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Effect of an E-Educational Poster on Improving the Knowledge, Attitude, and Practice on the Proper Use of Face Masks among School Students

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Abstract

Introduction: Two spread methods of Covid-19, namely airborne and respiratory droplets, can be prevented by proper use of face masks. However, it has been reported an inadequate knowledge attitude and practice of proper use of face masks among school students. Therefore, the knowledge, attitude, and practice of school students should be improved. Different approaches are used to improve knowledge, attitude, and practice. However, e-posters are rare, and the effect of e-posters on improving the knowledge, attitude, and practice of school students on the proper use of face masks has not been studied. **Objectives:** The objective of this study was to determine the effect of an e-educational poster on knowledge, attitude, and practice of the proper use of face masks among school students. **Method:** This study was conducted as a pre-test and post-test design. The sample was 364 grade 11 students of the Gampaha educational division, Sri Lanka. Data were collected using self-administered questionnaires distributed pre and post to the interventional e-education poster. Data analyses were conducted by using SPSS Software. **Results:** Results show no significant demographic difference ($p = 0.446$) between the pre and post-test groups. A significant increase was observed between the pre and post-test mean scores of knowledge ($p \leq 0.05$), attitude ($p \leq 0.05$), and practice ($p \leq 0.05$) on the proper use of face masks. In pre-group knowledge ($p = 0.155$), attitude ($p = 0.258$) and practice ($p = 0.211$) shows no significant dif-

ference due to gender. Also post group knowledge (p = 0.079), attitude (p = 0.835) and practice (p = 0.435) shows no significant difference due to gender. **Conclusions:** The results suggest that e-educational posters may be useful to improve the knowledge, attitude, and practice on the proper use of face masks among school students. The improvement of knowledge, attitude, and practice on the proper use of face masks by e-educational posters among school students occurs irrespective of gender.

Keywords

Covid-19, Prevention, Face Mask, E-Educational Poster, School Students

1. Introduction

1.1. Background of the Study

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus experience mild to moderate respiratory illness and recover without requiring special treatment. However, some may become seriously ill and require medical attention [1]. At the end of January 2020, it was declared a public health emergency of global concern and was characterized as a pandemic in March 2020 by the World Health Organization (WHO) [2].

Since the beginning of the pandemic, schools have been closed for in-person teaching as a strategy to slow the spread of SARS-CoV-2. Reports suggest that the limited in-person teaching during the pandemic may have had a negative effect on learning for children [3] and the mental and emotional well-being of both parents and children [4]. Therefore, it is a timely need to open schools for children to continue their in-person learning process. However, considering the current situation, the benefits of in-person teaching need to be balanced against the risk of acquiring and spreading SARS-CoV-2 in these settings.

During the early stage of the COVID-19 pandemic, children were not commonly identified as index cases in a household or other clusters [5], largely because schools and extracurricular activities around the world were closed or no longer held in-person. However, outbreaks among adolescents attending camps, sports events, and schools have demonstrated that adolescents can transmit SARS-CoV-2 to others [6]. Furthermore, transmission studies that have examined secondary infection risk from children and adolescents to household contacts who are rapidly, frequently, and systematically tested demonstrate that transmission does occur [7]. The introduction of new variants of the virus into the population will likely further affect the evolving epidemiology and interpretation of future studies, as well as understanding of how transmission varies by the age of the child. COVID-19 vaccination of adults and adolescents may also have an impact on the incidence of COVID-19 in young children who are unvaccinated and, therefore, at risk.

According to the current evidence, the COVID-19 virus is transmitted through respiratory droplets or contact [8]. It has been identified that multiple prevention strategies can be implemented in a layered approach by schools to promote safer in-person learning. These include promoting vaccination, consistent and correct use of masks, physical distancing, screening testing in schools to identify cases promptly, improved ventilation, handwashing, and respiratory etiquette, staying home when sick and getting tested, contact tracing in combination with isolation and quarantine, and routine cleaning with disinfection under certain conditions [9].

