**Anxiety and Perceptions of Healthcare Workers at the Onset of the Coronavirus Crisis**

**Abstract**.

**Objectives:** The coronavirus (COVID-19) epidemic negatively impacted public health on a widespread, international level. One particular consequence of a pandemic is its influence on mental health, such as increased levels of anxiety.To examine the impact of sociodemographic factors and perceptions of coronavirus on anxiety levels among the general population and healthcare workers during the coronavirus outbreak in Israel**.**

**Study design:** A cross-sectional questionnaire was distributed to 696 individuals from the general population and 470 healthcare workers through social networks, using snowball sampling.

**Method:** להוסיף שיטת דגימה, כלי מחקר ושיטת ניתוח נתונים

**Results:** Healthcare workers reported higher levels of anxiety than the general population. Explanatory demographic factors included gender, ethnic background, time spent in isolation, perceptions about coronavirus, and perceptions about the importance of isolation. Additionally, higher levels of anxiety among healthcare workers may have been due to their involvement in the organizational planning that occurred in preparation for the epidemic.

**Conclusions:** Healthcare workers reported higher anxiety levels compared to the general population. Managers of medical centers must be aware of the challenges facing health workers during the coronavirus epidemic and provide support to reduce anxiety and other negative consequences among health workers. This, in turn, will further promote the quality of care that is provided to patients.

**Anxiety and Perceptions of Healthcare Workers at the Onset of the Coronavirus Crisis**

The coronavirus (COVID-19) epidemic broke out in China in late 2019 1 and, within a few short weeks, spread to many countries around the world 2. COVID-19 was identified as the cause of the epidemic by the World Health Organization 3 and, within three months, the epidemic was declared a pandemic 4. COVID-19 has been found to mainly affect the respiratory system; in most cases, it causes mild symptoms such as dry cough but, in some cases, it can lead to severe respiratory disease, high contagion rates and mortality 5. This reality has created a challenge to the security of public health on a global level 6, leading to a series of unprecedented measures including rigorous airport inspections, lockdowns, border closures and cancellations of international events 7.

The outbreak of an infectious disease is a time of crisis, especially when it occurs on a global level, and it causes much anxiety and uncertainty 8-9. Anxiety levels have been shown to increase when infection by a virus is perceived to be an imminent possibility and it is linked to the adoption of new behaviors such as wearing face masks and practicing social distancing10-11. Research indicates that knowledge and clear behavioral guidelines help to reduce anxiety 12-15. Studies have found that females, younger individuals, and those with a lower educational level are at greater risk for experiencing high levels of anxiety during an epidemic11. On the other hand, those in higher socioeconomic social classes and those who are more educated tend to have higher levels of optimism and are more likely than their counterparts to adopt practices necessary to stop the virus from spreading16.

COVID-19 is a new disease, with severe consequences, whose clinical guidelines and prevention methods are constantly being updated. These changes instill confusion, fear and anxiety in the general population 9. Among healthcare workers in particular, the severity of anxiety varies. In this population, anxiety may be due to stressful work environments which involve extreme physical exertion, high workloads, unstable patients and lack of protective equipment, as well as simultaneous concern for loved ones at home while they are working on the front lines 17-18. Hence, the purpose of the present study was to examine the impact of personal factors and perceptions towards the coronavirus on anxiety levels among the general population and among healthcare workers in particular at the outset of the pandemic’s outbreak in Israel.

**Methods**

**Participants and Procedure**

Participants were recruited through snowball sampling. A questionnaire link was circulated on social networks via email, WhatsApp and Facebook focusing on groups of healthcare professionals. Participants were asked to forward the link to friends and colleagues. A total of 1,166 Hebrew-speaking participants over the age of 18 with internet access participated in the survey. Participants included 696 individuals from the general population and 470 healthcare workers. The sample characteristics are described in Table 1.

