Nusantara Journal of Public Health
NJoPH, Vol. 1, No. 2
ISSN3163-8392
September2026

Differences in Behavior Before and After Handwashing with Soap (CTPS) Education Using the Audiovisual Method among Students of SDN 10 Lambung Bukit, Padang City

Waldirahman[1], Rudjito[2], Dina Ediana[3]
[1,2,3]Public Health Study Program, Universitas Fort De Kock Bukittinggi, Indonesia

ABSTRACT

Background: Handwashing with soap (CTPS) is an easy way to prevent various diseases, especially those related to the digestive and respiratory tracts, because it breaks the chain of disease transmission. The highest number of diarrhea cases in 2015 was recorded in the working area of Pauh Public Health Center, with 784 cases. **Methods:** This pre-experimental study with a one group pretest-posttest design was conducted from July to August 2016 at SDN 10 Lambung Bukit, Padang City, to determine differences in behavior (knowledge, attitude, and action) before and after CTPS education using the audiovisual method, closed with a CTPS demonstration in front of the class by the students. The sample consisted of 20 students of grades IV and V (10 students each), selected by purposive sampling. Data were collected using questionnaires and analyzed with the paired t-test. **Results:** Mean knowledge increased from 20.35 to 34.25 (difference 13.9), attitude from 9.35 to 21.75 (difference 12.4), and action from 1.1 to 3.6 (difference 2.5), with p = 0.0005 (p < 0.05) for all three. **Conclusion:** There were significant differences in students' knowledge, attitude, and action before and after CTPS education using the audiovisual method. Schools need to add health promotion facilities and improve sanitation facilities, accompanied by policies and regulations from the principal and teachers, so that students become accustomed to practicing CTPS at school and in daily life.

Keywords: knowledge, attitude, action, education, handwashing with soap (CTPS), audiovisual

Submitted: May, 18, 2026
Reviewed: Agustus 3, 2026
Accepted: September 30, 2026

Introduction

Background

The 2015–2019 health development program is the Healthy Indonesia Program (Program Indonesia Sehat), which aims to improve the health status and nutritional condition of the community through health efforts and community empowerment, supported by financial protection and equitable distribution of health services. One of the main targets of the 2015–2019 National Medium-Term Development Plan (RPJMN) is improved disease control. Health is a human right and one of the elements of well-being that must be achieved as highly as possible through the implementation of health development. Health is also an investment for increasing work productivity in order to improve family welfare. Therefore, on 1 March 1999, the President of the Republic of Indonesia initiated health-oriented national development, meaning that every sector must consider the impact of development on health.

According to the Indonesian Ministry of Health (2014), a healthy condition can be achieved by changing behavior from unhealthy to healthy and by creating a healthy environment. One form of Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat, PHBS) is handwashing with soap (Cuci Tangan Pakai Sabun, CTPS). Prof. Ali Ghufron explained that, according to the 2013 Basic Health Research (Riskesdas) results, the proportion of Indonesians aged >10 years who wash their hands correctly rose from 23.2% in 2007 to 47.0% in 2013. Therefore, major efforts, supported by all parties, are needed so that CTPS becomes a daily habit.

Rotavirus-related diarrheal disease spreads rapidly and infects easily, so it cannot be ignored. The *Centers for Disease Control and Prevention* (CDC) of the United States recorded 10,080 deaths in 2007 from viral diseases in Africa and South Asia, with more than 80% of diarrhea-related deaths occurring in these two regions. In South Asia, India has the greatest diarrheal burden; approximately 0.4 million children in India die each year from diarrhea (Cairncross, 2011).

According to the 2014 West Sumatra Health Profile, the number of diarrhea cases presenting to health facilities was 106,205 in 2014 and 112,986 in 2013; the figures fluctuate considerably but show an increasing trend. Data from the Padang City Health Office for 2014 show that two of the 10 leading diseases in 2013 were caused by germs: infectious skin disease ranked 3rd with 18,729 cases and diarrhea ranked 7th with 7,827 cases. These data were obtained from 22 community health centers (Puskesmas), 62 auxiliary Puskesmas, 22 mobile Puskesmas, and 29 village health posts (Poskeskel) in Padang City.

