Health Education Improves Knowledge of Healthy Living and Cleanliness Behavior for Upper Respiratory Infection Prevention

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Abstract. The proportion of households in Indonesia Practicing Healthy Living and Cleanliness Behavior (PHLCB) is still very low. Low PHLCB practices can lead to deaths caused by acute respiratory infections such as pneumonia. This study aimed to determine the effect of health education on knowledge and attitudes towards PHLCB to prevent upper respiratory tract infections (URTI) in Kranggan Subdistrict, Semarang City. The research design was a pre-experimental study with a one-group pre-test and post-test design. The sampling technique used was accidental sampling, involving 31 respondents. The PHLCB education materials included: etiquette for sneezing, consumption of vegetables and fruits, physical activity, hand hygiene, and mask usage. Data were collected through interviews using a questionnaire prepared by the researcher. Paired t-test and Wilcoxon test were used to determine the differences in knowledge and attitude scores before and after health education.The percentage of respondents with knowledge about hand washing, mask usage, sneezing etiquette, consumption of vegetables and fruits, and physical activity increased after the health education. There was a highly significant difference in the respondents' knowledge scores about PHLCB after the education (Δ=2; p=0.000). Effective health education improves PHLCB knowledge for the prevention of URTI. The routine implementation of educational activities needs to be enhanced by involving a wider community.

Keywords: Healthy lifestyle, hygiene, respiratory tract infections, health education.

1 Introduction

Healthy Living and Cleanliness Behavior (PHLCB) is a conscious behavior practiced by individuals, groups, families, or communities to actively achieve community

A. Khoironi et al. (eds.), *Proceedings of the International Seminar and Workshop Public Health (ISWHOPHA 2023)*, Advances in Health Sciences Research 75,
https://doi.org/10.2991/978-94-6463-421-1_20

health independently [1]. Based on the 2007 Riskesdas (National Basic Health Research) data, the PHBS index consists of 8 individual and one household indicators. The PHLCB index includes childbirth attended by healthcare professionals, exclusive breastfeeding, infant/child weighing, no smoking indoors, engaging in sufficient daily physical activity, consuming an adequate amount of vegetables and fruits daily, using clean water in every household, using proper sanitation facilities for each individual, and proper handwashing [2]. The development agenda of Indonesia in the Fourth National Medium-Term Development Plan (RPJMN IV) for 2020-2024 aims to improve high-quality, competitive, intelligent, innovative, adaptive, skilled, and character-based human resources. In the field of health, this is achieved through improved sanitation and community-based disease prevention. The household-level PHLCB program empowers family members to know, be willing, and be capable of practicing PHLCB [3]. The benefits of PHLCB in households are that every individual will develop healthy habits, thereby reducing health problems. Additionally, this can enhance productivity and well-being within the household [2].

Washing hands with running water and soap is one of the indicators in PHLCB. The "Clean Hands Save Lives" campaign by WHO was launched in 2009, aiming to promote hand hygiene globally, especially in healthcare facilities. Research by Mathur states that handwashing practices using antimicrobial soap can reduce nosocomial infections in hospitals [4]. Another study indicates that the incidence of ventilator-associated pneumonia decreases (from 0.954 to 0.171/1000 patients per day) and the infection rate decreases (from 0.219 to 0.128/100 patients) when hand hygiene compliance is above 70% and is coupled with infection control strategies [5]. Another finding related to handwashing is that it helps prevent the transmission of many foodborne illnesses [6]. WHO also advocates for the importance of hand hygiene and individual cleanliness, including covering the mouth when sneezing.

The Basic Health Research results state that Indonesia's proportion of households practicing PHBS has increased by 28% over 11 years. The increases are as follows: 11.25% in 2007, 23.6% in 2013, and 39.15% in 2018 [2]. However, these achievements are still significantly lower compared to the Ministry of Health Regulation No. 1457/Menkes/SK/X/2003 regarding the Mandatory Authority of Minimum Service Standards in the health sector, which states that the target for healthy households in 2010 was 65% [7]. Some specific areas of concern regarding the proportion of households practicing PHBS from 2007 to 2018 are as follows: the daily consumption proportion of vegetables and fruits is deficient, with respective percentages of 0.6% (2007), 0.8% (2013), and 1.4% (2018). The proportion of engaging in physical activity/exercise is also low (20%), with respective percentages of 23.2% (2007), 25.8% (2013), and 27.6% (2018). The proportion of not smoking indoors has shown a non-significant increase from 46.3% (2013) to 51.1% (2018). On the other hand, the proportion of proper handwashing has significantly increased from 11.8% (2007) to 27.2% (2013) and 56.8% (2018) [2]. Nevertheless, handwashing behavior should be further improved as it is an easy practice to adopt.

