



Child assistance training: Effects of training on parents' knowledge in children's language and numeracy development

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ABSTRACT

Preschool-age children show rapid development in various aspects of their development, including numeracy and language development. Various and appropriate stimulations are expected to optimize their development. Parents as the closest support system for preschool children have a very significant role, especially in helping children optimize their numeracy and language skills. Parents can play an optimal role if they understand children's numeracy and language development. In this community service program, parents are given training on "Optimizing the Learning Environment for Numeracy and Language in Preschool Children" which aims to increase parents' understanding of children's numeracy and language development and efforts to optimize it. The participants were 31 parents and Posyandu cadres in Jatimukti, Sumedang, West Java. Parents' understanding was measured through a pre-test questionnaire administered at the beginning of the training and a post-test questionnaire at the end of the training. The results showed a positive effect of the training on parents' understanding of children's numeracy and language development. Therefore, the results of this training recommend further trainings aimed at improving parents' understanding of language and numeracy development in preschool childrens.

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1. INTRODUCTION

Literacy is a person's ability to manage and interpret various information. The literacy process requires several competencies, including written and spoken language competencies. The main asset for students in learning and facing future challenges is literacy. This is in line with the leading program launched by the Ministry of Education and Culture in 2016, the National Literacy Movement (GLN), which has three derivative programs: the School Literacy Movement, the Family Literacy Movement and the Community Literacy Movement. The main focus of GLN includes basic literacy, which consists of six aspects: literacy in reading and writing, numeracy, science, finance, and culture and citizenship. Literacy programs are implemented according to the curriculum to support literacy learning and habituation. Language, reading and writing skills are basic competencies required in almost all school subjects.

Therefore, as with basic education in general, basic education in Indonesia requires students to have the ability to read, write and calculate (numeracy) (Ekowati & Suwandayani, 2019).

Numeracy is the ability to interpret quantitative information around students to solve problems in everyday life (Hartatik, 2020). According to Ekowati and Suwandayani (2019), numeracy skills are closely related to unemployment, low income, and poor health. In addition, nowadays a lot of information is presented in numerical and graphic form so that numeracy skills are needed to understand information, to synthesize, and then to make the right decisions (Hartatik, 2020). In the context of education, numeracy is an important provision for mastering science, technology, engineering, and mathematics (STEM) subjects (Rohim, 2021).

To support children's literacy and numeracy development, parents play significant roles in creating a Home Learning Environment (HLE) for children. According to research by Niklas et al. (2016), literacy and numeracy aspects of the HLE provided by parents can be specific predictors of children's literacy and numeracy competencies. HLE is associated with literacy activities, as well as intelligence and applied problems, while the Home Numeracy Environment (HNE) is associated with math-related activities, intelligence, and knowledge of letters acquired by identifying number symbols (Niklas et al., 2016). To support children's literacy and numeracy competencies, according to Kumalasari and Sugito (2020), there are several roles of parents in shaping HLE, namely doing several activities (such as playing, talking, and reading) in introducing new learning materials and providing several opportunities and fun learning experiences. In creating HLE, parents need to pay attention to children's needs and interests, such as preschoolers' behavior, disciplinary strategies, relevant games and materials, and readiness for activities (Kumalasari & Sugito, 2020).

In general, previous studies confirmed that HLE is closely related to socioeconomic status (Bradley & Corwyn, 2002; McElvany et al., 2009; Sonnenschein & Sun, 2017). The mechanism of the relationship between HLE and social status was reported by a study on 772 primary school children in Germany (McElvany et al., 2009) which confirmed that the effect of socioeconomic status on children's cognitive competence was mediated by HLE (McElvany et al., 2009). This means that socioeconomic status will be a predictor of the quality of HLE which then affects children's cognitive competence. In another study, Chen et al. (2018) strengthened the effect of parental social status on child development moderated by children's learning motivation. The tendency that occurs is that low social status conditions can reduce children's learning motivation due to lack of parental support for the learning process. According to Chen et al. (2018), economic status allows parents to not be able to facilitate children's learning needs optimally so that the motivation to support their children's learning success tends to decrease. Therefore, parents, especially those with low socioeconomic status, need to gain a broader view of parenting patterns so that they can provide maximum support to their children.

