



RESEARCH ARTICLE

## Comparing the Manipulative Movement of Preschool Children in Religious and Conventional Education Settings

Imam HARIADI<sup>1\*</sup>, Nurrul FADHLI<sup>1</sup>, Dona YUDASMARA<sup>2</sup>, Mashuri Eko WINARNO<sup>2</sup> and Taufik TAUFİK<sup>3</sup>

<sup>1</sup>Universitas Negeri Malang, Sport Science Faculty, Sport Coaching Education Department, Malang City / Indonesia

<sup>2</sup>Universitas Negeri Malang, Sport Science Faculty, Sport Education Department, Malang City / Indonesia

<sup>3</sup>Universitas Negeri Yogyakarta, Sport Science Faculty, Sport Coaching Education Department, Yogyakarta City / Indonesia

\*Corresponding author: imam.hariadi.fik@um.ac.id

### Abstract

This study aims to identify manipulative skills, also known as object control, and compare them across preschoolers aged 4 to 5 who attend religious and secular schools. The TGMD-2 instrument is used in this study along with descriptive quantitative and qualitative approaches. Purposive random sampling was used to get samples from 75 girls and 86 boys enrolled in traditional and religious-based kindergartens in urban locations between the ages of 4 and 5. It was determined from the study's findings that children who attended conventional kindergartens had better manipulative skills (Girls; av. Score: 23,46 with  $p=0,645$ ; Boys; av. Score: 23,60 with  $p=0,431$ ) than those who attended religiously based education (Girls; av. Score: 23,00 with  $p=0,603$ ; Boys; av score: 21,52 with  $p=0,568$ ). It can be concluded that there are not many differences between the two educational systems when comparing them because in Indonesia, there are no preschool teachers specializing in physical education. Classroom teachers are required to teach kids outside, and no studies have been done on this issue. Schools with a religious bent emphasize cognitive skills more. Structured gross motor learning through physical education in schools and support for home play equipment can regularly enhance children's manipulating abilities.

### Keywords

Manipulative Movement, Conventional and Religious Schools, Preschoolers

## INTRODUCTION

Physical activity that is well-structured is only helpful for children's gross motor development, mainly when used in formal settings with supervised practice opportunities (Dapp et al., 2021). WHO recommends that children aged 3-5 years engage in at least 180 minutes of physical activity daily, with at least 60 minutes of moderate to vigorous activity (WHO, 2022). Physical inactivity from preschool age causes 80% of teenagers worldwide to be less active, resulting in a 20–30% greater risk of death (WHO, 2022). Gross motor abilities are also vital in infant development and serve as the foundation for a

lifelong active lifestyle for future participation in physical exercise and sports motivation (Dapp et al., 2021; Lubans et al., 2010). Fundamental motor skill mastery promotes physical development and health, as well as high levels of social and cognitive development (Gashaj et al., 2019; Lubans et al., 2010; van der Fels et al., 2015), psychosocial development and school achievement (Bart et al., 2007). However, seven studies on children's gross motor abilities have been discovered, and the findings are below average, indicating that fundamental motor skills intervention is required in the early school context (Bolger et al., 2021).

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Studies have shown that preschoolers' gross motor skills can benefit from physical activity education, regular attendance at physical education classes, and exercise routines (Iivonen & Sääkslahti, 2014; Jones et al., 2016). Educators can also use interventions to support the development of physical and gross motor abilities (Engel et al., 2018). Preschoolers who regularly attend physical classes, such as dancing, engage in moderate to strenuous physical activity that can further promote their motor development (Hardy et al., 2013). Structured physical activity education can help preschoolers achieve adequate motor development (Ruiz-Esteban et al., 2020).

A review of studies from 2007 to 2018 demonstrates that schools with professional physical education instructors who instruct physical activity produce good motor skills (Santos et al., 2020). However, most youngsters in one of Indonesia's early childhood education institutions still cannot perform manipulative actions such as kicking, throwing, catching, and so on (Hendra & Putra, 2019). Early childhood education in Indonesia, unlike in elementary, junior, and secondary schools, does not require teachers or separate physical education sessions.

