QATAR UNIVERSITY

COLLEGE OF HEALTH SCIENCES

COVID-19 VACCINATION KNOWLEDGE AND HESITANCY AMONG STUDENTS

AND EMPLOYEES AT QATAR UNIVERSITY; A CROSS-SECTIONAL STUDY

BY

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ABSTRACT

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Title: <u>COVID-19 Vaccination Knowledge and Hesitancy Among Students and Employees at Qatar University; A Cross-Sectional Study</u>

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Introduction: Vaccines are the most important and cost-effective public health tools known to control and prevent many infectious diseases. However, concerns regarding the safety and the need for a vaccine and reluctance and hesitancy towards vaccinations is a rising matter. Due to the emergence of the novel COVID19, high vaccine uptake will be needed to control the pandemic. Therefore, the aim of this study is to (1) assess the knowledge and attitude towards COVID19 and (2) determine the factors that influence acceptance to COVID19 vaccine. **Methods:** A cross-sectional study was done through a survey distributed among Qatar University students and faculties. SPSS software was used to perform the statistical analysis. **Results:** A total of 462 of QU staff and students participated in this study. Among our participants, 62.6% of respondents stated that they were willing to take the COVID-19 vaccine, while 37.4% were unwilling to vaccinate. Significant difference was found between gender, age, education level and nationality and willingness to vaccinate. 53% of our participants presented with a high knowledge score. The most common reason for not willing to vaccinate was vaccine safety. Side effects, length of vaccine development, importance of flu vaccine and COVID-19 news update were factors influencing vaccination acceptance and hesitancy. No significant difference was found between source of information and willingness to vaccinate. **Conclusion:** With the current COVID-19

disease spreading widely across the globe, our study provides insights into individuals

knowledge and hesitancy to a COVID-19 vaccine and understanding of factors and

determinates that influence willingness to vaccinate.

DEDICATION

This project is dedicated to my beloved parents, sisters and husband for their

unconditional love, advice and support throughout my master's journey.

And without whom none of my success would be possible.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

1.1 Research Background

The most important and cost-effective health approach known for controlling and decreasing spread of various infectious diseases are vaccines (Eskola et al., 2015). Vaccines are biological products that are synthetically made to provide immunity to certain diseases. They are produced from killed or weaker forms of a pathogen and stimulate the immune system to create antibodies when injected into the body (Delany et al., 2014). The advancement and widespread use of vaccines has proven to improve the health and well-being worldwide eliminating and eradicating the spread of different bacteria and viruses infections for example smallpox, rabies, polio, typhoid, the plague and several others (Harrison & Wu, 2020).

In spite of every effort to ensure the circulation and use of vaccines among the population, there are yet people and groups who have worries about the safety and the need for a vaccine, showing reluctance and hesitancy receiving vaccinations. The World Health Organization (WHO) considers vaccine hesitancy a worldwide issue, as a result, in 2019, it was recognized as one of the top ten threats influencing global health (Harrison & Wu, 2020). In 2015, the WHO Strategic Advisory Group of Experts (SAGE) developed a definition to vaccine hesitancy. They formed a Working Group (WG) to work on vaccine hesitancy and tackle the global challenge to mistrust and non-acceptance of vaccines worldwide. Vaccine hesitancy is a dynamic concept of indecisiveness towards accepting a vaccination, despite evidence of importance of vaccine in preventing diseases and availability of vaccination services (Larson et al., 2014). Vaccine hesitancy activists and groups use social media and online campaigns to spread the believe that vaccinations are unsafe (Wilson & Wiysonge, 2020). As a result, communities have changed from concerns of spread of serious diseases to

concerns about safety of the vaccine. As vaccine uptake decreases among the public, the risk for infectious disease outbreaks increases (Eskola et al., 2015).

In late 2019, the global spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), commonly known as "COVID-19", has presented a major problem to the public health, inflicted devastating worldwide economic damage (Muqattash et al., 2020). COVID-19 emerged as an infection of the respiratory system and was characterized as a global pandemic on the 11th of March, 2020 (Reiter et al., 2020). Although the focus of attention is towards the development of an effective COVID-19 vaccine, policymakers, public health sectors and governments should be ready for the forthcoming challenge of potential acceptance of the vaccine.

Causes behind decisions to delay or refuse vaccinations vary widely. The fast-tracking of vaccine development has additionally intensified public concerns and could compromise willingness to vaccinate (Goldman et al., 2020). In addition, multiple media channels spreading misinformation could have a substantial influence on attitudes towards a COVID-19 vaccine (Wilson & Wiysonge, 2020). Overall vaccine hesitancy and doubt in vaccine safety and novelty are amongst the main limitations concerning the COVID-19 vaccine acceptance (Thunstrom et al., 2020).

Since a COVID-19 vaccine is now accessible in Qatar, high vaccine uptake rates will be needed to ensure that satisfactory immunization levels are reached and sustained in the near future. That is why, it is crucial that hesitation of individual or community towards being immunized is addressed and understood better.

1.2 Study Aims and Objectives

The purpose of this study is to assess the knowledge level and hesitancy of COVID-19 disease and vaccination among Qatar University students and employees. We also aim to understand the factors and determinants that might be influencing acceptance of COVID-19 vaccine. The study will help to understand whom within the population is hesitant about vaccination, what their attitudes and concerns are and what are the various possible reasons that is driving this hesitancy.

Specific objectives:

1. To determine acceptance rates towards COVID-19 vaccine among QU students and employees.

2. To assess the level of knowledge towards COVID-19 virus, disease and vaccine.

3. To understand the attitudes and hesitancy facing COVID-19 vaccination.

4. To investigate the major factors influencing COVID-19 vaccine acceptance

CHAPTER 2: LITERATURE REVIEW

2.1 Vaccine History

In the last century, vaccines have been a major discovery and revolution for mankind so much so that they were identified as one of the "Top Ten Greatest Public Health Achievements" (*Ten Great Public Health Achievements --- United States, 2001--2010*, n.d.). Vaccines have shown to be the most valuable medical intervention to protect people from various infectious diseases and saving 2 to 3 million lives per year (Delany et al., 2014). The earliest practice of vaccination, or as it was called inoculation, can be traced back to a letter written in 1722 that was send to the Court of St James's (the Royal Court in the UK) by Cassem Aga, the Ambassador of Tripoli and a Fellows of the Royal Society in London (Shetty, 2011). The letter documents the use of pus from smallpox patients to immunize healthy children, a practice that was common in the Arab world (Shetty, 2011). In 1796, Edward Jenner used material from humans infected by cowpox disease to prevent smallpox disease (Delany et al., 2014). This lead to the eradication of smallpox virus in the Western countries in 1980 (Plotkin, 2005). Many other viral infections that traditionally caused childhood diseases have been almost eradicated through vaccines and national immunization programs, including the almost complete elimination of polio virus and a reduction of 95% of deadly diseases caused by diphtheria, pertussis, tetanus bacteria and measles, mumps and rubella diseases (Rappuoli et al., 2011).

Vaccines are made from biological products that enhance the body's immunity to protect and prevent diseases. This is accomplished through the injection of microorganisms acting as antigen to stimulates the production of antibodies (Delany et al., 2014). Vaccines have been developed to generate immunity through using methods comprising mostly of either killed (inactivated), live (attenuated), subunits,

polysaccharides, toxoids or recombinant type (Rappuoli et al., 2011). Distinct from other medicines, vaccine have an effect on not just the individual but also the community's health and safety.

2.2 Vaccine and Vaccination Hesitancy

In order to decrease the mortality and morbidity of vaccine-preventable infections and improve the community's health, high vaccine acceptance rates must be achieved through successful immunization programmes (Eskola et al., 2015). Consequently, monitoring and regulating the widespread of diseases relies on the uptake of vaccines among the general population. However, this is not always the case since skepticism and rejection of vaccination remains a major health concern among many in the public (Paoli et al., 2019).

One element that has come to be progressively important to vaccination coverage is vaccine hesitancy. The vaccine refusal and hesitancy problem are a worldwide complex issue and have various contributing factors, including medical, ethical and legal issues. A milestone in vaccine hesitancy was in 1998, when a study published by *The lancet* journal found that autism is strongly associated with the triple measles, mumps, and rubella (MMR) vaccine given to children (DeStefano & Shimabukuro, 2019). This study caused fall in children vaccination in the UK to 80% (*Refuting A Lie That Won't Die*, n.d.). In 2010, the study was retracted by the journal after they discovered that it was a fraud. The author had multiple undeclared conflict of interest including financial interests with pharmaceutical companies and that he manipulated the evidence (DeStefano & Shimabukuro, 2019). As per a global survey study on the State of Vaccine Confidence in 2016, 20% out of 67 countries showed to have reduced confidence towards the safety and effectiveness of vaccine, and 15% felt

that vaccines were insignificant (Larson et al., 2016). The most skepticism towards vaccination were reported in countries such as Azerbaijan, Russia, and Italy and France. Among Europe , skepticism is mainly on vaccine safety (Larson et al., 2016)

2.3 WHO Strategic Advisory Group of Experts on Vaccine Hesitancy

In 2015, the WHO Strategic Advisory Group of Experts on Immunization (SAGE) launched a Working Group due to the recognized increase of the adverse effects of hesitancy on vaccination acceptance (Hickler et al., 2015). Thus, SAGE attempted to provide a tight explanation to the hesitancy phenomena and developed the first definition of "Vaccine Hesitancy". Vaccine hesitancy was defined by the WHO-SAGE as: "*Delay in acceptance or refusal of vaccines despite availability of vaccine services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence." (MacDonald, 2015).* Although, vaccine hesitancy is a growing matter, it should be understood that is not equivalent to complete vaccine refusal or rejection (Figure 1). Vaccine hesitant individuals are heterogenous which means they might be willing to take certain vaccines and not others or they might postpone receiving vaccination but are unsure in doing so (Report of The SAGE Working Group on Vaccine Hesitancy, 2014).
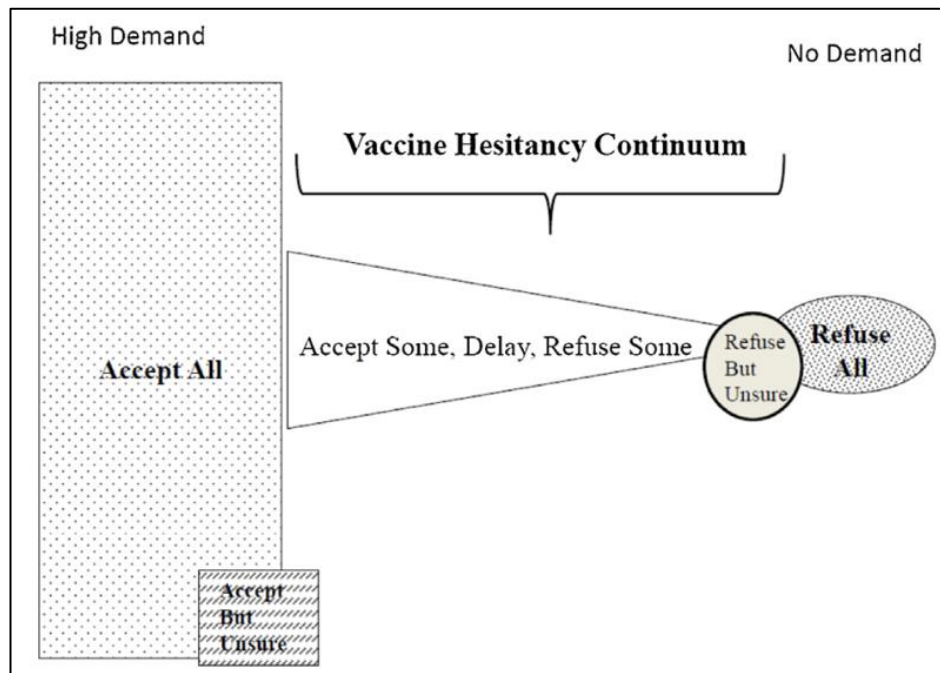
Figure 1. Range of vaccine hesitancy between full vaccine acceptance to complete refusal. (Adapted from MacDonald, N. E. 2015).

2.4 SAGE Working Group on Vaccine Hesitancy Model

In developing the definition, the SAGE WG also developed vaccine hesitancy determinants and organized them into a conceptual model. Review of this model showed behavior is affected by confidence, complacency and convenience factors, also known as the "3 C" model (Larson et al., 2014). The first C in the model is confidence, which is described as the trust in the vaccine efficacy and safety as well as reliability of the provider. Second is complacency, which means not recognizing a need or value for vaccinations, in a way people weigh the risk of receiving a vaccine against the risk of acquiring the disease. The third one is convenience, which explains the physical accessibility, quality and affordability of the vaccine (MacDonald, 2015). These factors have shown to influence individual's decision to be vaccinated and might be the cause of hesitancy.

The SAGE WG also outlined a "Model of Determinants of Vaccine Hesitancy" focusing on mainly three domains that are contextual influences, individual and social group influences and specific issues on vaccine and vaccination. The model is drawn from a collection of experiences and insights identified by the expert members of the SAGE WG. It includes a variety of factors that could be possible influencers of vaccine hesitancy (Table 1) (Larson et al., 2015).