Jatinangor is a sub-district in Sumedang Regency, West Java Province. During the colonial era, Jatinangor was known as a plantation area but is now known as one of the Education Areas in West Java. In preparing itself as a City of Education, Jatinangor residents themselves must be equipped with basic skills in order to be able to compete amid the influx of immigrants. One of the basic skills that need to be improved is numeracy and language skills, which become the capital for children to learn optimally at the next level of education. Good numeracy and language skills at preschool age will increase the potential for better academic success. Meanwhile, data shows that there are still many families with low socioeconomic status in Jatinangor, especially in Jatimukti Village. Data from BPS Sumedang Regency in 2018 shows that the number of poor and prosperous families in Jatimukti is still quite large, namely 169 families classified as Poor, 580 families classified as Prosperous I, and 764 families classified as Prosperous II-Plus (Djuyandi, 2020). This condition can potentially lead to a lack of parental knowledge

and the lack of facilities provided to develop numeracy and language skills that can affect children's literacy skills in the future.

Based on this, in this community service program, training on "Optimizing the Learning Environment for Numeracy and Language in Preschool Children" is conducted to help parents improve their understanding of child development, especially in the numeracy and language competency domains. This training aims to provide education to parents as the child's closest environment related to development and how to stimulate aspects of numeracy and language development in preschool children. It is hoped that this training will increase parents' understanding of the numeracy and language development of preschool children as a provision in optimizing children's literacy skills in the future.

2. METHODS

The Community Service Program (PKM) in the form of training was held on July 30, 2022. The training participants consisted of 28 parents with children aged 3-6 years and three Posyandu cadres who have the task of assisting early childhood development (total sample = 31, 1 male and 30 female). The training was held at two Early Childhood Education (PAUD) in Jatimukti Village, Jatinangor District, Sumedang, West Java. The implementation of this PKM activity was carried out in several stages as follows.

Preparation Phase

Regarding the program, the preparatory phase includes developing the topic, method, duration of the activity, tools, and materials. A field survey was conducted on July 18, 2022 to determine which PAUDs needed training. The determination of PAUD was based on the results of the field assessment and the willingness of the school to be the target of the activity. Based on these considerations, two PAUD were selected, namely PAUD Nurunnisa and PAUD Sabilil Huda, and it was agreed that the training would be held on July 30, 2022. After that, the team coordinated with the school and educated the parents about the activity and most of the parents came to the training. The illustration of the preparation phase presented in Figure 1.



Figure 1. Preparation phase

Implementation Phase

The main speakers for this program were 1 expert in the field of dyslexia and 2 psychologists. The program is also assisted by students from various Padjadjaran University study programs who serve as facilitators. The rundown of the program in Table 1.

Table 1. Rundown of the program

Time	Activities	Person in Charge
09.00-09.05	Introduction	Facilitator
09.05-09.15	Pre-test	Facilitator
09.15-10.15	Main lecture: Children's Language and Numeracy Development, Tips, and Trick	Main speakers
10.15-10.30	Example home learning activities	Facilitator
10.30-11.00	Discussion	Main speakers
11.00-11.10	Post-test	Facilitator
11.10-11.30	Games and closing	Facilitator

Introduction

The training program began with opening speeches from the principal of PAUD and head of the community service team who explained the purpose and activities of the day. In this phase, the learning contract was also carried out. The facilitator focused on building rapport and enthusiasm from the participants to take part in the activity until completion. The illustration of the introduction presented in Figure 2.



Figure 2. Opening speech from the principals and head of community service team



Figure 3. The participants are seen filling out the pre-test questionnaire

Pre-test

This training aims to enhance parents' understanding of child development, particularly in the areas of numeracy and language. Therefore, pre- and post-training assessments were conducted

to examine the impact of the training on parents' knowledge. The pre-test questionnaire consisted of 10 statements regarding the development of numeracy and language in preschool children. One example of the question is "Numeracy skills begin to develop after the child enters school". Participants completed the questionnaire under the guidance of the facilitator within a 10-minute timeframe. The pre-test session can be seen in Figure 3.

