which fluctuates with context, trait anxiety reflects a stable personality characteristic that persists across time and settings, making it resistant to transient interventions and necessitating sustained management strategies.

Physical activity has received growing empirical attention as a low-cost, accessible, and scalable approach to mental health promotion. Large-scale epidemiological evidence demonstrates that physically active adults report significantly lower anxiety levels than sedentary counterparts (Stubbs et al., 2017), and prospective cohort data indicate that higher baseline activity is associated with a reduced odds of developing anxiety disorders over time (Adjusted OR = 0.74, 95% CI [0.62, 0.88]; Rebar et al., 2015). Mechanistically, physical activity appears to exert anxiolytic effects through improved neurotransmitter regulation, attenuated cortisol reactivity, endorphin release, enhanced neuroplasticity, and psychological pathways including increased self-efficacy and better emotion regulation (Lubans et al., 2016; Sheng et al., 2024).

Despite this evidence base, two notable gaps persist. First, the preponderance of existing research has examined athletes, clinical populations, or participants already enrolled in structured exercise programs. Non-athlete adults who constitute the majority of any general population differ in their exercise histories, motivational frameworks, and exposure to practical barriers and their responses to ordinary daily physical activity remain under characterized (Rebar et al., 2015). Second, the relative contributions of specific physical activity dimensions (frequency, intensity, and duration) to trait anxiety reduction have seldom been disaggregated in non-clinical, non-athlete samples, limiting the precision with which practitioners can formulate guidance.

Two complementary theoretical frameworks inform this research. Self-Efficacy Theory (Bandura, 1977) proposes that individuals' beliefs in their capacity to execute a behavior govern both their engagement with that behavior and its downstream psychological consequences, including reductions in anxiety. The Health Action Process Approach (HAPA; Schwarzer, 2016) extends this by distinguishing a motivational phase,

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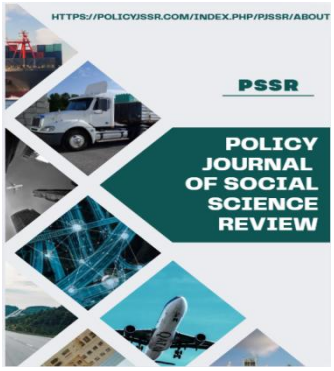

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during which intention to change behavior is formed, from a volitional phase encompassing planning, initiation, and maintenance. Together, these frameworks suggest that the pathway from physical activity to lower trait anxiety is mediated not only by biological processes but also by cognitive mechanisms such as self-efficacy and action planning, and that long-term behavior maintenance is essential for sustained benefit.

The present study therefore had three objectives: (1) to quantify the association between overall physical activity level and trait anxiety in non-athlete adults; (2) to determine which dimensions of physical activity frequency, intensity, or duration are most strongly associated with lower trait anxiety; and (3) to identify the barriers and facilitators that shape physical activity engagement in this population. The findings are intended to guide the design of targeted interventions for public health practitioners, mental health clinicians, and fitness professionals.

Methods

Design and Participants

A descriptive cross-sectional survey design was employed to examine naturally occurring associations between physical activity and trait anxiety without experimental manipulation. The target population comprised non-athlete adults aged 18–50 years residing in Lahore, Pakistan. Participants were excluded if they had engaged in competitive sport or structured athletic training at any point in the past 12 months, or if they reported a current diagnosis of an anxiety disorder for which they were receiving pharmacological or psychological treatment. Recruitment proceeded via convenience sampling across community settings, workplaces, and online social groups. Of 300 questionnaire packs distributed, 280 were returned (response rate = 93.3%), and a final sample of 270 was retained after screening for incomplete responses.

Measures

Trait Anxiety. The State-Trait Anxiety Inventory Trait Subscale (STAI-T; Spielberger et al., 1983) was used to assess enduring anxiety tendencies. The 20-item subscale asks respondents to indicate how they generally feel across a four-point Likert scale ranging from 1 (Almost Never) to 4 (Almost Always), with reverse-scored items reflecting calmness and emotional stability. Total scores range from 20 to 80, with higher scores indicating greater trait anxiety. The STAI-T demonstrates strong internal consistency (alpha typically >.90) and has been extensively validated across clinical and community adult populations (Petruzzello et al., 1991).