These basic motor skills are essential for physical activity and a healthy weight in preschool children, so environmental support, such as equipment that can improve children's motor skills, can allow children to move freely while developing children's manipulative skills (Bardid et al., 2019; Bardid et al., 2019). According to the age scale, children do not use physical activity equipment every day at the age of 3.5 years, but from this age range up to 5 years of age, they use games as motion control (manipulative) objects on average every day, allowing them to stimulate not only manipulative movements but also locomotor movements (Zeng et al., 2019). Equipment that is positively related to motor skills will allow children to increase sports and play activities that require specific skills (Cools et al., 2011). In contrast, children who have a risk of motor skills below the norm may be due to a lack of physical activity equipment at home (Bellows et al., 2017).

Little attention has been paid to the positive predictors of gross motor ability during preschool. Physical education becomes a key focus in early childhood education to develop children's gross motor proficiency, particularly in manipulating abilities. This study aims to measure the degree of

gross motor abilities of children, particularly in manipulative skills or object control, and to compare the manipulative skills of 4-5-year-old preschool children who attend religious and conventional education.

## MATERIALS AND METHODS

### *Study Design and Participants*

This study's design incorporates descriptive, quantitative, and qualitative elements. The manipulative skills sub-test, which includes catch, kick, overhand throw, and underhand roll, was used to identify children's manipulative skills using the TGMD-2 instrument (Ulrich & Sanford, 2000).

At the beginning of the study, 227 preschool children from various parts of Malang were included. Each child's parent or guardian was provided with a consent form as an initial step in getting their permission for their child's participation in the research. Out of the 227 parents or guardians who received the consent forms, 161 (75 girls and 86 boys) who attended conventional and religion-based agreed to let their children participate, while 66 either did not return the form or declined to allow their children to join the study. A purposive random sample was used by carrying out the approval procedure from the school and the approval of the parents of the children who were the research subjects.

### *Ethical Consideration*

This study has been approved Politeknik Kesehatan Kemenkes Malang State Polytechnic Of Health with certificate (Reg.No.:618 / KEPK-POLKESMA/ 2022). Parents and caregivers of the children agreed to sign the consent form, and the kindergarten director signed the director's consent form. Participation is optional and without compensation, and each participant understands the objective and procedure of the research, which is communicated directly to them.

### *Data Management and Analysis*

The process of comparing data is a critical aspect of data analysis, which involves the use of different statistical techniques to establish the minimum, maximum, standard deviation, and average values of research data processed from each research variable. The use of descriptive statistics is an effective means of describing the composition of manipulative movement in a

research study. It helps to identify the frequency of understanding of the data. In addition, IBM SPSS statistics are widely used to process data analysis and provide a robust framework for analyzing complex data sets. The software is designed to handle large data sets and can provide detailed insights into the patterns and trends that emerge from the data. Overall, the combination of descriptive statistics and IBM SPSS statistics is a powerful tool for researchers to gain a deeper understanding of their data and draw meaningful conclusions.

different variables and provides a more detailed

**RESULTS**

Tables 1 and 2 present the findings of a comparative examination of manipulative movement skills with minimum, maximum, standard deviation, average, and category scores for students attending conventional and Islamic religious-based schools.

**Table 1.** Comparison of manipulative activity in both type of school

Measured Skills (Manipulative Activity)	N	Age Group	Gain Scores		P-value	Criteria	Av. Score	Sig.
			Range	Mean ± SD				
<b>Conventional</b>								
Girls	61	4,5±0,71					23,46	0,645
Catch			6-12	9,00 ± 4,24	0,536	Average		
Kick			4-12	8,00 ± 5,66	0,844	Average		
Overhand Throw			8-16	12,00 ± 5,66	0,730	Average		
Underhand Roll			7-18	12,50 ± 7,78	0,470	Average		
Boys	57	4,5±0,71					23,60	0,431
Catch			6-12	9,00 ± 4,24	0,508	Average		
Kick			4-12	9,00 ± 4,25	0,493	Average		
Overhand Throw			8-16	12,00 ± 5,66	0,281	Average		
Underhand Roll			6-18	18,00 ± 8,49	0,441	Average		
<b>Religious-based</b>								
Girls	14	4,5±0,71					23,00	0,603
Catch			7-13	9,00 ± 2,83	0,380	Average		
Kick			6-11	8,50 ± 3,54	0,378	Average		
Overhand Throw			9-16	12,50 ± 4,95	0,827	Average		
Underhand Roll			9-20	14,50 ± 7,78	0,826	Average		
Boys	29	4,5±0,71					21,52	0,568
Catch			8-12	10,00 ± 2,83	0,425	Average		
Kick			6-12	9,00 ± 4,24	0,667	Average		
Overhand Throw			4-14	9,00 ± 7,07	0,483	Average		
Underhand Roll			8-17	12,50 ± 6,36	0,696	Average		

