

Training Preschool Teachers in Early Detection of Emotional-Behavioral Problems and ADHD using Audiovisual and Booklet Medi

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ABSTRACT

Background: Early identification of emotional and behavioral problems, including attention-deficit/hyperactivity disorder (ADHD), is essential for optimizing preschool children's development. In Indonesia, many preschool teachers lack sufficient competence due to limited structured training. Evidence comparing audiovisual and booklet-based instructional media is scarce. This study addresses this gap, providing insights to enhance teacher preparedness in early detection.

Purpose: This study compared the effectiveness of audiovisual and booklet-based training programs in improving preschool teachers' knowledge and skills in the early detection of emotional behavior problems and ADHD.

Methods: A quasi-experimental study with a non-equivalent group design was conducted among 58 preschool teachers selected through purposive sampling. Preschools were assigned to two formats that delivered identical training content through either audiovisual or booklet-based media. Participants' knowledge was assessed using a questionnaire, and practical skills were evaluated with a checklist, both of which were validated and reliable. Data were analyzed using independent t-tests and Mann–Whitney U tests.

Results: Audiovisual training produced significantly greater improvements in participants' knowledge ($p < 0.001$) and skills in early detection of emotional behavior problems ($p < 0.001$) and ADHD ($p = 0.009$) compared with booklet training. The audiovisual group achieved higher post-test scores and demonstrated better knowledge retention.

Conclusion: Audiovisual-based training was more effective than booklet-based training in enhancing preschool teachers' knowledge and skills for identifying early emotional and behavioral problems in children. These findings highlight the importance of integrating audiovisual learning into teacher development programs to strengthen early childhood mental health surveillance.

Keywords: attention deficit-hyperactivity disorder, audiovisual aids, pre-school teachers, problem behavior, training programs

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BACKGROUND

A pre-school period is one of the sensitive periods for children. In this period, they may suffer from certain disorders in terms of basic and emotional development. According to the United Nations Children's Fund (UNICEF), an estimated 240 million children aged 0–17 years, or approximately one in ten globally, are living with disabilities. These children experience multiple and often intersecting forms of deprivation, particularly in the areas of education, health, and protection, when compared to their peers without disabilities (United Nations Children's Fund (UNICEF), 2021). The 2019 Global Burden of Disease Study (GDB) report indicates a prevalence of 7.5% (49.8 million) for moderate to severe developmental disabilities in children under five years (Olusanya et al., 2022). Meanwhile, the prevalence of emotional behavior problems in childhood from 20 countries was estimated to be 1-51%, and preschool aged was 10% (Uğur et al., 2019). Merikangas et al. (2022) contend that the worldwide occurrence of various emotional developmental disorders, including Attention Deficit-Hyperactivity Disorder (ADHD) in children aged 4 to 17 years, varies from 2.23% to 8.7%. In Indonesia, the prevalence of children with ADHD ranged from 4% to 15% (Ardiyati, 2015). ADHD is most often diagnosed during school years, but the symptoms can be identified in pre-school children (Cao et al., 2018). Children likely experienced an emotional development disorder, and thus required a serious controlling effort (Ashary et al., 2015). Numerous preschoolers may have unnoticed behavioral and emotional issues, and those facing such problems are at an elevated risk of developing severe mental disorders, encountering challenges in social skills, and experiencing difficulties in education (Abd Rahim et al., 2023).

Emotional development problems in children can be detected during a pre-school period. Several caregivers, researchers, and policy-makers (the government) confirmed that monitoring the early intervention and detection in pre-school children was necessary to acquire an optimal result for either the children or their families (Warren et al., 2016; Ho, 2021; Perosa et al., 2023). The program monitoring early detection of development was proven effective to identify the development problems potentially experienced by children (Valla et al., 2015; Tupou et al., 2022; Taresh et al., 2023).

