

Analysis of gross motoric analysis of elementary school students: A comparative study of students in hill and coastal areas

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Abstract

Background and Study Aim Motor skills are a very important ability for every student to have because they can affect their full development. However, the growth and development of elementary school-age children is likely to be influenced by environmental factors such as family, social environment, school environment. This study aims to determine differences in gross motor skills in elementary school students in lower grades in hilly and coastal areas.

Material and Methods This research includes quantitative research with a cross sectional study approach. In this study were given tests and measurements to measure gross motor skills in elementary school students using the Gross Motor Development-2 Test (TGMD-2): running tests, gallops, hops, horizontal jumps, leaps, slides, striking a stationary ball, stationary dribble, catch, kick, overhand throw, and underhand roll. The subjects in this study were male students in the lower grades of SD Negeri 38 Nanga Tayap in the hilly area and SD Negeri 27 Sungai Kakap in the coastal area. The purposive sampling technique resulted in a sample of 45 samples consisting of 21 students from hilly areas and 24 students from coastal areas. Data analysis in this study was assisted by the SPSS Version 26 application.

Results Based on these results, it can be concluded that there are significant differences in gross motor skills between students in hilly areas and coastal areas. The results also show that the gross motor skills of students in hilly areas are classified as low. These results tend to be in the Poor category. Compared to the gross motor skills of students in coastal areas which show a Very Superior dominance.

Conclusions The results of the study proved that the gross motor skills of students in hilly and coastal areas had significant differences. These findings have provided additional references regarding gross motor skills of students. This can be used as material for evaluation by teachers and sports practitioners in designing suitable programs to stimulate gross motor skills in elementary school students.

Keywords: motor skills, elementary school, students in hill areas, students in coastal areas

Introduction

Motor skills are currently a very common topic that is being explored globally from different perspectives [1, 2, 3, 4]. Where poor motor skills have become an increasing problem in adolescents [5]. In addition, motor skills are fundamental to child development [6]. This statement is reinforced by Gustian that every student must have good motor skills in order to assist full development [7]. The need to improve basic motor skills in pre-schoolers will help optimize the learning process [8]. That way, in elementary school physical education is one of the important subjects to be taught [9], and is mandatory for students [10].

Growth and development in elementary school-age children is strongly influenced by the surrounding environment, such as family, social environment, school environment [11], and also stimulates physical fitness and motor development children [12]. Besides that in the school environment the teacher is an important agent in providing services to improve motor skills, in order to meet the development and growth and behavioral needs of each student in the future, knowing the student development phase is an important part so that all phases of motor skills can be carried out and that phase mastered according to the age level of the student [13]. Children's gross motor movements need to be well developed so that in the future they will have good hard good [14, 15].

Other research proves that by doing movement

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activities, children can explore their environment so that they can stimulate their development cognitive and student academic achievement [16]. Next, the development of fitness through learning movement activities in elementary schools is very effective in maximizing the gross motor development of school-age students [17]. Movement activities carried out by students make the body healthy and fit [18, 19], because it can improve fitness [20, 22, 23] and the cardiorespiratory system, as well as improving the performance of the metabolic and neuromuscular systems, also having a positive effect on children's achievement and cognitive outcomes.

Movement activities also provide positive changes in the physiological and anthropometric indices of the health of students who have normal weight and are obese. In addition, physical activity through sports is very easy to do for both adults and children [24]. Next, a study says that sports science has an important role in developing gross motor skills [25]. Thus, it is very important to integrate physical activity into a child's life and become a cornerstone in facilitating and maintaining a healthy and active lifestyle throughout adulthood. The problem that occurs is that most schools and parents lack understanding of the importance of stimulating motor skills and are more focused on improving students' cognitive abilities so that this impacts students' motor skills [26]. The inability of children to regulate their body balance, accuracy in throwing and catching things, and agility when moving are also problems in gross motor development [27]. The facts also show that the physical activity of students at school has a short duration of time [28]. Several studies say that gross motor skills are very important to learn as a whole for students [7, 29], so that they can encourage improvement in psychological and mental health [30].

