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Home Program: An Attempt of Improving Vocabularies in Down Syndrome Children

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Abstract
Children with Down's syndrome have delays in language development, particularly in vocabulary acquisition. Home-based programs offered by parents play an important role in improving the vocabulary of children with Down syndrome. The aim of this study was to analyze the effect of home programs on the vocabulary development of children with Down syndrome. This study used a quantitative method with a "quasi-experimental" non-equivalent control group design. The sample was divided into two groups: the intervention group, which received the home program, and the control group, which did not receive the treatment. Data were analyzed using a paired t-test and an independent t-test. The results of the analysis showed that there was a significant difference between the intervention group and the control group. The results of the paired T-test in the intervention group showed a p-value = 0.016, while in the control group p = 0.080. The independent T-test showed a p-value = 0.005 (p < 0.05), demonstrating a significant effect of the home program on vocabulary improvement in children with Down's syndrome. In conclusion, the more parents are involved in the home program proposed by the speech therapist, the more Down syndrome children improve their vocabulary.

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INTRODUCTION

Children with Down syndrome usually have a delayed language development, including the delay in vocabulary mastery. This abnormality often called trisomy 21 can result in delayed physical and mental development or even disabilities in children. This disorder can affect various aspects of children development, including their language ability Situmenang (2023) (1). World Health Organization (WHO)'s (2) data shows that about 3,000-5,000 babies with Down syndrome are born annually throughout world, with 1 Down syndrome case per 1,000-1,100 births. WHO also predicted that there are 8 million people developing Down syndrome throughout world today. Primary Health Research (Indonesian: Riset Kesehatan Dasar or Riskesdas) in 2010-2018 reported that there was an increase in Down syndrome incidence in Indonesia. In 2018, 0.41% of children aged 24-59 months develop congenital defect, and 0.21% of the age group develop Down syndrome.

Vocabulary mastery is an individual's ability of identifying, understanding and using words well and correctly during hearing, speaking, reading, and writing. This is very important to daily life, particularly to communication Maryam *et al* (2020) (3). An individual can speak well and fluently if he/she has adequate vocabulary. Vocabulary is important because an individual's ideas are understandable if it is expressed using appropriate words; this is mentioned in a book Shipley & McAfee (2021) (4). The development of vocabulary mastery affects a child's abilities of expressing idea and using language appropriately. However, the vocabulary development in children with Down syndrome needs guidance,

direction, and stimulation Rahmatunnisa *et al* (2020) (5). Children with Down Syndrome find difficulty in saying words and understanding vocabulary according to Zahro *et all* (2020) (6), some children often stick their tongue out so that their vocabulary becomes less clear as their oral cavity and tongue are slightly larger than their normal counterpart's. Vocabulary is very important in either spoken or written communication, because without vocabulary and grammar, nothing can be expressed Nurhalimah *et all* (2020) (7). Therefore, language development in the vocabulary mastery of children with Down syndrome needs more stimulation to improve their vocabulary mastery, particularly the role of parents at home in the presence of home program Pamungkas *et all* (2021) (8) .

This research is relevant to Piaget's (1997) theory as cited in a book Shipley & McAfee (2021) (4) stating that the strong bond with cognitive skill by carrying action (speaking) will improve language development. A previous research Walker (2020) (9) studied the implementation of home therapy program at home to children with DS. This research aimed to find out how parents did the home program activity at home and to give input to healthcare practitioners to design more interesting to parents by considering emotional resources and learning style at home. In addition, this research targeted the parents of children with DS to take part in the home program activity Mitra *et all* (2022) (10). The result of research showed that the parents' effort in holding therapy at home for children with DS indicates that the implementation of home program can improve the children's language development in vocabulary mastery. As a qualitative research, this research aimed to find the gap in the relevant literatures and to summarize the parents' experience with the implementation of home program for children with DS.

Another research Rachmansyah & Rahaju (2020) (11) had been conducted on the implementation of home program for the development of children with special needs. This research aimed to find out whether or not the implementation of home program can provide the parents with children with special needs and active involvement a skill of taking caring of children at home. This research used a descriptive qualitative method. This method was aimed to get a description, to understand and to explain the implementation of home program for the children with special needs. The result of research shows that the implementation of home program has positive contribution to working together to solve problems by means of discussing directly to exchange information in dealing with children with special needs in providing home program. This research targeted the parents of children with special needs to keep implementing home program in daily activities at home. Another research conducted by LeJeune (2020) (12) revealed that oral vocabulary intervention to children with DS can be implemented by parents through holding home program at home. This research aimed to find out whether or not the oral vocabulary intervention delivered by parents can improve the vocabulary ability of children with DS measured using targeted word mastery test. The research design used in this research was Single Case Research Design. The result of research showed that the successful role of parents in providing home program to improve vocabulary mastery in children with DS. This is because a successful home program is highly affected by parents' good cooperation with those involved in daily caretaking. This cooperation is important to the process of transferring skill learned during the therapy to be maintained and improved later out of therapy program.

