

Vaccine Acceptance and Adherence to Precautionary Measures among Majmaah Population, Major Challenges for Control of New Strains

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ABSTRACT

Background: Coronavirus pandemic (COVID-19) continues to have serious effects causing high mortality and morbidity worldwide with developments of several new strains.

OBJECTIVES: The aim of this study was to evaluate the acceptance of the COVID-19 vaccine and adherence to precautionary measures among the Majmaah community.

Methodology: A Cross-Sectional study was conducted among Majmaah population using a self-administered online questionnaire, collected during 7th of February to 5th of March 2021. The questionnaire collected socio-demographic characteristics, knowledge, attitude, use of precautionary measures and acceptance of COVID-19 vaccination. Individuals residing in the city of Majmaah aging 18 years old or more of both sexes were involved in the study. Data analysis was performed by SPSS, version 24.

Results: Of the 457 participants surveyed, majority of the participants were female (69.6%) as compared to the males (30.4%). About half of the participants (48.8%) had good knowledge. In addition, 55.1% showed low positive attitude toward COVID-19. There was significant association of COVID-19 attitude with participants' socio-demographics according to gender ($p < 0.05$). The use of precautionary measures identified in the study were high (46.4%) and 67.8% of participants were willing to get the COVID-19 vaccine.

Conclusion: The study concluded that majority of the participants in the study were female who had a low positive attitude towards COVID-19. The application of precautionary measures varied with age and the level of education. Two third of participants showed acceptance of COVID-19 vaccination. Those who had good knowledge, moderate positive attitude, and high positive application of precautionary measures towards COVID-19 were willing to get the vaccine. More education programs to the community of Majmaah city about COVID-19 precautionary measures and efficacy of vaccine are recommended.

Key words: Aesthetic procedure, Cosmetic surgery, Ethics, Professionalism, Social media

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INTRODUCTION

Coronavirus disease-2019 (COVID-19) caused by coronavirus-2 (SARS-CoV-2) was designated by WHO as a public health threat and proclaimed a pandemic on March 11, 2020. The virus

mutated throughout time which resulted in variability in virus severity, spread and its ability to cause disease. New strains of the virus have been discovered all over the world [1]. COVID-19 instances have grown as a result of the evolution of these variations. This places a greater strain on health-care resources, leads to more hospitalizations, comorbidity and mortality [2]. As of April 25, 2021, the global number of Coronavirus cases had surpassed 146 million, with over 124 million recovered cases and over 3 million deaths [3]. Saudi Arabia has reported approximately 411,000 confirmed

cases to date. More than 1300 confirmed cases have been reported in Majmaah province [4]. Coronaviruses can be transmitted by variable methods, including human-to-human transmission through respiratory aerosol distributed by the infected person's coughing and sneezing, or through intimate personal contact. The virus is also thought to spread through contacting contaminated objects [5]. COVID-19 patients may present with a variety of symptoms, including fever, dry cough, fatigue, dyspnea, and respiratory distress. General body ache, inability to smell or taste, sore throat, nausea, vomiting, diarrhea and other constitutional symptoms such as headache, congestion or runny nose may be other presenting symptoms [6]. Elder people and those with chronic conditions such cardiovascular or respiratory ailments, hypertension, or diabetes mellitus are at high risk and more liable for complications. Deaths in COVID-19 patients were highly linked to advanced age and COVID-19 sequelae. The most common cause of mortality among COVID-19 patients was acute respiratory failure, septic shock and multiple organ failure followed by acute kidney failure. The majority of the cases had chronic illness including hypertension, heart disease, and diabetes Mellitus [7]. In January 2020, the Coalition for Epidemic Preparedness Innovations (CEPI) announced the first financing allocations for the development of the covid-19 vaccine [8]. As of April 8, 2020, there were 115 global COVID-19 vaccine development candidates. There are 78 active candidates among them, with the remaining 37 having an unconfirmed developmental status [9]. There have been seven vaccinations for COVID-19 disease that have progressed to the phase 3 trial stage. As there is high mutation tendencies in SARS-COV-19 and new strain are still developing, vaccination and adherence to precautionary measures are without a doubt, a critical component of the pandemic's containment. Immunization programs can only be successful if they have high acceptability and coverage rates [10].

