Title: Exploring the Perception and Educational Level of the Pakistani Public on COVID-19: Knowledge Gaps, Misconceptions, and Implications for Public Health Interventions

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Abstract

Background: The COVID-19 pandemic caused by the SARS-CoV-2 virus is still causing extensive sickness, death, and social and economic devastation worldwide. Effective prophylactic strategies such as personal protection measures, social distancing, and vaccination is critical in limiting disease transmission. However, more than two years after the emergence of COVID-19, the pandemic continues to have a global impact, with new variants and surges in cases and fatalities. **Objectives:** This study aimed to investigate the Pakistani public's perception and knowledge regarding various aspects of COVID-19 after a period of two years of the pandemic. The study also aimed to investigate the association between education level and knowledge about COVID-19. **Methods:** An online cross-sectional survey was conducted using a convenience sample of 1100 individuals from different cities in Pakistan. The survey consisted of various sets of questions covering the aspects of the study objectives. **Results:** Most participants reported a solid understanding of COVID-19; however, there were some misconceptions and knowledge gaps concerning certain pandemic elements. The study also highlighted a link between education level and awareness of COVID-19, with a higher education level related to a better understanding of the pandemic and effective preventive strategies. **Conclusion:** This study provides valuable insight into the perception and education level of the Pakistani public regarding COVID-19. The findings highlight the need of continued public health efforts to promote and ensure access to effective prevention measures, particularly in vulnerable populations who may face barriers to obtaining protective equipment.

Runing title: The Perception & Educational Level of the Pakistani Public on COVID-19

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Conflict of interest statement

No conflict of interest.

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Results: Most participants reported a solid understanding of COVID-19; however, there were some misconceptions and knowledge gaps concerning certain pandemic elements. The study also highlighted a link between education level and awareness of COVID-19, with a higher education level related to a better understanding of the pandemic and effective preventive strategies.

Conclusion: This study provides valuable insight into the perception and education level of the Pakistani public regarding COVID-19. The findings highlight the need of continued public health efforts to promote and ensure access to effective prevention measures, particularly in vulnerable populations who may face barriers to obtaining protective equipment.

Keywords: Public perception, COVID-19, Health knowledge, Educational level, Pakistan.

Highlights

- COVID-19 pandemic persists globally, with new variants and surges in cases.
- Effective prophylactic strategies are crucial in limiting disease transmission.
- Solid knowledge of COVID-19 could be effective in controlling pandemic transmission.
- Higher education level associated with better knowledge of COVID-19.

Introduction:

COVID-19 has negatively impacted people's lives globally , causing 3.29 million fatalities among 15 million sick people as of May 7, 2021 . In countries that were more severely affected, the mortality scaled by 50%, while in those that strictly enforced lockdown measures, it decreased by 5%. Few of these nations provided actual death figures, but in many, it was found 1.6 times greater than the number of reported disease-related deaths. Additionally, the disease caused the loss of priceless time . As reported by 81 countries from January 2021, the disease stole 20.5 million years of life, nine times higher than seasonal influenza .

Public awareness about any outbreaks is crucial in mitigating the impact of such events, as increased awareness leads to quick adaptation of public health-related measures, fewer fatalities, and timely control. Previous outbreak experiences witnessed that the success of outbreak control depends upon attitude, knowledge, and public perception about it . Numerous studies revealed a direct correlation between public awareness of the disease and adherence to governmental regulations, resulting in the containment of COVID-19 spread and development .

Vaccination played an important role in tumbling the diseases burden, disability, and fatalities saving around 5 million people from deadly ailments per year, evidenced in a history of tackling polio, tetanus, hepatitis B, influenza, diphtheria, MMR (Measles, Mumps, and Rubella) and pertussis. Vaccine hesitancy is still a topic of debate as one of the global health threats, as observed by the World Health Organization (WHO) in 2019 . Nonetheless, various countries have been identified as having high levels of vaccine reluctance, often due to some religious beliefs, such as Thailand, Vietnam, and Mongolia .

