

A quasi experimental study on hand hygiene practices among secondary school children in Khyber Pakhtunkhwa

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Abstract

Objective: To evaluate the effectiveness of hand-hygiene training on handwashing practices among schoolchildren.

Method: The quasi-experimental study was conducted from 1st August- 2018 to 5th October- 2018 in four secondary schools in Peshawar and Kohat districts of Khyber Pakhtunkhwa, Pakistan, and comprised male students grades 5, 6, 7, 9 and 10. They were given a live demonstration about the standard steps of hand-hygiene as per the World Health Organisation checklist, and they were shown the steps in pictorial form as well to reinforce the message. Pre- and post-intervention scores were recorded on the 14- point checklist. Data was analysed by using SPSS 23.

Results: There were 200 boys with a mean age of 13.23 ± 0.92 years (range: 11-16 years); 87(43.5%) of them being from grade 7. Post-intervention score increased significantly compared to the baseline ($p < 0.01$). Significant differences were identified with respect to geographical location, type of school, grade in school and mothers' education ($p < 0.05$).

Conclusion: Hand-hygiene training significantly increased students' hand-washing practices and behaviours.

Keywords: Hand washing, Hand hygiene, Secondary school, Training, Practices. (JPMA 72: 664; 2022)

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Introduction

Globally, watery diarrhoea is the leading cause of malnutrition-related morbidities and mortalities among children, with only 44% receiving proper treatment in low-resource countries. The forgotten pillars of good health are safe water provision, appropriate sanitation and healthy hand-hygiene practices.¹ The World Health Organisation (WHO) defines hand-hygiene as a general term related to any action of cleansing the hands with the use of any liquid or soap for the purpose of soil, dirt, and micro-organism removal.²

In the world, 2.4 million deaths occur in developing countries due to diarrhoea and associated malnutrition. These mortalities can be prevented by good hygiene practice, adequate and reliable sanitation, and access to clean drinking water.³ A meta-analysis on 30 hand-hygiene studies concluded that handwashing techniques improved lower and upper respiratory tract infections by 21% and gastrointestinal diseases by 31%.⁴ A study published in Lancet reported that soap-associated handwashing could lessen the risk of diarrhoeal diseases by 42% to 47%, and promotion of handwashing could save millions of lives.⁵ Health education and awareness in relation to handwashing and making soap available for

children in schools could improve regular attendance.⁶

The importance of handwashing was revealed in Vienna's maternity clinics back in 1847, where clean hands of the medical personnel reduced deaths of mothers. Hands are the main culprits and route in transferring common communicable infections among children. Washing hands properly is a simple, safe and effective habit that plays a crucial role in protecting one's health. It is commonly known as "do it vaccine" involving five small steps to remove evident and obvious dirt.^{7,8}

Lack of easy, friendly hand-hygiene equipment with poor logistics is an essential and important factor for low compliance among people. Visible dirt can be removed with water and soap after toilet use and it can actually prove to be effective with simple handwashing technique that does not require much effort or time.⁹

Mostly, children get infected at academic institutions, where infectious diseases spread rapidly due to the presence of a large number of children. Primary schoolchildren are the most vulnerable who suffer serious consequences at the hand of infectious illnesses. As a matter of fact, schools are ideal places and students the target groups to be exposed to training sessions on hand-hygiene. Implementation of hygiene in schools can be enhanced through multidisciplinary approaches. Like surveys and interventions. Moreover, this tender age is crucial where personal hygiene rules actually transform

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easily into behaviours and habits. They can add up as new knowledge gained at school in addition to what one has learned at home. Training of personal health habits greatly affects future health statuses. Recent studies concluded that comprehensive handwashing trainings are successful and beneficial among young children.¹⁰

Water, sanitation and hygiene (WASH) is basically concerned with schools having water, sanitation, washing facilities with hygiene education. It is a widely known fact that the essential aspect of sufficient WASH facilities can influence children's behaviour of handwashing. Practical, functional, safe and child-friendly places for handwashing in schools enable the children to adopt handwashing with soap, improves health, boosts educational achievements, promotes gender equity and to have a positive influence on communities. In spite of the importance, national monitoring systems for such working handwashing stations in schools are weak in developing countries. Reliable data is only available in a few developing countries, and Pakistan is no exception. The United Nation's International Children Education Fund (UNICEF) reports half of its programme countries WASH data related to schools.¹⁰⁻¹²

Pakistan has one of the highest rate of mortalities and morbidities among children,¹ with paucity of studies on hand-hygiene practices among schoolchildren. The current study was planned to evaluate the effect of hand-hygiene on handwashing practices among schoolchildren.