Table 1. The SAGE WG model of determinants of vaccine hesitancy. (Adopted from Larson et al., 2015)

Factors	
Contextual influences	a. Influential leaders, individuals, immunization programme b. Politics/policies c. Religion/culture/gender/socio-economic d. Communication and media environment e. Pharmaceutical industries f. Historical influences g. Geographic barriers
Individual and social group influences	a. Immunity is a social standard against immunity is not necessary or is harmful b. Attitudes and beliefs about individual's health c. Vaccine awareness and knowledge d. Personal experience with and trust in health system/providers e. Risks/benefits f. Experience with past vaccination (e.g., pain)
Vaccine and vaccination-specific issues	a. Risk and benefits (scientifically or epidemiological) b. Vaccination schedule c. Mode or transmission/delivery d. Introduction of a new vaccine/formulation e. Reliability of vaccine supply f. Role of healthcare professionals g. Costs

2.5 Strategies for Addressing Vaccine Hesitancy

Giving the rising concern in many countries about vaccine hesitancy, public health officials, governments and national health programs must be entirely prepared to address vaccination hesitancy in order to allow the public to potentially accept immunization when one is needed (Jarrett et al., 2015). As part of good program practice, WHO encourages all countries to include a strategy to tackle and measure vaccine hesitancy (Eskola et al., 2015). However, due to vaccine hesitancy complicated nature there is no exact way of dealing with the concerns. To deal with vaccine hesitancy within a certain population, a thorough understanding of the degree of the problem is needed in order to diagnose its direct root cause. This can be done by using evidence-based strategy that is identified and tailored to address the specific root cause of an individual's hesitancy towards vaccination. Subsequently, an evaluation and monitoring of the effect of the strategy on vaccine acceptance (Eskola et al., 2015)

Moreover, according to Pogue et al. (2020), the impact of a certain diseases can significantly improve attitudes and beliefs related to vaccines if focused on the social, physical and emotional aspects. This can be done by attending lectures with a hefty emphasis on a disease that can be prevented by vaccination or talking and interviewing someone who suffered from a disease that was easily vaccine preventable. In addition, access to health information was also a positive and effective motivator seen in increasing vaccine acceptance among communities (Pogue et al., 2020). Another study showed that increase in vaccination knowledge and awareness, improving access to more convenient vaccination services and involving influential or religious leaders to encourage vaccinations, have shown a 25% increase in vaccine uptake among unvaccinated or under-vaccinated populations (Jarrett et al., 2015). The most useful intervention reported by the study was to increase knowledge and awareness about

vaccinations through education initiatives (Jarrett et al., 2015). In another study, Eskola et al. study showed that education initiative should focus mainly on hesitant health care workers (HCW), since negative attitudes of HCW towards vaccination strongly influences their patient's acceptance (Eskola et al., 2015)

2.6 Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2)

Previously, two viruses, Severe Acute Respiratory Syndrome (SARS-CoV) and the Middle East Respiratory Syndrome (MERS-CoV), of the coronavirus family, have been found to infect humans leading to more than 800 deaths (Bhagavathula et al., 2020). But before SARS-CoV and MERS-CoV, coronaviruses were not a major cause of health problems in humans. However, in December 2019 in Wuhan, China, the first human case of a new coronavirus was detected (Shereen et al., 2020). The new coronavirus was termed as Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV2). However, its more widely used global name became known as COVID-19 (Modi et al., 2020). The novel strain of the virus was not found earlier in humans and was identified as a zoonotic pathogen. It has shown to have an ecological origin in bats, although this is still controversial (Bhagavathula et al., 2020).

COVID-19 has primarily emerged as an outbreak in China but has then rapidly spread to the remainder of the world through human contact transmission (Shereen et al., 2020). Another factor adding to the fast spread is the dormancy nature of the virus signs and symptoms. A study conducted by Faasse and Newby (2020) showed that between 2 and 8 out of every 10 infections may be asymptomatic. However, the main symptoms seen were sudden onset of fever, shortness of breath and dry coughing. However, in more serious cases it can lead to acute respiratory distress syndrome

(ARDS), severe pneumonia, bacterial infections, kidney failure and eventually death (Faasse & Newby, 2020).

Ultimately, on 11 March 2020, coronavirus disease was recognized as a global pandemic by the WHO (Bhagavathula et al., 2020). By March 2020, more than 125,000 cases were confirmed infected with COVID-19 reaching across 118 countries and reporting more than 4600 death (Bhagavathula et al., 2020). Thus, the COVID-19 pandemic represents a significant health challenge among society and its economic situation. In turn, to decelerate the viral transmission, tough containment measures were taken place in majority of the countries worldwide, this includes social distancing between people, home confinement, closing of schools, malls, parks, businesses and the remote working of individuals (Ben Hassen et al., 2020).

2.7 Potential Vaccines Against SARS-Cov-2

The COVID-19 pandemic has urged rapid development of vaccines in an exceptional period. More than 180 vaccine candidates have been developed against COVID-19 and by March 2020, the first clinical trial began. Among them include; CoronaVac from Sinovac, Inactivated whole virus from Sinopharm, AdV5 vaccine from CanSino, ChAdOx1 nCoV-19 from AstraZeneca, and mRNA-1273 from Moderna, dV26 from Janssen and BNT162b1 and BNT162b2 from Pfizer (Krammer, 2020). The Food and Drug Administration (FDA) in the United States arranged immediate authorization to the two COVID-19 vaccines; Moderna and Pfizer (Meo et al., n.d.) on December 2020. Consequently, the Department of Pharmacy and Pharmaceutical Control in Qatar have been approved for use of Pfizer and Moderna COVID-19 vaccines (COVID19 Vaccine COVID-19 Vaccine, n.d.).

Pfizer and Moderna vaccines are mRNA vaccines formulated in lipid particles

and delivers mRNA into human host cells. As a result, SARS-CoV-2 S antigen is expressed to stimulate an immune response which protects against COVID-19. Additionally, Pfizer and Moderna vaccines include administration of two doses of the vaccine given apart 21 and 28 days, respectively. This is because it has shown that an immune response to only one dose of COVID-19 vaccine is fairly weak, and that a booster shot is given to provide a stronger immune reaction to COVID-19 antigen. (Livingston, 2021). Furthermore, the CEO of Pfizer recently discussed the likeliness for a third vaccine dose of Pfizer that will be given after the second dose within 6-12 months (Nishat, 2021). This could mean the COVID vaccine will be given more frequently than people earlier imagined. And could suggest booster shots will be needed similar to the seasonal flu. As a result, this might speculate a rise in vaccine hesitation in the community with people refusing to become fully vaccinated with more dosage requirements.

Side effects of COVID-19 vaccine play an important role in the vaccine uptake process and overall public confidence. As follows, studies funded by the manufacturers of COVID-19 vaccine published all data regarding the side effects which are complying with drug authorities' guidelines. However, in a study conducted in Czech Republic found that 93% of people stated that after the COVID-19 vaccine, at least one side effects was there (Riad et al., 2021).

For Pfizer vaccine, general and most common side effects includes pain and swelling in injection site, followed by fever, headache, fatigue, chills and joint/muscle pain (Riad et al., 2021). In Riad et al study (2021), side effects were more seen in participants who are less than 43-year-olds and fever was more prevalent after booster doses in 70% of participants. Additionally, Pfizer vaccine has been associated with 0.63% of rare anaphylaxis reactions (Joseph Angel De Soto MD, 2020). Anaphylaxis

reports were more commonly seen after taking Pfizer vaccine first dose (Shimabukuro & Nair, 2021). The most susceptible group to experience side effects are those on antihistamine among the allergic population since they are more easily affected by redness, headache and nausea. These rashes are also sometimes termed as "COVID arm" (CDC, 2021). As a result, people who have had previous allergic reactions should be vaccinated with precaution as per Centers for Disease Control and Prevention (CDC) (CDC, 2021). In addition, a study revealed that 5.2% of individuals stated a minimum of one skin side effect and 13% oral side effects after Pfizer vaccine. The most common seen were rashes in 62% of individuals followed by urticaria in 22%, usually among the older age group (Riad et al., 2021). Overall, the side effects was seen more among the participants who took both doses of the vaccine and not only one (Riad et al., 2021). On the other hand, side effects of Moderna COVID-19 vaccine include pain, swelling, redness at the site of vaccine. In addition to, fever grade 1-2, fatigue, headache, chills, vomiting, arthralgia, myalgia and urticaria (Joseph Angel De Soto MD, 2020). These side effects are also dose-specific (Joseph Angel De Soto MD, 2020)

Usually, soon after health problems starts to develop, people will incorrectly blame the COVID-19 vaccine and therefore will cause others to be hesitant in accepting it. Concerns also rise regarding the vaccine itself causing COVID-19. However, if a person develops the disease after the vaccination, it could be that the infection developed before the vaccine has the chance to produce antibodies and work effectively (Krammer, 2020). Furthermore, significant differences and side effects among the developed vaccines could influence the general response and hesitancy to COVID-19 vaccination.

2.8 Hesitancy Towards SARS-Cov-2 Vaccine

The genetic sequence of SARS-CoV-2 was identified and published on January, 2020 (Goldman et al., 2020). Usually, vaccines need years of research and testing before they are released for the public and before official approval. Also, any new vaccine development needs to follow a well-defined route of surveillance and trials. But during the COVID-19 pandemic, scientists and biopharmaceutical manufacturers, all around the world, rushed into clinical research for initiation and production of a safe vaccine as well as an effective one. Some vaccine candidates were even emergency fast-tracked by the US Food and Drug Administration (FDA). Vaccine licensure procedures for other infectious diseases, like Tuberculosis, Zika virus and meningococcal disease, have also observed to have been fast-tracked (Goldman et al., 2020). Furthermore, by February 8, 2021, 67 vaccines were under human trials as per The New York Times Coronavirus Vaccine Tracker (Kwok et al., 2021).

A high acceptance rate towards COVID-19 vaccine will be determined by the effectiveness of the vaccine. In Italy, a study done early during the pandemic showed that only 59% of the participants were likely to take COVID-19 vaccine (percentage includes people answered "likely" and "very likely") (Palamenghi et al., 2020). However, more recent study form the United States showed that 68% of residents plan to obtain a COVID-19 vaccine. In addition, parents' hesitancy towards having their children vaccinated has been due to safety concerns of COVID-19 vaccine (Pogue et al., 2020). Similarly, in a European study, 55% participant showed concern regarding vaccine side effects (Neumann-Böhme et al., 2020). These studies showed that the low level of COVID-19 vaccine confidence is possibly a consequence of many factors affecting decision and attitudes of individuals. This includes efficacy and safety of the vaccine, concern of side-effects, low trust in governments and health officials and low

economic and education status.

2.9 Herd Immunity and Immunization Program for COVID19

All over the world, scientists have united in an effort to develop a successful vaccine against COVID-19 infectious disease. Nonetheless, the spread of the disease relies on vaccine uptake and herd immunization. Generating herd immunity against COVD-19 virus will have a higher chance in protecting communities and countries, and limiting the spread of the disease (Thunstrom et al., 2020). Even though COVID-19 is a recently discovered virus, it is possible to have acquired partial immunity due to possible antibody production from cross-reactivity with previous common coronaviruses (Kwok et al., 2020)

Furthermore, a study done by Thunstrom et. al. (2020) displayed that to reach herd immunity in the U.S. 69.6% of the population should be immune either from a vaccine or a previous infection (Thunstrom et al., 2020). On the other hand, based upon data from outbreaks in China, when 82.5% of the population is immunized, that is when herd immunity will be likely achieved with COVID-19 vaccine (Kwok et al., 2020). Similarly, it was found that individuals are more willing to reject any novel vaccines than common known ones, and therefore the novel COVID19 vaccine hesitancy will be a barrier to reaching herd immunity in the populations (Thunstrom et al., 2020).

On 29 February 2020, Qatar has registered its first confirmed case of novel coronavirus. Among the Arab region, Qatar was recognized as having the second highest number of COVID-19 cases by July 2020 (Ben Hassen et al., 2020). As of January 2021, Qatar has reached 160,426 confirmed cases of COVID-19 along with 256 deaths (*Qatar Coronavirus (COVID-19) Statistics.*, n.d.). In order to better tackle and control COVID-19 pandemic in Qatar, the reasons of vaccine hesitancy need to be better comprehended. For this reason, this paper aims to assess the knowledge and

hesitancy towards COVID-19 vaccination among Qatar University employees and students. In turn, this will help the government and public health officials to tailor targeted interventions aiming at increasing COVID-19 vaccination uptake in Qatar and focus on finding motivating factors that will promote vaccination.

CHAPTER 3: METHODOLOGY

3.1 Ethical Approval

Ethical approval for this study has been reviewed and approved by Qatar University Institutional Review Board (IRB# QU-IRB 1404-E/20) (Appendix A). An online consent form was provided to participants prior to start of this study. All participants were provided with an informed consent regarding the anonymity, confidentiality and voluntary nature of the study (Appendix B).

3.2 Study Design and Setting

The study design is a descriptive cross-sectional web-based study that was conducted among QU students and employees. A link to the online survey was sent through QU email announcements with the help from the Institutional Survey Research, Institutional Research and Analytic Department at QU. Those who followed the link were asked to confirm their interest, agreement and consent to the study. Data for this study was collected during February 2021. Applying Cochran's sample size formula using 95% confidence interval and 5% margin of error, the sample size for this study has been estimated to be approximately 385 participants. Pilot testing was conducted by face-to-face interviews on ten participants before distributing the survey to validate and assess the comprehensibility, feasibility and any possible errors in the survey. The questions have been reformulated for the ease of understanding following the comments given by the participants in the pilot study. Pilot study participants were then omitted from the main study.

3.3 Study Participants

Participants for this study included Qatar University students, both graduates and undergraduates, faculty members and administrated staff from all QU colleges.

Only participants who were aged 18 years or above were eligible to partake in this study. Those who did not meet the criteria were excluded from the survey prior clicking on the link.

