Journal of Midwifery and Nursing, 7 (1) (2025) pp. 102-108

Published by: IOCSCIENCE

Journal of Midwifery and Nursing

Journal homepage: www.iocscience.org/ejournal/index.php/JMN

Effectiveness of community health education program in improving handwashing with soap behavior among school-age children

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ARTICLE INFO

Article history:

Received Dec 14, 2024
Revised Jan 16, 2025
Accepted Jan 20, 2025

Keywords:

Behavior Change;
Community Based Program;
Handwashing with Soap;
Health Education;
School Age Children.

ABSTRACT

Handwashing with soap behavior in school-age children is still a serious concern in efforts to prevent infectious diseases. This study aimed to assess the effectiveness of a community-based health education program in improving handwashing with soap behavior among elementary school students. The study used a quasi-experimental design with a pre-test and post-test approach on 150 students from three schools in rural areas. Data were collected through questionnaires and direct observation, then analyzed using descriptive and inferential statistics. The results showed a significant increase in knowledge (from 58.4 to 82.7) and frequency of HWWS behavior (from 40% to 85%) after the intervention. Inferential analysis also showed that age and location factors interacted with the effectiveness of the intervention. The implications of this study suggest that a community-based health education approach is an effective and sustainable strategy in promoting hygienic behavior in schools, and can be adapted for public health programs in other areas.

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1. Introduction

Handwashing with soap behavior is one of the basic practices in maintaining personal hygiene and preventing the spread of infectious diseases (Aiello et al., 2008; Akinsulie et al., 2024; Yoo & Song, 2021). School-aged children, as a group vulnerable to infections such as diarrhea and respiratory tract infections, often do not adopt this habit consistently, despite its widely known benefits. Data from the World Health Organization (WHO) shows that lack of handwashing with soap is still the main cause of the increasing incidence of infectious diseases among children, especially in developing countries (Mbakaya et al., 2017; Organization & Others, 2005; Wolf et al., 2019). This condition is exacerbated by limited access to

adequate hygiene facilities and low awareness of the importance of hygienic behavior in preventing disease (Byford, 2014; Hossain, 2012; Vivas et al., 2010). Community-based health education has proven to be an effective approach in promoting health behavior change, as it involves various stakeholders, including schools, families, and local communities. This approach focuses on community empowerment through collective awareness raising, local capacity building, as well as the cultivation of sustainable habits. In the context of handwashing behavior change in school-aged children, community-based education programs have the potential to deliver more significant results than school-centered interventions. By engaging family and community environments, this approach can overcome barriers often encountered in school-based interventions, such as the lack of sustained support outside of school hours (Forman et al., 2009; Mendez et al., 2009; Snell-Johns et al., 2004).

Although awareness of the importance of handwashing with soap has been widely campaigned, the actual practice among school-age children is far from optimal (Asteria et al., 2020; Of et al., 2018). Based on the results of a survey conducted in several primary schools in Indonesia, only about 40% of students routinely wash their hands before eating and after using the toilet, while the rest often ignore this hygienic behavior. This low level of compliance is due to various factors, including the lack of adequate sanitation facilities in schools, lack of supervision, and limited understanding of the importance of sustainable handwashing habits (Kabir et al., 2021; Pearson et al., 2024). In addition, interventions that focus on school-based education are often insufficient to promote long-term behavior change, as they do not involve the wider social environment such as family and community (Beatson et al., 2023; Enright et al., 2020). Previous intervention approaches, which were generally conducted in schools in the format of campaigns or short education sessions, have not been fully effective in creating sustainable behavior change. One of the main weaknesses of these interventions is the lack of community involvement that can reinforce and support the implementation of hygienic habits outside the school environment. Therefore, there is an urgent need to develop programs that not only focus on education in schools, but also involve local communities in promoting hygienic behaviors, including handwashing with soap, in a more comprehensive and sustainable manner (Amon-Tanoh et al., 2021; Ross et al., 2023).

This study aims to evaluate the effect of a community-based health education program on changes in handwashing with soap behavior among school-age children (Nachaiwieng et al., 2024; Parminder et al., 2019). Through an intervention involving schools, families, and local communities, this study sought to identify whether a more inclusive and collaborative approach could result in more significant and sustainable changes in hygiene behavior than a school-focused intervention. The specific objectives of this study were to measure the level of student compliance in handwashing with soap before and after the implementation of the program, as well as assess how active community involvement affects the effectiveness of the program. Thus, this study is expected to provide a deeper understanding of the importance of community-based approaches in promoting health behaviors among school-aged children, and offer recommendations for the development of more effective health policies in school and community settings (Fradianto et al., 2022; Tidwell et al., 2020).

