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AN EMPIRICAL STUDY ON MEASURING THE IMPACT OF OUTDOOR PHYSICAL ACTIVITIES ON MENTAL HEALTH

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Abstract
This study aimed to measure the impact of outdoor physical activity on mental health. The sample selection process involved a meticulous approach employing both purposive and convenience sampling techniques to derive a representative subset from a broader population. The targeted participants were people residing in Rohtak City, Haryana, for whom a carefully crafted questionnaire was used to gather pertinent data. The questionnaires were distributed among a randomly selected pool of 300 respondents, resulting in 280 responses. It is concluded that outdoor physical activities lead to stress reduction, temporal change, morale improvement, and sharpening mental activity which ultimately improve the mental health of individuals. Public health initiatives and individual efforts should emphasise the importance of engaging in outdoor physical activities for stress reduction and overall well-being. It is important to consider individual preferences and needs when designing outdoor activity programs. This can help ensure that participants find the activities enjoyable and engaging, thus maximising their potential benefits.

Keywords: *Exercise, Health, Physical Education, Temporal change, Health sciences*

Introduction
More than 10% of children and adolescents globally grapple with mental disorders, exerting adverse effects on their developmental trajectory, social interactions, and educational outcomes. These disorders may burgeon into chronic conditions, intensifying in severity as individuals progress throughout life. The onset of the vast majority of adult mental disorders occurs before 25 years of age, with a substantial proportion originating in early childhood. Untreated mental health concerns among adolescents tend to manifest persistently, underscoring the imperative need for early interventions. Moreover, there is a noteworthy correlation between the prevalence of mental disorders and the dearth of positive mental health. Consequently, there is a resounding call to safeguard and nurture positive mental well-being among youth as a preventive measure against the emergence of mental disorders. Compelling evidence suggests a positive association between ‘increased outdoor time’ and ‘enhanced mental well-being’ among adults. Research conducted by Beyer et al. (2014) demonstrated a discernible link between heightened “exposure to green spaces and reduced levels of anxiety and stress” in adults. Subsequent work by the same author in 2016 revealed that augmented outdoor time was inversely correlated with the “manifestation of depressive symptoms” in a population-based adult sample. Extending this line of enquiry to children, additional outdoor activities have been found to yield improvements in attention and cognitive functioning, concurrently mitigating the symptoms associated with attention-

deficit/hyperactivity disorder. A Canadian children study further underscored the positive impact of outdoor engagement, revealing that "each additional hour spent outdoors per day was associated with a notable 31% reduction in the likelihood of reporting peer relationship problems and 22% decrease in the odds of reporting psychosocial difficulties". These findings emphasise the salient role of outdoor activities in fostering positive mental health outcomes and mitigating the risk of mental disorders among the youth.

Regular participation in outdoor activities, like jogging, hiking, or gardening, not only complements a healthy diet but also improves physical fitness. The synergy of organic nutrition and regular outdoor exercises positively affects mental health (Rathee and Chhikara 2022). An added advantage of engaging in outdoor activities to foster positive mental health is the outdoor environment, which serves as a conducive setting for augmenting physical activity levels. There was a positive correlation between the duration of time spent outdoors and engagement in moderate-to-vigorous physical activity (MVPA) among youth. Research conducted by Larouche et al. in 2016 established that for each additional hour spent outdoors daily, children accrue an additional 7 min of MVPA. This holds significance, as the escalation of MVPA has been consistently linked to enhancements in mental health and self-esteem, coupled with a reduction in symptoms associated with depression and anxiety. The promotion of outdoor time, therefore, emerges as a multifaceted strategy not only conducive to positive mental well-being but also instrumental in encouraging physical activity, thereby contributing to a holistic approach to address mental health concerns among youth.

