

The Effect of Health Education Toward Preventive Measures Of COVID-19 Among Employees in Duhok City-Iraq: A Cluster Randomized Controlled Trial

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Abstracts: Background: Increasing the knowledge, attitudes, and behaviours of public sector employees regarding COVID-19 is one of the most effective ways to stop the spread of this virus. A substantial portion of the community is made up of people who work in the public sector. The purpose of this study is to evaluate and enhance government workers' knowledge, attitude, and practice (KAP) regarding COVID-19 preventive measures among directorates' employees in Duhok city, the age ranged between 18 and 75. Simple random sampling was used in the study. A structured questionnaire was applied for pre and post-test for intervention and control group. The KAP questions included COVID-19 preventive measures (vaccines, face masks, social distances and hygiene). Results: The findings demonstrated that intervention group improved significantly at ($P < 0.01$) toward KAP related to COVID-19 preventive measures. In terms of knowledge, attitude, and practice of COVID-19 preventive measures, the intervention group exceeded the control group on the post-test compared to the pre-test. The significant changes were recorded among good level of economic status by (2.69) degrees increased in the difference between pre and post-test in intervention group. In contrast, there are no improving in the post-test among those very low income in terms of knowledge at ($P < 0.01$). however, the second large improvement was related to practice from (5.05) increased to (6.61) at ($P < 0.01$). All other demographic characteristics, including age, occupation, religion, education, and place of residence, showed statistically significant variance at ($P < 0.01$). Conclusion: Health education is regarded as beneficial for general awareness and crucial COVID-19 preventive measures.

Keywords: Intervention, Knowledge, Attitude, Practice, COVID-19, Prevention, Employees.

1. INTRODUCTION

The discovery of a new respiratory illness was announced in Wuhan, China, towards the end of December 2019. The disease was discovered to be a novel coronavirus strain that is different from both MERS-CoV and SARS-CoV after being isolated, examined, and ultimately identified. According to evidence, this is the seventh coronavirus to infect humans (1). In late January 2020, after the disease had spread to the entire country and across international boundaries, the World Health Organization (WHO) proclaimed it to be a public health emergency of global concern (1). COVID-19 was designated a "global pandemic" by the WHO on March 11, 2020. The virus has spread rapidly, with approximately 118,000 cases reported in 114 countries and 4291 fatalities (2). Globally, as of August 8th, 2022, there were approximately 6,443,393 deaths and 590,823,934 cases reported (3). The first confirmed COVID-19 infection in Kurdistan was reported in Sulaymaniyah on March 1, 2020 (4). The first COVID-19 case was revealed by Duhok City officials on March 19, 2020 (5). The government took a variety of steps to stop the ongoing COVID-19 outbreak from spreading. The number of instances is continually rising despite government efforts to reduce COVID-19 regulations on facilities including bars, taxis, and restaurants (6). The association between people's views and knowledge about infectious diseases and their level of dread was recently explored. It was shown that the latter contributed to the sickness' spread and made people look for alternative treatment choices (7). One of the most efficient methods for preventing the transmission of this virus is to increase public sector employees' awareness, attitudes, and practices around COVID-19. Public sector workers make up a sizable section of the local population (8,9).

1.1. Aim

The aim of the study is to assess and enhance government employees' knowledge, attitude, and practice (KAP) about COVID-19 prevention measures.

1.2. Objectives

1. To conduct the education intervention programme on COVID-19 preventive measures among governmental employees in Duhok city.
2. To compare KAP scores of an educational programme among intervention and control groups toward COVID-19 preventive measures among governmental employees in Duhok city.

2. MATERIALS AND METHODS

2.1. Study Settings

The interventional study was carried out between October 1st, 2022 and February 1st, 2023 among the government workers in Duhok city, Iraq.

2.2. Study Design

There are (20) different directorates of Ministries and General Foundations in the Kurdistan Government Region of Iraq that exist in Duhok city participated in a cluster randomized controlled trial. The twenty directorates that satisfied the criteria for participation were randomly divided into the intervention group, which received educational intervention, and the control group, which did not receive any such intervention.