Pauh Public Health Center (Puskesmas Pauh) is one of the Puskesmas in Padang City with the highest incidence of diarrhea in 2015, at 784 cases, up from 780 cases in 2014. Diarrhea is among the 10 most common diseases in the working area of Puskesmas Pauh: acute respiratory infection (ISPA) 5,928 cases, gastritis 1,380 cases, infectious skin disease 1,205 cases, allergic skin disease 887 cases, rheumatism 879 cases, diarrhea 784 cases, other skin diseases, pulpal disease 331 cases, allergic rhinitis 314 cases, and myalgia 136 cases.

Various studies have proven that CTPS can significantly reduce the incidence of diarrhea and ISPA. A study by Curtis and Cairncross (2011) showed that CTPS can reduce the risk of diarrhea by up to 47%. According to a 2007 WHO study on the results of PHBS program implementation, the incidence of diarrhea decreased by 45% with handwashing with soap, 32% with improved community access to basic sanitation, and 39% with household drinking-water management behavior; with these efforts combined, the incidence of diarrhea decreased by 94%.

School-age children—whether at the preschool, elementary, junior high, or senior high level—are at a stage of life very different from adulthood. In this period, many health problems are found that greatly determine the quality of the child later in life, including general health, developmental disorders, behavioral disorders, and learning disorders, which generally hinder students' academic achievement at school.

The research site is SD Negeri 10 Lambung Bukit (SDN 10 Lambung Bukit), Padang City, the only elementary school in Lambung Bukit Village (Kelurahan). According to the school, students who are absent during class hours are mostly absent because of diarrhea and fever. According to data from Puskesmas Pauh, this school does not yet have a PHBS program from the Puskesmas. A preliminary survey of 10 students (5 in grade IV and 5 in grade V) showed that 60% of students had low knowledge and 70% had a negative attitude toward CTPS.

Literature Review

Health promotion. Health promotion is an effort or process of empowering people to maintain, improve, and protect their own health. This term was only adopted in Indonesia in 2000, although it has been used worldwide since the 1980s; efforts to shape health behavior were originally known as health education, then health counseling (penyuluhan), and finally health promotion (Achmadi, 2013). Global health experts led by WHO revitalized health education under the term *health promotion* in 1984; health promotion seeks not only behavior change but also changes in the environment that facilitate it, and places greater emphasis on improving the ability to live healthily rather than merely behaving healthily. Health promotion is part of the levels of disease prevention according to Leavell and Clark, namely health promotion, specific protection, early diagnosis and prompt treatment, disability limitation, and rehabilitation (Notoatmodjo, 2010). Health promotion also means marketing or introducing health messages so that people are willing to adopt healthy lifestyles. By setting, health promotion is carried out in the family setting (primary target: parents, especially mothers), school (as an extension of the family, with teachers responsible for providing education on behavior, including health behavior), workplace, public places, and health service institutions (Notoatmodjo, 2010).

Behavior and healthy behavior. Behavior is a person's actions and speech that can be observed, described, and recorded, whether by others or by the person themselves. Behavior has physical dimensions, frequency–duration–intensity, space, and time, and can be *overt* (visible and recordable) or *covert* (hidden). Healthy behavior is proactive knowledge, attitudes, and actions to maintain health and prevent the risk of disease, protect oneself from disease threats, and play an active role in public health movements. According to Skinner, health behavior consists of preventive, curative, recovery, and health-improvement behavior, healthy lifestyle behavior, and behavior related to the environment (Achmadi, 2013).

PHBS and CTPS. PHBS is an effort to provide learning experiences or create conditions for individuals, families, groups, and communities by opening communication channels, providing information, and conducting education to improve behavior through leadership approaches, atmosphere building (bina suasana), and community empowerment. PHBS is grouped into five settings, one of which is schools, with indicators of washing hands with running water and soap, consuming healthy food from the school canteen, using clean and healthy latrines, exercising regularly, eradicating mosquito breeding sites, not smoking, and disposing of garbage in its place. CTPS is a beneficial habit for cleaning hands

