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ORIGINAL RESEARCH

Public Perception Toward COVID-19 Disease Nature, Susceptibility to Complication, and Relationship to Influenza: A Cross-Sectional Study from Yemen

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Background: Following the coronavirus disease (COVID-19) declaration as a pandemic, Yemen has started applying preventive measures to prevent its spread. This study aims to identify the perception regarding the nature of the COVID-19 disease, susceptibility to severe forms of the disease, and its relationship to seasonal influenza among the population of Yemen.

Methods: This was a cross-sectional study of the public in Yemen. The relationship between participants' sociodemographic factors and their responses was assessed by the chi-square test.

Results: A total of 748 participants agreed to participate in the study. Regarding the nature of the diseases, nearly half of the participants (48.8%, n=352) believed that COVID-19 is a naturally occurring human virus that is a serious and fatal disease (61.2%, n=448). The majority (74.9%; n=518) did not agree that bacteria cause COVID-19. More than half of the participants (57.5%, n=423) believed this disease is transmitted to humans through a host animal. Regarding the vulnerable groups to develop severe COVID-19 infection, most of the participants pointed out that the elderly (94.3%, n=705), people with chronic diseases (89.9%, n=669), and pregnant women (53%, n=365) were more susceptible to severe diseases. Regarding symptoms, the majority (61.9%, n=458) of the participants agreed that the symptoms of COVID-19 are similar to those of seasonal influenza. Additionally, the majority (81.9%, n=579) agreed that some individuals develop more severe symptoms than seasonal influenza, particularly those with chronic illness. Gender, age, and education were found to be associated with participants' perceptions regarding the nature of the virus and susceptibility to severe disease.

Conclusion: Participants demonstrate a good understanding of the nature and susceptibility to complications associated with COVID-19 disease and its relationship to influenza. However, the respondents with a lower level of education might require additional educational campaigns to improve their awareness of the disease.

Keywords: public perception, COVID-19, susceptibility, complications, Yemen

Introduction

Coronavirus disease (COVID-19) is a highly transmittable disease[1] caused by a newly identified strain of a respiratory virus that is a member of the coronavirus family (CoV) that is widely distributed among mammals. The WHO categorized COVID-19 as a pandemic in March 2020.[2] COVID-19 causes severe respiratory illnesses,[3,4] with comparable symptoms to the Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS),[5] and

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seasonal influenza.[6] The symptoms range from mild to severe respiratory-related or even asymptomatic to mild in most cases.[7] The main symptoms of COVID-19 are fever, cough, and difficulty breathing in mild cases.[8,9] On the other hand, some patients may develop severe symptoms with complications such as pneumonia, severe acute respiratory syndrome, and acute kidney injury that might end with death,[10] especially in elderly patients and those with chronic illnesses such as diabetes, heart, and lung diseases.[7] The overall fatality rate among the total cases is approximately 2.3%, increasing to 8.0% and 14.8% in patients aged 70–79 years and > 80 years, respectively.[11] On 28 June 2022, WHO reported that the COVID-19 pandemic caused 542,188,789 confirmed cases and 6,329,275 deaths globally.[12] Thus, the COVID-19 pandemic has become a major global public health concern.[13–15]

Yemen is a developing Middle Eastern country. The current population of Yemen is estimated to be 31 million in 2020, with a mean age of 20.2 years.[16] The vast majority of people are Arab and Muslim. The literacy rate in Yemen is high. According to the education administration manager, there are 8.5 million male and female illiterates, accounting for a third of the country's population.[17] At the beginning of January 2020, the first COVID-19 case was officially reported in Yemen. Aiming to control the situation, the government has implemented several measures to prevent the spread of COVID-19 and prohibit overwhelming the healthcare system, including closing borders for a couple of weeks, except food and other essential goods,[18] suspending schools and academic activity, imposing a temporary ban on religious congregations and limiting the number of employees in the workplaces.[18] However, due to the political instability, ongoing war, and closure of the airports, the scenario of COVID-19 in Yemen is obscure, and the pandemic spread looks rather mild, which may not reflect the actual situation or the underreporting of the cases. By June 2022, there had been 11,824 confirmed cases in Yemen, and 2149 deaths were reported to WHO.[12]