3.4 Questionnaire

The questionnaire used in this study is based on an online self-administered questionnaire using Blue survey online software tool (*Blue | Experience Management Platform | Survey and Evaluation Software*, n.d.). Questions were adopted from previously published and validated instrument (Pogue et al., 2020). Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM) were carried out by Pogue et al. 2020 study questionnaire in order to determine the relationships between multiple items and to confirm factors were measured appropriately by each variable (Figure 2).
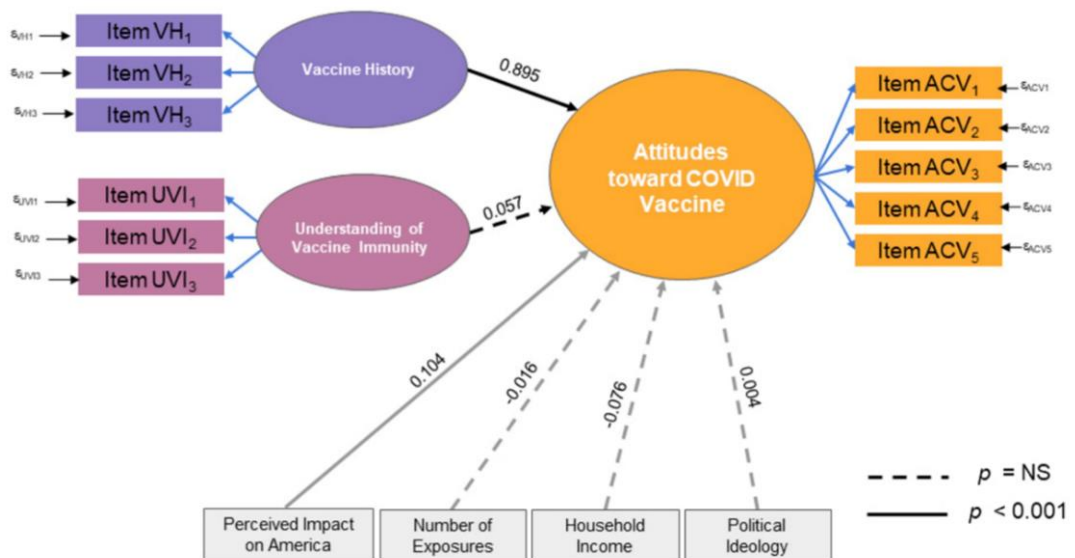
Figure 2. Design of the structural equation model obtained from Pogue et al. (2020)

The study questions were originally in English and then translated into Arabic language. The survey instrument consisted of eight sections that included 48 questions (Appendix C). The first part of the survey entails six questions on demographics including gender, age, nationality, student/employee, colleges and level of education. The rest of the survey consists of questions to assess the participant's knowledge about the disease, virus and vaccine, as well as experience with COVID-19 pandemic. Other items in the questionnaire asks about history of vaccinations and understanding of vaccine immunity. Additionally, items in the questionnaire were used to measure variables with an association with intent to get the vaccine against COVID-19. Such questions had options such as "I would vaccinate myself" or "I would not vaccinate myself". Overall participant's attitude, intentions and hesitancy towards a COVID-19 vaccine were assessed based on follow up questions as to the reasons why they choose not to vaccinate against COVID-19.

3.5 Data Analysis

For the quantitative data analysis of this study, results were tabulated and extracted in excel and analyzed using SPSS® Statistics V26.0 (IBM Statistics, Chicago, IL, USA). Descriptive statistics were performed to calculate frequency, cumulative percentages, mean and standard deviation. Frequency table was constructed to determine the proportion of study subjects that answered the survey questions. Cross tabulation and statistical Chi-Square test were done to assess the relationship of each demographics variable and willingness to vaccinate against COVID-19. Furthermore, knowledge level score was obtained, and independent t-test was used to determine significance difference between mean values of willing and unwilling to vaccinate. Frequency calculations, chi-square tests and logistic regression analysis were also used

to analyze each question measuring attitudes and factors influencing COVID-19 hesitancy. Partial correlation was used to measure the correlation between COVID-19 vaccine and willingness to vaccinate. This is done by controlling age, gender, nationality and level of education as interfering variables.

CHAPTER 4: RESULTS

4.1 Sociodemographic Characteristics

This study consisted of a total of 462 questionnaire responses collected from students, faculty and administrated staff at Qatar university. The majority of the respondents of this study were females (n=289, 62.6%) whereas only 173 (37.4%) were males. Among the respondents, the most frequently encountered age group was 18-24, accounting for 32.7%, followed by 25.3% were 25-34 years old, 18.4% were aged from 35-44 years and 23.6% were 45 years and above. The non-Qatari nationality (N=254, 55%) outnumbered the Qatari nationality (N=208, 45%). In our study, students and employees of QU participated equally (N=231). Also, participants from all different colleges contributed to the survey with highest involvement seen from Arts and Science College (23.3%), followed by college of Business and Economics (16.5%), Engineering (14.3%), Education (8.7%), Law (6.7%), Sharia and Islamic Studies (3.7%), Health Science (4.3%), Medicine (1.9%), Pharmacy (1.3%) and dental medicine (0.2%). Others (17.7%) were employees from departments such as Information Systems, Human Resources, Academic Advising etc. 58.4% of our respondents had a diploma or undergraduate degree and 41.6% had a post-graduate degree (MSc/PhD) (Table 2).

Table 2. Sociodemographic variables of the study population (N = 462)

Demographic	Variable category	N	%
Gender	Male	173	37.4
	Female	289	62.6
Age	18 – 24 years	151	32.7
	25 – 34 years	117	25.3
	35 – 44 years	85	18.4
	45+ years	109	23.6
Nationality	Qatari	208	45
	Non-Qatari	254	55
Status	Student	231	50
	Employee	231	50
College	Business and Economics	76	16.5
	Arts and sciences	107	23.2
	Education	40	8.7
	Engineering	66	14.3
	Health Sciences	20	4.3
	Law	31	6.7
	Medicine	9	1.9
	Sharia and Islamic Studies	17	3.7
	Pharmacy	6	1.3
	Dental Medicine	1	0.2
	Others	82	17.7
Education level	Diploma/undergraduate	270	58.4
	Post-graduate	192	41.6

4.2 Acceptance Towards COVID-19 Vaccine

In our study, out of 462, 454 responded when asked "I am likely to be vaccinated for COVID-19 when a vaccine becomes available" and 8 did not respond, among those responded, 62.6% (284/454) where willing to vaccinate against COVID-19, while 37.4% (170/454) were not willing to vaccinate (Figure 3).
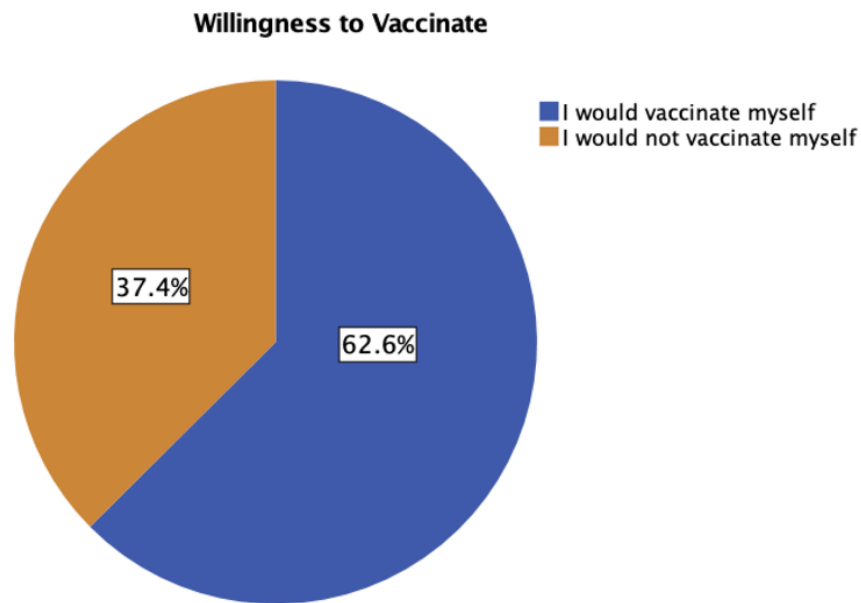
Figure 3. Participant's willingness to be vaccinated for COVID-19 using SPSS® software (N=454).

Furthermore, we found a relationship between demographics variable and willingness to vaccinate (Table 3). Higher percentage of acceptance towards COVID-19 vaccine was seen among males than females ($P<0.001$). Also, the most age group willing to accept a COVID-19 vaccine was the 45 years and older age group (80.2%), whereas the younger aged participants (18-24 years) fall equally between willing and not willing to vaccinate (Figure 4). This was also observed in the student population of our participants, since most of them fall between 18-24 years of age, 49.8% were

willing and 50.2% were not willing to vaccinate. Unlike the students, only 24.4% of employees at QU choose not to vaccinate themselves. Education level also showed significant difference, MSC/PhD holders are more likely to get the vaccine than Diploma/Bachelor holders ($P<0.001$). Lastly, there was also significant difference seen with nationality, with more non-Qataris (71.9%) accepting the vaccine than the Qatari nationals (51.2%)

Table 3. Willingness to be vaccinated against COVID-19 by characteristics using SPSS® software (N = 454).

Demographic	Variable category	Would vaccinate (N=284)	Would not vaccinate (N=170)	X^2	*P*
Gender	Male	123 (72.9%)	46 (27.1%)	12.019	<0.001
	Female	161 (56.7%)	124 (43.3%)		
Age	18 – 24 years	77 (51%)	74 (49%)	30.911	<0.001
	25 – 34 years	61 (53.5%)	53 (46.5%)		
	35 – 44 years	61 (73.5%)	22 (26.5%)		
	45+ years	85 (80.2%)	21 (19.8%)		
Nationality	Qatari	105 (51.2%)	100 (48.8%)	20.504	<0.001
	Non-Qatari	179 (71.9%)	70 (28.1%)		
QU Status	Student	114 (49.8%)	115 (50.2%)	32.186	<0.001
	Employee	170 (75.6%)	55 (24.4%)		
Education level	Diploma/Bachelors	136 (50.9%)	131 (49.1%)	37.358	<0.001
	Masters/PhD	148 (79.1%)	39 (20.9%)		
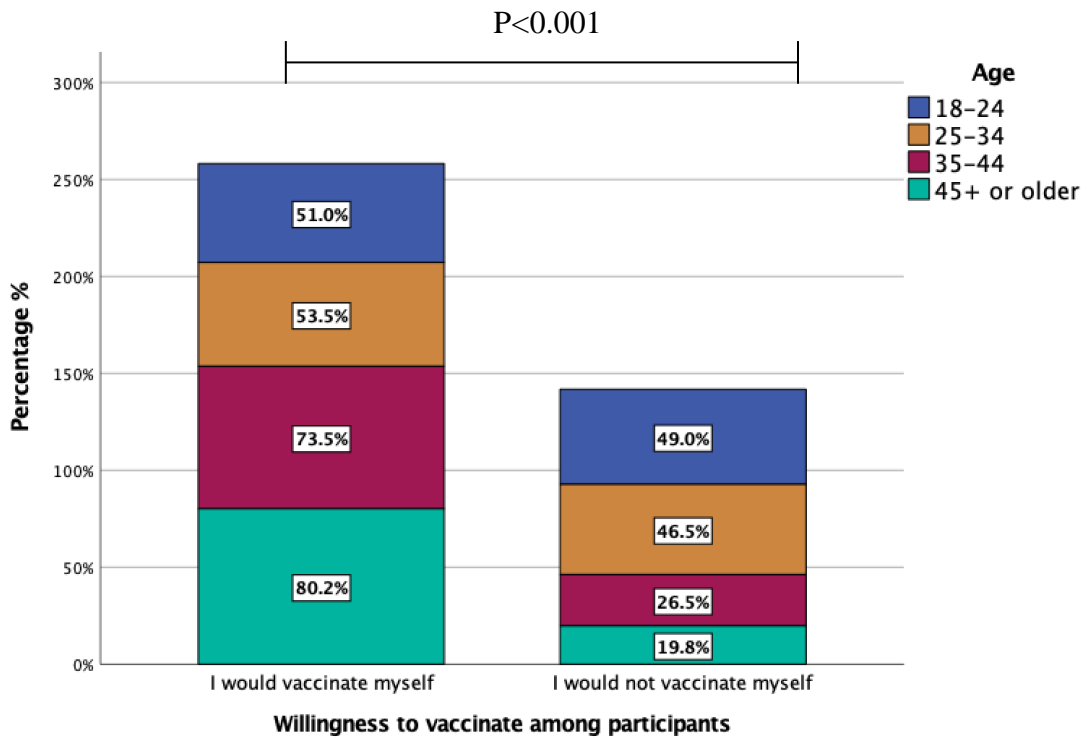
Figure 4. Relationship between willingness to vaccinate against COVID-19 and age using SPSS® software (N=454)

4.3 Knowledge Level to COVID-19 Disease and Vaccine

Seven questions were asked to determine knowledge level with a score range between 0-7. Correct answers were added up for the total knowledge score. Knowledge score was then further divided into three categories. A score from 0-3 (low), 4-5 (moderate) and 6-7 (high). As seen in Figure 5, 53% of participants achieved a high knowledge score and only 10% had poor knowledge towards COVID-19. A mean score of 5.3 ($\pm$1.49) among willing to vaccinate and 5.5 ($\pm$1.27) among those unwilling to vaccinate themselves was found with no significant difference using t-test for continuous data (Table 4). We used chi square test to analyze the three knowledge categories (high, medium & low) and similarly we found no significant difference between the three groups and willingness to vaccinate against COVID-19 ($P = 0.27$). This means that even though majority of respondents obtained a high knowledge score

regarding information about COVID-19 disease and vaccine, still it has no effect on the decision to get the COVID-19 vaccine.
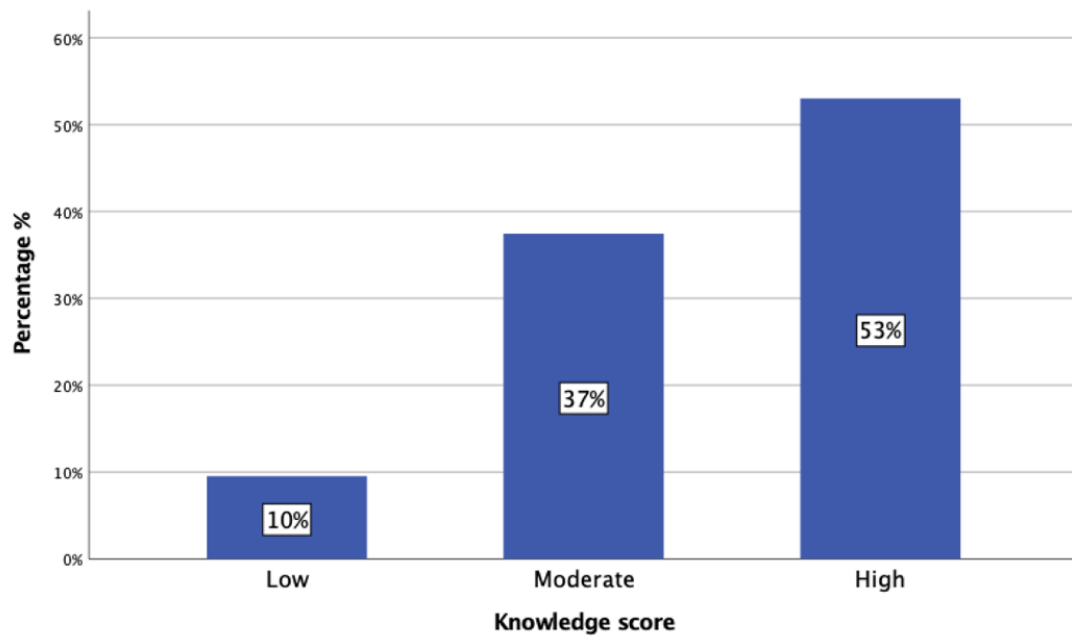
Figure 5. COVID-19 knowledge score among participants using SPSS® software (N=462).