Transmission that occurs through respiratory droplets can be prevented by applying good respiratory hygiene measures, including the proper use of face masks. It has been shown that consistent and correct use of face masks reduces the spread of SARS-CoV-2 [10]. Masks work through the combination of source control and protection for the mask wearer. Several studies have shown the success of using masks as one of the school's prevention strategies in limiting transmission in schools [11] [12]. Also, it has been shown that inconsistent mask use may have contributed to school-based outbreaks [13]. On the other hand, it has been reported that there is an inadequate knowledge attitude and practice of proper use of face masks among school students [14].

Therefore the school students must be equipped with the knowledge and positive attitudes and practice on the correct use of face masks to prevent or minimize the risk of spreading the virus. Different approaches are used to improve awareness about the importance and proper use of face masks [15]. However, e-posters on the proper use of face masks in the Sinhala language are scarce. On the other hand, the effect of e-educational posters on improving the knowledge, attitude, and practice of school students on the proper use of face masks has not been studied.

1.2. Objectives

The main objective of this study was to determine the effect of an e-educational poster on knowledge, attitude, and practice of the proper use of face masks among school students. The secondary objective of this study was to examine the effect of an e-educational poster on knowledge, attitude, and practice about the proper use of face masks with reference to gender among school students.

1.3. Hypothesis of the Study

An e-educational poster on the proper use of face masks has a positive effect on improving knowledge and attitudes on the proper use of face masks among school students.

2. Methodology

2.1. Study Setting

Students learning in Grade 11 of government schools in the Gampaha educa-

tional division in Sri Lanka participated in this study. The school information was obtained from the Directorate of the Gampaha educational division. A total number of 3945 students is learning in schools available in Gampaha educational division in Sinhala medium.

2.2. Participants and Sample Size

The sample size was calculated as follows using Solvin's formula [16]. Solvin's formula is, $n = N/(1 + Ne^2)$, where n = sample size, N = total population and e = margin of error. The target population size of the study was 3945 students, and the sampling error was considered at 5%. Therefore the sample size was 364. Therefore 364 grade 11 students were selected for the study by convenience sampling method. Four hundred five students were contacted, considering the response rate of 90% [17]. Inclusion criteria were: 1. Currently learning in grade 11 and 2. Learning in a school in Gampaha Educational Division. The exclusion criteria were: 1. Those who would not understand the e-educational poster and questionnaire, and 2. Those who would not desire to participate in the study.

2.3. Study Design

This study was conducted as a pre-test and post-test interventional study. A self-administered questionnaire was used to collect data on the level of knowledge, attitudes, and practice of the students about the proper use of face masks prior to the intervention. The consecutive sampling method was used for sample collection.

2.4. Data Collection and Instruments

The questionnaires were distributed among the students and stopped receiving answers once 405 students had completed the pre-test questionnaire. Thereafter, the e-educational poster was distributed among the same group of students. After one week of the distribution of the e-educational poster, the post-test questionnaire was distributed. Only students who answered the pre-test and studied the e-educational poster were allowed to answer the post-test questionnaire. Receiving answers for the post-test questionnaire was stopped once 364 students completed the pre-test questionnaire. Pre and post-tests were conducted through google forms based questionnaires. The questionnaires and e-educational posters were distributed using Whatsapp.

The questionnaire: The questionnaire was developed according to the current evidence and information from WHO regarding the knowledge and facts about the proper respiratory hygiene measures and use of face masks related to Covid-19. The questionnaire was reviewed by the subject experts for accuracy, appropriateness, and reliability. The questionnaire was given to 10 students (homogenous and non-participated) to assess the face validity, and the explanations, questions, and shortages inside the questionnaire were evaluated. The reliability of the questionnaire was assessed on 40 students through internal con-

sistency, and Cronbach's alpha for attitude (0.775) and practices (0.843) was obtained. The questionnaire consisted of the following parts: one question about the demographic characteristics of the students, seven questions on knowledge of face masks, six questions regarding face mask usage attitudes, and six questions that evaluated the practices of face mask usage. The scoring method of the questionnaire in the knowledge part was one score for each correct answer and 0 for each wrong answer. Likert scales were used to evaluate the responses in the attitude section (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree) and practices section (Always, Often, Sometimes, Seldom, Never), and positive aspect questions ranked from 1 to 5 and negative aspect questions ranked from 5 to 1. Total scores of each section were calculated following individual question scoring.