2.3. Eligibility Criteria

2.3.1. Inclusion Criteria

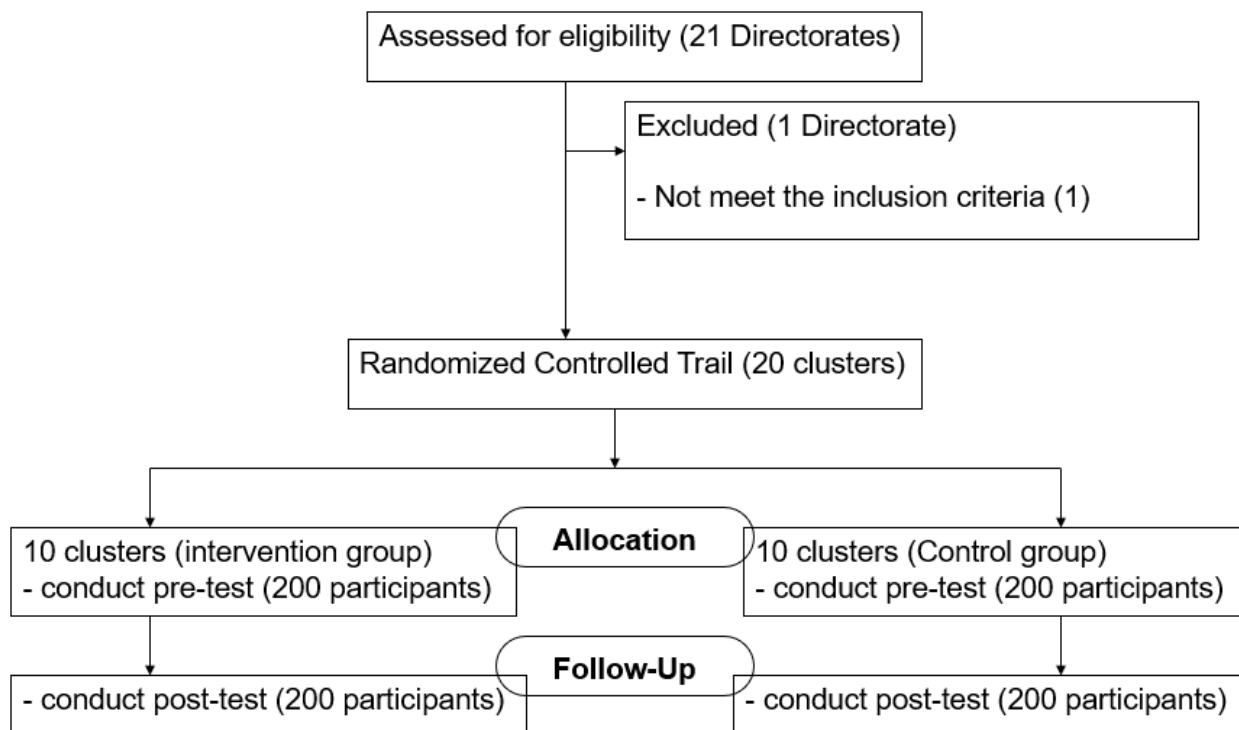
A total of 20 participants were randomly assigned to different positions in each directorate, including line managers, head of departments, head of units, head of subunits, and employees.

2.3.2. Exclusion Criteria

Health staff were excluded from the study.

2.4. Sample Size

Using the free programme G* Power, version 3.1.9.4 for calculating the sample size. The required sample size, 380, was expanded to 400 in order to account for missing or invalid responses, with the following assumptions being made: Confidence interval of 95%, Significance level (alpha) at 0.05%, Power of the study (1-beta) of 95%, and effect size of 0.33. A basic random sampling method was used to choose them. The study was completed by all 400 participants. A (20) employees in total are participating in each directorate including line managers, head of departments, head of units, head of subunits, and employees through simple random sampling. The control group did not receive any intervention education sessions; the intervention group participated in 4-hour-long education intervention sessions (below diagram).



2.5. Methods of Measurements (Instrument)

A closed-ended questionnaire was created to gather data on sociodemographic factors (8 questions), knowledge of COVID-19 preventative measures (10 questions), attitudes towards preventative measures (10 questions), and practice of COVID-19 preventative measures (10 questions). The identical questionnaire was used for both pre- and post-tests, which were completed one month before and after the start of the health education programme, respectively. The questionnaire was written in English, Kurdish, and Arabic. Cronbach's alpha was used to determine the questionnaire's internal consistency when the total score for each component was greater than 85%.