Kranggan Subdistrict is in the Central Semarang District, Semarang City, Central Java Province. The area has a dense population of 4,457 people. Approximately 97% of the total area (604.808 hectares) is occupied by residential buildings. The findings

of a preliminary study conducted among 104 respondents living in Kranggan Subdistrict indicate that the community is not yet aware of the importance of practicing PHLCB. This is evident from the discovery that more than half of the population never engage in physical activities/exercise (61.54%), there are still individuals who smoke (59.62%) and smoke indoors (29%), there is a lack of fruit consumption (54.81%), a lack of vegetable consumption (3.84%), and a high prevalence of not washing hands with running water and soap before meals and after defecating (53.8%). Observations also show low usage of masks among individuals with flu symptoms. The preliminary study also reveals that the highest reported illness in the past three months is Upper Respiratory Tract Infection (URTI).

Several factors that motivate individuals to engage in PHLCB include predisposing factors (knowledge, behavior, beliefs, values, beliefs, and perceptions of PHLCB), enabling factors (availability of resources), and reinforcing factors (support from health workers and community leaders). These three factors are interconnected in the sustainability and consistency of PHLCB behavior [8]. This study assesses respondents' knowledge and behavior regarding PHLCB to prevent URTI in Kranggan Subdistrict, Central Semarang District, Semarang City, after receiving education.

2 Methods

2.1 Study Design and Research Subjects

This study uses a pre-experimental design with a single-group pretest-posttest design. The research was conducted in the working area of Puskesmas Poncol, located in Semarang City. The study was carried out in November-December 2022. The sampling technique used in this study was accidental sampling, involving 31 respondents. The inclusion criteria for this research were individuals residing in Krangan Subdistrict, Central Semarang District, Semarang City, more than 17 years old, and who were willing to participate in the study by signing informed consent. The exclusion criteria were respondents who did not complete the intervention activities.

2.2 Intervention

The intervention was in the form of direct counseling using power point educational media carried out by researchers. Educational materials about PHLCB. The intervention activities were conducted through presentations, discussions, question-and-answer sessions, and participant sharing. The educational materials covered topics such as the definition and benefits of PHLCB, proper handwashing techniques using flowing water and soap, the importance of consuming fruits and vegetables, correct mask usage, cough and sneeze etiquette, the benefits of physical activity, and smoking etiquette.

2.3 Variables and Evaluation

The variables in this study include the independent variable, education, and the dependent variables, knowledge and behaviors related to PHLCB. The characteristic variables include age, gender, level of education, and marital status. The evaluation was conducted twice, before the intervention (pre-test) and after the intervention (post-test).

2.4 Research Instruments

The instrument in this study was a list of questions that referred to the parameters of knowledge and attitudes of PHBS according to Riskesdas in 2007, totaling five parameters. There are two questions for each parameter, so the total number of questions on the instrument is ten questions. These parameters are: 1) handwashing habits using running water and soap, 2) mask usage, 3) etiquette for sneezing and coughing, 4) fruit and vegetable consumption, and 5) physical activity/exercise. Test items are used to assess respondents' cognitive mastery of PHLCB knowledge. These items are in multiple-choice format with four answer choices. Non-test items are used to assess behaviors related to PHLCB. The assessment uses four answer choices (strongly disagree, disagree, agree, and strongly agree). The instrument's validity and reliability were tested using research data.

2.5 Data Management and Analysis

The occupation variable is categorized into two groups: working and non-working. The respondents' education is categorized into three levels: low (elementary and junior high school), medium (senior high school), and high (diploma, bachelor's degree, and higher). The marital status of the respondents is differentiated between widowed and married. The characteristics of the respondents are presented in the form of percentages. A dependent t-test analyzes behavior data due to its normal distribution. This test is used to determine the difference in behaviors of the respondents before and after the intervention. The Wilcoxon test analyzes knowledge data since its distribution is abnormal.

3 Results

The research results regarding the summary of respondent characteristics are presented in Table 1.

Table 1. Respondent Characteristics

Variables	Amount (n=31)	Percentage (%)
Occupation		
Employed	22	71,0
Unemployed	9	29,0
Education		

Low (Elementary school, junior high school)		
Medium (Senior High School)	10	32,3
High	16	51,6
	5	16,1
Status		
Married	22	71,0
Widowed	9	29,0
	Mean	Standard Deviation
	48,03	6,65

Table 1 shows that all respondents are female (100%), with an average age of 48 years old, and married (71%). Majority last education of the participant was a high school graduate (15%), although a quarter of the total respondents still have a low level of education, which is elementary school and junior high school (25%). The majority of respondents in this study are employed (71%).

Figure 1 shows an overview of the number of respondents who answered the questions about PHBS knowledge correctly before and after the intervention activities.

