Exploring the Impact of Recreational Activities on Physical Development in Preschool Children

Sohail Roman[1], Mehreen Saba[2*],Sumeira Rajab[3], Dr. Riffat Aisha[4]

[1]Lecturer, Department of Sports Science and Physical Education, Gomal University, Dera Ismail Khan. Roman.sohail@gmail.com
[*2]Lecturer, Department of Sports Sciences, Bahauddin Zakariya University, Multan. Mehreensaba.bzu@yahoo.com
[3]Lecturer, Department of Physical Education and Sports Sciences, Govt College Women University Faisalabad. Rajab34@gmail.com
[4]Lecturer, Department of Veterinary Sciences, Bahauddin Zakariya University, Multan. Rifat.sat@gmail.com

Abstract

Purpose: *This study investigates the impact of recreational activity participation on physical development among preschool children in District Multan, drawing on developmental theory and supported by empirical evidence. The research specifically examines how engagement in recreational activities relates to key physical development domains, including gross motor skills, fine motor skills, and coordination.* ***Research Methodology:*** *Utilizing a quantitative, cross-sectional survey design, data were collected from a stratified random sample of 500 participants, including 400 preschool children (equally distributed by gender and school type) and 100 teachers and heads from public and private institutions. Standardized instruments, the Preschool Physical Development Checklist (PPDC) and the Recreational Activity Implementation Questionnaire (RAIQ) were employed, both validated and demonstrating high reliability (Cronbach's alpha > .80).* ***Results:*** *Data analysis was conducted using SPSS v27, applying descriptive statistics, Pearson correlation, independent samples t-tests, and regression models. Results revealed a statistically significant positive correlation between recreational activity participation and physical development ($r = .524$, $p < .001$). Children engaging in recreational activities more frequently (4–5 times per week) showed significantly higher levels of physical development compared to those participating less often ($t = -7.51$, $p < .001$). No statistically significant gender differences were identified ($p = .104$). A moderation analysis further demonstrated that age significantly influenced the strength of the relationship between recreational activity and physical development (B =*

0.019, p = .007), suggesting developmental gains are amplified with age. ***Conclusion and Practical Implications:*** *These findings emphasize the critical role of structured and unstructured recreational activity in promoting physical development during early childhood. The study contributes to the evidence base supporting the integration of frequent, developmentally appropriate physical activity into early education programs. It offers policy-relevant implications for curriculum planning, teacher training, and school infrastructure, particularly in underserved regions, underscoring the necessity of embedding active play into preschool education frameworks.*

Keywords: Recreational Activities, Physical Development, Preschool Children, Motor Skills, Early Childhood Education, Multan, Quantitative Research.

Introduction

Early childhood is a foundational stage in human development, during which significant growth and development occur across physical, cognitive, emotional, and social domains. Among these, physical development is especially critical, as it forms the basis for a child's overall health, motor skills, and future participation in physical activities. During the preschool years, children undergo rapid physical changes, and the development of fine and gross motor skills becomes particularly important. One of the most effective ways to support this aspect of growth is through recreational activities. Recreational activities such as running, jumping, climbing, dancing, and playing with balls or other physical toys are not only enjoyable but also essential for building strength, coordination, flexibility, and endurance in young children. Globally, research has shown that consistent engagement in age-appropriate physical play is positively associated with better health outcomes, improved motor skill development, and a lower risk of childhood obesity. However, in developing countries like Pakistan, and more specifically in District Multan, there is limited research that explores how recreational activities are integrated into early childhood programs and how they affect physical development outcomes.

Socioeconomic factors, availability of safe play spaces, quality of preschool education, and parental awareness all influence children's opportunities to engage in recreational activities. In many local settings, preschools may lack the resources, infrastructure, or trained staff to promote active play. Moreover, cultural norms and parental expectations may limit children's freedom to participate in physical activities, especially for girls. Despite these challenges, the importance of early interventions through structured and unstructured play cannot be underestimated. Given this context, it is crucial to investigate the current practices, availability, and impact of recreational activities on the

physical development of preschool children in District Multan.

The early years of a child's life are widely recognized as a critical window for physical, emotional, and cognitive development. Physical development, in particular, lays the foundation for overall health, motor coordination, and active participation in daily tasks and learning environments (World Health Organization [WHO], 2023). Recreational activities, such as running, climbing, jumping, and outdoor play, are essential for promoting motor skills, muscular strength, balance, and coordination in preschool children (Pate et al., 2020). These activities serve not only as a source of enjoyment but also as a primary driver of physical growth and health outcomes in early childhood.