3. DATA COLLECTION

The intervention sessions also included a training session with a four-hour presentation on critical COVID-19 preventive issues (vaccines, face mask, social distance, and hand washing). We inform participants of the relevant details about the COVID-19 preventive measures through posters and booklets. All directorates received leaflets describing the COVID-19 prevention measures. The training was covered the knowledge of COVID-19 vaccine, side effects, benefits and adverse reactions, as well as understanding about different types of face mask, their uses, and their importance. Knowledge of proper hand washing techniques and hygiene habits can aid in preventing the spread of the COVID-19 illness, similar to the way social distance influences that disease's transmission. At the beginning, 200 members of the intervention group and 200 members of the control group filled out a questionnaire that served as a pre-test and primarily asked about the participants' general demographic characteristics, including their age, gender, marital status, position level, religion, level of education, place of residence, and economic status. It also asked about other COVID-19-related questions. A health and infection control expert from the Directorate of Preventive Health Affairs-Duhok led the training sessions over the course. All 400 participants in the intervention and control groups were asked to complete the post-test questionnaire after the training sessions.

3.1. Health Education Programme

The program's aims were to increase participant understanding of COVID-19 preventive measures, alter their attitudes about them, and improve their practice in these areas. Prior to being included in the pre-test, all of the chosen participants were initially questioned during a break where the study's methodology and aims were briefly discussed. Then, they were informed to attend the health education programme session (table 1) in specific date and place that the manager decided In-depth theoretical instruction on COVID-19 preventive measures was delivered to the participants, with a focus on the causative agent, mode of transmission, clinical features, symptoms, and prevention. Lectures, role-playing exercises, and group discussions comprised the program's presentation. As teaching tools, using images, posters, and leaflets. Using the same pre-test questionnaire, the programme was assessed using a post-test one month later.

Table 1: The educational intervention session agenda

Time	Subject	Duratio n (minute)	Training method
9:00-9:10	Introduction and aim of session	10	Orally
9:10-9:30	Pre-Test	20	Paper
9:30-10:30	Definition of knowledge, attitude, and practice - assessing the levels of knowledge, attitude and practice of the participants	60	Educational videos and posters
10:30-11:00	Break	30	
11:00-12:00	Understanding on COVID-19 preventive measures with special emphasis on causative agent, mode of transmission, clinical feature, complications, and prevention	60	Lectures, group discussions and posters
12:00-12:30	Change attitude and views on COVID-19 Vaccine, Social distance, mask and hygiene	30	Lectures and group discussions
12:30-1:30	Practicing on Social distance, hygiene and using face mask	60	Educational videos and role play
1:30-1:45	End sessions and remind meeting after 1 month	45	Orally

3.2. Pilot study

Ten individuals completed the questionnaire, which was modified before being deployed in the field to test its validity.

3.3. Ethical Consideration

The Research Ethics Committee of the Directorate General of Health Duhok provided the letter of approval (reference number: 06052021-5-4) and the participants signed a consent form to participate in this study after obtained oral permission from the General Director of Directorates. At the end of the study, the posters, leaflets, and lectures were offered to non-participant employees in all directorates as ethical actions.

3.4. Statistical Analysis

Statistical Program for Social Science (SPSS) software, version 26, was used to analyse the findings. To express quantitative data, mean and standard deviation were chosen. The differences between groups analyzed using independent t-tests. Statistical significance was set at $P \leq 0.05$.

4. RESULTS

The study included 400 participants, 20 from each of the 20 directorates. This results in a total of 18 (4.5%) line managers (manager and deputy), 32 (8%) heads of department, 63 (15.7%) heads of unit, 55 (13.8%) heads of

sub-unit, and 232 (58%) employees. Their mean age was 34.03 ± 8.79 years, ranging from 18 to 75 years for the intervention group and 28.9 ± 8.6 years for the control group. Their ages ranged from 18 to 75 years. The majority of the participants in the study were female employees. The bulk of the participants in high education as level of education 274 (68.5%). Table 2 provides demographic characteristics of the intervention group and control group, with the number and percentage of participants for each category.

