

Effectiveness of Providing Brain Gym on Gross Motor Development in Preschool Children

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ABSTRACT

Background: The golden period is the early life of a child where at the age of 0-5 years there is a very rapid brain development that affects motor development. The importance of motor development stimulation can improve and optimize growth and development, one of the stimulations that can be given is brain gym: The golden period is the early life of a child where at the age of 0-5 years there is a very rapid brain development that affects motor development. The importance of stimulating motor development can improve and optimize growth and development, one of the stimulations that can be given is brain gym.

Research Objective: To analyze the effectiveness of brain gym on gross motor development of preschool children.

Research Methods: This research design is a pretest-posttest group design with a control group. The sample was preschool children aged 4-6 years totaling 34 people consisting of intervention group (15 people) and control group (19 people). The gross motor measurement instrument used the Test of Gross Motor Development-2 (TGMD-2) technique. Brain gym was given 2 times per week for 4 weeks.

Results: The mean TGMD-2 score of the intervention group increased after being given brain gym by 1.17 points. The mean TGMD-2 score of the control group also increased by 0.16 points. The Man Whitney analysis results showed a p-value of 0.00 (value <0.05).

Conclusion: Brain gym is effective in improving the gross motor development of preschool children.

Keywords: *Brain Gym, Gross motor, Preschool children*

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INTRODUCTION

The *Golden Period* is the initial period of a child's life which starts from the beginning of a child's life until the child is 5 years old. This is also called the *golden age*. This *golden period* only occurs once in a child's life, so the child's brain development process occurs very rapidly during this period. The development that will be passed is motor development. Motor development is generally divided into two, namely gross motor skills and fine motor skills. Gross motor development can be seen in the development of movements in children that

involve large muscles such as walking, jumping and running (Yunita et al., 2020).

Factors that can influence children's development are the way parents care for and educate their children (Setiawati et al., 2020). Apart from that, there are internal factors (children's interests and genetics) and external factors (residential environment, school environment, and parents' knowledge) (Maryuqoh & Sutapa, 2022). Because these factors can influence children's motor development to be less than optimal. This will have an impact on reduced interest in learning, impaired development of coordination, and less ability to carry out daily activities independently (Yanti, 2020).

According to data taken by the *United Nations International Children's Emergency Fund* (UNICEF), the incidence of growth and development disorders in early childhood is around 27.5% or 5 million children experience motor development disorders. Meanwhile, according to data from the National Population and Family Planning Agency (BKKBN), the population of young children in Indonesia reached 31.8 million in 2012. Around 16% of Indonesian children experience delays and disorders in the process of brain and nerve development. Meanwhile, in developing countries, 200 million young children experience delays in the development process (Setiawati et al., 2020).

One way that can be used to determine gross motor development is by using the *Test of Gross Motor Development* (TGMD)-2. This test can be used to measure gross motor development in children, whether the development experienced is in the normal category or experiencing delays (Setyawan et al., 2018).

After measurements are taken, it will be known whether the child's development is optimal or not. One way that can be used to optimize children's gross motor development is by providing stimulation. The stimulation that can be given is in the form of a *brain gym*. *Brain gym* can be given to preschool children aged 4-6 years. *Brain Gym* is an alternative business that can be healthy and useful in helping to improve gross motor skills. *Brain gym* can help balance the work of the brain, both the right brain and the left brain so that logic, creativity and gerak anak menjadi seimbang (Panzilion et al., 2020). Pemberian *brain gym* mampu meningkatkan fungsi belajar and the functional ability of the brain so that the brain can plan movements and the muscles can carry out movements that have been ordered by the brain (Pramita & Diaris, 2020).

RESEARCH METHOD

This research is research that uses a *Pretest-Posttest Group Design* with a *control group*. The type of research used is *Quasi-Experimental*, where this type of research is quasi-experimental. This research was conducted at Istiqomah Pandean Kindergarten, Sukoharjo as the Intervention group and Samuel Baki Pandean

Christian Kindergarten, Sukoharjo as the Control group. Before the intervention is given, a *pretest* is carried out on the sample, then the intervention is given and after the intervention is given, a *posttest* is carried out. When the research was conducted in September 2022, it took place at the Samuel Pandeyan Christian Kindergarten, as the control group and the Istiqomah Kindergarten, as the kindergarten that received the intervention. The study was approved by the ethics committee of Dr Moewardi with number 1,521/ XI / HREC / 2022.

