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## Media's effect on shaping knowledge, awareness risk perceptions and communication practices of pandemic COVID-19 among pharmacists

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### ABSTRACT

**Background:** Coronavirus disease (COVID-19), an infection of the zoonotic coronavirus, is presenting a health-care challenge around the globe. This study aims to assess the levels of disease knowledge and risk perception among pharmacists. We also recognize predictors of risk perception and perceived media roles. **Methods** This is a questionnaire-base cross-sectional study. The questionnaire was developed on a web-based platform and invitations were sent to pharmacists nationwide to participate in the study using social media applications. **Results** A total of 486 pharmacists participated in this study, where females were dominant (78.6%, n = 382). Most (40.4%, n = 198) pharmacists scored 4 out of 5 in basic disease knowledge, and more than half were able to recognize common methods of spread. Risk was highly perceived among participants, and was predicted by gender, living area, and having children (p < 0,05). Frequency of watching the media and sources of information also influenced both risk perception and perceived media roles. **Conclusion** Disease awareness among pharmacists, as well as risk perception must be considered for effective risk communication planning. The role of media in shaping perceptions should also be carefully studied to encourage compliance with government containment measures and engagement in preventive behaviors.

### Introduction

After the pandemic of two human pathogenic respiratory coronavirus; the severe acute respiratory syndrome coronavirus (SARS-CoV)<sup>1</sup> and the Middle East respiratory syndrome coronavirus (MERS-CoV),<sup>2</sup> a third novel zoonotic human coronavirus (COVID-19) has emerged in December 2019. Through its crossing species, it was found to cause a cluster of frequently severe respiratory infection cases in human population that greatly resemble the clinical manifestation of viral pneumonia.<sup>3–5</sup> While first reports from initial investigations of this outbreak in Wuhan, China indicated that most cases are associated with wildlife animals and a seafood market where these patients had worked or visited, and the nonexistent of COVID-19 transmission between humans and if so, it could not spread easily between them.<sup>6</sup> However, now it is clear that such spreading occurs<sup>7</sup> and many confirmed cases were identified among contacts with patients with COVID-19 and among healthcare professionals, and most of these cases lack direct contact with this animal's market. Thus, transmission between human populations has been confirmed in china<sup>7</sup> and many other countries<sup>8,9</sup> and has

rapidly evolved into a global health emergency as declared by World health Organization (WHO).<sup>10</sup> As April 21st 2020, the confirmed number of cases was 2,555,760 with about 75,254 new cases globally, and these numbers are increasing continuously around the world, with the USA emerging as the new COVID-19 hotspot.<sup>11</sup>

It is observed that suspected COVID-19 cases are usually seeking medical help from available healthcare facilities near to them such as emergency department, pharmacies, and other health organizations. Therefore, health care professionals and front-line staff available in hospitals and other health organizations should be ready and well-prepared with the best available information and protocols to treat any patient with suspected COVID-19 infection even if presenting with minimal notice.<sup>12</sup> Pharmacists have been a first point of contact for healthcare provision and have historically performed major roles during pandemics and viral outbreaks. Those include vaccine administration, such as during the H1N1 outbreak, drug distribution, health education, and providing direct patient care under exceptional conditions.<sup>13,14</sup> Therefore, ensuring sufficient knowledge and awareness of pandemics among pharmacists, in addition to recognizing factors

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shaping their risk perceptions and communication practices, are vital for the prevention and control of disease.

Media was found to facilitate obtaining of up to date available information improving knowledge, awareness, and practices of both healthcare workers and general public.<sup>15</sup> Also, it plays a key role in communication between researchers, scientists, public health experts and funding agencies, for effective and rapid global response.<sup>15,16</sup> The emergence of the COVID-19 outbreak grabbed the attention of media news, press, and social media pages. However, there are too many sources and sites through which any one can obtain information, and many of them are not credible which resulted in misinformation and difficulties to distinguish between rumors and reality. Thus, health care workers and the public must refer to trustworthy sources and information regarding COVID-19 such as WHO which provided social media teams and technical risk communication to respond and track rumors and myths.<sup>11</sup> Additionally, government and health care facilities should provide transparent and clear communication with health care workers, staff, and public regarding COVID-19 outbreak. This study aimed to assess media role on shaping pharmacists' knowledge, perceptions and attitudes during the pandemic of COVID-19.