Based on the results of a preliminary study through physical education teacher interviews students' gross motor skills problems are also still not monitored. Meanwhile, motor skills are basic [6], and important aspects related to the healthy development of children [9], children with down syndrome, and typically developing children [31]. Furthermore, Marlia et al. [32] compared children who took part in rhythmic and non-rhythmic gymnastics. However, no research has been found that compares the gross motor skills of elementary school children in hilly and coastal areas, which have different environments, climates and locations. So this is one of the gaps that can be developed as well as the reason why this study is important. This study aims to show the level of gross motor skills in elementary school students in hilly and coastal areas and do a comparison between the two. Of course, this research plays an important role in knowing gross motor skills, so that this can be a basic exercise.

Materials and Methods

Participants

The subjects in this study were male students in the lower grades of SD Negeri 38 Nanga Tayap and SD Negeri 27 Sungai Kakap. As for this study, the determination of the sample using a purposive sampling technique so that is obtained the sample consisted of 45 students (21 elementary school students in hilly areas and 24 elementary schools in coastal areas) who were sampled.

Research Design

This research includes quantitative research with a cross sectional study approach namely a type of observational design that analyzes data from a population at a predetermined time [33]. As for this research, it is to see the gross motoric development of students SD Negeri 38 Nanga Tayap and SD Negeri 27 Sungai Kakap. The instruments in this study used tests and measurements by O'Brien et al., [34], namely, Test Gross Motor development-2 (TGMD-2) running tests, gallops, hops, horizontal jumps, leaps, slides, striking a stationary ball, stationary dribble, catch, kick, overhand throw, and underhand roll.

Statistical Analysis

Data analysis in this study uses descriptive analysis. This aims to determine gross motor skills in elementary school students in hilly and coastal areas as well as facilitating the presentation of research data. Furthermore, to find out the difference using the normality test, if the data is normal, the independent t test will be used, and if the data is not normal, it is non-parametric. In this study, data analysis was assisted by using the SPSS Version 26 application.

Results

Based on the results of the research, the description of the recording data for *Test Gross Motor development - 2 TGMD- 2* for gross motor skills of the sample in detail can be seen in the following table. The results can be seen in table 1.

The results in table 1 show that the average value of gross motor skills in male students from the lower grades of the hills is 11.8, while in the coastal areas it shows an average of 31.6. Based on these results, the average value of motor skills in students in coastal areas is greater than the average value of gross motor skills in students in hilly areas.

Before the differential test was carried out, a prerequisite normality test was first carried out using the *Shapiro-Wilk test formula*. The results show that the significance value for students in hilly areas is $0.248 > 0.05$ and in coastal areas $0.204 > 0.05$ based on these values, it can be concluded that the data is normally distributed. The results can be seen in Table 2.

The homogeneity test in Table 3 shows a significance value of $0.706 > 0.05$. The results indicate that the data is homogeneous. Next, a different test will be carried out, in this study using the *Independent Samples Test formula*.

After the prerequisite test was carried out, it was continued with the t test, the results of the study showed a significance value of $0.000 < 0.05$. Based on these results, it can be concluded that there are significant differences in gross motor skills between male students in elementary schools in hilly areas and coastal areas. The results can be seen in table 4.

The data in table 5 describes the assessment

of gross motor skills in male elementary school students in hilly and coastal areas. The results show that the skills of male students in hilly areas are low, where these results tend to be in the Poor category. Furthermore, the skills of male students in coastal areas show the results of Very Superior dominant percentages. The results are explained in figure 1.

Discussion

This study aims to determine the differences and gross motor skills in elementary school students in hilly and coastal areas, so that they can be used as an evaluation picture in learning physical education

Table 1. Descriptive Data on Students' Gross Motor Skills

Group	N	Means	std. Deviation	Minimum	Maximum
Hill Region Students	21	11.8	4.5	5.00	20.00
Coastal Students	24	31.6	4.7	20.50	42.50
Total	45	22.4	11.02044	5.00	42.50

Table 2. Shapiro-Wilk Normality Test

Results	Group	Shapiro-Wilk		
		Statistics	df	Sig.
Students' gross motor skills	Hill Region Students	0.943	21	0.248
	Coastal Students	0.944	24	0.204