Pakistan is a developing South Asian country with a hybrid healthcare system to which a minimum budget for medicines and medical products is assigned . Pakistan's population is estimated to be over 225 million in 2023 with a median age of 22.8 years and a literacy rate of 58.0% in 2019 . The country reported the first two confirmed COVID-19 cases on February 26, 2020 , and disclosed 4601 confirmed cases in the next 45 days, on the 10th of April 2020, with a fatality toll of around 66 people. International organizations, such as the WHO, have praised the Pakistani government for taking appropriate measures and actions to prevent the pandemic's spread and accomplish its duty as a state toward its citizens and their safety . The government of Pakistan took several measures to face COVID-19, including immediate response to contain disease spread, border control, quarantine houses, country-wide lockdown, cordoning off areas, testing and contact tracing, field epidemiology laboratory training program, implementation of SOPs (masks, sanitization, and social distancing), initiation of awareness campaigns (role of community health workers), economic measures, and production of ventilators . Six months after reporting the first case, the Pakistani government's efforts have resulted in a steady decline in active cases, with the number of deaths reported each day frequently falling into the single digits. As of October 1, 2020, the nation had 312,263 confirmed cases, and 6479 people had died due to COVID-19 .

Although the Pakistani government tried hard to fight with COVID-19 emergency and speeded awareness through social and electronic media, however, the country is the world's 5th most populous region with

a poverty rate of 21.89% at national poverty lines in 2018 and expected increased poverty after 2018 due to huge economic and political instability . Therefore, understanding the public perception of COVID-19 and its vaccination is important, as it can influence people's behavior and decision-making related to the pandemic. Public perception can also impact how government and health organizations respond to the pandemic, including developing and implementing public health policies and communication strategies.

Moreover, some people worldwide also related COVID-19 with Seasonal Influenza, although there are important differences between the two diseases. A novel coronavirus causes COVID-19, while seasonal influenza is caused by different strains of influenza viruses. COVID-19 is more contagious and can cause more severe illness and death than seasonal influenza. However, both are transmissible via respiratory droplets and share symptoms such as fever, cough, and body aches. Therefore, people must grasp the differences between COVID-19 and seasonal influenza and the potential hazards and benefits of vaccination against both diseases. Vaccination against COVID-19 is currently one of the most effective ways to protect oneself and others from the virus and its potentially severe consequences .

Previous studies have hypothesized that the comprehension of the pandemic and adherence to the public health guidelines might be influenced by the quality and quantity of individuals' education level . Therefore, the questionnaire in this study is designed to evaluate participants' perspectives on the role of education in shaping their perceptions of the pandemic. The study aims to investigate the connection between participants' education level and their perception of the COVID-19 pandemic. Moreover, this study aims to assess the evolution of participants' views and gain a better insight into the potential impact of education on public perception of the pandemic over time, considering that the study was conducted more than two years after the pandemic's initial outbreak. By incorporating multiple aspects of the pandemic, this study aims to provide a comprehensive understanding of the Pakistani public's perception of COVID-19 and the potential impact of education on their perception of the pandemic.

2. Method:

2.1 Study design

A cross-sectional study design was adopted to evaluate the perception of the Pakistani public about the COVID-19 pandemic regarding its nature, cause, symptoms, and vaccination through an internet-based survey. The study duration was from December 2022 to March 2023.

2.2 Study Ethics

The study procedures were approved by the Department of Pharmacy Practice, Bahauddin Zakariya University (Acad/PRAC/EXT/23/02). Participant confidentiality was maintained throughout the study. The current study did not collect the participant's personal or identifying information. Informed consent was obtained from the participants before recruiting for the study.

2.3 Data collecting tool

The research team developed the initial draft of the study questionnaire based on previously available literature. For clarity and comprehensiveness, face validity was done by an expert of the same background for the initial questionnaire draft. For the reliability assessment, a pilot study was conducted on 37 participants. A Cronbach alpha value of 0.71 was obtained to show a valid internal consistency. For the convenience of the study population, an Urdu translation was added alongside the English questions.

The questionnaire was comprised of six sections with a total of 37 questions. The first section consisted of participants' demographic data (seven questions) regarding age, gender, educational level, and current working profile. The second section asked participants about their perception of the nature of the COVID-19 pandemic (eight questions). The three-point Likert scale (agree, neutral, disagree) was adopted with the perception questions items in this section. The third section was on the participants' perceived susceptibility to the severe COVID-19 pandemic (single question). The fourth section was on the perception of participants

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about the symptoms of COVID-19 and the way they protect themselves (eleven questions). The fifth section was about the participants' perception regarding the symptoms of the COVID-19 pandemic compared to Seasonal Influenza (three questions). The sixth section contained questions regarding participants' perceptions of the COVID-19 vaccine (seven questions). Only close-ended questions were used in the questionnaire.

