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Evaluating the impact of hand washing education on the knowledge and practice of third-grade students in Tehran

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***Abstract*---**Background and Aim: Proper hand washing can prevent the spread of disease. This study was conducted to evaluate the effect of hand washing education program on knowledge and practices of student aged 8-9 years. Methods: The present study is an experimental non-randomized clinical trial with a control group. One girl school and one boy school were selected as the experimental group and one boy school and one girl school were selected as the control group. Random sampling was performed and 38 people were included in the experimental group and 38 people were included in the control group. To collect data in both groups, a general questionnaire, a knowledge questionnaire, and a checklist for hand washing practice were used. The educational program for 9-year-old children was held in 3 sessions of 20-25 minutes and in groups of 3-5 people, for 3 consecutive days. Three weeks after the education, the knowledge questionnaire was completed by the students and the practice checklist was completed in collaboration with the health instructor. Data analysis was performed in SPSS-20 software using descriptive and inferential statistics. Results: The findings showed that there was a statistically significant difference between the mean scores of knowledge and practice of students in the experimental group before and after the intervention (P <.05) Conclusion: Hand washing education programs can enhance the knowledge and practice of parents. IRCT ID: IRCT 20181008041275N1.

Keywords*---Education, Hand Washing, Knowledge, Practice, Student.***
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Introduction

Infections are very common in developing countries and comorbid infections are very common. Diseases caused by bacteria, fungi, viruses and other parasites are the leading cause of death, physical disability, and destructive socioeconomic effects for millions of people (1) (2, 3). Gastrointestinal diseases such as diarrhea are the second leading cause of death in children under 5 years of age. According to the World Health Organization, about 1.8 million people died due to this disease in 2004. The organization reports that 85 to 90% of internal infectious diseases are caused by unhealthy water and lack of observing the health activities such as not washing hands (4). Proper hand washing is one of the most important and effective ways to prevent the spread of infectious diseases. Learning the proper hand washing technique is very simple and plays a vital role in reducing the spread of infections among adults and children. Hand washing is one of the methods to prevent health interventions that interrupt the transmission of pathogens causing infectious gastrointestinal diseases (5).

A review of studies conducted in this regard by Curtis V and Cairncross SJTLid (6) showed that hand washing with soap can reduce internal infectious diseases by about 47% and save about one million people from death annually.

A review of studies found that during 12 studies in 9 countries, hand washing interventions reduced the symptoms of internal infectious diseases by 35% (7). Also, the study conducted by Lule JR et al. (8) showed that having soap at home is closely related to reducing internal infectious diseases. Applying hand washing educational programs plays a major role in the social health status. A hand washing education program is effective in preventing respiratory infections, gastrointestinal infections, flu and common colds and reduces absenteeism at school and work, reduced healthcare cost, a reduction in issues related to antibiotic resistance, a reduction in the spread of infection in the home and living place (9) (10). If the psychological, social, physiological or educational needs of students are not met timely in any of the early stages of life, it will not possible to compensate for the complications in later life. For the growth and development of a generation and improving and evolving the next generation, it is a fundamental strategy to invest in school health to improve the knowledge, attitude and practice of students in the area of personal health (11).

Health education in its general meaning is an educational method through which one can play an effective, useful and increasing role in creating and improving the health habits and behavior of the individual, family or society (11). Also, health education using theories or educational models is effective in enhancing knowledge, changing attitudes and adopting health behaviors (12). Since Iran is one of the youngest populations in the world, so that more than a third of its population belongs to age groups of 6-24 years and majority of them are also studying and exposed to physical, behavioral and social risks specific to these ages, providing health services, promoting health knowledge and knowledge and strengthening positive health behaviors can prevent the occurrence of these risks. Hence, their education and health promotion is one of the most important challenges of the Iran's development plan. In general, the aim of this study is to investigate the use of hand washing education on changes in knowledge and

practice of third-grade elementary students. The contents of this education were adopted from health belief model to develop a hand washing education program.

Methods

The present study is an experimental non-randomized clinical trial with a control group, which was conducted with the code of the ethics of IR.USWR.REC.1395.60 and the code of the clinical trial of IRCT20181008041275N1 in 2018. The statistical population of the study included the third-grade primary school students in Tehran.