Literature Review

Frühauf et al. (2016) conducted a "subjective experience of an acute outdoor exercise session on indoor sedentary individuals with clinical depression". It was discovered that a single outdoor exercise bout resulted in better emotional benefits for self-reported enthusiasm and activation than indoor and sedentary equivalents. An outside atmosphere may be beneficial in overcoming listlessness during depression treatment as patients feel more engaged. Thompson Coon et al. (2011) evaluated the "effects of physical activity in natural environments against physical activity inside on mental and physical well-being, health-related quality of life, and long-term adherence to physical activity". The findings revealed that emotions of serenity may be reduced after outdoor activities. Participants expressed "greater enjoyment and satisfaction" with outdoor activities, as well as greater intent to repeat the activity in the future. Toselli et al. (2022) examined the impact of the "Moving Parks" project, an "organised park-based physical activity intervention, on people's well-being during COVID-19". The "Moving Parks" project appears to be capable of improving people' psychological well-being, especially among women. Vella-Brodrick and Gilowska (2022) conducted a "PRISMA-guided systematic evaluation of the literature on the impact of natural interventions on cognitive functioning in children aged 5–18 years". The results indicated that connecting with nature can benefit cognitive functioning in educational settings. Schools can provide 'green' environments that can relieve stress and promote welfare and learning. Triguero-Mas et al. (2017) investigated the "associations between NOE exposure (i.e. residential availability and contact) and several measures of mental health as well as potential moderators and mediators". A study of 406 participants found no significant link between mental health and NOE exposure. However, greenery exposure was significantly associated with better mental health, particularly for males, younger people, those with low-medium education, and locals in Doetinchem. Physical exercise and social contacts were not mediators of most correlations, although perceived stress was. Wicks et al. (2022) evaluated the "impact of physical activity in natural green spaces versus urban spaces on psychological health outcomes in the general adult population". The effects on the six outcomes were examined using narrative synthesis (n = 24) and meta-analysis (n = 9). For anxiety, anger/hostility, energy, affect, and positive involvement, narrative synthesis is found in favour of the natural environment. Duration and social environment were identified as potential moderators based on the post-intervention impact sizes. Meta-analyses found that the natural environment had substantial or moderate effects on anxiety, exhaustion, positive affect, and

energy, with only a minor influence on depression. Weng and Chiang (2014) investigated the "impact of recreational activities on anxiety reduction and attention restoration". Five activities were selected and categorised indoor/outdoor, with each Taiwanese student (N=203) participating in one. The results showed that moderate outdoor activities such as strolling improved mental health. Conversing also reduced anxiety and restored attention. However, internet surfing and exercise did not significantly enhance mental health. Moreover, outdoor activities have received more attention than indoor ones. Kühn et al. (2022) examined the "relationship between spending time outside and brain structural plasticity as well as self-reported emotion". A comprehensive study found that spending time outside was linked to increased gray matter volume in the right dorsolateral prefrontal cortex and positive emotions, even after accounting for physical activity, hydration, free time, and hours of sunshine. These results demonstrate significant and potentially meaningful brain changes in a short period due to regular outdoor exposure, supporting the anecdotal benefits of walking for health and mood enhancement. Lawton et al. (2017) found that "participating in outdoor physical exercise reduces somatic anxiety and that outdoor activity, when combined with autonomy and NRexp, predicts lower anxiety levels". Li et al. (2022) considered that physical exercise and being outside were related to higher levels of positive and lower levels of negative affect compared to being "physically inactive or indoors," respectively. Bailey and Kang (2022) established a "direct link between brain systems influenced by physical exercise and the natural environment, and their impact on cognitive performance". This lends support to the "Attention Restoration Theory and the efficacy of brief outdoor therapies" integrating physical activity as a technique of regaining mental attention. Do et al. (2022) hypothesised that "pandemic-related closures hampered PA participation because of heavy dependence on school- and sports-based PA"'. Programmatic solutions (for example, "activity breaks", "active curriculum", and "free online activities/lessons") should contain aligning intervention measures and be directed towards changing and ongoing PA promotion based on the most recent data.

Objective: This study aimed to measure the impact of outdoor physical activity on mental health.

Research Methodology: This study utilises primary data supplemented by secondary data from reputable sources such as newspapers, magazines, journals, and official websites. The sample selection process involved both purposive and convenience sampling, to obtain a representative subset from a broader population (Solanki and Chhikara, 2023). The targeted participants were people residing in Rohtak City, Haryana, for whom a carefully crafted questionnaire was used to gather pertinent data. The questionnaires were distributed among a randomly selected pool of 300 respondents, resulting in 280 responses. Subsequently, a stringent validation process was used to identify 250 responses that met the established criteria and were deemed suitable for comprehensive analysis. Various statistical techniques, facilitated by software tools such as MS Excel and SPSS, were employed to rigorously analyse the data. The analytical procedures encompassed diverse methods, including tabulations, frequency distributions, percentage calculations, and similar statistical techniques, which contributed to a robust and thorough exploration of the findings.