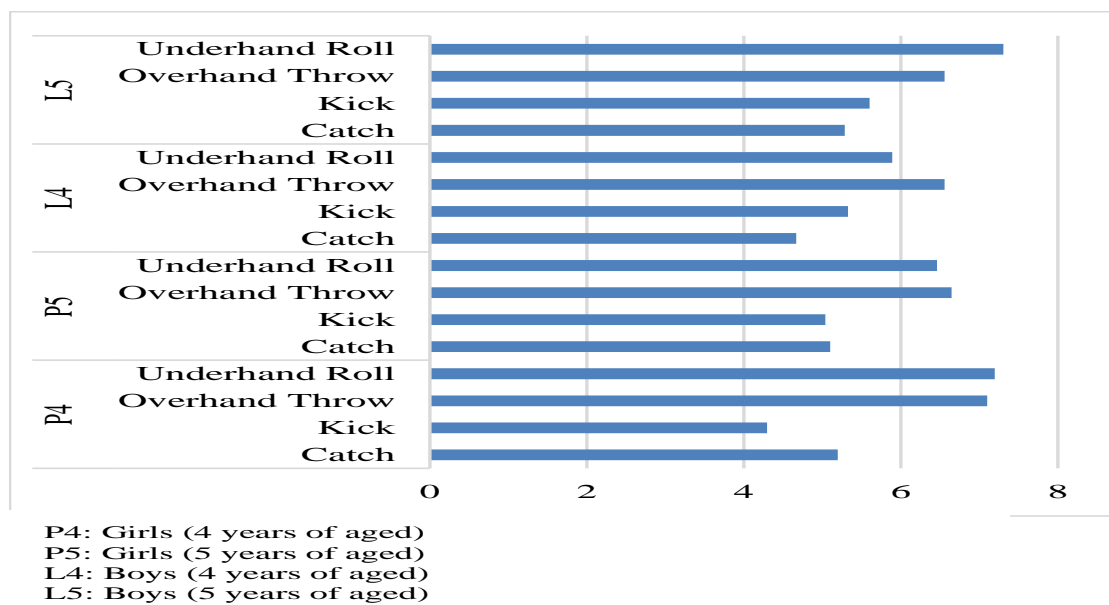
The following is a detailed comparison of the manipulative movement skills of students from conventional and Islamic religious-based schools. The data presented in Table 1 includes the minimum, maximum, standard deviation, average, and category scores. The results show that boys aged five years had the highest average score of 23.60, with a p-value of 0.431. This indicates that there is a significant difference between the scores of boys and girls of the same age group. On the other hand, girls aged five years had the lowest average score of 23.00, with a p-value of 0.603.

This suggests that there is no significant difference between the scores of girls and boys in this age group.

Furthermore, the highest average score for a 4-year-old girl in the conventional school was 23.46 (p-value: 0.643), which is only slightly lower than the overall average score. This indicates that the manipulative movement skills of four-year-old girls in conventional schools are generally on par with those of students from religious-based schools. The difference being referred to in this context is of a minor nature

when compared to the difference observed in boys' scores shown in Table 1. It is important to note that boys aged 4 had the lowest average score of 21.52 (p-value; 0,568), indicating that their manipulation skills were not at par with other age groups. The average scores of boys in Tables 1 and 2 differed by more than 2.00, which implies that children who attend conventional schools have an edge over those who attend Islamic religious-based schools in terms of their ability to manipulate