Table 2: demographic characteristics of the intervention group and control group

Demographics	Characteristics	Intervention Group		Control Group	
		Number	%	Number	%
Age group (Years)	18-28	16	8.00	104	52.00
	29-39	112	56.00	66	33.00
	40-50	50	25.00	29	14.50
	51-61	18	9.00	1	0.50
	>=62	4	2.00	0	0.00
Sex	Male	75	37.50	68	34.00
	Female	125	62.50	132	66.00
Marital Status	Single	15	7.50	111	55.50
	Married	177	88.50	82	41.00
	Divorced/ Widow	8	4.00	7	3.50
Position Level	Line Manager	15	7.50	3	1.50
	Head of Department	15	7.50	17	8.50
	Head of Unit	43	21.50	20	10.00
	Head of Sub-Unit	25	12.50	30	15.00
	Employee	102	51.00	130	65.00
Religion	Muslim	135	67.50	160	80.00
	Christian	39	19.50	5	2.50
	Yazidi	26	13.00	35	17.50
Education Level	Illiterate	10	5.00	2	1.00
	Write and read	0	0.00	4	2.00
	Primary	45	22.50	13	6.50
	High school	35	17.50	17	8.50
	High education	110	55.00	164	82.00
Residence	Urban	188	94.00	118	59.00
	Rural	12	6.00	82	41.00
Economic Status	Very good	10	5.00	9	4.50
	Good	26	13.00	6	3.00
	Medium	60	30.00	41	20.50
	Bad	94	47.00	144	72.00
	Very bad	10	5.00	0	0.00

Figure 1 compares the results from the pre- and post-tests for the intervention and control groups. The control group did not receive an intervention, whereas the intervention group did. The numbers on the y-axis shows the means for knowledge, attitude, and practice, and the various measures are represented by the various coloured bars. The pre-test and post-test results for the intervention and control groups are displayed on the x-axis.

