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Research Article

# Association between Patient Characteristics and Lifestyle and Symptoms in Saudi Confirmed COVID-19 Cases

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## Abstract

**Background**: The most common symptoms being reported are fever, fatigue, dry cough, and other upper respiratory symptoms which are considered less common symptoms. Given that there is still a dire need to define a proper relationship between these risks and COVID-19; we also assessed the factors associated with the manifestations of these signs and symptoms.

**Methodology**: It's an observational descriptive cross-sectional study based on a questionnaire sent to the participants via Whatsapp application focusing on COVID-19 related information between the end of 2020 and November 2021.

**Results**: The most reported symptoms during COVID-19 infection were exhaustion (65.6%), fever and losing the sense of smell (57.7% each), pains/aches and losing the sense of taste (55.7% and 55.5%).

**Conclusion**: The severity of the novel coronavirus ranges from mild symptoms (majority of cases) to severe respiratory tract infection. The most susceptible population involves the elderly and individuals with underlying medical conditions, especially obesity and diabetes. Symptoms in COVID-19 patients were mainly associated with presence of comorbidities, BMI, sex, and older age.

**Keywords:** COVID-19; SARS-CoV-2; Obesity; Diabetes mellitus; Symptoms

**Abbreviations:** BMI: Body Mass Index; COVID-19: Coronavirus Disease 2019; ICU: Intensive Care Unit; MOF: Multi-Organ Failure; SARS: Severe Acute Respiratory Syndrome; SARS CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; SPSS: Statistical Package for Social Sciences

## Introduction

The novel COVID-19 pandemic, caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS CoV-2), leads to severe respiratory diseases. The SARS CoV-2 belongs to a large family of coronaviruses that have been known to cause respiratory tract infections in humans [1]. Ever since its dawn in the city of Wuhan, China in December 2019, it has spread all over the world and has become a global health emergency [2].

The morbidity and mortality of SARS-CoV-2 are more prevalent in older subjects who present different comorbidities [3]. The clinical onset of SARS-CoV-2 infection is variable from mild self-limited influenza-like symptoms to a Severe Acute Respiratory Syndrome (SARS) with a conceivable relationship of Multi-Organ Failure (MOF) as a result of cytokine storm or hemophagocytic syndrome [4]. The most common symptoms being reported are fever (some early cases may not have fever only respiratory symptoms), fatigue, dry cough, dyspnea, nasal congestion, runny nose or sputum, and other upper respiratory symptoms which are considered less common symptoms. All of the infected patients had at least one symptom. Fever and cough were the dominant symptoms whereas upper respiratory symptoms and gastrointestinal symptoms were rare [5]. Most reported cases experienced mild disease symptoms and may not present positive signs (have the coronavirus but are asymptomatic) [6]. Patients in severe conditions may have shortness of breath, moist rales in lungs, weakened breath sounds, and dullness on the percussion, septic shock, and irreversible metabolic acidosis in a matter of a short period of time [7]. It has also been noted that COVID-19 has detrimental effects, especially in patients suffering from other comorbidities like diabetes mellitus, hypertension, and malignancies [8]. Patients already suffer-



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ing from cardiovascular diseases are at a higher risk of suffering from a serious adverse effect, those without pre-existing cardiovascular conditions are also predisposed to cardiovascular complications, one of the most common of which is a thrombotic complication [9].

During the rapid escalation of the COVID-19 pandemic in March and April 2020, we conducted an online survey on the lifestyle during COVID-19 pandemic and the symptoms by Saudi adults for acquiring COVID-19 information. Given that there is still a dire need for a substantial number of studies to be done so that a proper relationship between these risks and COVID-19 can be defined; we also assessed the factors associated with the manifestations of these signs and symptoms.

## Materials and Methods

### Study Design and Participants

It's an observational descriptive cross-sectional study based on a questionnaire sent to the participants as a Google document via Whatsapp application focusing on COVID-19 related information between the end of 2020 (after the first wave of COVID-19) and November 2021. All adults aged more than 18 years and living in the western region of Saudi Arabia were included in this study.

### Ethical Considerations

The study was approved by our IRB committee (BIOMED-E-8-2020) on 17/9/2020. Due to the retrospective nature of the study, informed consent from the participating individuals was not required by the ethical review board. This research received no specific grant from any funding agency in public, commercial, or nonprofit sectors.

### Data Collection

Patients received a Google document via Whatsapp application using a newly developed questionnaire that inquired about:

- Socio-demographic and economic information: age, gender, education, occupation, income.
- Medical information: comorbidities, malaria, anxiety.
- Lifestyle information in the pandemic context: handwashing, mask and gloves wear.
- Different symptoms related to COVID-19 infection: fever, exhaustion, pain, and many others with duration, severity and recovery
- Information regarding COVID-19 infection: testing, diagnosis, transmission, and education.

### Statistical Analysis

All statistical analyses were performed by using SPSS (Statistical Package for social sciences version 24.0). Descriptive results are presented as mean±Standard Deviation for all quantitative variables (such as age), whereas number (percentage) is reported for all categorical variables (such as gender). All statistical analysis was done using two-tailed tests and an alpha error of 0.05. A P-value less than 0.05 was considered to be statistically significant. Chi-squared analyses were used as appropriate to evaluate the relationships between participants' characteristics and different symptoms. Multinomial logistic regression was used to test the association between number of symptoms and risk factors while adjusting to multiple variables.

## Results

Table 1 shows the socio-demographic characteristics of the patients with slightly higher proportion of men (56.1%). Almost half of the participants are aged between 21-40 years (48%) followed by those aged between 41-60 years (41.6%). The mean weight was 80.29±20.57 Kg. The majority is from Saudi Arabia (90%), married (71.7%) with no comorbidities (67.5%) (Figure 1). A total of 249 had their flu vaccination (Figure 2). Regarding lifestyle characteristics during COVID-19 pandemic presented in Figure 3, only 6% live in an isolated neighborhood and almost the half go out because of work. The majority reported that they are keen to wash their hands (80.2%), mostly by soap (74.2%). Similarly, 81% wear their mask regularly, 71.9% keep social distancing while only 17.6% keen wear gloves.

The most reported symptoms during COVID-19 infection were exhaustion (65.6%), fever and losing the sense of smell (57.7% each), pains/aches and losing the sense of taste (55.7% and 55.5% respectively). Most of the symptoms were not very severe for majority of patients, the highest proportion suffered from severe aches and pain (36.4%). The symptoms lasted for one week mainly (59%) and resumed after one week for half of the participants (47.9%). Only 4 patients were admitted to the ICU (Figure 4-5).