## Methods

### Study design

This is a cross-sectional study based on self-reported questionnaire. The questionnaire was developed on a web-based platform to facilitate completion and collection of data during the quarantine period. Invitations were sent to pharmacists nationwide to participate in the study using social media applications. The link to the survey questionnaire was included in the sent invitations. Pharmacists were informed prior to their participation that their participation is anonymised, voluntary, and that their data will be treated as confidential. Also, a brief description about the study purpose was provided. The average completion time of the survey was 10 min. Ethical approval for conducting the study was obtained from the Institutional Review Board (IRB) (reference number: 21/132/2020).

### Questionnaire development

Scales for measuring perceived risk towards COVID19 and perceived role of media have been developed, for the most part, in studies relating perceived role of media to the perceived risk of acute infectious diseases. We developed a set of main ideas and primary items directly relevant to our topic were based on current scientific literature. The primary items were reviewed by seven experts in the field of clinical pharmacy and public health who were required to provide feedback and suggest necessary changes in order to establish both face and content validity of the survey questionnaire. Afterwards, the reliability of the questionnaire was established using a pilot test by collecting data from 20 pharmacists not included in the study sample. They were asked to fill in the questionnaire individually and were encouraged to think loudly and to speak what they meant by each answer and how they understood each question. Responses were voice recorded and questions were adjusted accordingly.

The final survey contained 29 items including closed ended questions with responses based on Likert scale and multiple-choice formats. It consisted of five parts: demographics, knowledge, and perceived risks and media role. Demographic information included gender, age, experience (years), level of education, work setting, monthly income, and marital status. Knowledge about COVID -19 was assessed using questions on basic knowledge and factual knowledge. Basic knowledge part consisted of 5 questions that included name, origin (place and vector), incubation period, and diagnosis. These were scored by assigning one point for each correct answer. Factual knowledge included questions on mode of transmission, signs and symptoms, and risk factors. The 3-point

Likert scale was used to measure pharmacists perceived risk towards COVID19 by giving each item of the questionnaire one point (Disagree = 1, Neutral = 3, and Agree = 4) to analyze the results as follows: low score (1.00–1.66), medium score (1.67–2.33), and high score (2.34–3). These were ranked as “Third”, “Second”, and “First” respectively.

The 5-point Likert scale was used to measure pharmacists perceived role of media, by giving each item of the questionnaire one point (Strongly Disagree = 1, Neutral = 3, and Strongly Agree = 5) to analyze the results as follows: low score (1.00–2.33), medium score (2.34–3.67), and high score (3.68–5.00). These were ranked “Third”, “Second”, and “First” respectively.

### Statistical analysis

Data were analyzed using IBM SPSS software version 24. Data were described using frequencies and percentages. Chi-square was used to analyze differences between categorical variables. Student's t-test was used to compare the means between two groups. A p-value of less than 0.05 was considered statistically significant.

## Results

### Demographic characteristics

Participants' demographics are shown in [Table 1](#). A total of 486 pharmacists were enrolled in our study. Females pharmacists were dominant (78.6%) with around 50% holding bachelor's degree of pharmacy and 40.2% working in a community or chain pharmacies. Around half of the participants had a monthly income of less than 700\$ and 80% are living in urban areas.

### Knowledge assessment about COVID-19

Frequency of correct answers of questions that assessed basic knowledge on COVID-19 are shown in [Table 2](#). Almost all the pharmacists had knowledge related to COVID-19 place of origin and incubation period. Most of the participants (n = 198, 40.4%) scored 4 out of 5 of basic knowledge about COVID-19 pandemic. Almost all of the participants answered that coughing and sneezing is the main mode of transmission, fever and shortness of breath are the most common signs and symptoms and that older patients and patients with chronic diseases and weakened immunity are at higher risk for contacting COVID-19. However, 68.2% (n = 334) of participants answered that the infection can be transmitted from person to person and only 13.5% (n = 66) answered that headache is a common sign of infection.

