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Article

Comparative Effectiveness of Demonstration, Play, and Role-Play Methods on Handwashing Behavior Among Preschool Children in East Lampung

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Abstract

Background: Handwashing with soap is one of the most effective strategies for preventing the spread of infectious diseases, particularly among young children. However, compliance with hand hygiene practices remains suboptimal in many regions.
Objective: This study aimed to compare the effectiveness of demonstration, play, and role-play methods in improving handwashing behavior among preschool-aged children at East Lampung.
Methods: A one-group pretest–posttest design was employed. A total of 20 preschool children were selected using total sampling. Health education interventions were delivered using three different methods: demonstration, play, and role-play. Data were collected through structured observation and analyzed using paired t-tests to assess changes in behavior within groups, and one-way ANOVA to compare effectiveness across the three methods.
Results: All three methods significantly improved handwashing behavior (demonstration: p = 0.002; play: p = 0.003; role-play: p = 0.001). However, the ANOVA test indicated no significant difference in effectiveness among the three methods (p = 0.190), suggesting each method was equally effective in promoting hand hygiene behavior.
Conclusion: Demonstration, play, and role-play are all effective educational strategies to enhance handwashing behavior among preschool children. These methods can be integrated into early childhood education programs to foster healthy hygiene habits and reduce infection risk.

Keywords: Hand hygiene, demonstration, play, role-play, preschool children, health education, behavior change

INTRODUCTION

Health development in Indonesia is an integral part of national development, aimed at increasing awareness, willingness, and capacity for healthy living among all citizens. One essential component is the promotion of Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat, called PHBS), particularly handwashing with soap which serves as a critical preventive measure against infectious diseases.

Handwashing with soap is a simple yet highly effective method of sanitation that eliminates pathogens from hands, preventing disease transmission. The World Health Organization (WHO) has consistently emphasized proper hand hygiene, recognizing October 15 as Global Handwashing Day to raise awareness of its importance. Despite global campaigns, disparities in hand hygiene behavior remain. According to UNICEF (2020), approximately 60 million Indonesians still lack access to adequate handwashing facilities, including in schools and healthcare settings.

Data from the Central Statistics Agency (Badan Pusat Statistik—BPS) indicate that while 79.3% of households in Lampung Province had access to handwashing facilities in 2018, only 48.8% of the population practiced proper handwashing behavior. In East Lampung Regency specifically, this figure was even lower, with just 39.5% of individuals habitually washing hands correctly (BPS, 2022). This discrepancy between facility availability and behavior highlights the importance of educational interventions, particularly among vulnerable populations such as young children.

Children in early childhood represent a pivotal target group for hygiene education due to their developmental stage, high susceptibility to infectious diseases, and their potential to form long-term healthy habits. According to Mardhiati (2019), instilling proper hand hygiene practices in young children can significantly reduce the risk of communicable diseases such as diarrhea and respiratory infections. Saragih (2019) further demonstrated that structured health education interventions significantly improved knowledge and handwashing practices among elementary school students, underscoring the impact of early intervention.

Similarly, Kurniawati and Kuswanto (2022) observed a strong correlation between students' knowledge of clean and healthy living behaviors and their hand hygiene practices during the COVID-19 pandemic. These findings are aligned with previous international research indicating that knowledge and environmental reinforcement both play vital roles in promoting hygiene behavior in school-aged children (Aiello et al., 2008; Curtis et al., 2011). Moreover, interventions that are developmentally appropriate, such as play-based and interactive methods have been shown to increase engagement, retention of health knowledge, and behavioral adherence among preschoolers (Chard et al., 2019; Bieri et al., 2013).

Moreover, interventions that are developmentally appropriate—such as play-based, experiential, and interactive methods—have been shown to significantly increase engagement, enhance retention of health knowledge, and improve behavioral adherence among preschool-aged children (Chard et al., 2019; Bieri et al., 2013). Preschoolers learn best through hands-on activities, imitation, and imaginative play, which allows health-related messages to be internalized in a more meaningful and memorable way. For example, Bieri et al. (2013) demonstrated that combining health education with storytelling and puppet shows significantly improved hygiene behavior among children in rural Laos. Similarly, Chard et al. (2019) found that a school-based water, sanitation, and hygiene (WASH) intervention using games and interactive learning modules effectively increased hand hygiene compliance in preschoolers.

