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RESEARCH ARTICLE

Bibliotherapy Using Picture Books in Improving Knowledge of Clean and Healthy Living Behaviours Among Lower-Year Primary School Children

Bibliotherapy melalui Buku Cerita Bergambar Terhadap Pengetahuan Perilaku Hidup Bersih dan Sehat Pada Anak SD Kelas Bawah

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Abstract

Clean and Healthy Living Behavior (PHBS) is an important effort to improve children's health status from an early age. However, PHBS implementation in Indonesia remains low. Only 39.1% of households comprehensively practice PHBS, while handwashing with soap reaches only 27.2%. In schools, around 29% of elementary schools lack adequate handwashing facilities, and 18% do not have separate toilet facilities. These conditions contribute to diseases among children, including diarrhea, skin infections, and Acute Respiratory Infections. The limited effectiveness of conventional learning methods indicates the need for more engaging health education strategies, such as bibliotherapy using illustrated storybooks. This study aimed to analyze differences in PHBS knowledge levels before and after bibliotherapy intervention among lower-grade elementary school students. A quantitative pre-experimental one group pretest–posttest design was used. The sample consisted of 30 third-grade students at MI Sunan Gunung Jati Malang selected through total sampling. Data were collected using a PHBS knowledge questionnaire before and after three bibliotherapy sessions using illustrated storybooks. Data were analyzed using the Wilcoxon test with a significance level of $p < 0.05$. The results showed an increase in the average knowledge score from 1.83 to 2.13. Students with good knowledge increased from 20.0% to 36.7%, while those with low knowledge decreased from 36.7% to 23.3%. The Wilcoxon test showed $p = 0.020$, indicating a significant difference before and after intervention. Bibliotherapy using illustrated storybooks demonstrated an increase in PHBS knowledge and has the potential to serve as an alternative health education strategy in primary schools.

Keywords: behavior, bibliotherapy, primary school, health education

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Abstrak

Perilaku Hidup Bersih dan Sehat (PHBS) merupakan upaya penting untuk meningkatkan status kesehatan anak sejak dini. Namun, implementasi PHBS di Indonesia masih rendah. Hanya 39,1% rumah tangga yang menerapkan PHBS secara komprehensif, sedangkan kebiasaan mencuci tangan dengan sabun hanya mencapai 27,2%. Di lingkungan sekolah, sekitar 29% sekolah dasar belum memiliki fasilitas cuci tangan yang memadai, dan 18% belum memiliki fasilitas toilet terpisah. Kondisi ini berkontribusi terhadap kejadian penyakit pada anak, termasuk diare, infeksi kulit, dan Infeksi Saluran Pernapasan Akut (ISPA). Terbatasnya efektivitas metode pembelajaran konvensional menunjukkan perlunya strategi pendidikan kesehatan yang lebih menarik, seperti biblioterapi menggunakan buku cerita bergambar. Penelitian ini bertujuan untuk menganalisis perbedaan tingkat pengetahuan PHBS sebelum dan sesudah intervensi biblioterapi pada siswa sekolah dasar kelas rendah. Penelitian ini menggunakan pendekatan kuantitatif dengan desain pre-eksperimental one group pretest–posttest. Sampel terdiri atas 30 siswa kelas III di MI Sunan Gunung Jati Malang yang dipilih melalui teknik total sampling. Data dikumpulkan menggunakan kuesioner pengetahuan PHBS sebelum dan sesudah tiga sesi biblioterapi menggunakan buku cerita bergambar. Data dianalisis menggunakan uji Wilcoxon dengan tingkat signifikansi $p < 0,05$. Hasil penelitian menunjukkan peningkatan skor rata-rata pengetahuan dari 1,83 menjadi 2,13. Siswa dengan pengetahuan baik meningkat dari 20,0% menjadi 36,7%, sedangkan siswa dengan pengetahuan rendah menurun dari 36,7% menjadi 23,3%. Uji Wilcoxon menunjukkan $p = 0,020$, yang mengindikasikan adanya perbedaan signifikan sebelum dan sesudah intervensi. Biblioterapi menggunakan buku cerita bergambar efektif meningkatkan pengetahuan PHBS dan dapat direkomendasikan sebagai strategi pendidikan kesehatan inovatif di sekolah dasar.