One of the public health programs as a preventive action by the Indonesia government through the Ministry of Health to reduce the development problem level and as an effort optimally increasing children's development quality is *Stimulasi Deteksi dan Intervensi Dini Tumbuh Kembang Anak* (SDIDTK, Early Intervention and Detection Stimulation to Children's Development). Within SDIDTK, one of the monitoring activities involves the early detection of emotional behavior disorders. This process comprises examining three aspects: emotional behavior problems assessed via the Emotional Behavior Problem Questionnaire, early autism detection using the Modified Checklist for Autism in Toddlers (M-CHAT), and early ADHD detection employing the Abbreviated Conner Rating Scale as outlined in the SDIDTK Guidebook (Ministry of Health of the Republic of Indonesia, 2018).

The monitoring of early detection in children is commonly through activities in the integrated health service post. Nevertheless, the public participation level in the activities is considered low. When children grew older, their mother was more unlikely to check their health in an integrated health service post (Rumiatun & Mawadah, 2017). The findings align with the National Basic Health Research Republic of Indonesia 2018, which reveals that the proportion of posyandu visits for growth and development monitoring activities among individual aged 36 to 59 months was lower than that observed in the younger age group (Ministry of Health of the Republic of Indonesia, 2018).

Besides, the implementation of SDIDTK program in community health centers and the networking were focused on the early detection of growth disorder; while the early detection

of basic development, emotional mental disorder, and stimulation based on children's age was still neglected (Ummah et al., 2016; (Herman et al., 2021). Considering these issues, monitoring and assistance activities in integrated health service posts integrated with preschool facilities is a recommended solution. It is in line with PMK RI Number 66 of 2014 Article 4 that the early detection of children's development activity can be conducted not only in an integrated health service center but also at school (elementary school or preschools).

Training is one of the activities elevating the level of knowledge and skill. Training media can be given using various learning media; such as audiovisual media (Abdulrahman et al., 2020). Several research have reported that audiovisual media are the key to the learning process (Arneliwati et al., 2019; Aprianto et al., 2022). Furthermore, audiovisual media (video) could motivate individual, draw their interests, and enable them to understand and memorize how to implement a beneficial learning procedure (Pupulim et al., 2015; Nicolaou et al., 2021).

Preschool teachers in Bula, East Seram, Maluku had not been given any training on the early detection of children's emotional behavior disorders. The evidence was based on our interview with 20 teachers from five early childhood education schools, the head of Bula Community Health Center, and staff from the division of the early detection of children's development in the Health Office of East Seram. Also, we conducted a screening of pre-school children's emotional behavior disorders in five early childhood education schools. We found 18 children with emotional and behavioral problems and six children with possible ADHD in our preliminary study. These local findings are consistent with national and international evidence indicating that emotional and behavioral problems and ADHD are prevalent among preschool children. Such evidence underscores the importance of early identification and intervention. In response, training for preschool teachers is necessary, focusing on monitoring and early detection using the Emotional Behavior Problems Questionnaire (*Kuesioner Masalah Perilaku Emosional: KMPE*) and the Abbreviated Conner Rating Scale for ADHD.

OBJECTIVE

This study aimed to compare the effectiveness of two training media, audiovisual and booklet-based, in improving the knowledge and skills of preschool teachers in Bula, East Seram, Maluku, for the early detection of emotional and behavioral problems and attention-deficit/hyperactivity disorder (ADHD).

METHODS

This study employed a quasi-experimental design, specifically a non-equivalent control group design, which was selected because random assignment of participants was not feasible. The design enabled comparison between pre-existing groups with similar characteristics. The research was conducted among preschool teachers in Bula, East Seram, Maluku, Indonesia. The population consisted of all preschool teachers in Bula. To minimize potential bias and information contamination, preschools were grouped by geographical proximity and assigned to one of two groups: the audiovisual training group and the booklet training group. Both groups received training of identical content delivered through different media formats, allowing for a direct comparison of learning outcomes.

The audiovisual group received training on the early detection of emotional and behavioral problems and attention-deficit/hyperactivity disorder (ADHD) using a 10-minute and 53-second instructional video. The booklet group received the same material in printed form, ensuring content equivalence. The training content covered the definition, objectives, implementation procedures, instruments, assessment methods, interpretation, and recommended interventions related to early detection of emotional and behavioral disorders in preschool-aged children.