of dirt and killing disease-causing germs, and is an easy way to prevent disease, especially diseases of the digestive and respiratory tracts. Handwashing requires soap, clean water, and a clean towel or cloth, for a duration of 20–30 seconds. The five critical times for CTPS are before eating, before preparing food, after defecating, after cleaning a child or baby after toileting, and after handling poultry or animals; other important times are before breastfeeding a baby, after coughing or sneezing and cleaning the nose, after cleaning up garbage, and after playing on soil or floors. The benefits of CTPS are killing germs on the hands, preventing the transmission of diseases such as dysentery, avian influenza, swine flu, and typhoid, and keeping hands clean and germ-free. The CTPS steps according to WHO (2005) in Depkes RI (2006) are: wet the hands with running water, pour a sufficient amount of soap, spread it over both palms, rub the backs of the hands and between the fingers, interlock the fingers (inner sides), rub the thumbs in a rotating motion, rub the fingertips on the palms, rub the wrists, rinse with water, dry with a single-use towel, and use that towel to turn off the tap.

Health promotion media. Media are all forms and channels used to convey messages and information and to serve as intermediaries between the educator and learners; their suitability must be considered in relation to the material, the learners' characteristics, and the situation (Notoatmodjo, 2012). Media are developed on the principle that knowledge is received through the senses; the more senses are used, the clearer the knowledge obtained. The eyes channel approximately 75–87% of knowledge to the brain, while 13–25% is channeled by the other senses (Maulana, 2009). Teaching aids consist of *visual aids* (projected, such as slides and films, or non-projected, such as pictures, maps, and charts), *audio aids* (such as radio and CDs), and *audiovisual aids* (such as television, videotapes, and DVDs).

Diarrhea. Diarrhea is a change in the frequency and consistency of stool; WHO (1984) defines it as watery bowel movements three or more times in 24 hours. Based on onset, diarrhea is divided into acute (<2 weeks) and chronic (>2 weeks). Its biggest cause is rotavirus infection. Common symptoms are watery or loose and frequent stools, vomiting, and signs of dehydration; specific symptoms include severe diarrhea with rice-water stools in *Vibrio cholerae* and mucous and bloody stools in the dysenteriform type. Prolonged diarrhea can cause dehydration, circulatory disturbance, acidosis, hypoglycemia, and nutritional disorders. According to Widoyono (2011), diarrhea can be prevented through health promotion, including using clean water, boiling water until it boils before drinking, washing hands with soap under running water, giving breast milk until the baby is two years old, using healthy latrines, and disposing of the stools of babies or children properly.

Knowledge, attitude, and action. Knowledge is the result of knowing that occurs after sensing a particular object; most knowledge is obtained through the eyes and ears. Knowledge has six levels: knowing, comprehension, application, analysis, synthesis, and evaluation, and is influenced by internal factors (education, occupation, age) and external factors (environment and sociocultural factors) (Wawan & Dewi, 2010). Before adopting a new behavior, a person goes through a process of *awareness*, *interest*, *evaluation* (weighing the options), *trial*, and *adaption* (Rogers, 1974, in Notoatmodjo, 2003). Attitude is a person's closed response to a particular stimulus or object that already involves opinion and emotion (like–dislike, agree–disagree, good–bad). According to Katz (1964), attitude has four functions: instrumental (adjustment or benefit), ego defense, value expression, and knowledge. According to Allport (1954), attitude has three main components: beliefs, ideas, and concepts regarding an object; emotional life or evaluation of an object; and a tendency to act. Attitude formation is influenced by personal experience, other people considered important, culture, mass media, educational and religious institutions, and emotional factors; the levels of attitude are receiving, responding, valuing, and being responsible. Attitude does not automatically translate into action; supporting factors such as facilities are needed. Action or practice has three levels: guided response, mechanism, and adoption (Notoatmodjo, 2012).

Theoretical framework. According to Lawrence Green's theory, behavior is determined by three factors: predisposing factors (knowledge, tradition, values, attitudes), enabling factors (availability of facilities, means, and infrastructure), and reinforcing factors (regulations, supervision, laws, and the attitudes of community leaders) (Notoatmodjo, 2010; Kholid, 2012).