Despite the lack of the necessary resources to combat COVID-19 and the fragile health system in Yemen,[19] public adherence to the preventive measures is crucial in preventing the spread of the disease. Studies show that public practice significantly impacts the success of public health efforts to control the pandemic spread,[20,21] and the public adherence to COVID-19 preventive measures is likely influenced by their awareness about the disease.[22,23] Given that COVID-19 is still spreading in some developed and developing countries, it is urgent to assess the public's perception of the COVID-19 disease in Yemen, as the present resources will likely be insufficient to combat any more outbreaks of the disease. Also, assessing the public perception is vital to discover the gaps and strengthen the ongoing efforts in adopting suitable preventive measures towards COVID-19. Therefore, this study aimed to investigate the perception of the general population in Yemen regarding the nature of COVID-19, susceptibility to develop severe disease, and symptoms of COVID-19 compared to seasonal influenza.

Materials and Methods

Study Participants

The participants of this study were Yemeni males and females aged > 18 years. Participants were invited to participate in this study from May-July 2021. Social media platforms, including WhatsApp and Facebook, were used to recruit the participants. In addition, a snowball sampling technique was used to collect the required number of participants, and each participant was asked to invite other participants from their network.

The study's research team followed up with the participants to ensure the representation of different settings and entities of the Yemeni society. A statement for volunteer participation was inserted at the beginning of the questionnaire. All Participants provided their informed consent to volunteer in the study prior to answering the questionnaire by choosing an option called agree to participate. This option was preceded by explanation of the study objectives, right to participate/ not to participate, and the confidentiality of the participants' information. For data analysis and presentation, participants' sociodemographic data were categorized into age (between 18–29 and ≥ 30 years), education (school, diploma, bachelor, and Master/Ph.D.), and perception (agree, neutral, and disagree). The ethical committee at the University of Science and Technology approved the study protocol (Reference Number: EAC/UST225). This study complies with the Declaration of Helsinki and all its amendments and revisions.

Study Instrument

A pre-validated questionnaire was used with slight modifications.[24] The study tool was provided in Arabic to ensure a complete understanding of each question. This tool consisted of four parts. Participants were asked to fill their sociodemographic data in the first part, including age, gender, education, and working sectors. In the second part, participants were asked about their perception of the nature of COVID-19. This part consisted of six questions, including the source (human, engineered in the lab, animal), the etiology (caused by bacteria), the fatality (serious and fatal), the nature of the diseases (punishment from God). All questions in this section started with the same introductory question (in your opinion, COVID-19 is……). In the third part, participants were asked about their perception of the population prone to developing severe COVID-19 infection. This section included five choices: all people, pregnant women, children, elderly, and people with comorbidities. In the final part, participants were asked about their perception regarding the symptoms of COVID-19 compared to seasonal influenza. This section consisted of four questions to assess participants' perceptions regarding the extent of similarity in symptoms between COVID-19 and seasonal influenza and the degree of severity in symptoms among patients with COVID-19. All items of perception questions were assessed using a three-point Likert scale (agree, neutral, and disagree).

Statistical Analysis

Data were analyzed using IBM SPSS statistics version 29.0 for windows® (IBM Corp., Armonk, NY, USA). Categorical variables were displayed as frequency and percentage. The relationship between participants' sociodemographic factors (gender, age group, and education) and their responses was assessed by the chi-square test. P values of less than 0.05 were used to indicate significant differences.

Results

Background Characteristics

In this study, the perception of the Yemenis population toward COVID-19 was investigated (n=748). Gender distribution revealed that most of the participants in the current study (61.9%, n= 485) were males. The mean age of participants was 27.02 ± 8.6 years. The majority (75.6%, n=594) of participants were aged between 18 and 29. The education of the participants was a bachelor's (71.7%, n=566), school and lower (10.5%, n=83), master/Ph.D. degrees (9.1%, n=72), and diploma (8.6%, n=68).