Physical Activity. Physical activity was assessed using a structured self-report questionnaire that captured three dimensions: frequency (days per week of activity), intensity (self-rated light, moderate, or vigorous), and duration (average minutes per session). An overall physical activity composite score was also derived to enable

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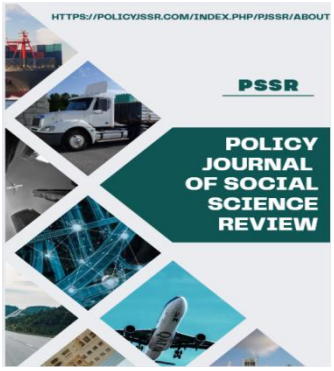

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examination of aggregate associations. A five-item section of open-ended questions elicited participants' perceived barriers and facilitators to physical activity engagement.

Procedure

Following institutional ethical approval, questionnaire packs were distributed in person and via email to eligible adults. Participation was voluntary and anonymous; written informed consent was obtained prior to data collection. Participants completed the battery independently and returned it within one week. Hard-copy responses were double-verified before entry into a password-protected digital spreadsheet, and reverse-scored STAI-T items were coded according to the official scoring guide. Data were subsequently cleaned for missing values and outliers.

Statistical Analysis

All quantitative analyses were conducted using SPSS Version 26. Descriptive statistics (frequencies, means, and standard deviations) characterized the sample and study variables. Pearson correlation coefficients (two-tailed) examined the linear associations between overall physical activity, each of its three dimensions, and trait anxiety. The significance threshold was set at alpha = .05. Open-ended responses to barrier and facilitator items were analyzed thematically following the six-phase approach described by Braun and Clarke (2006): familiarization, coding, theme generation, review, definition, and reporting. Coded themes were independently verified by a second researcher, and frequency counts were recorded to indicate the prominence of each theme.

Results

Sample Characteristics

The final sample comprised 270 non-athlete adults (55% male [n = 148]; 45% female [n = 122]). Age was distributed across four groups: 18–25 years (n = 82, 30.4%), 26–33 years (n = 74, 27.4%), 34–41 years (n = 61, 22.6%), and 42–50 years (n = 53, 19.6%). Regarding educational attainment, 33.0% held a bachelor's degree, 26.3% had completed intermediate education, 20.7% held secondary qualifications, and 20.0% possessed a master's degree or higher. In terms of employment, 44.8% were employed, 30.7% were students, 15.2% were self-employed, and 9.3% were unemployed. Table 1 summarizes physical activity frequency, indicating that the largest proportion engaged in activity two to three days per week (35.6%), while only 13.0% reported daily participation.

Table 1

Frequency Distribution of Physical Activity Participation per Week (N = 270)

Physical Activity Frequency	n	%
0–1 days per week	68	25.2

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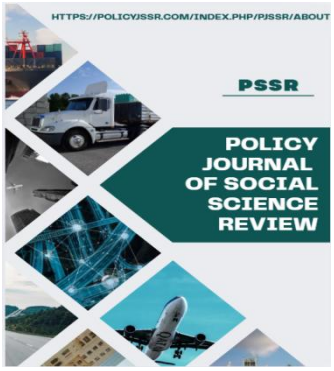

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Physical Activity Frequency	n	%
2–3 days per week	96	35.6
4–5 days per week	71	26.3
6–7 days per week	35	13.0
Total	**270**	**100.0**

Note. Physical activity frequency was self-reported by participants in terms of days per week of any purposeful physical activity.

Association between Overall Physical Activity and Trait Anxiety

Pearson correlation analysis revealed a statistically significant, moderate negative association between overall physical activity level and trait anxiety ($r = -.42$, $p < .01$), indicating that non-athlete adults who engaged more frequently and consistently in physical activity tended to report lower anxiety tendencies. The effect size ($r = -.42$) falls within the moderate range according to Cohen's (1988) conventions, suggesting a practically meaningful relationship. These findings are presented in Table 2.

Table 2

Pearson Correlation between Overall Physical Activity Level and Trait Anxiety (N = 270)

Variable	1	2	p (2-tailed)
1. Physical Activity (Overall)			
2. Trait Anxiety (STAI-T)	**.42**	—	< .001

Note. Correlation is significant at the .01 level (two-tailed). STAI-T = State-Trait Anxiety Inventory – Trait subscale.