RESULT

Respondent characteristics

Data or general characteristics of the respondents in this study amounted to 50 respondents. Based on the inclusion criteria, the final total of respondents was 34 people in two groups kontrol 19 orang dan kelompok intervensi 15 people. The following is an explanation of the characteristics of the respondents in this study.

Table I. Characteristics of Respondents

| Variable | Intervention Group n (%) | Control Group n (%) |
|---------------|-----------------------------|------------------------|
| Age | | |
| 4 years | 1 (6,7%) | 2 (10.5%) |
| 5 years | 6 (40%) | 13 (68.4%) |
| 6 years | 8 (53.3%) | 4 (21.1%) |
| Gender | | |
| Man | 5 (33.3%) | 9 (47.4%) |
| Women | 10 (66.7%) | 10 (52.6%) |
| TOTAL | 15 (100%) | 19 (100%) |

Source: Primary data (2023)

Based on the respondent characteristics table, it shows that the majority of respondents were aged 5 years to 6 years from both groups. In the control and intervention groups, there were more women (> 55%). Based on the results of two variables with 34 respondents who had carried out the *pre-test* and *post-test* which had been processed, they obtained the results which will be explained in the table as follows:

Table II. Status of Gross Motor Skills in Two Groups

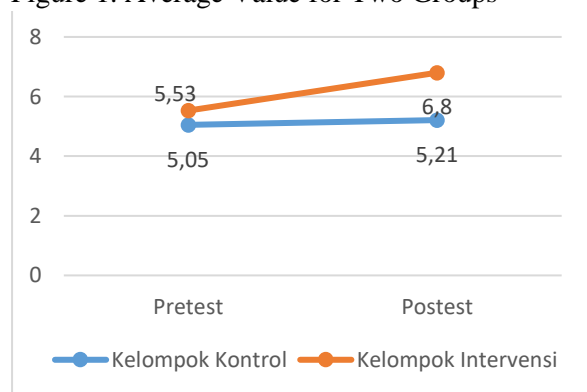
| Rough motoric | Intervention group | | Control group | |
|-------------------|--------------------|---------------|---------------|---------------|
| | Pre-test (n) | Post-test (n) | Pre-test (n) | Post-test (n) |
| Very bad | 0 | 0 | 0 | 0 |
| Bad | 0 | 0 | 0 | 0 |
| Less than average | 0 | 0 | 1 | 1 |
| Average | 1 | 0 | 6 | 3 |
| More than average | 6 | 0 | 5 | 8 |
| Superior | 7 | 3 | 5 | 5 |
| Very Superior | 1 | 12 | 2 | 2 |
| TOTAL | 15 | 15 | 19 | 19 |

Source: Primary data. (2023)

Based on the average score from TGMD-2, it shows that the intervention group experienced an improvement and the control group did not observe an improvement. It can be seen from the *mean* results obtained, from the TGMD-2 values during the *pretest* and *posttest* in the control and intervention groups in graph 4.1 below.

In the following chart it can be seen that

Figure 1. Average Value for Two Groups



gross motor skills in the intervention group

increased and in the control group tended to be stable and there was no increase. The results of the hypothesis test show that there is a significant effect of providing *brain gym* on gross motor development ($p < 0.05$). Test the hypothesis on this research using SPSS with a data analysis test using *Wilcoxon* with the provisions if < 0.05 then H_a is accepted and if > 0.05 then H_o is rejected, the hypothesis test can be seen from the following table.

Table III. Paired Hypothesis Test Results.

| Group | Pretest (M) | Posttest (M) | Score P |
|--------------|-------------|--------------|---------|
| Intervention | 5.53 | 6.80 | 0.01 |
| Control | 5.05 | 5.21 | 1.80 |

Source: Primary data. (2023)

From the following table, it can be concluded that the hypothesis test uses *Wilcoxon*. The results obtained in the intervention group had a significant value with $p 0.01 < 0.05$. Thus, it can be concluded that providing a *brain gym* can influence the gross motor development of children in the intervention group.