This research could give additional evidence that the attempt of providing home program can improve the vocabulary mastery in children with DS, in line with the result of previous research finding that this research affects or gives impact on the home program intervention and will be successful when it is implemented. Parents have significance in children's language mechanically in the presence of stimulation exposure to the children that will affect the improvement of vocabulary mastery. Data showed that speech therapist is healthcare workers with limited number. This encourages the limited number or quantity of therapy for children with DS. The presence of home program allows for the increase of intervention dosage in children with DS. This increase of therapy can increase output and outcome of

intervention process, particularly in vocabulary area. Still another research shows that the more the intervention dosage, the better will be the vocabulary mastery in children with DS. This will be confirmed with Bruner's (1996) theory as cited in Pratomo (2022) (13) stating that the vocabulary mastery can be affected by the engagement of social environment, particularly parents, in children's language development.

Thus, the author is interested in conducting a research entitled providing home program to improve the vocabulary mastery in children with Down Syndrome. Although some researches have taken the same variables concerning the provision of home program, no research has been conducted on the providing home program to improve the vocabulary mastery in children with Down Syndrome. Additionally, the author aims to improve the data related to the role of parents in improving the vocabulary mastery in children with Down syndrome that has not been conducted in Indonesia.

METHODS

This research used a quantitative approach. A quantitative method, according to Sugiyono (2023) (14), is a research method used to study certain population or sample, by collecting data using research instrument and data analysis that is quantitative or statistic in nature. It is intended to study the hypothesis formulated and to assess the effect of a treatment or intervention in independent variable on dependent variable. The research design used was intervention, in this case "Quasi-Experimental Design" with "Non-equivalent Control Group Design" type. According to Ulfa (2019) (15) In this Non-equivalent Control Group Design, the test was carried out on one group employed but divided into two: a half of group for intervention group (to which treatment is given) and another half for control group (to which treatment is not given), and this was not selected randomly. Other studies use only interview techniques to collect data on vocabulary mastery by children with Down's syndrome from their parents, and use only one group as a sample. This method is inaccurate, as it fails to distinguish between children with Down's syndrome who benefit from a home-based program and those who do not. For this reason, the researchers used two groups to see the difference between the intervention group (to which treatment is given) and the control group (to which treatment is not given) in order to see the development of mastery in children with Down syndrome. In the case of the control group (no treatment), the treatment consists solely of a pre-test to determine the child's vocabulary fluency. After one month, the control group undergoes a post-test to determine whether the child's vocabulary mastery has evolved after one month of no treatment or home activities.

1. Participant

   The study population consisted of 30 children with Down's syndrome according to predetermined inclusion and exclusion criteria, with a sample of 10 children aged 6 to 12 with Down's syndrome. The intervention or treatment group consisted of five children, and the remaining five children constituted the control or non-treatment group. All participants underwent a pre-test before receiving the post-test. However, in the intervention group, after the pre-test, parents received treatment in the form of activities with the home program module to be carried out at home for one month at a frequency of 20 times. Then, the intervention group and the control group who did not receive treatment will be subjected to a post-test to see if there is a difference in the increase in vocabulary mastery in children with Down syndrome after receiving treatment.

2. Instrument

   The instrument used in this research was functional measurement of vocabulary adopted by Pratomo *et all* (2023) (16) to test all participants before and after the treatment given. Hafidz Triantoro Aji Pratomo, SST.TW., MPH (2019) explained the validity and reliability of this instrument. This instrument contains several questions divided into two groups. The first group assessed vocabulary comprehension and the second group assessed vocabulary use. The first group contains several questions: capable of designating object when others mention the name of object, capable of

equating two object, understanding noun, understanding verb, understanding types of emotion, understanding adjective, capable of equating object and picture, and capable of designating or taking object when its function is mentioned. Meanwhile, the second group contains several questions: capable of naming a word familiarly spontaneously, capable of saying word appropriate to the context of activity, using noun spontaneously, using verb spontaneously, using adjective spontaneously, naming types of emotion spontaneously, capable of mentioning function and category of object.