Intervention: The e-educational poster was developed according to the current evidence and information from WHO regarding the knowledge and facts about the proper respiratory hygiene measures and use of face masks related to Covid-19. The poster was reviewed by the subject expert for accuracy and appropriateness.

2.5. Ethical Considerations

Ethical approval was obtained from the ethics review committee of the Charted Society of Physiotherapy, Sri Lanka. Consent of the parents or guardians was obtained before participation in the study by filling out the pre-test questionnaires.

2.6. Data Analyses

In this study, the data were analyzed by using SPSS Software. The normality of the data was checked using the Shapiro Wilk test. Since the data were not normally distributed, an independent t-test with bootstrapping approach was used to compare the means of the KAP attributes between the pre and post-groups and assess their mean changes. Co-relational analysis was done to identify the relationship between the attributes in pre and post-groups. Chi-square was used to evaluate and compare differences in demographic variables between the pre and post-groups. $\alpha = 0.05$ was considered the significant level for all the tests.

3. Results

3.1 Socio-Demographic Characteristics of Participants

A total of 405 students completed the pre-test before the intervention. After the intervention, a total number of 364 students completed the study. The majority of the participants were female students in the pre-test (56.3%) and the post-test (56.3%). Characteristics of the total study population are presented in Table 1. Frequency and percentage distributions of pre and post-group demographic characteristics are presented separately. Pre- and post-group students were identical in gender ($p = 0.446$). Hence in terms of demographic variables, there was

no significant difference between the pre and post-groups (Table 1).

The distribution of pre and post-data suggested that data does not follow a normal distribution (Shapiro-Wilk test p-value < 0.001 for all the KAP attributes of both pre and post-groups). Post-group distribution plots show all three highly left-skewed attributes, suggesting that most subjects obtain near maximum scores after approaching the e-educational poster. The co-relational analysis indicates that there is a positive moderate, to a high correlation between knowledge, attitudes, and practices in both pre and post-groups (Figure 1).

3.2. Knowledge of the Proper Use of Face Masks

The mean value of the pre-test (3.20) increased in post-test (6.46) after the application of the intervention. There is a significant increase (p < 0.001) in the

Table 1. Demographic characteristics of participants.

Demographic Characteristic		PRE (N = 405)		POST (N = 364)		Pearson Chi-Square value	Significance (P value)
		Frequency	Percent (%)	Frequency	Percent (%)		
Gender	F	217	53.6	205	56.3	0.581	0.446
	M	188	46.4	159	43.7		

*Significance at p value 0.05.