Main lecture

During the main lecture phase, the keynote speaker provided explanations on the development of numeracy and language in humans, particularly from infancy to school age children, aspects that affect numeracy and language development, and home-based learning support. Observations were made throughout this presentation session to capture participants' reactions. The main lecture session and selected presentation slides can be seen Figure 4 and Figure 5.



Figure 4. Main lecture



Figure 5. Some of slide materials

Example home learning activities

In this session, the facilitator provided an example of an activity that parents can engage in at home to support their child's development, which involves the use of a book. The book, titled "Yuk, Sekolah bersama Beba" (Let's Go to School with Beba), was created and developed by psychology students under the supervision of their instructor. The book introduces alphabet letters, includes illustrated stories, trigger questions, and other activities that can be done by the child together with their parents. It also comes with a guidebook for parents that provides guidance on how to use the book and outlines the steps involved. The facilitator demonstrated the usage and guided the participants to try it out. The activities and sample content from the Beba book can be seen in Figure 6 and Figure 7.



Figure 6. Facilitators demonstrate Beba Book



Figure 7. Some example pages of Beba Book

Discussion

The facilitator guided the discussion by allowing participants to ask direct questions to the speakers. From the observations, it was evident that the participants actively engaged and showed enthusiasm during the discussion. Several questions arose regarding parents' experiences in caring for

preschool children, strategies for engaging children in learning, stimulating late-talking children, and the roles of schools and parents in teaching appropriate language to children. The school principal also provided insights into the participants' questions. The illustration of the activities during this phase can be seen in Figure 8.



Figure 8. Discussion

Post-test

In this phase, the same questionnaire with identical items as the pre-test session was given to the participants. The participants were asked to independently complete the 10 items within a 10-minute time frame. The results of the post-test questionnaire will be evaluated to assess the achievement of training objectives and the effectiveness of the training in enhancing parental understanding.

Games and closing

At the end of the training, the facilitator conducted a game session consisting of questions related to the training content, followed by a lucky draw for door prizes. The participants were also given the opportunity to contact the speakers if they had any further inquiries regarding child development and parenting.



Figure 9. Games and closing

Evaluation Phase

The evaluation was conducted using observation and questionnaire assessment. To determine the effectiveness of the training, the team administered questionnaires to determine improvements in attitudes and knowledge. The evaluation was conducted by testing the difference between the pre-test (before the training) and post-test (after the training) scores given to the trainees. Trainees were asked to complete an assessment of parental knowledge about numeracy and language development. The assessment consisted of 10 questions in the form of multiple choice and true-false statements. One example of the question is "Numeracy skills begin to develop after the child enters school".

Data Analysis Phase

The evaluation was analyzed using paired t-test. Paired t-test belongs to the category of repeated measure design, which is an analysis conducted by comparing two averages of measurement data derived from the same individual, object, or unit. These measurements can be measurements taken at different times (pre-test and post-test scores with an intervention in between) as was done in this study. In the t-test, the assumption of normal distribution must be met so that before conducting the t-test, the assumption of normal distribution is tested using the Shapiro-Wilk test with $\alpha = 0.05$. All analyses were conducted using Statistical Package for the Social Science (SPSS) version 25 software.

Reporting Phase

The results of data analysis will be one of the references in reporting the results of community service program activities that have been carried out.

3. RESULTS AND DISCUSSION

Results

As explained in the main lecture section above, the expected outcome of this PPM is an increase in parents' understanding of literacy and numeracy in pre-school children. From the observation during the main lecture, participants showed enthusiasm and curiosity through discussion. The participants also exhibited positive reactions, as evidenced by their enthusiasm, attentive listening, note-taking, and other positive responses. In addition to the discussion, the improvement of the participants' understanding was also measured through questionnaires given before (pre-test) and after the main lecture (post-test).

The results of the descriptive analysis show that the average pre-test score is 57.00 with a standard deviation of 14.18. Meanwhile, the average post-test score is 67.30 with a standard deviation of 17.41. Normality testing was conducted using the Shapiro-Wilk test to examine the data distribution. The analysis results indicate a p-value of 0.06 for the pre-test data, while the normality analysis for the post-test data shows a p-value of 0.12, indicating that both data sets are normally distributed.