Table IV. Unpaired Hypothesis Test Results

| Group | N | Mean | p-value |
|--------------|----|-------|---------|
| Intervention | 15 | 25.30 | |
| Control | 19 | 11.34 | 0.00 |
| Total | 34 | | |

Source: Primary data. (2023)

Testing the effectiveness of providing brain gym on gross motor development was carried out using Mann-Whitney analysis. The final statistical results show a *p-value* of $0.00 < 0.05$ so it can be concluded that *brain gym* is effective for the development of gross motor skills in preschool children.

DISCUSSION

Based on the results of research with a total of 34 respondents with an average age category of 4 years - 6 years, this age is classified as preschool-age children. At this age, children experience motoric, intellectual, language and

social development. This development begins from the beginning of birth until the child is five years old. This is related to physical conditions, especially the development of abilities related to children's gross motor skills. The reason for researching pre-school age children is that at this age children are still in their (*golden age*) so children's cognitive development has developed but is not yet perfect and this development only reaches 80% at preschool age (Khairunisa et al., 2022).

An increase in the intervention group compared to the control group is shown in Table 4.2. The group that did not receive intervention in the form of *brain gym* was less effective because what they did was only daily physical activity but it was not by *brain gym* movements where these movements were modified to balance the work between the right and left brain and the child's gross motor skills. Meanwhile, the intervention group experienced an increase, this was due to the involvement of academic and brain gym activities which were carried out gradually in each session (Andrea & Ginger, 2019).

Providing a *brain gym* can improve gross motor development in a child because gross motor skills will continue to develop until the growth and development stage. Furthermore, providing a *brain gym* can help and stimulate development so that brain optimization occurs perfectly. Figure 1 shows that gross motoric development increased in the intervention group. The provision of *brain gym* to the intervention group was successful, increasing because in the brain gym movements, there were gross motor movements in the form of running, jumping, dancing, and skills in combined rhythmic movements (*zik-zak* running) where these movements involve large muscle movements. This was stated by Khairunisa, et al (2022). The results of the hypothesis test obtained showed that there was a significant influence on the provision of *brain gym* in the intervention group with ($P < 0.05$) (Khairunisa et al., 2022; Pramita & Diaris, 2020).

The main aim of this research is to find out whether providing a *brain gym* is effective for gross motor development in preschool children. *Brain Gym* is a method that is packaged in the form of several movements that aim to balance and stimulate parts of the brain, namely the right

brain, left brain, upper brain and lower brain. A series of movements that aim to improve learning abilities by involving the whole brain using movements so that the brain can work in the balance between left and right so that the child's potential can be unleashed (Adimayanti et al., 2019; Khasanah et al., 2022).

The benefit of providing a *brain gym*, apart from improving gross motoric development, is that it can help the mind concentrate better. If the child is already concentrating, the child will be more creative, efficient and able to think clearly, so the child will be more creative and efficient in the learning process. Apart from that, *brain gym* can increase a child's self-confidence and make the child healthier with the movements they do. Children's development will be optimal if they are given stimulation in the form of movement, numbers, music and singing (Khasanah et al., 2022).

Research that supports that giving a *brain gym* is effective in improving gross motor development is research conducted by Pramita and Diaris (2020) which proves that giving a *brain gym* can improve gross motor development in preschool children. *Brain gym* movements involve eye and hand coordination, where the more frequently coordinated movements are carried out, the better the child's gross motor development (Madyastuti et al., 2018).

In this study, data was obtained that women are more dominant than men, but gender is not a benchmark for assessing a child's development process. Gross motor development is not influenced by a child's gender because gross motor development will be greatly influenced by external factors such as socioeconomic and genetics. Apart from external factors, internal factors (genetics) also influence motor development in children because the development and maturation process is seen from biological development (Bakhtiari et al., 2011; Ferasinta et al., 2022).

The *brain gym* method can be used as a reference for increasing gross motor activity and development where brain gym movements mostly involve the work of large muscles so the *brain gym* is considered effective for increasing gross motor development in preschool children. The *brain gym* movement is a structured physical movement where in the *brain gym* movement

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there is a combination of movements such as crossing movements between the upper and lower extremities which are carried out simultaneously. This movement can stimulate the child's large muscles so that the resulting movement is more optimal. The movements that have been carried out can improve children's gross motor development (Khasanah et al., 2022).