This testing instrument was selected to identify the level of vocabulary mastery relevant to daily life in children with Down syndrome. This instrument was designed to measure receptive (vocabulary comprehension) and expressive aspects (vocabulary use) including noun, verb, adjective, spatial concept, attribute, quantitative, temporal and emotion categories. This instrument was used by providing quantitative and qualitative description on the extent to which children understand and use functional vocabularies either independently or with assistance, and from the result of assessment conducted periodically to measure learning progress, to identify area needing further improvement, and to evaluate the effectiveness of method used in learning program. Thus, this instrument assessment functions as a diagnostic tool and an evaluation tool all at once to support this research's objective, to improve the vocabulary mastery of children with Down syndrome through a home program-based approach that is planned and adaptive to children's needs.

3. Instructional Procedure

Intervention was carried out using home program log-book and module. However, before the intervention is administered, a test (pretest) was given first with vocabulary measurement to find out the vocabulary mastery. Furthermore, the author gave home program in the form of module and log book or monitoring to the children's parents to be given to the children at home. After receiving treatment, test (post-test) would be given again to compare the vocabulary mastery before and after treatment using home program.

In this research, to improve the vocabulary of children with Down syndrome, the author used home program method with module encompassing various activities designed to be implemented by parents or caretaker at home. This program is intended to improve the children's vocabulary in systematic and structured manner. This research also provided parents and caretakers with skill and knowledge necessary to implement the program effectively. This program was implemented for 4 (four) weeks with the frequency of 5 times in a week and 30-minute duration per day. To monitor the children's progress, this research used log book or monitoring as observation sheet to record the children's vocabulary development during the administration of home program using module. This research has been registered with the research license number 2.247/IX/HREC/2024 and under the supervision of Dr. Moewardi Regional General Hospital of Surakarta (Indonesian: RSUD Dr. Moewardi Surakarta).

RESULTS AND DISCUSSION

As a result of the number of students in each of group is small: five children in intervention group and five children in control group, each of groups to which pre-test and post-test have been given was analyzed Shapiro-Wilk analysis as the number of respondents is 10 ≤50), according to Mitra *et all* (2022) (10). From the result of analysis, it can be seen that the significance value of pretest for intervention group is 0.417 and that of post-test is 0.153. Both values are more than 0.05, indicating that data of pre-test and post-test in intervention group are distributed normally. Meanwhile, the significance value of pre-test for control group is 0.325 and that of post-test is 0.758. Both values are also more than 0.05, indicating that data of pre-test and post-test in control group are also distributed normally. This indicates that ρ (sig.) value > 0.05, meaning that the data of both variables are distributed normally.

Table 1. Treatment and Control Groups

Treatment Group			
Participant	Pretreatment	Posttreatment	Gain Score
1	113	176	63
2	151	171	20
3	70	155	85
4	84	155	71
5	156	179	23
N	574	836	262

Control Group			
Participant	Pretreatment	Posttreatment	Gain Score
1	125	125	0
2	112	115	3
3	119	119	0
4	125	130	5
5	121	125	4
N	602	614	12

Table 1 explains that the gain score of intervention participants is subtracted with the gain score of control group. This calculation results in the net score difference of 250, the difference of scores between intervention and control groups. It can interpreted that the mean increase gained by children in treatment group more than standard deviation is larger than that gained by children in control group (receiving no treatment). The average performance of pre-test and post-test for each group in various analogies is illustrated in Picture 1. Visual inspection shows that the treatment group experienced an improvement in vocabulary mastery. Meanwhile, the control group has only a slight improvement in vocabulary mastery.

Table 2 *Paired T-Test Pre-Test* and *Post-Test*

Variabel	Nilai *p*/*Sig.* (2-tailed)
Pre-Test dan *Post-Test* Treatment Grup	0.016
Pre-Test dan *Post-Test* Control Grup	0.080

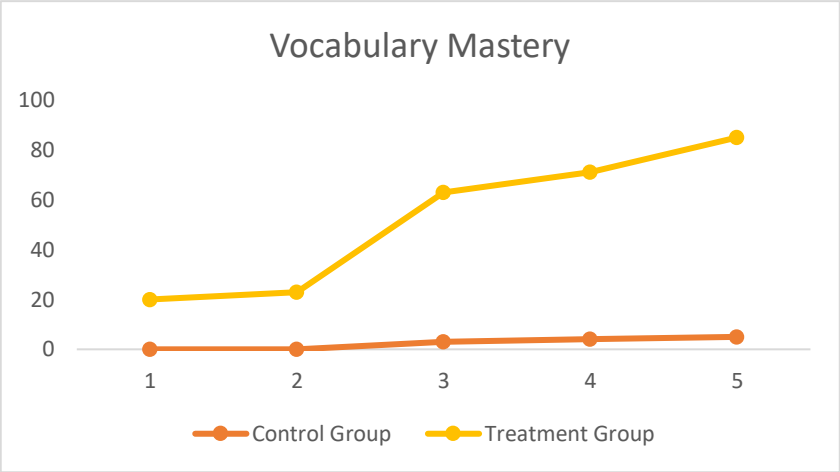
Table 2 shows that from the result of bivariate test with Paired T-Test, it can be concluded that each of group pairs, pre-test post-test sore of intervention group is different from the pre-test post-test score of control group, in which the pre-test post-test score of intervention group is 0.016 and the pre-test post-test score of control group is 0.080. Thus, it can be concluded that there is a difference of scores in paired t-test between intervention and control groups.