A purposive sampling technique was applied to select participants from a total population of 83 preschool teachers in Bula Subdistrict, Indonesia, who met the inclusion criteria: (1) having no prior training in early detection of emotional and behavioral problems; (2) aged 25–59 years; (3) possessing at least a senior high school education; and (4) having a minimum of one year of teaching experience. A total of 66 teachers were initially enrolled, with 33 assigned to the audiovisual training group and 33 to the booklet training group, leaving a reserve to account for potential dropouts. During the study, eight participants (five from the audiovisual group and three from the booklet group) withdrew, resulting in 58 participants for the final analysis.

The research utilized questionnaires assessing knowledge and skill, along with observation checklist sheets, which have undergone validation and reliability testing. The development of the instruments was referred to as the SDIDTK (*Stimulasi Deteksi dan Intervensi Dini Tumbuh Kembang Anak*, Early Intervention and Detection Stimulation to Children's Development) Guidebook published in 2018 by the Ministry of Health of the Republic of Indonesia. The validity and reliability test results of the knowledge questionnaires showed a value of >0.36 for the correlation coefficient ($r_{\text{count}} > r_{\text{table}}$) and a reliability coefficient of 0.810. As for the observation checklist sheet was checked for its reliability using the intraclass correlation coefficient (ICC). We conducted the reliability test among observers and found the ICC of 0.895 (≥ 0.80), indicating that our measurement instrument had a high stability level.

Data were analyzed using SPSS version 20. The Shapiro–Wilk test was applied to examine data normality. Variables with a normal distribution were analyzed using a parametric test (independent sample t-test) to compare mean differences between the two groups. Variables that were not normally distributed were analyzed using a non-parametric test (Mann–Whitney U test). All statistical tests were performed at a significance level of 0.05. These analyses aimed to determine whether there were statistically significant differences in the knowledge and skill scores of preschool teachers between the audiovisual and booklet training groups.

The research obtained ethical approval from the ethical committee of the Faculty of Medicine, Public Health, and Nursing at Universitas Gadjah Mada (KE/FK/0812/EC/2019). Furthermore, the research had also acquired a research recommendation letter from the Government of East Seram, Maluku.

RESULTS

The study included 58 preschool teachers in Bula, East Seram, Maluku, comprising 28 participants in the audiovisual training group and 30 participants in the booklet training group. All participants were female. The characteristics of the respondents are presented in Table 1.

Table 1. Characteristic of Respondents

Characteristic of Respondents	Audiovisual Group (n=28)		Booklet Group (n=30)		Test of Homogeneity p
	f	%	f	%	
Age group					
25 – 35	12	42.9	18	60.0	0.422
36 – 46	13	46.4	10	33.3	
>46	3	10.7	2	6.7	
Last education					
Senior High School	6	21.4	12	40.0	0.276
Bachelor	13	46.4	12	40.0	

Other:					
Diploma	9	32.2	6	20.0	
Years of being a preschool teachers	11	39.3	19	63.3	0.067
1 – 5 years	17	60.7	11	36.7	
>5 years					
Total	28	100	30	100	

The results of the homogeneity test for the characteristics of respondents from both groups in Table 1 indicate a p-value of >0.05 . Thus, it can be inferred that the characteristic data from the two groups have similar or homogeneous variances.

In this study, the normality test was conducted using the Shapiro-Wilk test. The outcomes revealed that the knowledge and skills for early ADHD detection utilizing the Abbreviated Conner Rating Scale in both groups exhibited a normal distribution ($p > 0.05$). However, the data concerning the skill variable for early detection of emotional behavior problems, as assessed using the Emotional Behavior Problem Questionnaire, did not display normal distribution in both groups ($p < 0.05$).

A 3-time measurement (during the pretest, posttest I, and posttest II) was conducted to find the score of respondents' knowledge level in both groups. The measurement of respondents' skill score was only conducted twice which was in posttest I and posttest II. Based on the statistical analysis results obtained from the independent t-test regarding the disparity in mean scores of respondents' knowledge, the p-value was >0.05 . This suggests that there was no notable difference in the mean scores of the pretest administered to both groups before the intervention was implemented. Besides, it indicated that teachers' knowledge in both groups before the intervention was almost similar which was inadequate.

