



The Effect of COVID-19 Knowledge Level on Healthcare Workers' Attitude and Behavior

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Research Article

History

Received: 24/12/2021

Accepted: 19/03/2022

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ABSTRACT

This cross-sectional study was conducted to determine the effect of healthcare workers' COVID-19 knowledge level on their attitudes and behaviors. The population consisted of 1794 healthcare workers of a city hospital in Eastern Anatolia, Turkey. The study was conducted on a sample of 310 healthcare workers, as determined by power analysis, who were selected by accidental sampling. Data for the study were collected during February 2021 through a three-part online questionnaire survey (sociodemographic characteristics, COVID-19 knowledge, COVID-19-related behaviors) and COVID-19 Attitude Scale. The average age of the participants was 34.50 ± 8.36 years, and the mean years of work experience was 11.94 ± 8.89. COVID-19 knowledge level was positively correlated with and explained 46% of variation in attitude towards COVID-19 and 28% of variation in COVID-19-related behaviors. We conclude that healthcare workers' COVID-19 knowledge level positively affected their attitudes and behaviors towards COVID-19.

Keywords: Attitude, Behavior, COVID-19, Healthcare worker, Knowledge

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How to Cite: Kilinc NO, Erci B (2022) The Effect of COVID-19 Knowledge Level on Healthcare Workers' Attitude and Behavior, Journal of Health Sciences Institute, 7(1): 32-38

Introduction

On December 31, 2019, the World Health Organization (WHO) was notified of the first case of an unidentified pneumonia from Wuhan city, China. Since then, the epidemic has rapidly evolved and became an important global public health concern. This outbreak was named COVID-19, and following the recommendations of the Emergency Committee, it was declared a "Public Health Emergency of International Concern (PHEIC)" on 30 January 2020 (WHO, 2021a). The epidemic had caused millions of deaths across the world, and was still rapidly growing (WHO, 2021b).

Turkey was identification of the first case in March 10th and effected from this pandemic alongside the entire world (Republic of Turkey Ministry, 2021a). The rapidly growing pandemic has brought attention to personal protection and wellness among Turkish healthcare workers (Huh, 2020). Due to their work setting, healthcare workers are under a high risk of COVID-19 infection and can spread the disease to their families and communities (CDC, 2020; Qarawi et al., 2020).

The negative effects of COVID-19 brings along many physical, mental and social health problems among healthcare workers, and even death (Gao, 2020; Huang, 2020; Sfindla and Handrya, 2020) World Health Organization announced that healthcare workers made up almost 10% of all COVID-19 cases around the world (WHO, 2021c).

Healthcare workers' awareness concerning COVID-19 is crucial for disease prevention, personal protection, and the efficiency of the healthcare system (Taghrir, 2020). Having knowledge of a certain disease may affect healthcare workers' attitudes and behaviors, and inaccurate knowledge and practice may directly increase the risk of infection (McEachan, 2016). Knowledge, attitude, and practices (KAP) of the individuals is a significant cognitive factor in protecting and improving health while fighting pandemic and for its prevention (Zhong, 2020).

Understanding healthcare workers knowledge, attitudes, and behaviors concerning COVID-19 can help to

predict the outcomes of the planned behavior (Zhang, 2020). Further research is required to evaluate healthcare professionals' behaviors towards the COVID-19 outbreak and to determine relevant factors. Our review of the literature revealed few studies concerning the impact of COVID-19 knowledge levels on attitudes and behaviors among healthcare workers, an at-risk group for COVID-19 infection (Ayinde, 2020; Maleki, 2020; Zhang, 2020).

This study was conducted to determine the effect of healthcare workers' COVID-19 knowledge level on their attitudes and behaviors.

Research Hypotheses

H1; COVID-19 knowledge levels of healthcare professionals affect COVID-19 attitudes

H2; COVID-19 knowledge levels of healthcare professionals affect COVID-19 behaviors

Material and Methods

This cross-sectional study included healthcare workers of a city hospital in Eastern Anatolia, Turkey to determine the impact of their knowledge of COVID-19 on their attitudes and behaviors.

