

# A study of handwashing training effects on awareness, attitude, and handwashing skills of third grade elementary school students

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## ABSTRACT

**Background and Aims:** Hands are the first way of which many infectious diseases are transmitted. Hand hygiene is a means of infection control in schools. Close consideration of handwashing in educational units is important to control and prevent infection transmission. The present study aimed to determine the effect of handwashing education on awareness, attitude and handwashing skills of third-grade elementary school students in Tehran. **Methods:** In this study, 76 third grade students of elementary schools located at district 1 of Tehran with the mean age of 9 years were randomly divided into intervention and control groups using pre-test and post-test. Data collection for intervention and control groups was done using a researcher-made awareness- and attitude-gauging questionnaire, along with a checklist of handwashing performance which was completed in cooperation with the health instructor. **Results:** The results of this study showed that there was a significant difference between the awareness of 3<sup>rd</sup>-grade students in intervention ( $69.79 \pm 1.61$ ) and control ( $49.03 \pm 1.18$ ) groups ( $P < 0.05$ ). Moreover, students' attitude toward handwashing improved as a result of education, and the intervention group ( $62.37 \pm 0.65$ ) had a more positive attitude toward hygiene and handwashing compared to the control group ( $48.45 \pm 0.73$ ) ( $P < 0.05$ ). In the case of handwashing performance, the intervention group ( $56.76 \pm 1.33$ ) had better health performance compared to the control group ( $40.08 \pm 0.67$ ) ( $P < 0.05$ ). **Conclusion:** Practical training, preparation of educational posters and videos can enhance awareness, attitude and handwashing performance.

**Keywords:** Attitude, awareness, children, health, handwashing, performance

## Introduction

Infections caused by poor health care are one of the most common factors of mortality and morbidity in hospitalized patients in both of under-development and developed countries. A survey by World Health Organization (WHO) of 55 hospitals in 14 different countries, including the Eastern Mediterranean

countries, confirmed the prevalence of infections (an average of 8.7%) due to the poor health care provision in hospital wards.<sup>[1]</sup> According to WHO, at any given time in the world, there are 1,400,000 people suffering from nosocomial infections. The rate of preventable healthcare-associated infections is estimated to be 40% or over in developing countries.<sup>[2]</sup> Hospital-associated infections lead to longer hospitalization of patients, high costs of patients and the country's health care system and patient death.<sup>[3]</sup> Hand hygiene is a very simple way to reduce hospital-associated infections, prevent the spread of antimicrobial resistance, and increase patient safety.<sup>[4]</sup>

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It is well-known today that proper hand washing can prevent infection and spread of diseases. The hands are a convenient means of transmitting a variety of infections and diseases. Bacteria and other pathogens can be transmitted from non-living objects to hands, and then spread indirectly from a person to another. Continuation of this trend leads to widespread disease. Generally, two types of bacteria, known as normal flora, are found temporarily and permanently on the skin. Human infections are mainly caused by harmful, temporary bacteria that stick to the hands. As a result, proper washing of hands by soap and water can help to remove these bacteria from the skin.<sup>[5]</sup>

As a social structure, the school provides a unique environment for education where the child spends critical years of his/her living. School health plays an important role in the overall health policy and health care investment strategies as well as development and social welfare programs in the country, since school has the second most important role in child health after the family. Studies have shown that multiple educational interventions can increase the effectiveness of handwashing training programs and produce long-lasting effects on the health of individuals.<sup>[6]</sup> The Evidence-Based Handwashing Education Project expanded handwashing educational activities for children 3 to 6 years of age in pre-kindergarten and kindergarten classes in Volusia County, Florida. The classrooms were implemented for available products including warm water, soap, towels and hand sanitizer.<sup>[7]</sup>

Iran owns one of the youngest populations in the world, with more than one-third of the population being between the ages of 6 to 24 years old, most of them are educated and exposed to physical, behavioral and social hazards specific to these ages. Providing health services, promoting health awareness and fostering positive health behaviors in these populations will prevent highly occurrence of these risks. As a result, educating and promoting their health is one of the major challenges in the development programs of the country.<sup>[8]</sup>

This study aimed to provide proper education on handwashing and its importance in order to enhance the level of knowledge, attitude, and handwashing skills to improve health and feedback for students.

## Methods

The present study is an empirical non-randomized clinical trial with pre- and post-test with the aim of investigating the effect of combined education on the quality of health, attitude and awareness of 9-year-old children, having at least the literacy to read. This study was approved by the University with the Code of Ethics of IR.USWR.REC.1395.60, and the Clinical Trial Code of IRCT20181008041275N1.

In this study, 76 third grade students of elementary schools located at district 1 of Tehran with the mean age of 9 years were randomly divided into an intervention group (n = 38) and control

group (n = 38) using pre- and post-test. The educational program for the students in the intervention group included 3 sessions of 20-25 minutes which were conducted over 3 consecutive days in a quiet environment with the presence of children health educators [Table 1].