Research Gap

Previous studies have shown that health promotion on CTPS behavior produces significant change (Sari, 2013), that PHBS education on handwashing affects handwashing behavior among grade V elementary school students in Surakarta (Wati, 2011), and that the audiovisual method can improve mothers' behavior in managing toddlers with diarrhea in two hospitals in Malang City because it is an attractive education method that stimulates many senses (Kapti, 2010). The audiovisual method also increased the mean level of knowledge of posyandu (integrated health post) cadres by 5.87 after education on breast self-examination in Yogyakarta (Devi, 2013). However, at SDN 10 Lambung Bukit, Padang City, a school located in the working area of Puskesmas Pauh, which has the most diarrhea cases, there is no PHBS program

from the Puskesmas, and the change in the students' CTPS behavior after education using the audiovisual method is not yet known.

Novelty and Rationale of the Study

This study assesses behavior change encompassing three components at once—knowledge, attitude, and action regarding CTPS—among grade IV and V students of an elementary school located on the bank of the Gunung Nago River, where many houses around the school have no latrines. Education was delivered using the audiovisual method, supplemented with a demonstration of the CTPS steps and a question-and-answer session. The rationale is that the high number of diarrhea cases in the working area of Puskesmas Pauh, student absences due to diarrhea and fever, the students' low knowledge and negative attitudes in the preliminary survey, and the absence of a PHBS program at this school indicate the need for an attractive health promotion intervention that stimulates many senses.

Research Objectives

Problem statement. In general, the problem statement of this study is how behavior differs before and after education about CTPS among grade IV and V students at SD N 10 Lambung Bukit, Padang City, in 2016.

General objective. To determine the difference in behavior before and after education about CTPS among grade IV and V students at SD N 10 Lambung Bukit, Padang City, in 2016.

Specific objectives. This study aims to determine:

a. the mean knowledge of CTPS among students of SDN 10 Lambung Bukit, Pauh District, Padang City, before education using the audiovisual method;
b. the mean knowledge of CTPS among students after education using the audiovisual method;
c. the mean attitude toward CTPS among students before education using the audiovisual method;
d. the mean attitude toward CTPS among students after education using the audiovisual method;
e. the mean action toward CTPS among students before education using the audiovisual method;
f. the mean action toward CTPS among students after education using the audiovisual method;
g. the mean difference in students' knowledge of CTPS before and after education using the audiovisual method;
h. the mean difference in students' attitude toward CTPS before and after education using the audiovisual method; and
i. the mean difference in students' action toward CTPS before and after education using the audiovisual method.

Hypotheses. The hypotheses of this study are:

1. there is a difference between students' knowledge before and after education about CTPS using the audiovisual method;
2. there is a difference between students' attitude before and after education about CTPS using the audiovisual method; and
3. there is a difference between students' action before and after education about CTPS using the audiovisual method.

Methods

Study Design

This study is pre-experimental, because the type of study, a test of the difference between two dependent means (*one group pretest and posttest*), is classified as a pre-experimental design, namely a design without a comparison (control) group, but in which at least a first observation (*pretest*) has been made that allows the researcher to test the change that occurs after the experiment (treatment). The design is pretest (O1) – intervention (X) – posttest (O2), where O1 is behavior before education about CTPS, O2 is behavior after education about CTPS, and X is the treatment in the form of education about CTPS using the audiovisual method.

Testing with the *one group pretest-posttest* design uses a test of the difference between two dependent means to test the difference between two dependent data groups, namely where the after data depend on the before data. The requirements for this test are normally distributed data, two dependent data groups, and numerical and categorical (two-group) variable types. The variables studied are knowledge (the respondent's result of knowing an object through their senses), attitude (the respondent's closed reaction or response to a particular stimulus or object that involves opinion and emotion), action (the process by which respondents carry out and practice clean and healthy living behavior, especially CTPS), and the audiovisual method (a health promotion method that uses video, film, and DVD media and combines visual and hearing aids).

Research Location and Timeline

The study was conducted at SDN 10 Lambung Bukit, Padang City. The series of activities, from the preliminary survey, preparation of the research thesis (skripsi), and conduct of the study to the presentation of the research results, was carried out from July to August 2016.

Population and Sampling Technique

The study population was grade IV and V students of SDN 10 Lambung Bukit, Padang City, namely 40 grade IV students and 48 grade V students, for a total of 88 students. For the behavior variable, the sample was selected by *purposive sampling*, namely 10 grade IV students and 10 grade V students, for a total of 20 students. The sample size was determined using the formula (t–1)(r–1) > 15, where t is the number of samples and r is the number of replications: (t–1)(2–1) > 15, so t > 16. To avoid *drop out*, the sample was rounded up to 20 respondents. The inclusion criteria were willingness to be a respondent and the ability to communicate well. The exclusion criteria were being unreachable in three consecutive visits and respondents being ill such that an interview was not possible.