[Table 3](#) shows the perceived risk of COVID-19 infection among pharmacists. The average ( $\pm$  SD) risk perception score for participants was high for almost all statements. For example, pharmacists were concerned about the risk of community spread ( $2.93 \pm 0.33$ ) and getting infected during work in healthcare settings ( $2.56 \pm 0.79$ ). They also believed this disease is more dangerous than winter flu ( $2.64 \pm 0.68$ ). However, scores were also high for positive risk perceptions, such as high recovery rates ( $2.67 \pm 0.63$ ) and mildness of the disease for less susceptible patients ( $2.51 \pm 0.79$ ).

The perceived role of media briefing on COVID-19 was also assessed ([Table 4](#)). Pharmacists scored high in agreement with the following media roles: spreading disease awareness, educating the public on preventive behaviors, caring for ill or suspected ill individuals, and preparing for an outbreak. Meanwhile, they agreed that media increases fear and anxiety among the public ( $3.79 \pm 1.26$ ) and had moderate trust ( $2.85 \pm 1.07$ ) in what is posted on social media.

Several factors predicted an increased risk perception among pharmacists ([Table 5](#)). For example, female gender, living in a city, and having children were all associated with an increased perception of COVID-19 risk (P < 0.05). Those who watched the media weekly,

**Table 1**  
Characteristics of participants (N = 486).

Variable	Frequency (%)
Gender	
Male	104 (21.4)
Female	382 (78.6)
Age group	
Up to 25	179 (36.8)
26–30	143 (29.4)
31–35	67 (13.8)
Above 35	97 (20.0)
Experience (years)	
≤ 5	242 (49.8)
6–10	79 (16.3)
> 10	165 (34)
Levels of Education	
Diplomate in Pharmacy	52 (10.7)
Bachelor of Pharmacy	253 (52.1)
PharmD	106 (21.8)
Master's Degree in Pharmacy	75 (15.4)
Work Setting	
Working Part-time	133 (27.4)
Full-time Community Pharmacy	197 (40.2)
Full-time Hospital Pharmacy	156 (31.8)
Monthly Income (USD\$)	
Less than 700	274 (56.4)
700–1400	156 (32.1)
More than 1400	56 (11.4)
Marital Status	
Married	223 (45.5)
Single	263 (54.1)
Have children	
Yes	188 (38.6)
No	298 (61.3)
Area of living	
Urban	392 (80.7)
Rural	94 (19.3)
Source of information	
Local Channels and International Channels	123 (25.3)
Social Media	283 (58.2)
WHO Website and social pages	28 (5.8)
Scientific Journals	16 (3.3)
Others (e.g., Workplace and Colleagues, and Ministry of Health (MOH) Website)	36 (7.4)
Frequency of use of source of information	
Daily	165 (34.0)
Weekly	264 (54.3)
Monthly	57 (11.7)

compared to daily or monthly, also had higher risk perceptions. Other predictors included work setting and sources of information. Gender, work setting, frequency of watching the media, sources of information also predicted the perceived media role among pharmacists ( $p < 0.05$ ).

## Discussion

The novel coronavirus (COVID-19) outbreak, originating from Wuhan, China, presents a global healthcare crisis.<sup>15</sup> In this study, we aimed to assess the knowledge of pharmacists about disease spread, symptoms, and susceptibility. We also identify predictors of the COVID-19 risk perception and perceived media roles during the outbreak.