Associations between Physical Activity Dimensions and Trait Anxiety

Table 3 presents the correlations between individual physical activity dimensions and trait anxiety. All three dimensions were significantly and negatively associated with trait anxiety. Duration emerged as the strongest predictor ($r = -.41$, $p < .01$), followed closely by frequency ($r = -.38$, $p < .01$). Intensity exhibited a statistically significant but comparatively weaker association ($r = -.29$, $p < .05$). This pattern indicates that consistency and volume of engagement rather than exertion level are more salient factors in the relationship between physical activity and lower trait anxiety.

Table 3

Pearson Correlations between Physical Activity Dimensions and Trait Anxiety (N = 270)

Physical Activity Dimension	r	p (2-tailed)	Effect Size	Sig.

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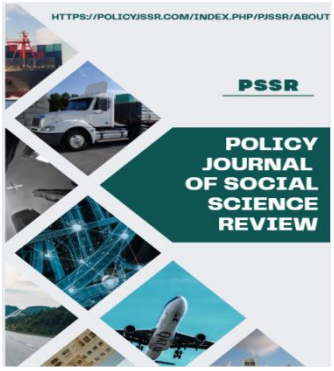

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Physical Activity Dimension	r	p (2-tailed)	Effect Size	Sig.
Frequency (days/week)	**−.38**	< .001	Moderate	Yes
Intensity (self-rated)	−.29	.013	Small-Moderate	Yes
Duration (min/session)	**−.41**	< .001	Moderate	Yes

Note. P < .05. P < .01. Effect sizes interpreted using Cohen's (1988) conventions: small = .10–.29, moderate = .30–.49, large ≥ .50. Correlations are with trait anxiety (STAI-T total score).

Barriers and Facilitators to Physical Activity Participation

Thematic analysis of open-ended responses yielded four barrier themes and four facilitator themes, summarized in Tables 4 and 5 respectively. Among barriers, lack of time was by far the most commonly cited obstacle (n = 118, representing 43.7% of participants), attributed predominantly to occupational demands, academic workloads, and domestic responsibilities. Low motivation encompassing fatigue, disinterest, and perceived low capability was the second most prominent barrier (n = 87, 32.2%). Limited access to safe, affordable, or conveniently located facilities was noted by 54 participants (20.0%), while fear of injury or physical discomfort was reported by 41 (15.2%).

On the facilitator side, perceived stress relief was the most frequently endorsed motivator (n = 121, 44.8%), with many participants explicitly describing physical activity as a coping mechanism for anxiety and daily stressors. Social support encouragement from family members, friends, or exercise partners was the second most cited facilitator (n = 89, 33.0%). Health awareness, defined as a desire to improve both mental and physical wellbeing, motivated 76 participants (28.1%), while routine formation (i.e., deliberately scheduling activity as part of a daily structure) supported engagement among 63 participants (23.3%).

Table 4

Barriers to Physical Activity Participation among Non-Athlete Adults (N = 270)

Barrier Theme	Description	n	% of Sample
Lack of Time	Competing demands from work, study, and family responsibilities	118	43.7
Low Motivation	Fatigue, low interest, and diminished sense of capability	87	32.2
Limited Facilities	Absence of accessible, safe, or affordable exercise spaces	54	20.0

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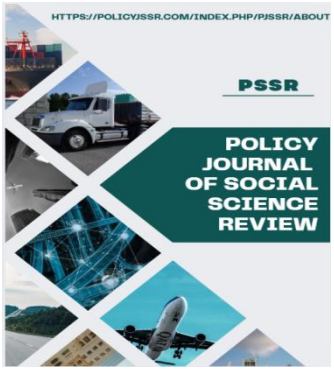

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Barrier Theme	Description	n	% of Sample
Health Concerns	Fear of physical injury or somatic discomfort during exercise	41	15.2

Note. Frequencies are not mutually exclusive; participants could endorse multiple barrier themes.

Table 5

Facilitators of Physical Activity Participation Among Non-Athlete Adults (N = 270)

Facilitator Theme	Description	n	% of Sample
Stress Relief	Perception of physical activity as a coping mechanism for anxiety	121	44.8
Social Support	Encouragement from family members, friends, or exercise companions	89	33.0
Health Awareness	Motivation derived from desire to improve mental and physical health	76	28.1
Routine Formation	Deliberate scheduling of physical activity into daily structure	63	23.3

Note. Frequencies are not mutually exclusive; participants could endorse multiple facilitator themes.

Discussion

The present investigation examined the relationship between physical activity and trait anxiety in 270 non-athlete adults using a mixed-methods survey design. Three principal findings warrant discussion in the context of existing theory and empirical literature.