Table 4. Relationship between COVID-19 knowledge score and willingness to vaccinate using SPSS® software.

Knowledge score	Would vaccinate	Would not vaccinate	X^2	*P*
Low (0-3)	30 (73.2%)	11 (26.8%)	2.6	0.27
Medium (4-5)	100 (59.5%)	68 (40.5%)		
High (6-7)	154 (62.9%)	91 (37.1%)		
Mean score	5.3	5.5		
Standard deviation	1.49	1.27		
Independent t-test	t(452) = -0.944			
***P*-value**	0.346			

4.4 Attitude and Hesitancy Towards COVID-19 Vaccine

      All participants who responded that they were not willing to take the COVID-19 vaccine were asked for the reason why. Concerns regarding vaccine safety was the most frequently mentioned for 46% of the participants (Figure 6). Furthermore, 19.3% of the participants do not believe in any vaccine at all and 16.3% expressed that they do not believe the vaccine is effective. Only 6.4% said that they don't trust the source that encourages them to take the vaccine.
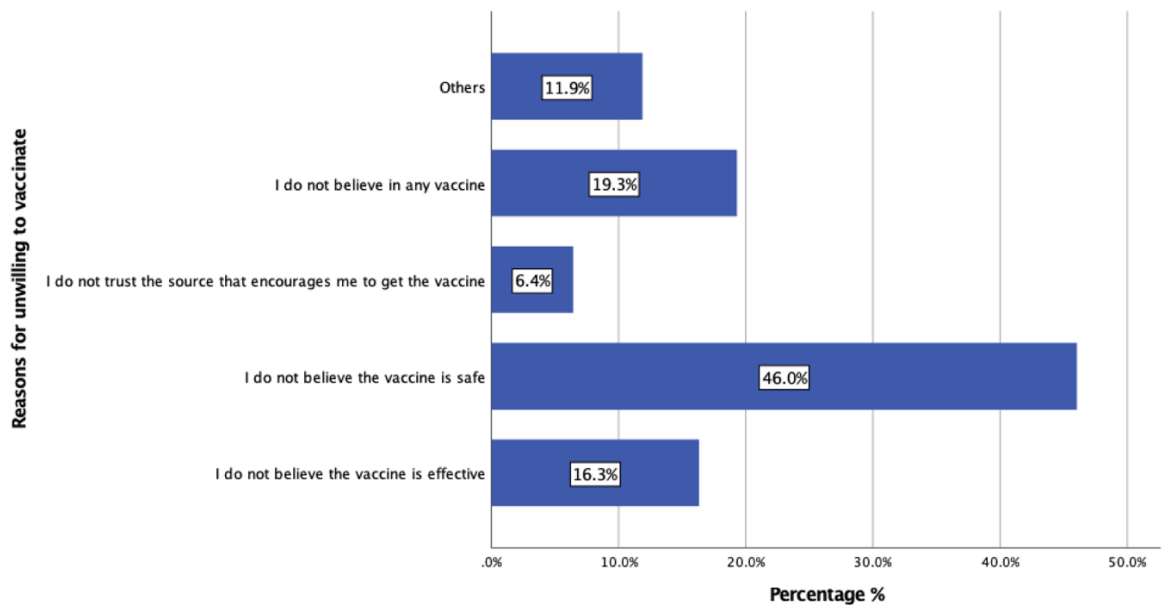
Figure 6. Participants responses towards reasons for COVID-19 vaccine hesitancy using SPSS® software.

We measured participants attitude towards COVID-19 against their willingness to vaccinate (Table 5). 86.5%, of whom accept the COVID-19 vaccine, agree that "a vaccine is important to end the pandemic", while only 13.5% of those unwilling to vaccinate agree to that. A significant difference was observed regarding importance of a vaccine and willingness to vaccinate. Furthermore, results show that participants of this study mostly viewed the COVID-19 as the most important problem in Qatar and

the world. 26 out of 224 (willing to vaccinate) and 22 out of 170 (unwilling to vaccinate) believe that COVID-19 is an insignificant problem compared to other problems. Consequently, we did not find any significant difference between viewing the pandemic as an important problem against vaccine acceptance ($P = 0.411$). 86.9% of participants unwilling to vaccinate disagreed to the statement that others being vaccinated against COVID-19 will control the pandemic, whereas 82.7% of those willing to be vaccinated agree with that statement. Significant difference was also observed when asked if herd immunity is adequate enough to protect everybody and when participants stated that they "would rather obtain immunity by being exposed to an infected person than actually receive the vaccine". It was noticeable that majority of participants who are unwilling to be vaccinated agreed with both statement and those who would vaccinate disagreed with the statements ($P<0.001$).

Table 5. Relationship between variables measuring attitude and willingness to vaccinate using SPSS® software.

Attitude	Answers	Would vaccinate (N=284)	Would not vaccinate (N= 170)	X²	P
A vaccine is important to end the COVID-19 pandemic.	Agree	225 (86.5%)	35 (13.5%)	176.40	<0.001
	Neither agree nor disagree	56 (43.1%)	74 (56.9%)		
	Disagree	3 (4.7%)	61 (95.3%)		
How much of a problem is COVID-19 in Qatar and the world	Not a problem/insignificant	26 (54.2%)	22 (45.8%)	1.779	0.411
	Somewhat a problem	68 (63.6%)	39 (36.4%)		
	Severe/most important problem	186 (64.1%)	104 (35.9%)		
Other people being vaccinated against COVID-19 will be helpful in controlling the pandemic	Agree	239 (82.7%)	50 (17.3%)	146.04	<0.001
	Neither agree nor disagree	37 (35.6%)	67 (64.4%)		
	Disagree	8 (13.1%)	53 (86.9%)		
I believe heard immunity is sufficient to protect everyone	Agree	72 (54.5%)	60 (45.5%)	19.187	<0.001
	Neither agree nor disagree	93 (56%)	73 (44%)		
	Disagree	119 (76.3%)	37 (23.7%)		
I would rather build immunity by exposure to infected individual than receive the vaccine	Agree	34 (30.4%)	78 (69.6%)	68.06	<0.001
	Neither agree nor disagree	62 (66.7%)	31 (33.3%)		
	Disagree	188 (75.5%)	61 (24.5%)		

We further explored participants' belief toward COVID-19 disease, vaccination and immunity using a 5-point Likert scale (Figure 7). Almost equal responses (95 disagree and 100 agree) was seen with participants believing that the side effects outweigh the benefits. 119 participants strongly disagreed, and 106 participants disagreed with regards that they are worried the vaccine itself will give them the disease. Majority of

participants strongly agree (142) and agree (154) to accept the vaccine if it was essential for traveling outside the country. Finally, our participants showed no preference regarding the location of the vaccine development, whether in America, Europe or any other parts of the world.
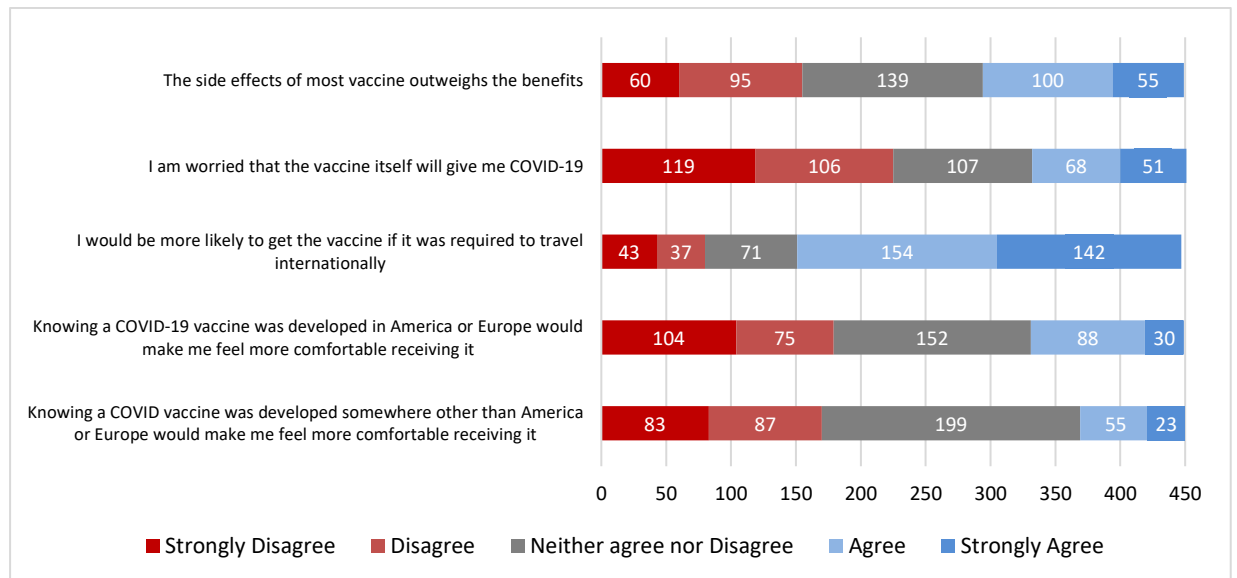
Figure 7. Participants beliefs towards COVID-19 disease, vaccine and immunity using 5-points Likert scale using SPSS® software.

4.5 Factors Influencing Willingness to Vaccinate Against COVID-19

It was observed in our study that 48.8% (would vaccinate) and 51.2% (wouldn't vaccinate) worry about vaccine side effects (Table 6). As such, significant difference was observed between side effects and vaccine acceptance ($P<0.001$). Another hesitancy factor was the length of development of the vaccine. The rushed pace of COVID-19 vaccine testing and inability to detect side effects was a worry in both willing and unwilling groups (52.9% and 47.1% respectively). Participants where then asked "what the minimum length of time a testing process is needed to make them comfortable with receiving the vaccine". Our results show that among those willing to

get vaccinated, 89.1% agree to a 3 -months to a 1-year time, whereas only 10.9% from those unwilling agree to this short period. On the other hand, 59.5% of participants unwilling to vaccinate would want a 3-5 years for vaccine development to become comfortable. The third factor we tested was direct exposure to COVID-19 infection either self, family member, friends or co-worker. No significant difference was found between exposure and willingness to vaccinate ($P = 0.061$). Participants were also asked whether it is important for them to get the flu vaccine every year. Participant with higher annual influenza vaccination were less hesitant to accept the COVID-19 vaccine ($P < 0.001$). However, among participants who stated that it is important for them to take influenza vaccine, 13% indicated that they would not take COVID-19 vaccine. Finally, when asked about where participants obtain their information regarding COVID-19 virus, both groups showed to obtain information from both professional (primary doctor, local health authority, WHO) and non-professional (social media, friends, celebrities, public figures) sources, thus no significant difference was found ($P = 0.37$)

Table 6. Relationship between factors influencing acceptance and willingness to vaccinate using SPSS® software.

Question	Answers	Would vaccinate (N=284)	Would not vaccinate (N= 170)	X²	P
I am worried about *side effects* of the vaccine for myself	Agree	145 (48.8%)	152 (51.2%)	69.1	<0.001
	Neither agree nor disagree	71 (88.8%)	9 (11.3%)		
	Disagree	68 (88.3%)	9 (11.7%)		
I worry that the rushed *pace* of testing for a COVID-19 vaccine will fail to detect potential side effects	Agree	155 (52.9%)	138 (47.1%)	33.22	<0.001
	Neither agree nor disagree	80 (78.4%)	22 (21.6%)		
	Disagree	49 (83.1%)	10 (16.9%)		
What is the minimum *length of time* a testing process would take to make you feel comfortable with COVID-19 vaccine?	3 months – 1 year	139 (89.1%)	17 (10.9%)	86.31	<0.001
	1-2 years	68 (63%)	40 (37%)		
	3-5 years	77 (40.5%)	113 (59.5%)		
How severe were the *symptoms* of COVID19 infection for yourself, family, friend or coworker	Not at all	50 (58.8%)	35 (41.2%)	7.36	0.061
	Moderate	71 (62.3%)	43 (37.7%)		
	Severe	12 (40%)	18 (60%)		
	Death	9 (81.8%)	2 (18.2%)		
How important is it for you to get the *flu vaccine* every year?	Important	93 (86.9%)	14 (13.1%)	60.84	<0.001
	Somewhat important	75 (75.8%)	24 (24.2%)		
	Not important	116 (46.8%)	132 (53.2%)		
How closely do you follow *news* regarding COVID-19 pandemic	Very closely	171 (70.7%)	71 (29.3%)	18.90	<0.001
	An average amount	78 (58.6%)	55 (41.4%)		
	Not at all	35 (44.3%)	44 (55.7%)		
What is your primary *source of information* regarding COVID-19?	Professional source	139 (64.7%)	76 (35.3%)	0.819	0.37
	Unprofessional source	141 (60.5%)	92 (39.5%)		

We also measured the relationship between respondent's knowledge level with source

of information (Figure 8). All three knowledge score levels showed no significant difference with source of information about COVID-19.
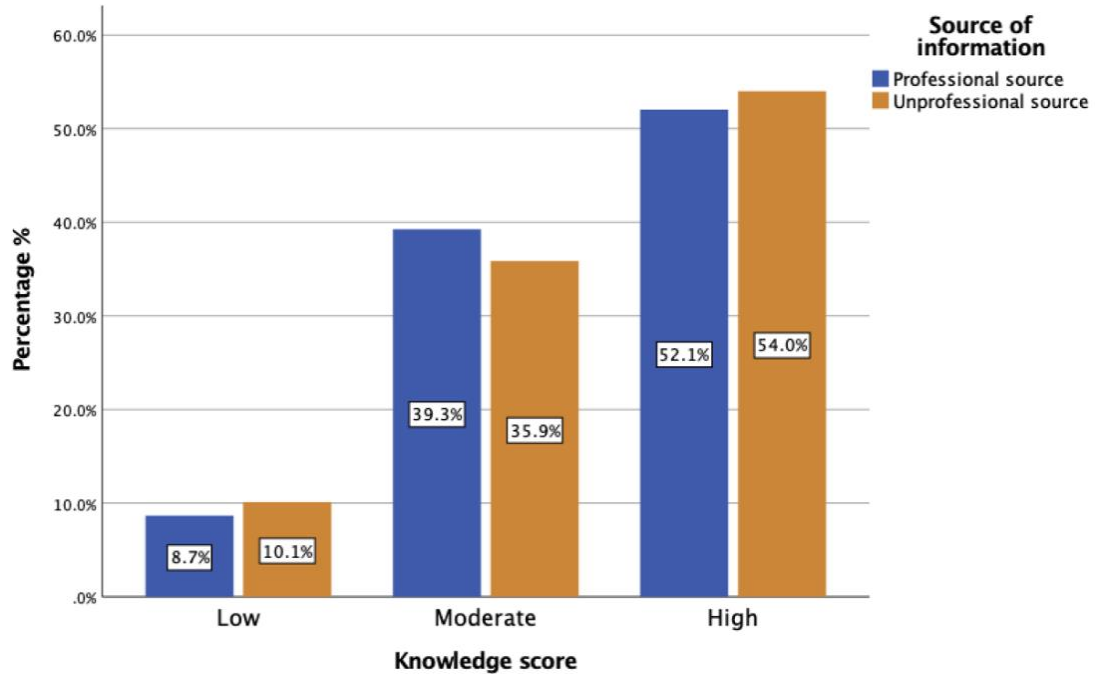
Figure 8. Relationship between COVID-19 knowledge score and primary source of information ($P = 0.709$) using SPSS® software.