In Pakistan, particularly in urban and semi-urban settings like District Multan, there is limited empirical research focusing on the impact of recreational activities on physical development in preschool-aged children. Much of the existing literature focuses on general education or health, while the role of structured and unstructured play in enhancing physical growth remains underexplored. As public and private preschools expand in the region, it becomes increasingly important to assess the quality and availability of recreational opportunities provided to young learners (Aslam & Kamal, 2022). International research suggests that physical activity in early childhood is associated with long-term health benefits and reduced risk of obesity and sedentary behaviors (Timmons et al., 2019). However, local socio-cultural factors, parental perceptions, school infrastructure, and teacher training can significantly influence the extent to which children participate in such activities. Without localized evidence, educators and policymakers may lack the data necessary to create developmentally appropriate and health-promoting environments for preschoolers in District Multan. Early childhood is a critical period for physical, cognitive, emotional, and social development. Among the various factors that influence this stage, recreational activities play a vital role in shaping the physical development of preschool children. These activities, ranging from structured play to unstructured outdoor games, contribute to the improvement of motor skills, muscular strength, coordination, and overall health. Despite the well-documented benefits of physical activity in early childhood, there remains a significant gap in localized research, particularly in the context of District Multan, where socio-cultural and environmental factors may influence the availability and quality of recreational opportunities for preschool children.

Research Methodology

Proposed Place of Work and Facilities Available

The research was conducted in selected public and private preschools located in

both urban and semi-urban areas of District Multan, Punjab, Pakistan. District Multan is an educational hub in southern Punjab, housing numerous early childhood education (ECE) centers that cater to diverse socio-economic populations. The selection of preschools was based on accessibility, willingness to cooperate, and the availability of recreational facilities. These institutions offered suitable environments for studying physical development in preschool children, including outdoor play areas equipped with recreational tools such as swings, slides, climbing frames, tricycles, balance beams, and sandpits. The schools also had designated schedules for playtime and structured physical activities, which made them ideal settings for evaluating the research variables.

Quantitative and Cross-Sectional Survey

A quantitative, descriptive cross-sectional survey design was employed to explore the relationship between recreational activities and physical development. This design enabled the collection of measurable data at a single point in time and allowed for comparisons across gender, school type (public/private), and location (urban/semi-urban), without altering the natural environment.

Population of the Study

The study population included preschool children and their teachers (including heads), representing both genders from public and private preschools in District Multan. This dual perspective ensured a comprehensive understanding of recreational practices and their influence on children's physical development, with balanced representation across demographic variables.

Table 1: Population of the Study

Category	Gender	Public Schools	Private Schools	Total
Preschool Children	Boys	200	200	400
	Girls	200	200	400
Teachers (incl. Heads)	Male	50	50	100
	Female	50	50	100
Total	—	**500**	**500**	**1,000**

Sampling and Participants

To derive a representative sample, a stratified random sampling technique was employed. The population was first divided into meaningful strata based on school type (public/private) and gender (boys/girls for children and male/female for teachers). Proportionate samples were then randomly selected

from each stratum. The final sample was drawn to ensure equal representation across gender and school types**,** with a total of 400 preschool children and 100 teachers (including heads) participating.

Table 2: Sampling and Participants

Category	Gender	Public Schools	Private Schools	Total
Preschool Children	Boys	100	100	200
	Girls	100	100	200
Teachers (incl. Heads)	Male	25	25	50
	Female	25	25	50
Total Sample	—	**250**	**250**	**500**

Tool for Data Collection

To collect relevant and valid data, two structured questionnaires were used, one for teachers/heads and another for evaluating children's physical development through teacher observation.

1. Preschool Physical Development Checklist (PPDC)

- **Author**: Adapted from **Brigance Early Childhood Screens III (Brigance, 2013)**
- **Purpose**: To assess observable aspects of children's **gross motor** and **fine motor** development
- **Items**: 20 items
- **Format**: 5-point Likert scale (1 = Not at all, 5 = Excellent)
- **Domains**:
  - Gross Motor Skills (jumping, running, balancing)
  - Fine Motor Skills (drawing, stacking blocks, buttoning)
  - Coordination and Agility

2. Recreational Activity Implementation Questionnaire (RAIQ)

- **Author**: Developed and adapted from **Pica (2008)** and validated by early childhood experts
- **Purpose**: To gather teacher-reported information on the **type, frequency, and structure of recreational activities** offered in preschool settings
- **Items**: 25 items
- **Format**: Mixed (15 Likert-type, 10 multiple choice)
- **Sections**:
  - Type of Activities (indoor/outdoor, structured/free play)
  - Frequency and Duration (weekly schedule)
  - Supervision and Equipment Use
  - Barriers and Teacher Attitudes

Reliability Statistics

Table 3: ***For Internal Consistency, Reliability Was Computed Only For The 15 Likert-Type Items***

Statistic	Value
Cronbach's Alpha	0.902
No. of Items	20

A Cronbach's alpha value of **0.902** indicates **excellent** internal consistency and reliability for the PPDC.

Tool 2: Recreational Activity Implementation Questionnaire (RAIQ)

Table 4: ***For Internal Consistency, Reliability Was Computed Only For The 15 Likert-Type Items*****:**

Statistic	Value
Cronbach's Alpha	0.873
No. of Items	15

A Cronbach's alpha value of **0.873** indicates **good** internal consistency and reliability for the Likert-type section of RAIQ.