First, the moderate negative correlation between overall physical activity and trait anxiety ($r = -.42$) is consistent with and extends a substantial body of prior work. Meta-analytic evidence from Petruzzello et al. (1991) established that aerobic exercise reliably reduces both state and trait anxiety, an effect replicated across diverse populations in more recent reviews (Rebar et al., 2015; Stubbs et al., 2017). The current effect size aligns closely with Rebar et al.'s (2015) meta-meta-analytic estimate ($d = -.48$) for non-clinical adult samples, lending external validity to the findings. Importantly, the present study extends these findings to specific demographic non-athlete adults in a South Asian context where direct evidence has been sparse. The correlation magnitude is practically meaningful, suggesting that even relatively modest increases in physical activity could translate into perceptible reductions in chronic anxiety tendencies.

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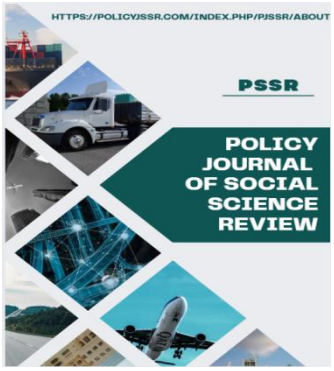

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Second, the finding that duration (r = −.41) and frequency (r = −.38) of physical activity were more strongly associated with lower trait anxiety than intensity (r = −.29) carries important practical implications. This hierarchy is consistent with research by Dong et al. (2022), who found that vigorous physical activity predicted trait anxiety reductions partly through enhanced executive functioning, but that cumulative engagement over time remained a stronger overall predictor. From a public health standpoint, the comparative attenuation of the intensity anxiety link is encouraging: it implies that non-athlete adults do not need to exercise strenuously to derive psychological benefit. Moderate, sustained, and frequent activity aligned with current WHO recommendations of 150–300 minutes per week of moderate activity appears sufficient to reduce trait anxiety meaningfully. This is especially pertinent for a population likely to perceive high-intensity exercise as inaccessible or aversive.

The mechanism underlying the frequency and duration effects may relate to the accumulation of mood-regulating neurobiological adaptations over repeated exercise bouts, as well as the progressive strengthening of exercise-related self-efficacy (Bandura, 1977; Zhang et al., 2024). Each successful bout of activity reinforces individuals' beliefs in their capacity to manage stress through physical means, creating a positive feedback loop between participation and psychological benefit. The HAPA model (Schwarzer, 2016) offers a complementary account: regular activity strengthens action planning and self-monitoring habits, which in turn sustain participation and maximize cumulative anxiolytic effects. Intensity, by contrast, may not accumulate these cognitive and habitual benefits in the same manner, particularly among participants unfamiliar with vigorous exercise.

Third, the qualitative data provide an ecologically valid account of why many non-athlete adults fail to leverage physical activity as an anxiety-management tool despite its demonstrated efficacy. The dominance of time-related barriers (43.7%) mirrors findings from large-scale studies of physical activity determinants in community samples (Bauman et al., 2012) and reflects the particular constraints of employed adults juggling occupational, academic, and familial demands. Low motivation, the second most common barrier (32.2%), aligns with self-efficacy theory's prediction that individuals with low confidence in their exercise ability will avoid or discontinue participation (Bandura, 1977). Together, these barriers suggest that simply informing non-athlete adults of physical activity's anxiolytic properties is insufficient; structural and psychological enablers must be actively cultivated.

Conversely, the emergence of stress relief as the most cited facilitator (44.8%) is theoretically significant. It suggests that many non-athlete adults already intuit or have experienced the calming effects of physical activity, meaning that awareness-based messaging may effectively activate latent motivation. Social support (33.0%) and routine formation (23.3%) correspond directly to HAPA's volitional phase constructs

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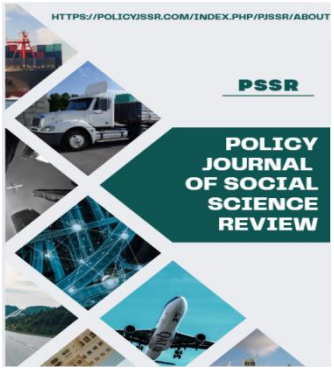

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specifically, action planning and social resource mobilization indicating that interventions grounded in this model may be particularly well suited to this population. The predominance of psychosocial over material facilitators (e.g., stress relief and social support outweighing facility access) further suggests that community-based, socially embedded physical activity programs may offer better uptake than facility-centric approaches alone.