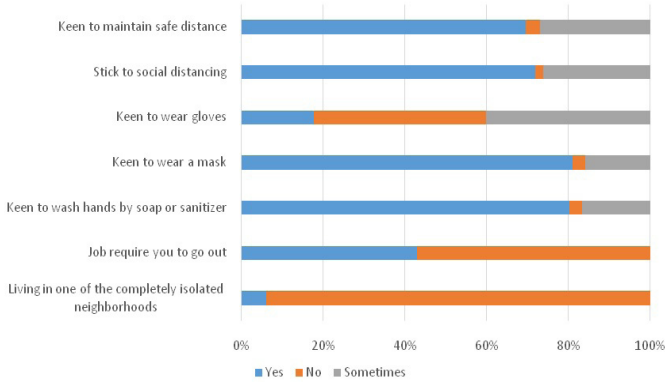


**Figure 1:** Lifestyle characteristics during COVID-19 pandemic.

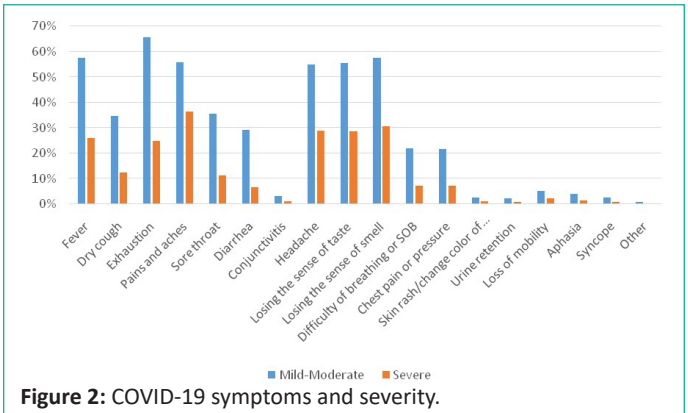


**Figure 2:** COVID-19 symptoms and severity.

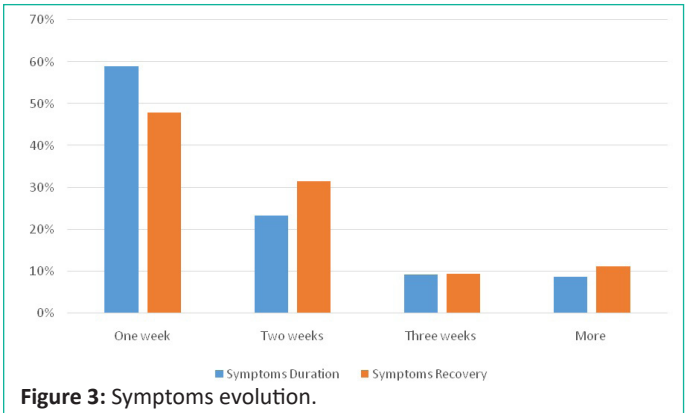


**Figure 3:** Symptoms evolution.

**Table 1:** Socio-demographic characteristics (N=519).

| | Frequency | Percentage (%) |
|---|---|---|
| **Gender** | | |
| *Female* | 228 | 43.9 |
| *Male* | 291 | 56.1 |
| **Age (years)** | | |
| *Less or equal to 20* | 28 | 5.4 |
| *21-40* | 249 | 48 |
| *41-60* | 216 | 41.6 |
| *More or equal to 61* | 26 | 5 |
| **Weight (Kg)** | Min:34 Max:170 | 80.29±20.57 |
| **Height (cm)** | Min:140 Max:202 | 167.3±10.29 |
| **Waist circumference** | Min:15 Max:180 | 59.13±34.02 |
| **Nationality** | | |
| *Algeria* | 1 | 0.2 |
| *Burma* | 2 | 0.4 |
| *Egypt* | 6 | 1.2 |
| *Ethiopia* | 2 | 0.4 |
| *Filipina* | 1 | 0.2 |
| *Indian* | 1 | 0.2 |
| *Indonesia* | 2 | 0.4 |
| *Jordan* | 3 | 0.6 |
| *Nigeria* | 1 | 0.2 |
| *Pakistan* | 6 | 1.2 |
| *Palestine* | 2 | 0.4 |
| *Saudi Arabia* | 467 | 90 |
| *Somali* | 2 | 0.4 |
| *South Africa* | 2 | 0.4 |
| *Sudan* | 1 | 0.2 |
| *Syria* | 3 | 0.6 |
| *Turkey* | 2 | 0.4 |
| **Educational level** | | |
| *Less than secondary* | 26 | 5 |
| *Secondary* | 85 | 16.5 |
| *University* | 293 | 56.8 |
| *Postgraduate* | 112 | 21.7 |
| **Marital status** | | |
| *Divorced or separated* | 18 | 3.5 |
| *Married* | 367 | 71.7 |
| *Single* | 117 | 22.9 |
| *Widow* | 10 | 2 |
| **Occupation** | | |
| *Freelance* | 25 | 4.9 |
| *Government employee* | 188 | 36.6 |
| *Private sector employee* | 103 | 20 |
| *Retired* | 40 | 7.8 |
| *Unemployed* | 158 | 30.7 |
| **Monthly income** | | |
| *1,000 Riyal or less per month* | 93 | 19.7 |
| *1,001-5,000 Riyal* | 78 | 16.5 |
| *5,001 - 10,000 Riyal* | 111 | 23.5 |
| *10,001-20,000 Riyal* | 138 | 29.2 |
| *More than 20,000 Riyal* | 52 | 11 |
| **Chronic diseases** | | |
| *No* | 340 | 67.5 |
| *Allergic diseases* | 24 | 4.8 |
| *Cancer diseases* | 4 | 0.8 |
| *Diabetes* | 63 | 12.5 |
| *Heart diseases* | 5 | 1.0 |
| *Hypertension* | 44 | 8.7 |
| *Respiratory diseases* | 24 | 4.8 |
| **History of malaria** | | |
| *No* | 502 | 98.2 |
| *Yes* | 9 | 1.8 |
| **Ever had flu vaccination** | | |
| *No* | 264 | 51.5 |
| *Yes* | 249 | 48.5 |
| **Been diagnosed with any mental illness before COVID-19** | | |
| *No* | 480 | 96.8 |
| *Has mental illness with same presentation* | 12 | 2.4 |
| *Has mental illness with worse presentation* | 39 | 0.8 |

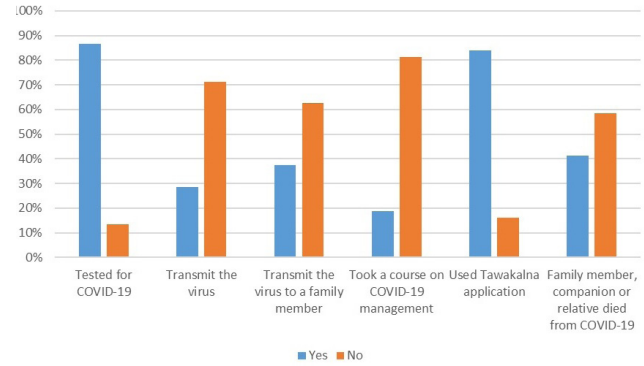


**Figure 4:** Additional COVID-19 characteristics.

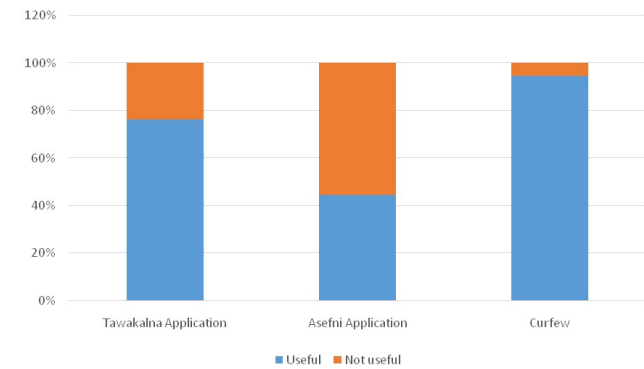


**Figure 5:** Usefulness of different types in reducing COVID-19 infection.

Table 2 describes general information related to COVID-19. A large proportion did not suffer or suffered slightly from anxiety because of isolation (32.6% and 33.8% respectively). The majority were previously tested for COVID-19 (86.5%) and diagnosed with light symptoms (73.1%). A total of 273 participants were isolated due to COVID-19 infection where they mostly don't know its source (38%). More than the half-received health education from online and social networking (59.6%) followed by the Ministry of Health website (21.5%). Almost half of participants had one of their family members, relative or companion died from COVID-19 (Figure 6). The majority believed that Tawakalna and Asefni applications were useful (Figure 7).

Table 3 to 9 reported associations between different symptoms and patient characteristics and lifestyle. In all statistically significant associations between presence of comorbidities and different symptoms, those with comorbidities presented more symptoms except for losing sense of taste. Higher educational level was associated significantly with lower fever presentation (University 60%). As for dry cough, obese participants had higher presentation dry cough (49.1% vs 31.1%), in addition, those who had flu vaccination presented higher rate of fever (2.8% vs 0.9%) yet lower headache manifestations (43.2% vs 53.8%). In table 5, underweight and obese participants had higher presentation of exhaustion (2.9% vs 0.6% and 41.7% vs 28.8% respectively) and those living in isolated neighborhood had lower exhaustion signs. For pains and aches (Table 8) participants aged more than 40 years had significantly higher rate of manifestations (44.5% vs 38.7% and 7.1% vs 2.2%). Females have significantly suffered more of headaches (51.6% vs 34.5%) and losing sense of taste (48.9% vs 37.6%) and smell (48.5% vs 37.7%). In addition, keen to wear mask and gloves was associated with lower headache manifestation. Losing sense of smell was more seen in under/overweight and obese participants (Table 9). When dividing the number of symptoms into 3 categories only gender and BMI in socio-demographic factors were significantly associated where females and obese individuals had higher