After fulfilling the assumption of normality, a paired sample t-test was performed, as mentioned in the data analysis section. The paired t-test analysis obtained significant results with a t-score of 3.90 and a p-value of 0.00. This indicates an improvement in parents' understanding of numeracy and language development after attending the training. In other words, providing education in the form of lectures on numeracy and language development can significantly enhance participants' knowledge. Although the number of measured subjects is relatively small, the high t-value suggests a significant training effect on improving parents' understanding of numeracy and language development in children. With an average

pre-test score of 57.00, it can be concluded that, on average, parents can correctly answer only half of the 10 questions related to language and numeracy development. This demonstrates that parents still need information regarding their children's language and numeracy development in order to provide optimal support to their children.

The percentage of parents who answered each item correctly can be seen in Table 1. Generally, more parents answered correctly in the language aspect compared to numeracy, both in the pre-test ($M_{\text{numerasi}} = 1,80$; $SD_{\text{numerasi}} = 0,76$; $M_{\text{bahasa}} = 2,87$; $SD_{\text{bahasa}} = 0,57$; $t = 6,14$, $p = 0,00$), and post-test ($M_{\text{numerasi}} = 2,00$; $SD_{\text{numerasi}} = 0,95$; $M_{\text{bahasa}} = 3,17$; $SD_{\text{bahasa}} = 0,69$; $t = 5,43$, $p = 0,00$).

Table 2. Percentage of pre-test and post-test

Item	Pre-test (% correct answer)	Post-test (% correct answer)
Sentence utterance in preschool children.	25.81%	35.48%
Introduction of new vocabulary in children.	96.77%	100%
Speaking ability of Subjek-Predikat-Objek-Keterangan (SPOK) in children.	93.54%	93.54%
Onset of children's counting ability.	16.13%	35.48%
Stimulation of children's counting ability.	74.19%	67.74%
Factors influencing language-numeracy development.	41.94%	67.74%
Differences in language-numeracy development between girls and boys.	58.06%	87.09%
Age for introducing mathematical symbols to children.	29.03%	38.71%
Ways to stimulate children's language abilities.	61.29%	87.09%
Behavior exhibited by children who have developed counting skills	54.84%	61.29%

Discussion

The training results show that parents have higher language test scores compared to numeracy test scores. This indicates that parents' understanding of preschool children's language development is higher than their understanding of numeracy development (pre-test: $t = 6.14$, $p = 0.00$, and post-test: $t = 5.43$, $p = 0.00$). Previous research has shown that 74% of parents express difficulties in understanding preschool children's numeracy development and are unsure of what to expect from their children in terms of numeracy skills (Cannon & Ginsburg, 2008). If parents are unable to understand their children's competence development, it becomes challenging for them to provide optimal support, such as: (1) Creating an optimal home learning environment; (2) Assisting their child's development through scaffolding; and (3) Seeking help when the child needs it. In the training program "Optimizing Numeracy and Language Learning Environment for Preschool Children," parents were provided with information regarding the three examples of parental support mentioned above, albeit without maximum depth. Additionally, t-test analysis also reveals that the difference between pre- and post-test scores is greater in the language aspect compared to the numeracy aspect, indicating that the training has a greater effect on parents' understanding of language development than their understanding of numeracy development.

Participant responses were also observed during the training sessions. In the literacy topic session, parents were able to answer or provide concrete examples of things they commonly do at home, indicating that they already have a basic knowledge of literacy development. On the other hand, parents seemed to realize for the first time that numeracy development is related to numbers and counting. Based on the responses displayed by parents during the numeracy discussion, there is an indication that parents feel that early childhood education centers are more responsible for teaching numeracy than the parents themselves. However, towards the end of the session, parents appeared to be awakened and impressed, realizing that numeracy development stimulation can also be done at home through simple activities with their children.

Both literacy and numeracy developments are closely related to cognitive development, particularly working memory and children's language development (Raghubar & Barnes, 2017). Language development can be observed starting from how infants learn to speak, from cooing, babbling, single meaningful words, to eventually increasing their vocabulary and being able to express complete sentences that are understood by their environment (Santrock, 2020). Preschool-aged children are expected to have developed pre-reading skills through letter recognition, listening to rhymes, or matching words with the initial sounds of objects (Soebadi, 2013).