This study was conducted to evaluate the acceptance of the COVID-19 vaccine, knowledge, attitude and adherence to precautionary measures among the Majmaah community.

METHODOLOGY

Study setting, design, and participants

A cross-Sectional study conducted in Majmaah city, Saudi Arabia, Majmaah has a population of 133,285 people in an area of 30.000 km² including 12 neighborhoods and 4497 housing units. The study targeted Majmaah city population in a randomly selected residual neighborhoods: Alandalos neighborhood, Almargab neighborhood, Alajameen neighborhood, Almatar neighborhood, Almurooj neighborhood, Almogbel neighborhood, Aljazeera neighborhood, King Fahad neighborhood, Alfaisaliah neighborhood, Al fayha neighborhood, Alnahdah neighborhood, Albasirah neighborhood and another selection was added [11,12].

Inclusion criteria

All individuals residing in the city of Majmaah aging 18 years old or more of both sexes were included in the study.

Exclusion criteria

Subjects less than 18 years old, non-English, or non-Arabic speakers, Illiterate individuals, who are unable to answer the questionnaire individually and independently were excluded from the study.

Questionnaire and scoring methods

The study was conducted through an online questionnaire using google forms tool in both Arabic and English language, in the period from 7th of February 2021 to 5th of March 2021. Ethical approval from Majmaah University IRB was obtained. Informed consent was obtained from the participants. The questionnaire was of 5 sections, started with the demographic data included (gender, age, education, residual area) and a question about the exposure to covid-19. Second one was the knowledge section consisted of 13 questions covering (Sources of knowledge, type of infection, the main route of transmission, groups liable to complication, the symptoms and the preventive measures) with a total score of 0-18. Accordingly, the participants were classified into good (9-18) or poor (0-8) knowledge. Third section asking questions about the attitude toward COVID-19 included 6 questions about (being scared from human-to-human transmission, people who got infected with covid-19, or coming in close contact with

infected persons and the adherence to social distancing measures). Given a score of 0-7, the participants were classified into high (6-7), moderate (5), and low (0-4). Fourth section was about the use of precautionary measures and the extent of compliance to these measures ; (Use of hand sanitizer, touching public objects, wearing face masks, attending crowded places and social events, self-isolation, cleaning cell phone screen, and shaking hands). Given a score from 0-16, the participants were classified into high positive (16-7), moderate positive (6), and low positive (≤ 5). Fifth section regarding the vaccine asking about (perceived effectiveness of the vaccine, the willingness to get vaccinated and if not, what is the most probable cause of refusal, and obstacles to get the vaccine). The participants were classified into willing to get the vaccine or not willing [13].

Data analysis

Data analysis was performed by the statistical package for social sciences (SPSS), version 24 (SPSS, Chicago, Illinois, USA). Descriptive and inferential statistics were employed. Pearson's chi-square was used to compare qualitative variables and to test significance; p value less than 0.05 was considered significant.

RESULTS

Socio-demographic characteristics

A total of 457 participants responded to the questionnaire. Most of the participants were female (69.6%, 318) as compared to the males (30.4%, 139). More than 77% of the participants belonged to the age group of 18-29 years, followed by 30-41 years (11.2%), 42-53 years (8.1%), 54-64 years (3.1%), and the percentage of participants more than 65 years is 0.2%. Almost two-thirds of the participants were college students 67%, those who attended high

school were 27.6%, while the percentage of postgraduates is only 2% and the percentage of participants with other educational levels is 3.5% (Table1).

Covid-19 knowledge

The majority of the participants 234 (51.2%) had poor knowledge, while 223 (48.8%) had good knowledge. The most common source of knowledge is the Ministry of Health and social media 133 (29.1%) (Figure1).

Covid-19 attitude

Majority of participants show low positive attitude toward COVID-19, 252 (55.1%), followed by moderate positive attitude 196 (42.9%) while high positive attitude was the minimum 9 (2.0%) (Figure1).