Population and sample

The population consisted of 1794 healthcare workers (e.g. doctor, nurse, technician, etc.) of a city hospital in Eastern Anatolia, Turkey. By performing a power analysis with an error of 0.05, a 0.95 confidence interval, an effect size of 0.25, and a population representation of 0.95, it was determined that the minimum sample size was 310 healthcare workers. Thus, the study was conducted on a sample of 310 healthcare workers who were selected by accidental sampling.

Data collection

Data for the study were collected during February 2021 through a three-part online questionnaire survey ((i) sociodemographic characteristics, (ii) COVID-19 knowledge, (iii) COVID-19-related behaviors) and COVID-19 Attitude Scale. Prior to the study, a pilot study was performed with 20 healthcare workers from a different healthcare institution. The pilot study did not reveal any issues with the questionnaire. The questionnaire was prepared as an online form and was distributed and collected via a smartphone application (WhatsApp).

Data Collection Tools

Personal information form: The form was developed by the researchers to collect demographic data. This form included 11 items concerning participants' socio-demographic and COVID-19-related characteristics (age, sex, education level, working year, position in organisation, working clinic, knowledge perceived from reference).

COVID-19 information test: This test was developed by the researchers as per the review of the current literature. It consisted of 15 yes/no questions concerning the symptoms of COVID-19, prevention methods, and

information related to diagnosis and treatment (Abdollahi, 2019; Ahmed, 2019; Republic of Turkey Ministry, 2020b; Republic of Turkey Ministry, 2020c; Republic of Turkey Ministry 2020d; WHO, 2020d).

COVID-19 behavior form: This 10-item yes/no form was prepared by the researchers to determine the COVID-19-related behaviors of healthcare workers (Abdollahi, 2019; Ahmed, 2019; Republic of Turkey Ministry, 2020b; Republic of Turkey Ministry, 2020c; Republic of Turkey Ministry 2020d; WHO, 2020d).

COVID-19 attitude scale: This 8-item 5-point Likert-type scale (strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree) was prepared by Kılınc et al to determine the COVID-19-related attitudes of healthcare workers (Kılınc and Erci, 2020).

For reliability, item-to-total item correlations ranged from 0.23 to 0.60. The Cronbach Alpha was 0.65. As a result of the explanatory factor analysis, it was determined that the factor loading values of the items varied between 0.329 and 0.750. The scale was composed of 8 items and 3 subscales. Item 8 is reverse scored. As the score of the scale gets higher, COVID-19 attitude levels are positively affected (Kılınc and Erci, 2020).

Data analysis

The collected data were analyzed using the SPSS 22 software package. Data were evaluated using frequency, mean, linear regression and auto-linear regression.

Ethical considerations

This study was granted ethical approval by the Non-Invasive Research Ethics Committee of Firat University Faculty of Medicine (date 22.04.2020, number 390205). The data were collected in line with the principles of voluntarism and confidentiality with the permission of the hospital. The participants were informed and gave their consent.

Results

Table 1 presents the descriptive characteristics of the participants. The average age of the participants was 34.50 ± 8.36 years, and the mean years of work experience was 11.94 ± 8.89 . Among the participants, 48% were female, and 64% were married. 48% of the participants reported equal income and expenses, and 49.7% had been working in healthcare for ≤ 10 years. 71.9% of the participants were nurses, 23.9% worked in the outpatient clinic, and 63.5% worked ≤ 40 hours per week. Participants acquired COVID-19-related information mainly through mass media, including radio and television (27.7%) and social media (21.6%).

Table 2 presents the impact of descriptive variables on healthcare workers' attitudes towards COVID-19. Healthcare professionals' attitudes towards COVID-19 were not associated with age, gender, marital status, income, number of children, education status, years of work experience, position, department, weekly working hours, or source of COVID-19 information ($R^2: 0.061$, $p = 0.062$, $p < 0.05$).