Perceptions of Participants About the Nature of COVID-19 Disease

Participants' perception of the nature of COVID-19 is summarized in Table 1. The results of the data analysis showed that nearly half of the participants (48.8%, n=352) believed that COVID-19 is a naturally occurring human virus that can lead to severe and possibly fatal disease (61.2%, n=448). The majority (74.9%; n=518) of the participants disagreed that bacteria cause this disease. Remarkably, nearly half (45.8%, n=337) of respondents believed that the COVID-19 virus is modified in a laboratory, and more than half (57.5%, n=423) believed this disease was transmitted to humans through a host animal. The results of participant data analysis in Table 1 also show the relationship between participants' perception of COVID-19 and their different demographic variables.

This study showed that females were the most likely to believe that COVID-19 is a naturally occurring human virus. Participants who thought COVID-19 was a modified virus in the lab or believed COVID-19 was "God's punishment" were more likely to be below 30 years old. On the other hand, the largest proportion of participants aged ≥30 believed that COVID-19 was transmitted from an animal, and it is a severe and deadly disease.

In terms of educational level, compared to participants with master's and doctoral degrees, the results showed that a greater proportion of participants with only a school degree believed that COVID-19 was caused by bacteria, a punishment from God, and dangerous and fatal.

A significant association between participants' gender and their perception regard to the etiology and the seriousness and fatality of the diseases. Additionally, the educational background of the participants was associated with their perception regarding the etiology of the diseases.

Table 1 Perceptions of Participants About the Nature of COVID-19 Disease

In Your Opinion, COVID-19 is		Total: N (%)	Gender		Age Groups		Education			
			Male	Female	18–29	≥30	School	Diploma	Bachelor	Master/PhD
			N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
They are naturally occurring Human Viruses.	Agree	352 (48.8)	210(47.2)	142(51.6)	268(48.8)	85(48.9)	33(44.6)	35(58.3)	250(47.6)	35(53.0)
	Neutral	160 (22.6)	102(22.9)	58(21.1)	119(21.7)	42(24.1)	20(27.0)	12(20.0)	115(21.9)	15(22.7)
	Disagree	209 (28.9)	133(29.9)	75(27.3)	162(29.5)	47(27.0)	21(28.4)	13(21.7)	160(30.5)	16(24.2)
	X^2, p-value		1.346, 0.510		0.645, 0.724		4.738, 0.578			
Modified virus in the labs	Agree	337 (45.8)	188(41.7)	149(52.5)	271(48.3)	67(37.9)	27(35.5)	30(48.4)	257(47.9)	25(37.9)
	Neutral	215 (29.2)	137(30.4)	78(27.5)	158(28.2)	58(32.8)	22(28.9)	13(21.0)	163(30.4)	19(28.8)
	Disagree	184 (25.0)	126(27.9)	57(20.1)	132(23.5)	52(29.4)	27(35.5)	19(30.6)	117(21.8)	22(33.3)
	X^2, p-value		**9.254, 0.010***		**6.031, 0.049***		**13.148, 0.041***			
Animal disease transmitted to human	Agree	423 (57.5)	259(57.6)	159(57.2)	317(56.9)	103(59.5)	41(54.7)	30(49.2)	309(58.2)	42(63.6)
	Neutral	143 (19.4)	92(20.4)	50(18.0)	107(19.2)	35(20.2)	19(25.3)	15(24.6)	98(18.5)	10(15.2)
	Disagree	170 (23.1)	99(22.0)	69(24.8)	133(23.9)	35(20.2)	15(20.0)	16(26.2)	124(23.4)	14(21.2)
	X^2, p-value		1.129, 0.569		0.992, 0.609		5.071, 0.535			
It is caused by bacteria.	Agree	65(9.4)	46(11.1)	17(6.3)	46(8.7)	17(10.6)	21(29.2)	4(7.5)	33(6.6)	5(8.2)
	Neutral	109(15.8)	70(16.9)	38(14.1)	76(14.4)	33(20.5)	18(25.0)	12(22.6)	70(13.9)	9(14.8)
	Disagree	518(74.9)	298(72.0)	215(79.6)	404(76.8)	111(68.9)	33(45.8)	37(69.8)	400(79.5)	47(77.0)
	X^2, p-value		**6.219, 0.045***		4.301, 0.116		**51.796, <0.001***			
Punishment from God	Agree	381(51.7)	265(58.6)	117(41.5)	296(53.0)	85(47.8)	48(63.2)	48(71.6)	268(50.5)	21(31.8)
	Neutral	176(23.9)	95(21.0)	78(27.7)	130(23.3)	45(25.3)	12(15.8)	14(20.9)	131(24.7)	18(27.3)
	Disagree	180(24.4)	92(20.4)	87(30.9)	132(23.7)	48(27.0)	16(21.1)	5(7.5)	132(24.9)	27(40.9)
	X^2, p-value		**20.898, <0.001***		1.559, 0.459		**30.684, <0.001**			
Serious and fatal	Agree	448 (61.2)	300(66.7)	145(52.3)	329(59.5)	119(66.9)	47(68.1)	42(67.7)	321(59.8)	39(60.0)
	Neutral	136 (18.6)	79(17.6)	55(19.9)	110(19.9)	25(14.0)	14(20.3)	8(12.9)	97(18.1)	16(24.6)
	Disagree	148 (20.2)	71(15.8)	77(27.8)	114(20.6)	34(19.1)	8(11.6)	12(19.4)	119(22.2)	10(15.4)
	X^2, p-value		**18.405, <0.001***		3.835, 0.147		7.998, 0.238			