Covid-19 precautionary measures

Regarding the precautionary measures towards COVI-19, most of the participants 148 (46.4%) applying high positive precautionary measures, followed by low positive precautionary measures in 97 (32.4%) participants and moderate positive precautionary measures in 212 (21.2%) participants (Figure1).

Covid-19 vaccine acceptance

About two third of participants, 310 (67.8%) showed acceptance of vaccine and are willing to get it, while the remaining 147 (32.2%) refused getting vaccinated (Figure 2).

Comparing the sociodemographic data with the studied parameters, the participants' knowledge about COVID-19 was not statistically significant with the level of education ($p > 0.05$), age ($p > 0.05$), or gender ($p > 0.05$). There was a significant association of COVID-19 attitude with participants' Socio-demographics according to gender ($p < 0.05$), as females had a higher low positive COVID-19 attitude than males. No

Table 1: Socio-demographic Characteristics (n=457).

| Variables | No.(%) | Variables | No.(%) |
|---------------|------------|------------------|------------|
| Gender | | Education | |
| Female | 318 (69.6) | High school | 126 (27.6) |
| Male | 139 (30.4) | Collage | 306 (67.0) |
| | | Post graduated | 9 (2.0) |
| | | Other | 16 (3.5) |
| Age | | | |
| 18-29 | 354 (77.5) | | |
| 30-41 | 51 (11.2) | | |
| 42-53 | 37 (8.1) | | |
| 53-64 | 14 (3.1) | | |
| 65+ | 1 (0.2) | | |

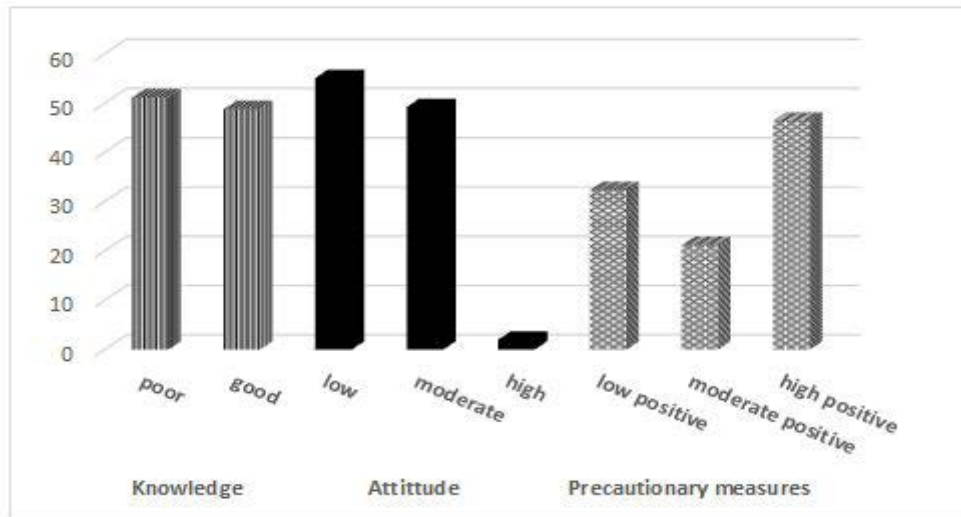


Figure 1: Percentage of knowledge, attitude and precautionary measures among the participants.

COVID-19 Vaccine Acceptance

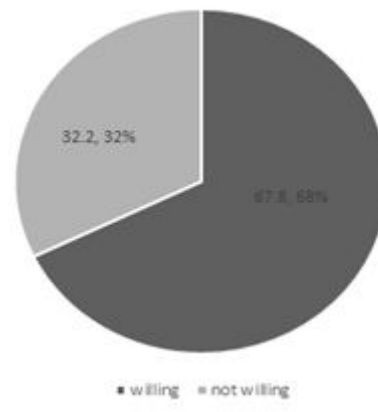


Table 2: Association of socio demographic data with knowledge, attitude, precautionary measures and COVID-19 Vaccine Acceptance (n=457).