Table 3 presents the impact of descriptive variables on healthcare workers' COVID-19-related behaviors. Healthcare professionals' COVID-19-related behaviors were not associated with age, gender, marital status, income, number of children, education status, years of work experience, position, department, weekly working hours, or source of COVID-19 information (R2: 028, p = 671).

Graph 1 demonstrates the impact of COVID-19 knowledge on attitude towards COVID-19. We found that healthcare workers' COVID-19 knowledge scores were

significantly positively correlated with their attitude scores ($\beta = 0.46, p < 0.01$), that is, increased knowledge translated into a better attitude.

Graph 2 demonstrates the impact of COVID-19 knowledge on COVID-19-related behavior. We found that healthcare workers' COVID-19 knowledge scores were significantly positively correlated with their behavior scores ($\beta = 0.28, p < 0.01$), that is, increased knowledge translated into better behavior.

Table 1. Characteristics of the health worker

	Descriptive Variables	n	%
Age	20-29 age	108	34.8
	30-39 age	101	32.6
	40-49 age	89	28.7
	50 age and over	12	3.9
Sex	Female	220	71.0
	Male	90	29.0
Marital Status	Married	198	63.9
	Single	112	36.1
Family Income	Lower	100	32.3
	Equal	149	48.1
	Higher	61	19.7
Child Number	0	122	39.4
	1	57	18.4
	2	89	28.7
	3	37	11.9
	4	3	1.0
	5 and over	2	0.6
Education Level	Normal High School	13	4.2
	Vocational High School	14	4.5
	Undergraduate(2 years)	63	20.3
	License(4 years)	184	59.4
	Post Graduate	32	10.3
	Doctorate	4	1.3
Working Year	0-10 Year	154	49.7
	11-20 Year	105	33.9
	21-30 Year	43	13.9
	31 Year and Over	8	2.6
Position in Organisation	Nurse	233	71.9
	Doctor	17	5.5
	Technician	51	16.5
	Other	19	6.1
Working Clinic	Outpatient Diagnosis and Treatment	74	23.9
	Emergency Group	67	21.6
	Intensive Care	43	13.9
	Internal Services	57	18.4
	Surgical Services	42	13.5
	Other	27	8.7
Work Hour	40 hours and less	197	63.5
	Over 40 hours	113	36.5
Knowledge Perceived from Reference	Social Media	67	21.6
	Seminars and Meetings	56	18.1
	Books and Articles	27	8.7
	Radio Television	86	27.7
	Poster and Brochure	7	2.3
	My Colleagues	62	20.0
	Laypeople (relatives, friends out of health, etc.)	5	1.6

n: frequency; %: percent

Table 2. Explanation of predictors of attitude toward covid-19 with linear regression in Model 1