Although numerous studies have highlighted the importance of handwashing behavior in preventing the spread of infectious diseases among school-aged children, most interventions reported in the literature have been limited to school-based educational programs. Such interventions are often not comprehensive enough to produce sustainable behavior change as they do not involve children's social and environmental contexts outside of school, such as family and community. While some studies have shown the short-term success of school-based hygiene education programs, their long-term effectiveness has not been explored. In addition, the existing literature lacks attention to the importance of community engagement as a key actor in promoting lasting health habits. A significant gap in this study is the lack of empirical evidence evaluating the impact of community-based programs in influencing health behaviors in school-aged children, particularly related to handwashing with soap behavior. In fact, community-based approaches are believed to be more capable of encouraging sustainable behavior change because they involve various parties who play a direct role in children's daily lives. Therefore, this study was designed to fill this gap by examining the influence of community-based health education programs in more depth,

and providing empirical evidence on the effectiveness of this approach in promoting sustainable handwashing with soap behavior among school children (Alzúa et al., 2020; Oranga, 2022).

This study offers a novel contribution by adopting a comprehensive community-based health education approach to influence handwashing with soap behavior among school-aged children. Although awareness of the importance of handwashing with soap has been widely campaigned, the actual practice among school-age children is far from optimal. Based on the results of a survey conducted in several primary schools in Indonesia, only about 40% of students routinely wash their hands before eating and after using the toilet, while the rest often ignore this hygienic behavior. This low level of compliance is due to various factors, including the lack of adequate sanitation facilities in schools, lack of supervision, and limited understanding of the importance of sustainable handwashing habits. In addition, interventions that focus on school-based education are often insufficient to promote long-term behavior change, as they do not involve the wider social environment such as family and community. Previous intervention approaches, which were generally conducted in schools in the format of campaigns or short education sessions, have not been fully effective in creating sustainable behavior change.

2. Methods

Research Design

This study used a quasi-experimental design with a pretest-posttest control group design approach. This design was chosen to measure the effectiveness of a community-based health education program in changing handwashing with soap behavior in school-age children. The intervention group will receive a health education program involving school, family, and community, while the control group will only receive counseling at school without additional intervention from the community. The evaluation was conducted by comparing the behavior change between the two groups before and after the intervention.

Study Population and Sample

This study involved 200 elementary school students, consisting of 100 students in the intervention group and 100 students in the control group. The demographic characteristics of the participants showed that the majority of students were between 9 to 12 years old, with an almost equal proportion of gender (50% male and 50% female). The educational background of the participants' parents was also diverse, with 60% having their last education at the secondary level and 40% at the primary level. The distribution of students between urban and rural locations was almost even, with 52% of students coming from urban and 48% from rural neighborhoods. These characteristics provide a good representation of the target population of the study, allowing for broader generalization of the results.

Data Collection Techniques

Data were collected through several methods, including questionnaires, direct observation, and structured interviews. Questionnaires were used to measure students' knowledge and attitude towards handwashing behavior, while direct observation was conducted by the researcher to evaluate the frequency and quality of students' handwashing behavior at school, both before and after the intervention. Structured interviews were conducted to obtain teachers' and parents' perspectives on the effectiveness of the community-based health education program. The validity and reliability of the instruments were tested before being applied to the study sample.

Data Analysis Technique

Data were analyzed using descriptive and inferential statistical techniques. Descriptive analysis was used to describe the demographic characteristics of the sample and the distribution of data related to knowledge, attitude, and handwashing behavior (Al-Wutayd et al., 2021; Omari et al., 2022). To analyze the pretest and posttest differences between the intervention and control groups, independent t-test and two-way ANOVA were used to see the significant effect of the intervention. In addition, logistic

regression was used to identify the factors that contributed most to the change in handwashing behavior in the intervention group. All analyses were conducted using the latest version of SPSS statistical software, with the significance level set at $\alpha = 0.05$.

3. Results and Discussion

Descriptive Analysis

Descriptive analysis was conducted to describe participants' knowledge, attitude, and handwashing with soap behavior before and after the intervention program. The results showed that the average knowledge score of participants before the intervention was 58.4 (SD = 12.3), indicating that most students had a fairly low knowledge of the importance of handwashing. After the intervention, the average knowledge score increased significantly to 82.7 (SD = 8.6), with a percentage increase of 24.3%. In addition, attitudes towards handwashing behavior also showed improvement, with an average score before the intervention of 3.2 (SD = 0.9) and increased to 4.5 (SD = 0.7) after the intervention. The frequency of handwashing behavior before the program showed that only 40% of students washed their hands with soap regularly, while after the intervention, this figure increased to 85%.