Kata Kunci: *perilaku, biblioterapi, anak-anak sekolah dasar, pendidikan kesehatan*

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Highlight:

- There was a positive shift in students' understanding, characterized by an increase in the proportion of good-level knowledge and a decrease in the low-level category post-intervention.
- A significant difference in PHBS knowledge levels was observed before and after the intervention.
- The use of illustrated storybooks was proven to help students understand personal hygiene and sanitation materials in a more engaging, interactive, and concrete manner

INTRODUCTION

Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat, PHBS) is an important effort to improve children's health status from an early age. Indonesia, however, still faces various challenges in basic health behavior, particularly personal hygiene and sanitation practices among primary school children (Ministry of Health of the Republic of Indonesia, 2011). UNICEF data show that more than 646 million schoolchildren worldwide do not have handwashing facilities with soap at school, while

427 million children lack access to adequate sanitation. In Indonesia, only 39.1% of households practice PHBS comprehensively, with handwashing using soap being the lowest indicator (27.2%) (UNICEF, 2024). In addition, around 29% of primary schools lack adequate handwashing facilities and 18% do not have separate toilets for male and female students. These conditions mean that PHBS implementation in schools is not yet optimal (Malang City Health Office, 2024).

Low adoption of PHBS can increase children's risk of various illnesses, such as diarrhea, helminth infection, skin infection, and acute respiratory infection (ARI). According to a 2023 report by the Indonesian Ministry of Health, the incidence of diarrhea among school-age children reached 6.8%, while skin infections were found in about 10–15% of primary school students (Ministry of Health of the Republic of Indonesia, 2024). In Malang, more than 11,000 cases of diarrhea and 6.2% helminth infection were recorded among primary school children, linked to poor personal-hygiene and sanitation practices (Malang City Health Office, 2024). Children's limited knowledge of PHBS is shaped by health education methods that tend to be monotonous, involve little active interaction, and offer minimal student participation during learning (Fradianto et al., 2022). As a result, children's understanding of PHBS is not yet fully translated into behavior change in daily activities.

One educational approach that can be used to improve children's understanding of PHBS is bibliotherapy using picture books. This method uses stories to convey health messages, making them more engaging and easier for primary school children to grasp. Anggraeni and Kurniawati (2022) showed that picture-book bibliotherapy can raise children's interest in learning while helping them understand health information more effectively. Visual and narrative media are also considered better suited to the cognitive developmental stage of primary school children, so that PHBS material can be received in a more concrete and understandable form. Saragih (2019) found an improvement in handwashing with soap after applying bibliotherapy to primary school students. Even so, research on bibliotherapy in the context of PHBS remains relatively limited, especially studies using picture-book media with lower-grade primary school students. Most previous studies have also focused more on emotional aspects than on measuring gains in PHBS knowledge specifically.

Given these conditions, research is needed on the effectiveness of bibliotherapy through picture books on Clean and Healthy Living Behavior (PHBS) knowledge among lower-grade primary school children. This study is expected to offer an alternative health education strategy that is more engaging, interactive, and suited to the characteristics of primary school children.

METHODS

This study used a quantitative approach with a pre-experimental design based on a one-group pretest–posttest model. A quantitative approach was chosen because the study aimed to measure changes in students' knowledge objectively through numerical data analyzed statistically. The one-group pretest–posttest design was used to compare measurements before the intervention (pretest) and after the intervention (posttest) in the same group without a control group, so that changes in knowledge before and after the treatment could be identified.

The study was conducted at MI Sunan Gunung Jati Malang in January 2026. The site was chosen for several reasons: the school has lower-grade students suited to the use of picture-book media, had never received PHBS education through bibliotherapy, and still showed suboptimal personal-hygiene behavior based on the researchers' initial

observation, such as inconsistent handwashing. The school also gave its support and permission for the study, allowing the intervention to run in a structured manner.