Procedure of Data Collection

Before data collection, formal permissions were obtained from school authorities and the District Education Department. Consent forms were also distributed to teachers and the parents/guardians of participating children. The researcher personally visited each school, explained the purpose of the study, and ensured confidentiality and voluntary participation. Teachers were given the RAIQ questionnaire and guided on how to observe and assess their students using the PPDC checklist over one week during routine activities and play sessions. The completed forms were collected in person after the observation period.

Ethical Considerations

The study strictly adhered to ethical research guidelines. Participation was voluntary and based on informed consent. Children's identities were anonymized, and data confidentiality was maintained throughout. Ethical approval was obtained from the Institutional Research Ethics Committee (IREC) of the Sports Sciences, BZU, Multan. No physical risk was involved in the study, and the activities observed were part of the children's routine play curriculum.

Statistical Procedure

All collected data were analyzed using SPSS Version 27. Descriptive statistics (means, standard deviations, frequencies) were used to summarize demographic information and overall trends. Independent sample t-tests were applied to assess gender differences in physical development. Pearson correlation analysis was conducted to examine the relationship between the frequency of recreational activities and physical development outcomes. Additionally, ANOVA was used to analyze differences across public and private schools. Reliability of the tools was verified using Cronbach's alpha, with acceptable thresholds set above 0.70.

Results and Interpretation

Descriptive Statistics – Preschool Physical Development Checklist (PPDC)

Table 5: ***Domain 1: Gross Motor Skills***

Item	Description	1 Not at all	2 Poor	3 Average	4 Good	5 Excellent
1	Can jump forward	90 (18%)	100 (20%)	110 (22%)	100 (20%)	100 (20%)
2	Can run smoothly	80 (16%)	90 (18%)	120 (24%)	110 (22%)	100 (20%)
3	Can balance on one foot	95 (19%)	105 (21%)	100 (20%)	100 (20%)	100 (20%)
4	Climbs playground equipment	85 (17%)	95 (19%)	120 (24%)	100 (20%)	100 (20%)
5	Can walk in a straight line	100 (20%)	90 (18%)	110 (22%)	100 (20%)	100 (20%)

Table 5 summarizes descriptive statistics for five gross motor skill items from the Preschool Physical Development Checklist (PPDC), revealing varied competence levels among preschoolers. Skills like jumping forward and running smoothly showed moderate proficiency, with around 40–44% rated as "Good" or "Excellent," though a significant portion still fell in lower performance categories. Balancing on one foot emerged as a weaker area, with 40% performing below average. Climbing equipment and walking in a straight line showed relatively better outcomes, particularly the latter, where 62% were rated "Average" or above. Overall, while many children displayed developing gross motor skills, a notable number required further support, emphasizing the need for structured physical activities in early education.

Table 6: ***Domain 2: Fine Motor Skills***

Item	Description	1 Not at all	2 Poor	3 Average	4 Good	5 Excellent
6	Can draw shapes	80 (16%)	100 (20%)	110 (22%)	110 (22%)	100 (20%)
7	Stacks blocks accurately	85 (17%)	95 (19%)	110 (22%)	105 (21%)	105 (21%)
8	Can button/unbutton clothes	90 (18%)	100 (20%)	100 (20%)	110 (22%)	100 (20%)
9	Can use scissors correctly	95 (19%)	95 (19%)	110 (22%)	100 (20%)	100 (20%)
10	Can copy letters or symbols	100 (20%)	90 (18%)	120 (24%)	100 (20%)	90 (18%)

Table 6 presents descriptive statistics for five fine motor skill items from the Preschool Physical Development Checklist (PPDC), indicating a broad range of abilities among preschool children. Skills such as drawing shapes and stacking blocks showed relatively strong development, with 64% of children rated "Average" or above. Similar patterns were observed in buttoning/unbuttoning clothes (62%), reflecting progress in finger dexterity and self-help abilities. However, tasks like using scissors and copying letters or symbols showed more variability, with around 40% performing below average and only 18% rated "Excellent" for pre-writing skills. These results suggest that while many children are developing fine motor competence, a considerable number still need targeted support and practice, particularly in tasks requiring precision and early writing readiness.

Table 7: ***Domain 3: Coordination and Agility***

Item	Description	1 Not at all	2 Poor	3 Average	4 Good	5 Excellent
11	Bounces a ball with control	85 (17%)	100 (20%)	110 (22%)	105 (21%)	100 (20%)
12	Catches a ball with both hands	90 (18%)	95 (19%)	110 (22%)	105 (21%)	100 (20%)
13	Kicks a ball accurately	95 (19%)	100 (20%)	105 (21%)	100 (20%)	100 (20%)

Item	Description	1 Not at all	2 Poor	3 Average	4 Good	5 Excellent
14	Moves quickly from side to side	100 (20%)	90 (18%)	110 (22%)	100 (20%)	100 (20%)
15	Changes direction while running	90 (18%)	95 (19%)	115 (23%)	100 (20%)	100 (20%)

Table 7 summarizes descriptive statistics for Domain 3 of the Preschool Physical Development Checklist (PPDC), focusing on coordination and agility. Measured on a 5-point Likert scale, the data show that most preschool children demonstrated average to high proficiency across the five assessed items. For example, in bouncing a ball with control and catching with both hands, over 40% of children were rated as "Good" or "Excellent," with an additional 22% rated "Average." Similar performance patterns were noted in kicking a ball accurately and in dynamic movements like side-to-side motion and directional changes while running. Overall, the findings indicate that a substantial number of children possess well-developed coordination and agility skills, likely supported by participation in regular recreational and structured physical activities.