| Variables | Knowledge | | Attitude | | | Precautionary measures | | | Vaccine acceptance | | |
|-----------|---------------|------|----------|----------|------|------------------------|-------------------|--------------|--------------------|------|------|
| | poor | good | low | moderate | High | High positive | Moderate positive | Low positive | No | Yes | |
| Gender | female | 49.1 | 50.9 | 51.3 | 46.9 | 1.9 | 50.0 | 19.5 | 30.5 | 34.9 | 65.1 |
| | male | 56.1 | 43.9 | 64 | 33.8 | 2.2 | 38.1 | 25.2 | 36.7 | 25.9 | 74.1 |
| | P=0.165 | | P=0.035 | | | P=0.062 | | | P=0.058 | | |
| Age | 18-29 | 50.8 | 49.2 | 53.4 | 44.9 | 1.7 | 43.5 | 19.8 | 36.7 | 31.1 | 68.9 |
| | 30-41 | 52.9 | 47.1 | 56.9 | 39.2 | 3.9 | 49 | 25.5 | 25.5 | 49 | 51 |
| | 42-53 | 51.4 | 48.6 | 67.6 | 29.7 | 2.7 | 51.4 | 35.1 | 13.5 | 24.3 | 75.7 |
| | 53-64 | 50 | 50 | 57.1 | 42.9 | 0 | 92.9 | 7.1 | 0 | 21.4 | 78.6 |
| | 65+ | 100 | 0 | 100 | 0 | 0 | 100 | 0 | 0 | 0 | 100 |
| | P=0.904 | | P=0.695 | | | P=0.001 | | | P=0.059 | | |
| Education | High school | 48.4 | 51.6 | 54 | 42.9 | 3.2 | 35.7 | 24.6 | 39.7 | 34.9 | 65.1 |
| | Collage | 52.9 | 47.1 | 54.2 | 44.1 | 1.6 | 48.7 | 21.2 | 30.1 | 31.7 | 68.3 |
| | Post graduate | 55.6 | 44.4 | 88.9 | 11.1 | 0 | 55.6 | 11.1 | 33.3 | 44.4 | 55.5 |
| | Other | 37.5 | 62.5 | 62.5 | 37.5 | 0 | 81.3 | 0 | 18.8 | 12.5 | 87.5 |
| | P=0.566 | | P=0.421 | | | P=0.015 | | | P=0.27 | | |

A significant difference in participants' acceptance toward COVID-19 vaccine according to COVID-19 attitude and precautionary measures ($P < 0.05$) was observed (Table 3).

Table 3: Association of COVID-19 Vaccine Acceptance with knowledge, attitude, and precautionary measures (n=457).

| Variable | Not willing to get vaccinated No.(%) | Willing to get vaccinated No.(%) | P-value |
|------------------------|--------------------------------------|----------------------------------|---------|
| COVID-19 knowledge | | | |
| Poor | 78 (33.3) | 156 (66.7) | 0.584 |
| Good | 69 (30.9) | 154 (69.1) | |
| COVID-19 attitude | | | |
| Low | 85 (33.7) | 167 (66.3) | 0.042 |
| Moderate | 56 (28.6) | 140 (71.4) | |
| High | 6 (66.7) | 3 (33.3) | |
| Precautionary measures | | | |
| Low positive | 57 (38.5) | 91 (61.5) | 0.01 |
| Moderate positive | 37 (38.1) | 60 (61.9) | |
| High positive | 53 (25.0) | 159 (75.0) | |

There was significant association between COVID-19 vaccine acceptance with the following variables: perceived effectiveness against serious diseases, perceived obstacles to the vaccine and perceived believe of disease prevention by the vaccine ($P<0.05$) (Table 4).