**Table 2:** COVID-19 general characteristics.

| | Frequency | Percentage (%) |
|---|---|---|
| **Degree of anxiety during lockdown** | | |
| *Never* | 164 | 32.6 |
| *Slightly* | 170 | 33.8 |
| *Average* | 116 | 23.1 |
| *Very much* | 26 | 5.2 |
| *A lot* | 27 | 5.4 |
| **Times of taking PCR** | Min:0 Max:15 | 2.07±1.79 |
| **Been diagnosed or having symptoms of COVID-19** | | |
| *Diagnosed with no symptoms* | 65 | 12.7 |
| *Diagnosed with light symptoms* | 373 | 73.1 |
| *Not confirmed by laboratory and no Symptoms* | 39 | 7.6 |
| *Diagnosed and condition is critical* | 33 | 6.5 |
| **Been isolated because of COVID-19** | | |
| *No* | 170 | 33.7 |
| *Isolated due to COVID-19 suspicion* | 25 | 5 |
| *Isolated due to contact to infected person* | 27 | 5.3 |
| *Isolated due to COVID-19 infection* | 273 | 54.1 |
| *Isolated due to travel* | 10 | 2 |
| **Source of infection** | | |
| *Don't know* | 185 | 38.0 |
| *Co-worker* | 30 | 6.2 |
| *Friends* | 34 | 7 |
| *Family member* | 153 | 31.4 |
| *Hospital or clinic* | 19 | 3.9 |
| *Relatives* | 58 | 11.9 |
| *Supermarket* | 8 | 1.6 |
| **Received Heath education from** | | |
| *Ministry of Health website* | 108 | 21.5 |
| *Online and social networking* | 300 | 59.6 |
| *Paper publication* | 5 | 1 |
| *Television* | 90 | 17.9 |

number of symptoms (Table 10). Table 11 shows the multiple logistic regression after adjusting on multiple factors. Regarding clinical factors, having comorbidities or a history of malaria was associated with higher number of COVID-19 signs. Going out for shopping once a week or once every 3 days compared to other categories was more associated with lower score of symptoms (12.3% and 13.9% with no symptoms). Those living in an isolated neighborhood had lower number of symptoms compared to those who are not. Interestingly, individuals who sometimes wear their mask were the most associated with more reported symptoms (60.5% had more than 6 symptoms).

## Discussion

The world has been and is still involved with a pandemic created by the novel coronavirus where community transmission became an important issue as numerous countries forced progressive lockdown measures in response to the increasing number of COVID-19 cases. Currently, the novel coronavirus caused unprecedented alteration in lifestyle routines with a social significance, and beyond including mask wearing, quarantine, self-isolation when suspected of infection and disruption of personal and social activities.

Clinical manifestations of COVID-19 cases may progress rapidly, and severe cases may develop hypoxia, concomitant organ failure, and even death [10]. Despite the fact that early identi-

**Table 3:** Association between Fever and different Characteristics.

| | Absence of Fever | Presence of Fever | p-value |
|---|---|---|---|
| **Socio-demographic variables** | | | |
| **Gender** | | | |
| *Female* | 91(42.3%) | 132(45.1%) | 0.541 |
| *Male* | 124(57.7%) | 161(54.9%) | |
| **Age (years)** | | | |
| *Less or equal to 20* | 12(5.6%) | 16(5.5%) | 0.234 |
| *21-40* | 109(50.7%) | 133(45.4%) | |
| *41-60* | 88(40.9%) | 125(42.7%) | |
| *More or equal to 61* | 6(2.8%) | 19(6.5%) | |
| **BMI** | | | |
| *Underweight* | 6(3%) | 4(1.5%) | 0.146 |
| *Normal* | 66(32.8%) | 69(26.1%) | |
| *Overweight* | 64(31.8%) | 82(31.1%) | |
| *Obese* | 65(32.3%) | 109(41.3%) | |
| **Educational level** | | | |
| *Less than secondary* | 7(3.3%) | 19(6.6%) | **0.004** |
| *Secondary* | 35(16.3%) | 50(17.2%) | |
| *University* | 111(51.6%) | 175(60%) | |
| *Postgraduate* | 62(28.8%) | 47(16.2%) | |
| **Monthly income** | | | |
| *1,000 Riyal or less per month* | 34(16.8%) | 59(22.8%) | 0.207 |
| *1,001-5,000 Riyal* | 31(15.3%) | 45(17.4%) | |
| *5,001 - 10,000 Riyal* | 52(25.7%) | 55(21.2%) | |
| *10,001-20,000 Riyal* | 57(28.2%) | 77(29.7%) | |
| *More than 20,000 Riyal* | 28(13.9%) | 23(8.9%) | |
| **Comorbidities** | | | |
| *No* | 153(73.6%) | 180(62.9%) | **0.013** |
| *Yes* | 55(26.4%) | 106(37.1%) | |
| **History of malaria** | | | |
| *No* | 208(99%) | 285(%) | 0.275 |
| *Yes* | 2(1%) | 6(2.1%) | |
| **Flu vaccination** | | | |
| *No* | 101(47.4%) | 161(55.5%) | 0.072 |
| *Yes* | 112(52.6%) | 129(44.5%) | |
| **Lifestyle variables** | | | |
| **Days to go out for shopping** | | | |
| *Every two weeks* | 73(35.1%) | 91(32.4%) | 0.925 |
| *Once a week* | 59(28.4%) | 82(29.2%) | |
| *Once every 3 days* | 45(21.6%) | 66(23.5%) | |
| *Every day or two* | 31(14.9%) | 42(14.9%) | |
| **Living in one of the completely isolated neighborhoods** | | | |
| *No* | 202(94.4%) | 275(94.2%) | 0.918 |
| *Yes* | 12(5.6%) | 17(5.8%) | |
| **Job require you to go out** | | | |
| *No* | 121(57.6%) | 160(58%) | 0.938 |
| *Yes* | 89(42.4%) | 116(42%) | |
| **Keen to wash hands by soap or sanitizer** | | | |
| *No* | 6(2.9%) | 9(3.1%) | 0.464 |
| *Sometimes* | 30(14.4%) | 54(18.6%) | |
| *Yes* | 172(82.7%) | 228(78.4%) | |
| **Keen to wear a mask** | | | |
| *No* | 6(2.9%) | 10(3.4%) | 0.108 |
| *Sometimes* | 25(12%) | 55(18.8%) | |
| *Yes* | 177(85.1%) | 227(77.7%) | |
| **Keen to wear gloves** | | | |
| *No* | 88(42.3%) | 122(41.9%) | 0.061 |
| *In the markets and hospitals* | 36(17.3%) | 74(25.4%) | |
| *Sometimes* | 47(22.6%) | 44(15.1%) | |
| *Yes* | 37(17.8%) | 51(17.5%) | |
| **Stick to social distancing** | | | |
| *No* | 4(2%) | 5(1.7%) | 0.089 |
| *Sometimes* | 43(21.3%) | 87(30.2%) | |
| *Yes* | 155(76.7%) | 196(68.1%) | |
| **Education on COVID-19** | | | |
| **Took a course on COVID-19 management** | | | |
| *No* | 167(81.1%) | 241(82.5%) | 0.675 |
| *Yes* | 39(18.9%) | 51(17.5%) | |
| **Received Heath education from** | | | |
| *Ministry of Health website* | 45(21.6%) | 58(20.4%) | 0.713 |
| *Online and social networking* | 123(59.1%) | 174(61.1%) | |
| *Paper publication* | 1(0.5%) | 4(1.4%) | |
| *Television* | 39(18.8%) | 49(17.2%) | |
| **Used Tawakalna application** | | | |
| *No* | 30(14.3%) | 50(17.4%) | 0.389 |
| *Yes* | 180(85.7%) | 238(82.6%) | |