Results and Discussion

Table 1. Demographic profile of the respondents

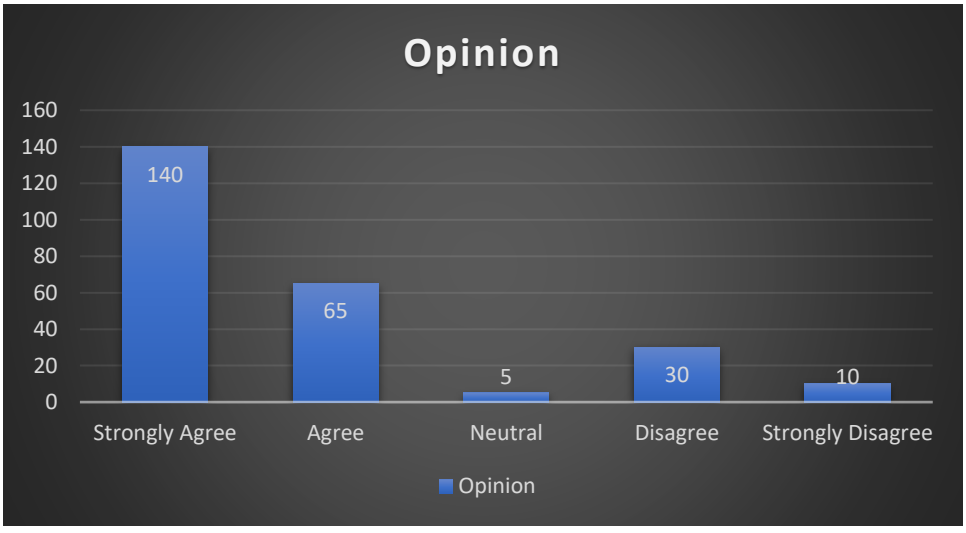
Category	Particulars	Frequency	%
Gender	Female	150	60
	Male	100	40
	Total	*250*	*100*
Age (in years)	Below 25	90	36
	26 to 40	60	24
	41 to 60	70	28

	60+	30	12
	Total	*250*	*100*
Marital status	Unmarried	170	68
	Married	80	32
	Total	*250*	*100*
Educational qualification	Basic	30	12
	10^{th} pass	80	32
	Graduate	120	48
	Others	20	8
	Total	*250*	*100*
Annual earnings (in INR)	Upto 100,000	50	20
	100,000 to 500,000	190	76
	Above 500,000	10	4
	Total	*250*	*100*

Source: Researcher's calculations

Table 1 presents a comprehensive overview of the respondents' demographic characteristics, categorising them based on gender, age, marital status, educational qualifications, and annual earnings. In terms of gender distribution, 60% of the respondents were male and 40% were female, resulting in a total sample size of 250 individuals. Regarding age distribution, the majority of respondents (36%) fell below 30 years, with 24% in the 31–45 age brackets, 28% between 45 and 60 years, and 12% above 60 years. The marital status of the respondents indicated that 68% were married and 32% were unmarried. Educational qualifications varied among the respondents, with 12% categorised as uneducated, 32% having completed 10th grade, 48% holding a graduate degree, and 8% falling under the "Others" category. Annual earnings, presented in INR, show that 20% earned up to 100,000, 76% fell within the bracket of 100,000 to 500,000, and 4% reported earnings above 500,000. This table provides a comprehensive snapshot of the demographic composition of the study participants across various categories.

Figure1. Respondents' opinions about the impact of outdoor physical activities on stress reduction