The study population comprised all 30 third-grade students at MI Sunan Gunung Jati Malang, forming one active class in the 2025/2026 academic year. Sampling used total sampling, in which all members of the population served as the study sample. Third-grade students were chosen because they are at the concrete operational stage of cognitive development and were therefore considered able to understand the content of picture books, take part in interactive discussion, and complete the questionnaire on their own. Third-grade students were also judged more representative than students in lower grades because their reading and instruction-following skills are more developed. At the same time, lower-grade students were considered to need reinforcement of PHBS education from an early age more than students in higher grades.

The choice of population also took into account the relatively homogeneous characteristics of the students in terms of age, learning environment, and school curriculum, which could provide an initial picture of PHBS knowledge among primary school students in that setting. During the study, the researchers coordinated with the homeroom teacher and the school to schedule the intervention so that all students could take part in the full sequence of activities. The researchers also accompanied students while they completed the questionnaire and during the intervention to minimize information bias and prevent dropout. All subjects took part in the study until the posttest stage was completed.

The study variables consisted of an independent and a dependent variable. The independent variable was the bibliotherapy intervention using picture books themed on Clean and Healthy Living Behavior (PHBS). The dependent variable was students' level of PHBS knowledge, covering personal hygiene, healthy living habits, and environmental sanitation. The instrument was a PHBS knowledge questionnaire consisting of 10 multiple-choice items. A correct answer scored 1 and an incorrect answer scored 0, giving a total score ranging from 0 to 10. Scores were then converted into percentages and grouped into three knowledge categories: good (76–100%), fair (56–75%), and poor (≤ 55%). Knowledge categories: low (score 1), moderate (score 2), and good (score 3).In addition to the questionnaire, an observation sheet was used to assess the delivery of the intervention, including the stages of activity and student participation during the bibliotherapy sessions.

The bibliotherapy intervention was delivered in three sessions within one week, on Monday, Wednesday, and Friday, each lasting 60 minutes. Each session comprised an opening, interactive reading of the picture book, discussion and reflection, and a closing. Material was delivered in stages covering personal hygiene, environmental hygiene, and the use of clean water and sanitation. Data collection proceeded in several stages: obtaining informed consent from parents or guardians, administering a pretest to assess students' baseline knowledge, delivering the bibliotherapy intervention, and administering a posttest to measure knowledge after the intervention.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Univariate analysis was used to describe subject characteristics and the distribution of knowledge levels, while bivariate analysis was used to determine the difference in knowledge before and after the intervention. Normality was tested using the Shapiro–Wilk test because the sample was fewer than 50 subjects. If the data were normally distributed, the paired-sample t-test was used; if not, the Wilcoxon Signed-Rank Test was used, with a significance level of $p < 0.05$.

The study obtained ethical approval from the Health Research Ethics Committee

of ITSK RS dr. Soepraoen Malang under number KEPK-EC/468/1/2026. All subjects provided informed consent, and data confidentiality was maintained in line with the ethical principles of health research throughout the study.

RESULTS AND DISCUSSION

General characteristics of the subjects

The general characteristics of the subjects included age, sex, and parental education level. These three aspects were chosen because they provide a basic picture of the subjects' demographic and social background that may influence the study results. A detailed description of the distribution of these characteristics is presented in Table 1.

Table 1. General characteristics of the subjects

Age	**n**	**%**
9 years	26	86.7
10 years	4	13.3
Sex		
Male	11	36.7
Female	19	63.3
Parental education level		
Primary school	7	23.3
Junior high school	9	30.0
Senior high school	8	26.7
University	6	20.0
Total	**30**	**100.0**

Source: Primary data, 2026

The characteristics recorded in Table 1 show that most students were 9 years old (26 students, 86.7%), while only 4 students (13.3%) were 10 years old. This age homogeneity provides a strong basis for the study's internal validity, because age was stabilized from the outset, so that changes in knowledge are more likely due to the intervention than to differences in cognitive development across ages.