Here, we did not conduct a pretest regarding respondents' skills in both groups as they did not have any idea about our measurement instrument to monitor the early emotional disorders and its operation method. The abilities we assessed include skills in identifying early emotional behavior problems using the Emotional Behavior Problem Questionnaire and skills in early detection of ADHD using the Abbreviated Conner Rating Scale instrument.

The information regarding the knowledge and skills of both groups in identifying early emotional behavior problems, assessed using the Emotional Behavior Problem Questionnaire, and ADHD evaluated through the Abbreviated Conner Rating Scale instrument, is displayed in Table 2.

Table 2. The results of knowledge and skills in both groups were assessed before and after receiving training on the early detection of emotional behavior disorders and ADHD

Variabel	Audiovisual	<i>p</i>	Booklet	<i>p</i>
Knowledge				
Pre-test	5.14±27.07	$<0.001^a$	5.27±1.48	$<0.001^a$
Post-test I	9.29±2.68		7.47±1.98	
Post-test II	9.50±1.86		7.27±1.34	
Early detection skills of emotional behavior disorders				
Post-test I	34.00(27-40)	$<0.001^c$	29.00(22-32)	0.001 ^c
Post-test II	32.00(26-40)		28.00(22-30)	

**Early detection skills
of ADHD**

Post-test I	23.96±3.32	<0.001 ^b	22.63±2.59	<0.001 ^b
Post-test II	22.46±2.85		20.70±1.97	

Repeated measures ANOVA^a Paired t-test^b Wilcoxon signed-rank test^c

In Table 2, the p-values of pretest-posttest I and pretest-posttest II regarding knowledge in both groups were <0.05, indicating a significant difference before (pre-test) and after (post-test I and post-test II) the intervention. However, the p-value for post-test I-post-test II analysis in terms of knowledge for both groups was >0.05, suggesting no significant difference.

Table 2 also demonstrates a decrease in the skill of participants in both groups, supported by a p-value of <0.05 in posttest I and II, indicating a significant disparity in the ability to detect emotional behavior problems early between the groups. However, the median scores in the audiovisual group were higher than those in the booklet group. Furthermore, both groups exhibited a decrease in mean scores for early ADHD detection skills, with a p-value of <0.05 in post-test I and II, suggesting a substantial variance in early detection skills between the groups. the skills of both groups were not measured before the intervention (pre-test) because neither group had previously used the above-mentioned instrument.

The data presenting the disparity or comparison in scores of knowledge and skills for early detection of emotional behavior problems, as well as ADHD, across both groups are displayed in Table 3.

Table 3. Differences in knowledge and skill scores between the audiovisual and booklet training groups

Variable	Audiovisual	Booklet	Mean Difference ^a /Mean Rank ^b	p
Knowledge	4.36(1.85)	2.00(1.97)	2.35(1.35-3.36) ^a	< 0.001 ^a
Early detection skills of emotional behavior disorders	32.00(26-40)	28(22-30)	39.96 : 19.73 ^b	<0.001 ^b
Early detection skills of ADHD	22.46(2.85)	20.70(1.97)	1.76(0.46-3.06) ^a	0.009 ^a

Independent t-test^a Mann-whitney test^b

Table 3 displays the outcome of an independent t-test examining the difference or comparison in knowledge and skill scores for early detection of ADHD using the Abbreviated Conner Rating Scale instrument between both groups, revealing a p-value of <0.05. this suggests a notable difference in the mean scores of knowledges and skill for early ADHD detection between the audiovisual group and the booklet group, with the audiovisual group exhibiting higher mean scores compared to the booklet group.

Table 3 additionally reveals the outcome of the Mann-Whitney test aimed at discerning the disparity in the mean rank of participants' skills for early detection of emotional behavior problems using the Emotional Behavior Problem Questionnaire between both groups, resulting in a p-value of <0.05. in summary, a significant difference in skill for the early detection of emotional behavior problems was observed between the two groups. the mean rank in the audiovisual group, 39.96, exceeded that of the booklet group, which was 19.73.