**Table 4:** Association between Dry cough and different Characteristics.

| | Absence of Dry cough | Presence of Dry cough | p-value |
|---|---|---|---|
| **Socio-demographic variables** | | | |
| **Gender** | | | |
| *Female* | 135(40.8%) | 88(49.7%) | 0.053 |
| *Male* | 196(59.2%) | 89(50.3%) | |
| **Age (years)** | | | |
| *Less or equal to 20* | 18(5.4%) | 10(5.6%) | 0.129 |
| *21-40* | 170(51.4%) | 72(40.7%) | |
| *41-60* | 129(39%) | 84(47.5%) | |
| *More or equal to 61* | 14(4.2%) | 11(6.2%) | |
| **BMI** | | | |
| *Underweight* | 9(3%) | 1(0.6%) | **<0.0001** |
| *Normal* | 90(29.8%) | 45(27.6%) | |
| *Overweight* | 109(36.1%) | 37(22.7%) | |
| *Obese* | 94(31.1%) | 80(49.1%) | |
| **Educational level** | | | |
| *Less than secondary* | 15(4.6%) | 11(6.2%) | 0.829 |
| *Secondary* | 54(16.5%) | 31(17.5%) | |
| *University* | 186(56.7%) | 99(55.9%) | |
| *Postgraduate* | 73(22.3%) | 36(20.3%) | |
| **Monthly income** | | | |
| *1,000 Riyal or less per month* | 67(22.2%) | 26(16.4%) | 0.438 |
| *1,001-5,000 Riyal* | 46(15.2%) | 30(18.9%) | |
| *5,001 - 10,000 Riyal* | 72(23.8%) | 35(22%) | |
| *10,001-20,000 Riyal* | 87(28.8%) | 47(29.6%) | |
| *More than 20,000 Riyal* | 30(9.9%) | 21(13.2%) | |
| **Comorbidities** | | | |
| *No* | 232(72.5%) | 101(58%) | **0.001** |
| *Yes* | 88(27.5%) | 73(42%) | |
| **History of malaria** | | | |
| *No* | 321(99.1%) | 172(97.2%) | 0.138 |
| *Yes* | 3(0.9%) | 5(2.8%) | |
| **Flu vaccination** | | | |
| *No* | 183(56%) | 79(44.9%) | **0.018** |
| *Yes* | 144(44%) | 97(55.1%) | |
| **Lifestyle variables** | | | |
| **Days to go out for shopping** | | | |
| *Every two weeks* | 104(32.5%) | 60(35.5%) | 0.775 |
| *Once a week* | 97(30.3%) | 44(26%) | |
| *Once every 3 days* | 71(22.2%) | 40(23.7%) | |
| *Every day or two* | 48(15%) | 25(14.8%) | |
| **Living in one of the completely isolated neighborhoods** | | | |
| *No* | 309(93.9%) | 168(94.9%) | 0.646 |
| *Yes* | 20(6.1%) | 9(5.1%) | |
| **Job requires you to go out** | | | |
| *No* | 189(59.4%) | 92(54.8%) | 0.321 |
| *Yes* | 129(40.6%) | 76(45.2%) | |
| **Keen to wash hands by soap or sanitizer** | | | |
| *No* | 10(3.1%) | 5(2.8%) | 0.47 |
| *Sometimes* | 59(18.3%) | 25(14.1%) | |
| *Yes* | 253(78.6%) | 147(83.1%) | |
| **Keen to wear a mask** | | | |
| *No* | 9(2.8%) | 7(4%) | 0.59 |
| *Sometimes* | 49(15.2%) | 31(17.5%) | |
| *Yes* | 265(82%) | 139(78.5%) | |
| **Keen to wear gloves** | | | |
| *No* | 131(40.7%) | 79(44.6%) | 0.834 |
| *In the markets and hospitals* | 74(23%) | 36(20.3%) | |
| *Sometimes* | 60(18.6%) | 31(17.5%) | |
| *Yes* | 57(17.7%) | 31(17.5%) | |
| **Stick to social distancing** | | | |
| *No* | 8(2.5%) | 1(0.6%) | **0.048** |
| *Sometimes* | 94(29.2%) | 36(21.4%) | |
| *Yes* | 220(68.3%) | 131(78%) | |
| **Education on COVID-19** | | | |
| **Took a course on COVID-19 management** | | | |
| *No* | 261(81.1%) | 147(83.5%) | 0.494 |
| *Yes* | 61(18.9%) | 29(16.5%) | |
| **Received Heath education from** | | | |
| *Ministry of Health website* | 71(21.9%) | 32(18.9%) | 0.122 |
| *Online and social networking* | 201(62%) | 96(56.8%) | |
| *Paper publication* | 2(0.6%) | 3(1.8%) | |
| *Television* | 50(15.4%) | 38(22.5%) | |
| **Used Tawakalna application** | | | |
| *No* | 49(15.3%) | 31(17.5%) | 0.513 |
| *Yes* | 272(84.7%) | 146(82.5%) | |

**Table 5:** Association between Exhaustion and different Characteristics.

| | Absence of Exhaustion | Presence of Exhaustion | p-value |
|---|---|---|---|
| **Socio-demographic variables** | | | |
| **Gender** | | | |
| *Female* | 71(40.6%) | 152(45.6%) | 0.273 |
| *Male* | 104(59.4%) | 181(54.4%) | |
| **Age (years)** | | | |
| *Less or equal to 20* | 13(7.4%) | 15(4.5%) | 0.429 |
| *21-40* | 86(49.1%) | 156(46.8%) | |
| *41-60* | 69(39.4%) | 144(43.2%) | |
| *More or equal to 61* | 7(4%) | 18(5.4%) | |
| **BMI** | | | |
| *Underweight* | 1(0.6%) | 9(2.9%) | **0.011** |
| *Normal* | 53(34%) | 82(26.5%) | |
| *Overweight* | 57(36.5%) | 89(28.8%) | |
| *Obese* | 45(28.8%) | 129(41.7%) | |
| **Educational level** | | | |
| *Less than secondary* | 6(3.4%) | 20(6.1%) | 0.144 |
| *Secondary* | 37(21.1%) | 48(14.5%) | |
| *University* | 99(56.6%) | 186(56.4%) | |
| *Postgraduate* | 33(18.9%) | 76(23%) | |
| **Monthly income** | | | |
| *1,000 Riyal or less per month* | 37(22%) | 56(19.1%) | 0.904 |
| *1,001-5,000 Riyal* | 26(15.5%) | 50(17.1%) | |
| *5,001 - 10,000 Riyal* | 39(23.2%) | 68(23.2%) | |
| *10,001-20,000 Riyal* | 46(27.4%) | 88(30%) | |
| *More than 20,000 Riyal* | 20(11.9%) | 31(10.6%) | |
| **Comorbidities** | | | |
| *No* | 128(75.7%) | 205(63.1%) | **0.004** |
| *Yes* | 41(24.3%) | 120(36.9%) | |
| **History of malaria** | | | |
| *No* | 165(97.6%) | 328(98.8%) | 0.452 |
| *Yes* | 4(2.4%) | 4(1.2%) | |
| **Flu vaccination** | | | |
| *No* | 87(50.9%) | 175(52.7%) | 0.697 |
| *Yes* | 84(49.1%) | 157(47.3%) | |
| **Lifestyle variables** | | | |
| **Days to go out for shopping** | | | |
| *Every two weeks* | 53(32.1%) | 111(34.3%) | 0.718 |
| *Once a week* | 51(30.9%) | 90(27.8%) | |
| *Once every 3 days* | 34(20.6%) | 77(23.8%) | |
| *Every day or two* | 27(16.4%) | 46(14.2%) | |
| **Living in one of the completely isolated neighborhoods** | | | |
| *No* | 157(90.2%) | 320(96.4%) | **0.005** |
| *Yes* | 17(9.8%) | 12(3.6%) | |
| **Job require you to go out** | | | |
| *No* | 100(60.6%) | 181(56.4%) | 0.372 |
| *Yes* | 65(39.4%) | 140(43.6%) | |
| **Keen to wash hands by soap or sanitizer** | | | |
| *No* | 3(1.8%) | 12(3.6%) | 0.293 |
| *Sometimes* | 33(19.5%) | 51(15.5%) | |
| *Yes* | 133(78.7%) | 267(80.9%) | |
| **Keen to wear a mask** | | | |
| *No* | 4(2.4%) | 12(3.6%) | 0.73 |
| *Sometimes* | 26(15.5%) | 54(16.3%) | |
| *Yes* | 138(82.1%) | 266(80.1%) | |
| **Keen to wear gloves** | | | |
| *No* | 79(47%) | 131(39.6%) | 0.346 |
| *In the markets and hospitals* | 31(18.5%) | 79(23.9%) | |
| *Sometimes* | 31(18.5%) | 60(18.4%) | |
| *Yes* | 27(16.1%) | 61(18.4%) | |
| **Stick to social distancing** | | | |
| *No* | 4(2.4%) | 5(1.6%) | 0.815 |
| *Sometimes* | 45(26.6%) | 85(26.5%) | |
| *Yes* | 120(71%) | 231(72%) | |
| **Education on COVID-19** | | | |
| **Took a course on COVID-19 management** | | | |
| *No* | 140(84.3%) | 268(80.7%) | 0.323 |
| *Yes* | 26(15.7%) | 64(19.3%) | |
| **Received Heath education from** | | | |
| *Ministry of Health website* | 31(18.9%) | 72(21.9%) | 0.137 |
| *Online and social networking* | 110(67.1%) | 187(56.8%) | |
| *Paper publication* | 1(0.6%) | 4(1.2%) | |
| *Television* | 22(13.4%) | 66(20.1%) | |
| **Used Tawakalna application** | | | |
| *No* | 26(15.2%) | 54(16.5%) | 0.706 |
| *Yes* | 145(84.8%) | 273(83.5%) | |