Table 3 *Independent T-Test Pre-Test* and *Post-Test*

Variabel	Mean	Nilai *p*/*Sig.* (2-tailed)
Vocabulary mastery of the treatment group	52.40	0.005
Vocabulary mastery of the control group	2.40	0.019

Considering Table 3 presenting the result of bivariate test with Independent T-Test, it can be concluded that providing home program for children with Down syndrome results in significance (2-tailed) value of 0.005 in which

significance (2-tailed) value is less than α = 0.05. Thus, it can be concluded that Ha is supported, meaning that there is an effect of parents' effort in implementing home program on the improvement of vocabulary mastery in children with Down syndrome.



Picture 1. Vocabulary Mastery of Intervention and Control Groups

Based on the description of vocabulary mastery in children with Down Syndrome, it can be seen that the presence of the attempt of providing home program to improve the vocabulary mastery has significant ratio of scores between intervention (to which treatment is given) and control group (to which no treatment is given).

In several other studies entitled Implementation of home programmes for the development of children with special needs Rachmansyah & Rahaju (2020) (11), an attempt was made to determine whether the implementation of home programmes could help parents acquire skills in caring for children with special needs and become an active part of their home care. The results showed that the implementation of a home-based program had a positive effect on collaboration to solve problems and exchange information on the care of children with special needs and the implementation of home-based programs. Parents of children with special needs face the challenge of continuing to implement the home program in their daily activities at home.

Other research by LeJeune (2020) (12) has shown that parents can intervene in the oral vocabulary of children with Down Syndrome by implementing a home program. The results of this study showed that the role of parents in implementing home programs for children with Down Syndrome improved vocabulary acquisition. This is because the success of the home program is strongly influenced by the quality of the collaboration between parents and other people involved in daily care tasks. The process of transferring the skills acquired during therapy requires this cooperation. These skills must then be maintained and improved outside the therapy program.

By showing that there are similarities with previous studies showing that this study has an influence or impact on the success of a home intervention program if carried out successfully, this study is able to provide evidence that efforts to provide home programs can improve vocabulary acquisition by Down Syndrome children. Parents influence children's language through exposure to stimulation, which can improve vocabulary acquisition. With the home program, the intervention dose for Down Syndrome children can be increased, which may improve the performance and outcomes of the intervention process, particularly in terms of vocabulary. This is also supported by the theory (Bruner., 1966) in the book Pratomo (2022) (13) that vocabulary mastery can be influenced by the involvement of the social environment, particularly parents, in children's language development.

The data indicates speech therapist is healthcare workers with limited number. This encourages the limited number or quantity of therapy for children with Down syndrome. The presence of home program allows for the increase of intervention dosage in children with Down syndrome Walker (2020) (9).This increase in therapy can improve output and outcome of intervention process, particularly in vocabulary area. Another research found that the higher the intervention dosage, the better will be the vocabulary mastery in children with Down syndrome. Thus, home program is an activity carried out at home to help children learn to communicate and to interact socially. This successful program can help children grow optimally and affect their development positively.

CONCLUSION

Based on the results of the data analysis and the discussion that took place regarding efforts to increase vocabulary fluency through home programs for children with Down syndrome that were carried out in two sample groups with and without treatment, it is possible to meet the objectives of this study in everyday life applications for parents who can measure the development of vocabulary fluency in children with Down syndrome with the home program module when parents want to provide home programs, and assess the impact of providing home programs on the development of vocabulary fluency in children with Down's syndrome using the logbook provided, and the benefits of this study provide information to the community, particularly parents of children with Down's syndrome, that parental involvement in pursuing home programs as part of caring for children with Down's syndrome can contribute to the development of their vocabulary fluency. Therefore, it can be concluded that there is an effect of home program implementation on the successful improvement of vocabulary mastery in children with Down syndrome. The higher the parents' effort in implementing home program as the speech therapist provided, the more successful will be the therapy on children with Down syndrome.

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