Different teaching methods (lecture, in-group Q and A) were applied in the sessions. In addition, teaching aids including posters, PowerPoints, videos and animations were utilized throughout the teaching process and the contents were fully explained in simple and comprehensible words for a school child [19]. The control group was also provided with all the educational materials and videos by their health educator, except for the training.

Inclusion criteria in this study included: Having an age of 8 to 12, being a third grade elementary school, consent of child or his/her parents, never participated in similar research, having no mental disability (such as hyperactive or autistic people who cannot focus) and none of the child's parents be a member of the health staff.

Exclusion criteria were: Missing one of the training sessions, the dissatisfaction of the children or parents with a continuing contribution, occurring any stressful event during the training program.

Descriptive statistics including tables, graphs, absolute and relative frequencies, mean, and standard deviation were used for descriptive purposes. Independent and paired t-tests were used to compare the mean scores for variables between the two groups.

## Results

Totally, two groups of control and intervention were evaluated in this study [Table 1]. There are 3 demographic tables in which the Chi-square test was used to analyze the data. Health belief variables are summarized in three sections, including attitude, awareness, and performance. The results of analyzes are shown in the tables using the *t*-test method [Tables 2-4].

The results for awareness variable at the pre-test showed no significant difference between the control ( $62.26 \pm 1.73$ ) and the intervention ( $62.32 \pm 1.06$ ) groups ( $P > 0.05$ ). In general, there was no significant difference in health behavior awareness between the 2 groups at the pre-test, indicating that the health awareness of all participants was similar before the intervention.

The results for the health attitude variable at the pre-test indicated no significant difference between the control ( $53.71 \pm 1.43$ ) and intervention ( $54.34 \pm 0.95$ ) groups ( $P > 0.05$ ). Generally, there was no significant difference in health attitude between the two groups at the pre-test, indicating that the healthy attitude of all students was similar before intervention.

The results for students' performance variable at the pre-test showed no significant difference between the



**Diagram 1:** Research diagram

control ( $48.63 \pm 0.95$ ) and the intervention ( $51.37 \pm 0.8$ ) groups ( $P > 0.05$ ). From the viewpoint of the health educator, there was generally no significant difference in health behavior performance between the two groups at the pre-test, indicating that the health performance of the two groups was similar before the intervention.

The level of health behavioral awareness at the post-test is statistically different between the intervention ( $69.79 \pm 1.61$ ) and control ( $49.03 \pm 1.18$ ) groups ( $P = 0.05$ ). This suggests that intervention and training children regarding handwashing and hygiene will increase the students' awareness of the importance of hygiene observation. At the post-test stage, significant differences were observed in the healthy performance between the two groups of intervention and control, and the health performance of the intervention group ( $56.76 \pm 1.33$ ) improved compared to the control group ( $40.08 \pm 0.67$ ) ( $P < 0.05$ ). This result suggests that intervention and training of children relating to handwashing and hygiene will enhance the students' performance on hygiene observation [Diagram 1].

Paired comparison of pre-test ( $62.32 \pm 1.61$ ) and post-test ( $69.79 \pm 1.06$ ) results for the health awareness variable showed a significant difference between the two groups ( $P < 0.05$ ). Paired comparison of pre-test ( $54.34 \pm 0.95$ )

and post-test ( $62.37 \pm 0.65$ ) results for the health attitude variable showed a significant difference between the two groups ( $P < 0.05$ ). Paired comparison of pre-test ( $51.37 \pm 0.8$ ) and post-test ( $56.76 \pm 1.33$ ) results for the health performance variable showed a significant difference between the two groups ( $P < 0/05$ ).

## Discussion

In this study, 67% of participants were males and 33% females. Also, the age frequency of participants was 67% in 8-year-old group and 33% in 9-year-old group. There was no significant difference between the 2 groups in terms of the girls-to-boys ratio and age range.

Comparison of the awareness levels at pre-test and post-test stages in the control group showed a reduction in the level of awareness of students at the post-test stage, and there was a significant difference between pre-test and post-test stages. The reduction in the level of awareness at the post-test stage in the control group may be attributed to approaching end of the year examinations, since at these times, the students' mental and psychological focus is mainly on exams, and the stress-induced by exams prevents students from concentration and raising their awareness. This is in line with the results of Goodarzi *et al.*<sup>[9]</sup> study, which found that students' performance, attitude and awareness

**Table 1: Describing the content of the sessions in this study**

Sessions	Content of each session	Duration/minutes	Concept transfer techniques
1 <sup>st</sup> session	1. Explaining the objectives and work methodology	5	1. Group discussion
	2. Q & A 1	5	2. Expressing the content in simple words
	3. Explaining the content in simple words	10	3. Posters related to body structure and hygiene 4. PowerPoint with sound and visual contents related to hand and face washing
2 <sup>nd</sup> session	1. Review of the previous session	5	1. Group discussion and the use of paper and pen
	2. PowerPoints of number 2 and 3 (Self-Care, Health and Care)	10	2. Provision a PowerPoint related to handwashing
	3. Q & A 2	5	3. Using children's poems to better understand the contents
3 <sup>rd</sup> session	1. Review previous session	5	1. Group discussion and the use of paper and pen
	2. In-person and oral explanation	10	2. Explain how the children get sick if they do not observe the health points
	3. Q & A 3	5	3. Review of the important concepts and answer the questions