Conclusion

This study provides evidence that physical activity is inversely and meaningfully associated with trait anxiety in non-athlete adults, with duration and frequency of engagement carrying greater psychological salience than exercise intensity. The identification of time constraints and low motivation as the principal barriers alongside stress relief and social support as the principal facilitators offers a clear empirical basis for intervention design. Physical activity should be promoted not solely as physical health behavior but as an accessible, low-cost, and effective strategy for managing chronic anxiety tendencies in the general adult population. Future research employing longitudinal and experimental designs will be necessary to establish causality and to evaluate the long-term effectiveness of tailored community-based physical activity programs for anxiety reduction.

Practical Implications and Recommendations

- Emphasize duration and frequency over intensity in public health messaging: Guidance for non-athlete adults should foreground the value of consistent, moderate-duration activity (e.g., 30–45 minutes on most days) rather than high-intensity exercise, thereby lowering the perceived threshold for participation and reducing the risk of dropout.
- Integrate HAPA-based planning support into community programs: Practitioners should incorporate structured action-planning components such as scheduling worksheets, coping planning prompts, and weekly goal-setting modules into physical activity initiatives designed for anxious adults. Brief online or group-based planning workshops may facilitate sustained engagement.
- Harness social support as a motivational lever: Community walking groups, peer accountability partnerships, and family-inclusive physical activity events can activate the social support facilitator identified in this study, while simultaneously addressing the time and motivation barriers by embedding activity within existing social routines.
- Appoint mental health liaisons in community fitness settings: Gym instructors and community wellness facilitators should receive basic training in anxiety recognition and motivational interviewing so they can provide tailored support to non-athlete participants who are using physical activity primarily for mental health management.

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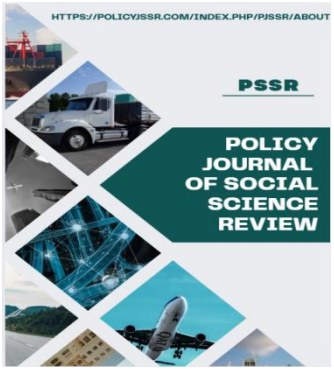

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- Address structural barriers through policy: Local authorities and employers should consider facilitating flexible working arrangements, subsidized access to exercise facilities, and on-site wellness programs to mitigate the time and access constraints identified as the most prevalent barriers to physical activity participation.
- Prioritize longitudinal and experimental follow-up: Future studies should employ randomized controlled trial designs with objective physical activity measurement (e.g., accelerometer) and repeated trait anxiety assessment over six to twelve months to establish causal directionality and optimal dosage parameters for anxiolytic effect.

Limitations

Several limitations qualify the interpretation of these findings. The cross-sectional design precludes causal inference; it is not possible to determine from these data whether physical activity reduces trait anxiety, whether individuals with lower trait anxiety are intrinsically more inclined to exercise, or whether a third variable drives both. Reliance on self-reported physical activity data introduces recall bias and social desirability effects; future research should incorporate objective measures such as wrist-worn accelerometers. Convenience sampling limits generalizability, particularly to rural populations and to women as a distinct subgroup. The study was conducted in a single urban setting in Pakistan, and findings may not transfer to Western or low-income contexts with different barrier profiles. Finally, the absence of an STAI-T norm-referenced comparison prevented determination of whether participants' anxiety scores fell within clinical or subclinical ranges.

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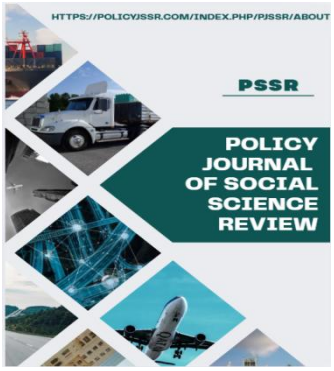

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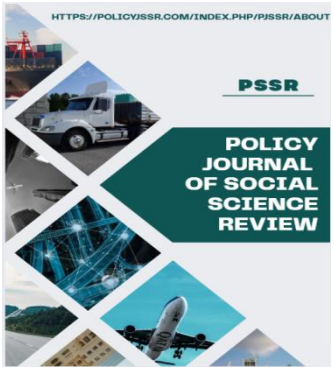

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