Language development also serves as the foundation for children's reading, writing, and numeracy development. Language plays a key role in acquiring new knowledge and integrating that knowledge with previous knowledge. Additionally, language may play a crucial role in integrating numeracy skills and formal mathematics learning (Raghubar & Barnes, 2017). For the development of numeracy skills or counting, children need to have a wide vocabulary and an understanding of basic concepts such as more/less, big/small, and recognition of mathematical symbols (Resnick, 1999). In most children, the acquisition and mastery of early numeracy skills occur spontaneously through activities at home and other experiences in the child's daily environment (Le Fevre et al., 2009).

Parental involvement in literacy and numeracy activities at home is related to children's future school achievement (Lukie et al., 2014). Parents, as the closest environment to the child, are expected to provide various activities for stimulating and exploring language and numeracy development. Previous research has shown that there are three misconceptions among parents when it comes to stimulating their children's literacy and numeracy development. One of these misconceptions is regarding the implementation of literacy and numeracy routines at home, such as asking children to read books for a specific duration of time (Meliyanti et al., 2021) or learning to read and write while sitting neatly at a desk (Yulia & Eliza, 2021).

The findings from previous studies also emerged during the discussions in the training. Parents seemed to be aware of various ways to stimulate literacy development, such as engaging in learning activities, reading books together, listening to songs, watching videos, and having conversations. However, there was a need to clarify and emphasize that these activities can be done in all situations, anytime, and anywhere. This aligns with the research findings by Lukie et al. (2014) regarding children's interest and collaborative parent-child involvement, which have an impact on literacy and numeracy exposure at home. Studies on Home Numeracy Environment (HNE) in Asian regions have shown that the activities conducted by Asian parents at home refer to both formal or direct activities (such as asking children to read words, write, or do simple addition) and informal or indirect activities (such as reading books, playing with number and letter flashcards) (Cheung et al., 2021). Examples of these activities were also observed from the activities described or shared by parents during the training sessions.

In Indonesia, the introduction and understanding of the importance of literacy are supported by the government through the National Literacy Movement (Gerakan Literasi Nasional or GLN) since 2016 (Ministry of Education and Culture, 2016). One of its programs is the Family Literacy Culture (Budaya Literasi Keluarga or BuLiKe), which aims to introduce early childhood to the world of literacy through learning and play activities (Kya, 2019). The conducted training is expected to be one manifestation of the GLN program targeting parents.

4. CONCLUSION AND RECOMMENDATIONS

As the primary caregivers, parents of preschool children play a crucial role in facilitating the development of numeracy and language skills. This community engagement program aims to provide parents with knowledge to optimize the development of numeracy and language in preschool children. The evaluation of the parents' knowledge before and after the program indicates an improvement in their understanding of numeracy and language development in preschool children. Additionally, observations showed that the participants were enthusiastic, engaged, asked many questions, and displayed other positive responses to the program. The analysis results demonstrate a positive effect of the training, leading the researchers to recommend further training sessions for parents of preschool children. Although evaluation of the training program seems to be convincing, the conducted training has several limitations. First, due to time consideration, the training consists of a lecture and discussion session only. Therefore, participants can be considered to play a less active role in the training compared to other approaches such as group discussion, games, or reflection. Second, the Beba book has a digital chapter. However, due to time and facility restrictions (e.g., limited tablets available), participants were not informed about the digital services. Third, the evaluation items in the pre- and post-tests are the same, which may play some role in the outcome of this study.

Furthermore, based on the limitations described above, there are three recommendations that can be proposed. First, with more time windows, the future training may need to consider using focus group discussion approach, in which the participants could share their experiences with each other and enable them to be more engage in the training sessions. Second, although it may be difficult for particular sample, the next training may want to ask their participants to bring personal tablets or smartphones into the training in order to enable them to participate actively in a session about Beba digital chapter. Third, it is recommended to use distinct items with similar difficulties in the pre- and post tests to ensure the absence of learning effect.

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