Table 3. Test of Homogeneity of Variances

Results		Levene Statistics	df1	df2	Sig.
Students' gross motor skills	Based on Means	0.144	1	43	0.706

Table 4. Independent Samples Test

Results		F	Sig.	t	df	Sig. (2-tailed)
Students' gross motor skills	Equal variances assumed	0.144	0.706	-14,308	43	0.000
	Equal variances not assumed			-14,364	42,729	0.000

Table 5. Motoric Assessment of Lower Class Students in Hilly and Coastal Areas

Gross Motor Quotient	Hills (Men)	Relative (%)	Coastal (Men)	Relative (%)	Descriptive Ratings
>130	0	0%	13	54.1%	Very Superior
121 - 130	0	0%	9	37.5%	Superior
111 - 120	0	0%	1	4.2%	Above Average
90 - 110	2	9.5%	1	4.2%	Average
80 - 89	6	28.6%	0	0%	Bellows Average
70 - 79	6	28.6%	0	0%	Poor
<70	7	33.2%	0	0%	Very Poor

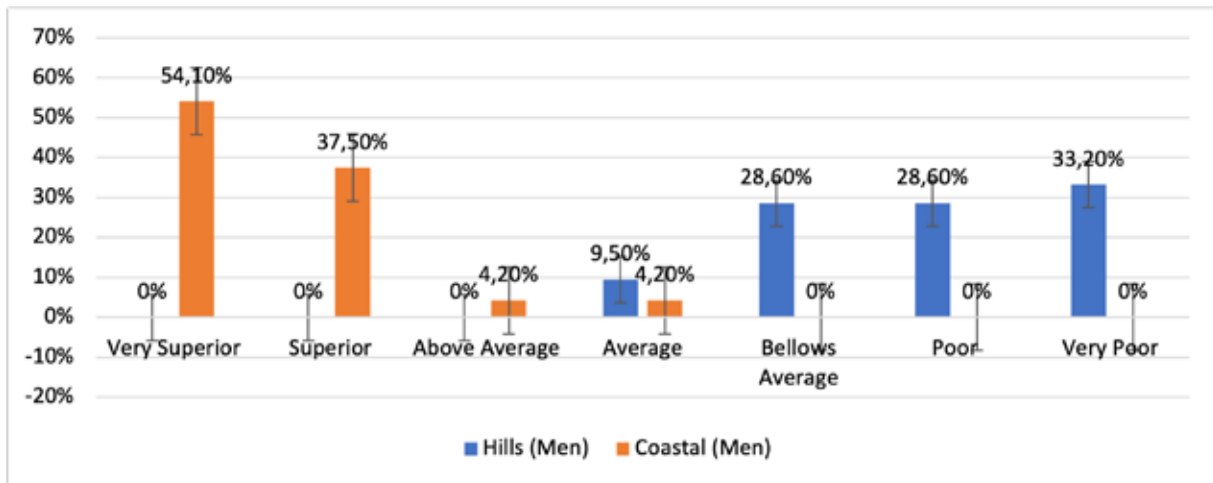


Figure 1. Description of Gross Motor Assessment

at school. The results of this study showed that there was a difference in the mean value of the gross motor skills of students in hilly areas of 11.8 and the gross motor skills of students of coastal areas or there was a difference of 31.6. In addition, the significance value indicates a significant difference, the results also show that the t count is greater than the t table. Based on these results, this study proves that there are differences in the gross motor skills of students from hilly areas and students from coastal areas, where the gross motor skills of hill students are better. The results of previous research conducted by Aydin & Gulac on students aged 8-10 years who took part in sports activities, where the results of the study showed that soccer students had better gross motor skills than sports by basketball and taekwondo [35].

A study that is relevant to the research that we have done, the results of the study show a real difference between those found in children with down syndrome, typically developing children, and children with borderline intellectual functioning [31], where children with down syndrome are likely most of the identified developmentally advanced age-appropriate or delayed [36]. Furthermore, it was found that motor skills in boys showed better than girls [35], and athletes in volleyball and gymnastics had lower gross motor skills when compared to other sports. Another study was conducted by Suryadi there was a significant difference in physical fitness between basketball and futsal extracurriculars, in which basketball has a better level of fitness [19].