Various types of gross motor movements can be packaged into a movement, namely *Brain Gym*. The *brain gym* is one way to optimize work in every dimension of the brain through light movements in gymnastics that involve hand and foot movements so that it can provide stimulation and be able to improve gross motor development in preschool children (Syafri et al., 2020).

CONCLUSION

Based on the research results and discussion, it can be concluded that a program in the form of a *brain gym* can improve gross motor development in the intervention group. The benefits expected from the results of this research include the hope that the results of this research can become information or a source of data for the development of subsequent research, especially those related to the effectiveness of providing *brain gym* on the gross motor development of preschool children.

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ABSTRACT

Background: The golden period is the early life of a child where at the age of 0-5 years there is a very rapid brain development that affects motor development. The importance of motor development stimulation can improve and optimize growth and development, one of the stimulations that can be given is brain gym: The golden period is the early life of a child where at the age of 0-5 years there is a very rapid brain development that affects motor development. The importance of stimulating motor development can improve and optimize growth and development, one of the stimulations that can be given is brain gym.

Research Objective: To analyze the effectiveness of brain gym on gross motor development of preschool children.

Research Methods: This research design is a pretest-posttest group design with a control group. The sample was preschool children aged 4-6 years totaling 34 people consisting of intervention group (15 people) and control group (19 people). The gross motor measurement instrument used the Test of Gross Motor Development-2 (TGMD-2) technique. Brain gym was given 2 times per week for 4 weeks.

Results: The mean TGMD-2 score of the intervention group increased after being given brain gym by 1.17 points. The mean TGMD-2 score of the control group also increased by 0.16 points. The Man Whitney analysis results showed a p-value of 0.00 (value <0.05).

Conclusion: Brain gym is effective in improving the gross motor development of preschool children.

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INTRODUCTION

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involve large muscles such as walking, jumping and running (Yunita et al., 2020).

Factors that can influence children's development are the way parents care for and educate their children (Setiawati et al., 2020). Apart from that, there are internal factors (children's interests and genetics) and external factors (residential environment, school environment, and parents' knowledge) (Maryuqoh & Sutapa, 2022). Because these factors can influence children's motor development to be less than optimal. This will have an impact on reduced interest in learning, impaired development of coordination, and less ability to carry out daily activities independently (Yanti, 2020).

According to data taken by the *United Nations International Children's Emergency Fund* (UNICEF), the incidence of growth and development disorders in early childhood is around 27.5% or 5 million children experience motor development disorders. Meanwhile, according to data from the National Population and Family Planning Agency (BKKBN), the population of young children in Indonesia reached 31.8 million in 2012. Around 16% of Indonesian children experience delays and disorders in the process of brain and nerve development. Meanwhile, in developing countries, 200 million young children experience delays in the development process (Setiawati et al., 2020).

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After measurements are taken, it will be known whether the child's development is optimal or not. One way that can be used to optimize children's gross motor development is by providing stimulation. The stimulation that can be given is in the form of a *brain gym*. *Brain gym* can be given to preschool children aged 4-6 years. *Brain Gym* is an alternative business that can be healthy and useful in helping to improve gross motor skills. *Brain gym* can help balance the work of the brain, both the right brain and the left brain so that logic, creativity and gerak anak menjadi seimbang (Panzilion et al., 2020). Pemberian *brain gym* mampu meningkatkan fungsi belajar and the functional ability of the brain so that the brain can plan movements and the muscles can carry out movements that have been ordered by the brain (Pramita & Diaris, 2020).

RESEARCH METHOD

This research is research that uses a *Pretest-Posttest Group Design* with a *control group*. The type of research used is *Quasi-Experimental*, where this type of research is quasi-experimental. This research was conducted at Istiqomah Pandean Kindergarten, Sukoharjo as the Intervention group and Samuel Baki Pandean

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RESULT

Respondent characteristics

Data or general characteristics of the respondents in this study amounted to 50 respondents. Based on the inclusion criteria, the final total of respondents was 34 people in two groups kontrol 19 orang dan kelompok intervensi 15 people. The following is an explanation of the characteristics of the respondents in this study.