Data Collection Procedures and Instruments

The research instrument was a questionnaire, namely a written list of questions given to respondents to measure the behavior variables; action was recorded using an observation sheet (answer yes = 1, no = 0). Primary data were obtained from interviews with grade IV and V students of SDN 10 Lambung Bukit using a questionnaire on CTPS behavior. Secondary data were obtained from the school's annual documents (numbers of students, teachers, and classes) and the 2015 annual report of Puskesmas Pauh.

The research procedure consisted of three stages. *First*, behavior was measured before education by giving a questionnaire to grade IV and V students, and the mean behavior before education was then analyzed univariately. *Second*, the intervention consisted of CTPS education using the audiovisual method in the classroom for 30 minutes, a demonstration of the correct CTPS steps outside the classroom for 20 minutes, and a question-and-answer session in the classroom for 10 minutes. *Third*, behavior after education was measured through guided interviews with the sampled students, and the mean behavior after education was then analyzed univariately and the difference in behavior before and after education was analyzed bivariately (*dependent sample t-test*).

Data processing was carried out in four stages: *editing* (checking the completeness of responses, errors, and consistency of answers), *coding* (assigning codes to answers so that they can be converted into numbers), *data entry* (entering the answer codes using a computer), and *cleaning* (checking for entry errors before analysis so that values match the data collection results).

Statistical Analysis

Univariate analysis was used to determine the frequency distribution (mean) of each behavior variable. Bivariate analysis used the paired t-test on the data before and after treatment, with computer assistance, to determine differences in the behavior of grade IV and V students of SDN 10 Lambung Bukit, with a 95% confidence level and $\alpha = 0.05$. If $p \leq 0.05$, H0 is rejected, meaning there is a significant difference between behavior before and after education about CTPS; if $p > 0.05$, H0 is accepted, meaning there is no significant difference. The Kolmogorov-Smirnov normality test showed that the data were normally distributed ($p > 0.05$): knowledge 0.435 (before) and 0.540 (after), attitude 0.435 and 0.616, and action 0.147 and 0.159.

Scope and/or Limitations of the Methodology Used

The increase in diarrhea incidence in the working area of Puskesmas Pauh is caused, among other things, by the community's lack of PHBS, and one way to realize PHBS is CTPS. The study was conducted on students of SDN 10 Lambung Bukit, Pauh District, Padang City, with student behavior variables, namely knowledge, attitude, and action regarding CTPS before and after education using the audiovisual method. The population was 88 students, with a sample of 10 grade IV and 10 grade V students. Univariate analysis was used to determine the mean of the variables, and bivariate analysis used the *dependent sample t-test* at a 95% confidence level. The methodological limitation is the pre-experimental design, which has no comparison (control) group.

Results

General description of the research site. SDN 10 Lambung Bukit is located in Lambung Bukit Village (Kelurahan), Pauh District (Kecamatan), Padang City, West Sumatra Province. It is bordered on the east by Solok Regency, on the west by the working area of Puskesmas Andalas (East Padang), on the north by the working area of Puskesmas Koto Tangah, and on the south by part of the working area of Puskesmas Lubuk Kilangan. The school is located on the bank of the

Gunung Nago River, so many houses around it have no latrines because people prefer to urinate, defecate, bathe, and wash clothes in the river. The school has 6 classrooms and 237 students (grade I 34, grade II 36, grade III 39, grade IV 40, grade V 48, and grade VI 40 students) with 21 teaching staff, as well as a library, toilets, a teachers' room, and a school canteen.

Univariate analysis. Table 1 shows that mean student knowledge increased from 20.35 before education to 34.25 after education, mean attitude from 9.35 to 21.75, and mean action from 1.1 to 3.6 (n = 20 students).