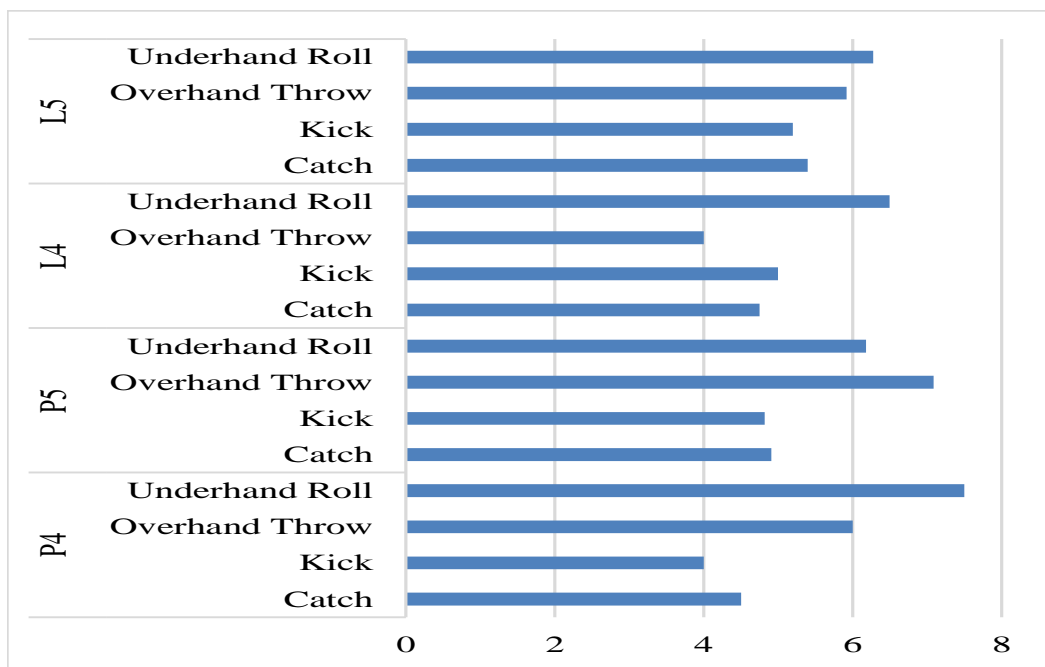
objects and perform tasks. This observation can be attributable to the difference in teaching methodologies and emphasis on skill development in the two types of schools. It is imperative to note that this difference can have a significant impact on the overall cognitive development of children and, therefore, needs to be taken into account while designing educational programs. Then the comparison of each subtest in both of schools presented in figure 1 and 2 below;



**Figure 1.** Average value of conventional school students' manipulative skills

According to the data presented in Figure 1, there seems to be a variation in the physical abilities of children based on their gender and the type of school they attend. The chart indicates that male children who attend traditional schools show high levels of proficiency in the underhand roll movement at the age of five, which may indicate that boys in traditional schools receive more opportunities to develop their physical skills. On the other hand, female children aged four years who perform the actions of catch, overhand throw, and underhand roll fall under the "average" category, which may suggest that girls in this age group may need more practice and guidance to improve their physical abilities. Overall, the data presented in Figure 1 provides valuable insights into the physical development of children and could help educators and parents tailor their approach to better support children's growth and development. Then, for religious-based, it is presented in this figure below.

As per the data presented in Figure 2, it has been observed that children who attend Islamic religious-based schools exhibit exceptional proficiency in the underhand roll movement. This particular movement involves the ability to roll the ball efficiently, and the male children aged five years who attend these schools have been found to excel in this aspect. In addition, the data indicates that a 4-year-old girl's catching and throwing skills are categorized as "below average". This implies that while she may be able to perform these movements, her skills in these areas are not yet fully developed. Similarly, a 4-year-old boy's overhand throwing ability falls in the "average" category, indicating that he has a moderate level of proficiency in this particular movement. Overall, the data presented in Figure 2 sheds light on the varying levels of physical skills exhibited by children of different ages and genders, and the role that attending an Islamic religious-based school can play in enhancing these abilities.



P4: Girls (4 years of aged)  
 P5: Girls (5 years of aged)  
 L4: Boys (4 years of aged)  
 L5: Boys (5 years of aged)

**Figure 2.** Average value of religion-based school students' manipulative skills

**DISCUSSION**

It is widely believed that object control or manipulative skills serve as the foundation for developing other athletic skills (Butterfield et al., 2012a). As we age, basic motor abilities continue to develop and improve (Bolger et al., 2021). This development of motor skills is essential to increase physical activity and sports enthusiasm in the future, which is referred to as "physical literacy" (Jurbala, 2015). Many individual traits, such as physical activity, physical fitness, play activities, ethnicity, age, and gender, influence motor abilities (Iivonen & Sääkslahti, 2014).