Subjects and Methods

The quasi-experimental study was conducted from 1st August-2018 to 5th October-2018 in four secondary schools in Peshawar and Kohat districts of Khyber Pakhtunkhwa, Pakistan. After approval from the institutional ethics review board of Prime Foundation Pakistan (PRP), Peshawar, the sample size was calculated using G-Power calculator¹³⁻¹⁵ with effect size 0.44, power 90%, alpha error probability 0.05. The sample size was inflated by 20% to compensate for dropouts. The sample was raised using systematic random sampling technique. Two schools each were randomly selected through lottery method from Peshawar and Kohat from both public and private setups and in both urban and rural areas. Subsequently, after permission of respective school administrations, every 5th student was approached from grades 5, 6, 7, 9 and 10. Those included were students present on the day when the researchers visited the school, and who volunteered to participate. Those who were absent or did not consent were excluded.

After written informed consent from the parents of the

subjects, they were exposed to the intervention. School staff was trained and briefed about the objectives of the study and they in turn imparted it to the students. The researchers were trained in handwashing steps by a public health specialist as per the WHO standard guidelines.¹⁶ A 14-point handwashing checklist was used to identify the handwashing skills of the students before and after the intervention. Each step was scored as 1 mark if the step was performed by the student correctly, and 0 when they missed or skipped it. The total score was 14 marks. The students were first asked to demonstrate handwashing steps as per their own understanding on the first day of the visit and their pre-intervention scores were recorded. They were then given a demonstration of the actual steps of handwashing as per the WHO checklist, and were shown pictorials¹³ to reinforce the message. The researchers returned to the schools after 8 weeks and asked the students to demonstrate their current handwashing to record their post-intervention scores.

Data was analysed using SPSS 23. Mean and median valued along standard deviation and interquartile range (IQR) were calculated for continuous variables, like age, pre- and post-intervention score, while frequencies and percentages were calculated for categorical variables, like location, school, class/grade, mothers' education status. Normality of data was checked using Shapiro-Wilk and Kolmogorov Smirnov tests. Wilcoxon signed rank test was used to compare pre- and post-interventional scores. The threshold for statistical significance was established at a $p \leq 0.05$.

Results

There were 200 boys with a mean age of 13.23 ± 0.92 years

Table-1: Sociodemographic characteristics.

	Mean $\pm$ SD	Median
Variable		
Age	13.23 $\pm$ 0.92	13.0
Variable	N	%
Location		
Urban	100	50.0 %
Rural	100	50.0 %
School		
Public sector	100	50.0 %
Private	100	50.0 %
Class/Grade		
5th	11	5.5 %
6th	42	21.0 %
7th	87	43.5 %
9th	48	24.0 %
10th	12	6.0 %

SD: Standard deviation.

Table-2: Comparison of hand-hygiene score before and after the training (n=200).

Knowledge	N	Median (Q1, Q3)	Mean±SD	P ^a
Hand hygiene washing training (Before)	200	7 (6, 8)	7.23±1.48	<0.01**
Hand hygiene washing training (After)	200	11 (9, 13)	10.70±2.30	
Difference		4 (3, 5)	3.47±0.82	

^aWilcoxon sign-rank test.

*p<0.05. **p<0.01.

(range: 11-16 years); 87(43.5%) of them being from grade 7 (Table-1).

Post-intervention score increased significantly compared to the baseline (p<0.01) (Table-2).

Significant differences were identified post-intervention with respect to geographical location, type of school, grade in school and mothers' education (p<0.05). Pre-intervention, differences were significant for

Table-3: Comparison of hand-hygiene score according to demographic characteristics.