**Table 6:** Association between Pains and aches and different Characteristics.

| | Absence of Pains and Aches | Presence of Pains and Aches | p-value |
|---|---|---|---|
| **Socio-demographic variables** | | | |
| **Gender** | | | |
| *Female* | 91(40.4%) | 132(46.6%) | 0.162 |
| *Male* | 134(59.6%) | 151(53.4%) | |
| **Age (years)** | | | |
| *Less or equal to 20* | 16(7.1%) | 12(4.2%) | **0.015** |
| *21-40* | 117(52%) | 125(44.2%) | |
| *41-60* | 87(38.7%) | 126(44.5%) | |
| *More or equal to 61* | 5(2.2%) | 20(7.1%) | |
| **BMI** | | | |
| *Underweight* | 6(3%) | 4(1.5%) | 0.335 |
| *Normal* | 63(31.5%) | 72(27.2%) | |
| *Overweight* | 64(32%) | 82(30.9%) | |
| *Obese* | 67(33.5%) | 107(40.4%) | |
| **Educational level** | | | |
| *Less than secondary* | 9(4%) | 17(6%) | 0.709 |
| *Secondary* | 38(17%) | 47(16.7%) | |
| *University* | 130(58.3%) | 155(55%) | |
| *Postgraduate* | 46(20.6%) | 63(22.3%) | |
| **Monthly income** | | | |
| *1,000 Riyal or less per month* | 44(21.1%) | 49(19.4%) | 0.555 |
| *1,001-5,000 Riyal* | 36(17.2%) | 40(15.9%) | |
| *5,001 - 10,000 Riyal* | 43(20.6%) | 64(25.4%) | |
| *10,001-20,000 Riyal* | 66(31.6%) | 68(27%) | |
| *More than 20,000 Riyal* | 20(9.6%) | 31(12.3%) | |
| **Comorbidities** | | | |
| *No* | 165(75.5%) | 168(60.9%) | **<0.0001** |
| *Yes* | 53(24.3%) | 108(39.1%) | |
| **History of malaria** | | | |
| *No* | 217(98.6%) | 276(98.2%) | 1 |
| *Yes* | 3(1.4%) | 5(1.8%) | |
| **Flu vaccination** | | | |
| *No* | 119(53.4%) | 143(51.1%) | 0.609 |
| *Yes* | 104(46.6%) | 137(48.9%) | |
| Lifestyle variables | | | |
| **Days to go out for shopping** | | | |
| *Every two weeks* | 74(34.6%) | 90(32.7%) | 0.877 |
| *Once a week* | 60(28%) | 81(29.5%) | |
| *Once every 3 days* | 46(21.5%) | 65(23.6%) | |
| *Every day or two* | 34(15.9%) | 39(14.2%) | |
| **Living in one of the completely isolated neighborhoods** | | | |
| *No* | 208(92.9%) | 269(95.4%) | 0.223 |
| *Yes* | 16(7.1%) | 13(4.6%) | |
| **Job requires you to go out** | | | |
| *No* | 127(59.1%) | 154(56.8%) | 0.619 |
| *Yes* | 88(40.9%) | 117(43.2%) | |
| **Keen to wash hands by soap or sanitizer** | | | |
| *No* | 5(2.3%) | 10(3.6%) | 0.616 |
| *Sometimes* | 35(16%) | 49(17.5%) | |
| *Yes* | 179(81.7%) | 221(78.9%) | |
| **Keen to wear a mask** | | | |
| *No* | 7(3.2%) | 9(3.2%) | 0.898 |
| *Sometimes* | 33(15.1%) | 47(16.7%) | |
| *Yes* | 178(81.7%) | 226(80.1%) | |
| **Keen to wear gloves** | | | |
| *No* | 95(43.6%) | 115(40.9%) | 0.601 |
| *In the markets and hospitals* | 42(19.3%) | 68(24.2%) | |
| *Sometimes* | 40(18.3%) | 51(18.1%) | |
| *Yes* | 41(18.8%) | 47(16.7%) | |
| **Stick to social distancing** | | | |
| *No* | 6(2.8%) | 3(1.1%) | 0.232 |
| *Sometimes* | 51(24.2%) | 79(28.3%) | |
| *Yes* | 154(73%) | 197(70.6%) | |
| Education on COVID-19 | | | |
| **Took a course on COVID-19 management** | | | |
| *No* | 181(83.4%) | 227(80.8%) | 0.45 |
| *Yes* | 36(16.6%) | 54(19.2%) | |
| **Received Heath education from** | | | |
| *Ministry of Health website* | 45(20.9%) | 58(20.9%) | 0.796 |
| *Online and social networking* | 129(60%) | 168(60.4%) | |
| *Paper publication* | 1(0.5%) | 4(1.4%) | |
| *Television* | 40(18.6%) | 48(17.3%) | |
| **Used Tawakalna application** | | | |
| *No* | 40(18.1%) | 40(14.4%) | 0.269 |
| *Yes* | 181(81.9%) | 237(85.6%) | |