2.4 Participants:

The final pre-tested questionnaire was utilized to create a Google survey form and published as a cross-sectional survey on 1st of December 2022. The link of the Google survey form was designed in such a way that only 1 response can be generated using one device. The inclusion criteria were Pakistani citizens of both sexes, aged [?] 18, and residing within the country. The recruitment was accomplished online (Facebook, LinkedIn, WhatsApp, Instagram, and Twitter) and offline methods (data collectors took responses conveniently). In order to avoid selection biases, the data collectors were hired from different regions of Pakistan to have a representative sample (four provinces: Punjab, Sindh, Khyber Pakhtunkhwa (KPK), and Balochistan; the Islamabad Capital Territory; and the administrative territories of Azad Jammu and Kashmir and Gilgit–Baltistan). Moreover, the data collectors included participants from different age groups. Participants declared their consent to voluntarily participate in this study prior to filling out the survey.

2.5 Data analysis

The data collection was done using Google Forms and cleaned using Microsoft Excel. The final datasets were integrated and analyzed using the Statistical Package for the Social Sciences (SPSS version 21). The sociodemographic characteristics of respondents were subjected to descriptive statistical analysis, and the results were presented as mean ±SD, frequency, and percentages. A correlation analysis was conducted to determine the relationship between medication recommendation, vaccination status, and vaccination willingness and demographic characteristics. All statistical tests were deemed significant with a p-value < 0.05 and a 95% confidence interval.

3. Results:

3.1 Demographic characteristics

A total of 1077 individuals participated in this current study, most of which were males (51.3 %) compared to females (48.7%). Most participants aged between 18-30 years (77.6 %), with a smaller portion over 30 years old (19.2%). Additionally, most of the participants were students (49.4 %), having undergraduate education level (58.6 %) or having attained graduate-level education (32.8%), with a considerable number are professional workers (32.4%). Finally, most indicated residing in urban areas (74.5%). The details regarding demographic characteristics can be seen in **Table (1)** .

3.2 Public's knowledge of COVID-19 virus nature and origin

Most participants (57.1%) believed that COVID-19 is a naturally occurring human virus, while others (38.7%) believed it has a bacterial origin. A considerable number (43.5%) believed it to be a laboratory-created virus or a punishment from God (50 %). The detail can be seen in **Table (2)** .

3.3 Public's knowledge of COVID-19 disease susceptibility, self-protection measures, and antibiotics and antimalarial use

The majority of the participants opinioned that the COVID-19 virus could infect any group of the population. However, the elder (20.4%) and co-morbidities population (13.3%) were more susceptible to COVID-19. Most of the participants (91.3%) confirmed using self-protection measures for protection against the COVID-19 pandemic, and most (66.7%) believed that antibiotics and antimalarials (chloroquine) are effective in protection against the COVID-19 pandemic, as shown in **Table (3)** .

3.4 Public's drug recommendation for COVID-19 disease

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Regarding the recommendation of antibiotics, 34.4% of the participants were recommended; the medication included antibiotics (4.9%), steroids (0.8%), and antiviral (0.5%). However, vaccination and self-protection were recommended by 3.2% and 65.8% of the participants, respectively. Almost all participants were knowledgeable about the COVID-29 symptoms (94.3%), as shown in **Table 4** .

3.5 Public knowledge regarding influenza and COVID-19 viruses and their vaccination

Most participants reported that the symptoms and vaccines for Influenza and COVID-19 are very similar. However, most participants were not vaccinated against influenza (51.8%). The participants vaccinated against COVID-19 were (90.9%), but 9.1% were still not vaccinated. The reported reasons for not-vaccinated were the ineffectiveness of the vaccine (24.5%), dependency on innate immunity (23.8%), and safety concerns regarding the COVID-19 vaccine (21.7%). The majority of the participants showed a willingness to recommend vaccination to others (76%). Most participants decided by themselves to vaccinate and opinioned that healthcare professionals should prioritize vaccination against COVID-19. The detail can be seen in **Table 5** .

3.6 Correlation of demographics with medication recommendation, influenza and COVID-19 vaccination

The vaccination status against COVID-19 vaccination was significantly correlated with Education ($r = -0.067$, $p < 0.05$). The details can be seen in **Table 6** .