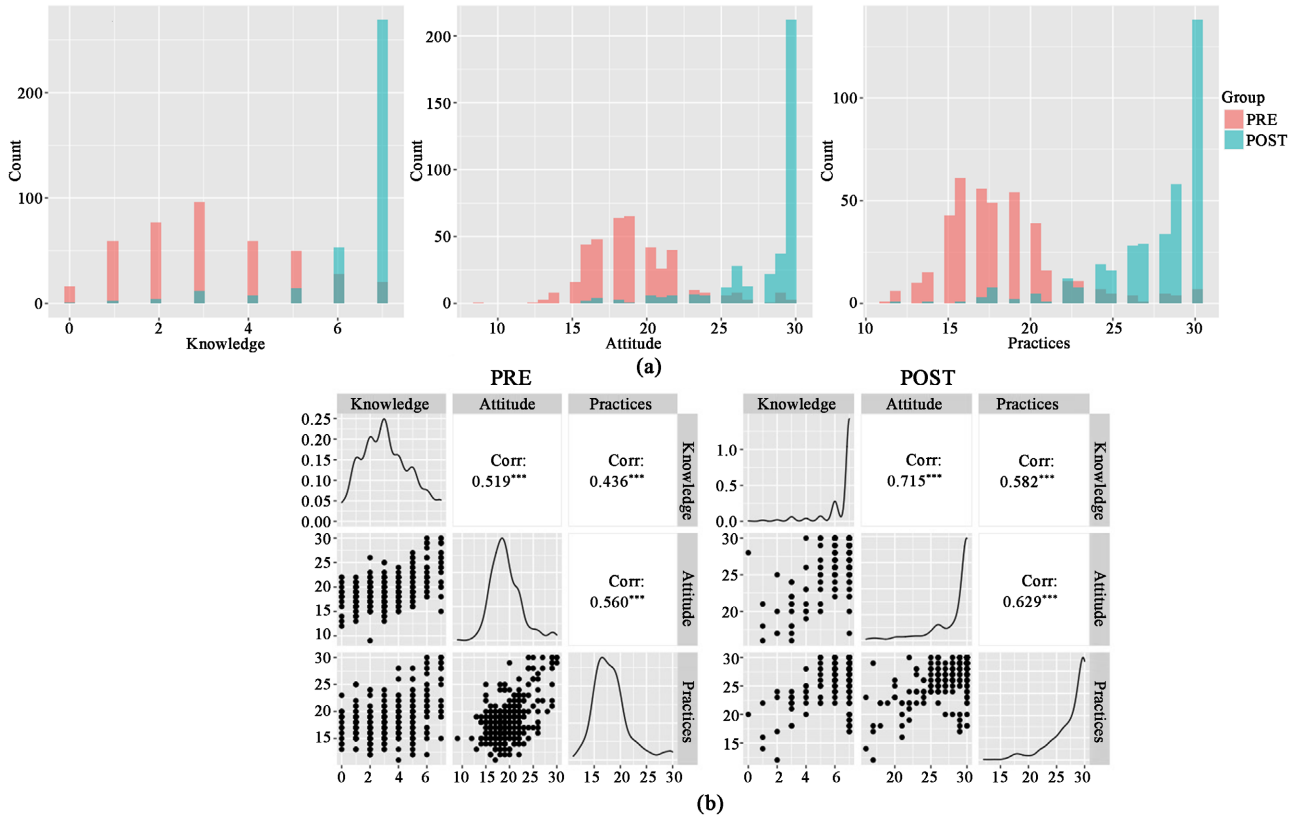

Figure 1. Distribution (a) and Correlation (b) of Knowledge, Attitudes, and Practice of Pre and Post groups.

mean value of the score on knowledge of the proper use of face masks in the post-test compared to the pre-test (Table 2 & Figure 2).

3.3. Attitudes towards the Proper Use of Face Masks

The mean value of the pre-test (19.25) increased (28.20) after the application of the intervention. There is a significant increase ($p < 0.001$) in the mean value of score on attitudes toward the proper use of face masks in the post-test compared to the pre-test (Table 2 & Figure 2).

3.4. The Practice of the Proper Use of Face Masks

The mean value of the pre-test (18.28) increased in post-test (27.43) after the application of the intervention. There is a significant increase ($p < 0.001$) in the mean value of the score on the practice of the proper use of face masks in the post-test compared to the pre-test (Table 2 & Figure 2).

In pre group knowledge ($p = 0.155$), attitude ($p = 0.258$) and practice ($p = 0.211$) shows no significant difference due to gender. Also post group knowledge

Table 2. Knowledge, attitude, and practices mean score comparisons between pre and post groups.

Attributes	Group	N	Mean	SD	SE Mean	Mean Difference	t	P value
Knowledge	PRE	405	3.20	1.775	0.088	−3.272*	−30.089	<0.001
	POST	364	6.46	1.200	0.063			
Attitude	PRE	405	19.25	3.243	0.161	−8.946*	−39.288	<0.001
	POST	364	28.20	3.048	0.160			
Practices	PRE	405	18.28	3.532	0.176	−9.147*	−36.884	<0.001
	POST	364	27.43	3.321	0.174			