**Table 7:** Association between Headache and different Characteristics.

| | Absence of Headache | Presence of Headache | p-value |
|---|---|---|---|
| **Socio-demographic variables** | | | |
| **Gender** | | | |
| *Female* | 79(34.5%) | 144(51.6%) | **<0.0001** |
| *Male* | 150(65.5%) | 135(48.4%) | |
| **Age (years)** | | | |
| *Less or equal to 20* | 12(5.2%) | 16(5.7%) | 0.981 |
| *21-40* | 108(47.2%) | 134(48%) | |
| *41-60* | 97(42.4%) | 116(41.6%) | |
| *More or equal to 61* | 12(5.2%) | 13(4.7%) | |
| **BMI** | | | |
| *Underweight* | 4(2%) | 6(2.3%) | 0.601 |
| *Normal* | 54(26.3%) | 81(31.2%) | |
| *Overweight* | 70(34.1%) | 76(29.2%) | |
| *Obese* | 77(37.6%) | 97(37.3%) | |
| **Educational level** | | | |
| *Less than secondary* | 12(5.3%) | 14(5%) | 0.464 |
| *Secondary* | 35(15.4%) | 50(18%) | |
| *University* | 124(54.6%) | 161(57.9%) | |
| *Postgraduate* | 56(24.7%) | 53(19.1%) | |
| **Monthly income** | | | |
| *1,000 Riyal or less per month* | 39(18.1%) | 54(22%) | 0.702 |
| *1,001-5,000 Riyal* | 36(16.7%) | 40(16.3%) | |
| *5,001 - 10,000 Riyal* | 47(21.9%) | 60(24.4%) | |
| *10,001-20,000 Riyal* | 68(31.6%) | 66(26.8%) | |
| *More than 20,000 Riyal* | 25(11.6%) | 26(10.6%) | |
| **Comorbidities** | | | |
| *No* | 157(69.5%) | 176(65.7%) | 0.37 |
| *Yes* | 69(30.5%) | 92(34.3%) | |
| **History of malaria** | | | |
| *No* | 219(98.6%) | 274(98.2%) | 1 |
| *Yes* | 3(1.4%) | 5(1.8%) | |
| **Flu vaccination** | | | |
| *No* | 104(46.2%) | 158(56.8%) | **0.018** |
| *Yes* | 121(53.8%) | 120(43.2%) | |
| **Lifestyle variables** | | | |
| **Days to go out for shopping** | | | |
| *Every two weeks* | 75(34.1%) | 89(33.1%) | 0.413 |
| *Once a week* | 63(28.6%) | 78(29%) | |
| *Once every 3 days* | 55(25%) | 56(20.8%) | |
| *Every day or two* | 27(12.3%) | 46(17.1%) | |
| **Living in one of the completely isolated neighborhoods** | | | |
| *No* | 213(93.4%) | 264(95%) | 0.458 |
| *Yes* | 15(6.6%) | 14(5%) | |
| **Job require you to go out** | | | |
| *No* | 135(60.5%) | 146(55.5%) | 0.264 |
| *Yes* | 88(39.5%) | 117(44.5%) | |
| **Keen to wash hands by soap or sanitizer** | | | |
| *No* | 5(2.3%) | 10(3.6%) | 0.489 |
| *Sometimes* | 41(18.5%) | 43(15.5%) | |
| *Yes* | 176(79.3%) | 224(80.9%) | |
| **Keen to wear a mask** | | | |
| *No* | 6(2.7%) | 10(3.6%) | **0.026** |
| *Sometimes* | 25(11.3%) | 55(19.8%) | |
| *Yes* | 191(86%) | 213(76.6%) | |
| **Keen to wear gloves** | | | |
| *No* | 91(41.2%) | 119(42.8%) | **0.026** |
| *In the markets and hospitals* | 54(24.4%) | 56(20.1%) | |
| *Sometimes* | 48(21.7%) | 43(15.5%) | |
| *Yes* | 28(12.7%) | 60(21.6%) | |
| **Stick to social distancing** | | | |
| *No* | 5(2.3%) | 4(1.5%) | 0.697 |
| *Sometimes* | 59(27.4%) | 71(25.8%) | |
| *Yes* | 151(70.2%) | 200(72.7%) | |
| **Education on COVID-19** | | | |
| **Took a course on COVID-19 management** | | | |
| *No* | 179(81%) | 229(82.7%) | 0.629 |
| *Yes* | 42(19%) | 48(17.3%) | |
| **Received Heath education from** | | | |
| *Ministry of Health website* | 51(23.1%) | 52(19.1%) | 0.528 |
| *Online and social networking* | 126(57%) | 171(62.9%) | |
| *Paper publication* | 3(1.4%) | 2(0.7%) | |
| *Television* | 41(18.6%) | 47(17.3%) | |
| **Used Tawakalna application** | | | |
| *No* | 32(14.4%) | 48(17.4%) | 0.369 |
| *Yes* | 190(85.6%) | 228(82.6%) | |

**Table 8:** Association between losing sense of taste and different Characteristics.

| | Absence of losing sense of taste | Presence of losing sense of taste | p-value |
|---|---|---|---|
| **Socio-demographic variables** | | | |
| **Gender** | | | |
| *Female* | 85(37.6%) | 138(48.9%) | **0.011** |
| *Male* | 141(62.4%) | 144(51.1%) | |
| **Age (years)** | | | |
| *Less or equal to 20* | 11(4.9%) | 17(6%) | 0.504 |
| *21-40* | 101(44.7%) | 141(50%) | |
| *41-60* | 103(45.6%) | 110(39%) | |
| *More or equal to 61* | 11(4.9%) | 14(5%) | |
| **BMI** | | | |
| *Underweight* | 4(1.9%) | 6(2.3%) | 0.746 |
| *Normal* | 64(31.1%) | 71(27.4%) | |
| *Overweight* | 60(29.1%) | 86(33.2%) | |
| *Obese* | 78(37.9%) | 96(37.1%) | |
| **Educational level** | | | |
| *Less than secondary* | 12(5.4%) | 14(5%) | 0.82 |
| *Secondary* | 38(17%) | 47(16.7%) | |
| *University* | 130(58%) | 155(55.2%) | |
| *Postgraduate* | 44(19.6%) | 65(23.1%) | |
| **Monthly income** | | | |
| *1,000 Riyal or less per month* | 41(19.6%) | 52(20.6%) | 0.531 |
| *1,001-5,000 Riyal* | 28(13.4%) | 48(19%) | |
| *5,001 - 10,000 Riyal* | 52(24.9%) | 55(21.8%) | |
| *10,001-20,000 Riyal* | 63(30.1%) | 71(28.2%) | |
| *More than 20,000 Riyal* | 25(12%) | 26(10.3%) | |
| **Comorbidities** | | | |
| *No* | 137(62.6%) | 196(71.3%) | **0.04** |
| *Yes* | 82(37.4%) | 79(28.7%) | |
| **History of malaria** | | | 0.308 |
| *No* | 215(97.7%) | 278(98.9%) | |
| *Yes* | 5(2.3%) | 3(1.1%) | |
| **Flu vaccination** | | | |
| *No* | 116(52%) | 146(52.1%) | 0.978 |
| *Yes* | 107(48%) | 134(47.9%) | |
| **Lifestyle variables** | | | |
| **Days to go out for shopping** | | | |
| *Every two weeks* | 70(31.7%) | 94(35.1%) | 0.645 |
| *Once a week* | 61(27.6%) | 80(29.9%) | |
| *Once every 3 days* | 54(24.4%) | 57(21.3%) | |
| *Every day or two* | 36(16.3%) | 37(13.8%) | |
| **Living in one of the completely isolated neighborhoods** | | | |
| *No* | 208(92.4%) | 269(95.7%) | 0.126 |
| *Yes* | 17(7.6%) | 12(4.3%) | |
| **Job require you to go out** | | | |
| *No* | 123(56.4%) | 158(59%) | 0.581 |
| *Yes* | 95(43.6%) | 110(41%) | |
| **Keen to wash hands by soap or sanitizer** | | | |
| *No* | 6(2.8%) | 9(3.2%) | 0.549 |
| *Sometimes* | 41(18.9%) | 43(15.2%) | |
| *Yes* | 170(78.3%) | 230(81.6%) | |
| **Keen to wear a mask** | | | |
| *No* | 9(4.1%) | 7(2.5%) | 0.151 |
| *Sometimes* | 28(12.8%) | 52(18.5%) | |
| *Yes* | 182(83.1%) | 222(79%) | |
| **Keen to wear gloves** | | | |
| *No* | 95(43.6%) | 115(40.9%) | 0.827 |
| *In the markets and hospitals* | 44(20.2%) | 66(23.5%) | |
| *Sometimes* | 41(18.8%) | 50(17.8%) | |
| *Yes* | 38(17.4%) | 50(17.8%) | |
| **Stick to social distancing** | | | |
| *No* | 6(2.7%) | 3(1.1%) | 0.057 |
| *Sometimes* | 67(30.6%) | 63(23.2%) | |
| *Yes* | 146(66.7%) | 205(75.6%) | |
| **Education on COVID-19** | | | |
| **Took a course on COVID-19 management** | | | |
| *No* | 177(81.6%) | 231(82.2%) | 0.854 |
| *Yes* | 40(18.4%) | 50(17.8%) | |
| **Received Heath education from** | | | |
| *Ministry of Health website* | 42(19.3%) | 61(22.2%) | 0.17 |
| *Online and social networking* | 138(63.3%) | 159(57.8%) | |
| *Paper publication* | 0(0%) | 5(1.8%) | |
| *Television* | 38(17.4%) | 50(18.2%) | |
| **Used Tawakalna application** | | | |
| *No* | 38(17.2%) | 42(15.2%) | 0.539 |
| *Yes* | 183(82.8%) | 235(84.8%) | |