Discussion

Understanding the public perception of COVID-19 is crucial for effective public health management, policymaking, communication, and addressing the social and economic impacts of the pandemic. It can influence public health outcomes by affecting peoples' adherence to preventive measures, such as wearing masks, social distancing, and vaccination. It can also impact policymaking decisions and help policymakers develop appropriate responses to address the social and economic impacts of the pandemic. Furthermore, understanding the public's concerns and beliefs can enable health officials and policymakers to communicate effectively and address misinformation and rumors that could lead to further confusion and fear .

Since the beginning of the COVID-19 pandemic, several studies have examined the public's perception of the outbreak in Pakistan from various perspectives. For instance, Khyzar Hayat et al. conducted a rapid online survey within two weeks of the outbreak to assess the public's general knowledge about it in different areas of Pakistan . Ot her studies by Taaha Muddassir Mirza et al. , Muhammad Arslan Iqbal et al. , Narendar KUMAR et al. , Saadullah Khattak et al. , Sammina Mahmood et al. , and Zoya Fatima Rizwan Ladiwala et al. have examined the Pakistani public's knowledge, perception, and preventive measures regarding COVID-19. Muhammad Junaid Tahir et al. have investigated the attitudes of the Pakistani population toward COVID-19 vaccination. This research aimed to provide a comprehensive understanding of the Pakistani public's perception of COVID-19 and the impact of education on their perception of the pandemic.

Concerning sample distribution in this study, age is a critical factor, as it may influence participant's level of knowledge and cognitive abilities; therefore, our findings confirmed the intimate link between age and knowledge, corroborating with previous studies' findings . Furthermore, the large proportion of educated participants in this study suggests a potential correlation between higher levels of education, and improved perception and knowledge of COVID-19. Educated individuals are likely to have higher critical thinking and access to information resources, resulting in greater awareness, comprehension of health hazards and preventive measures . Additionally, the fact that the overwhelming majority of the participants resided in urban areas suggests that their experience and perception may differ from those living in rural areas. Moreover, individuals with a higher socioeconomic status were found to possess greater knowledge about the diseases, display optimistic attitudes, and engage in reasonable practices to prevent their spread . Interestingly, no significant association was observed between gender and perception, susceptibility to complications, and relationship with influenza, which is opposite to what was mentioned by Hayat et al. , and Mahmood et al. . These findings suggest that gender may not significantly determine an individual's

knowledge and attitudes about COVID-19. However, further research is needed to explore other potential factors that may influence individuals' perceptions and behaviors related to the disease, especially in cities where females have no right to pursue their high education unless under special circumstances.

Since the onset of the COVID-19 pandemic, numerous hypotheses have emerged regarding its origin. Of particular interest is the contention that SARS-CoV-2 virus was laboratory engineered as part of an effort to produce an AIDS vaccine. Another hypothesis suggested that the virus may have been inadvertently released by a trainee at the Wuhan Institute of Virology in China. These conjectures have contributed to the notion that COVID-19 is a laboratory-manufactured bioweapon . In contrast, the belief that COVID-19 has a bacterial origin, despite its acronym indicating a viral origin, suggests that a substantial portion of the population still lacks awareness about the COVID-19 acronym and its corresponding meaning. The COVID-19 pandemic has also been approached through a religious lens . Since Pakistan has a predominantly Muslim population, participants were queried about their perspective on whether COVID-19 represents a divine punishment. Half of the participants (50%) affirmed that they believed COVID-19 to be a punishment from God. This outcome highlights the importance of spirituality in Pakistan.

Furthermore, half the participants (50.2%) believed the virus may have been transmitted to humans from an animal host. This perspective is supported by scientific evidence indicating that bats serve as the primary reservoir hosts of SARS-CoV-2 . However, it does not necessarily suggest that COVID-19 can directly transmit to humans from animals, particularly bats. Similarly, a significant proportion (56.7%) maintained that COVID-19 is nothing more than a toxic gas that solely affects the respiratory system rather than a microbial organism. These findings imply that a lack of adequate medical knowledge may impair the public's capacity to comprehend scientific news or that the scientific reports presented on social media may not be sufficiently comprehensible for general publicity.