Binary logistic analysis was done to determine the odd ratio among factors associated with side effects, rushed pace, length of testing process, previous COVID-19 exposure, flu vaccine importance and news and source of information (Table 7). Logistic regression analysis revealed that side effects (OR: 0.44, 95% CI: 0.25–0.76), rushed pace (OR: 0.41, 95% CI: 0.29-0.58), length of testing process (OR: 3.33, 95% CI: 2.5-4.3), previous exposure (OR: 1.3, 95% CI: 0.76-2.04), flu vaccine importance (OR: 2.9, 95% CI: 2.17-3.9) and source of information (OR: 1.09, 95% CI: 0.9-1.3) were significant factors associated with concerns of COVID-19 vaccine.

Table 7. Binary Logistic regression analysis of variables associated with vaccination factors using SPSS® software.

	Odd ratio	95% CI	P
I am worried about *side effects* of the vaccine for myself	0.27	0.18 - 0.39	<0.001
I worry that the *rushed pace of testing* for a COVID-19 vaccine will fail to detect potential side effects	0.41	0.29 - 0.58	<0.001
What is the minimum *length of time* a testing process would take you make you feel comfortable with COVID-19 vaccine?	3.30	2.5 - 4.3	<0.001
Previous exposure to COVID-19 infection (self, family member, friend or coworker)	1.25	0.76 - 2.04	0.34
How important is it for you to get the *flu vaccine* every year?	2.90	2.17 - 3.9	<0.001
Primary *source of information* regarding COVID-19 (professional vs unprofessional)	1.09	0.9 - 1.3	0.37
How closely do you follow *news* regarding COVID-19 pandemic	1.70	1.35 - 2.23	<0.001

In our study, participants were introduced with three levels of hypothetical vaccine efficacy (50%, 75% or 99%) (Figure 9). As percentage of efficacy increased, respondents were more likely to be vaccinated. Consequently, when efficacy was 50%, 53% were unlikely to be vaccinated and only 27.7% were likely. However, with 75% efficacy, 39.4% responded to be more likely to be vaccinated. Furthermore, a 99% efficacy increased participants likeliness to a vaccine to 57.2% and decreased unlikeness to 31.8%.
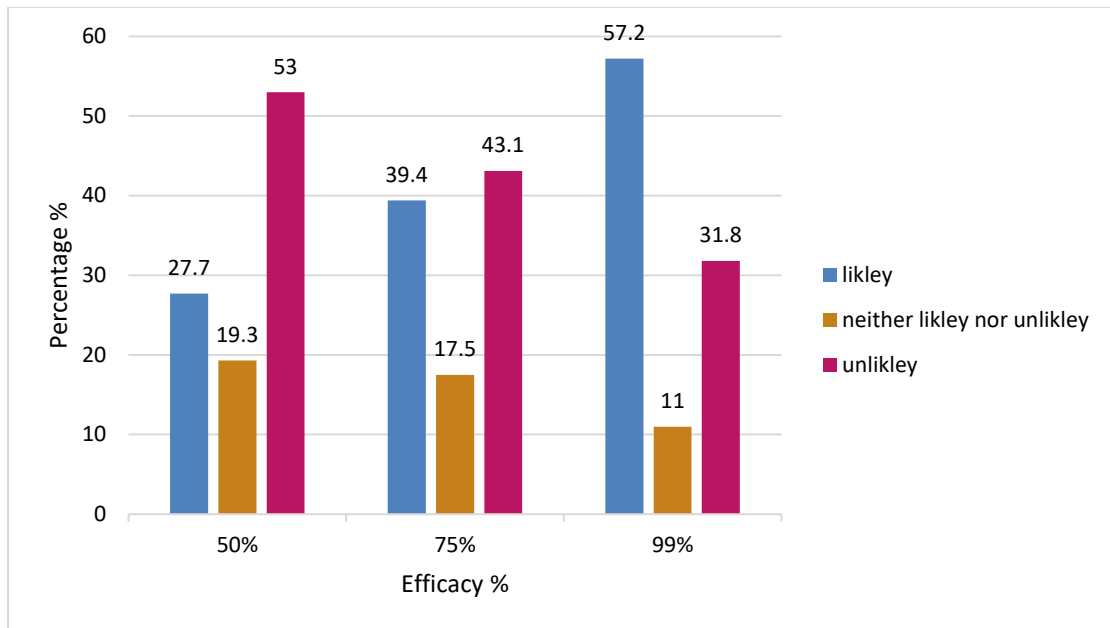
Figure 9. Different levels of vaccine efficacy and participants response to how likely to be vaccinated (*P*<0.001) using SPSS® software.

With 50% efficacy, 93% of those willing to vaccinate were still likely to get the vaccine while those unwilling, 7% were likely and 59% were unlikely (Table 8). However, participants who stated that they were unwilling to vaccinate are more likely 11%, to accept the vaccine at 75% efficacy and 17.2% at 90% efficacy. All three levels of vaccine efficacy showed significant association with willingness to vaccinate (p<0.001). Additionally, when controlling variables such as gender, age, nationality and education level, we found positive correlation between efficacy level and willingness to vaccinate. As expected, when percentage of vaccine efficacy increased from 50% to 75% to 99%, the correlation coefficient was also increasing to 0.42 to 0.47 to 0.49 respectively.

Table 8. Partial correlation between 50%, 75% and 99% of vaccine efficacy against COVID-19 and willingness to vaccinate by controlling for age, gender, nationality, education level (N=454) using SPSS® software.

% of Vaccine efficacy	Category	Would vaccinate (N=284)	Would not vaccinate (N=170)	Correlation	P
50%	Likely	**119 (93%)**	**9 (7%)**	0.42	<0.001
	Neither likely nor unlikely	67 (77%)	20 (23%)		
	Unlikely	98 (41%)	141 (59%)		
75%	Likely	**162 (89%)**	**20 (11%)**	0.47	<0.001
	Neither likely nor unlikely	58 (73.4%)	21 (26.6%)		
	Unlikely	64 (33.2%)	129 (66.8%)		
99%	Likely	**216 (82.8%)**	**45 (17.2%)**	0.49	<0.001
	Neither likely nor unlikely	29 (59.2%)	20 (40.8%)		
	Unlikely	39 (27.1%)	105 (72.9%)		

4.6 Effective Ways of Promoting COVID-19 Vaccination

We provided participants with an open-ended question; "Please answer the following question in your own words: What would make you the most comfortable with the idea of receiving a vaccine for COVID-19?" In total we had 151 out of 462 (33%) participants answered the open question. Responses were varied, however, most common were: other people who already took the COVID-19 vaccine, for it to be an optional choice, for the return of life to normal, knowing all side-effects of vaccine, seeing results and success rates of vaccine on those vaccinated, longer clinical trials and testing, proof of 100% effectivity/success and ability to travel.

CHAPTER 5: DISCUSSION

5.1 Acceptance Towards COVID-19 Vaccine

As far as we know, this is the first research study to explore COVID-19 vaccine hesitancy in a representative education cohort in Qatar. Overall, 462 employees and students participated in this study. Out of these 462, 454 participants answered to our key question: are they willing or not willing to receive a COVID-19 vaccine. 62.6% (284/454) of our study participants stated yes that they were willing to take the COVID-19 vaccine, while 37.4% (170/454) were not willing (Figure 3). Overall, respondents of this study had a positive acceptance rates towards a vaccine against COVID-19. Similarly, the in the United States, a study showed that 68.6% were willing to receive COVID-19 vaccine, 15.57% were not willing to vaccinate and 15.89 neither agreed or disagreed (Pogue et al., 2020). Additionally, percentages of positive response towards COVID-19 vaccine were gathered through a global survey that included more than 13,000 participants across 19 countries. Highest positive responses was seen from China with 88.62% acceptance, 85.36% in Brazil, 81.58% in South Africa, 79.79% in South Korea, 76.25% in Mexico, 74.53% in India and 71.48% in UK etc. (Lazarus et al., 2021). It is possible that a low hesitancy rate and higher acceptance to the vaccine is seen as way to enable life to return to normal and resuming of full economic activity. On the other hand, it may be a result of fear of unemployment and job insecurity due to the global financial stress.

5.2 Sociodemographic Characteristics and Willingness to Vaccinate

We had more females participated than males (289 and 173 respectively), which is a representative of Qatar University's population as 78% are females. Our main participants were aged 18–25 (32.7%) followed by 25.3% aged 25 to 35 (Table 2). This is also representative of Qatar University's population. However, we found

equal participation (50%) among students and employees in our study, with 58.4% with an undergraduate level of education and 41.6% with a postgraduate degree. In addition, more respondents were non-Qataris (55%) than Qatari's nationals (45%). In our study we assessed willingness to be vaccinated against COVID-19 with socio-demographics characteristics (Table 3). On the whole, significant difference was observed among all characteristics and willingness to vaccinate ($P<0.001$). 72.9% of males demonstrated that they were willing to vaccinate and 27.1% would not, as compare to females, 56.7 % and 43.3% respectively. On the contrary, one study stated that males are less likely to think vaccines are important in general (Larson et al., 2016). Among age groups, 18 – 25-year-old showed equal willingness and unwillingness to vaccinate against COVID-19, 51% and 49%, respectively (Figure 4). Whereas it was noted that those age 45 or older were 80.2% willing to be vaccinated. A reason for willingness to vaccinate among the older age group could be likely due to their health status. This is because they are more likely to encounter severe complications if contracted with the virus, since majority of older age individuals relatively present with health complications, such as asthma, hypertension, diabetes and cardiac problems. Furthermore, within the Qatari population, participants were divided almost equally among willing and unwilling (51.2% and 48.8%), as opposed to non-Qataris with 71.9% willing to be vaccinated. this means that non-Qataris are more accepting to the vaccine than Qataris. Our finding is similar to a study conducted by Alabdulla et al. 2021, in which vaccine hesitancy in the working age local Qataris was higher (42.57%) as compared to 16.71% for the non-Qatari population and that non-locals were significantly more likely to accept the vaccine than native Qataris (Alabdulla et al., 2021). Furthermore, higher education (MSc and PhD) demonstrated greater willingness (79.1%) to COVID-19 vaccine as compared with

Diploma/Bachelors with equal willingness and unwillingness (50.9% and 49.1%) (Table 3). Any education level was found to promote positive views towards immunizations for COVID-19. Thus, Masters or PhD is not associated with more acceptance towards the vaccine than those with lower education level (Larson et al., 2016). Overall, our results are similar to a research study in Australia where male participants, older age individuals, and participants with a higher education level are more accepting towards COVID-19 vaccine (Alley et al., 2021).

5.3 Knowledge level to COVID-19 Disease and Vaccine

Furthermore, we assessed participants knowledge towards COVID-19 virus, disease and vaccine by asking seven true or false questions and calculating correct responses. Surprisingly, knowledge level among participants have not been seen to be associated with vaccine hesitancy and acceptance ($P = 0.27$) (Table 4). According to our study, we found that 90% of our participants had a knowledge score between moderate and high (Figure 5). As a result, COVID-19 disease and vaccine has no effect on the participants decision on willingness or unwillingness to vaccinate. Because our study was conducted in a university environment, targeting educated students and faculties, it may explain the high level of knowledge observed among our participants. Furthermore, another study demonstrated that knowledge about the disease or vaccine, did not significantly correlate or effect with intention to vaccinate to COVID-19 (Pogue et al., 2020). The reason for that could be because information regarding COVID-19 pandemic is mostly heard and read through social media, newspaper, television and public health officials, therefore majority of participants will have acquired some sort of information about the disease and vaccine using such sources. Additionally, we assessed participants primary source of information along

with knowledge score. All three knowledge score levels showed no significant difference with where the source of information about COVID-19 is obtained (Figure 8). Thus, our study explains that a good knowledge score does not necessarily correlate with acceptance to the vaccine nor with source of information provided.