Table 1. Mean and median knowledge, attitude, and action of students before and after CTPS education using the audiovisual method (n = 20)

Variable	Before Mean	Before Median	After Mean	After Median
Knowledge	20.35	20	34.25	34.50
Attitude	9.35	9	21.75	21.50
Action	1.1	1	3.6	3.5

Bivariate analysis. Table 2 shows a mean difference of 13.9 for knowledge, 12.4 for attitude, and 2.5 for action. The statistical test yielded p = 0.0005 for all three variables, so it can be concluded that there are differences in students' knowledge, attitude, and action before and after CTPS education using the audiovisual method.

Table 2. Differences in students' knowledge, attitude, and action before and after CTPS education using the audiovisual method (paired t-test)

Variable	Mean difference	Standard deviation	p value
Knowledge	13.9	2.972	0.0005
Attitude	12.4	1.875	0.0005
Action	2.5	1.192	0.0005

Results and Discussion

Health promotion is a way to improve health status, especially in the preventive field, because it is oriented more toward behavior change that affects the environment. Health promotion is prioritized for children because they are highly vulnerable to disease transmission, especially environment-based diseases. WHO data show that 67% of child deaths are caused by environment-based diseases such as diarrhea, ISPA, dengue hemorrhagic fever (DBD), malaria, and TB. What increases every year is diarrhea in children caused by unclean daily habits, while diarrhea itself is caused by *E. coli* bacteria, which are abundant in unclean environments.

Escherichia coli lives in humans and other warm-blooded animals and plays an important role in controlling the entry of microbes into the body. This bacterium can be beneficial, but it can become a cause of dangerous diarrhea when present in large numbers in the intestine. In addition to non-pathogenic *E. coli*, there are enteropathogenic *E. coli* (EPEC), enteroinvasive (EIEC), and enterotoxigenic (ETEC) strains, which are associated with diarrhea in infants, dysentery-like illness, and traveler's diarrhea. In general, water is the carrier of this group, food is rarely specifically implicated, and the presence of *E. coli* in food is likely due to poor sanitation.

Knowledge

Mean student knowledge before education was 20.35. According to Zahara Idris (1992), knowledge is influenced not only by formal education but also by informal education, such as one's own or others' experience, health education, and information from posters and mass and electronic media about clean and healthy living. This was evident from discussions and question-and-answer sessions with several highly knowledgeable students, who, in addition to obtaining information from the CTPS education during the study, also obtained health knowledge from electronic media and their parents; one of them had a parent working in the health field. A person's knowledge is obtained not only from formal activities but also during break time or in daily activities.

After education, mean knowledge became 34.25, an increase with a mean difference of 13.9. This is supported by Donald Robert's (1971) theory of behavior change, which holds that behavior change is influenced by communication.

Health education is a form of communication for delivering health messages such as CTPS using audiovisual media or methods so that the message reaches the right target, namely grade IV and V students of SDN 10 Lambung Bukit.

Attitude

Mean student attitude before education was 9.35 and after education was 21.75. This improvement in attitude is in line with the improvement in student knowledge, consistent with the theory of behavior change that begins at the knowledge stage, which then influences attitude and continues into action as the application of the knowledge possessed (Notoatmodjo, 2012). According to Notoatmodjo, attitude is a person's assessment (which may take the form of an opinion) of a stimulus or health object, with indicators of attitude toward sickness and disease (symptoms, causes, transmission, and prevention), attitude toward health maintenance and healthy living (food, drink, exercise, and rest), and attitude toward environmental health (clean water, waste disposal, and pollution).

Action

Mean student action before education was 1.1 and after education was 3.6. This is in line with the changes in knowledge and attitude, because behavior change begins with knowledge, which influences attitude and continues into action. According to Notoatmodjo (2012), an attitude does not automatically translate into action; to realize it, supporting factors or enabling conditions, including facilities, are needed. Action or practice has the levels of guided response (being able to do something in the correct order and following an example), mechanism (being able to do it correctly and automatically or as a habit), and adoption (action that has developed well and been modified without compromising its correctness).

Differences in knowledge, attitude, and action

Mean student knowledge at *pretest* was 20.35 and at *posttest* was 34.25, a difference of 13.9; mean attitude at *pretest* was 9.35 and at *posttest* was 21.75, a difference of 12.4; and mean action at *pretest* was 1.1 and at *posttest* was 3.6, a difference of 2.5. The statistical test yielded p = 0.0005 for all three, so there are differences in knowledge, attitude, and action before and after CTPS education. Behavior change can be influenced by several factors; according to Notoatmodjo, behavior change can be brought about by giving a stimulus or action to individuals or groups. This theory supports the behavior change among grade IV and V students of SDN 10 Lambung Bukit resulting from CTPS education using the audiovisual method, while the education delivered to students in groups can be interpreted as the stimulus or action.