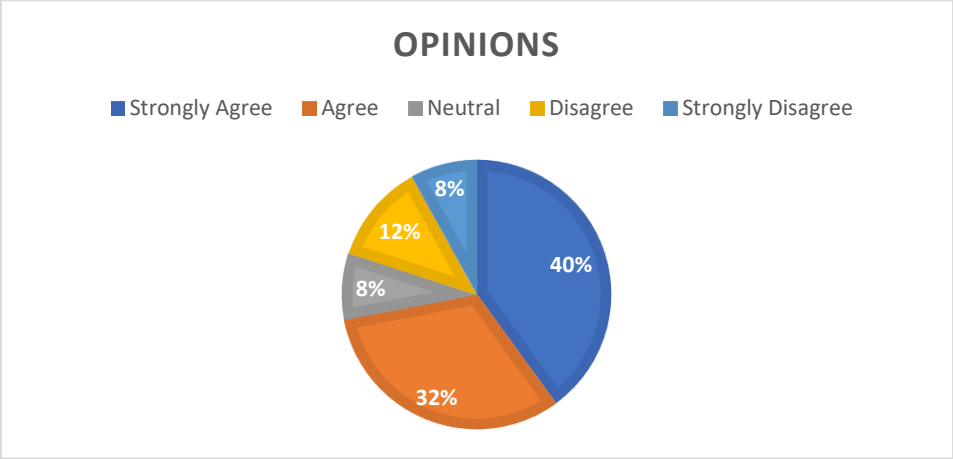


Source: Researcher's calculations

Figure 1 outlines the respondents' perspectives on the impact of outdoor physical activities on stress reduction. The data were presented in terms of opinions, with respondents indicating their level of agreement on a five-point scale. The majority of respondents (56 %) expressed strong agreement with the notion that outdoor physical activities have a positive impact on stress reduction. An additional 26%

agreed, but not strongly. Only a small proportion (4%) of the participants remained neutral. Conversely, 16% of respondents disagreed with the statement, with 12% indicating disagreement and 4% strongly disagreeing. Overall, the data from Figure 1 suggest a prevailing positive sentiment among respondents regarding the stress-reducing benefits of engaging in outdoor physical activities. The majority either strongly agreed or agreed with the statement, underscoring a perceived positive association between outdoor physical activity and stress reduction in the respondents' opinions.

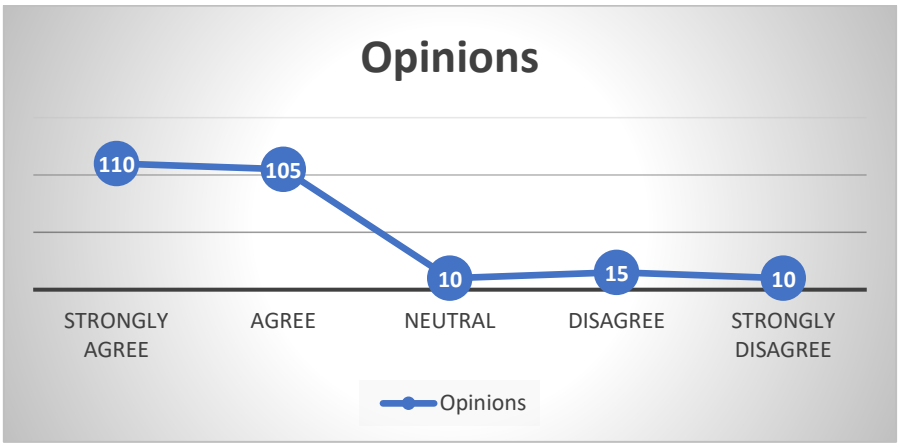
Figure2. Respondents' opinions about the impact of outdoor physical activities on temporal change



Source: Researcher's calculations

Figure 2 illustrates the respondents' viewpoints on the impact of outdoor physical activity on temporal change. Notably, 40% of respondents expressed strong agreement, while an additional 32% agreed with this perspective. Meanwhile, 8% remained neutral. On the contrary, 20% of respondents disagreed with the statement, with 12% indicating disagreement and another 8% strongly disagreeing. In summary, Figure 2 suggests a prevalent positive sentiment among the respondents regarding the perceived impact of outdoor physical activities on temporal change, with the majority either strongly agreeing or agreeing with the statement. The data reflect a relatively balanced distribution of opinions, highlighting the perceived influence of outdoor physical activities on temporal aspects, according to the respondents' perspectives.