5.4 Attitude and Hesitancy Towards COVID-19 Vaccine

Attitude towards COVID-19 and participants willingness to vaccinate was also assessed in this study. All participants who chose option to vaccinate were provided with a follow up question of the main reason why (Figure 6). This allowed to assess the attitude and hesitancy towards COVID-19. Among our participants, 46% said that the major concern was the safety of the vaccine, 19.3% do not believe in any vaccine, 16.3% believe the vaccine is ineffective and 6.4% do not trust the source of the vaccine. Similar finding from a study in Japan using internet research panel showed that nearly two-thirds of participants were concerned about the potential safety of a vaccine and absence of trust in vaccine effectiveness (Yoda & Katsuyama, 2021). Another study from the United States identified participants reasons for not wanting to be vaccinated are due to specific concerns about the vaccine (specially safety and effectiveness), holding antivaccine attitudes, beliefs, or emotions; and not trusting sources involved in the development of vaccine and its testing (Fisher et al., 2020).

We also assessed the relationship between the variables measuring attitude and willingness to vaccinate in our study (Table 5). Majority of who are willing and unwilling to vaccinate agree that in order to end the COVID-19 pandemic a vaccine is needed and thus a significant association was found. Likewise, almost all participants in Yoda & Katsuyama (2021) study stated that they believed vaccination

was the greatest effective and preventable strategy for self and people protection (Yoda & Katsuyama, 2021). This explains that although participants understand that the only solution to end the pandemic is a vaccine, yet some are still hesitant to accept. On the other hand, no association was found with participants attitude towards how much of a problem is COVID-19 in Qatar and the world. Understanding of vaccine immunity was also measured to determine attitude and hesitancy. Significant association was found between participants attitude and vaccine immunity. Only 23.7% of participants unwilling to vaccinate disagree when asked if herd immunity is sufficient to protect everyone and 76.3%, of those willing, disagree with the statement. A study has shown that willingness to take the COVID-19 vaccine could arise from reasons of protecting others via herd immunity (Kwok et al., 2021).

Moreover, beliefs towards COVID-19 infection, vaccine and immunization were investigated by using a 5-point Likert scale (Figure 7). Through our study, we found that many students and faculties agree that if the vaccine was required for travel, they are willing to take it. This was also found in another study in Japan in which reasons for wanting to vaccinate was travel (Yoda & Katsuyama, 2021). On the other hand, a study conducted in Qatar showed that 25.6% were willing to quarantine after return from travel than accept the vaccine (Alabdulla et al., 2021). We also asked participants whether they believe site of production of vaccine, Europe, America or any other place, would be more comfortable in terms of accepting the vaccine. Majority stated that it had no difference.

5.5 Factors Influencing Willingness to Vaccinate Against COVID-19

Moreover, as part of our objectives, factors and determinants influencing vaccine acceptance hesitancy was assessed in this study (Table 6). A significant

association was found between side effects of vaccine and willingness to vaccinate. This is consistent with earlier findings that people are mainly skeptical to new vaccines. Our study also found significant association with rushed pace of testing and intent to vaccinate. Similarly, a study by Thunstrom (2020) found that the novelty of the vaccine and its undesirable side effects were the most important factor influencing individual's decision to vaccinate (Thunstrom et al., 2020). Side effects of vaccine also includes misconceptions that the mRNA of the Pfizer and Moderna vaccine will enter human nucleus cells and lead to infertility. This is a rising concern among females that are pregnant, planning for pregnancy or breastfeeding. However, it should be noted that mRNA vaccines are not new and have been used before. Furthermore, the manufacturing of mRNA vaccines is related with improved safety since it does not entail toxic chemicals or cell cultures, and the fast pace limits contact to contaminating microorganisms (Anderson et al., 2020).

Another major factor concerning COVID-19 specifically was the fast development of the vaccine and distribution into international markets. 89.1% of participants willing to vaccinate feel comfortable with a 3 month to one year vaccine testing process. On the other hand, only 10.9% who are unwilling to vaccinate agree with a short period and that 59.5% would only feel comfortable with a minimum of 3-5 years of vaccine testing process. This could be due to concerns around how a vaccine can be confirmed safe when it was only developed in a less than the usual timeline of other known vaccines. We also assessed if self, family, friend or coworker previous exposure and symptoms will affect willingness and decrease hesitancy to COVID-19. However, no significant difference was found. Likewise, a study found that vaccine hesitancy was not associated with previous severity if infected with COVID-19, but had decreased with having had symptoms or knowing someone with

COVID-19 (Faasse & Newby, 2020). Additionally, 53.2% (unwilling) and 46.8% (willing) stated that they do not think it is important to take the flu every year and thus significant association was found between these two variables. However, a study of U.S adults found that participants who had previously received the flu vaccine had a 94% lower likelihood of accepting the vaccine (Fisher et al., 2020). This is also seen in another study in which an increased intention towards a COVID-19 vaccine was observed with having received the flu vaccine in the past year (Faasse & Newby, 2020).

Source of information was divided into two groups: professional (primary doctor, local health authority, WHO) vs unprofessional (social media, friends, celebrities, public figures). Both groups willing and unwilling to vaccinate showed to obtain information from either source. Thus, no association was found between participants primary source of information and willingness to vaccinate. This is contradicting with previous research in which source of information has shaped the society's attitude around COVID-19 disease and vaccine (Alabdulla et al., 2021). As opposed to our results, another study found significant association between traditional and non-traditional media sources. The study stated that using the internet and social media consistently to obtain fake health information, is seen as a factor influencing decision to vaccinate (Alley et al., 2021).

Currently, Pfizer and BioNTech, and Moderna COVID-19 vaccines have been approved to be used in Qatar by the Ministry of Public Health. Pfizer vaccine have stated 95% efficacy, while Moderna reported slightly less of 94.5% efficacy ("COVID-19 Vaccines," 2021). As a result, participants were asked about three hypothetical efficacy levels, meaning a vaccination that will 50%, 75% or 99% of the population from COVID-19 (Figure 9). Results found significant association and

correlation between percentage of efficacy and willingness to vaccinate (Table 7 and 8). Participants who already accepted the vaccine in the first place were still (93%) willing to take the vaccine with a 50% efficacy. However, it was noticeable that at 50% efficacy, only 7% were likely to accept the vaccine from participants who had no intent to vaccinate. However, this rose up to 11% with a 75% efficacy and 17.2% with 95% efficacy, and thus a decrease in hesitancy was seen with an increase in efficacy. A similar study in Indonesia found that 93.3% of participants were more likely to be vaccinated for a vaccine with a 95% efficacy, but this acceptance decreased to 67% for a vaccine with 50% effectiveness (Harapan et al., 2020). In addition, there could be an increase in hesitancy with the emergence of new COVID-19 variants. Individuals will be questioning whether the new variant will affect vaccine efficacy. Studies shown that the new vaccine appears to work against the new variants. Although the new variant does increase the ability of the virus to spread faster, it does not influence the sickness of the individual from the disease (Livingston, 2021).

5.6 Effective Ways of Promoting COVID-19 Vaccination

Given the extreme level of investment, research, and skills that took place in developing a vaccine, it will be worthless if people refuse to receive it. Therefore, this section was included to understand what idea the participant would be most comfortable with in order to receive the COVID-19 vaccine. We provided the participants with an open-ended question in order to find ways of promoting COVID-19 vaccine. Firstly, majority of respondents mentioned that the most factor that will make them more comfortable with the vaccine was knowing all the side-effects that come along with it. In addition, one study showed that continues hearing of severe

side-effects stories from vaccinated individuals, makes others more hesitant towards the vaccine. This is why it is important for, vaccine communications teams to proactively spread successful cases and statistics (Wood & Schulman, 2021). Other factors that participants mentioned were seeing other people being vaccinated against COVID-19 and observing their results would make them feel safer. Additionally, although the vaccine is currently optional, participants still mentioned that they would not want to be forced to take it. Other responses included return of life to normal. As a result, the governments and public health officials should reassure the public that with higher vaccine uptake, more hope of return of life to normal and decrease in restrictions and constrains. Many participants also stated that they would feel more comfortable if the vaccine had undergone longer clinical trials and proven to be 100% effective. This is why it is important for governments to release information about the scientific achievements in the vaccine development to improve transparency for the community. Moreover, a few participants also included that nothing would make them take the vaccine. This means there are still individuals that are hesitant and reluctant despite vaccine services availability.

CHAPTER 6: LIMITATIONS, CONCLUSION AND RECOMMENDATIONS

6.1 Limitations

The design of this study has potential limitations. Firstly, it is a cross-sectional study that includes a convenient sample of students and staff from Qatar University and therefore the findings do not reflect the general population of Qatar. Although other research studies have investigated the effect of vaccine hesitancy in other diseases, such as seasonal Influenza virus, the COVID-19 pandemic is a novel and ongoing matter and so there is little or lack of previous research on this topic. A second limitation was the timing of when the survey was released. A COVID-19 vaccine was already out and distributed across Qatar when the survey was published, and a number of people would have already been vaccinated. Therefore, attitudes and concerns could have influenced decisions and acceptance to the vaccine and might have affected the results as compared to when a vaccine was still in development.

6.2 Recommendations

Overcoming the pandemic will require most of Qatar's population to vaccinate against COVID-19. Several recommendation options can be used to decrease vaccination hesitancy and increase uptake. Firstly, communication plays a major role in providing the correct information and message about safety, efficacy and knowledge about the vaccine and disease. Additionally, since a major factor influencing acceptance is side-effects, officials should reassure the population of the side effects and success rates. Lastly, it is important to make easy as possible to being vaccinated such as convenient time, location and access.

6.3 Conclusion

As a conclusion, vaccine hesitancy is known to be a major threat on immunizations initiatives across the world. Through this study, we found that many students and employees at Qatar University are willing to accept being vaccinated against COVID-19 disease. However, causes for non-acceptance were almost always driven by concerns around vaccine safety, effectiveness and length of vaccine development. This hesitancy could hamper achieving herd immunity in Qatar.

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APPENDICES

APPENDIX A: IRB APPROVAL

Qatar University Institutional Review Board QU-IRB
QU-IRB Registration: IRB-QU-2020-006, QU-IRB, Assurance: IRB-A-QU-2019-0009

October 28th, 2020

Dr. Atiyeh Abdallah
College of Health Sciences
Qatar University
Phone: 4403 7578
Email: aabdallah@qu.edu.qa

Dear Dr. Atiyeh Abdallah,

Sub.: Research Ethics Review Exemption
Project Title: "COVID19 Vaccination Hesitancy Among Students and Faculties at Qatar University: A Cross-Sectional Study"

We would like to inform you that your application along with the supporting documents provided for the above project, has been reviewed by the QU-IRB, and having met all the requirements, has been granted research ethics **Exemption** based on the following category(ies) listed in the Policies, Regulations and Guidelines provided by MoPH for Research Involving Human Subjects:

Exemption Category 2: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified; and (ii) any disclosure of the human subjects' responses outside the research could reasonably, place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation
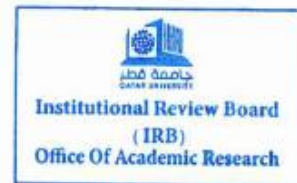
Documents Reviewed: QU-IRB Request for Ethics Approval, QU-IRB Application Material Check List, Research Proposal, Informed consent استمارة الموافقة المسبقة, Questionnaire استبيان, Review Forms, responses to IRB queries and updated documents.

Please note that exempted projects do not require renewal; however, any changes/modifications to the original submitted protocol should be reported to the committee to seek approval prior to continuation.

Your Research Ethics Approval Number is: **QU-IRB 1404-E/20**. Kindly refer to this number in all your future correspondence pertaining to this project. In addition, please submit a closure report to QU-IRB upon completion of the project.

Best wishes,
Dr. Mohamed Emara

Vice Chair, QU-IRB

Institutional Review Board
(IRB)
Office Of Academic Research

Qatar University-Institutional Review Board (QU-IRB), P.O. Box 2713 Doha, Qatar
Tel +974 4403-5307 (GMT +3hrs) email: QU-IRB@qu.edu.qa

APPENDIX B: ONLINE INFORMED CONSENT

Dear participant,
You are invited to participate in a research study entitled:

"How Prepared Are You to Receive The COVID-19 Vaccine"

This study has been reviewed and approved by the Qatar University Institutional Review Board (Approval # QU-IRB 1404-E/20)

PURPOSE: The study aims to assess awareness and hesitancy of COVID-19 vaccine among Qatar University students and faculties.
PROCEDURE: The procedure involves filling a self-administered online questionnaire about COVID19 vaccination hesitancy. The survey will take approximately **10-15 minutes** to complete.
RISKS & BENEFITS: There are no known risks, discomfort or costs associated with participating in this study. You may not benefit directly from this study but your participation will help the government agencies and public health communities in Qatar to find effective ways to reduce COVID-19 vaccine hesitancy.
VOLUNTARY PARTICIPATION & WITHDRAWAL: Your participation in this study is voluntary. You may refuse to participate before the study begins or withdraw at any time from this study.
CONFIDENTIALITY: All given responses will be completely confidential and we do not collect any personal identifying information.
CONTACT PERSONS:
If you have any questions, information, suggestions or comments, you may contact:
Graduate Student: Reem Mohammed Al-Mulla
Master's in Biomedical Laboratory Management at Qatar University
Email: ra1305908@qu.edu.qa
Phone: 55754362
Research Supervisor: Dr. Atiyeh Abdallah
Assistant Professor at the College of Health Sciences at Qatar University
Email: aabdallah@qu.edu.qa
Tel: 44037578

Please find the survey link below:

عزيزي المشارك،
أنت مدعو للمشاركة في دراسة بحثية بعنوان:

"ما مدى استعدادك لتلقي لقاح كوفيد19"

علمًا بأنه تمت مُراجعة هذه الدراسة والموافقة عليها من قبل مجلس المراجعة المؤسسية بجامعة قطر رقم الموافقة (QU-IRB 1404-E/20):
الهدف من الدراسة البحثية: تقييم الوعي و التردد من أخذ لقاح فيروس كوفيد-١٩ بين الطلاب والكادر الأكاديمي في جامعة قطر.
إجراء: يتضمن الإجراء ملء استبيان عبر الإنترنت حول التردد من أخذ لقاح كوفيد ١٩. سيستغرق الاستبيان حوالي 10-15 دقيقة لإكماله.
المخاطر والفوائد: مشاركتك في هذه الدراسة لن يشكل أي نوع من أنواع المخاطر أو الإزعاج أو التكاليف، قد لا تستفيد مباشرة من هذه الدراسة ولكن مشاركتك ستكون عامل فعال يساعد الحكومة القطرية ووزارة الصحة العامة في قطر لإيجاد طرق فعالة للحد من التردد والخوف من أخذ لقاح فيروس كوفيد – ١٩
المشاركة الطوعية والانسحاب: مشاركتك في هذه الدراسة تعد طوعية، حيثُ يمكنك رفض المشاركة قبل بدء الدراسة أو الانسحاب في أي وقت من هذه الدراسة
السرية: ستكون جميع الردود المقدمة من قبل المُشترك سرية تمامًا، ولا نقوم بجمع أي معلومات شخصية
التواصل
إذا كان لديك أي أسئلة أو معلومات أو اقتراحات أو تعليقات، يمكنك التواصل معنا من خلال الآتي:
طالبة الدراسات العليا: ريم محمد الملا
ماجستير في إدارة المختبرات الطبية الحيوية بجامعة قطر
البريد الإلكتروني: ra1305908@qu.edu.qa
رقم الجوال: 55754362
مشرف البحث: د. عطية عبد الله
أستاذ مساعد بكلية العلوم الصحية
البريد الإلكتروني: aabdallah@qu.edu.qa
الرقم: 44037578
نشكرك على مشاركتك هذه الدراسة كما نقدر وقتك وملاحظاتك.
يرجى العثور على رابط الاستبيان أدناه:

APPENDIX C: SURVEY QUESTIONNAIRE IN ENGLISH AND ARABIC

How Prepared Are You to Take The COVID-19 Vaccine?