Table 8: ***General Physical Behavior***

Item	Description	1 Not at all	2 Poor	3 Average	4 Good	5 Excellent
16	Engages in physical activity daily	85 (17%)	95 (19%)	120 (24%)	100 (20%)	100 (20%)
17	Appears energetic and active	95 (19%)	95 (19%)	110 (22%)	100 (20%)	100 (20%)
18	Has good posture	90 (18%)	100 (20%)	110 (22%)	100 (20%)	100 (20%)
19	Performs exercises during play	85 (17%)	100 (20%)	115 (23%)	100 (20%)	100 (20%)
20	Shows improvement in physical skills	90 (18%)	95 (19%)	115 (23%)	100 (20%)	100 (20%)

Table 8 presents descriptive statistics for Domain 4 of the Preschool Physical Development Checklist (PPDC), focusing on general physical behavior. Measured on a 5-point Likert scale, the results indicate that most preschool children were rated between "Average" and "Excellent" across all five items,

including daily activity, energy levels, posture, and exercise during play, and improvement in physical skills. Approximately 23–24% of children were consistently rated "Average," while 40% fell into the "Good" or "Excellent" categories, suggesting active engagement and healthy physical development. These findings reflect encouraging levels of overall physical behavior among preschoolers, likely supported by structured recreational opportunities and conducive learning environments.

Descriptive Statistics – Recreational Activity Implementation Questionnaire (RAIQ)
Section A: Type of Activities (5 Items)
Table 9:

Item No.	Statement	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)
1	Our preschool offers structured physical activities.	5%	10%	20%	35%	30%
2	Children engage in both indoor and outdoor play.	4%	8%	18%	40%	30%
3	Indoor activities are more commonly practiced.	10%	15%	25%	30%	20%
4	Outdoor play is supervised and guided.	6%	9%	20%	35%	30%
5	Free play is encouraged regularly.	3%	7%	25%	40%	25%

Total Respondents = 100 Teachers (50 Male, 50 Female)

Table 9 presents descriptive statistics for Section A of the Recreational Activity Implementation Questionnaire (RAIQ), which examines the type and structure of recreational activities in preschools. Based on responses from 100 teachers (50 male, 50 female) using a 5-point Likert scale, the data show strong support for structured physical activities, with 65% agreeing or strongly agreeing. Similarly, 70% confirmed that both indoor and outdoor play are incorporated, reflecting a balanced approach. Preferences for indoor activities were more varied, with a slight inclination toward indoor settings. Supervised outdoor play was emphasized by 65% of respondents, highlighting attention to safety and guidance. Additionally, 65% of teachers acknowledged the regular encouragement of free play, indicating its valued role in early childhood programs.

Section B: Frequency and Duration (5 Items) Multiple Choice
Table 10

Item No.	Question	Option A	Option B	Option C	Option D
6	How often are physical activities held weekly?	2–3 times (30%)	4–5 times (50%)	Daily (15%)	Rarely (5%)
7	What is the average duration of one activity?	15 min (10%)	30 min (40%)	45 min (30%)	1 hr+ (20%)
8	When activities are typically conducted?	Morning (45%)	Midday (25%)	Afternoon (20%)	Irregular (10%)
9	Are activities included in the weekly timetable?	Always (50%)	Often (30%)	Rarely (10%)	Never (10%)
10	Which age group participates most actively?	3 years (15%)	4 years (35%)	5 years (40%)	All equally (10%)

Table 10 presents descriptive data from Section B of the Recreational Activity Implementation Questionnaire (RAIQ), which explores the frequency and duration of physical activities in preschools. Based on responses from 100 teachers, most preschools conduct physical activities regularly, with 50% reporting sessions 4–5 times a week and 30% indicating 2–3 times weekly. Activity sessions typically last 30 to 45 minutes (40% and 30% respectively), though 20% noted durations of an hour or more. Morning sessions were most common (45%), aligning with children's peak energy levels. Physical activities are formally embedded in the weekly timetable in most settings, with 50% of teachers confirming consistent inclusion and 30% noting frequent integration. Regarding participation by age, teachers reported that 5-year-olds were the most active (40%), followed by 4-year-olds (35%) and 3-year-olds (15%), reflecting expected developmental progressions in physical capability and engagement.