To conduct the present study, after the approval of the ethics committee of the University of Social Welfare and Rehabilitation Sciences and obtaining the necessary permissions from the education department of Tehran, District 1 was selected with the coordination of the relevant school officials. Multi-stage sampling method was used, in which one district was randomly selected from among the education departments and then one district was randomly selected from among its districts.

Two boy schools and two girl schools were randomly selected. Then, one boy school and one girl school were considered as experimental group and one boy school and one girl school were considered as the control group. Then, sample was selected randomly from the third-grade students of those schools if that school has more than one third-grade class. The required sample size was estimated at 35 people for each group considering 95% confidence level and 80% test power and 38 people in each group were considered considering the probability of dropout in samples.

The consent to participate in the research was completed and signed by the parents after explaining the objectives and method of the study. To reduce information pollution, the experimental group was selected from the educational center of one school and the control group from another school. The educational program for 9-year-old children was held in 3 sessions of 20-25 minutes and in small groups of 3-5 people, for 3 consecutive days in a calm and suitable environment with the presence of child health educators. Inclusion criteria of the study included minimum and maximum ages of 8 and 10, respectively, studying in the third-grade primary school, child and parent consent, no participation in similar project, no concentration disorders (such as hyperactive people or autism who do not concentrate), and none of the parents of the child should be a member of health care staff. Exclusion criteria also included not attending one of the educational sessions, non-consent of the child and parents to continue the project, and the occurrence of any stressful event during the implementation of the educational program.

The method of this education was inspired by the health belief model, which has been approved by ten professors of the University of Social Welfare and Rehabilitation Sciences. Different educational methods (lectures, questions and group answers) were used in the sessions. Teaching aids including whiteboards, PowerPoint, music and children's poems were used during the teaching. The control group did not receive any education, but all educational materials and

videos were given to the health instructor to present to them after the intervention. The experimental group received all the educations related to hand washing and observing the health. Hand washing education focused on the: 1) Defining health, the importance of health, the way of observing health and hand and face washing 2) stating physical problems and diseases caused by poor health, correct hand and face washing education 3) stating the social and educational problems due to lack of health, taking drugs and its side effects.

During 3 sessions of 20-25 minutes of the educational class, the topics were presented to the students. The sessions were set at times that did not interfere with students' lessons. During the last educational session to re-answering time (three weeks later), to follow up whether the child follows the educational process and educational content or not, four telephone calls were made to the child and his or her family and possible questions were answered. To establish a two-way interaction, the contact number of the researcher and the project manager was provided to the participants and it was emphasized that they are ready to answer their questions and requests at any time and the follow-up process should continue.

To collect data in both experimental and control groups, a general questionnaire, a knowledge questionnaire, and a checklist for assessing the practice of hand washing were filled out with the cooperation of a health educator. Their validity and reliability was evaluated using CVR (Content Validity Ratio) test. Demographic characteristics of children were also measured. The questionnaires were submitted to the students and the health educators were asked to complete them in a calm and stress-free situation and return it to the researcher. The completed questionnaires were reviewed individually by a statistical assistant and incomplete cases were excluded. The content validity of the instrument were assessed by 10 experts of the university and based on their opinions, the necessary changes were made in the questionnaire. CVR method was used to determine the validity.

Content Validity Ratio Index (CVR): This index was designed by Lawshe (1975) (13). To calculate this index, the opinions of experts in this area were used. After explaining its objectives to them and providing operational definitions of the content of the questions, they are asked to categorize each question based on the 3-point Likert scale, including "item is necessary", "item is useful but not necessary" and "item is not necessary". When less than half of the people choose the necessary option, the CVR becomes negative. When half of the people choose the necessary option and the other half choose the other option, the CVR becomes zero. When one chooses the necessary option, the CVR becomes 1 (converted to 99%). When the number of people who choose the necessary option is more than half but not the total number, the CVR is between zero and 99%.