Furthermore, to master the ability to move, of course, requires a relatively long time [37]. Based on this statement, research conducted by Gustian by providing treatment in the form of traditional games can actually stimulate gross motor skills in elementary school children [7]. Apart from that, improvements also cover locomotor movements, fundamental movements, and object control [38, 39, 40]. In line with research by Domville playing

methods are consistently carried out with fun designs [41], this will increase students' enjoyment in doing motor learning [7]. Thus, learning activities by playing are considered capable of being a medium for forming behavior on condition that it goes according to the rules [42]. Recent findings prove that by combining integrative physical activity learning with various forms of games it turns out to have an effective effect on stimulating cognitive in elementary school students [43].

Based on these various reviews, it has been illustrated that a well-designed game model will have a positive influence on gross motor results in students. Next Pham by implementing the BRAINballs program can have a positive influence on motor outcomes in children and can help to understand the development of motor skills [44]. In addition, where at the elementary school level, students' motor skills are in the basic movement phase of the adult stage and the special movement phase of the transition and application stages [45]. Research Johari providing training in handling parents is beneficial for improving the motor function of children with cerebral palsy [46]. Based on the research results obtained, this can be an illustration for designing exercise programs by teachers and sports practitioners as a treatment that will give to help gross motor development and improve athlete performance [47].

Conclusions

The results of this study have a strong foundation regarding differences in gross motor skills in male elementary school students in hilly areas and coastal areas, based on the references listed in the discussion results. Research shows that there is a mean difference in gross motor skills of students in hilly areas and coastal areas. The results of the study proved that the gross motor skills of elementary school students in hilly and coastal areas had significant differences. These results have

provided a new reference regarding the gross motor skills of elementary school students, so that this can be used as material for evaluation by teachers and sports practitioners in preparing lesson plans and exercises to provide improvements to gross motor skills. Recommendations for further research can conduct research on developing appropriate and fun training programs to stimulate gross motor skills in elementary school students.

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Conflict of interest

There is no conflict of interest.