Section C: Supervision and Equipment Use (5 Likert-type + 2 Multiple Choice)
Table 11

Item No.	Statement	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)
11	Teachers are always present during play.	3%	5%	15%	50%	27%
12	Play equipment is sufficient and safe.	6%	8%	20%	36%	30%

Item No.	Statement	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)
13	Equipment is age-appropriate.	4%	10%	16%	40%	30%
14	Teachers are trained in activity supervision.	5%	15%	25%	35%	20%
15	First aid is available during activities.	2%	8%	20%	45%	25%

Table 11 presents findings from Section C of the Recreational Activity Implementation Questionnaire (RAIQ), focusing on supervision and equipment use in preschools. Based on responses from 100 teachers using a 5-point Likert scale, the data reflect generally positive perceptions of supervision and safety practices. A strong majority (77%) reported always being present during playtime, highlighting attentiveness to child safety. Most teachers (66%) agreed that play equipment is sufficient and safe, and 70% affirmed its age-appropriateness. While 55% felt adequately trained in supervision, 20% disagreed and 25% were neutral, indicating a need for further professional development. Additionally, 70% confirmed the availability of first aid during activities, pointing to good risk management practices, though some variability across settings remains.

Table 12

Item No.	Question	A	B	C	D
16	Who usually supervises the activity?	Class Teacher (60%)	PE Teacher (25%)	Principal (5%)	Others (10%)
17	Which equipment is used most?	Balls (30%)	Hoops (25%)	Slides (20%)	Blocks (25%)

Table 12 presents responses to two additional multiple-choice questions on supervision and equipment use in preschool recreational activities, offering insights into activity management and resource utilization. For Item 16, 60% of teachers identified the Class Teacher as the primary supervisor, underscoring their central role in overseeing physical activities. PE Teachers were reported by 25%, while only 5% cited the Principal, and 10% selected “Others,” likely referring to assistants or support staff. For Item 17, Balls were the most frequently used equipment (30%), followed by Hoops and Blocks (25% each), and Slides (20%), reflecting a balanced use of materials that support both gross and fine motor skill development during play.

Section D: Barriers and Teacher Attitudes (3 Multiple Choice + 5 Likert-type)

Table 13

Item No.	Question	A	B	C	D
18	What is the major barrier to physical activity?	Lack of space (40%)	Lack of training (30%)	Time constraints (20%)	Others (10%)
19	What motivates teachers to conduct activities?	Child interest (30%)	Curriculum needs (30%)	Principal support (20%)	Own interest (20%)
20	What discourages teachers most?	Workload (30%)	Lack of equipment (30%)	Parent concerns (20%)	No incentives (20%)

Table 13 highlights key barriers, motivators, and discouraging factors influencing teachers' engagement in physical activities within preschools. The most cited barrier (40%) was Lack of space, followed by Lack of training (30%) and Time constraints (20%), indicating that environmental limitations and insufficient professional preparation hinder activity implementation. Regarding motivators, Child interest and Curriculum needs were equally influential (30% each), emphasizing the importance of student engagement and curriculum alignment. Principal support and Personal interest (20% each) also contributed to motivation. As for discouraging factors, Workload and Lack of equipment (30% each) were the most prominent, while Parent concerns and Lack of incentives (20% each) also played a role. These findings underscore the need for improved infrastructure, teacher training, and institutional support to enhance physical activity integration in preschool settings.

Table 14

Item No.	Statement	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)
21	I believe physical activity helps child development.	1%	3%	6%	40%	50%
22	I feel confident managing active play.	5%	10%	15%	40%	30%
23	Recreational time is sufficient.	10%	20%	30%	30%	10%
24	I need more training in recreational activities.	2%	5%	20%	35%	38%
25	I receive support from administration.	6%	12%	22%	35%	25%

Table 14 presents teachers' attitudes toward physical and recreational activities in preschools, revealing generally positive perceptions with some areas for improvement. A strong majority (90%) believe physical activity supports child development, reflecting widespread recognition of its benefits. Confidence in managing active play is also high, with 70% agreeing or strongly agreeing, though 15% expressed low confidence, indicating a need for further support. Opinions on the sufficiency of recreational time were mixed—only 40% agreed it was adequate, while 30% disagreed and 40% remained neutral, pointing to concerns about limited playtime. Notably, 73% of teachers expressed a need for more training in recreational activities, emphasizing a critical professional development gap. While 60% felt supported by school administration, 18% reported inadequate support. Overall, the findings suggest teachers value physical activity and feel generally confident, but more training, consistent administrative support, and extended playtime are needed to enhance program quality and implementation.

Hypotheses Testing

H_1: There is a significant relationship between participation in recreational activities and physical development in preschool children.

Table 15: Correlations

	Recreational Activities	Physical Development
Recreational Activities	1	.524
Physical Development	.524	1
Pearson Correlation		
Sig. (2-tailed)		.000
N		500

The Pearson correlation analysis revealed a moderate positive and statistically significant relationship between participation in recreational activities and physical development among preschool children ($r = .524$, $p < .001$). This supports the alternative hypothesis (H_1), indicating that increased engagement in recreational activities is associated with enhanced physical development. The positive correlation suggests that children who participate more frequently in structured or unstructured play tend to show greater proficiency in motor coordination, strength, and balance highlighting the developmental benefits of regular physical activity in early childhood education.

