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Hand Hygiene: Knowledge and Practice among Pre-School Students

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Abstract

Human health has been jeopardized due to a lack of understanding about proper hand washing techniques. Because of their underdeveloped immune systems, preschool children are more vulnerable to infectious infections. Hand hygiene inhibits the spread of infectious illnesses. The purpose of this study was to develop a better understanding of pre-school children's hand hygiene knowledge and behavior on the current situation of COVID-19. A total of 232 children aged 5 and 6 years old from 10 pre-schools in the Sepang region of Selangor, Malaysia, were chosen for this study. A questionnaire containing socio-demographic information, knowledge, and hand hygiene behavior was distributed. A completed hand hygiene education programme, including a video on correct hand washing technique, was presented to the test group. The results were statistically examined using descriptive analysis and an independent t-test. More than 90% of the participants displayed effective hand washing technique. Hand hygiene routine practice was much superior ($p < 0.05$) in the test group. Indeed, further progress should be made through targeted health education initiatives emphasizing the importance of hand hygiene in health.

Keywords

Hand Hygiene, Pre-School, Knowledge, Practice

1. Introduction

Human hands are a major means of transferring illnesses, particularly diarrhoea and respiratory diseases, which infectious diseases continue to be the greatest cause of morbidity and death in children globally (Dagne et al., 2019; Ogwezzy-Ndisika & Solomon, 2019). Many infections begin when disease-causing

germs contaminate the hands such as water and food-borne diseases, contagious diseases, severe acute respiratory syndrome (SARS), H1N1 influenza A, norovirus, cholera, malaria, dysentery, meningitis and shigellosis (Almoslem et al., 2021; Manandhar & Chamdyo, 2018; Dajaan et al., 2018). According Tengku Jamaluddin et al. (2020), infection can occur after using the restroom, coughing or blowing your nose, playing, handling trash, or contacting other contaminated surfaces.

Personal hygiene is essential at all stages of life, but good hygiene habits should be established in early childhood. Study by Nagar et al. (2021) revealed that hand hygiene is especially crucial for children since they are more vulnerable to illnesses spread by dirty hands. Hand washing is known to be one of the most effective and least disruptive hygiene-promoting actions and it is a useful means of preventing the spread of numerous infectious illnesses (Ogwezzy-Ndisika & Solomon, 2019; Mohamed et al., 2019; Pratinidhi et al., 2019). Hand washing is the act of washing one's hands using ordinary or antibacterial soap and water. Nagar et al. (2021) stated that hand washing, particularly before eating, is thought to be one of the initial methods of protecting children, teenagers, and adults against numerous infectious illnesses. Various studies have demonstrated that hand washing is essential in hygiene management in order to prevent under-five mortality Pratinidhi et al. (2019) & Saima Alam et al. (2020). In a nutshell, hand washing can lessen the risk of mortality from these fatal illnesses.

Most Malaysian parents send their children to pre-school to prepare them for primary school. Pre-schools, in general, are a contained setting with various inanimate objects that serve as vehicles for infection transmission (Tengku Jamaluddin et al., 2020). Young children may lack the capacity to execute their own personal hygiene and understand the necessity of appropriate hygiene, thus caregivers must provide constant care and monitoring.

Given the extensive public sensitivity to COVID-19 infection, hand hygiene is frequently stressed in all conceivable media to the whole community. The protection of primary school children is sometimes disregarded, thus this study aimed to better understand the present state of knowledge and practices of hand hygiene among pre-school kids.

2. Methodology

2.1. Study Population

This study focused on the Sepang district Selangor, Malaysia region, including participation from ten kindergartens. The sample size was taking from pre-school-aged youngsters. Prior to the commencement of this project, formal permission from relevant agencies (KEMAS) was obtained, and parents were given a subject information sheet as well as a consent form outlining the relevance of the study, its background, risks, and aims.

2.2. Data Collection

Based on its applicability for this investigation, a previously validated question-

naire (Bacterfree) from Tengku Jamaluddin et al., 2020 was improved. All of the data collection entirely conducted by preschool teacher. The researcher provided a briefing to the teachers on the questionnaire prior to its administration. These are intended to enhance instrument validity. The questionnaire was divided into three sections: demonstration, knowledge of hand washing and on how the germs can spread through, and hand hygiene practices. Data were collected in three phases as below:

- First phase: A survey on demographic information such as gender and age were acquired.
- Second phase: Evaluating the children's existing hand washing technique and hand hygiene routine. They were asked about their hand hygiene routine and whether they wash their hands after using the restroom, before and after meals, after playing outside, after coughing and sneezing, and after playing with pets. To help the children pick and express their replies during the interview, the hand hygiene routine times were provided in graphics and easy situations.
- Third phase: Following from the second phase, the interviewers observed the pupils' hand washing procedure in accordance with the World Health Organization's guidelines (WHO). There are 11 hand washing steps which are as follows: thoroughly wetting hands under running water, using soap on the hands, rubbing hands palm to palm, rubbing hands with fingers interlaced, rubbing one palm over the back of the other hand, cleaning the back of fingers to opposing palms, rotational rubbing of the thumbs, fingertips, and wrists, thoroughly rinsing hands with water, and finally drying hands. Soap, tissues, and trash cans were made available.