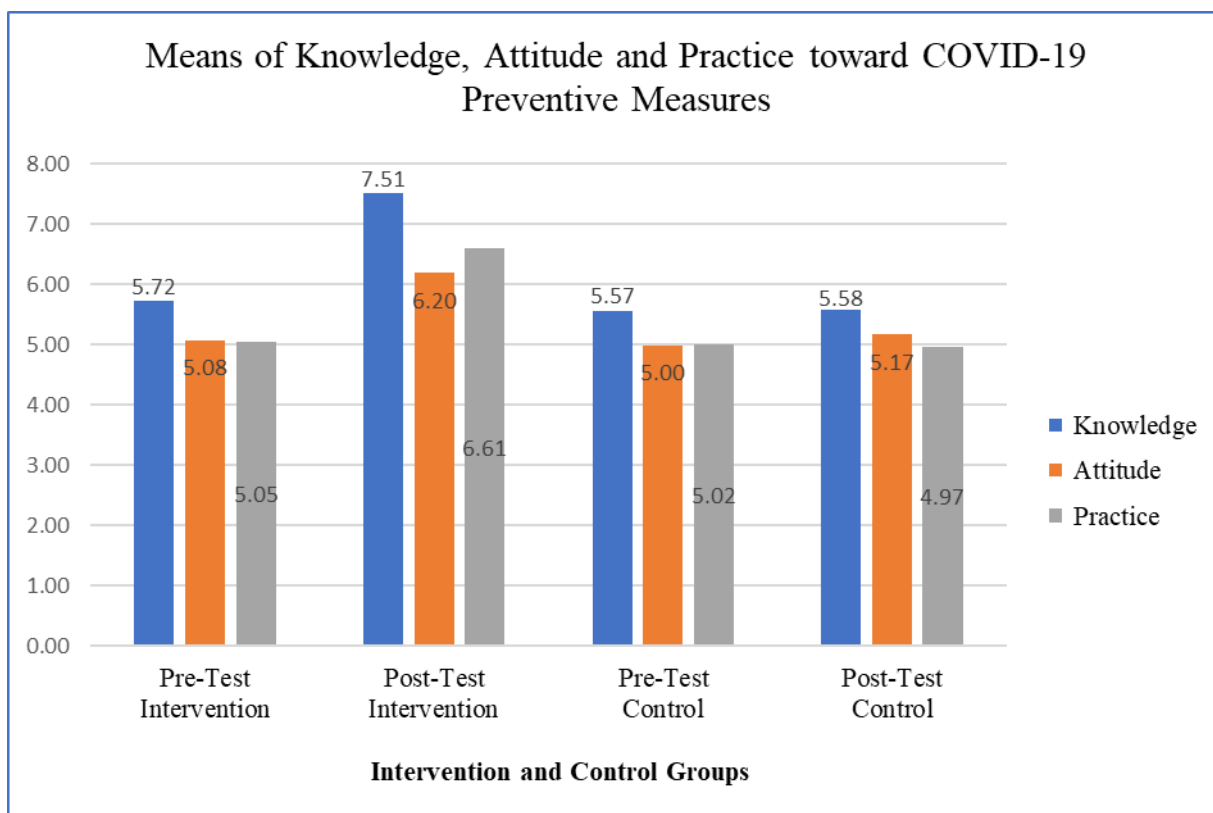


Figure 1: different means of knowledge, attitude and practice toward COVID-19 preventive measures in related to pre and post test of both intervention and control groups

According to the data shown in figure 1, it appears that the intervention group performed better on the post-test in terms of knowledge, attitude, and practice of COVID-19 preventive measures than the pre-test. Between the pre-test and post-test, the control group's mean scores did not significantly alter (knowledge 5.57 became 5.58), (attitude 5 increased to 5.17) and (practice 5.02 decreased to 4.97). Overall, the intervention was successful in enhancing knowledge, attitudes and practices related to COVID-19 prevention. In the control group and the intervention group, the mean of knowledge differs between the baseline and the education session. Table 3 shows that in the intervention group, the mean level of knowledge among participants significantly increased following the educational session, but this change only minimally manifested in the control group for all demographic characteristics.

Table 3: mean of knowledge among different subgroups of respondents before and after intervention and control

Knowledge Mean ± SD						
Demographics	Characteristics	Pre-test Intervention	Post-test Intervention	Pre-test Control	Pre-Test Control	P value
Age group (years)	18-28	6.56 (2.06)	7.12 (2.41)	5.75 (2.54)	5.64 (2.56)	0.000
	29-39	5.74 (2.49)	7.32 (1.8)	5.46 (2.18)	5.57 (2.42)	
	40-50	5.54 (2.66)	7.94 (1.87)	5.17 (2.46)	5.41 (2.48)	
	51-61	5.5 (2.72)	7.94 (2.18)	4 (0)	4 (0)	
	>=62	5 (0)	7 (1.82)	0 (0)	0 (0)	
Sex	Male	5.97 (2.49)	7.28 (1.94)	5.44 (2.39)	4.89 (2.29)	0.000
	Female	5.56 (2.5)	7.64 (1.89)	5.63 (2.43)	5.93 (2.52)	
Marital Status	Single	5.93 (2.18)	7.6 (1.84)	5.67 (2.49)	5.68 (2.53)	0.000
	Married	5.69 (2.48)	7.48 (1.93)	5.48 (2.38)	5.51 (2.51)	
	Divorced/widow	5.92 (4.08)	7.67 (1.6)	5.75 (0.83)	4 (1.26)	
Position Level	Line Manager	5.53 (2.79)	7.93 (1.33)	5 (1)	6.33 (3.51)	0.000
	Head of Department	5.86 (2.85)	7.06 (2.34)	5.88 (2.54)	5.94 (2.58)	
	Head of Unit	5.3 (2.49)	7.25 (1.73)	5.55 (2.01)	5.2 (2.87)	