Note: The star sign (*) and bold text indicate significant relationship.

Perception of the Participants of Who is Most Susceptible to Severe COVID-19 Infections

Table 2 summarizes participants' perceptions regarding susceptibility to severe COVID-19 infection. Most participants (94.3%, n=705; 89.9%, n=669) indicated that the elderly and people with chronic diseases such as diabetes and heart disease are more likely to have severe COVID-19 infections. More than half (53%, n=365) of the participants believed that pregnant women are susceptible to severe illness. Less than half (44.4%, n=319; 41.4%, n=287) of the participants agreed that all individuals, including children, are also at risk of severe infection with COVID-19.

The cross-table findings between the individual most susceptible to severe COVID-19 infection and gender type showed that a greater proportion (58.5%, n=158) of females believed that pregnant women are more susceptible to severe COVID-19 infection. On the other hand, nearly half of the males (48.8%, n=215) thought that all individuals were more susceptible to severe infection by COVID-19.

Table 2 Perception of Participants About Susceptibility to Severe COVID-19 Infection

Variables		Total: N (%)	Gender		Age Group		Education			
In Your Opinion, Who is Most Susceptible to Severe COVID-19 Infection			**Male**	**Female**	**18–29**	**>30**	**School**	**Diploma**	**Bachelor**	**Master/PhD**
			N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
All individuals	Agree	319 (44.4)	215 (48.8)	104 (37.5)	247 (45.4)	74 (41.8)	33 (45.8)	30 (48.4)	226 (43.2)	33 (49.3)
	Neutral	132 (18.4)	70 (15.9)	62 (22.4)	100 (18.4)	33 (18.6)	12 (16.7)	11(17.7)	100 (19.1)	11 (16.4)
	Disagree	267 (37.2)	156 (35.4)	111 (40.1)	197 (36.2)	70 (39.5)	27 (37.5)	21(33.9)	197 (37.7)	23 (34.3)
	X^2, p-value		**9.74, 0.008***		0.79, 0.672		1.55, 0.956			
Children	Agree	287 (41.4)	175(41.4)	112 (41.3)	234 (44.4)	55 (32.2)	26 (38.8)	28 (45.9)	221 (43.6)	14 (21.5)
	Neutral	168 (24.2)	100(23.6)	68 (25.1)	127 (24.1)	43 (25.1)	17 (25.4)	19 (31.1)	120 (23.7)	15 (23.1)
	Disagree	239 (34.4)	148(35.0)	91 (33.6)	166 (31.5)	73 (42.7)	24 (35.8)	14 (23.0)	166 (32.7)	36 (55.4)
	X^2, p-value		0.24, 0.887		**9.45, 0.009***		**9.65, 0.003***			
Pregnant women	Agree	365 (53.0)	207(49.4)	158 (58.5)	288(54.8)	82 (49.1)	30 (44.1)	33 (54.1)	281 (56.0)	26 (40.6)
	Neutral	177 (25.7)	115(27.4)	62 (23.0)	140 (26.6)	37 (22.2)	19 (27.9)	20 (32.8)	124 (24.7)	15 (23.4)
	Disagree	147 (21.3)	97(23.2)	50 (18.5)	98 (18.6)	48 (28.7)	19 (27.9)	8 (13.1)	97 (19.3)	23 (35.9)
	X^2, p-value		5.51, 0.064		**7.90, 0.019***		**16.10, 0.013***			
Elderly	Agree	705 (94.3)	448(96.1)	257 (91.1)	530 (93.6)	178(96.2)	59 (81.9)	62 (95.4)	521 (95.6)	69 (95.8)
	Neutral	22 (2.9)	9 (1.9)	13 (4.6)	20 (3.5)	2(1.1)	5 (6.9)	2 (3.1)	14 (2.6)	1 (1.4)