**Table 2: Mean comparisons at pre-test for awareness, attitude and performance variables**

Index	Mean		Standard deviation		t	P	Confidence interval			
							Intervention		Control	
	Intervention	Control	Intervention	Control			Up	Down	Up	Down
Health behavioral awareness	62.32	62.26	1.06	1.73	0.03	0.4	62.43	61.92	62.91	61.61
Attitude	54.34	53.71	0.95	1.43	0.36	0.37	54.70	53.98	54.25	53.17
Performance	51.37	48.63	0.8	0.95	2.19	0.06	51.67	51.07	48.99	48.27

**Table 3: Mean comparisons at post-test for awareness, attitude and performance variables**

Index	Mean		Standard deviation		t	P	Confidence interval			
							Intervention		Control	
	Intervention	Control	Intervention	Control			Up	Down	Up	Down
Health behavioral awareness	69.79	49.03	1.61	1.18	13.1	0.00	70.36	69.18	49.47	48.59
Attitude	62.37	48.45	0.65	0.73	11.64	0.00	62.61	62.12	48.72	48.17
Performance	56.76	40.08	1.33	0.67	14.14	0.00	56.26	56.26	40.33	39.83

**Table 4: Paired comparison of awareness, attitude and performance variables at the pre- and post-test stages in the intervention group**

Index	Mean		Standard deviation		t	P	Confidence interval			
							Post-test		Pre-test	
	Post-test	Pre-test	Post-test	Pre-test			Up	Down	Up	Down
Health behavioral awareness	69.79	62.32	1.61	1.06	8.05	0.00	70.36	69.18	62.43	61.92
Attitude	62.37	54.34	0.65	0.95	6.7	0.00	62.61	62.12	54.70	53.98
Performance	56.76	51.37	1.33	0.8	9.34	0.00	57.26	56.26	51.67	51.07

decreased close to the examination times. In this study, there was also a significant difference in the level of awareness between the intervention and control groups after training.

In this study, there were no differences in attitude variables between the control and intervention groups at the pre-test stage. Rasouli *et al.*<sup>[10]</sup> studied the effect of integrated health education programs on awareness, attitude and nutritional performance of female high-school students in Bojnourd. They found no significant difference between the control and intervention groups at the pre-test stage. However, there was a significant difference between the two groups at the level of 0.01 in the post-test stage, which is in agreement with the results of this study.

At the post-test stage, the comparison between the two groups showed a significant difference in attitude variable, so it could be concluded that students' attitude towards health care will be improved via education. Pang *et al.*<sup>[11]</sup> argued that high awareness and attitudes of participants do not necessarily mean high compliance with health practices since high attitudes and awareness have sometimes led to infectious diseases such as diarrhea and other infections. In their study, Vivas *et al.*<sup>[12]</sup> stated that washing hands is one of the most effective ways to prevent gastrointestinal infections. They further stated that although 77% of students believed that the hands need to be washed after the toilet, in practice a few of them washed their hands. This contradiction between belief and practice is related to students'

attitudes, as well as many other factors such as laziness, a rush to play with friends or even a lack of handwashing facilities in the toilet. This is in agreement with the results of Hashemi *et al.*<sup>[13]</sup>

Before the intervention, the mean perceived severity score was similar in both intervention and control groups, and the studied groups had a positive attitude toward the seriousness of problems induced by poor sanitation. After education, this variable increased significantly in the intervention group. That is students in the intervention group have realized the dangers of non-compliance with health tips, and better perceived the serious risks of it. The specific purpose of this study was to increase students' handwashing performance in the intervention group, which has been realized according to the obtained results. Moreover, the overall hypothesis of this study as the significant impact of education on students' handwashing, was also confirmed. Generally, it could be concluded that education can increase the levels of awareness, attitude, and performance of students regarding handwashing and hygiene. This result is in agreement with the results of Witt and Spencer.<sup>[14]</sup>

In the present study, the problems related to the deficiency of detergent and hygiene products were one of the main obstacles of students' handwashing avoidance. Similarly, in Vivas *et al.*<sup>[12]</sup> study, the frequency of handwashing with soap was very low among studied student, which was due to the lack of soap and detergents in schools and at home. Generally, it can be said that water, soap, and other antiseptics are among the essential materials for proper school health activities.

## Conclusion

Generally, the results showed that the undertaken measures in this study to promote hygiene and children's performance and belief regarding handwashing were proper and reasonable. As a result, the awareness of students can be enhanced through providing practical training with the aid of materials such as PowerPoint, instructional videos, pamphlets and oral explanation.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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