	Head of Sub-unit	6.36 (2.21)	7.16 (1.95)	5.4 (2.62)	5.46 (2.44)	
	Employee	5.74 (2.49)	7.7 (1.98)	5.58 (2.45)	5.6 (2.43)	
Religion	Muslim	5.71 (2.51)	7.43 (1.87)	5.53 (2.29)	5.63 (2.52)	0.000
	Christian	5.2 (2.46)	7.82 (1.84)	5.8 (2.48)	4.8 (1.92)	
	Yazidi	6.5 (2.4)	7.42 (2.24)	5.71 (2.94)	5.45 (2.45)	
Education Level	Illiterate	6.7 (2.54)	6.7 (2.4)	4 (0)	5 (1.41)	0.000
	Read and Write	0 (0)	0 (0)	4.75 (0.95)	5 (1.41)	
	Primary School	5.57 (2.5)	6.97 (1.85)	5.3 (2.05)	6.38 (2.29)	
	Secondary School	5.82 (2.51)	7.97 (1.96)	5.23 (2.58)	5.17 (2.67)	
Residence	High Education	5.65 (2.51)	7.65 (1.83)	5.66 (2.46)	5.57 (2.52)	0.000
	Urban	5.67 (2.53)	7.53 (1.92)	5.58 (2.22)	5.44 (2.5)	
	Rural	6.41 (1.83)	7.16 (1.85)	5.54 (2.68)	5.76 (2.48)	0.000
	Very good	5.7 (2.21)	7 (1.88)	4.66 (1.22)	5 (2.82)	
Economic Status	Good	5.38 (2.46)	8.07 (1.83)	5.83 (3.76)	4.66 (2.25)	0.000
	Medium	5.83 (2.6)	7.5 (1.8)	5.21 (2.19)	5.21 (2.39)	
	Bad	5.63 (2.49)	7.5 (1.94)	5.71 (2.46)	5.75 (2.5)	
	Very bad	6.7 (2.54)	6.7 (2.4)	0 (0)	0 (0)	

Also, as seen in table 4, the attitude mean increases noticeably following the intervention session. In the post-test, the intervention group, particularly in the age ranges 40–50 and 51–61, differs from the control group at (P<0.01).

Table 4: mean of attitude among different subgroups of respondents before and after intervention and control

Attitude Mean ± SD						
Demographics	Characteristics	Pre-test Intervention	Post-test Intervention	Pre-test Control	Pre-Test Control	P value
Age group (years)	18-28	5.37 (2.12)	5.37 (2.09)	4.98 (2)	5.42 (2.16)	0.000
	29-39	5.16 (2.12)	6.2 (2.14)	5.09 (1.86)	4.93 (2.34)	
	40-50	4.82 (2.14)	6.16 (2.52)	4.93 (1.85)	4.89 (2.12)	
	51-61	4.5 (2.45)	6.55 (2.45)	2 (0)	2 (0)	
	>=62	7.25 (0.95)	8 (1.41)	0 (0)	0 (0)	
Sex	Male	5.01 (1.94)	6.1 (2.32)	4.89 (1.83)	4.97 (2.16)	0.000
	Female	5.11 (2.28)	6.24 (2.24)	5.04 (1.99)	5.27 (2.26)	
Marital Status	Single	4.26 (2.6)	5.86 (2.58)	4.97 (2.02)	5.17 (2.14)	0.000
	Married	5.12 (2.09)	6.19 (2.24)	5.13 (1.82)	5.25 (2.35)	
	Divorced/ Widow	5.83 (2.48)	7 (2.19)	3.33 (1.03)	4.66 (1.63)	
Position Level	Line Manager	5.26 (2.05)	6.6 (2.16)	3 (1.73)	4.33 (2.08)	0.000
	Head of Department	3.8 (2)	5.06 (2.46)	4.47 (1.87)	5 (1.96)	
	Head of Unit	5.2 (2.01)	6.44 (2.53)	5.4 (1.93)	4.85 (2.64)	
	Head of Sub-unit	5.72 (2.09)	5.84 (2.37)	4.83 (1.91)	4.86 (2.38)	
Religion	Employee	5.01 (2.22)	6.28 (2.08)	5.08 (1.94)	5.33 (2.17)	0.000
	Muslim	5.05 (2.05)	6.13 (2.33)	5.04 (1.85)	5.15 (2.24)	
	Christian	4.94 (2.16)	6.66 (2.09)	3.6 (1.67)	3.8 (2.28)	
	Yazidi	5.34 (2.71)	5.8 (2.17)	4.97 (2.3)	5.42 (2.14)	
Education Level	Illiterate	4 (2.66)	6 (2)	2 (0)	4 (2.82)	0.000
	Read and Write	0 (0)	0 (0)	4 (0)	5 (1.15)	
	Primary School	5.13 (2.35)	5.53 (2.5)	5 (2.04)	5.23 (3.13)	
	Secondary School	4.8 (1.95)	6.02 (2.07)	4.7 (1.75)	4.76 (1.82)	
Residence	High Education	5.23 (2.08)	6.53 (2.21)	5.08 (1.95)	5.22 (2.21)	0.000
	Urban	5.09 (2.11)	6.26 (2.27)	4.91 (1.88)	4.94 (2.26)	
	Rural	4.83 (2.85)	5.08 (1.92)	5.1 (2.01)	5.5 (2.15)	0.000
	Very good	4.6 (2.59)	6.1 (3.03)	4 (2)	4 (1.65)	
Economic Status	Good	4.61 (2.15)	6.8 (2.24)	4 (1.78)	3.33 (2.06)	0.000
	Medium	5.3 (2.18)	5.85 (2.5)	5.19 (1.6)	4.85 (2.3)	
	Bad	5.22 (2.02)	6.27 (2.05)	5.04 (2.01)	5.4 (2.19)	
	Very bad	4 (2.66)	6 (2)	0 (0)	0 (0)	