Implications

The results show that CTPS education using the audiovisual method, supplemented with a demonstration and a question-and-answer session, was followed by improvements in students' knowledge, attitude, and action. For schools, this means the need to provide handwashing facilities, add health promotion facilities, and improve sanitation facilities, given that attitude does not automatically translate into action without supporting factors such as facilities. The implementation of policies and regulations by the principal and teachers is needed so that students become accustomed to practicing CTPS at school and in daily life. For health services, schools that do not yet have a PHBS program from Puskesmas Pauh need to be reached through collaboration for the sustained implementation of the School Health Program (Usaha Kesehatan Sekolah, UKS).

Research Contribution

For the school, this study serves as input so that SDN 10 Lambung Bukit, Pauh District, Padang City, pays more attention to its students' behavior regarding PHBS. For students, this study adds knowledge and application of PHBS science, especially regarding CTPS. For the researcher, this study improves abilities, skills, experience, and insight in conducting scientific research and applying the research methodology learned in university coursework.

Limitations

This study used a one-group pre-experimental design without a comparison (control) group, with a sample of 20 students selected by *purposive sampling* from a single school. In addition, students' knowledge may also be influenced by sources other than the education, such as electronic media and parents. Therefore, the research results need to be interpreted in accordance with these limitations.

Suggestions

To the school, SDN 10 Lambung Bukit, Padang City:

a. provide handwashing facilities at school;

b. increase teacher participation so that teachers care more about and pay attention to students' cleanliness;
c. always remind students to practice the CTPS habit; and
d. collaborate with relevant parties such as the Puskesmas for the sustained implementation of UKS (School Health Program).

To the students of SDN 10 Lambung Bukit, Padang City:

a. make CTPS a habit at school and at home;
b. keep fingernails short and always keep hands clean every day; and
c. play an active role in practicing the CTPS habit at home and at school, one way being active participation in UKS activities.

Conclusion

Based on the study of grade IV and V students of SDN 10 Lambung Bukit, Padang City, on differences in knowledge, attitude, and action before and after CTPS education using the audiovisual method, the following results were obtained.

1. Mean knowledge of CTPS before education was 20.35.
2. Mean knowledge of CTPS after education was 34.25.
3. Mean attitude toward CTPS before education was 9.35.
4. Mean attitude toward CTPS after education was 21.75.
5. Mean action toward CTPS before education was 1.1.
6. Mean action toward CTPS after education was 3.6.
7. The mean difference in knowledge before and after CTPS education using the audiovisual method was 13.9 with $p = 0.0005$, indicating a difference because $p < 0.05$.
8. The mean difference in attitude before and after CTPS education using the audiovisual method was 12.4 with $p = 0.0005$, indicating a difference because $p < 0.05$.
9. The mean difference in action before and after CTPS education using the audiovisual method was 2.5 with $p = 0.0005$, indicating a difference because $p < 0.05$.

Acknowledgment

The authors thank the Head of STIKes Fort De Kock Bukittinggi, Dr. Ns. Hj. Evi Hasnita, S.Pd, M.Kes; the Head of the Public Health Study Program of STIKes Fort De Kock Bukittinggi; all lecturers and staff of the Public Health Study Program of STIKes Fort De Kock Bukittinggi; friends and colleagues who helped, supported, and encouraged the authors throughout the research process; and SDN 10 Lambung Bukit and all students who participated in this study.

References

Achmadi, U. F. (2013). *Kesehatan masyarakat: Teori dan aplikasi* [Public health: Theory and application]. Rajagrafindo Persada.

Depkes RI. (2006). *Panduan penyelenggaraan Hari Cuci Tangan Pakai Sabun Sedunia (HCTPS) kedua* [Guidelines for organizing the second World Handwashing with Soap Day (HCTPS)].