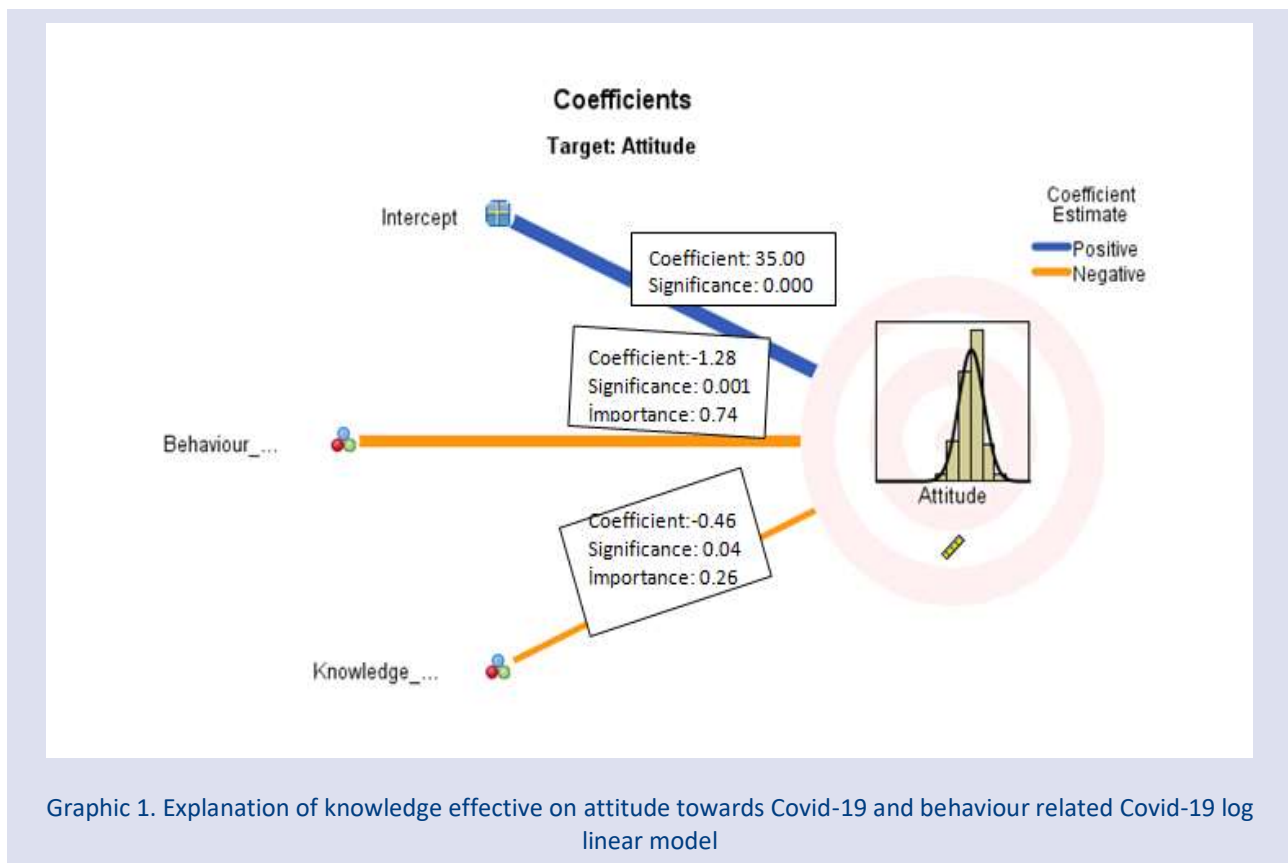
Descriptive Variables	Beta	t	Sig.
		25.763	0.000
Age	0.100	0.704	0.482
Gender	0.113	1.882	0.061
Marital Status	0.018	0.254	0.800
Family Income	-0.103	-1.161	0.247
Child Number	0.077	1.242	0.215
Education Level	-0.162	-1.240	0.216
Working Year	0.053	0.818	0.414
Position in Organisation	-0.053	-0.885	0.377
Working Clinic	0.052	0.756	0.450
Work Hour	-0.081	-1.175	0.241
Knowledge Perceived from Reference	0.002	0.040	0.968

R: 0.24; R Square: 061; F: 1.75; Sig: 0.062; a. Dependent Variable: Attitude; b. Predictors: (Constant), Age, Gender, Marital Status, Family Income, Child Number, Education Level, Working Year, Position in Organisation, Working Clinic, Work hour, Knowledge perceived from reference