The concentration of subjects in the 9–10 year range indicates that they were in middle childhood, the phase when children begin to understand simple cause-and-effect relationships, follow step-by-step instructions, and connect new information with everyday experience. This fits the use of bibliotherapy through picture books, since PHBS messages are conveyed not only verbally but also through illustrations and a more concrete storyline. Bánfai-Csonka et al. (2022) explained that image- and story-based health messages can support the development of health literacy in children because health information is presented in a form that is easy to observe, recognize, and connect with daily activities. Knisel et al. (2020) also found that a health-literacy promotion intervention in primary school children aged 6–12 improved their ability to understand health information, with gains that did not depend significantly on age or sex. These findings reinforce the suitability of selecting third-grade students as subjects, because a relatively homogeneous age range can reduce variation in cognitive development between students.

The subjects' age also supports the use of story media as a health education strategy. Conrad et al. (2020) found that storybooks containing causal explanations of disease transmission can increase children's knowledge and encourage adaptive behavior toward sources of contamination. Penyami et al. (2025) reported improved knowledge

and cough-etiquette practice among schoolchildren after education using a storybook and a leaflet, with Wilcoxon analysis showing a significant change after the intervention. These results are close to the present study because both use a story-based education approach with school-age children and assess changes in health knowledge after treatment. For PHBS material, visualizing behaviors such as handwashing, maintaining personal hygiene, using the toilet, and keeping the school environment clean becomes easier to understand when presented in a storyline close to children's experience.

By sex, there were more female than male subjects: 19 students (63.33%) and 11 students (36.67%). This composition should be read as a demographic description rather than a basis for drawing conclusions about differences in intervention effectiveness by sex, because the study did not perform gender-stratified analysis. Teng (2024) showed that children's engagement in reading interactive picture books can differ by sex, so gender still needs to be recorded in studies based on visual and narrative media. However, Knisel et al. (2020) found that gains in health literacy in a primary school intervention were not significantly affected by sex. With a female-dominated sample, the improvement in PHBS knowledge still reflects the class group's response to the intervention, but it cannot be concluded that girls or boys responded better to bibliotherapy.

The varied parental education levels indicate differing potential for health-literacy support within the family. Subjects whose parents had a primary-school education made up 23.3%, junior high school 30.0%, senior high school 26.7%, and university 20.0%. This variation matters because parental education can affect access to health information, how parents explain clean and healthy living behavior, and the habituation of children's health practices at home. de Buhr and Tannen (2020) found that parental health literacy is related to several child health behaviors, including fruit and vegetable intake, physical activity, and toothbrushing habits. Asil et al. (2025) also found a relationship between parental health literacy and education level, children's health status, and choices in accessing health services. Based on these findings, parental education in this study can be understood as a background factor that may affect children's initial readiness to receive PHBS messages.

PHBS knowledge levels before and after the intervention

Before the bibliotherapy intervention, most students had a fair level of PHBS knowledge. After the intervention, the number of students in the good-knowledge category increased and the low-knowledge category decreased. The change in the distribution of knowledge levels before and after the intervention is presented in Table 2.

Table 2. Distribution of PHBS knowledge levels before and after the intervention

Category	Pretest n (%)	Posttest n (%)
Low	11 (36.7%)	7 (23.3%)
Moderate	13 (43.3%)	12 (40.0%)
Good	6 (20.0%)	11 (36.7%)
Total	**30 (100.0%)**	**30 (100.0%)**

Source: Primary data, 2026

As shown in Table 2, before the intervention most students were in the fair (43.3%)

and low (36.7%) knowledge categories, while only 20.0% had good knowledge. After bibliotherapy through picture books, the number of students with good knowledge rose to 36.7%, while the low-knowledge category fell to 23.3%. These results show that the bibliotherapy intervention produced a positive change in students' PHBS knowledge.

Students' low baseline knowledge may be influenced by health education methods that lack variety and still rely on a conventional approach. Based on initial observation and interviews with the class teacher, PHBS education at the school was generally delivered through brief lectures without interactive media or the specific use of picture books. Moreover, PHBS material was not delivered in a structured, continuous way, so students tended to become bored quickly and were less active during learning. This is consistent with previous research reporting that one-way teaching methods are less effective in improving health understanding among primary school children because they do not create an engaging and meaningful learning experience (Putri et al., 2024).