A cross-sectional study was conducted. Data were collected every day online over the course of one week (from March 13, 2020 to March 20, 2020). When the questionnaire was first distributed, early in the outbreak, only 126 patients were diagnosed with COVID-19; two were in moderate-to-severe condition and the others in mild condition. On the final day of the questionnaire, 677 patients were diagnosed with COVID-19, 6 of whom were severely ill, 13 were moderately ill and the others were in mild condition. The study was reviewed and approved by the institution’s ethics committee.

The survey was available as a Google Form document. The beginning of the document included information about the purpose of the survey and a section related to participant consent. It was emphasized that participation in the survey was voluntary and anonymous, and that it was possible to stop the survey at any stage. Data were collected and stored on Google Drive with access available only to the researchers.

**Measures**

***Socio-Demographic Factors***

 Participants reported their age, gender, marital status, number of children, ethnicity, level of education, employment status, residence, and occupation within the healthcare profession (if relevant). In addition, COVID-19 related information was collected, including whether the participant was in isolation and, if so, the amount of time they had been in isolation and the reason requiring isolation.

***Perceptions about Coronavirus***

The questionnaire was developed for the current research study and was validated by five experts: a physician specializing in infectious diseases, a Ministry of Health epidemiology nurse, an epidemiology nurse employed at a medical center, a senior manager of a medical center, and a social worker. The measure included 11 items, such as, “The coronavirus is a dangerous virus that can spread from person to person”; “Coronavirus is highly contagious requiring stringent isolation measures to prevent continuous infection”; “The healthcare system is working properly to prevent the outbreak of coronavirus in Israel”. Subjects were asked to rate their agreement on a Likert-type scale ranging from 0 (strongly disagree) to 3 (strongly agree). The Cronbach’s alpha of the questionnaire was 0.61. Principal factor analysis was subsequently performed, which demonstrated three factors that explained 49% of the variance: (1) perceptions of COVID-19 (α=0.59), (2) isolation and COVID-19 (α=0.60), and (3) Ministry of Health’s functioning during the COVID-19 pandemic (α=0.70). Table 2 presents the results of the factor analysis.

***The Anxiety Scale of the Hospital Anxiety and Depression Scale) HADS(***

This measure was developed by Zigmond and Shait 19 and contained 7 self-report items assessing anxiety levels, based on a 4-point Likert-type response scale ranging from 0 to 3. The score was calculated as a sum of the scores on all items, and ranges from 0 to 21. Higher scores indicated higher levels of anxiety. Cronbach’s alpha for this measure in the current study was 0.85.

**Results**

Table 1 shows that most of the participants were Jewish women between 18-32 years old, who were married and had no pre-existing conditions. Among the healthcare workers, most of the participants worked as nurses and the vast majority worked in clinical positions. Healthcare workers reported higher anxiety levels than the general population and their satisfaction with the healthcare system’s actions was lower (Table 3). Since anxiety levels among healthcare workers were higher than the general population, we examined factors that predicted healthcare worker anxiety. We first ran *t*-tests and then performed hierarchical linear regressions. Table 3 includes the results of the *t*-tests for independent samples analyses which examined the differences between healthcare workers and the general population on anxiety levels and the three components of the coronavirus questionnaire. We found that non-Jewish participants who hold clinical positions, participants who work full-time, those below the age 32, those who live alone and those who were not in isolation, reported higher levels of anxiety than their counterparts (Table 4).

A hierarchical linear regression analysis was then performed, in which the first step included socio-demographic variables that were found to significantly correlate with anxiety (gender, age, ethnicity, clinical position and employment). Table 5 presents the results of the regression analysis. The same regression analysis was performed on the study’s general population. These variables explained 26.3% of the explained variance of anxiety levels among the general population in the initial stages of the coronavirus outbreak in Israel. The explained variance suggests that only gender (B=2.65, β=2.88, *t*=2.37, *p*> 0.01) and the section of the questionnaire concerning perceptions about the coronavirus (B=3.34, β=0.29, *t*=2.57, *p*> 0.01) contributed to the prediction of anxiety levels in the general population group.