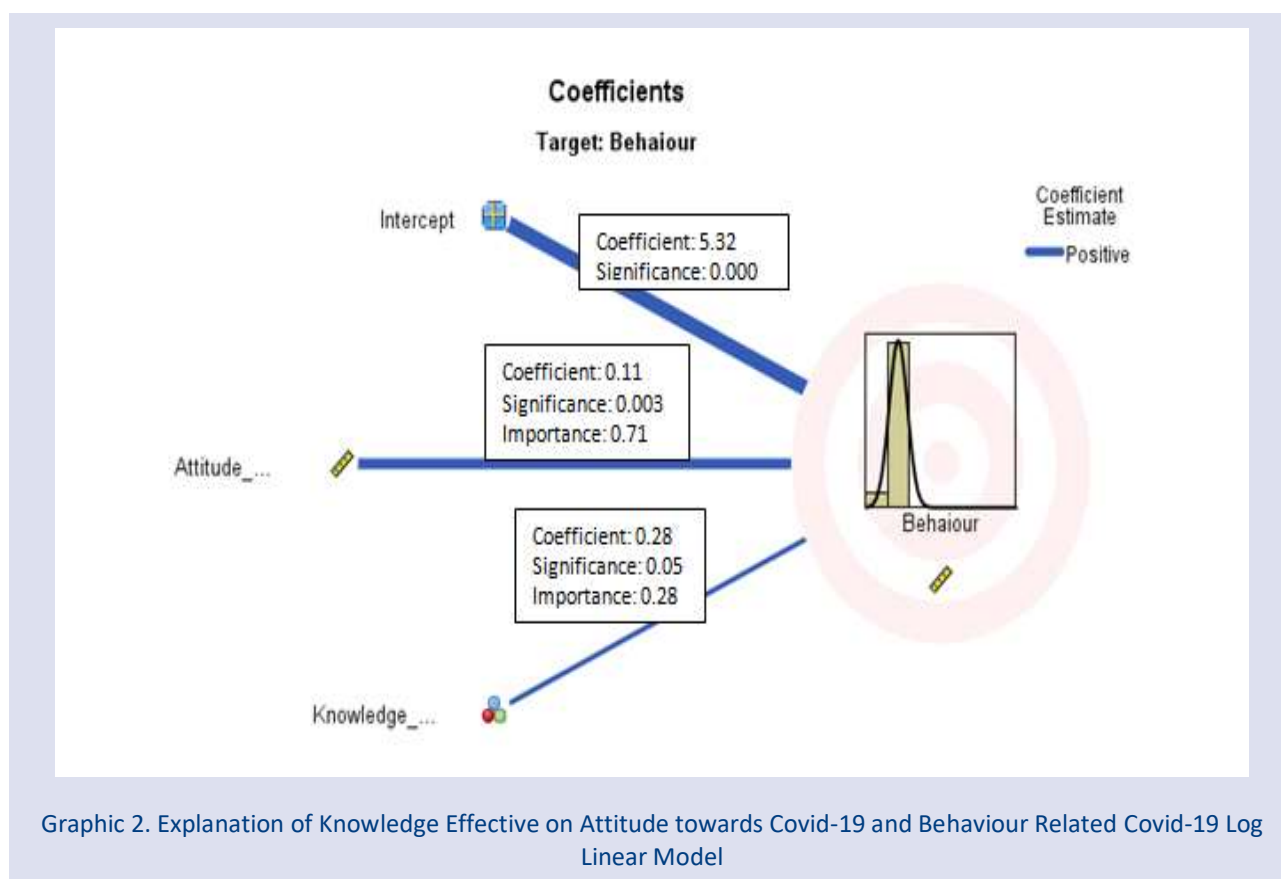
Table 3. Explanation of Predictors of Behaviour Related Covid-19 with Linear Regression in Model 1

Variables	Beta	t	Sig.
		10.745	0.000
Age	0.093	0.639	0.524
Gender	0.067	1.109	0.269
Marital Status	-0.035	-0.477	0.634
Family Income	-0.011	-0.119	0.906
Child Number	0.014	0.215	0.830
Education Level	-0.069	-0.520	0.604
Working Year	-0.121	-1.827	0.069
Position in Organisation	-0.010	-0.167	0.868
Working Clinic	0.000	-0.004	0.997
Work Hour	0.074	1.058	0.291
Knowledge Perceived from Reference	0.096	1.677	0.095

R: 0.16; R Square: 028; F: 0.76; Sig: 671; a. Dependent Variable: Behaviour; b. Predictors: (Constant), Age, Gender, Marital Status, Family Income, Child Number, Education Level, Working Year, Position in Organisation, Working Clinic, Work hour, Knowledge perceived from reference



Graphic 1. Explanation of knowledge effective on attitude towards Covid-19 and behaviour related Covid-19 log linear model



Graphic 2. Explanation of Knowledge Effective on Attitude towards Covid-19 and Behaviour Related Covid-19 Log Linear Model

Discussion

Knowledge is essential for prevention efforts and positive attitude and behavior. Knowledge level affects coping strategies and behaviors through shaping perceptions and attitudes towards the disease (Mceachan, 2016; Ayinde, 2020).