In addition, the applied nature of PHBS material calls for concrete learning media that are easy for children to understand. At primary school age, students take in information more easily through visual media and contextual experience than through purely theoretical explanation. The use of picture books in bibliotherapy is therefore considered suitable for helping students understand PHBS concepts through situations close to their everyday lives.

After the bibliotherapy intervention, students' PHBS knowledge improved. The posttest showed that the percentage of students with good knowledge rose from 20.0% to 36.7%, while the low-knowledge category fell from 36.7% to 23.3%. Although the fair-knowledge category still predominated, the results indicate a positive change after the intervention.

This improvement shows that bibliotherapy through picture books can help students understand PHBS material more effectively. The use of stories and illustrations makes health information more engaging, easier to understand, and suited to how primary school children learn. In this process, students not only received information passively but also engaged actively by reading, listening to the story, and discussing the content, so that the understanding they gained was more meaningful.

These results are consistent with several earlier studies reporting that visual narrative media are effective in improving health knowledge among primary school children (Verika et al., 2026). Picture-book media help students link health information with everyday experience, making the material easier to understand and remember. The combination of visual and narrative elements can also increase students' attention and motivation to learn during the lesson.

Change in PHBS knowledge before and after bibliotherapy

Table 3 presents the Wilcoxon test results used to examine the change in students' PHBS knowledge before and after the bibliotherapy intervention. The analysis showed a Z value of -2.324 and a *p-value* of 0.020. The results showed an increase in the average knowledge score from 1.83 to 2.13.

Table 3. Analysis of the change in PHBS knowledge before and after bibliotherapy

Categories	N	Mean	Z	Sig.(2-tailed)
Pretest	30	1,83	-2. 324	0.020*
Postest	30	2,13		

*Note: *Wilcoxon test; significant if p < 0.05*

The improvement in knowledge after the intervention shows that visual narrative

media can help students understand health material in a more engaging and concrete way. In this study, students not only received information passively but also engaged actively in reading, listening to the story, and discussing story content related to PHBS. This active engagement made it easier for students to understand and remember the health information conveyed. This finding is consistent with previous research reporting that picture-book media and narrative-based learning are effective in improving health knowledge among primary school children (Liasari et al., 2025).

The discussion in this study draws on constructivism as its main theoretical basis. Constructivist theory holds that knowledge is built by the child through meaningful, contextual learning experiences. In this study, picture books served as media that helped students connect PHBS material with situations they encounter in daily life, making concepts of personal hygiene and sanitation easier to understand. Using illustrations and stories close to children's experience also made the learning process more interactive and less monotonous.

Although the results show an improvement in knowledge, most students remained in the fair-knowledge category after the intervention. This indicates that bibliotherapy did not fully optimize every student's understanding. Bibliotherapy could therefore be combined with other teaching methods, such as hands-on practice, group discussion, or audiovisual media, to make students' understanding of PHBS more optimal. Combining teaching methods is considered important because primary school children generally need varied stimuli to stay focused and active during learning.

These results show that picture-book bibliotherapy can serve as an effective alternative health education strategy suited to the characteristics of primary school children. Besides improving knowledge, this method can also increase students' engagement in learning, so that PHBS material is easier to understand and apply in daily life.

This study has several limitations. It was conducted in only one school with a relatively small sample, so the results cannot yet be broadly generalized. The design was pre-experimental without a control group, so the effect of the intervention cannot be compared with other teaching methods. Knowledge was also measured over a relatively short period, so the findings cannot capture the long-term persistence of changes in students' knowledge or behavior.

CONCLUSION

Bibliotherapy using illustrated storybooks demonstrated a significant difference in PHBS (Clean and Healthy Living Behavior) knowledge levels among lower-grade elementary school students before and after the intervention. This is evidenced by an increase in students' knowledge scores and a statistically significant difference between pretest and posttest results. The narrative and visual-based approach of this intervention effectively helps students comprehend cleanliness and sanitation concepts in a more concrete, engaging, and understandable manner. Therefore, storybook-based bibliotherapy can be recommended as an innovative strategy for health education in elementary schools.

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