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
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. (2-tailed) | t      | df             |
| 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    |
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 where 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.

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