**Table 9:** Association between losing sense of smell and different Characteristics.

| | Absence of losing sense of smell | Presence of losing sense of smell | p-value |
|---|---|---|---|
| Socio-demographic variables | | | |
| **Gender** | | | |
| *Female* | 81(37.7%) | 142(48.5%) | **0.015** |
| *Male* | 134(62.3%) | 151(51.5%) | |
| **Age (years)** | | | |
| *Less or equal to 20* | 10(4.7%) | 18(6.1%) | 0.241 |
| *21-40* | 93(43.3%) | 149(50.9%) | |
| *41-60* | 100(46.5%) | 113(38.6%) | |
| *More or equal to 61* | 12(5.6%) | 13(4.4%) | |
| **BMI** | | | |
| *Underweight* | 1(0.5%) | 9(3.3%) | **0.026** |
| *Normal* | 68(35.1%) | 67(24.7%) | |
| *Overweight* | 56(28.9%) | 90(33.2%) | |
| *Obese* | 69(35.6%) | 105(38.7%) | |
| **Educational level** | | | |
| *Less than secondary* | 13(6.1%) | 13(4.5%) | 0.829 |
| *Secondary* | 37(17.4%) | 48(16.4%) | |
| *University* | 119(55.9%) | 166(56.8%) | |
| *Postgraduate* | 44(20.7%) | 65(22.3%) | |
| **Monthly income** | | | |
| *1,000 Riyal or less per month* | 45(23%) | 48(18.1%) | 0.141 |
| *1,001-5,000 Riyal* | 23(11.7%) | 53(20%) | |
| *5,001 - 10,000 Riyal* | 45(23%) | 62(23.4%) | |
| *10,001-20,000 Riyal* | 58(29.6%) | 76(28.7%) | |
| *More than 20,000 Riyal* | 25(12.8%) | 26(9.8%) | |
| **Comorbidities** | | | |
| *No* | 136(64.8%) | 197(69.4%) | 0.287 |
| *Yes* | 74(35.2%) | 87(30.6%) | |
| **History of malaria** | | | |
| *No* | 205(98.1%) | 288(98.6%) | 0.725 |
| *Yes* | 4(1.9%) | 4(1.4%) | |
| **Flu vaccination** | | | |
| *No* | 115(54.2%) | 147(50.5%) | 0.408 |
| *Yes* | 97(45.8%) | 144(49.5%) | |
| Lifestyle variables | | | |
| **Days to go out for shopping** | | | |
| *Every two weeks* | 65(31.3%) | 99(35.2%) | **0.03** |
| *Once a week* | 51(24.5%) | 90(32%) | |
| *Once every 3 days* | 51(24.5%) | 60(21.4%) | |
| *Every day or two* | 41(19.7%) | 32(11.4%) | |
| **Living in one of the completely isolated neighborhoods** | | | |
| *No* | 201(93.9%) | 276(94.5%) | 0.776 |
| *Yes* | 13(3.1%) | 16(5.5%) | |
| **Job require you to go out** | | | |
| *No* | 116(56.9%) | 165(58.5%) | 0.717 |
| *Yes* | 88(43.1%) | 117(41.5%) | |
| **Keen to wash hands by soap or sanitizer** | | | |
| *No* | 7(3.4%) | 8(2.7%) | 0.174 |
| *Sometimes* | 42(20.4%) | 42(14.3%) | |
| *Yes* | 157(76.2%) | 243(82.9%) | |
| **Keen to wear a mask** | | | |
| *No* | 8(3.8%) | 8(2.7%) | 0.765 |
| *Sometimes* | 34(16.3%) | 46(15.8%) | |
| *Yes* | 166(79.8%) | 238(81.5%) | |
| **Keen to wear gloves** | | | |
| *No* | 83(39.9%) | 127(43.6%) | 0.796 |
| *In the markets and hospitals* | 48(23.1%) | 62(21.3%) | |
| *Sometimes* | 41(19.7%) | 50(17.2%) | |
| *Yes* | 36(17.3%) | 52(17.9%) | |
| **Stick to social distancing** | | | |
| *No* | 6(2.9%) | 3(1.1%) | 0.113 |
| *Sometimes* | 62(29.7%) | 68(24.2%) | |
| *Yes* | 141(67.5%) | 210(74.7%) | |
| Education on COVID-19 | | | |
| **Took a course on COVID-19 management** | | | |
| *No* | 167(80.7%) | 241(82.8%) | 0.54 |
| *Yes* | 40(19.3%) | 50(17.2%) | |
| **Received Heath education from** | | | |
| *Ministry of Health website* | 37(17.9%) | 66(23.1%) | **0.046** |
| *Online and social networking* | 137(66.2%) | 160(55.9%) | |
| *Paper publication* | 0(0%) | 5(1.7%) | |
| *Television* | 33(15.9%) | 55(19.2%) | |
| **Used Tawakalna application** | | | |
| *No* | 35(16.7%) | 45(15.6%) | 0.755 |
| *Yes* | 175(83.3%) | 243(84.4%) | |

**Table 10:** Association between number of symptoms and other factors.

| | No symptoms N=50 | 1-5 symptoms N=242 | More than 6 symptoms N=227 | p-value |
|---|---|---|---|---|
| Socio-demographic variables | | | | |
| **Gender** | | | | |
| *Female* | 26(11.4%) | 82(36%) | 120(52.6%) | **<0.0001** |
| *Male* | 24(8.2%) | 160(55%) | 107(36.8%) | |
| **Age (years)** | | | | |
| *Less or equal to 20* | 3(10.7%) | 13(46.4%) | 12(42.9%) | 0.729 |
| *21-40* | 29(11.6%) | 116(46.6%) | 104(41.8%) | |
| *41-60* | 16(7.4%) | 103(47.7%) | 97(44.9%) | |
| *More or equal to 61* | 2(7.7%) | 10(38.5%) | 14(53.8%) | |
| **BMI** | | | | |
| *Underweight* | 1(10%) | 5(50%) | 4(40%) | **<0.0001** |
| *Normal* | 28(19.7%) | 58(40.8%) | 56(39.4%) | |
| *Overweight* | 9(6.1%) | 77(52.4%) | 61(41.5%) | |
| *Obese* | 7(4%) | 79(44.6%) | 91(51.4%) | |
| **Educational level** | | | | |
| *Less than secondary* | 3(11.5%) | 7(26.9%) | 16(61.5%) | 0.279 |
| *Secondary* | 9(10.6%) | 37(43.5%) | 39(45.9%) | |
| *University* | 24(8.2%) | 146(49.8%) | 123(42%) | |
| *Postgraduate* | 14(12.5%) | 50(44.6%) | 48(42.9%) | |
| **Monthly income** | | | | |
| *1,000 Riyal or less per month* | 8(8.6%) | 45(48.4%) | 40(43%) | 0.242 |
| *1,001-5,000 Riyal* | 7(9%) | 34(43.6%) | 37(47.4%) | |
| *5,001 - 10,000 Riyal* | 17(15.3%) | 48(43.2%) | 46(41.4%) | |
| *10,001-20,000 Riyal* | 9(6.5%) | 78(56.5%) | 51(37%) | |
| *More than 20,000 Riyal* | 7(13.5%) | 22(42.3%) | 23(44.2%) | |
| **Comorbidities** | | | | |
| *No* | 38(11.2%) | 166(48.8%) | 136(40%) | **0.016** |
| *Yes* | 9(5.5%) | 70(42.7%) | 85(51.8%) | |
| **History of malaria** | | | | |
| *No* | 41(8.2%) | 240(47.8%) | 221(44%) | **0.015** |
| *Yes* | 3(33.3%) | 1(11.1%) | 5(55.6%) | |
| **Flu vaccination** | | | | |
| *No* | 21(8%) | 125(47.3%) | 118(44.7%) | 0.616 |
| *Yes* | 26(10.4%) | 116(46.6%) | 107(43%) | |
| Lifestyle variables | | | | |
| **Days to go out for shopping** | | | | |
| *Every two weeks* | 13(7.8%) | 80(48.2%) | 73(44%) | **0.039** |
| *Once a week* | 18(12.3%) | 60(41.1%) | 68(46.6%) | |
| *Once every 3 days* | 16(13.9%) | 53(46.1%) | 46(40%) | |
| *Every day or two* | 1(1.4%) | 43(58.9%) | 29(39.7%) | |
| **Living in one of the completely isolated neighborhoods** | | | | |
| *No* | 42(8.6%) | 228(46.9%) | 216(44.4%) | **0.03** |
| *Yes* | 7(22.6%) | 14(45.2%) | 10(32.3%) | |
| **Job require you to go out** | | | | |
| *No* | 27(9.5%) | 127(44.9%) | 129(45.6%) | 0.694 |
| *Yes* | 21(9.9%) | 103(48.4%) | 89(41.8%) | |
| **Keen to wash hands by soap or sanitizer** | | | | |
| *No* | 2(12.5%) | 7(43.8%) | 7(43.8%) | 0.653 |
| *Sometimes* | 9(10.6%) | 34(40%) | 42(49.4%) | |
| *Yes* | 33(8.1%) | 198(48.4%) | 178(43.5%) | |
| **Keen to wear a mask** | | | | |
| *No* | 1(6.3%) | 9(56.3%) | 6(37.5%) | **0.03** |
| *Sometimes* | 5(6.2%) | 27(33.3%) | 49(60.5%) | |
| *Yes* | 38(9.2%) | 205(49.5%) | 171(41.3%) | |
| **Keen to wear gloves** | | | | |
| *No* | 18(8.4%) | 97(45.1%) | 100(46.5%) | 0.598 |
| *In the markets and hospitals* | 11(9.7%) | 50(44.2%) | 52(46%) | |
| *Sometimes* | 9(9.8%) | 50(54.3%) | 33(35.9%) | |
| *Yes* | 5(5.6%) | 44(48.9%) | 41(45.6%) | |
| **Stick to social distancing** | | | | |
| *No* | 1(5.6%) | 5(27.8%) | 12(66.7%) | 0.401 |
| *Sometimes* | 11(8%) | 67(48.6%) | 60(43.5%) | |
| *Yes* | 33(9.3%) | 168(47.3%) | 154(43.4%) | |
| Education on COVID-19 | | | | |
| **Took a course on COVID-19 management** | | | | |
| *No* | 30(7.2%) | 197(47.6%) | 187(45.2%) | 0.219 |
| *Yes* | 12(12.6%) | 44(46.3%) | 39(41.1%) | |
| **Received Heath education from** | | | | |
| *Ministry of Health website* | 15(13.9%) | 49(45.4%) | 44(40.7%) | 0.120 |
| *Online and social networking* | 22(7.3%) | 153(51%) | 125(41.7%) | |
| *Paper publication* | 0(0%) | 1(20%) | 4(80%) | |
| *Television* | 6(6.7%) | 37(41.1%) | 47(52.2%) | |
| **Used Tawakalna application** | | | | |
| *No* | 10(12.2%) | 31(37.8%) | 41(50%) | 0.161 |
| *Yes* | 37(8.7%) | 209(48.9%) | 181(42.4%) | |