Regarding the prevalence of the COVID-19 pandemic, it is noteworthy that as of 12:37 am CEST, 26 April 2023, the World Health Organization has reported 764,474,387 confirmed cases of COVID-19, with 6,915,286 recorded deaths globally . Despite this, a significant majority of the participants (75.7%) believed COVID-19 could be fatal. Nevertheless, a minority (33.8%) believed it was not an excessively severe life-threatening affliction. These outcomes suggest that despite the high global mortality rate, many individuals may lack awareness of the fatal effect of COVID-19 or express skepticism regarding the reliability of global health authorities and statistical data. Taking it all together suggests that knowledge promotion could contribute to the relative success of future public health measures enforced in Pakistan.

This research also assessed participants' knowledge of COVID-19 disease susceptibility. Based on the results, it is suggested that participants have linked the severity and life-threatening consequences of COVID-19 with elderly individuals, possibly due to their perception of the higher vulnerability of this population group. This perception is consistent with previous studies that have reported higher susceptibility to COVID-19 in older adults , pregnant women , , or those with chronic co-morbidities , including cancer and transplantation patients . However, it is important to note that COVID-19 can affect individuals of all ages , and younger individuals can also experience severe symptoms and complications, in particular, mentally and financially . This highlights the need for continued public health efforts to promote accurate information about COVID-19 susceptibility, effective prevention measures, and treatments, particularly among those who may be less informed or have limited access to information. By raising awareness about the potential risks of COVID-19 for all age groups and providing accurate information about prevention and treatment, public health officials can help to mitigate the spread of the disease and reduce the incidence of severe complications.

Regarding prophylaxis and preventive measures against COVID-19, most participants showed an acceptable understanding with high adherence to preventive measures, including using masks and hand sanitizers to minimize the risk of infection. In contrast, exceeding half of the participants have used or recommended specific medications such as antibiotics and chloroquine or suggested self-protection, despite the lack of evidence to support these claims, indicating a potential lack of awareness about the risk and benefits of medications. The findings obviously indicated the participants have mixed up the use of drugs for prophylaxis or treatment purposes. This delusion led the participants to recommend some prescription-

required medications, such as antibiotics, antiviral, anticoagulants, and steroids. Such drugs are intended for prophylactic use and require specialized medical supervision. The misuse of such medications can result in severe or even lethal consequences that could be more harmful than the pandemic itself. These findings emphasize the critical need to increase participants' health education and improve their health knowledge, especially regarding over-the-counter (OTC) medications and their appropriate use. People must be educated that non-specialized individuals should not recommend specific medications to others, and the general public should be aware of the potential risks and benefits of medications and consult medical professionals for guidance.

The results suggest that people have a good understanding of the similarities between COVID-19 and seasonal influenza. They also showed acceptable knowledge regarding the vaccine priorities. These findings underscore the importance of targeted health education campaigns to address vaccine hesitancy and improve public knowledge about the benefits of COVID-19 vaccination.

Conclusion and limitation

In conclusion, the present study provides valuable insights into the perception of the Pakistani public regarding various aspects of COVID-19; the findings highlight the importance of continued public health efforts to promote and ensure access to effective prevention measures, particularly in vulnerable populations who may face barriers to obtaining protective equipment. The study also highlights the critical demand for sustained public education initiatives that advocate accurate knowledge about COVID-19 susceptibility, effective prevention measures, and treatments, especially for less informed people or those with limited information access.

Furthermore, participants' knowledge of the disease's nature, the causative organism, and the risk of complications showed the experience accumulated from previous outbreaks, such as SARS and H1N1. These outcomes will significantly implicate policy development and health interventions that aim to improve the efficiency of COVID-19 prevention measures in public.

Nevertheless, some limitations have been claimed to this study, including the use of an online survey and self-reported data, in which individuals with no internet access or have discomfort using online platforms may be excluded, resulting in biased samples, as they might hold opinions that differ than those who participated. The study also relied on self-reported data subject to social desirability or recall bias. Some individuals may provide inaccurate responses based on socially acceptable behaviors rather than their own beliefs, which may influence the study's ultimate conclusion.

Moreover, further research is required to investigate other potential factors that may influence public perceptions and behaviors toward the pandemic, especially in regions where females may encounter challenges to pursue higher education, unless under special circumstances. Less educated individuals may have implications for the generalizability of the study findings, as they may have different perceptions and behaviors toward the COVID-19 pandemic than educated individuals. Therefore, to ensure the applicability of the findings across various demographic groups and geographic regions, future studies should consider incorporating a broader range of populations from different ages, levels of education, and geographic locations.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analysed in this study.