*: Statistically significant at $p \leq 0.05$

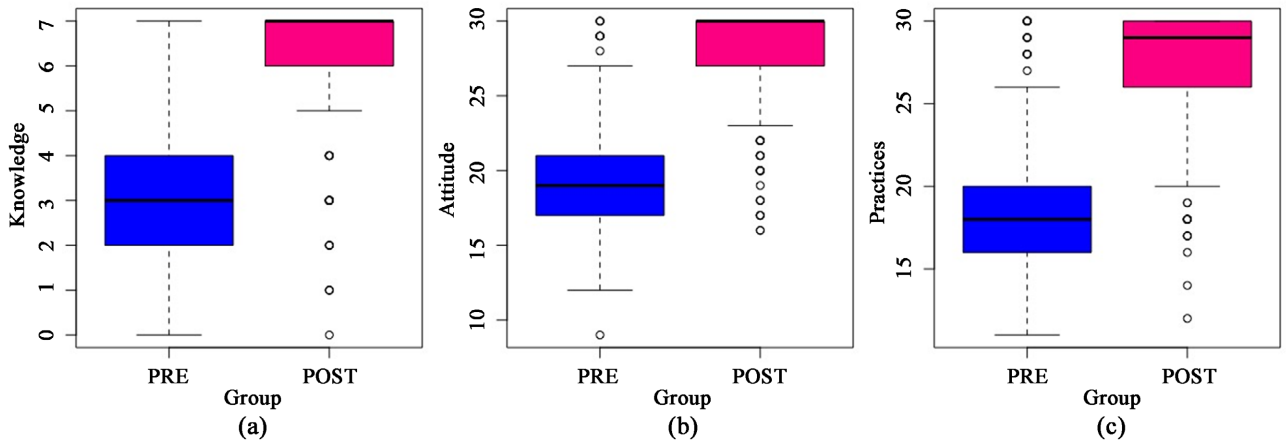

Figure 2. Box-plots of knowledge, attitude, and practices of pre-test and post-test Knowledge, attitude, and practice about the proper use of face masks with reference to gender.

Table 3. Association of demographic characteristics with attributes.

		Knowledge		Attitude		Practices	
		t	P value	t	P value	t	P value
Gender	PRE	−1.43	0.155	−1.13	0.258	−1.25	0.211
	POST	−1.76	0.079	−0.21	0.835	−0.78	0.435

*: Statistically significant at $p \leq 0.05$; t: Independent sample t-test for comparing the gender (male, female).

($p = 0.079$), attitude ($p = 0.835$) and practice ($p = 0.435$) shows no significant difference based on gender (Table 3).

4. Discussion

To the best of our knowledge, this is the first study conducted to determine the effect of the e-educational poster on knowledge, attitude, and practice on the proper use of face masks among school students. According to the results, after the educational intervention, a significant increase was established in the mean score of knowledge ($p < 0.001$), attitude ($p < 0.001$), and practice ($p < 0.001$) of students in the post group compared with the pre-intervention time (pre-group) (Table 2). Several other studies have shown that health education intervention had an impact on the knowledge base, attitude, and practice of study subjects in the intervention group compared to the control group [18]. The results of another study have indicated that the health knowledge of the students significantly improved after education. The attitude of the students towards personal hygiene also improved significantly after education. The practice of personal hygiene improved significantly as well [19]. The reason for the effectiveness of the e-educational poster may be the media of distribution, *i.e.* electronic media. A study has shown that secondary school students are conducting on the internet, social media, and online information is becoming one of the principals and rapid ways to obtain information, compared with other resources [20].

5. Limitations and Suggestions for Future Research

This study was limited to grade 11 students and those with e-learning facilities. Thus, results may not be generalized to all school children. Therefore future research with the participation of different grade students is recommended. Additionally, there were no plans to test the retention of the effects of the intervention. This limitation resulted in the unavailability of an assessment of the influence of the intervention approach on retention. Therefore, investigating the retention of the effects of e-educational posters on the improvement of knowledge, attitudes, and practice on the proper use of face masks is suggested.

6. Conclusion

Based on the results of this study, it can be concluded that the e-educational

poster on knowledge, attitude, and practice on the proper use of face masks is an effective educational measure to improve the knowledge, attitude, and practice on the proper use of face masks among school students. Additionally, it can be concluded that the e-educational poster on knowledge, attitude, and practice on the proper use of face masks is an effective educational measure to improve the knowledge, attitude, and practice on the proper use of face masks among school students regardless of the gender difference.

Author Contribution

Ms. Thunpaththu and Dr. Weerasinghe provided concept, idea, research design, and writing. Ms. Thunpaththu, Dr. Weerasinghe, and Mr. Weerasinghe provided data collection. Dr. Weerasinghe and Ms. Weerasinghe provided the project management and facilities/equipment. Ms. Herath, Dr. Weerasinghe, and Ms. Weerasinghe provided the data analysis. Dr. Weerasinghe, Ms. Herath, Ms. Jayawardana, Ms. Kanivila, Mr. Thunpaththu, and Ms. Dissanayake provided the consultation for the study.

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Conflicts of Interest

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

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