Additional evidence supports the idea that educational approaches involving role play and demonstration are particularly effective for promoting health behaviors in early childhood. Demonstration enables children to visualize and imitate correct techniques, while role play fosters emotional engagement and peer modeling—key mechanisms in behavior formation at this developmental stage (Ramirez et al., 2018; Thakker & Jani, 2020). A study by Mahmud et al. (2020) reported that children who participated in group-based health play activities were significantly more likely to practice correct handwashing compared to those who only received verbal instruction. Furthermore, creative approaches such as singing handwashing songs and using hand puppets have been shown to reinforce learning and improve retention over time (Liu et al., 2022).

Taken together, these studies underscore the importance of tailoring hygiene education to the cognitive and emotional capacities of young children. By leveraging play and active learning, health interventions can move beyond rote memorization and promote sustainable behavior change in this formative age group. Therefore, selecting age-appropriate educational strategies such as demonstration, role-play, and interactive play is crucial for maximizing the effectiveness of hand hygiene interventions in early childhood settings. These approaches not only support knowledge acquisition but also foster behavior change through experiential learning and social modeling.

METHOD

Study Design

This study employed a quantitative, quasi-experimental design using a pretest-posttest one-group design to evaluate the comparative effectiveness of three health education methods, namely demonstration, play, and role-play on improving handwashing behavior among preschool-aged children. The study was conducted between March and April 2023 at PAUD Kuntum Melati Indah, located in Braja Indah Village, Braja Selebah District, East Lampung Regency, Indonesia.

Population and Sample

The target population consisted of preschool children enrolled at PAUD Kuntum Melati Indah. Using total sampling, all children aged 4–6 years who met the inclusion criteria were selected for participation, yielding a final sample of 20 students. Children were eligible for inclusion if they were aged between 4–6 years, attended the full duration of the intervention, obtained informed consent from a parent or legal guardian, and were physically and cognitively able to follow simple instructions. Children were excluded if they had any diagnosed cognitive or motor impairment affecting ability to participate, were absent during either the pretest or posttest observation.

Sample size was calculated using G*Power version 3.1.9.7 for repeated measures ANOVA (within-subject factors). With an effect size (f) of 0.30 (medium), power of 0.80, $\alpha = 0.05$, and three repeated measures (pre-post across three intervention methods), the required minimum sample was 19. To account for potential dropouts, 20 children were enrolled.

Instruments

The primary instrument was a structured Handwashing Observation Checklist developed based on WHO and UNICEF guidelines for proper handwashing in early childhood (UNICEF, 2019). The checklist consists of 10 behavioral items, including wetting hands, using soap, scrubbing all parts, rinsing, and drying. Each behavior was scored as 1 (performed correctly) or 0 (not performed), with total scores ranging from 0 to 10. Scores ≥8 were categorized as "Good

Handwashing Behavior," scores 5–7 as "Fair," and ≤4 as "Poor." Higher scores reflect better adherence to correct handwashing practices. The original instrument demonstrated strong content validity (I-CVI = 0.90) and reliability (Cronbach's α = 0.83) in early childhood populations (Mahmud et al., 2020). For the Bahasa Indonesia adaptation, the instrument was translated, culturally adapted, and reviewed by early childhood education and public health experts. A pilot study with 10 preschoolers showed good internal consistency (Cronbach's α = 0.81).

Procedures

Following ethical clearance from the Health Research Ethics Committee of STIKes Abdi Nusantara (No. 005/KEPK/III/2023), informed consent was obtained from all parents/guardians. Baseline handwashing behavior was assessed using the checklist. Over three consecutive weeks, each child was exposed to one method per week: 1) Week 1: Demonstration-based learning (teacher demonstrates and children mimic). 2) Week 2: Play-based learning (games, songs, and puzzles about handwashing). 3) Week 3: Role-play learning (children act out handwashing scenarios in groups). At the end of each week, post-intervention behavior was assessed using the same checklist. To maintain consistency, the same facilitator conducted all sessions and observations, and sessions were standardized to 30 minutes.

Data Analysis

Data were analyzed using SPSS version 26. Descriptive statistics were used to summarize participant characteristics and handwashing scores. Inferential statistics included: Paired sample t-tests to compare pre- and post-intervention scores for each method and One-way repeated measures ANOVA to assess differences in effectiveness among the three methods. A significance level of $p < 0.05$ was used for all statistical tests.

RESULTS

A total of 20 preschool children participated in the study, with a mean age of 5.2 years (SD = 0.68). Of these, 11 were male (55%) and 9 were female (45%). All participants completed the three intervention sessions and the corresponding pretest and posttest assessments.