Generally, social media was the main source for coronavirus-related information in around half of the population. This was followed by local and international channels. Such sources were used daily to weekly by most pharmacists. These results are in accordance with a study that compared knowledge and practices among healthcare workers during the 2012 Middle East Respiratory Syndrome (MERS) outbreak.<sup>17</sup> Pharmacists comprised 4.6% of the study population, which also included physicians (41.4%), nurses (33.3%), and technicians (20.7%). Social media ranked second among sources of MERS-related information used by healthcare providers (45%), only preceded by seminars

**Table 2**  
Basic and factual knowledge of pharmacists about COVID 19.

Statements	n (%)
Basic Knowledge	
Name of Corona Virus (COVID19)	373 (76.6)
Where Corona Virus Originated (China)	485 (99.8)
Corona Virus (Animal Origin)	305 (62.8)
Incubation Period (2–14 days)	437 (89.9)
Diagnostic Testing (PCR)	150 (30.9)
Factual knowledge	
Main method of transmission	
Coughing and Sneezing	486 (100)
One person to another	334 (68.7)
Contaminated surfaces	448 (92.2)
Faecal-Oral Route	111 (22.8)
Air droplets	201 (41.4)
Body Fluids	51 (10.5)
Unknown	9 (1.9)
Raw Food	76 (15.6)
Receiving goods from China	76 (15.6)
Most common sign and symptoms	
No Sign and Symptoms	5 (1)
Fever	480 (98.8)
Dry Cough	457 (94)
Shortness of Breath	469 (96.5)
Diarrhea	202 (41.6)
General Weakness	405 (83.3)
Headache	66 (13.6)
Nausea and Vomiting	356 (73.3)
Sputum Secretion	42 (8.6)
Patients at-Risk for contacting COVID19	
Older Adults	486 (100.0)
Chronic Diseases	486 (100.0)
Weakened Immunity	461 (94.9)
Pregnant	315 (64.8)
Smoker	292 (60.1)
Children	83 (17.1)
Adult Female	10 (2.1)
Adult Male	48 (9.9)

and workshops (48%). Other media outlets used were newspapers and magazines (18%), and radio and television (37%). However, among pharmacists, books and articles led the source of MERS-related information, followed by workshops and seminars (38%) and posters and pamphlets (38%). Media sources of information among pharmacists included social media (33%), radio and television (27%), and newspapers and magazines (22%). Two other similar studies on MERS had consistent results, as social media and the internet were the most common sources of information among healthcare providers.<sup>18,19</sup>

Risk perception of pandemics can predict compliance with preventive measures and tendency to seek treatment or vaccination.<sup>18,19</sup> Furthermore, identifying how risk is perceived is important for creating risk communication plans.<sup>20</sup> Unlike other reports, where female gender has been linked to more worry and engagement in preventive and treatment-seeking behaviors,<sup>21,22</sup> we find males to have higher perception of risk. Additionally, living in city areas, having children, and working in a hospital pharmacy are all associated with a higher perceived risk of the coronavirus pandemic. Other studies also report a strong association between age and risk perception. For example, Jacob et al. found that younger age (16–24) predicted higher disease concern.<sup>20</sup> In contrast, a study of 1290 US adults showed no association between age and engagement in protective measures during the H1N1 influenza pandemic.<sup>23</sup> In our study, those below 25 and above 35 years had the highest risk perception, but the difference was not significant. This could be due to lower participation of younger age groups (< 20 years) in both our study and the study from the US. Distinction between city and rural areas can also be justified by the variation in case numbers between different geographic areas.<sup>23</sup> Therefore, we expect higher concern about viral spread in the more crowded cities. Jacobs also finds no association between having elderly and children in the

**Table 3**  
Perceived risk of COVID-19 infection among Pharmacists.

Statement	Mean (SD)	Rank
I feel that it would be extremely dangerous if it began to spread in the community	2.93 ± 0.33	First
The lack of current information about the Corona virus makes it difficult to prepare for each scenario	2.80 ± 0.56	First
The disease recovery rate is high, which is a good thing	2.67 ± 0.63	First
I am concerned about getting sick by dealing with the public	2.65 ± 0.73	First
This disease is more dangerous than winter flu	2.64 ± 0.68	First
I am concerned about getting an infection while working in health care settings	2.56 ± 0.79	First
I feel that the disease will be very dangerous for those who are more likely to develop the disease, and it will be mild to the rest	2.51 ± 0.79	First
All patients with coronavirus will need supportive medical care	1.78 ± 0.93	Second