	Disagree	21 (2.8)	9 (1.9)	12 (4.3)	16 (2.8)	5 (2.7)	8 (11.1)	1 (1.5)	10 (1.8)	2 (2.8)
	X^2, p-value		**8.13, 0.017***		2.97, 0.227		**26.15, <0.001*** [b]			
People with chronic illnesses such as heart disease and diabetes	Agree	669 (89.9)	415 (89.8)	254 (90.1)	504 (89.4)	166(91.2)	59 (80.8)	55 (88.7)	498 (91.4)	61 (88.4)
	Neutral	54 (7.3)	35 (7.6)	19 (6.7)	40 (7.1)	15 (8.2)	12 (16.4)	6 (9.7)	29 (5.3)	8 (11.6)
	Disagree	21 (2.8)	12 (2.6)	9 (3.2)	20 (3.5)	1 (0.5)	2 (2.7)	1 (1.6)	18 (3.3)	0 (0.0)
			0.39, 0.823		4.69, 0.096		16.98, 0.009* [b]			

Note: The star sign (*) and bold text indicate significant relationship b: indicates fisher's exact test is used

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Analysis of this study revealed a significant association between participants' sociodemographic factors (age, gender, and education) with perception regarding the vulnerable population to have severe COVID-19 infection.

Perception of the Participants Regarding the Symptoms of COVID-19 Compared to Those of the Seasonal Influenza

Participants' perceptions about the symptoms of COVID-19 compared to seasonal influenza are presented in Table 3. More than half of the participants (61.9%, n=485) agreed that the symptoms of COVID-19 are similar to those of seasonal influenza. In addition, most respondents (81.9%, n=579) also believed that only some COVID-19 patients show severe symptoms. In the same context, more than three-quarters (77.8%, n=560) of participants believe that patients with chronic diseases who develop COVID-19 are those with severe symptoms.

The results in Table 3 also show the effect of different demographic variables on participants' perceptions. Nearly two-thirds (62.2%, n=171) of female participants do not believe that all COVID-19 patients develop acute symptoms. Furthermore, it was observed that individuals aged >30 years were more likely to believe that symptoms of COVID-19 are similar to seasonal influenza. Also, they were more likely to believe that chronically ill COVID-19 patients might develop severe symptoms. The educational level of the participants also had a clear impact on their perceptions of the symptoms of COVID-19 patients compared to the symptoms of seasonal influenza. Specifically, individuals with master's and doctoral degrees were the least likely (compared to those with school certificates) to believe that all COVID-19 patients had severe symptoms. At the same time, they (who have Master's/PhD) were the most significant percentage who believed that only some COVID-19 patients had severe symptoms.

The study analysis showed a significant association between participants' factors (gender, education) and their perception regarding the severity of COVID-19 symptoms when compared to the symptom of seasonal influenza infection.