References

1. Fernandes VR, Ribeiro MLS, Melo T, Maciel-Pinheiro P de T, Guimarães TT, Araújo NB, et al. Motor coordination correlates with academic achievement and cognitive function in children. *Front Psychol*. 2016;7(318). <https://doi.org/10.3389/fpsyg.2016.00318>
2. Ghassabian A, Sundaram R, Bell E, Bello SC, Kus C, Yeung E. Gross motor milestones and subsequent development. *Pediatrics*. 2016;138(1):1–8. <https://doi.org/10.1542/peds.2015-4372>
3. Kenny L, Hill E, Hamilton AF d. C. The Relationship between Social and Motor Cognition in Primary School Age-Children. *Front Psychol*. 2016;7(288). <https://doi.org/10.3389/fpsyg.2016.00228>
4. Libertus K, Hauf P. Editorial: Motor skills and their foundational role for perceptual, social, and cognitive development. *Frontiers in Psychology*. 2017. 8(301):1–4. <https://doi.org/10.3389/fpsyg.2017.00301>
5. Plumb MS, Hands B, McIntyre F, Timler A. Self-Report Motor Competence in Adolescents Aged 12–18 Years in Regional and Rural Victoria (Australia). *Res Q Exerc Sport*. 2021;92(3):388–98. <https://doi.org/10.1080/02701367.2020.1739606>
6. Lucas BR, Elliott EJ, Coggan S, Pinto RZ, Jirikowic T, McCoy SW, Latimer J. Interventions to improve gross motor performance in children with neurodevelopmental disorders: A meta-analysis. *BMC Pediatr*. 2016;16(193):1–16. <https://doi.org/10.1186/s12887-016-0731-6>
7. Gustian U. Effectiveness of Traditional Games In Stimulating Elementary School Student Motor Skill Development. *J Pendidik Jasm dan Olahraga*. 2021;6(1):75–80. <https://doi.org/10.17509/jpjo.v6i1.27026>
8. García-Marín P, Fernández-López N. Motor skills competence in preschool education. *Apunt Educ Fis y Deport*. 2020;141:21–32. [https://doi.org/10.5672/APUNTS.2014-0983.ES.\(2020/3\).141.03](https://doi.org/10.5672/APUNTS.2014-0983.ES.(2020/3).141.03)
9. van Kernebeek WG, de Kroon MLA, Savelsbergh GJP, Toussaint HM. The validity of the 4-Skills Scan A double-validation study. *Scand J Med Sci Sport*. 2018; <https://doi.org/10.1111/sms.13231>
10. Rubiyatno R, Suryadi D. Penerapan Media Audio Visual Dalam Meningkatkan Hasil Belajar Servis Bulutangkis di MTs Mujahidin Pontianak. *Musamus J Phys Educ Sport*. 2022;4(2):140–9. <https://doi.org/10.35724/mjpes.v4i02.4303>
11. Fadhullah RF, Teguh L, Wiguno H. Pertumbuhan dan Perkembangan Motorik Kasar Pada Kelas Rendah Sekolah Dasar. *Sport Sci Heal*. 2020;2(8):401–14. <https://doi.org/10.17977/um062v2i82020p401-414>
12. Hu BY, Wu Z, Kong Z. Family Physical Activities Choice, Parental Views of Physical Activities, and Chinese Preschool Children's Physical Fitness and Motor Development. *Early Child Educ J*. 2022;50(5):841–53. <https://doi.org/10.1007/s10643-021-01190-5>
13. Iswanto A, Widayati E. Pembelajaran pendidikan jasmani yang efektif dan berkualitas [Effective and quality physical education learning]. *Maj Ilm Olahraga*. 2021;27(1). (In Indonesian).
14. Hadi H, Royana IF, Setyawan DA. Keterampilan Gerak Dasar Anak Usia Dini Pada Taman Kanak-Kanak (TK) di Kota Surakarta. *J Ilm Penjas*. 2017;3(2):61–73.
15. S. TS, Nasirun M, D D. Aplikasi Gerak Lokomotor Sebagai Media Untuk Meningkatkan Kemampuan Motorik Kasar Pada Kelompok B1. *J Ilm Potensia*. 2020;5(1):16–24. <https://doi.org/10.33369/jip.5.1.16-24>
16. Tandon PS, Tovar A, Jayasuriya AT, Welker E, Schober DJ, Copeland K, et al. The relationship between physical activity and diet and young children's cognitive development: A systematic review. *Prev Med reports*. 2016;3:379–90. <https://doi.org/10.1016/j.pmedr.2016.04.003>
17. Kiranida O. Memaksimalkan Perkembangan Motorik Siswa Sekolah Dasar Melalui Pelajaran Penjaskes [Maximizing the Motor Development of Elementary School Students Through Physical Education Lessons]. *J Tunas Bangsa*. 2019;6(2):318–28. (In Indonesian).
18. Suhartoyo T, Budi DR, Kusuma MNH, Syafei M, Listiandi AD, Hidayat R. Identifikasi Kebugaran Jasmani Siswa SMP Di Daerah Dataran Tinggi Kabupaten Banyumas [Physical Fitness of Junior High School Students in the Highlands of Banyumas Regency]. *Phys Act J*. 2019;1(1):8–17. (In Indonesian). <https://doi.org/10.20884/1.paju.2019.1.1.1995>
19. Suryadi D. Analisis kebugaran jasmani siswa: Studi komparatif antara ekstrakurikuler bolabasket dan futsal [Analysis of students' physical fitness: Comparative study between basketball and futsal extracurriculars]. *Edu Sport Indones J Phys Educ*. 2022;3(2):100–10. (In Indonesian). [https://doi.org/10.25299/es:ijope.2022.vol3\(2\).9280](https://doi.org/10.25299/es:ijope.2022.vol3(2).9280)
20. Gea-García GM, González-Gálvez N, Espeso-