[Three-point Likert scale, agree with the perceived risk = 3; neutral = 3, disagree = 3].

household and disease concerns. This is however inconsistent with results from a similar study, where more household members predicted increased precautionary activities.<sup>23</sup> It is justified as children can be more susceptible to viral infections. Nonetheless, it is worth to note the difference in disease vulnerability among children between H1N1 and the novel coronavirus. Whereas morbidity and mortality is increased in the former, COVID-19 appears to take a milder toll on children.<sup>4,24</sup>

Frequency of watching media predicted both risk perception and perceived media roles among pharmacists. This is strongly supported by previous reports from the MERS, SARS, and H1N1 outbreaks. For example, a study from South Korea had shown a positive association between social media exposure and the formation of risk perception during the latest MERS outbreak.<sup>25</sup> Moreover, Chang et al. reported a correlation between watching H1N1-related television news and formation of public risk perception about the outbreak.<sup>26</sup> While this may support the role of media in effective risk communication, it is worth noticing the effects media create on mental wellbeing during a pandemic. In its advice for coping with coronavirus stress, WHO recommends limiting news exposure that may cause upset or agitation.<sup>27</sup>

Overall, pharmacists had good basic knowledge about COVID-19, as most (n = 198, 40.4%) has scored 4 out of 5. Almost all recognized the most common methods of disease spread. Like other respiratory viruses<sup>28–31</sup> transmission of COVID-19 occurs mainly through respiratory droplets and person-to-person contact.<sup>7,32</sup> The most common symptoms, including fever, cough, fatigue or myalgia<sup>4</sup> were also recognized by almost all participants. However, only 13.6% and 41.6% correctly identified headache and diarrhea, respectively, as disease symptoms. Those symptoms, in addition to nausea, may be the early clinical manifestation among coronavirus patients.<sup>4</sup> Reports from earlier pandemics show similar satisfactory levels of disease knowledge among pharmacists. However, they remain inferior compared to other healthcare providers, possibly due to less involvement in hospital patient care. For example, when Albarrak et al. scored knowledge related to MERS, pharmacists (88.9%) ranked third to physicians (95.7%) and technicians (91.4%) in having 'Good' disease knowledge.<sup>17</sup> Highest scores (94.4%) were attained for questions related to vaccine availability in the market and methods of viral transmission. Most (94.4%) pharmacists showed positive attitudes towards the MERS crisis, with all (100%) agreeing that protective masks, gloves, and goggles should be used when dealing with patients, and that patients should be kept in isolation. This was in accordance with study results from Saudi and

Vietnamese populations where attitudes towards wearing protective gear were also positive.<sup>33–35</sup> The majority of pharmacists have also shown positive MERS practices, including washing hands with soap and water (72.2%), throwing used tissues in the trash (100%), and covering nose and mouth during sneezing and coughing (77.8%). However, only 27.8% reported wearing face masks in the crowds. Another small study of 35 healthcare providers (HCP) in hospitals and community pharmacies was conducted during the H1N1 pandemic.<sup>36</sup> The study assessed the knowledge of HCP on the transmission, prevention, and management of H1N1. Pharmacists' knowledge was suboptimal among all three aspects. Additionally, most participants (64%) were uninformed about the drug management of H1N1 or the side effects (92.5%) of recommended antivirals.

## Conclusion

Disease knowledge and awareness, in addition to risk perception, are determining factors in how people respond to and engage in preventive behaviors. Pharmacists had good levels of COVID-19 knowledge and have shown high risk perception of the disease. This was significantly affected by social and media-related factors. This must be taken into consideration when planning for effective risk communication. Moreover, future studies should assess the effect of these factors on treatment-seeking and vaccination should a vaccine be available.

## CRedit authorship contribution statement

**Reema Karasneh:** Conceptualization, Methodology, Validation, Formal analysis, Writing - original draft, Supervision, Project administration. **Sayer Al-Azzam:** Conceptualization, Methodology, Supervision, Project administration, Writing - review & editing. **Suhaib Muflih:** Conceptualization, Methodology, Writing - review & editing, Formal analysis. **Ola Soudah:** Conceptualization, Methodology, Supervision, Project administration, Writing - review & editing. **Sahar Hawamdeh:** Conceptualization, Methodology, Writing - review & editing. **Yousef Khader:** Conceptualization, Methodology, Writing - review & editing.