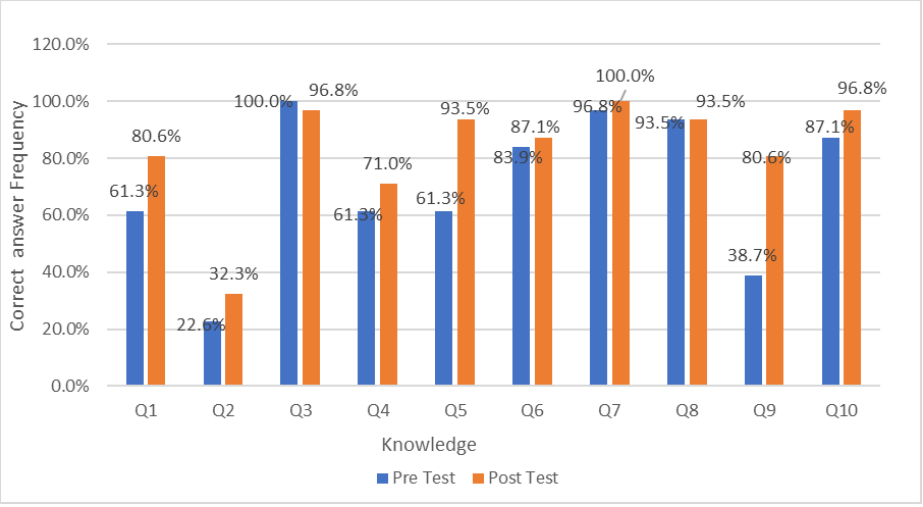

Fig. 1. Number of Respondents with PHLCB Knowledge Before and After the Intervention

Based on Picture 1, it can be observed that the number of respondents with correct answers increased after the intervention in almost all PHLCB indicators. The number of respondents answering correctly about using masks (question no. 3) experienced a non-significant decrease (3.2%) after the intervention. The number of respondents answering correctly about consuming fruits and vegetables (question no. 8) remained relatively unchanged before and after the intervention. Knowledge about the habit of washing hands with running water and soap (question 2) and knowledge about physi-

cal activity (question no. 9) were the lowest levels of knowledge among the respondents in this study.

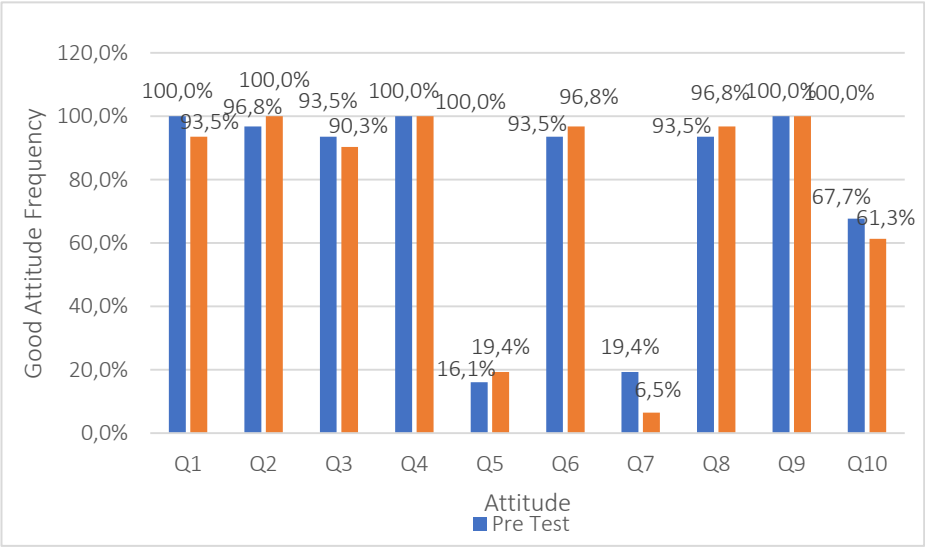

Fig. 2. Frequency of Respondents with a Positive Attitude towards PHLCB

The overview of attitudes towards PHLCB shows that the respondents did not experience an improvement in positive attitudes after the PHLCB intervention. The respondents' lowest attitudes were towards Physical activity/exercise (question number 5) and the habit of washing hands with running water and soap (question number 5).

Table 2 shows the results of the difference in respondents' knowledge scores about PHLCB before and after the intervention.

4 Discussion

Knowledge results from what is acquired through human senses (sight, smell, touch, taste, and hearing) towards an object. Knowledge is derived from one's intellect, mindset, and personal experiences. Knowledge can be obtained through formal or non-formal means [9].