Table 5 demonstrates high levels of means in the post-test compared to the pre-test in both the intervention group and the control group. The increase is more significant among divorced/widow. Similar to this, the mean increases significantly in high levels of economic status.

Table 5: mean of practice among different subgroups of respondents before and after intervention and control

Practice Mean ± SD						
Demographics	Characteristics	Pre-Test Intervention	Post-Test Intervention	Pre-Test Control	Pre-Test Control	P value
Age group (years)	18-28	6.56 (2.06)	7.12 (2.41)	5.75 (2.54)	5.64 (2.56)	0.000
	29-39	5.74 (2.49)	7.32 (1.8)	5.46 (2.18)	5.57 (2.42)	
	40-50	5.54 (2.66)	7.94 (1.87)	5.17 (2.46)	5.41 (2.48)	
	51-61	5.5 (2.72)	7.94 (2.18)	4 (0)	4 (0)	
	>=62	5 (0)	7 (1.82)	0 (0)	0 (0)	
Sex	Male	5.97 (2.49)	7.28 (1.94)	5.44 (2.39)	4.89 (2.29)	0.000
	Female	5.56 (2.5)	7.64 (1.89)	5.63 (2.43)	5.93 (2.52)	
Marital Status	Single	5.93 (2.18)	7.6 (1.84)	5.67 (2.49)	5.68 (2.53)	0.000
	Married	5.69 (2.48)	7.48 (1.93)	5.48 (2.38)	5.51 (2.51)	
	Divorced/ Widow	5.83 (3.92)	8.33 (1.5)	4.5 (0.83)	5 (1.26)	
Position Level	Line Manager	5.53 (2.79)	7.93 (1.33)	5 (1)	6.33 (3.51)	0.000
	Head of Department	5.86 (2.85)	7.06 (2.34)	5.88 (2.54)	5.94 (2.58)	
	Head of Unit	5.3 (2.49)	7.25 (1.73)	5.55 (2.01)	5.2 (2.87)	
	Head of Sub-unit	6.36 (2.21)	7.16 (1.95)	5.4 (2.62)	5.46 (2.44)	
	Employee	5.74 (2.49)	7.7 (1.98)	5.58 (2.45)	5.6 (2.43)	
Religion	Muslim	5.71 (2.51)	7.43 (1.87)	5.53 (2.29)	5.63 (2.52)	0.000
	Christian	5.2 (2.46)	7.82 (1.84)	5.8 (2.48)	4.8 (1.92)	
	Yazidi	6.5 (2.4)	7.42 (2.24)	5.71 (2.94)	5.45 (2.45)	
Education Level	Illiterate	6.7 (2.54)	6.7 (2.4)	4 (0)	5 (1.41)	0.000
	Read and Write	0 (0)	0 (0)	4.75 (0.95)	5 (1.41)	
	Primary School	5.57 (2.5)	6.97 (1.85)	5.3 (2.05)	6.38 (2.29)	
	Secondary School	5.82 (2.51)	7.97 (1.96)	5.23 (2.58)	5.17 (2.67)	
	High Education	5.65 (2.51)	7.65 (1.83)	5.66 (2.46)	5.57 (2.52)	
Residence	Urban	5.67 (2.53)	7.53 (1.92)	5.58 (2.22)	5.44 (2.5)	0.000
	Rural	6.41 (1.83)	7.16 (1.85)	5.54 (2.68)	5.76 (2.48)	
Economic Status	Very good	5.7 (2.21)	7 (1.88)	4.66 (1.22)	5 (2.82)	0.000
	Good	5.38 (2.46)	8.07 (1.83)	5.83 (3.76)	4.66 (2.25)	
	Medium	5.83 (2.6)	7.5 (1.8)	5.21 (2.19)	5.21 (2.39)	
	Bad	5.63 (2.49)	7.5 (1.94)	5.71 (2.46)	5.75 (2.5)	
	Very bad	6.7 (2.54)	6.7 (2.4)	0 (0)	0 (0)	