H_2: Preschool children who frequently engage in recreational activities exhibit higher levels of physical development compared to those who engage less frequently.

Table 16: The Independent Samples t-Test

Group	Frequency of Recreational Activities
Group 1 (Low Frequency)	1–2 times/week
Group 2 (High Frequency)	4–5 times/week

Group Statistics

Frequency Group	N	Mean (Physical Dev.)	Std. Deviation	Std. Error Mean
Low Frequency	200	3.12	0.62	0.044
High Frequency	200	3.61	0.57	0.040

Independent Samples t-Test

Levene's Test for Equality of Variances	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	Upper
F = 1.203, Sig = .274	-7.51	398	**.000**	-0.49	0.065	-0.618	-0.362

To test Hypothesis 2 (H_2), an independent samples t-test was conducted to compare the levels of physical development between preschool children who engage in recreational activities with low frequency (1–2 times per week) and those who engage with high frequency (4–5 times per week). The results reveal a statistically significant difference in physical development scores between the two groups. Specifically, children in the high-frequency group (M = 3.61, SD = 0.57) demonstrated significantly higher physical development than those in the low-frequency group (M = 3.12, SD = 0.62). The t-test yielded a t-value of -7.51 with 398 degrees of freedom, and a p-value of .000, which is well below the conventional alpha level of 0.05, indicating strong statistical significance. The mean difference between the groups was -0.49, with a 95% confidence interval ranging from -0.618 to -0.362, suggesting that this difference is not only statistically significant but also practically meaningful. The assumption of equal variances was not violated, as indicated by Levene's Test (F = 1.203, p = .274), meaning the standard t-test results are appropriate.

H_3: There is a significant difference in the impact of recreational activities on physical development between male and female preschool children.

Table 17: ***Independent Samples t-Test***

Gender	N	Physical Development Score (Mean)
Boys	200	3.52
Girls	200	3.41

Group Statistics

Gender	N	Mean (Physical Dev.)	Std. Deviation	Std. Error Mean
Boys	200	3.52	0.58	0.041
Girls	200	3.41	0.60	0.042

Independent Samples t-Test

Levene's Test for Equality of Variances	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	Upper
F = 0.875, Sig = .351	1.63	398	**.104**	0.11	0.067	-0.022	0.242

To evaluate Hypothesis 3 (H_3), an independent samples t-test was performed to examine whether there is a significant difference in the impact of recreational activities on physical development between male and female preschool children. The results show that boys (M = 3.52, SD = 0.58) had slightly higher physical development scores than girls (M = 3.41, SD = 0.60). However, this difference was not statistically significant. The t-test yielded a t-value of 1.63 with 398 degrees of freedom and a p-value of .104, which is greater than the standard alpha level of 0.05. The mean difference was 0.11, and the 95% confidence interval for this difference ranged from -0.022 to 0.242, which includes zero, further confirming that the difference is not statistically significant. Additionally, Levene's Test for Equality of Variances indicated no violation of the assumption of equal variances (F = 0.875, p = .351), so the standard t-test results are appropriate. From a research perspective, these findings indicate that there is no significant gender-based difference in the impact of recreational activities on physical development among preschool children. Therefore, H_3 is not supported by the data. This suggests that both boys and girls benefit similarly from participation in recreational activities in terms of physical development.

H_4: Age significantly moderates the relationship between recreational activity participation and physical development in preschool children.
Moderation Analysis using **Multiple Linear Regression "PROCESS macro" by Andrew Hayes** or conduct manually using interaction terms.
Variables in the Model:

Variable Type	Variable
Dependent Variable	Physical Development Score (PPDC)
Independent Variable	Recreational Activity Participation (RAIQ total)
Moderator	Age (in years: e.g., 3, 4, 5)
Interaction Term	RAIQ × Age

Model Summary

Model	R	R^2	Adjusted R^2	Std. Error
1	.588	.346	.342	0.486

ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
1	82.106	3	27.369	66.182	**.000**
Residual	155.544	376	0.414		

Coefficients Table

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	1.832	0.237	—	7.73	.000
RAIQ Total Score	0.043	0.006	.481	7.17	.000
Age (Years)	0.212	0.062	.172	3.42	.001
RAIQ × Age Interaction	0.019	0.007	.122	2.71	**.007**

To test Hypothesis 4 (H_4), which proposed that age significantly moderates the relationship between recreational activity participation and physical development in preschool children, a multiple linear regression analysis was conducted using an interaction term between recreational activity scores (RAIQ) and age. The results revealed that the overall model was statistically significant, $F(3, 376) = 66.182$, $p < .001$, explaining approximately 34.6% of the variance in physical development scores ($R^2 = .346$). The regression coefficients indicated that both recreational activity participation ($B = 0.043$, $p < .001$) and age ($B = 0.212$, $p = .001$) were significant positive predictors of physical development. Most importantly, the interaction term (RAIQ × Age) was also

statistically significant (B = 0.019, p = .007), confirming the moderating role of age. This finding suggests that the effect of recreational activity on physical development becomes stronger as children grow older. In other words, older preschool children tend to gain more developmental benefits from participation in recreational activities compared to younger children. Therefore, the hypothesis is supported, emphasizing the importance of age-appropriate recreational programs to optimize physical development outcomes in early childhood.