**Table 4**  
Perceived role of media briefing on COVID-19 among Pharmacists.

Statement	Frequency (%)	Rank
The role of the media in educating people about the procedures to follow in the event of an outbreak and how to prepare for it	4.48 ± 0.79	First
The role of the media in increasing general preventive behaviours to control the infection	4.47 ± 0.79	First
The role of the media in spreading awareness in the community	4.44 ± 0.86	First
The role of the media in people education on how to protect others if they are ill or suspected of being ill	4.38 ± 0.86	First
The role of the media in increasing fear, anxiety and confusion among people	3.79 ± 1.26	First
Your trust in what is posted on social media	2.85 ± 1.07	Second

[Five-point Likert scale, strongly disagree = 1 to strongly agree with the perceived risk = 5].

**Table 5**  
Association between pharmacists' perceived risk of COVID19 and role of media by sociodemographic characteristics, COVID19-related basic knowledge.

Variable	Groups	Perceived Risk		Perceived Media Role	
		Mean (SD)	P value	Mean (SD)	P value
Gender	Male (n = 104)	2.41 (.30)		3.94 (.67)	< 0.05
	Female (n = 382)	2.39 (.29)		4.2 (.57)	
Age group	Up to 25 (n = 179)	2.41 (.29)		4.06 (.58)	
	26-30 (n = 143)	2.38 (.29)		4.08 (.59)	
	31-35 (n = 67)	2.35 (.29)		4.01 (.67)	
	Above 35 (n = 97)	2.44 (.28)		4.12 (.56)	
Area of Living	City (n = 392)	2.41 (.29)	< 0.05	4.08 (.56)	
	Rural (n = 96)	2.34 (.31)		4.00 (.69)	
Work setting	Hospital Pharmacy (n = 183)	2.47 (.29)	< 0.05	4.19 (.59)	< 0.05
	Community Pharmacy (n = 181)	2.36 (.30)		3.98 (.61)	
	Part-Time (n = 122)	2.35 (.35)		4.01 (.58)	
Level of education	Diplomate in Pharmacy (n = 52)	2.46 (.29)		4.13 (.54)	
	Bachelor of Pharmacy (n = 253)	2.39 (.31)		4.08 (.55)	
	PharmD (n = 106)	2.41 (.27)		4.03 (.64)	
Frequency of watching media	Master's Degree in Pharmacy (n = 75)	2.35 (.30)		4.04 (.69)	
	Daily (n = 165)	2.29 (.37)	< 0.05	4.15 (.59)	< 0.05
	Weekly (n = 264)	2.45 (.27)		4.05 (.56)	
Sources of information	Monthly (n = 57)	2.36 (.31)		3.91 (.61)	
	Local and International Channels (n = 123)	2.39 (.32)	< 0.05	4.06 (.62)	< 0.05
	Social Media (n = 283)	2.38 (.29)		4.05 (.55)	
	WHO Website (n = 28)	2.58 (.29)		4.32 (.55)	
	Scientific Journals (n = 16)	2.29 (.24)		3.70 (.75)	
Years of Experience	Others (e.g., Workplace and Colleagues, and Ministry of Health (MOH) Website) (n = 36)	2.45 (.32)		4.12 (.55)	
	Less than 5 years (n = 242)	2.41 (.32)		4.06 (.55)	
	5–10 years (n = 79)	2.36 (.31)		4.11 (.61)	
Having children	More than 10 years (n = 165)	2.40 (.28)		4.07 (.62)	
	No (n = 298)	2.36 (.30)	< 0.05	4.06 (.59)	
	Yes (n = 188)	2.45 (.29)		4.06 (.59)	

<sup>a</sup>Significant value (p < 0.05).

## Declaration of competing interest

None.

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