ETHIC STATEMENT

Not applicable.

References

Tables

Table 1 Demographic characteristics of the participants.

Variables	Variables	N (%)
Gender	Male	552 (51.3)
	Female	525 (48.7)
Age (Year)	<18	34(3.2)
	18-30	836(77.6)
	>30	207(19.2)
Education	Illiterate	8(0.7)
	Below secondary education	14(1.3)
	Secondary education	69(6.4)
	Higher secondary education	2(0.2)
	Undergraduate	631(58.6)
	Graduate	353(32.8)
Occupation	Student	532(49.4)
	Professional worker	349(32.4)
	Worker	76(7.1)
	Other	120(11.1)
Residence	Urban	802(74.5)
	Rural	275(25.5)

Variables	Variables	N (%)
A naturally occurring Human virus:	Agree	615 (57.1)
	Neutral	218(20.2)
	Disagree	244(22.7)
A lab-altered virus (Man-made virus)	Agree	469(43.5)
	Neutral	305(28.3)
	Disagree	303(28.1)
An animal disease transmitted to human (from animal to human)	Agree	541(50.2)
	Neutral	235(21.8)
	Disagree	301(27.9)
A bacterial origin:	Agree	417(38.7)
	Neutral	223(20.7)
	Disagree	437(40.6)
A punishment from the God	Agree	538(50.0)
	Neutral	275(25.5)
	Disagree	264(24.5)
A serious and fatal (Critical) virus	Agree	815(75.7)
	Neutral	190(17.6)
	Disagree	72(6.7)
A serious but not fatal	Agree	364(33.8)

	Neutral	289(26.8)
	Disagree	424(39.4)
A toxic gas effect on the respiratory system (Breathing system)	Agree	611(56.7)
	Neutral	197(18.3)
	Disagree	269(25.0)

Table 2 Perception of the participant regarding the COVID-19 virus

Table 3 Participant perception regarding COVID-19 susceptibility, self-protection, and antibiotics and anti-malarial use in the COVID-19 pandemic.

Variables

In your opinion, who is the most susceptible to severe COVID-19 pandemic?

Do you know anyone infected with COVID-19?

Are you afraid to get infected with the COVID-19 pandemic?

Do you think you have come in contact with COVID-19?

Do you think it is important to have protection measures (such as masks, hand sanitizers, etc.)?

Do you have protection measures (such as masks, hand sanitizers) in your place?

Do you believe medications such as antibiotics, Chloroquine, and/or herbal remedies can protect you against the COVID-19

Table 4 Participant's recommendation of medication and knowledge about the COVID-19 pandemic.

Variables	**Variables**	**N (%)**
Do you recommend any medications for people in your circle (area) as protection against the COVID-19 pandemic?	Yes	371 (34.4)
	No	706 (65.6)
Class of medication recommended by the participants	Antibiotics	18 (4.9)
	Antiviral	2 (0.5)
	Antibiotics and Antimalarial	1 (0.3)
	Antibiotics and symptomatic treatment	11 (3.0)

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	Antibiotics and antiviral	1 (0.3)
	Anticoagulant	1 (0.3)
	Antibiotics, steroids, and symptomatic treatment	2 (0.5)
	Herbal remedies	9 (2.4)
	Symptomatic and herbal remedies	5 (1.3)
	Symptomatic treatment	60 (16.2)
	Steroids	3 (0.8)
	Vaccination	12 (3.2)
	Vaccination and antibiotics	1 (0.3)
	Vaccination and symptomatic treatment	1 (0.3)
	Self-Protection	244 (65.8)
Do you know the symptoms of the COVID-19 pandemic include fever, fatigue, dry cough, loss of smell and/or taste, and muscle pain?	Yes	1016 (94.3)
	No	61 (5.7)
Do you know any other symptoms of the COVID-19 pandemic other than the above symptoms?	Yes	350 (32.5)
	No	727 (67.5)
Other symptoms reported by the participants	Respiratory Symptoms	94 (44.8)
	Psychological symptoms	6 (2.9)
	Multiple organ Symptoms	12 (5.7)
	General symptoms	98 (46.7)

Table 5 Participants' perception regarding influenza and COVID-19 viruses and their vaccination.