In the present study, first 42 questions were designed for each of the questionnaires of knowledge and practice measurement. However, because some of them had a CVR of less than 0.6, the items with a CVR of 0.6 or more were included in the questionnaire. Accordingly, 26 items in the Knowledge Questionnaire and 19 items in the Practice remained in the Questionnaire. The items were scored on a Likert scale from 0 to 4. In the knowledge questionnaire,

zero means I strongly disagree and 4 means I strongly agree. In the practice checklist, zero means very poor and 4 means excellent. Information was collected from the relevant questionnaire for the control group during one stage. Regarding the experimental group, the students' questionnaire was completed in two stages of before the intervention and 3 weeks after the last educational session. Then, the practice checklist questionnaire was completed with the cooperation of the health instructor. All data collection and processing was done under the supervision of scientific and statistical colleagues of the project. Data analysis was performed using SPSS software (version 20, SPSS Inc., Chicago, IL). For descriptive purposes, descriptive statistics including tables, graphs, absolute and relative frequency, mean, and standard deviation were used. Independent and paired t-tests were used to compare the mean scores of the two groups.

Results

Demographic characteristics of the research samples showed that there is no statistical difference between the frequencies of male and female students in the experimental and control groups. It means that the ratio of girls to boys was similar in both groups (19 people in each group). The frequency of age of third-grade students showed that 67% of people in the two groups are eight years old and about 33% are nine years old and the two groups do not have a statistically significant difference in terms age. In the control group, the frequency of parents with university education was higher than the experimental group (22.37%) and the frequency of parents with associate and primary school degrees in the experimental group was higher than the control group (10.53 and 2.63, respectively).

The results of knowledge variable in the pre-test stage between the two control (62.26 ± 1.73) and experimental (62.32 ± 1.06) groups were not significant ($p> 0.05$). In general, there was no statistically significant difference between the two groups in the pre-test stage in terms of the level of knowledge of health behavior, indicating that the health knowledge of individuals before the intervention is homogeneous.

The results of analyzing the variable of students' practice in the pre-test stage between the control (48.63 ± 0.95) and experimental (51.37 ± 0.8) groups were not significant ($p> 0.05$). In the post-test, there was a statistically significant difference between the experimental and control groups in the health behavior knowledge: experimental (69.79 ± 1.61) and control (49.03 ± 1.18) ($p <0.05$) (Tables 1 and 2).

There is a significant difference between two groups of experimental and control in terms of health practice in post-test. Health practice of the experimental group (56.76 ± 1.33) improved compared to the control group (40.08 ± 0.67) ($p <0. 05$) (Table 2). Comparison of the control group in the pre-test (62.26 ± 1.73) and post-test (49.03 ± 1.18) stages showed that in the post-test stage, students' behavior knowledge. Therefore, there is no difference between the levels of knowledge of students in the control group in both stages or the level of health behavior knowledge in the post-test stage is less than the pre-test in the control group ($p <0.05$). (Table 1)

Comparing the health practice of the control group in the pre-test (48.63 ± 0.95) and post-test (40.08 ± 0.67) stages showed a significant difference and students in the post-test showed poorer health practice than the pre-test ($p < 0.05$) (Table 1). A pairwise comparison of pre-test (62.32 ± 1.61) and post-test (69.79 ± 1.06) for the health knowledge variable indicates a significant difference between the two groups and a significant difference is observed in the post-test stage, indicating an increase in health knowledge of the experimental group, compared with the pretest ($p < 0.05$) (Tables 1 and 2). Paired T comparison of pre-test (51.37 ± 0.8) and post-test (56.76 ± 1.33 for the health practice variable indicates a significant difference between the two groups, indicating an increase in the health practice of the experimental group compared to pretest ($p < 0.05$) (Tables 1 and 2).

Discussion

The results of the analysis of research results revealed that hand washing education is effective on the practice and knowledge of third-grade elementary children. In the control group, the frequency of parents with higher education was higher than the experimental group, which may affect some factors of children's knowledge and practice. This result is consistent with the results of study conducted by Ansari Moghaddam, which showed that there is a significant relationship between mothers' education level and knowledge about oral health, so that the university group was significantly had higher knowledge that those with illiterate, primary, secondary and high school levels of education (14). A study conducted by Zafarmand also suggest that the job of parents of female middle school students in Tehran is very effective in their knowledge of oral health issues, so that 75% of children who have employed parents and especially those in high-level jobs have a good knowledge of oral health issues (15).