Dear respondent, the information in this questionnaire is for research and education purpose only and responses will be treated anonymously and confidentially. To participate in this study, you must be a student, faculty or staff of QU and at least 18 years or older. Please answer sincerely by choosing where appropriate. Thank you.

1.1 Gender

○ Male

○ Female

1.2 Age

○ 18 – 24 yearss

○ 25 – 34 years

○ 35 – 44 years

○ 45 or older

1.3 Nationality

○ Qatari

○ Non-Qatari

1.4 Are you a

○ Student

○ Faculty member

○ Administrated staff

1.5 College

○ Business and Economics

○ Arts and Sciences

○ Education

○ Engineering

○ Health Sciences

○ Law

○ Medicine

○ Sharia and Islamic Studies

○ Pharmacy

○ Dental Medicine

○ Other (Specify)

2.1 Please select ALL of the following statements that apply to your experience with COVID-19:

☐ I have tested positive for a COVID-19 infection

☐ A family member has tested positive for COVID-19 infection

☐ A friend has tested positive for COVID-19 infection

☐ A coworker has tested positive for COVID-19 infection

☐ I do not know anyone who has tested positive for COVID-19 infection |

Display This Question:
If Q2.1 = I have tested positive for a COVID-19 infection

2.2 How severe was *your COVID-19 infection*?

○ No symptoms/mild symptoms

○ Moderate symptoms but health care providers were not contacted

○ Moderate symptoms and health care providers were contacted

○ Severe symptoms/hospitalization

Display This Question:
If Q2.1 = A family member has tested positive for COVID-19 infection

2.3 How severe were the symptoms of the COVID-19 infection of *your immediate family member?*

○ No symptoms/mild symptoms

○ Moderate symptoms but health care providers were not contacted

○ Moderate symptoms and health care providers were contacted

○ Severe symptoms/hospitalization

○ Death

Display This Question:
If Q2.1 = A friend has tested positive for COVID-19 infection

2.4 How severe were the symptoms of the COVID-19 infection of *your friend who does not live with you?*

○ No symptoms/mild symptoms

○ Moderate symptoms but health care providers were not contacted

○ Moderate symptoms and health care providers were contacted

○ Severe symptoms/hospitalization

○ Death

2.5 How severe were the symptoms of the COVID-19 infection of *your coworker?*

◯ No symptoms/mild symptoms

◯ Moderate symptoms but health care providers were not contacted

◯ Moderate symptoms and health care providers were contacted

◯ Severe symptoms/hospitalization

◯ Death

2.6 How has your experience with the COVID-19 global pandemic affected your opinion on vaccinations in general?

◯ I am much more likely to vaccinate myself/my children

◯ I am more likely to vaccinate myself/my children

◯ My opinion on vaccinations has not changed

◯ I am less likely to vaccinate myself/my children

◯ I am much less likely to vaccinate myself/my children

2.7 How has the COVID-19 pandemic affected your mental health?

◯ Much better

◯ Somewhat better

◯ About the same

◯ Somewhat worse

◯ Much worse

2.8 How has the COVID-19 pandemic affected your ability to carry out your normal activities?

◯ Dramatic restrictions

◯ Moderate restrictions

◯ No restrictions

◯ Moderately easier

◯ Much easier

3.1 How closely do you follow news regarding COVID-19?

○ Very closely

○ Somewhat closely

○ An average amount

○ Not very closely

○ Not at all

3.2 What is your primary source of information regarding COVID-19?

○ Your primary doctor

○ Local Health Authority or WHO (World Health Organization)

○ Local news

○ Friends or Social Media

○ Celebrities/public figures

○ Religious leaders

○ Political leaders

○ Other (Please specify)

4.1 Vaccines against pneumonia can protect against COVID-19

○ True

○ False

4.2 Certain antibiotics can prevent and/or treat COVID-19.

○ True

○ False

4.3 On average it takes 5–6 days from when someone is infected with COVID-19 for symptoms to show, however it can take up to 14 days.

○ True

○ False

4.4 Regularly rinsing your nose with saline can help prevent infection with COVID-19.

○ True

○ False

4.5 Once you contract COVID-19, the virus can never be eliminated from your body.

○ True

○ False

4.6 Symptoms of COVID-19 can include sore throat, diarrhea, and conjunctivitis (eye infection).

○ True

○ False

4.7 Most people who contract COVID-19 will recover from it.

○ True

○ False

5.1 I take all the vaccines recommended by my primary care physician.

○ I take them all

○ I take most

○ I take some

○ I do not take any

○ I am uncertain

7

61

5.2 How important is it for you to get the flu vaccine every year?

○ Very important

○ Important

○ Somewhat important

○ Not very important

○ Not at all important

Please indicate how you would respond in the following scenarios if a vaccine were developed to prevent contracting COVID-19.

5.3 If a COVID-19 vaccine was made publicly available

○ I would vaccinate myself

○ I would not vaccinate myself

Display This Question:
If Q5.3 = I would not vaccinate myself

5.4 Which of these statements most closely resembles your reason for choosing to not vaccinate yourself:

○ I do not believe the vaccine is safe

○ I do not believe the vaccine is effective

○ I do not trust the source that encouraged me to get the vaccine

○ I do not believe in any vaccines, and my reason is not any different for a new COVID-19 vaccine

○ A source that I trust encouraged me to NOT get the vaccine

○ I am indifferent to receiving the vaccine, but will probably end up not receiving it

○ Other

5.5 If a COVID-19 vaccine was made publicly available

○ I do have children and I would vaccinate them

○ I do have children and I would not vaccinate them

○ I do not have children

Display This Question:
If Q5.5 = I do have children and I would not vaccinate them

5.6 Which of these statements most closely resembles your reason for choosing to not vaccinate your children:

○ I do not believe the vaccine is safe for children

○ I do not believe the vaccine is effective

○ I do not trust the source that encouraged me to give my child the vaccine

○ I do not believe in any vaccines, and my reason is not any different for a new COVID-19 vaccine

○ A source that I trust encouraged me to NOT give my child the vaccine

○ I am indifferent to having my child receive the vaccine, but probably will not end up having my child receive it

○ Other

6.1 Will you be willing to vaccinate with the COVID-19 vaccine if it was recommended by your employer?

○ I would vaccinate myself

○ I would not vaccinate myself

6.2 Do your religious or cultural beliefs go against vaccinations (e.g non-halal source in vaccine)?

○ Yes

○ No

6.3 If a COVID-19 vaccine was made publicly available, but it would need to be administered yearly (similar to the flu shot), how likely would you be to be vaccinated?

○ Extremely likely (almost every year)

○ Very likely

○ Somewhat likely

○ Not very likely

○ Not at all likely (almost never)

Display This Quetion:
If Q6.3 = Not very likely
And Q6.3 = Not at all likely (almost never)

6.4 Which of the following most closely describes why you would be unlikely to receive a yearly vaccination for yourself?

○ Limited time

○ Limited money or insurance

○ Limited access to health care

○ Concern with the vaccine itself

○ Other

6.5 If a vaccine for COVID-19 was made available and you were told it would protect 50% of the people who received it, how likely would you be to be vaccinated?

○ Extremely likely

○ Somewhat likely

○ Neither likely nor unlikely

○ Somewhat unlikely

○ Extremely unlikely

6.6 If a vaccine for COVID-19 was made available and you were told it would protect 75% of those who received it, how likely would you be to be vaccinated?

○ Extremely likely

○ Somewhat likely

○ Neither likely nor unlikely

○ Somewhat unlikely

○ Extremely unlikely

6.7 If a vaccine for COVID-19 was made available and you were told it would protect 99% of those who received it, how likely would you be to be vaccinated?

○ Extremely likely

○ Somewhat likely

○ Neither likely nor unlikely

○ Somewhat unlikely

○ Extremely unlikely

6.8 Other people being vaccinated against COVID-19 will be helpful in controlling the pandemic

○ Strongly agree

○ Somewhat agree

○ Neither agree nor disagree

○ Somewhat disagree

○ Strongly disagree

7.1 Vaccines are important for the prevention of serious diseases.

○ Strongly agree

○ Agree

○ Uncertain

○ Disagree

○ Strongly disagree

7.2 The administration of more than one vaccine at the same time can be unsafe for my child's health.

○ Strongly agree

○ Agree

○ Uncertain

○ Disagree

○ Strongly disagree

7.3 The side effects of most vaccines outweigh the benefits

○ Strongly agree

○ Agree

○ Uncertain

○ Disagree

○ Strongly disagree

7.4 I worry that the rushed pace of testing for a new COVID-19 vaccine will fail to detect potential side effects or dangers.

○ Strongly agree

○ Agree

○ Uncertain

○ Disagree

○ Strongly disagree

7.5 A vaccine is important to end the COVID-19 pandemic

○ Strongly agree

○ Somewhat agree

○ Neither agree nor disagree

○ Somewhat disagree

○ Strongly disagree

8.1 What is the minimum length of time a testing process would take that would make you feel comfortable with a COVID-19 vaccine?

○ 3-6 months

○ 6 months to a year

○ 1-2 years

○ Between 2 and 5 years

○ More than 5 years

8.2 Please rank from 1-5 how much you agree with the following statements, where 1 is Strongly Disagree and 5 is Strongly Agree

	1 (Strongly Disagree)	2 (Disagree)	3 (Neither agree nor Disagree)	4 (Agree)	5 (Strongly Agree)
I am worried that the vaccine itself will give me COVID-19.	○	○	○	○	○
I would rather build immunity by exposure to an infected individual than receive the vaccine.	○	○	○	○	○
I would be more likely to get the vaccine if it was required to travel internationally.	○	○	○	○	○
I believe herd immunity is sufficient to protect everyone.	○	○	○	○	○
I am worried about the cost of a COVID-19 vaccine	○	○	○	○	○

66

I am worried about side effects of the vaccine for myself.	○	○	○	○	○
I am worried about side effects of the vaccine for children.	○	○	○	○	○
The side effects of the vaccine are likely to be worse than COVID-19 itself	○	○	○	○	○
Knowing a COVID-19 vaccine was developed in America or Europe would make me feel more comfortable receiving it	○	○	○	○	○
Knowing a COVID vaccine was developed somewhere other than America or Europe would make me feel more comfortable receiving it	○	○	○	○	○

8.3 How much of a problem is COVID-19 in Qatar and to the world?

○ Not a problem at all

○ Insignificant compared to other problems

○ Somewhat of a problem

○ A severe problem, more important than most other issues

○ The most important problem facing the world right now

8.4 Which vaccine do you think safer?

○ Oxford-AstraZeneca vaccine produced in the UK

○ Pfizer vaccine produced in the USA

○ No difference

8.5 Please answer the following questions in your own words: The biggest fear I have about a COVID-19 vaccine is...
        <type here>

8.6 Please answer the following question in your own words: What would make you the most comfortable with the idea of receiving a vaccine for COVID-19?
        <type here>

67

1.1الجنس
- ○ ذكر
- ○ أنثى

1.2 العمر
- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 أو أكبر

1.3 الجنسية
- ○ قطري
- ○ غير قطري

1.4 هل أنت
- ○ طالب
- ○ عضو هيئة تدريس
- ○ الموظفين الإداريين

1.5 الكلية
- ○ الأعمال والاقتصاد
- ○ الآداب والعلوم
- ○ التعليم
- ○ الهندسة
- ○ العلوم الصحية
- ○ القانون
- ○ الطب
- ○ الشريعة والدراسات الإسلامية
- ○ الصيدلة
- ○ طب الأسنان
- ○ أخرى (يرجى التحديد)

1.6 المستوى التعليمي الحالي
- ○ دبلوم
- ○ المرحلة الجامعية
- ○ الماجستير
- ○ دكتوراه
- ○ أخرى (يرجى التحديد

2.1 يرجى تحديد جميع العبارات التالية التي تنطبق على تجربتك مع COVID- 19
- o لقد ثبتت إصابتي بعدوى COVID-19
- o ثبتت إصابة أحد أفراد الأسرة بعدوى COVID-19
- o ثبتت إصابة صديق بعدوى COVID-19
- o ثبتت إصابة زميل في العمل بعدوى COVID-19
- o لا أعرف أي شخص ثبتت إصابته بعدوى COVID-19

اعرض هذا السؤال:
إذا كانQ2.1 = لقد ثبتت إصابتي بعدوى COVID-19

2.2 ما مدى شدة اصابتك بـ COVID-19؟
- o لا توجد أعراض / أعراض خفيفة
- o أعراض معتدلة ولكن لم يتم الاتصال بمقدمي الرعاية الصحية
- o أعراض معتدلة وتم الاتصال بمقدمي الرعاية الصحية
- o أعراض شديدة / دخول المستشفى