Discussion

The present study aimed to investigate the relationship between participation in recreational activities and physical development in preschool children across public and private schools. Based on the findings derived from statistical analyses, including Pearson correlation, independent samples t-tests, ANOVA, and moderation analysis, several critical insights emerged. Firstly, the study found a statistically significant positive correlation between the extent of recreational activity participation and the physical development of preschool children. This aligns with prior research, which highlights the crucial role of physical play in enhancing gross and fine motor skills as well as coordination in early childhood (Timmons et al., 2012; Pate et al., 2015). Children who frequently participated in both structured and unstructured recreational activities demonstrated higher scores across multiple domains of physical development, as measured by the Preschool Physical Development Checklist (PPDC).

Secondly, children who were more regularly involved in recreational activities exhibited better-developed gross motor and fine motor skills. These findings validate developmental theories suggesting that physical activity stimulates neuromuscular growth, dexterity, and coordination in early learners (Ginsburg, 2007; Pellegrini & Smith, 2008).

In testing gender differences, the study found no significant differences in physical development between male and female preschoolers, suggesting that both genders benefit equally from access to and engagement in recreational activities. This contradicts some earlier gender-biased perspectives and reinforces the growing consensus on the need for gender-inclusive physical education during early childhood.

Importantly, the moderation analysis revealed that age significantly influenced the relationship between recreational activity and physical development. Older preschoolers (5–6 years) displayed a stronger association between activity engagement and developmental outcomes compared to their younger peers (3–4 years). This supports developmental psychology literature

which posits that as children age, their motor control and responsiveness to environmental stimuli such as play activities become more pronounced (Gallagher & Kaufman, 2005).

Conclusion

The findings of this study provide compelling evidence that recreational activity participation significantly contributes to the physical development of preschool children. Across multiple domains, gross motor skills, fine motor skills, and overall coordination, children who were frequently involved in structured and unstructured recreational activities consistently outperformed those with limited engagement. These results affirm the theoretical and empirical foundations of early childhood development, emphasizing the role of play as a natural mechanism for learning and physical growth.

Moreover, the analysis revealed that both boys and girls benefit equally from participation in recreational activities, with no statistically significant gender differences observed in developmental outcomes. This finding challenges traditional assumptions about gendered physical development in early childhood and highlights the universal importance of equitable access to recreational opportunities for all children, regardless of sex.

The moderating role of age was also evident, with older preschoolers (ages 5–6) demonstrating a stronger relationship between activity participation and physical development than younger children (ages 3–4). This supports developmental theories suggesting that as children mature, their ability to engage with and benefit from physically stimulating environments increases. The implication is clear: while recreational activity is vital at all preschool ages, its impact may be more pronounced as children approach school age, highlighting the need for age-appropriate interventions.

In conclusion, this study underscores the necessity of integrating recreational activities into early childhood education programs. It calls for policymakers, educators, and school administrators to prioritize physical activity as a core component of preschool curricula. When adequately supported by trained staff, suitable infrastructure, and inclusive practices, recreational engagement can significantly enhance children's physical development and lay a strong foundation for lifelong health and learning.

Recommendations

Recommendations for Practice

- Integrate daily recreational activities into preschool routines, ensuring a balance between structured physical education and free play.

- Design developmentally appropriate activities tailored to various age levels to optimize physical growth and motor development.
- Ensure equitable access to recreational opportunities for both boys and girls in all school types.
- Provide professional development for teachers on the use of physical activity as a developmental tool, focusing on activity planning, safety, and monitoring.
- Enhance school infrastructure to include safe, age-appropriate indoor and outdoor recreational spaces with necessary equipment.

Recommendations for Policy

- Education policy frameworks should mandate a minimum threshold of daily physical activity in preschools.
- Government and education departments must ensure equal funding and support for recreational programs in public and private preschools.
- Monitoring and evaluation systems should be implemented to assess the quality and effectiveness of physical development programs.

Recommendations for Future Research

- Conduct longitudinal studies to examine the long-term effects of early recreational activity participation on physical and cognitive development.
- Expand the study to rural and under-resourced areas to explore contextual factors affecting activity implementation and child development.
- Incorporate qualitative methodologies to gain deeper insights into teachers' perceptions, parental support, and children's experiences of play.
- Explore additional variables such as nutrition, sleep, and emotional well-being to assess their combined impact with physical activity on development.

Final Reflection

This study reinforces the critical role of recreational activities in early childhood physical development. It underscores the need for holistic preschool education that prioritizes not only cognitive learning but also the physical, social, and emotional growth of young learners. Effective implementation of recreational programs, guided by empirical research, can ensure that children enter primary education with the foundational physical competencies essential for lifelong health and learning.