Comparison of health knowledge levels of control group in pre-test and post-test showed that the level of knowledge in post-test stage decreased compared to pre-test, and there was a significant difference between pre-test and post-test. One of the reasons for this decrease in the level of knowledge in the post-test stage in the control group is the approaching final exams of students, since at this stage, the mental and psychological focus of the person is mainly on the exams and the stress of the exam prevents students from paying attention and raising their knowledge in this regard.

This result is in line with the results of the study conducted by Goodarzi et al. (16) which due approaching the exam time, it caused a decrease in students' practice and knowledge. In the experimental group, comparison of pre-test and post-test showed that education had a significant effect on students' knowledge and had a significant difference in health behavior knowledge.

The results of a study conducted by Abood et al. (17) also showed that education improves health behavior knowledge and these researchers attributed this issue to reducing follow-ups and people returning to their previous lifestyle. The results of this study also showed that the use of hand washing education has been effective and is associated with some behaviors such as shortening and cleaning nails and the use of soap in hand washing after toilet. Khosravan et al. achieved a similar result in this regard (18). Therefore, health education and enhancing the

knowledge of children and their parents can be effective and complementary. The practice results between the control and intervention groups showed that education can have a significant effect on students' health practice. The results revealed that before the educational intervention, the majority of people did not consider themselves at risk of infection and contamination, and lack of observing the health, not washing hands after using the toilet and before eating, eating unwashed fruits and vegetables, consumption of leftover food that was not stored correctly and this issue affects the accuracy and sensitivity in people's behavior. It indicates that if a person is sensitive to a problem and believes that non-observance of a number of health issues can make him or her ill, he will be more motivated to observe health behavior. These results are similar to the results of the studies conducted by Hazavei (19), Mehri and Mohagheghnejad (9).

The results of this study were consistent with the results of White and Spencer (20). In their study, they indicated that hand washing education programs improve the multidimensional activity of people and increase people practice and knowledge compared to before. In the study conducted by Tasman et al. (10), multidisciplinary educational programs implemented over several weeks improved the personal health of the subjects. Snow M et al. (21) also found that educational programs can be somewhat inexpensive, resulting in a relatively good increase in increasing health in primary school. In the study conducted by Wivas et al. (22), the most health activities were washing feet, brushing teeth and changing clothes, respectively. Bathing and washing were ranked the lowest. Health activities that require more water seem to rank lower. In general, recommendations to observe the health in children require infrastructure. For example, in Tehran, although the quality and quantity of water is better than other cities and remote rural areas, but due to water shortages and droughts, observing the optimal consumption of water should be considered in the agenda of health educators. Water is one of the vital and God-given resources that the way of its consumption should be taught from an early age. Therefore, the challenge of water shortage is one of the issues that should be considered along with such studies and health advice. In general, studies have shown that observing health in water shortage is less preferable than consuming water for drinking, cooking, washing clothes and cleaning the residence (23).

Conclusion

This study revealed that children in Tehran schools in the third-grade primary school have moderate knowledge and practice in observing health and hand washing. The results of comparing the means in the two groups of control and intervention showed that there was no difference between these variables in the two groups and after the implementation of educational programs for children, the difference between the two groups was significant. Thus, the results of this study show that educational programs have a positive and significant effect on children's health behavior and beliefs. Therefore, these educations are recommended for children in all places and cities.

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Table 1: Paired T comparison between knowledge and practices variables in pre-test and post-test in the control group

Index / variable	Mean		SD		t	Probability level	Confidence interval			
	posttest	pretest	posttest	pretest			posttest		Pretest	
							upper	lower	upper	lower
Health behavior knowledge	49.03	62.26	1.18	11.73	-11.25	0.00	49.37	48.65	62.81	61.71
Practice	40.08	48.63	0.67	0.95	10.82	0.00	40.29	39.87	48.93	48.33

Table 2: Paired T comparison between knowledge and practices variables in pre-test and post-test in the experimental group

Index / variable	Mean		SD		t	Probability level	Confidence interval			
	posttest	pretest	posttest	pretest			posttest		Pretest	
							upper	lower	upper	lower
Health behavior knowledge	69.79	62.32	1.61	1.06	8.05	0.00	70.36	69.18	62.43	61.92
Practice	56.76	51.37	1.33	0.8	9.34	0.00	57.36	56.26	51.67	51.07