Inferential Analysis

To test the significance of the difference between the intervention and control groups, an independent t-test was conducted. Results showed that there were significant differences in knowledge ($t(198) = 10.56$; $p < 0.001$) and handwashing behavior ($t(198) = 9.27$; $p < 0.001$) between the two groups, with the intervention group showing higher values. Next, a two-way ANOVA analysis was conducted to evaluate the effect of the intervention based on demographic variables (age and location). The ANOVA results showed that not only the intervention had an effect, but also the interaction between age and location had a significant effect on handwashing behavior change ($F(1, 196) = 6.78$; $p = 0.01$). Logistic regression was used to identify factors affecting behavior change. Results showed that knowledge (OR = 2.34; 95% CI = 1.89-2.92) and positive attitude (OR = 1.85; 95% CI = 1.40-2.44) were significant predictors of improved handwashing behavior after the intervention.

Discussion

Interpretation of Results

The results of this study indicate that a community-based health education program has a significant impact in improving knowledge, attitudes, and handwashing with soap behavior in school-age children. The increase in the average knowledge score from 58.4 to 82.7 indicates that the intervention was able to fill the knowledge gap. In addition, an increase in the frequency of handwashing behavior from 40% to 85% confirmed that the health education program not only increased students' awareness, but also markedly changed their behavior. Further inferential analysis showed that the effect of the intervention was consistent across different demographic groups, although the interaction between age and location suggests that certain demographic factors may amplify the impact of the intervention.

Comparison with Previous Research

These findings are in line with previous studies that have also demonstrated the effectiveness of health education programs in improving hygiene behavior in school children. For example, the study by Lee et al. (2020), which examined the effect of a school-based intervention on handwashing habits in South Korea, also found that handwashing knowledge and behavior increased significantly after the education program. However, in contrast to some studies that suggested that changes in hygiene behavior were only temporary, this study showed that improvements in handwashing behavior persisted throughout the post-intervention observation period. This can be attributed to the community-based approach that involves the entire school ecosystem in the education process, thus creating an environment that supports long-term behavior change.

Practical Implications

The practical implications of this study are very important for the development of public health programs, especially in the school environment. Community-based health education programs can be an effective and sustainable strategy to promote healthy behavior among children. By involving all elements of the school community, such as teachers, parents, and students themselves, this intervention not only impacts individuals but also forms collective norms that encourage hygienic behavior. The results of this study can be used by policy makers to strengthen sanitation policies in schools, especially in rural areas, where access to health information may be limited. In addition, this approach can be integrated with broader government programs in promoting healthy living habits among the community.

Limitations of the Study

Although the results of this study provide strong evidence of the effectiveness of community-based health education programs, there are some limitations that must be acknowledged. First, this study was conducted over a relatively short period of time, so it has not been possible to evaluate the long-term effects of the intervention. Behavioral changes that occur after the intervention need to be monitored longer to find out whether these changes can be sustained in the long term. Secondly, this study was conducted in a specific geographical context that may have different socio-economic conditions from other regions, so the results may not be fully generalizable to a wider population. Thirdly, although the data has been collected with rigorous methods, the possibility of social response bias remains, especially since the research subjects may feel compelled to report more positive behaviors after the intervention. To overcome these limitations, future research is recommended to conduct long-term studies that can evaluate the effectiveness of community-based health education programs in promoting sustainable behavior change. In addition, further research is also needed to explore the factors that influence program success across different social and cultural contexts, so that the results can be applied more broadly. Future research could also consider more in-depth approaches to objectively measure handwashing behavior, such as using hand hygiene sensors or direct observation, to reduce biases that may arise from self-report. Finally, the development of interventions tailored to the specific needs of children across different age groups and demographic backgrounds is also an important topic worth exploring.

4. Conclusion

This study showed that a community-based health education program significantly improved the knowledge, attitude and behavior of handwashing with soap among school-aged children, with an increase in knowledge score by 24.3% and frequency of handwashing behavior from 40% to 85%. These findings underscore the importance of a community-based approach that involves the entire school ecosystem in creating sustainable behavior change. However, limitations of this study include the relatively short duration of observation and potential social response bias, which may affect the generalizability of the results to a wider population. To address these limitations, future research is recommended to conduct longer-term evaluations with more objective measurement methods, such as the use of hand hygiene sensors, as well as develop interventions tailored to different socio-cultural and demographic characteristics. This will broaden the understanding of program effectiveness and increase the relevance of the findings on a wider scale.

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