Table 1. Pretest and posttest scores of handwashing behavior by method (N = 20)

Method	Pretest Mean ± SD	Posttest Mean ± SD	Mean Difference	*p*-value
Demonstration	4.85 ± 1.27	8.10 ± 0.85	+3.25	0.002*
Play	5.00 ± 1.32	8.05 ± 0.95	+3.05	0.003*
Role-play	4.95 ± 1.21	8.40 ± 0.75	+3.45	0.001*

$p < 0.05$ indicates statistical significance based on paired sample t-test

Table 1 presents the mean handwashing behavior scores for each method (demonstration, play, and role-play) measured before and after the intervention. All three methods demonstrated statistically significant improvements in handwashing behavior ($p < 0.05$). Among them, role-play showed the highest posttest mean score (8.40), followed closely by demonstration (8.10) and play (8.05).

To examine whether there were significant differences among the three methods, a one-way repeated measures ANOVA was conducted. The results indicated no statistically significant differences in the effectiveness of the three interventions: $F(2, 38) = 1.69$, $p = 0.190$. Although all methods improved behavior significantly from pre- to posttest, the comparative analysis showed that the magnitude of improvement did not differ significantly across methods. This suggests that demonstration, play, and role-play were equally effective in enhancing handwashing behavior among preschool children in this setting.

DISCUSSION

This study evaluated the comparative effectiveness of three health education methods—demonstration, play, and role-play—in improving handwashing behavior among preschool children. All three interventions resulted in statistically significant improvements from pretest to posttest, indicating that each method was effective in promoting appropriate handwashing practices. However, comparative analysis revealed no statistically significant difference in effectiveness between the three methods, suggesting that each approach may be equally beneficial when tailored to early childhood education contexts.

These findings are in line with previous literature emphasizing the importance of interactive, developmentally appropriate methods for health behavior change in young children. Chard et al. (2019) and Bieri et al. (2013) reported that play-based and participatory hygiene education significantly enhance knowledge retention and behavioral adherence among children. Similarly, Saragih (2019) and Kurniawati & Kuswanto (2022) confirmed that health education targeting hygiene behaviors, particularly handwashing, significantly improves children's knowledge and practice. Our study extends this evidence to show that even among preschool-aged children, structured and interactive educational interventions are highly effective in enhancing personal hygiene behaviors.

While the role-play method showed the highest post-intervention score, followed closely by demonstration and play, these differences were not statistically significant. This suggests that when implemented with consistency and engagement, all three methods can produce similar behavioral outcomes. Demonstration allows children to visually observe correct practices, play encourages active participation and motivation, and role-play fosters empathy and reinforcement of learned behaviors. These results highlight the adaptability of various instructional strategies within early childhood education, allowing educators flexibility based on resource availability, setting, and child preference.

This study also aligns with regional and national health promotion efforts. Despite the availability of handwashing facilities in more than 79% of households in Lampung (BPS, 2022), actual hand hygiene practices remain low, particularly among young children. Interventions such as those tested in this study offer practical and scalable solutions for improving Clean and Healthy Living Behavior (PHBS) among children, particularly in underserved or rural regions where educational outreach is limited.

Limitations

Several limitations should be acknowledged. First, the sample size was relatively small ($N = 20$) and derived from a single early childhood education center, which limits the generalizability of findings. Second, behavior was measured through observational and self-reported components, which may be prone to bias. Third, the study did not assess long-term retention of handwashing behavior post-intervention, making it unclear whether the behavioral changes were

sustained over time. Future research with a larger, more diverse sample and follow-up assessments is needed to confirm the durability of these findings. Additionally, the integration of parental involvement and environmental modifications (e.g., visual cues in classrooms or homes) could be explored to reinforce hand hygiene behaviors beyond the classroom.

CONCLUSION

The findings of this study demonstrate that demonstration, play, and role-play methods are all effective in improving handwashing behavior among preschool children. Although no single method was statistically superior, each offers unique advantages in promoting health education in early childhood. These results provide evidence-based guidance for educators and public health practitioners in designing hygiene promotion programs that are engaging, age-appropriate, and adaptable to different learning environments. Effective hand hygiene education is a critical step toward reducing preventable infections in children and building a foundation for lifelong healthy habits. Given the high prevalence of inadequate handwashing behavior in regions such as East Lampung, integrating interactive educational strategies into early childhood curricula may significantly contribute to achieving national public health goals.

Conflict of Interest

The authors have declared that no conflict of interest exists.

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