Discussion

This study aimed to investigate the Yemen residents' perception toward the COVID-19 pandemic nature, complications susceptibility, and its relation to seasonal influenza. Nearly half of the participants believed that COVID-19 is a naturally occurring human virus that can result in a serious and fatal outcome. In addition, most respondents did not agree that bacteria cause this disease. However, they mostly agreed that the symptoms of the COVID-19 virus are similar to those of seasonal influenza. Almost half of the respondents concurred that the COVID-19 virus was engineered in a laboratory, which might be due to cultural beliefs and misconceptions about the disease.[25] At the same time, over half, believed that the COVID-19 virus was transmitted to humans through a host animal. This awareness about the virus's transmissibility might reflect comprehensive media reporting or the improved knowledge base and specialization on the subject matter. Regardless, knowledge seems to promote the relative success of public health measures mandated in Yemen during the second COVID-19 wave.

The perception of COVID-19 as a naturally occurring human virus was higher with older respondents, which is not unexpected within this study since over half of the respondents were more senior than students and had postgraduate degrees. This association between age and knowledge is consistent with several studies.[26–28] It has also been reported that doctoral students scored significantly higher than undergraduate students,[29,30] which supports the possible association between educational level and perception. Another factor that has been reported to be associated with the perception of COVID-19 infection, susceptibility to related complications, and relationship with influenza is gender. Thus, it could be deduced that better education correlates with better perception and Knowledge about COVID-19.[24] Previous studies conducted in Italy, China, and Jordan, reported a good level of knowledge about the epidemic and its control among educated respondents. Those with higher socioeconomic status are more knowledgeable about COVID-19, display optimistic attitudes, and have reasonable practices towards COVID-19. Yemenis with a school degree are a good target group for dedicated awareness and education campaigns designed to ameliorate some misconceptions and biases about COVID-19. Furthermore, although the results indicate females were the most likely participants to believe that COVID-19 is a naturally occurring human virus, the association with gender is ambiguous as the reported results are relatively

Table 3 Participants' Perception of the Symptoms of COVID-19 and Its Relationship to Seasonal Influenza

What is Your Opinion Regarding the Followings?		Total: N (%)	Gender		Age Group		Education			
			Male	Female	18–29	>30	School	Diploma	Bachelor	Master/PhD
			N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Symptoms of COVID-19 are similar to seasonal influenza to a large extent	Agree	458 (61.9)	275(60.0)	183(64.9)	344(61.2)	114(63.3)	46(64.8)	47(71.2)	325(60.0)	43(65.2)
	Neutral	105 (14.2)	68(14.8)	37(13.1)	87(15.5)	19(10.6)	9(12.7)	8(12.1)	83(15.3)	6(9.1)
	Disagree	177 (23.9)	115(25.1)	62(22.0)	131(23.3)	47(26.1)	16(22.5)	11(16.7)	134(24.7)	17(25.8)
	X^2, p-value		1.74, 0.419		2.860,0 0.239		5.211, 0.517			
All COVID-19 patients develop severe symptoms.	Agree	207 (29.0)	140(31.9)	67(24.4)	157(29.1)	49(27.7)	29(40.8)	23(37.1)	139(26.7)	16(24.2)
	Neutral	120 (16.8)	83(18.9)	37(13.5)	89(16.5)	30(16.9)	17(23.9)	10(16.1)	88(16.9)	5(7.6)
	Disagree	387 (54.2)	216(49.2)	171(62.2)	293(54.4)	98(55.4)	25(35.2)	29(46.8)	293 (56.3)	45(68.2)
	X^2, p-value		**11.55, 0.003***		0.137, 0.934		**19.98, 0.003***			
Some COVID-19 patients develop severe symptoms.	Agree	579 (81.9)	349(79.7)	230(85.5)	443(82.8)	141(80.1)	47(68.1)	47(75.8)	436(84.2)	55(85.9)
	Neutral	55 (7.8)	39(8.9)	16(5.9)	41(7.7)	13(7.4)	11(15.9)	4(6.5)	37(7.1)	3(4.7)
	Disagree	73 (10.3)	50(11.4)	23(8.6)	51(9.5)	22(12.5)	11(15.9)	11(17.7)	45(8.7)	6 (9.4)
	X^2, p-value		3.89, 0.143		1.266, 0.531		**16.36, 0.012***			
COVID-19 patients with chronic illnesses develop severe symptoms	Agree	560 (77.8)	339(76.2)	221(80.4)	417(76.9)	146(80.2)	48(67.6)	49(77.8)	419(79.7)	49(74.2)
	Neutral	101 (14.0)	67(15.1)	34(12.4)	79(14.6)	22(12.1)	12(16.9)	8(12.7)	68(12.9)	13(19.7)
	Disagree	59 (8.2)	39(8.8)	20(7.3)	46(8.5)	14(7.7)	11(15.5)	6(9.5)	39(7.4)	4, (6.1)
			1.72, 0.423		0.897, 0 0.639		9.22, 0.161			