COVID-19 emerged in December 2019 and spread to the world. It is argued that knowledge concerning COVID-19 can impact attitudes and behaviors. Our review of the literature revealed few studies concerning the impact of COVID-19 knowledge levels on attitudes and behaviors among healthcare workers, an at-risk group for COVID-19 infection (Ayinde, 2020; Zhang, 2020).

This study was conducted to investigate the effect of healthcare workers' knowledge level on their attitudes and behaviors. Here, we discuss our results in reference to the current literature.

When we investigated our participants' primary source of COVID-19-related information, we found that they primarily acquired information through mass media, firstly including radio and television, and secondly social media (Table 1). Duruk et al. (2020) asked Turkish dentists about their primary sources of information about COVID-19 and reported 96.27% had obtained information from "personal websites/social media accounts of doctors". Similarly, a study by Alzoubi et al. (2020) determined that Jordanian university students, enrolled in medicine or other departments, primarily used social media, the internet, and television as sources of information for COVID-19. These findings indicate that mass media are frequently referred to for information on COVID-19.

In this study, we found that healthcare professionals' attitudes towards COVID-19 were not associated with age, gender, marital status, income, number of children, education status, years of work experience, position, department, or weekly working hours (Table 2). Zhang et al. (2020) investigated COVID-19-related knowledge, attitudes and practices among healthcare workers in Henan, China, and reported that work experience and position significantly affected healthcare workers' attitudes and practices. In our study, work experience and job position did not affect healthcare workers' attitude towards the COVID-19 outbreak. This may be because such an outbreak is unprecedented in Turkey.

In this study, we investigated the effect of healthcare workers' knowledge level on their attitudes towards COVID-19 and observed that COVID-19 knowledge was positively correlated with and explained 46% of variation in attitude towards COVID-19 (Graph 1). Zhang et al. (2020) stated COVID-19 knowledge level affected healthcare workers' attitudes towards COVID-19. A hospital-based cross-sectional study by Ayinde et al. (2020) from Oyo State, Nigeria showed a significant correlation between knowledge of COVID-19 and a positive attitude. Our results are consistent with the literature. Any accurate information acquired by healthcare workers reflects on their attitudes.

In this study, we found that healthcare professionals' COVID-19-related behaviors were not associated with age, gender, marital status, income, number of children, education status, years of work experience, position,

department, or weekly working hours (Table 3). Zhang et al. (2020) reported that work experience and position affected attitudes and practices among healthcare workers in Henan, China. Unlike China, such an outbreak is unprecedented in Turkey, which may explain why our participants' job experience and position did not affect their COVID-19-related behaviors.

In this study, we investigated the effect of healthcare workers' knowledge level on their COVID-19-related behaviors and observed that COVID-19 knowledge was positively correlated with and explained 28% of variation in COVID-19-related behaviors (Graph 2). Similar to our study, Zhang et al. (2020) determined that COVID-19 knowledge level affects healthcare workers' COVID-19-related practices. Our results are consistent with the literature. Our results indicate that healthcare workers' COVID-19 knowledge level affects their attitude, and subsequently their behavior.

Conclusion

As a result; we determined that healthcare workers' COVID-19 knowledge level positively affected their attitudes and behaviors towards COVID-19. Trainings including evidence-based information from scientific resources via effective methods are required for healthcare professionals who are in close contact with COVID-19 to change their attitudes and behaviors. We found that our participants mainly acquired COVID-19-related information through mass media, including radio, television, and social media. It is crucial to monitor the information disseminated through these media, and to actively employ these tools to provide accurate information.

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