In this study, the percentage of respondents with low knowledge was observed regarding handwashing with soap and running water, as well as physical activity. This finding is consistent with the conditions in the region, where an initial survey revealed that the highest prevalence of diseases, particularly Upper Respiratory Tract Infections (URTI), is observed. A review of studies conducted in low- and middle-income countries has found evidence linking handwashing with soap and running water to

URTI, lower respiratory tract infections, and preventing respiratory diseases from worsening [10]. A study conducted in Bangladesh has shown that the combination of food nutrition management, hygiene practices, sanitation, and clean water is associated with respiratory diseases [11]. This is consistent with a research review by Jefferson et al., which stated that maintaining hand hygiene tends to reduce the burden on individuals suffering from respiratory diseases [12]. The lack of knowledge about physical activity impacts the low practice of exercising. Regular physical activity improves the body's immune system against diseases. The combination of knowledge about hand hygiene using soap and physical activity in this study will impact a weakened immune system, making individuals more susceptible to URTI. This condition reflects the situation in the research area. Although this view contradicts the findings of Bangladesh research, where sanitation, cleanliness, and nutrition had no influence on the prevalence of URTI [13].

During the study, the researchers observed a high population density, a lack of health protocols among flu patients, low usage of masks, and a high prevalence in the past three months. This is related to the high incidence of infectious respiratory diseases, with URTI prevalence reaching 23.08% in the research area. According to Zeru, one of the risk factors for URTI is living in overcrowded households. An individual living in an overcrowded household has a five times higher chance of contracting URTI compared to someone who does not live in overcrowded conditions (AOR = 5.3; 95%CI = 2.3, 12.1) [14].

The research results indicate a significant improvement in respondents' knowledge of PHBS after receiving the intervention (Δ=2; p=0.000). Previous studies have also shown successful knowledge improvement through education and PHLCB research models. For example, a study conducted in Lombok, Indonesia, reported a higher increase in knowledge (Δ=8.5; p=0.000) [15] and a study in India showed a substantial increase in knowledge (Δ=34.13; p<0.001) [16]. A study in Pakistan also implemented a behavior change communication program, including education and motivation, for three months. This intervention significantly improved hygiene and sanitation domains, such as hand washing before meals, before cooking, before feeding children, after defecation, safe drinking water usage, and personal hygiene [17].

The intervention conducted in this study involved providing education, question-and-answer sessions, and sharing information. During the intervention, there was social interaction, which is a reinforcing factor that impacts the formation of knowledge about PHLCB. This is supported by Bahri's perspective, which states that group activities involving cooperation and group discussions can create longer-lasting knowledge in memory [18]. The increase in knowledge in this study may also be attributed to the majority of respondents having education levels of Senior High School (51.6%) and higher education (16.1%). Formal education is one of the determining factors in an individual's knowledge acquisition [9]. Logically, individuals with a moderate level of education are more likely to be receptive to information than those with lower or no education. According to theory, knowledge progresses from awareness, understanding, application, analysis, synthesis, to evaluation [19]. The lowest level of knowledge is "awareness," so it can be expected that respondents with a mod-

erate level of education will easily reach that level after receiving information about PHLCB through counseling sessions.

The counseling conducted in this study did not improve the respondents' positive attitudes (p=0.601). Attitude refers to a person's predisposition or tendency to generate positive or negative responses based on the received stimulus. Attitude serves as a predictor before an individual engages in actions or practices [19]. Based on the theory of attitude change, attitudes are influenced by an individual's personality, social context, and cultural context (such as climate, generation, background, and culture) [20].The lack of improvement in attitudes after the intervention in this study may be related to the local cultural environment, such as the lack of health protocols and low mask usage among flu patients. The duration of the intervention and the timing of attitude measurement can also influence an individual's attitude change. The research by Wulandari (2022) suggests that positive attitudes in respondents only formed after an intervention period of 3.5 months. Furthermore, it is emphasized that the formation of positive attitudes is not easy and requires a considerable amount of time [21]. The change in attitude influenced by cultural, personality, and social factors will have an effect on the strategies for processing the received information. Furthermore, this will impact individuals' thought patterns as they associate their feelings and emotions with decision-making [20].

5 Limitation

This study used a small number of respondents and did not go through the validity and reliability test before collecting the data. Therefore, the research results may not be able to represent the actual conditions in the field.

6 Conclusion

The counseling effectively improved the respondents' knowledge regarding PHLCB to prevent URTI (handwashing, mask usage, proper sneezing etiquette, consumption of fruits and vegetables, and physical activity). Regular and inclusive counseling involving a more comprehensive community is needed to enhance knowledge, attitudes, and practices of PHLCB.

7 Author Contributions

WR came up with conceptualization, study desain, methodology, writing, supervision and translated. Sifai IA collect, data input dan analysis. All authors have read and agreed to the published version of the manuscript.

8 Funding

This research received no external funding.

9 Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by Ethics Committee of Universitas Dian Nuswantoro (Number: 360/EA/KEPK-FKes-UDINUS/II/2023).

10 Acknowledgments

Thank you to the students who have helped with this research.

11 Conflicts of Interest

The authors declare no conflict of interest.

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