Note: The star sign (*) and bold text indicate significant relationship.

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mixed. Hence, no significant association was found between gender and perception, susceptibility to complications, and relationship with influenza.

Most participants (94.3% and 89.9%) indicated that the elderly and people with chronic diseases such as diabetes and heart disease are more likely to have severe COVID-19 infections. In comparison, over half (53%) believed that the infected pregnant women are susceptible to severe illness. Less than half (44.4%, 41.4%) concurred that all individuals, including children, are also at risk of severe infection with COVID-19. In addition, a larger proportion (58.5%) of the participating females believed that pregnant women were more susceptible to severe disease by COVID-19. In contrast, about half (48.8%) of the males thought all individuals were more sensitive to severe illness caused by COVID-19. This is consistent with prior related studies, where older adults,[31] pregnant women,[32] cancer and transplant patients,[33] or those with chronic comorbidities[34] are reported to be more susceptible to infection and more severe symptoms. This level of knowledge by the public on the perception and nature of the disease, the organism causing the outbreak, and susceptibility to the complications associated with the infection indicates the cumulative experience from other episodes of diseases primarily affecting the respiratory system, such as SARS and H1N1, which signifies the success of any public health measure to manage the outbreak.[35] The research outcomes would aid public health officials in identifying gaps in general Knowledge of COVID-19 and implement crucial steps to fill these gaps. Generally, it can be posited that the sampled Yemeni citizens had a good knowledge of the nature of COVID-19 virus infection, including high-risk groups. Most sampled participants knew that COVID-19 is a viral infection rather than bacterial, was not engineered in the lab, and might be lethal if persons are infected. In addition, most sampled participants could identify those most susceptible to the severity of the infection. The deductions are consistent with those of an earlier study[24] conducted among the residents of Jordan, which showed that those who had a good perception of the infection were more prepared to adhere to recommendations from local authorities.

As the pandemic evolved locally and transmission has accelerated with the appearance of high infectious virus variants, measures must be constantly monitored and adjusted with the ever-shifting landscape. The findings of this study could provide relevant management staff and policymakers in health institutions about the gaps in knowledge on public perception regarding COVID-19, the nature of the disease, susceptibility to complications, and relationship to influenza, the perceptions, and behavior of the staff and students related to the COVID-19 pandemic, thereby allowing adjustments to existing measures and policies to improve upon them if deemed necessary. Despite the non-generalization of the results, this study offers a concise insight into the perception of the effects of the pandemic in Yemen. Finally, it provides a reference point for future studies.

Although the current study is the first of its kind in Yemen that addressed public perceptions towards three different aspects of COVID-19, including the nature of the disease, susceptibility to complications, and its relationship to seasonal influenza, the study had several limitations, including the sampling method, which might not provide an equal chance for all participants but instead provided a higher opportunity for those who had access to internet services. Another limitation was the bias of the online survey toward younger generations, which might not be representative of the general population. Another limitation was the desirability bias, where the participants might respond to the questions based on what others expected from them.

Conclusion

Participants in this study demonstrate an acceptable level of perception of the nature and susceptibility to severe forms of COVID-19 disease and its relationship to influenza. However, the respondents with a lower level of education might require national health educational campaigns to improve their awareness of the disease. Additionally, future studies should ensure the elimination of the above-mentioned limitation.

Disclosure

The authors report no conflicts of interest in this work.

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