Previous studies have found that boys tend to have better manipulative skills than girls. They are able to handle objects with greater ease and achieve good results, while girls tend to get poor results. This is consistent with previous research that has shown that boys are better at controlling objects (Bolger et al., 2021). Boys also tend to be better at throwing and attacking, while girls don't show a significant difference in catching and kicking (Butterfield et al., 2012b). However, some data suggest that gender has only a minor effect on object control skills, while age has a significant impact (Yang et al., 2015). It is important to learn these skills during the early preschool years when

movement patterns are developing (Hardy et al., 2010). Additionally, manipulative abilities tend to improve rapidly between the ages of 9-10, followed by delays in catching, throwing, and kicking, before continuing at a consistent pace at around the age of 14 (Butterfield et al., 2012b). Although girls aged 4-9 or 9-12 demonstrate mastery of certain attack skills such as stationary dribbles, throws, or overhand kicks, they only master around 40% of the 24 sub-skills, lacking in the six control skills preparation, action, and recovery phases (Eather et al., 2018).

The development of physical and gross motor abilities is an essential aspect of a child's growth and development. Educators play a vital role in facilitating this development through various interventions. According to a study by Engel et al. (2018), preschoolers can benefit significantly from such interventions. The study compared the performance of children attending traditional schools with those attending Islamic religious-based education. It found that conventional schools, with manipulative activities such as throwing, catching, kicking, and dribbling, had better results than religious-based schools. The latter focuses on cognitive aspects, neglecting gross and fine motor skills development (Kibtiyah, 2018).

Movement exercises are crucial for preschoolers to understand their body and its ability to move. Movement pattern development focuses on enhancing the competence and efficiency of body mechanics in a range of movement contexts. This development is not limited to high-level abilities in specific movement scenarios but aims to benefit the proficiency and efficiency of body mechanics in various movement contexts.

Lahuerta-Contell et al., (2021) conducted a study on the effects of structured movement on children. They observed that children who had ample time for vigorous physical activity during physical education sessions were more likely to have a lot of time for vigorous physical activity throughout the week. This structured movement contributed nearly three times the amount of moderate to vigorous activity compared to days spent without structured movement. Educators must incorporate physical activity and manipulative activities in their teaching to help preschoolers develop their physical and gross motor abilities. This development is critical to a child's overall growth and development and lays the foundation for a healthy lifestyle.

In conclusion, this study has uncovered several significant implications for both parents and the future of preschool education. The research has found that children require practice in their manipulative movement skills, both at school and at home, to see significant improvements in their fundamental movement skills and potential. To this end, it is recommended that young children engage in physical activity in line with WHO guidelines, which suggest at least 60 minutes of moderate to vigorous intensity activity three times a week.

Furthermore, the study has shown that the optimal time for children to learn these skills is during preschool. During this time, children's brains and bodies are still growing and developing, and their movement control can be improved with the right encouragement. Play equipment, such as balls, ropes, and swings, can be effective tools for encouraging children's movement control. It is also important that instructors and parents are consistently present to guide and encourage children in their physical activities.

Overall, this research demonstrates the importance of both school and home environments in promoting children's physical development.

Parents can help children achieve their full potential and lay the foundation for a lifetime of healthy physical activity by providing opportunities for children to practice their manipulative movement skills.

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## Conflict of interest

The authors declared there were no conflicts of interest. Additionally, no financial assistance was given.

## Ethics Committee

This study has been approved Politeknik Kesehatan Kemenkes Malang State Polytechnic Of Health with certificate (Reg.No.:618 / KEPK-POLKESMA/ 2022).

## Author Contributions

Study Design, IH, NF; Data Collection, IH, DY; Statistical Analysis, IH, MEW; Data Interpretation, IH, NF, DY, MEW,TT; Manuscript Preparation, IH, NF, DY, MEW,TT; Literature Search, IH, NF, DY, MEW,TT. All authors have read and agreed to the published version of the manuscript.

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