	N (%)	Before Hand Hygiene Training Median Score (Q1, Q3)	After Hand Hygiene Training Median Score (Q1, Q3)	Difference	P ^a
Setting					
Urban	100 (50.0%)	8 (7, 9)	9 (8, 10)	1	<0.01**
Rural	100 (50.0%)	6 (6, 7)	13 (11.2, 13)	7	<0.01**
pb		<0.01**	<0.01**		
School					
Private	100 (50.0%)	7(6, 8)	11 (9, 12)	4	<0.01**
Public	100 (50.0%)	7, (6, 8)	13 (9, 13)	6	<0.01**
pb		>0.05	<0.01**		
Class/Grade					
5th	11 (5.5)	6 (5, 7)	13 (9, 14)	7	<0.05*
6th	42 (21.0%)	7 (6, 9)	10.5 (8.7, 13)	3.5	<0.01**
7th	87 (43.5%)	7 (6, 8)	11 (9, 13)	4	<0.01**
9th	48 (24.0%)	7 (6, 8)	12 (9.2, 13)	5	<0.01**
10th	12 (6.0%)	7 (6, 9)	11 (8.2, 11)	4	<0.05*
pc		>0.05	<0.05*		
Mother's Education Level					
No Education	116 (58.0%)	7 (6, 8)	13 (9.2, 13)	6	<0.01**
Primary	21 (10.5%)	7 (6, 8)	11 (8.5, 12)	4	<0.05*
Secondary	9 (4.5%)	7 (6, 7.5)	10 (8.5, 11)	3	<0.05*
Matric	26 (13.0%)	8.5 (7, 9)	9 (8, 11.5)	1.5	<0.05*
Intermediate	12 (6.0%)	8 (6, 9)	9 (8, 11)	1	<0.05*
Bachelors	6 (3.0%)	8.5 (7.5, 9.5)	8.5 (7, 11)	0	>0.05
Masters	10 (5.0%)	8 (7.7, 9)	9 (8, 10)	1	>0.05
pb		<0.01**	<0.01**		

Note. Q1 = quartile 1; Q3 = quartile 3.

^a Wilcoxon signed-rank test.^b Mann-Whitney U test.^c Kruskal-Wallis test.

*p<0.05. **p<0.01.

geographical location and mothers' education level (p<0.05), but the differences were not significant for type of school and the grades to which the student belonged (p>0.05) (Table-3).

Discussion

Hand-hygiene is a widely accepted simple and effective method to control infections. The current study found significant improvement in handwashing technique with a simple intervention in terms of demonstration the right handwashing training, which is in line with literature. One of the studies found that knowledge and practice of handwashing of students improved following an interactive handwashing promotion week in the school.⁹

Another study comprising 7 schools and students of grades 3-5 showed significant differences after health education intervention.¹⁷

A study on medical undergraduates in Saudi Arabia found average awareness of hand-hygiene with low compliance in clinical settings.¹⁸ The same researchers carried the

same study again after two years and found a significant difference in awareness and compliance, proving that dedicated multifaceted interventions can improve hand-hygiene practices.¹⁹

A school-based study in Turkey with students from grades 6-9 found significant difference post-intervention. Girls attained the highest scores, and improvement in handwashing skill was significantly more among students whose mothers had studied up to the undergraduate level compared to those having mothers with higher education qualifications. Interestingly, significant relationship was found between students' handwashing skills and their fathers' educational level.²⁰ The findings of the current study related to the education level of the mothers were similar, while that of the father was not among the factors explored.

A study carried out in two rural communities of Vietnam, using both qualitative and quantitative methods, demonstrated low level of handwashing skills among the students, but the skill level increased by grade, and males washed longer than females.²¹ The present study comprised only male students, and qualitative methods of knowledge assessment were not employed. However, compliance post-intervention in the present study was excellent which was really encouraging.

A study in Malaysia using a self-administered questionnaire and observational checklist showed knowledge (16.70%), practice (23.80%) and self-efficacy (41.70%) of the students in proper handwashing as low. Significant association of gender ($p=0.004$), academic achievements ($p=0.038$) and practices ($p=0.003$) was found with self-efficacy regarding handwashing.²² The current study had no gender comparison in terms of knowledge assessment and academic achievements. However, practice scores were similar.

A randomised controlled trial (RCT)²³ comprising private schoolchildren in Korangi, Karachi, reported findings consistent with those of the current study in terms of practice scores.

The current study has its limitations which limits the generalisability of the findings. It did not consider student-focussed approaches and methods that could have been more productive as educational techniques. Direct observation of hand-hygiene compliance might induce an increase in compliance unrelated to the intervention, the Hawthorne effect.²⁴ It can lead to substantial overestimation of compliance. It is possible that it is the novelty of the intervention itself that leads to improvements in compliance and that any sufficiently

novel intervention would do the same regardless of the components used. This clearly cannot be ruled out and is not necessarily inconsistent with the findings that interventions with more components tend to perform better.

Besides, the findings of the current study might have been distorted by publication bias, fathers' education was not taken into consideration, female students were not included, the number of students in the classes were unbalanced, which was due to absenteeism, and, finally, the effect of the intervention was evaluated 8 weeks after its completion, but there is a risk that prolonging a programme may lead to participant fatigue accompanied by diminishing success.

Conclusion

Training related to proper handwashing significantly increased students' hand-hygiene behaviour. The training enhanced handwashing compliance rates and the use of soap. Such initiatives could be part of students' hygiene knowledge and education programme with regular training and evaluation, especially in primary and secondary schools.

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