اعرض هذا السؤال:
إذا كانQ2.1 = لقد ثبتت إصابة احد افراد الاسرة بعدوى COVID-19

2.3 ما مدى شدة أعراض عدوى COVID-19 لأفراد عائلتك المباشرين؟
- o لا توجد أعراض / أعراض خفيفة
- o أعراض معتدلة ولكن لم يتم الاتصال بمقدمي الرعاية الصحية
- o أعراض معتدلة وتم الاتصال بمقدمي الرعاية الصحية
- o أعراض شديدة / دخول المستشفى
- o الموت

اعرض هذا السؤال:
إذا كانQ2.1 = لقد ثبتت إصابة صديق بعدوى COVID-19

2.4 ما مدى شدة أعراض عدوى COVID-19 لصديقك الذي لا يعيش معك؟
- o لا توجد أعراض / أعراض خفيفة
- o أعراض معتدلة ولكن لم يتم الاتصال بمقدمي الرعاية الصحية
- o أعراض معتدلة وتم الاتصال بمقدمي الرعاية الصحية
- o أعراض شديدة / دخول المستشفى
- o الموت

اعرض هذا السؤال:
إذا كانQ2.1 = ثبتت إصابة زميل في العمل بعدوى COVID-19

2.5 ما مدى شدة أعراض عدوى COVID-19 لزميلك في العمل؟
- o لا توجد أعراض / أعراض خفيفة
- o أعراض معتدلة ولكن لم يتم الاتصال بمقدمي الرعاية الصحية
- o أعراض معتدلة وتم الاتصال بمقدمي الرعاية الصحية
- o أعراض شديدة / دخول المستشفى
- o الموت
- o أعراض شديدة / دخول المستشفى
- o الموت

2.6 كيف أثرت تجربتك مع جائحة COVID-19 العالمي على رأيك في التطعيمات بشكل عام؟
- ○ انا اكثر احتمالاً أن أقوم بتطعيم نفسي / أطفالي
- ○ احتمال أن أقوم بتطعيم نفسي / أطفالي
- ○ رأيي في التطعيمات لم يتغير
- ○ أنا أقل احتمالاً لتطعيم نفسي / أطفالي
- ○ أنا أقل احتمالاً بكثير لتطعيم نفسي / أطفالي

2.7 كيف اثر جائحة COVID-19 على صحتك العقلية؟
- ○ أفضل بكثير
- ○ أفضل الي حد ما
- ○ عن نفسه
- ○ أسوأ الى حد ما
- ○ أسوأ بكثير

2.8 كيف اثر جائحة COVID-19 على قدرتك على القيام بأنشطتك المعتادة؟
- ○ قيود كبيرة
- ○ قيود معتدلة
- ○ لا قيود
- ○ أسهل الى حد ما
- ○ أسهل بكثير

3.1 إلى أي مدى تتابع عن الأخبار المتعلقة في COVID-19 ؟
- ○ اتابع بكثره
- ○ اتابع إلى حد ما
- ○ اتابع باعتدال
- ○ لا اتابع كثيرا
- ○ لا اتابع على الأطلاق

3.2 ما هو مصدرك الأساسي للمعلومات المتعلقة بـ COVID-19 ؟
- ○ طبيبك الاساسي
- ○ هيئة الصحة المحلية أو منظمة الصحة العالمية (منظمة الصحة العالمية)
- ○ الأخبار المحلية
- ○ الأصدقاء أو وسائل التواصل الاجتماعي
- ○ مشاهير / شخصيات عامة
- ○ القادة الدينيون
- ○ القادة السياسيون
- ○ أخرى (يرجى التحديد)

4.1 يمكن للقاحات ضد الالتهاب الرئوي أن تحمي من COVID-19
- ○ صحيح
- ○ خطأ

4.2 يمكن لبعض المضادات الحيوية أن تمنع و / أو تعالج COVID-19.
- ○ صحيح
- ○ خطأ

4.3 في المتوسط ، يستغرق الأمر من 5 إلى 6 أيام من إصابة شخص ما بفيروس COVID-19 حتى تظهر الأعراض ، ومع ذلك قد يستغرق الأمر ما يصل إلى 14 يومًا.
- ○ صحيح
- ○ خطأ

4.4 شطف الأنف بانتظام بمحلول ملحي يمكن أن يساعد في منع الإصابة بـ COVID-19.
- ○ صحيح
- ○ خطأ

4.5 بمجرد إصابتك بـCOVID-19 ، لا يمكن القضاء على الفيروس من جسمك.
- ○ صحيح
- ○ خطأ

4.6 يمكن أن تشمل أعراض COVID-19 التهاب الحلق والإسهال والتهاب الملتحمة (عدوى العين).
- ○ صحيح
- ○ خطأ

4.7 يتعافى معظم الأشخاص المصابين بـ COVID-19 منه.
- ○ صحيح
- ○ خطأ

5.1 أنا أتلقى التطعيمات التي أوصى بها طبيب الرعاية الأولية.
- ○ أنا منتظم على كل المطاعيم
- ○ أنا منتظم في معظم المطاعيم
- ○ أنا منتظم على بعض المطاعيم
- ○ أنا لست منتظم على أي من المطاعيم
- ○ أنا غير متأكد

5.2 ما مدى أهمية الحصول على لقاح الإنفلونزا كل عام بالنسبة لك؟
- ○ مهم جدا
- ○ هام
- ○ مهم إلى حد ما
- ○ ليس مهم جدا
- ○ ليس مهما على الإطلاق

5.3 يرجى توضيح كيف ستستجيب في السيناريوهات التالية إذا تم تطوير لقاح لمنع الإصابة بـCOVID-19؟

إذا تم توفير اللقاح

- ○ سأقوم بتلقيح نفسي
- ○ لن أقوم بتلقيح نفسي

اعرض هذا السؤال:
اذا كان 5.3 = لن أقوم بتلقيح نفسي

5.4 أي من العبارات التالية يشبه إلى حد كبير سبب اختيارك عدم تلقيح نفسك:
- ○ لا أعتقد أن اللقاح آمن
- ○ لا أؤمن أن اللقاح فعال
- ○ لا أثق بالمصدر الذي حثني على أخذ اللقاح
- ○ لا أؤمن بأي لقاحات ، ولا يختلف سببي مطلقًا عن لقاح جديد لـCOVID-19
- ○ مصدر أثق به أنه شجعني على عدم الحصول على اللقاح
- ○ أنا غير مبال بتلقي اللقاح ، لكن من المحتمل أن ينتهي بي الأمر بعدم تلقيه
- ○ أخرى

5.5 إذا تم توفير اللقاح
- ○ لدي أطفال وسأقوم بتطعيمهم
- ○ لدي أطفال ولن أقوم بتلقيحهم
- ○ ليس لدي اطفال

اعرض هذا السؤال:
اذا كان 5.5 = لدي أطفال ولن أقوم بتلقيحهم

5.6 أي من العبارات التالية يشبه إلى حد كبير سبب اختيارك عدم تطعيم أطفالك:

○ لا أعتقد أن اللقاح آمن للأطفال
○ لا أؤمن أن اللقاح فعال
○ لا أثق بالمصدر الذي شجعني على إعطاء طفلي اللقاح
○ لا أؤمن بأي لقاحات ، وسببي لا يختلف عن لقاح جديد لـCOVID-19
○ مصدر أثق به شجعني على عدم إعطاء اللقاح لطفل
○ أنا غير مبال بتلقي طفلي اللقاح ، ولكن من المحتمل ألا ينتهي الأمر بتلقي طفلي
○ أخرى

6.1 هل ستكون على استعداد للتطعيم بلقاح COVID-19 إذا أوصى به صاحب العمل؟

○ سأقوم بتلقيح نفسي
○ لن أقوم بتلقيح نفسي

6.2 هل ستظل تفكر في أخذ اللقاح إذا كانت معتقداتك الدينية أو الثقافية تتعارض مع اللقاحات (مثل المصدر غير الحلال في اللقاح) ؟

○ نعم
○ لا

6.3 إذا قدم لقاح COVID-19 متاحة للشعب العام، لكنه في حاجة إلى أن يؤخذ سنويا (على غرار لقاح الانفلونزا) ، ما مدى احتمال أن تأخذ التلقيح؟

○ مؤكد سوف أخذ اللقاح الى ابعد حد (تقريباً سنوياً)
○ محتمل جدا
○ محتمل الى حد ما
○ غير محتمل كثيراً
○ غير محتمل على الاطلاق

6.4 أي مما يلي يصف بشكل وثيق لماذا من غير المحتمل أن تتلقى تطعيمًا سنويًا لنفسك؟

○ محدود الوقت

○ محدودية المال او التأمين

○ محدودية الحصول على الرعاية الصحية

○ قلق من اللقاح نفسه

○ اخرى

6.5 إذا تم توفير لقاح لـ COVID-19 وقيل لك إنه سيحمي نصف (50%) الأشخاص الذين تلقوه ، فما مدى احتمالية تلقيك للتطعيم؟

○ محتمل للغاية
○ محتمل إلى حد ما
○ ليس محتملًا ولا مستبعدًا
○ غير محتمل إلى حد ما
○ مستبعد للغاية

6.6 إذا تم توفير لقاح لـ COVID-19 وقيل لك أنه سيحمي (75%) من تلقوه ، فما مدى احتمالية تلقيك للتطعيم؟
- ○ محتمل للغاية
- ○ محتمل إلى حد ما
- ○ ليس محتملًا ولا مستبعدًا
- ○ غير محتمل إلى حد ما
- ○ مستبعد للغاية

6.7 إذا تم توفير لقاح لـ COVID-19 وقيل لك أنه سيحمي 99% من تلقوه ، فما مدى احتمالية تلقيك للتطعيم؟
- ○ محتمل للغاية
- ○ محتمل إلى حد ما
- ○ ليس محتملًا ولا مستبعدًا
- ○ غير محتمل إلى حد ما
- ○ مستبعد للغاية

6.8 الأشخاص الآخرون الذين يتم تطعيمهم ضد COVID-19 سيساعدون في السيطرة على الوباء
- ○ أوافق بشدة
- ○ موافق إلى حد ما
- ○ لا أوافق ولا أختلف
- ○ لا أوافق إلى حد ما
- ○ أعارض بشدة

7.1 .اللقاحات مهمة للوقاية من الأمراض الخطيرة
- ○ أوافق بشدة
- ○ اوافق
- ○ غير مؤكد
- ○ غير موافق
- ○ أعارض بشدة

7.2 قد يكون إعطاء أكثر من لقاح واحد في نفس الوقت غير آمن لصحة طفلي
- ○ أوافق بشدة
- ○ اوافق
- ○ غير مؤكد
- ○ غير موافق
- ○ أعارض بشدة

7.3 الآثار الجانبية لمعظم اللقاحات تفوق الفوائد
- ○ أوافق بشدة
- ○ اوافق
- ○ غير مؤكد
- ○ غير موافق
- ○ أعارض بشدة

7.4 أشعر بالقلق من أن الوتيرة المتسارعة لاختبار لقاح جديد لـ COVID-19 ستفشل في اكتشاف الآثار الجانبية أو الأخطار المحتملة.
- ○ أوافق بشدة
- ○ اوافق
- ○ غير مؤكد
- ○ غير موافق
- ○ أعارض بشدة

7.5 اللقاح مهم لإنهاء وباء COVID-19

- o أوافق بشدة
- o اوافق
- o غير مؤكد
- o غير موافق
- o أعارض بشدة

8.1ما هو الحد الأدنى من الوقت الذي تستغرقه عملية الاختبار والذي من شأنه أن يجعلك تشعر بالراحة مع لقاح COVID-19؟

- o 3-6أشهر
- o 6أشهر إلى سنة
- o 1-2سنوات
- o بين 2 و 5 سنوات
- o أكثر من 5 سنوات

8.2 يرجى الترتيب من 1-5 إلى أي مدى توافق على العبارات التالية ، حيث 1 يرفض بشدة و 5 موافق بشدة

5 موافق بشده	4 موافق	3 لا أوافق ولا ارفض	2 ارفض	1 ارفض بشده	
O	O	O	O	O	أنا قلق من أن اللقاح نفسه سوف يعطيني COVID-19.
O	O	O	O	O	أفضل بناء المناعة من خلال التعرض لفرد مصاب بدلاً من تلقي اللقاح
O	O	O	O	O	من المرجح أن أحصل على اللقاح إذا لزم السفر دوليًا.
O	O	O	O	O	اعتقد ان مناعة القطيع كافية لحماية الجميع.
O	O	O	O	O	أنا قلق بشأن تكلفة لقاح COVID- 19.
O	O	O	O	O	أنا قلق من الآثار الجانبية للقاح بالنسبة لي.
O	O	O	O	O	أنا قلق من الآثار الجانبية للقاح للأطفال.
O	O	O	O	O	من المحتمل أن تكون الآثار الجانبية للقاح أسوأ من الإصابة بحد ذاتها
O	O	O	O	O	معرفة ان لقاح COVID-19 تم تطويره في أمريكا او اوروبا سيجعلني أشعر براحة أكبر عند تلقيه
O	O	O	O	O	معرفة أن لقاح COVID قد تم تطويره في مكان آخر غير أمريكا أو أوروبا سيجعلني أشعر براحة أكبر في تلقيه.

74

8.3 ما هو حجم مشكلة COVID-19 في قطر والعالم؟
○ ليست مشكلة على الإطلاق
○ تافهة مقارنة بالمشكلات الأخرى
○ إلى حد ما من مشكلة
○ مشكلة خطيرة أهم من معظم القضايا الأخرى
○ أهم مشكلة تواجه أمريكا الآن

8.4 ما هو اللقاح التي تعتقد انه امن؟
○ لقاح اوكفورد-استرا زينيكا المنتج في بريطانيا
○ لقاح فايزر المنتج في الولايات المتحدة الامريكية
○ لا فرق بينهما

8.5 الرجاء الإجابة على الأسئلة التالية بكلماتك الخاصة: أكبر مخاوف لدي بشأن لقاح COVID-19 هو ...

<اكتب هنا>

8.6 الرجاء الإجابة على السؤال التالي بكلماتك الخاصة: ما الذي يجعلك أكثر راحة لفكرة تلقي لقاح لـ COVID-19؟

<اكتب هنا>