Variables	Variables	N (%)
To which extent do you think symptoms of COVID-19 are similar to Seasonal Influenza?	No similarity	69 (6.4)
	Small similarity	233 (21.6)
	There is a similarity, but don't know how much similarity between them	340 (31.6)
	Large extent	1 (0.1)
	There is a big similarity	434 (40.3)
Have you ever been vaccinated against Seasonal Influenza?	Yes	356 (33.1)
	no	558 (51.8)
	I don't remember	163 (15.1)
To what extent do you think there is a similarity between the COVID-19 vaccine and the Seasonal Influenza vaccine?	No similarity	228 (21.2)

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	Small similarity	198 (18.4)
	Large extent	390 (36.2)
	There is a big similarity	261 (24.2)
Have you ever been vaccinated against the COVID-19 pandemic?	Yes	979 (90.9)
	No	98(9.1)
Are you willing to get the COVID-19 vaccine?	Yes	434 (72.0)
	No	169 (28.0)
Reason for non-vaccination against COVID-19	The COVID-19 vaccine is safe and effective, but I would prefer to depend on my innate immunity	26 (9.0)
	The COVID-19 vaccine is safe and effective, but I would prefer to depend on my innate immunity	69 (23.8)
	Due to the cost of the vaccine	15 (5.2)
	Fear of vaccination due to weakened immune system, it is not safe and could be lethal	63 (21.7)
	I believe that the COVID-19 vaccine is not effective	71 (24.5)
	I believe there is no such thing called COVID-19, so I don't need to take any vaccines	30 (10.3)
	The vaccine is not available in my area	16 (5.5)
Do you know people who are NOT willing to get vaccinated?	Yes	655 (60.8)
	No	422 (39.2)
Do you recommend for those who are NOT willing the vaccination to get vaccinated?	Yes	819 (76.0)
	No	258 (24.0)
Who recommends you get the COVID-19 vaccine?	I decided myself to get vaccinated	641 (59.5)
	Family member or friend	174 (16.2)
	Govt. policy to get vaccinated	40 (3.7)
	A physician or other medical professional	85 (7.9)
	Social media or TV	137 (12.7)
In your opinion, which of the following has the priority to receive the COVID-19 vaccine?	18 years old or younger	25 (2.3)
	People older than 65 years	145 (13.5)
	Healthcare providers in direct contact with patients	391 (36.3)
	All of the above	484 (44.9)
	None	32 (3.0)

Table 6 Correlation of demographics with medication recommendation and influenza and COVID-10 vaccination.

Variables	Variables	Gender	Age	Education	Occupation	Residence
Do you recommend any medications for people in your circle (area) as a protection against the COVID-19 pandemic?	r	-.012	-.002	.030	.013	.017
	P-value	.686	.953	.322	.668	.584
Have you ever been vaccinated against Seasonal Influenza?	r	-.003	-.003	.009	-.036	.017
	P-value	.933	.919	.765	.236	.583
Have you ever been vaccinated against COVID-19 pandemic?	r	.021	.045	-.067*	-.021	-.008
	P-value	.494	.136	.028	.495	.804
If you answered for the above question with "Yes" please jump to the question number 4. If you answered "No" then please answer this question: - Are you willing to get COVID-19 vaccine?	r	.033	-.016	-.054	.006	-.065
	P-value	.424	.687	.183	.891	.111

*	**	**	**	**	**	**
Correlation is significant at the 0.01 level (2-tailed).	Correlation is significant at the 0.01 level (2-tailed).	Correlation is significant at the 0.01 level (2-tailed).	Correlation is significant at the 0.01 level (2-tailed).	Correlation is significant at the 0.01 level (2-tailed).	Correlation is significant at the 0.01 level (2-tailed).	Correlation is significant at the 0.01 level (2-tailed).
Correlation is significant at the 0.05 level (2-tailed).	* Correlation is significant at the 0.05 level (2-tailed).	* Correlation is significant at the 0.05 level (2-tailed).	* Correlation is significant at the 0.05 level (2-tailed).	* Correlation is significant at the 0.05 level (2-tailed).	* Correlation is significant at the 0.05 level (2-tailed).	* Correlation is significant at the 0.05 level (2-tailed).