- García A, Marcos-Pardo PJ, González-Fernández FT, Martínez-Aranda LM. Relationship Between the Practice of Physical Activity and Physical Fitness in Physical Education Students: The Integrated Regulation As a Mediating Variable. *Front Psychol*. 2020; <https://doi.org/10.3389/fpsyg.2020.01910>
21. Lee HS, Jeong WW, Choi YJ, Seo YG, Noh HM, Song HJ, Paek YJ, Kim YM, Lim HJ, Lee HJ, Jang HB, Park SI, Park KH. Association between physical fitness and cardiometabolic risk of children and adolescents in Korea. *Korean J Fam Med*. 2019;40(3):159–64. <https://doi.org/10.4082/kjfm.17.0085>
 22. Malicka I, Mrowiec J, Sajkiewicz N, Siewierska K, Czajkowska M, Woźniewski M. Physical fitness of school-age children after cancer treatment. *Int J Environ Res Public Health*. 2019;16(8):1436. <https://doi.org/10.3390/ijerph16081436>
 23. Popović B, Cvetković M, Mačak D, Šćepanović T, Čokorilo N, Belić A, Trajković N, Andrašić S, Bogataj Š. Nine months of a structured multisport program improve physical fitness in preschool children: A quasi-experimental study. *Int J Environ Res Public Health*. 2020;17(14):4935. <https://doi.org/10.3390/ijerph17144935>
 24. Suryadi D, Gustian U, Fauziah E. The Somatotype of Martial Athletes in the Fighter Category Against Achievement. *JUARA J Olahraga*, 2022;7(1):116–25.
 25. Roslan NAA, Abdullah B. Differences in the level of children gross motor skills development in silat, taekwondo and karate in Malaysia. *Int J Hum Mov Sport Sci*. 2020;8(2):57–62. <https://doi.org/10.13189/saj.2020.080202>
 26. Mahmud B. Urgensi Stimulasi Kemampuan Motorik Kasar pada Anak Usia Dini [The Urgency of Stimulating Gross Motor Skills in Early Childhood]. *Didakt J Kependidikan*. 2019;12(1):76–87. (In Indonesian). <https://doi.org/10.30863/didaktika.v12i1.177>
 27. Mayasari D, Diana D, Setiawan D. Pengaruh Modifikasi Selodor terhadap Kemampuan Motorik Kasar Anak Usia Dini [The Effect of Selodor Modification on Gross Motor Ability in Early Childhood]. *J Obs J Pendidik Anak Usia Dini*. 2022;6(6):5808–18. (In Indonesian). <https://doi.org/10.31004/obsesi.v6i6.3231>
 28. Kremer MM, Reichert FF, Hallal PC. Intensity and duration of physical efforts in Physical Education classes. *Rev Saude Publica*. 2012;46(2):320–6. <https://doi.org/10.1590/S0034-89102012005000014>
 29. Kustari NE, Mahendra AM. Studi Deskriptif Mengenai Keterampilan Motorik Kasar Siswa Sekolah Dasar Se Kecamatan Cileunyi [Descriptive Study of Gross Motor Skills of Elementary School Students in Cileunyi District]. *J Penelit Pendidik*. 2020;20(3):382–391. (In Indonesian). <https://doi.org/10.17509/jpp.v20i3.27089>
 30. Lobstein T, Jackson-Leach R, Moodie ML, Hall KD, Gortmaker SL, Swinburn BA, et al. Child and adolescent obesity: part of a bigger picture. *Lancet*. 2015;385(9986):2510–20. [https://doi.org/10.1016/S0140-6736\(14\)61746-3](https://doi.org/10.1016/S0140-6736(14)61746-3)
 31. Alesi M, Battaglia G, Pepi A, Bianco A, Palma A. Gross motor proficiency and intellectual functioning A comparison among children with down syndrome, children with borderline intellectual functioning, and typically developing children. *Med (United States)*. 2018;97(41):e12737. <https://doi.org/10.1097/MD.00000000000012737>
 32. Marlia A, Nisa' TF, Fajar YW. Perbandingan Keterampilan Motorik Kasar Anak Kelompok B pada Kegiatan Senam Berirama dan yang Tidak Berirama [Comparison of Gross Motor Skills of Group B Children in Rhythmic and Non-Rhythmic Gymnastics Activities]. *J PG-PAUD Trunojoyo J Pendidik dan Pembelajaran Anak Usia Dini*. 2018;5(2):116–22. (In Indonesian). <https://doi.org/10.21107/pgpaustrunojoyo.v5i2.5439>
 33. Wang X, Cheng Z. Cross-Sectional Studies: Strengths, Weaknesses, and Recommendations. *Chest*. 2020. <https://doi.org/10.1016/j.chest.2020.03.012>
 34. O' Brien W, Belton S, Issartel J. Fundamental movement skill proficiency amongst adolescent youth. *Phys Educ Sport Pedagog*. 2016;21(6):557–71. <https://doi.org/10.1080/17408989.2015.1017451>
 35. Aydin E, Gulac M. Comparison of Gross Motor Skills of 8-10 Years Old Students Active in Different Sport Branches. *Asian J Educ Train*. 2019;5(4):p582-588. <https://doi.org/10.20448/journal.522.2019.54.582.588>
 36. Winders P, Wolter-Warmerdam K, Hickey F. A schedule of gross motor development for children with Down syndrome. *J Intellect Disabil Res*. 2019;63(4):346–56. <https://doi.org/10.1111/jir.12580>
 37. Silverman S, Mercier K. Teaching for physical literacy: Implications to instructional design and PETE. *J Sport Heal Sci*. 2015;4(2):150–5. <https://doi.org/10.1016/j.jshs.2015.03.003>
 38. Akbari H, Abdoli B, Shafizadeh M, Khalaji H, HAJI HS, ZIAEI V. The effect of traditional games in fundamental motor skill development in 7-9 year-old boys. *Iran J Pediatr*. 2009;19(2):123–9. <https://doi.org/10.1080/02701367.2016.1164009>
 39. Gipit MA, Abdullah MR, Musa RM, Kosni NA, Maliki ABHM. The effect of traditional games intervention programme in the enhancement school-age children's motor skills: A preliminary study. *Malaysian J Movement, Heal Exerc*. 2017;6(2):157–69. <https://doi.org/10.15282/mohe.v6i2.142>
 40. Supriadi D. Traditional Games Activities to Develop Fundamental Movement Skills of Elementary School Students. *J Pendidik Jasm dan Olahraga*. 2019;4(1):98–102.
 41. Domville M, Watson PM, Richardson D, Graves LEF. Children's perceptions of factors that influence PE enjoyment: a qualitative investigation. *Phys Educ Sport Pedagog*. 2019;24(3):207–19. <https://doi.org/10.1080/17408989.2018.1561836>
 42. Kovačević T, Opić S. Contribution of traditional games to the quality of students' relations and frequency of students' socialization in primary education. *Croat J Educ*. 2014;16(1):95–112.
 43. Gustian U, Samodra TJ, Pranata R. The integration