2.3. Statistical Analysis

The data was statistically analyzed using the Statistical Package for the Social Sciences (SPSS) software Version 21. Demographic information from samples was analyzed using descriptive statistics. The independent t-test was used to compare gender and age of hand hygiene practice. $p < 0.05$ was set as the criterion of significance.

3. Result

Data was obtained from 232 pupils from 10 Sepang kindergarten schools. Each student's demographics, such as gender and age, were identified. There were a total of 120 males and 112 female among the participants. In terms of age, the students were all 5 years old (48.7%, n = 113) and 6 years old (51.3%, n = 119).

3.1. Knowledge

In the first part, their prior knowledge of hand hygiene was evaluated explicitly on their ways of learning hand washing as shown in **Table 1**. The majority of students indicated that their teachers were responsible for their prior knowledge

Table 1. Pre-school students knowledge on hand hygiene.

Methods Of Learning Hand Washing	Frequency (%)
Parents taught them	202 (87.1%)
Teacher taught them	222 (95.7%)
Other family members taught them	128 (55.2%)
A friend demonstrate in front of them	146 (62.9%)
They watched on television	183 (78.9%)
They saw it on a poster	152 (65.5%)
They learn it through song	176 (75.9%)
They learn it from campaign	125 (53.9%)

about hand hygiene. The second most important source of hand hygiene education for students is their parents (87.1%). 128 of the total students stated that they were also being taught by other family members. 62.9% of them claimed they also learn through observing their peers. Not only that, but 78.9% of students said they learned about hand hygiene via television, followed by 65.5% from posters, 75.9% from songs, and 53.9% from campaigns.

In the next part, their knowledge on how the germs spread through was evaluated as shown in Table 2. All of students showing a good knowledge on how the germs can spread through especially by hands which 100% of them agreed to it. The second highest on how germs can spread through are by toys (97%) and followed by through surface (94%) and stationery (93.5%).

3.2. Practice

In the first part of this section, the children were also assessed on their current hand hygiene routine daily and the result was show good hand hygiene practice among the students (Table 3). Out of 6 crucial times for hand washing, it was mostly performed after they go to the toilet and before and after meals. Hand washing after playing outdoors was least compared to other routine but the result was considered in good range. The mean score of the student's hand hygiene routine for boys (0.83 ± 0.12) and girls (0.92 ± 0.09).

Table 4 illustrates the descriptive statistics of the pre-school student's hand washing techniques. Out of 11 steps, 8 steps were all done by the students. The 3 commonly missed steps are "Rotational rubbing of the thumbs", "Rotational rubbing of the fingertips on palm" and "Rotational rubbing of both wrists".

3.3. Comparison of Hand Hygiene

The students hand hygiene practices were then compared according to the gender, age and pre-schools as shown in Table 5. Females scored higher than males in hand hygiene technique. 6 years old performed slightly better in hand hygiene technique.

Table 2. Pre-school students knowledge on germs can spread through.

The germs can spread through	Frequency (%)
Toys	225 (97%)
Stationery	217 (93.5%)
Hands	232 (100%)
Surface	218 (94%)

Table 3. Hand hygiene routine among the pre-school student.

Routine	Performed (%)	Not performed (%)
After toilet	232 (100%)	0
Before and after meals	232 (100%)	0
After playing outdoors	216 (93.1%)	16 (6.9%)
After sneezing	218 (94%)	14 (6%)
After coughing	226 (97.4%)	6 (2.6%)
After playing with pets	224 (96.6%)	8 (3.4%)

Table 4. Observation on pre-school student hand washing technique.

Hand washing steps	Frequency (%)
1) Wet hands under running water thoroughly	232 (100%)
2) Use soap on the hands	232 (100%)
3) Rub hands palm to palm	232 (100%)
4) Rub hands palm to palm with fingers interlaced	232 (100%)
5) Rub right palm over back of left hand, and vice versa	232 (100%)
6) Clean the back of fingers to opposing palms with fingers interlocked	232 (100%)
7) Rotational rubbing of the thumbs	177 (76.3%)
8) Rotational rubbing of the fingertips on palm	177 (76.3%)
9) Rotational rubbing of both wrists	177 (76.3%)
10) Rinse hands with water thoroughly	232 (100%)
11) Dry your hands	232 (100%)

Table 5. Pre-School students mean scores of hygiene practices.