**Discussion**

The purpose of the current study was to examine the influence of sociodemographic factors and perceptions of the coronavirus on the level of anxiety among healthcare workers and the general population at the beginning of the outbreak of the pandemic in the State of Israel. Results indicated that the degree of anxiety among the participants was relatively low, but that healthcare workers reported higher levels of anxiety as compared to the general population.

These results may be explained by the timing of the data collection, which was conducted during the initial stages of the coronavirus outbreak in Israel. The fact that the number of verified patients was low and that there were no deaths may explain the low anxiety levels and the perception that the consequences of the disease were not very severe. In addition, the Ministry of Health’s guidelines for the general population focused on specific details such as restrictions on those returning from foreign countries and on events with large numbers of people (over 5,000 people). This, as well as the fact that these restrictions did not affect much of the population, may have served to mitigate people’s anxiety.

Furthermore, the public was required to enter isolation if exposed to a verified coronavirus patient; this requirement came in response to the findings of epidemiological investigations conducted by the Ministry of Health20, and may have led to a sense that the disease was under control. The Ministry of Health also provided details on the locations where verified patients visited, possibly increasing a feeling of control and reducing fear surrounding contagion. Another factor that may have contributed to decreased feelings of anxiety was the disparity between the relatively controlled situation in the State of Israel and the reports ensuing from other places in the world, such as Italy, which reflected a different and more difficult situation. In early March 2020, it was reported that about 10% of those infected in Italy required life support ventilators and hospitalization, and that 20% of medical personnel contracted COVID-19 21. Additionally, in Spain, over 1,000 new cases were reported daily22. The announcement by the World Health Organization that COVID-19 was a pandemic4 could also have influenced the degree of anxiety among the research participants.

 Healthcare workers reported higher anxiety levels compared to the general population. This result might be explained by the increased knowledge of healthcare workers related to the consequences of the disease, as well as the fact that healthcare workers were part of the medical preparation for the pandemic. These preparations included increasing resources, both physical and human resources, so that healthcare professionals would be able to care for infected patients, and particularly for those who would need to be ventilated. In addition, healthcare workers perceived lower levels of support by the Ministry of Health in their handling of the pandemic than the general population. Healthcare professionals may have understood the potential limits of the healthcare system to cope with the pandemic, a scenario that had developed in other countries such as Italy21.

The examination of sociodemographic characteristics that contributed to the degree of anxiety among healthcare workers indicated that minority group women reported a higher level of anxiety than their counterparts did. These findings coincided with prior studies11,14. It is possible that the women felt less supported by those around them during stressful situations, which may have led them to experience higher levels of anxiety23. Minorities working in the healthcare system were also more concerned about their family members when they were at work in the front lines of medical centers, and they reported being unable to support their family members and to communicate the Ministry of Health guidelines to them. It should be noted that only after the data collection for the current study was completed were the guidelines available in Arabic. It is also likely that the fear of infecting family members also contributed to the anxiety among minority healthcare workers.

Healthcare workers are positioned at the forefront of the fight against coronavirus, both in community healthcare settings and in hospitals. Healthcare workers are generally the ones managing and coordinating patients’ treatment plans and are in close contact with a variety of healthcare providers such as physiotherapists and others. Managers of medical centers need to be aware of the challenges that the healthcare workers face when dealing with coronavirus and provide them with support to reduce the anxiety that they experience as a result of the epidemic. More generally, managers of medical centers should act in ways that reduce, as much as possible, the negative consequences that healthcare workers face in light of their role in fighting coronavirus. This, in turn, will further promote the quality of care that is provided to patients.

Research limitations included the method of sampling (snowball sampling) and of data collection ­­­­­­ (online questionnaires), which may have led to a biased sample that might not represent the larger population. In addition, the survey was conducted relatively early in the onset of the coronavirus outbreak. Recommendations for continued research include repeating the survey with other populations and conducting a longitudinal study to examine changes over time.