Figure3. Respondents' opinions about the impact of outdoor physical activities on boosting morale

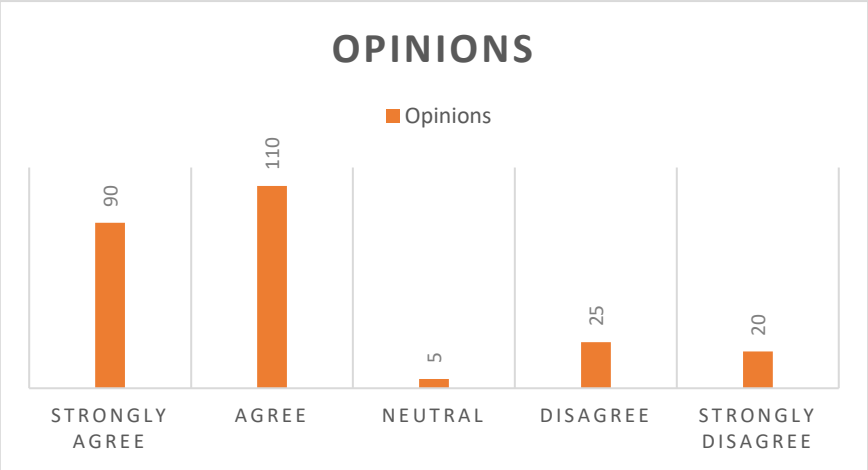


Researcher's calculations

Figure 3 delineates the respondents' viewpoints on the influence of outdoor physical activities on morale enhancement. Notably, 44% of the respondents expressed a robust agreement, complemented by an

additional 42% who concurred with this perspective. Conversely, a minimum of 4% of the participants remained neutral. On the contrary, 12% of respondents conveyed a dissenting view, with 6% disagreeing and another 6% strongly disagreeing. In summary, Figure 3 underscores the prevailing positive sentiment among respondents regarding the perceived impact of outdoor physical activities on morale improvement. The majority either strongly agreed or agreed with the statement, reflecting a consensus on the positive influence of outdoor activities on boosting morale according to respondents' perspectives.

Figure4. Respondents' opinions about the impact of outdoor physical activities on making the mind more active



Source: Researcher's Calculations

Figure 4 outlines the respondents' perspectives on the influence of outdoor physical activities on enhancing mental activity. Notably, 36% of respondents strongly agreed, complemented by an additional 44% who agreed with this notion. Conversely, a minimum of 2% of the participants remained neutral. In contrast, 22% of respondents expressed a dissenting view, with 10% disagreeing and another 12% strongly disagreeing. Overall, Figure 4 underscores the predominant positive sentiment among respondents regarding the perceived impact of outdoor physical activity on sharpening mental activity. The majority either strongly agreed or agreed with the statement, indicating a consensus on the positive influence of outdoor activities on enhancing mental acuity from the respondents' perspective.

Conclusion and Suggestions

Based on the results, the following conclusions can be drawn:

Stress reduction: Respondents overwhelmingly agreed that engaging in outdoor physical activities helps reduce stress. This suggests that incorporating such activities into regular routines could be beneficial for managing stress and improving overall wellbeing.

Temporal change: The data indicated a relatively balanced distribution of opinions regarding the perceived impact of outdoor activities on temporal aspects. While some respondents may find these activities helpful for managing time and staying on track, others may not find them impactful in this regard.

Morale improvement: A strong majority agreed that outdoor activities contribute to boosting morale. This finding suggests that engaging in such activities can be an effective way to improve mood, combat negative feelings, and enhance overall emotional well-being.

Sharpening mental activity: The data indicated a widespread belief that outdoor activities can enhance mental acuity and cognitive function. This suggests that spending time outdoors and engaging in physical activity can be beneficial in improving focus, concentration, and overall cognitive performance.
Overall, it can be said that outdoor physical activity improves the mental health of individuals.
Based on these conclusions, we suggest the following hypothesis:

Promoting outdoor physical activities: Public health initiatives and individual efforts should emphasise the importance of engaging in outdoor physical activities for stress reduction and overall well-being.
Tailor programs for individual preferences: It is important to consider individual preferences and needs when designing outdoor activities. This can help ensure that participants find the activities enjoyable and engaging, thus maximising their potential benefits.

Integrating outdoor activities into mental health programs: Mental health professionals can incorporate outdoor activities into treatment plans for individuals struggling with stress, anxiety, or depression. This can be a valuable tool for improving mood, cognitive function, and overall mental wellbeing.

Additional studies are needed to explore the specific mechanisms by which outdoor physical activity affects stress, mood, and cognitive functions. This can help refine recommendations and develop more effective interventions to promote well-being through outdoor activities.

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