5. DISCUSSION

Public health education is an effective way to get people ready for a catastrophic health emergency so they can take steps to avoid getting a deadly disease (10). Comprehensive health education especially modulated to suit the different educational levels is recommended (11). In this study, the intervention group showed a big change in KAP about COVID-19 preventive measures. Other studies have come to the same conclusions about how to prevent COVID-19 (12). Studies have shown that expanding one's knowledge base is a crucial initial step in the process of altering one's behaviours. This means that knowing how to stop the spread of diseases like COVID-19 is a crucial first step (13). Those with more knowledge showed a more favourable attitude towards preventive measures (14). On the other hand, inadequate information increases the likelihood of developing diseases (15). During the COVID-19 epidemic, research evaluating the knowledge of Chinese citizens revealed that health education had enhanced their awareness of the disease, resulting in altered attitudes and behaviours towards the sickness (1). In the present study, line managers were primarily responsible for enhancing the mean level of participant knowledge. This may be due to their status and responsibilities (16). A statistically significant association between sociodemographic factors and general knowledge was found in the current study. Similarly, the socio-demographic data was substantially associated with attitude and practice, as indicated in tables (3,4,5) which was consistent with the findings of several studies (17,18).

Following health education sessions, the majority of participants had good knowledge, attitudes, and practice on COVID-19 preventive measures, according to the current study (Figure 1). A nearby cross-sectional study conducted by Khanum *et al* evaluated the knowledge, attitude, and practice of health care workers regarding intervention prevention and control (IPV) practice related to COVID-19, as well as whether training sessions could be utilised as an effective educational tool to increase comprehension (19). The findings indicated that knowledge, attitude, and practice rose in the intervention group after the post-test, while the control group had only a modest improvement on all three levels. In the intervention group's post-test, the knowledge skill had the best score compared to attitude and practice. In addition, the data demonstrated the significance of enhancing knowledge of COVID-19 through health education, which may lead to change in attitude and practice about COVID-19 preventive measures (12).

The lowest rating was achieved for the attitude towards COVID-19 preventive measures. This discovery is consistent with the research from the rapid online cross-sectional survey that was carried out by Zhong *et al.* (12). Also, the study discovered that the control group slightly reduced their practice of COVID-19 preventive measures after the test, which may have been due to time and a lack of attitude towards the illness. According to the current study, female participants were more likely than male participants to improve knowledge, attitude, and practice following the education session. On the other hand, individuals with very low income did not experience any appreciable changes in their levels of knowledge or practice about COVID-19 preventive measures, which may be related to the requirement to purchase some preventive tools like face masks. Economic difficulties can be seen as one of the problems for having poor preventive practice, as research also indicated that the average household monthly income was one of the elements affecting preventive practice (20).

CONCLUSION

Since it expands general knowledge and critical measures against COVID-19 preventive actions, health education is considered as advantageous. Throughout subsequent sessions, incorrect beliefs and information that existed during the initial assessment were rectified. Knowledge scores and qualities generally have a favourable relationship. The results of this study demonstrated the value of educational health programmes in changing employees' attitudes and practice towards infection prevention as well as their knowledge of the necessity of doing so. Using a variety of media for health education and successfully utilising social media can promote public health. Stopping the spread of COVID-19 should be a priority for national health organisations.

Study Limitations

1. Difficulty in obtaining an agreement from some directorates which randomly selected.
2. Difficulty in completing the questionnaires within the busy working day for the employees and managers.
3. Difficulty in arrangement the intervention session date.

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DOI: <https://doi.org/10.15379/ijmst.v10i4.2301>

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