Student background	N	Mean	*t*-test	*p* value
Gender				
Male	120	0.88 (SD 0.12)	−2.359	0.019
Female	112	0.92 (SD 0.09)		

Continued

Age				
5 years old	113	0.52 (SD 0.11)	−2.377	0.018
6 years old	119	0.74 (SD 0.12)		

4. Discussion

Hand hygiene is a very essential component of infection management, and schools are thought to be the best location to start this practise in childhood (Saima Alam et al., 2020). Adequate understanding of hand hygiene has been shown to result in beneficial hygiene behavior (Tengku Jamaluddin et al., 2020). Present study showed that teachers are the greatest influence in teaching the children hand washing instead of from parent. This result differs from the one reported by Almoslem et al. (2021) and Tengku Jamaluddin et al. (2020), where the study showed that parents are the greatest influence in teaching the children hand washing. However, both teachers and parents play an important role in instilling excellent hand hygiene practices in young children (Mohamed et al., 2020). This is significant because, aside from their parents, children spend the majority of their time at school with their teachers. In this study, the next highest percentage of them gained hand washing education after teachers and parent are from watching the television and through songs. These methods are considered assertive tools for education. Children nowadays are more engaged in action-oriented and colorful learning which will increase their ownership of the new information.

Hand hygiene practise should begin at home, where parents set a role model, and be followed by formal teaching in schools. A previous research by Mohamed et al. (2019) found that pre-school children's understanding improved after being exposed to a variety of hand hygiene-related treatments such as interactive games, story-telling, posters, and hands-on training. It was discovered that knowledge and awareness of hand hygiene rules, habit, and perceived behavioral control all had a significant impact on hand hygiene compliance.

In addition, the children's present hand hygiene practice was examined and analyzed. The presence of interviewers may have impacted the children's hand washing performance since they were being closely supervised. From this study, found that the common performed hand washing steps by the students are "Wet hands under running water thoroughly", "Rub hands palm to palm", "Rub hands palm to palm with fingers interlaced", "Rub right palm over back of left hand, and vice versa" and "Clean the back of fingers to opposing palms with fingers interlocked". From this study also found that commonly missed steps by the students are "Rotational rubbing of the thumbs", "Rotational rubbing of the fingertips on palm" and "Rotational rubbing of both wrists". This result finding was similar to Tengku Jamaluddin et al. (2020).

Washing hand with a soap is way more effective than washing hand with water alone at removing bacteria. This is due to the presence of surfactant in soap,

which displace germs off the skin. Following that, Dagne et al. (2019) stated that the soap should be washed away under running water to reduce skin irritation and prevent contamination. From his study showed that all of the students are using a soap while washing their hand. This result showing that the student have good hand hygiene practise compared to previous study that were conducted showing only half of the students rinsed their hands with soap. This positive feedback might due to the fact of the outbreak of COVID-19. The students become more aware of the important of hand hygiene in their daily life Almoslem et al. (2021).

According to Tengku Jamaluddin et al. (2020), the findings of their study, hand washing is most effective after using the restroom and before and after eating. This is consistent with what most parents and teachers would have taught them. Although the other routine of hand hygiene were also showed good hand hygiene practice with above 90% of the student practice hand hygiene in their daily life, we still always need to remind them some proper etiquette as sometimes they might forget, such as while coughing and sneezing as coughing and sneezing are well-known mechanisms of disease transmission from an ill person to another person, hence it is critical to urge them to follow proper cough etiquette (Dajaan et al., 2018). These findings are consistent with previous findings, which suggest that children should be reminded of fundamental hand hygiene habits on a regular basis. This is where caregivers, such as parents, teachers, extended family members may encourage one another to maintain good hand hygiene. According Manandhar & Chandyo (2018), hand washing practice awareness is one of the most significant techniques for preventing infectious illnesses. Hand washing with soap and water mainly before eating and after defecation can help to lower the risk of diarrhoea and other infectious disorders.

Present study also revealed that girls scored higher than boys washing technique. This finding similar to the previous study and is consistent with a prior study that found that females were more readily encouraged to practice better hand hygiene than boys (Tengku Jamaluddin et al., 2020). From this study also found out that 6 years old performed slightly better in hand hygiene technique. The study that were done by Saima Alam et al. (2020), was found students who are older had higher of good hand hygiene practice compared to those are younger. It might be because students who are older are more exposed to public and school hygiene promotion, which boosts their hand washing routines.

This study not only supplemented earlier studies on hand-washing knowledge, but it also gave a deeper understanding of pre-school students' handwashing behavior. It did, however, have certain limitation in this study. The sample size was large, but it was insufficient because only 10 schools were included. It was advised that a second round of surveys be conducted with more schools to further increase the sample's representative. Furthermore, various interviewers may conduct the interview in a different manner based on whether they were successful in getting the children to respond to all of the questions posed. Furthermore, a few special needs children participated in the interview

session, which may need a different technique in questioning them. Throughout the interview session, however, none of the participants had difficulty answering any component of the questionnaire and following the directions given.

5. Conclusion

Ultimately, the current study's goal was to establish the degree of school kids' hand hygiene knowledge and practices, with a focus on their source of knowledge about hand hygiene. Furthermore, it was shown that parents and teachers have a significant role in teaching children about hand cleanliness where girls displayed superior hand hygiene skill than boys. Surprisingly, more than 90% of the students had extensive knowledge and practice of hand hygiene. In the future, effective hand hygiene education and training programme, such as seminars and forums concentrating on hand hygiene technique and practice, should be done frequently and to include the roles of caregivers in establishing and supporting good behaviour in children.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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