Devi, E. S. (2013). *Pengaruh penyuluhan media audiovisual video terhadap tingkat pengetahuan pemeriksaan payudara sendiri (SADARI) pada kader posyandu di Tejokusuman RW 04 Notoprajan Yogyakarta* [The effect of video audiovisual media education on the level of knowledge of breast self-examination (SADARI) among posyandu cadres in Tejokusuman RW 04 Notoprajan Yogyakarta].

Dinkes Kota Padang. (2014). *Profil kesehatan Kota Padang tahun 2014* [Padang City health profile 2014].

Hastono, S. P. (2006). *Basic data analysis for health research training*. SPH.

Kapti, R. E. (2010). *Efektivitas audiovisual sebagai media penyuluhan kesehatan terhadap tingkat perilaku ibu dalam tatalaksana balita dengan diare di dua rumah sakit Kota Malang* [The effectiveness of audiovisual media as health education on the behavior level of mothers in managing toddlers with diarrhea in two hospitals in Malang City].

Kepmenkes RI. (2015). *Rencana strategis Kementerian Kesehatan tahun 2015–2019* [Strategic plan of the Ministry of Health 2015–2019] (No. HK.02.02/MENKES/52/2015).

Kholid, A. (2012). *Promosi kesehatan* [Health promotion]. Rajawali Pers.

Maryunani, A. (2013). *Perilaku hidup bersih dan sehat (PHBS)* [Clean and healthy living behavior (PHBS)]. Trans Info Media.

Notoatmodjo, S. (2005). *Metodologi penelitian* [Research methodology]. Rineka Cipta.

Notoatmodjo, S. (2010). *Promosi kesehatan dan aplikasinya* [Health promotion and its applications]. Rineka Cipta.

Notoatmodjo, S. (2012). *Promosi kesehatan dan perilaku kesehatan* [Health promotion and health behavior] (Rev. ed.). Rineka Cipta.

Pratama, R. K. O. (2013). *Pengaruh pendidikan kesehatan terhadap perubahan pengetahuan, sikap dan perilaku tentang kebiasaan berperilaku hidup bersih dan sehat siswa SDN 1 Mandong* [The effect of health education on changes in knowledge, attitudes, and behavior regarding clean and healthy living habits among students of SDN 1 Mandong]. Universitas Muhammadiyah Surakarta.

Prihatin, L. (2015). *Tingkat pengetahuan siswa tentang cuci tangan pakai sabun di SMP N 2 Mojolaban Sukoharjo* [Students' level of knowledge about handwashing with soap at SMP N 2 Mojolaban Sukoharjo]. Sekolah Tinggi Ilmu Kesehatan Kusuma Husada Surakarta.

Profil kesehatan Sumatera Barat tahun 2014 [West Sumatra health profile 2014]. (2014).

Puskesmas Pauh. (2015). *Laporan tahunan Puskesmas Pauh* [Annual report of Puskesmas Pauh].

Sari, F. N. (2013). *Pengaruh promosi kesehatan tentang PHBS cuci tangan pakai sabun (CTPS) dengan perilaku CTPS pada ibu-ibu di pengajian 'Aisyiyah Ranting Bangun Tapan Bantul Yogyakarta tahun 2013* [The effect of health promotion on PHBS handwashing with soap (CTPS) on CTPS behavior among women at the 'Aisyiyah religious study group, Ranting Bangun Tapan, Bantul, Yogyakarta, 2013]. Sekolah Tinggi Ilmu Kesehatan 'Aisyiyah Yogyakarta.

Wati, R. (2011). *Pengaruh pemberian penyuluhan PHBS tentang mencuci tangan terhadap perilaku mencuci tangan pada siswa kelas V di SDN Bulukantil Surakarta* [The effect of PHBS education on handwashing on handwashing behavior among grade V students at SDN Bulukantil Surakarta]. Universitas Sebelas Maret.

Wawan, A., & Dewi, M. (2010). *Teori dan pengukuran pengetahuan, sikap, dan perilaku manusia* [Theory and measurement of human knowledge, attitudes, and behavior]. Nuha Medika.

Widoyono. (2011). *Penyakit tropis: Epidemiologi, penularan, pencegahan, dan pemberantasannya* [Tropical diseases: Epidemiology, transmission, prevention, and eradication] (2nd ed.). Gelora Aksara Pratama.