**Table 11:** Multinomial logistic regression (Group with no symptoms was the reference group).

| | 1-5 symptoms N=242 | | | More than 6 symptoms N=227 | | |
|---|---|---|---|---|---|---|
| | OR | 90% CI | p-value | OR | 90% CI | p-value |
| **Gender** | | | | | | |
| *Female* | 0.605 | 0.27-1.3 | 0.214 | 1.56 | 0.7-3.47 | 0.266 |
| *Male* | Reference | - | - | Reference | - | - |
| **BMI** | | | | | | |
| *Underweight* | 0.2 | 0.01-2.8 | 0.236 | 0.3 | 0.02-3.33 | 0.327 |
| *Normal* | 0.23 | 0.08-0.62 | 0.004 | 0.16 | 0.06-0.45 | <0.001 |
| *Overweight* | 0.8 | 0.26-2.47 | 0.7 | 0.51 | 0.16-1.59 | 0.251 |
| *Obese* | Reference | - | - | Reference | - | - |
| **Comorbidities** | | | | | | |
| *No* | 0.684 | 0.26-1.78 | 0.437 | 0.42 | 0.16-1.08 | 0.074 |
| *Yes* | Reference | - | - | Reference | - | - |
| **History of malaria** | | | | | | |
| *No* | 16.22 | 0.85-309.1 | 0.064 | 3.95 | 0.35-44.3 | 0.264 |
| *Yes* | Reference | - | - | Reference | - | - |
| **Days to go out for shopping** | | | | | | |
| *Every two weeks* | 1.85 | 0.6-5.72 | 0.281 | 1.55 | 0.49-4.82 | 0.449 |
| *Once a week* | 0.43 | 0.16-1.16 | 0.097 | 0.53 | 0.19-1.44 | 0.214 |
| *Every day or two* | 7.11 | 0.7-71.82 | 0.096 | 7.16 | 0.7-72.4 | 0.095 |
| *Once every 3 days* | Reference | - | - | Reference | - | - |
| **Living in one of the completely isolated neighborhoods** | | | | | | |
| *No* | 2.63 | 0.71-9.64 | 0.144 | 3.21 | 0.86-11.95 | 0.082 |
| *Yes* | Reference | - | - | Reference | - | - |
| **Keen to wear a mask** | | | | | | |
| *No* | $5x10^7$ | - | 0.997 | $2x10^7$ | - | 1 |
| *Sometimes* | 0.97 | 0.28-3.37 | 0.965 | 2.02 | 0.06-6.76 | 0.252 |
| *Yes* | Reference | - | - | Reference | - | - |
| **Used Tawakalna application** | | | | | | |
| *No* | 0.54 | 0.2-1.46 | 0.231 | 0.77 | 0.03-2.01 | 0.606 |
| *Yes* | Reference | - | - | Reference | - | - |

fication of potentially critical patients helps in controlling the disease, no definitive way to predict the prognosis and severity of the disease has been developed [11].

Females were significantly more affected by some symptoms such as headache as compared to males participants synchronizing with results of multiple studies while contrasting with the findings of a few [12]. More specifically, a previous study found that female sex and having comorbidities were more frequent in patients with headache which was also the case in our case [13].

All ages are susceptible; however, individuals with underlying medical conditions or the elderly are at a much higher risk [14]. This aligns with our results where, in almost all symptoms, participants with comorbidities presented more these signs and manifestations. Specifically, previous investigations reported diabetes and hypertension as the most distinctive comorbidities in COVID-19 cases [15,16]. It was also reported in present findings: the higher percentage of comorbidity was diabetes, and some symptoms (including dry cough, exhaustion, losing sense of smell) were more presented in obese participants. In addition, our results showed that those aged more than 40 years had significantly suffered more from pains and aches.

The most common symptoms being reported are exhaustion, fever, pains and aches and losing sense of smell and taste. Previous evidence showed that most of these manifestations were the dominant symptoms whereas upper respiratory symptoms and gastrointestinal symptoms were rare [5]. In this study sample, 55.5% and 57.7% of the participants reported taste and smell dysfunction slightly lower than previous evidence [17]. In accordance with some studies and dis-concordance with others in the literature, there was a significant association between losing sense of smell and taste and female domination that may be due to gender-related differences in the inflammatory reaction process [18-20].

Previous Saudi investigations provided similar finding with new insights on the impact of different factors on symptoms on the COVID-19 patients, yet, they focused on a group of factors such as comorbidities or radiographic and laboratory characteristics [21,22].

The most reported information source was online and social media, followed by ministry of health website, this was also seen in a previous cross-sectional study that showed the most common source of information was the internet (89.3%) including social media handles, websites, blogs, and social media [23].

The present study showed a descriptive scope of the current COVID-19 symptomatology and its associated factors on a representative sample. However, there are some limitations to our study. Our study's limitations include its cross-sectional design, which is less potent than a cohort study. For example, a follow-up longitudinal study can assess the causal relationship between risk factors and the symptoms. The most important limitation is that the information has been gathered by whatsapp from the participants without direct access to medical records; therefore, clinical data may be misreported. In addition, some lifestyle questions such as keen to wash hands and wear masks can be biased due to social desirability bias therefore reporting more positive answers.

## Conclusion

The severity of the novel coronavirus ranges from mild symptoms (majority of cases) to severe respiratory tract infection. The most susceptible population involves the elderly and individuals with underlying medical conditions, especially obesity and diabetes. Symptoms in COVID-19 patients were mainly associated with presence of comorbidities, BMI, sex, and older age.

## Author Statements

### Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

### Data Access

The dataset used and analysed during the current study is available from the corresponding author on reasonable request.

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### Ethical Approval

Competing Interest for all authors: Author declare that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data Availability Statement

Author confirms that the data supporting the findings of this research paper are available within the article and/or its supplementary materials.

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