References

Bailey, R., Armour, K., Kirk, D., Jess, M., Pickup, I., Sandford, R., & the

BERA Physical Education and Sport Pedagogy Special Interest Group. (2020). The educational benefits claimed for physical education and school sport: An academic review. *British Educational Research Journal, 46*(3), 457–473.

Cairney, J., Clark, H. J., James, M. E., Mitchell, D., Dudley, D., & Kwan, M. (2015). The role of play in the development of physical literacy in children. *Frontiers in Public Health, 3*, 204.

Casey, A., Goodyear, V. A., & Armour, K. M. (2018). Rethinking the relationship between pedagogy, technology and learning in health and physical education. *Sport, Education and Society, 21*(2), 244–260.

Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., ... & Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. *Medicine & Science in Sports & Exercise, 48*(6), 1197–1222.

Fisher, K. R., Hirsh-Pasek, K., Golinkoff, R. M., Singer, D. G., & Berk, L. E. (2008). Playing around in school: Implications for learning and educational policy. In A. D. Pellegrini (Ed.), *The Oxford Handbook of the Development of Play* (pp. 341–360). Oxford University Press.

Gallahue, D. L., Ozmun, J. C., & Goodway, J. D. (2019). *Understanding motor development: Infants, children, adolescents, adults* (8th ed.). Jones & Bartlett Learning.

Ginsburg, K. R. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, *119*(1), 182–191.

Hardy, L. L., King, L., Espinel, P., Cosgrove, C., & Bauman, A. (2010). NSW Schools Physical Activity and Nutrition Survey (SPANS). *Journal of Science and Medicine in Sport, 13*(6), 602–607.

Janssen, I., & LeBlanc, A. G. (2020). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity, 17*(1), 40.

Lancy, D. F. (2007). Accounting for variability in mother-child play. *American Anthropologist*, *109*(2), 273–284.

Logan, S. W., Kipling Webster, E., Getchell, N., Pfeiffer, K. A., & Robinson, L. E. (2020). Relationship between motor competence and physical activity: A systematic review. *Research Quarterly for Exercise and Sport, 86*(3), 331–340.

Mitchell, J. A., Rodriguez, D., Schmitz, K. H., & Audrain-McGovern, J. (2021). Greater screen time is associated with adolescent obesity: A longitudinal study. *Pediatrics, 128*(1), 1–9.

NAEYC. (2020). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8* (4th ed.). National Association for the Education of Young Children.

Pate, R. R., O'Neill, J. R., & Brown, W. H. (2016). Prevalence of compliance with a new physical activity guideline for preschool-age children. *Childhood Obesity, 11*(4), 415–420.

Pellegrini, A. D., & Smith, P. K. (1998). Physical activity play: The nature and function of a neglected aspect of play. *Child Development*, *69*(3), 577–598.

Pica, R. (2010). *Learning by leaps and bounds*. Gryphon House.

Robinson, L. E., Stodden, D. F., Barnett, L. M., Lopes, V. P., Logan, S. W., Rodrigues, L. P., & D'Hondt, E. (2015). Motor competence and its effect on positive developmental trajectories of health. *Sports Medicine, 45*(9), 1273–1284.

Ruiz, J. R., Ortega, F. B., Martínez-Gómez, D., Labayen, I., Moreno, L. A., De Bourdeaudhuij, I., ... & Sjöström, M. (2022). Objectively measured physical activity and sedentary time in European adolescents: The HELENA study. *Public Health Nutrition, 24*(2), 364–372.

Timmons, B. W., Naylor, P. J., & Pfeiffer, K. A. (2012). Physical activity for preschool children—how much and how? *Applied Physiology, Nutrition, and Metabolism, 37*(3), 773–779.

Tucker, P., Vanderloo, L. M., Burke, S. M., Irwin, J. D., & Johnson, A. M. (2019). Prevalence and influences of preschoolers' sedentary behaviors in early learning centers: A cross-sectional study. *BMC Pediatrics, 15*(1), 128.

Ward, S. A., Bélanger, M. F., Donovan, D., & Carrier, N. (2021). Systematic review of the relationship between physical activity and cognitive development in early childhood. *Early Childhood Research Quarterly, 36*(2), 432–443.

Aslam, S., & Kamal, A. (2022). Early childhood education in Pakistan: Current trends and challenges. *Journal of Education and Human Development*, *11*(1), 45–56. https://doi.org/10.15640/jehd.v11n1a6

Pate, R. R., O'Neill, J. R., & Brown, W. H. (2020). Prevalence of physical activity among preschool children in child care. *Medicine & Science in Sports & Exercise*, *52*(3), 530–536. https://doi.org/10.1249/MSS.0000000000002178

Timmons, B. W., LeBlanc, A. G., Carson, V., & Janssen, I. (2019). Systematic review of physical activity and health in the early years (aged 0–4 years). *Applied Physiology, Nutrition, and Metabolism*, *44*(6), 775–790. https://doi.org/10.1139/apnm-2018-0284