Table 4: Association of COVID-19 Vaccine Acceptance with vaccine perceived Variables (n=457).

| Variable | Not willing to get the vaccine No.(%) | Willing to get the vaccine No.(%) | P-value |
|--|---------------------------------------|-----------------------------------|---------|
| Perceived effectiveness against serious diseases | | | |
| Yes | 65 (19.5) | 269 (80.5) | 0.000 |
| No | 82 (66.7) | 41 (33.3) | |
| Most probable cause of refusal of the vaccine | | | |
| Ineffective | 86 (30.3) | 198 (69.7) | 0.269 |
| Otherwise | 61 (35.3) | 112 (64.7) | |
| Perceived obstacles to the vaccine | | | |
| No | 104 (36.9) | 178 (63.1) | 0.006 |
| Yes | 43 (24.6) | 132 (75.4) | |
| Perceived believe of disease prevention by the vaccine | | | |
| A little | 43 (63.2) | 25 (36.8) | 0.000 |
| A lot | 16 (10.1) | 142 (89.9) | |
| A moderate amount | 61 (31.9) | 130 (68.1) | |
| Not at all | 27 (67.5) | 13 (32.5) | |

Table 5: Association of COVID-19 Exposure with Knowledge, Attitude, Precautionary measures, and Vaccine acceptance (n=457).

| Variable | Variable | No exposure to COVID No. (%) | Exposure to COVID No. (%) | P value |
|------------------------|-------------------|------------------------------|---------------------------|---------|
| Knowledge | Poor | 200 (50.6) | 195 (49.4) | 0.538 |
| | Good | 34 (54.8) | 28 (45.2) | |
| | High | 7 (1.8) | 2 (3.2) | |
| Attitude | Moderate | 173 (43.8) | 23 (37.1) | 0.496 |
| | Low | 215 (54.4) | 37 (59.7) | |
| Precautionary Measures | High positive | 188 (47.6%) | 24 (38.7) | 0.137 |
| | Moderate positive | 78 (19.7%) | 19 (30.6) | |
| | Low positive | 129 (32.7%) | 19 (30.6) | |
| Vaccine Acceptance | No | 128 (32.4) | 19 (30.6) | 0.783 |
| | Yes | 267 (67.6) | 43 (69.4) | |

significant difference with other demographics was observed. There was significant association of precautionary measures with participants' Socio-demographics according to age and education ($P<0.05$). No significant difference in participants' acceptance toward COVID-19 vaccine according to gender, age, education ($P>0.05$) was observed (Table 2).

Covid-19 exposure

The majority of participants (86.4%) were not exposed to COVID-19. There was no significant difference between COVID-19 exposure and

participants' knowledge, attitude, precautionary measures or acceptance of vaccination as shown in Table 5.

DISCUSSION

Four hundred and fifty-seven participants were involved in the study. Only 223 (48.8%) of participants had good knowledge. However, it might be a negative indicator of people's understanding of the pandemic. In contrast, a higher level of knowledge was observed among general population of KSA [14].

In regard to attitudes, only 2% of the participants had high positive attitude towards COVID-19. This finding is lower than that reported in other studies conducted on KSA, China and Malaysia [14-16]. On the other hand, 46.40% of participants have high positive precautionary measures. Additionally, higher education levels were more committed to precautionary measures (48.7%) rationally, because they are more literate. This result is consistent with another study conducted among university students in Jordan [17]. A similar finding in a cross-sectional survey among university students in Bangladesh observed most participants having moderate practice levels 54.73% and manifest females' predominance in both good attitude and practices against Coronavirus disease [18]. In contrast, a study conducted in Riyadh city showed that 53.3% of participants were having poor compliance to preventive practices. Interestingly, the same study showed that 98.2% of participants encouraged safety actions taken by Saudi government [14].

The present study focused on identifying the presence of connection between several variables including knowledge, exposure, attitude, adherence to precautionary measures and sociodemographic data. Although the level of the knowledge might be thought to be influenced by the educational level, the participant's knowledge in this study was not significantly associated with the level of education. This is also true for other variables such as age and gender. Conversely, a study conducted in Riyadh city showed slight increase in the level of knowledge in males compared to females, with only 3% difference [19].

In the present study, the female participants showed lower positive attitude than males. This in contrast to the finding of a study conducted in Italy focusing on identifying the gender difference in relation to beliefs, attitudes, and behaviors towards the pandemic. It had shown that females had a greater sense of severity of the situation which ultimately influenced the level of adherence and obedience during the pandemic curfew [20]. The above-mentioned study conducted in Riyadh city showed that females also demonstrated better practice (82%) than males (80%) [19]. In both studies, the results were attributed to many factors including the role in the family, economic status,

psychological, environmental, or cultural factors. Particularly, cultural influence might be the most notable factor.