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**Table 1**

 *Number of Study Participants by Demographic Characteristics*

|  |  |  |  |
| --- | --- | --- | --- |
| Healthcare workers(*n* = 470) (%) | General population(*n* = 696) (%) |  | Variable |
| 126 (26.8) | 215 (30.9) | Men | Gender |
| 344 (73.2) | 481 (69.1) | Women |
| 198 (42.1) | 386 (55.5) | Below age 32 | Age  |
| 272 (57.9) | 310 (44.5) | Above age 32 |
| 148 (31.5) | 266 (38.2) | Single | Marital status |
| 322 (68.5) | 430 (61.8) | In relationship |
| 278 (59.1) | 545 (78.3) | Jewish | Ethnicity |
| 192 (40.9) | 151 (21.7) | Non-Jewish (Muslim/Christian/ Druze) |
| 410 (87.2) | 618 (88.8) | Yes | Comorbidity |
| 60 (12.8) | 78 (11.2) | No |
| 75 (16) | 79 (11.4) | Yes | Smoking |
| 395 (84) | 617 (88.6) | No |
| 55 (11.7) | 102 (14.7) | Yes | Isolation |
| 415 (88.3) | 594 (85.3) | No |
| 50 (10.6)291 (61.9)69 (14.7)34 (7.2)26 (5.5)410 (87.2)60 (12.8) |  | Doctor | Role |
|  | Nurse |
|  | Para-medical |
|  | Senior- management |
|  | Administrative |
|  | Clinical | Clinical position |
|  | Non-clinical |

**Table 2**

*Factor Analysis with Varimax Rotation: Perceptions of COVID-19 Questionnaire*

|  |  |  |
| --- | --- | --- |
| Number | Item | Factor loadings  |
| PerceptionsandCOVID-19 | Isolation and COVID-19 | Ministry of Health’s functioning during COVID-19 |
| 2 | COVID-19 complications | **.646** | .267 | -0.08 |
| 9 | Society's perception towards people exiting isolation | **.633** | .029 | .112 |
| 8 | Society's perception towards people in isolation | **.618** | -.163 | -.044 |
| 5 | Perception of treatment | **.579** | -.058 | .172 |
| 4 | Risks associated with isolation | **.553** | .245 | -.002 |
| 6 | Disease exacerbation signs | .407 | -.008 | .277 |
| 3 | Tools for reducing contagion | .006 | **.769** | .098 |
| 7 | Mandatory isolation for confirmed COVID-19 patients | -.037 | **.703** | .090 |
| 1 | Means of contagion | .144 | **.697** | .088 |
| 10 | Preventative measures by the Ministry of Health against the virus outbreak  | .061 | .117 | **.850** |
| 11 | Advocacy activity of the health system | .013 | .167 | **.841** |

 **Table 3**

 *Differences in Main Study Variables between the General Population and Healthcare Workers*

|  |  |  |
| --- | --- | --- |
| *t* | Mean (Standard Deviation) | Variable |
|  | Healthcare workers | General population |  |
| -2.63\*\*\* | 6.72 (4.47) | 6.04 (4.22) | Anxiety (0-21) |
| 1.28 | 1.65 (0.38) | 1.67 (0.35) | Perceptions of COVID-19 (0-3) |
| -1.68 | 2.64 (0.46) | 2.59 (0.45) | Isolation and COVID-19 (0-3) |
| 2.19\* | 2.02 (0.74) | 2.11 (0.70) | Ministry of Health’s functioning during the COVID-19 pandemic (0-3) |
| -1.43 | 36.00 (11.6) | 34.8 (14.4) | Age (years) |

 \**p*<0.05. \*\*\**p*<.001.