Table I. Characteristics of Respondents

| Variable | Intervention Group n (%) | Control Group n (%) |
|---------------|-----------------------------|------------------------|
| Age | | |
| 4 years | 1 (6,7%) | 2 (10,5%) |
| 5 years | 6 (40%) | 13 (68,4%) |
| 6 years | 8 (53,3%) | 4 (21,1%) |
| Gender | | |
| Man | 5 (33,3%) | 9 (47,4%) |
| Women | 10 (66,7%) | 10 (52,6%) |
| TOTAL | 15 (100%) | 19 (100%) |

Source: Primary data (2023)

Based on the respondent characteristics table, it shows that the majority of respondents were aged 5 years to 6 years from both groups. In the control and intervention groups, there were more women (> 55%). Based on the results of two variables with 34 respondents who had carried out the *pre-test* and *post-test* which had been processed, they obtained the results which will be explained in the table as follows:

Table II. Status of Gross Motor Skills in Two Groups

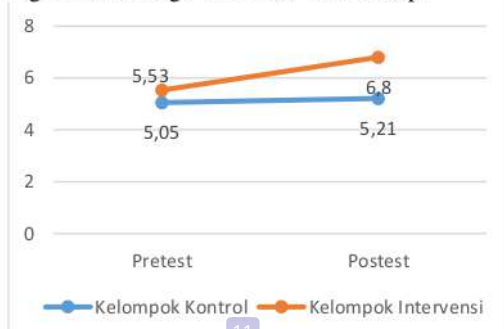
| Rough motoric | Intervention group | | Control group | |
|-------------------|--------------------|---------------|---------------|---------------|
| | Pre-test (n) | Post-test (n) | Pre-test (n) | Post-test (n) |
| Very bad | 0 | 0 | 0 | 0 |
| Bad | 0 | 0 | 0 | 0 |
| Less than average | 0 | 0 | 1 | 1 |
| Average | 1 | 0 | 6 | 3 |
| More than average | 6 | 0 | 5 | 8 |
| Superior | 7 | 3 | 5 | 5 |
| Very Superior | 1 | 12 | 2 | 2 |
| TOTAL | 15 | 15 | 19 | 19 |

Source: Primary data. (2023)

Based on the average score from TGMD-2, it shows that the intervention group experienced an improvement and the control group did not observe an improvement. It can be seen from the mean results obtained, from the TGMD-2 values during the *pretest* and *posttest* in the control and intervention groups in graph 4.1 below.

In the following chart it can be seen that

Figure 1. Average Value for Two Groups



gross motor skills in the intervention group

increased and in the control group tended to be stable and there was no increase. The results of the hypothesis test show that there is a significant effect of providing *brain gym* on gross motor development ($p < 0.05$). Test the hypothesis on this research using SPSS with a data analysis test using *Wilcoxon* with the provisions if < 0.05 then H_a is accepted and if > 0.05 then H_o is rejected, the hypothesis test can be seen from the following table.

Table III. Paired Hypothesis Test Results.

| Group | Pretest (M) | Posttest (M) | Score P |
|--------------|-------------|--------------|---------|
| Intervention | 5.53 | 6.80 | 0.01 |
| Control | 5.05 | 5.21 | 1.80 |

Source: Primary data. (2023)

From the following table, it can be concluded that the hypothesis test uses *Wilcoxon*. The results obtained in the intervention group had a significant value with $p 0.01 < 0.05$. Thus, it can be concluded that providing a *brain gym* can influence the gross motor development of children in the intervention group.

Table IV. Unpaired Hypothesis Test Results

| Group | N | Mean | p-value |
|--------------|----|-------|---------|
| Intervention | 15 | 25.30 | |
| Control | 19 | 11.34 | 0.00 |
| Total | 34 | | |

Source: Primary data. (2023)

Testing the effectiveness of providing brain gym on gross motor development was carried out using Mann-Whitney analysis. The final statistical results show a *p-value* of $0.00 < 0.05$ so it can be concluded that *brain gym* is effective for the development of gross motor skills in preschool children.