Furthermore, there was no significant change in knowledge, attitude, precautionary measure in relation to disease exposure. This might be attributed to the large number of participants that were not exposed to the disease (n=215) in comparison to the exposed that comprised only 37 participants.

Regarding vaccine acceptance, about two third of participants, 310 (67.8%) were willing to get the vaccine. A significant difference was observed in vaccine acceptance to covid-19 attitude and precautionary measures. A greater degree of adherence to precautionary measures and a positive attitude towards the pandemic could essentially suggest a greater likelihood for willful vaccination.

As shown by the resurgence of some infectious diseases, vaccine reluctance is a long-standing problem that presents a direct threat to public health. Luckily, numerous studies showed a satisfying acceptance rate. The current study demonstrated that most of the participants are willing to get vaccinated (67.8%) without association to any sociodemographic data nor exposure to COVID-19. Similar percentage was obtained in a study in the USA (67%), the author reported that the result was not sufficient and they need to understand the hesitancy towards getting the vaccine [21]. Another study in USA reported that acceptance of the vaccine was influence by various health beliefs as population perception towards vaccine efficacy and its potential harms [22] Close ratio was found in a study conducted in KSA (68.9%) and showed a higher vaccine acceptance in elderly group [9]. In contrast, A great percentage of vaccine acceptance was in a worldwide survey showed that Ecuador had the highest acceptance rate (>97%) [23]. On the other hand, lowest acceptance proportion was reported in Arabian study done among many countries where most of the participants were from Kuwait and Jordan which illustrate 29.4% as a total acceptance majority of them were men, post-graduates, and people with chronic diseases [24].

As a convenient outcome, a lump of participants believed that immunization in general can protect against serious illnesses. Reasons

for vaccine refusal have to be identified and accordingly we investigated different reasons. Majority of responses to the questionnaire voted for "The vaccine is ineffective", nevertheless, abundant number are willing to get the vaccine. The above-mentioned Arabian study discussed the reasons of vaccine rejection and the main findings for refusal were variable and most were heavily conspiracy influenced, reasonings such as long-term effects on fertility being the most commonly mentioned [24].

This was explained by authors as highly entrenched ideas about conspiracy especially in Jordan and Kuwait and hence the public trust to health authorities is threatened [24]. In current study, participants were considering many hurdles to get the vaccine such as waiting-time and cost but that can be denied, as the government of Saudi Arabia and the current health system are working to provide vaccination in local centers and cost-free in an effort to make vaccination as readily available as possible. The longevity of the effectiveness of vaccines was also another major concern to participants as measured by "how much the COVID-19 vaccine is going to protect from the disease?", as expected, the generality, those who accept to get vaccinated, reflect "a lot" whereas the majority of those who refused the vaccine said, "not at all". Parallely, an article discussing COVID-19 vaccine acceptance in Japan demonstrates that representatives that are willing to get vaccinated believed the vaccine is highly effective and those who reject the vaccine ratify low effectiveness of COVID-19 vaccine as predictable [25].

CONCLUSION

The majority of participants weren't exposed to COVID-19 and have poor knowledge about it. Two third of participants showed acceptance of COVID-19 vaccination. Most of the participants in the study were female and had a low positive attitude towards COVID-19. The application of precautionary measures varies with age and the level of education. Those who had good knowledge, moderate positive attitude, and high positive application of precautionary measures towards COVID-19 were willing to get the vaccine. They believed in its effectiveness in prevention of the disease or its serious complications.

LIMITATIONS

The study involved a small sample size to be representative. Second, the data collected through a self-administered questionnaire which may be inaccurate. Another noteworthy limitation that we allowed more than one selection in the source of knowledge which limited our ability to compare it with the result.

RECOMMENDATIONS

More education programs to the community of Majmaah city about COVID-19 are essential to endorse proper precautionary measures and improve the attitude towards it, especially through the Ministry of Health and social media. Orientation programs about vaccine effectiveness are recommended. Further studies on larger scales are also recommended.

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CONFLICT OF INTEREST

The Authors declare that they have no conflict of interests.

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