**Table** **4**

*Anxiety level Differences by Demographic Characteristics among the General Population and Healthcare Workers*

|  |  |  |  |
| --- | --- | --- | --- |
| Healthcare workers | General population | Values | Variable |
| *t* | *SD* | Mean | *t* | *SD* | Mean |
| -4.48\*\*\* | 3.48 | 5.15 | -5.07\*\* | 3.86 | 4.84 | Men | Gender |
| 4.59 | 7.17 | 4.26 | 6.57 | Women |
| 4.59\*\*\* | 4.62 | 7.70 | 1.61 | 4.35 | 6.27 | Below age 32 | Age (nominal) |
| 4.08 | 5.84 | 4.03 | 5.75 | Above age 32 |
| 4.06\*\*\* | 4.67 | 7.83 | 2.17\* | 4.35 | 6.48 | Single | Marital status |
| 4.18 | 6.07 | 5.76 | 4.10 | In relationship |
| -2.03\* | 4.43 | 6.25 | -0.35 | 4.02 | 5.74 | Full-time | Employment |
| 4.21 | 7.15 | 4.20 | 5.86 | Not full-time |
| -6.05\*\*\* | 1.01 | 5.64 | -4.43\*\* | 4.14 | 5.67 | Jewish | Ethnicity |
| 4.57 | 8.06 | 4.25 | 7.37 | Non-Jewish (Muslim/ Christian/ Druze) |
| 0.00 | 4.40 | 6.63 | 0.64 | 4.30 | 6.07 | Yes | Comorbidity |
| 4.50 | 6.62 | 3.50 | 5.75 | No |
| 1.28 | 4.76 | 7.23 | 1.20 | 4.35 | 6.58 | Yes | Smoking |
| 4.34 | 6.51 | 4.20 | 5.97 | No |
| -3.61\*\*\* | 3.75 | 4.63 | -2.13\* | 3.86 | 5.22 | Yes | Isolation |
| 4.43 | 6.89 | 4.26 | 6.18 | No |
| 2.44\* | 4.45 | 6.82 | Not relevant | Clinical | Clinical position |
| 3.93 | 5.33 | Non-clinical |

\**p*<0.05. \*\*\**p*<.001.

**Table 5**

*Results of the Hierarchical Linear Regression Analyses Predicting Anxiety among Healthcare Workers*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *R*2 | *t* | β | *B* | Variable | Step |
| 0.142 | 5.01\*\*\* | 0.24 | 2.42 | Gender | 1 |
| 0.47 | -0.02 | -.206 | Employment |
| 4.52\*\*\* | 0.24 | 2.23 | Ethnicity |
| -0.64 | -0.03 | -.312 | Age (nominal) |
| -1.74 | -0.08 | -.81 | Marital status |
| 0.90 | -0.00 | -0.06 | Clinical position |
| 0.155 | 4.75\*\*\* | 0.23 | 2.25 | Gender | 2 |
| 0.52 | -0.02 | 0.22 | Employment |
| 3.69\*\*\* | 0.20 | 1.88 | Ethnicity |
| -0.93 | -0.05 | -0.45 | Age (nominal) |
| -1.96 | -0.09 | -0.91 | Marital status |
| -0.20 | -0.01 | -0.12 | Clinical position |
| 2.54\* | 0.11 | 1.69 | Isolation |
| 0.193 | 4.63\*\*\* | 0.22 | 2.17 | Gender | 3 |
| 0.54 | -0.02 | 0.23 | Employment |
| 2.97\*\*\* | 0.17 | 1.50 | Ethnicity |
| -0.69 | -0.03 | -0.33 | Age (nominal) |
| -2.39\* | -0.11 | -1.09 | Marital status |
| -0.19 | 0.00 | -0.11 | Clinical position |
| 2.49\* | 0.11 | 1.55 | Isolation |
| 2.07\* | 0.09 | 1.00 | Perceptions of coronavirus |
| 4.03\*\*\* | 0.19 | 1.71 | Isolation and coronavirus |
| -1.68 | -0.07 | -0.44 | Ministry of Health’s functioning during COVID-19 |

\**p*<.05. \*\*\**p*<.001.