- of games and physical activities to stimulate cognitive abilities of elementary school students. *J Pendidik Jasm dan Olahraga*. 2022;7(1):104–9. <https://doi.org/10.17509/jpjo.v7i1.42886>
44. Pham VH, Wawrzyniak S, Cichy I, Bronikowski M, Rokita A. Brainballs program improves the gross motor skills of primary school pupils in Vietnam. *Int J Environ Res Public Health*. 2021;18(3):1290. <https://doi.org/10.3390/ijerph18031290>
45. Gallahue DL, Ozmun JC, Godway JD. *Understanding motor development: Infants, Children, Adolescents, Adults, Seventh Edition*. Americas, New York: The McGraw-Hill Companies; 2019.
46. Johari S, Kahjoogh MA, Sanei F, Havaei N, Daemi M. Training mothers to improve gross motor skills in children with cerebral palsy: A randomized controlled trial. *Iran Rehabil J*. 2019; 17(1):9-16. <https://doi.org/10.32598/irj.17.1.9>
47. Mehamad MFZ Bin, Abdullah B Bin, Samsuddin S. Differences in Gross Motor Development among Early School Children: Comparison on Team and Individual Sports. *ACPES J Phys Educ Sport Heal*. 2021;1(1):22–30. <https://doi.org/10.15294/ajpesh.v1i1.46297>

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