DISCUSSION

The research results indicate that a training program focused on early detection of emotional behavior problems and ADHD improved the knowledge and skills of our participants in both groups. This finding aligns with several research studies that report booklets as proven effective instructional media (Yu et al., 2015; Espigares-Tribo & Ensenyat, 2021; Fontenele et al., 2021). Other research on education using audiovisual media shows that audiovisual media; such as video could elevate knowledge (Nagamma et al., 2020) and skills or psychomotor aspects (Shah et al., 2016; Shaojie et al., 2022). To reduce the prevalence of emotional development disorders in children and enhance developmental quality, preschool teachers must have a comprehensive understanding of early detection methods for emotional behavior disorders.

Preschool teachers' knowledge about the early detection of emotional behavior problems, as well as ADHD in preschool children can be enhanced in a training activity. The training was an activity to develop human resources and to elevate the training participants' knowledge and skill (Harding et al., 2018). Participating in training sessions that concentrate on the early detection of emotional behavior problems and ADHD in preschool children can provide preschool teachers with new insights and knowledge.

The effectiveness of training activities is affected by the methods and media used as well; therefore, this aspect needs to be considered (Sibualamu et al., 2023). Besides, the methods and media used in learning highly affect a learning output in terms of either knowledge or skill (Sibualamu et al., 2022). Learning media; such as booklets; were proven effective in a knowledge elevation (Lima et al., 2022). The particular media were suitable for independent learning and for long-term use, although demanding using individuals to have an adequate reading ability (Pratiwi & Puspitasari, 2017). However, other research indicates that using printed learning media (booklets or leaflets), yields little positive impact on learning outcomes (Abdullah et al., 2020; Hasanica et al., 2020). Hence, it becomes imperative to integrate these materials with other media and learning methods, such as audiovisual media and demonstration methods (Golzari et al., 2015; Golzari et al., 2015). These findings aligned with the results presented in this study, which show that audiovisual media (video) as education media effectively increases students' understanding..

According to the results of several meta-analyses, the use of technology media elevated learning (Brame, 2016). Several other research on the effectiveness of digital technology in learning outcomes also report similar findings (Jeffrey et al., 2019; Moreno et al., 2022). One of the technology media is audiovisual media in the form of video. Some research had indicated that video as a learning media or an education instrument was proven very effective (Abdulrahman et al., 2020; Nagamma et al., 2020). Audiovisual media stimulate students' or participants' cognitive skills and enable them to solve problems and think critically. The research indicates that video, as a learning media could be used in an educational activity about healthcare. They found that the participants' knowledge about diseases, treatment, and compliance was elevated after they watched a video of health education (Eshel et al., 2019; Gunn et al., 2023). However, audiovisual media present several practical limitations. The production of high-quality video content is often time-consuming, demands specialized technical skills, and entails considerable financial resources. Recent reviews and empirical studies have consistently documented these challenges within educational contexts (Abdulrahman et al., 2020; Liu et al., 2022; Rosendahl & Wagner, 2024).

The disparity in the average knowledge and skill scores between the groups indicates a meaningful effect of the training media, with the audiovisual group achieving superior learning outcomes compared to the booklet group. This finding is consistent with empirical evidence

from a recent meta-analysis in health education, which reported that video-based learning produced a moderate to large effect on both knowledge acquisition and skill development compared to non-video formats (Morgado et al., 2024). Similarly, a systematic review on audiovisual patient information found that audiovisual formats significantly improved knowledge and decision-making compared to printed materials (Stacey et al., 2022). These convergent lines of evidence support the present study's implication that integrating audiovisual media into teacher training programs can enhance knowledge retention and practical skill performance among preschool teachers responsible for the early detection of emotional and behavioral problems and ADHD.

CONCLUSION

This study confirmed that audiovisual-based training was more effective than booklet-based training in improving preschool teachers' knowledge and skills for the early detection of emotional and behavioral problems and attention-deficit/hyperactivity disorder (ADHD) in Bula, East Seram, Maluku. The findings provide scientific evidence supporting the use of technology-enhanced instructional media to strengthen teachers' capacity in early identification and intervention for children's developmental and behavioral issues. Integrating audiovisual learning into teacher education and community health programs may enhance early childhood mental health surveillance and preventive care. Future studies should examine the optimal duration and interactive features of audiovisual materials to improve engagement and minimize distraction during learning.

CONFLICTS OF INTEREST

Throughout the course of this research, until its completion, there is no conflict of interest.

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