DISCUSSION

Based on the results of research with a total of 34 respondents with an average age category of 4 years - 6 years, this age is classified as preschool-age children. At this age, children experience motoric, intellectual, language and

social development. This development begins from the beginning of birth until the child is five years old. This is related to physical conditions, especially the development of abilities related to children's gross motor skills. The reason for researching pre-school age children is that at this age children are still in their (*golden age*) so children's cognitive development has developed but is not yet perfect and this development only reaches 80% at preschool age (Khairunisa et al., 2022).

An increase in the intervention group compared to the control group is shown in Table 4.2. The group that did not receive intervention in the form of *brain gym* was less effective because what they did was only daily physical activity but it was not by *brain gym* movements where these movements were modified to balance the work between the right and left brain and the child's gross motor skills. Meanwhile, the intervention group experienced an increase, this was due to the involvement of academic and brain gym activities which were carried out gradually in each session (Andrea & Ginger, 2019).

Providing a *brain gym* can improve gross motor development in a child because gross motor skills will continue to develop until the growth and development stage. Furthermore, providing a *brain gym* can help and stimulate development so that brain optimization occurs perfectly. Figure 1 shows that gross motoric development increased in the intervention group. The provision of *brain gym* to the intervention group was successful, increasing because in the brain gym movements, there were gross motor movements in the form of running, jumping, dancing, and skills in combined rhythmic movements (*zik-zak* running) where these movements involve large muscle movements. This was stated by Khairunisa, et al (2022). The results of the hypothesis test obtained showed that there was a significant influence on the provision of *brain gym* in the intervention group with ($P < 0.05$) (Khairunisa et al., 2022; Pramita & Diaris, 2020).

The main aim of this research is to find out whether providing a *brain gym* is effective for gross motor development in preschool children. *Brain Gym* is a method that is packaged in the form of several movements that aim to balance and stimulate parts of the brain, namely the right

brain, left brain, upper brain and lower brain. A series of movements that aim to improve learning abilities by involving the whole brain using movements so that the brain can work in the balance between left and right so that the child's potential can be unleashed (Adimayanti et al., 2019; Khasanah et al., 2022).

The benefit of providing a *brain gym*, apart from improving gross motoric development, is that it can help the mind concentrate better. If the child is already concentrating, the child will be more creative, efficient and able to think clearly, so the child will be more creative and efficient in the learning process. Apart from that, *brain gym* can increase a child's self-confidence and make the child healthier with the movements they do. Children's development will be optimal if they are given stimulation in the form of movement, numbers, music and singing (Khasanah et al., 2022).

Research that supports that giving a *brain gym* is effective in improving gross motor development is research conducted by Pramita and Diaris (2020) which proves that giving a *brain gym* can improve gross motor development in preschool children. *Brain gym* movements involve eye and hand coordination, where the more frequently coordinated movements are carried out, the better the child's gross motor development (Madyastuti et al., 2018).

In this study, data was obtained that women are more dominant than men, but gender is not a benchmark for assessing a child's development process. Gross motor development is not influenced by a child's gender because gross motor development will be greatly influenced by external factors such as socioeconomic and genetics. Apart from external factors, internal factors (genetics) also influence motor development in children because the development and maturation process is seen from biological development (Bakhtiari et al., 2011; Ferasinta et al., 2022).

The *brain gym* method can be used as a reference for increasing gross motor activity and development where brain gym movements mostly involve the work of large muscles so the *brain gym* is considered effective for increasing gross motor development in preschool children. The *brain gym* movement is a structured physical movement where in the *brain gym* movement

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there is a combination of movements such as crossing movements between the upper and lower extremities which are carried out simultaneously. This movement can stimulate the child's large muscles so that the resulting movement is more optimal. The movements that have been carried out can improve children's gross motor development (Khasanah et al., 2022).

Various types of gross motor movements can be packaged into a movement, namely *Brain Gym*. The *brain gym* is one way to optimize work in every dimension of the brain through light movements in gymnastics that involve hand and foot movements so that it can provide stimulation and be able to improve gross motor development in preschool children (Syafri et al., 2020).

3 CONCLUSION

Based on the research results and discussion, it can be concluded that a program in the form of a *brain gym* can improve gross motor development in the intervention group. The benefits expected from the results of this research include the hope that the results of this research can become information or a source of data for the development of subsequent research, especially those related to the effectiveness of providing *brain gym* on the gross motor development of preschool children.

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