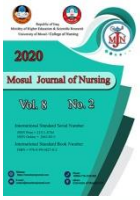
Mosul Journal of Nursing, Vol. 9, No. 2, 2021 ( 207-231 )

Mosul Journal of Nursing

www.mjn.mosuljournals.com



# Hospitalization-related Stress and Its Impact on the Monitored Vital Signs of Adult Patients with Corona Virus Diseases-19 In Respiratory Isolation Wards: A Repeated-Measure Study

**Article information**

***Article history:***
Received May 18, 2021
Accepted August 15, 2021
Available online November 6, 2021

DOI: 10.33899/mjn.2021.169849 

**Marwan Thamer Hajem**[1] **Sadeq Al-Fayyadh**[2]

## Abstract

**Background**: Psychological stress has an obvious effect on vital signs of patients with covid-19 The body responses to psychological stress includes tachypnea, pulse rate, blood pressure, and temperature. which will lead to increasing the respiratory rate and increase the length of hospitalization therefore, this study was endeavored to examine the causal relationship between hospitalization-related Psychological stress and change vital signs among the targeted subjects.

**Aims** (s): Examining the impact of psychological stress on the vital signs prognosis of hospitalized adult patients with Covid-2019 in respiratory isolation wards This can be done by determining the difference between the prognosis of stressed & non-stressed patients.

**Design**: A longitudinal design was used to accomplish the above-mentioned goals.

**Methods**: A purposive sample of 140 patients with Covid-19 who were hospitalized in respiratory isolation wards in two public hospitals, in Baghdad city. The data collection process started December 25th - 2020 – April 15th 2021. Two measures were conducted at seven-days intervals. The Depression Anxity Stress scales (DASS) was the selected tool to examine the study main variables.

**Result**: There is a statistically significant difference of respiratory rate in response to psychological stress between the 1st and 2nd measures (P=0.004, Sig=0.001 ).

**Concluation**: The study show, There is a statistically significant difference of respiratory rate in response to psychological stress between the 1st and 2nd measures (P=0.004, Sig=0.001 ).

[1] **Bachelor of Science in Nursing** / marwan.thamer1202a@conursing.uobaghdad.edu.iq / Ministry of Health, Medical City Complex, Private Nursing Nome Hospital
[2] Ph.D. / s.al-fayyadh@conursing.uobaghdad.edu.iq / University of Baghdad, College of Nursing

**Recommendation**: mointoring vital signes, Provide psychological support to the patient with covid-19. And all adult age groups must be careful of infection with the virus.

**Keywords**: Covid-19, vital signs, prognosis, psychological stress.

**Introduction**

The respiratory system, lungs, in particular, is the organ most often influenced by Covid-19, causing irreversible damage. Covid-19 associated pneumonia is a sever from of lung inflammation, in which inflammation may cause fluid to fill the tiny air sacs which make up the lungs. Pneumonia appears to damage the two lungs in Covid-19. People fail to consume enough oxygen and are taken to the hospital if large portions of the lungs are affected. Acute Respiratory Distress Syndrome (ARDS), also known as, wet lung, is another significant consequence. Affected persons, as a result, may require life-saving management, starting with urgent admission to the Intensive Care Unit (ICU), and mechanical ventilation, for an extended period. Of equal importance, COVID-19 may cause severe coagulation problems in the small blood vessels of the lungs and other body tissues. COVID-19 systematic effects may cause a wide array of consequence; starting from simple, non-specific symptoms to life-threatening problems, such as: impairment of kidney functions, heart, gastrointestinal tract, nervous system, and clotting system. Any symptoms could be caused partially by the development of clots in the small blood vessels that feed these vital organs causing irreversible tissue damage (Sivakumaran, Davies & Sallakh, 2020).The prognosis of such an unpresented pandemic has not been fully highlighted. Therfore, this study was created to examining the impact of psychological stress on the vital signs prognosis of hospitalized adult patients with coronavirus diseases-2019 in respiratory isolation wards through measuring some physiological variables,which include respiratory rate, pulse rate, blood pressure and temperature. This can be done by determining the difference between the prognosis of stressed & non-stressed patients.

**Background**:

Stress is a part of daily human life, as the knowledge of stress goes back to World War II when researchers found trauma in soldiers resulted from fear of shells and bombs. The concept of stress was borrowed from the field of physics by Hans Selye, one of the pioneers of stress theory (O'Connor, Thayer & Vedhara, 2020). In mechanics, twisting a part of metal until it breaks due to the force, or stress, exerted on it. Similarly, stress defines the power that causes pressure on a human body that may produce a permanent or temporary impact on vital aspects of body systems. After finishing his medical studies at the University of Montreal in the 1920s, Hans Selye began to use the term stress. He found his hospitalized patients suffered from, He said that there was a non-specific strain on the body caused by abnormalities in natural body processes as a direct result of stress. The activation of stress hormones has caused this stress. He named this the "General Adaptation Syndrome". A closer look at the general syndrome of adaptation, the short-term and long-term reactions of human body to stress may enhance understanding of this iceberg phenomenon. (Center for studies on human stress, 2020).

Stress is a common source of many diseases, such as however not limited to, heart disease, arteries pathological changes, and hormonal imbalances, as it has been proven that stress affects human health through the response of body organs to stress,

such as the endocrine system and, cardiovascular system, and respiratory system (O'Connor et al., 2020). Individuals who are affected by acute stressors may exhibit the following in response to stressors: changes in blood pressure(BP) or heart rate (HR)would be the strongest increase in the chance of ill-health in the future. The literature confirms that increased cortisol due to stress is associated with negative health outcomes.( Hamer, Steptoe , 2012; Hamer et al. 2010, 2012). Therfore, this study was endvored to examin hypothisezed causality between stress level and the prognosis of hospitalized adult patients with coronavirus diseases-2019 in respiratory isolation wards through measuring some physiological variables,which include respiratory rate, pulse rate, blood pressure and temperature. This can be done by determining the difference between the prognosis of stressed & non-stressed patients.

**Methods:**

**Study design, sample, and setting**

Longitudinal designs are research projects that are scheduled with the a specefic period between data collection phses. It has the potential to explain improvements over time and the temporal sequencing of phenomena, which is an important prerequisite for determining causality, as a key benefit of longitudinal designs (Polit, Beck, &Hungler, 2001). It was conducted on 140 patients who were hospitalized patients with Covid-19 in respiratory isolation wards in two major teaching hospital at Baghdad City from December 25$^{th}$ - 2020 – April 15$^{th}$ 2021.

**Data collection and tool (s)**

Data were collected after the interview with Covid-19 patients in respiratory isolation wards, and the participants answered the questionnaire represented by their consent to participate in the study. The research tool consists of three parts; the first part includes socio-demographic characteristics. The second part included the monitored variables such as Spo2, vital signs, and hospitalization duration. The third part consists of 21 elements of the Depression Anxiety Stress Scal (DASS).The researcher's consent was obtained for the use of the tool (Moussa, Lovibond, & Laube, 2001). The DASS is internally consistent, and the reliability of the whole scale was (0.94) by using Cronbach’s Alpha. Additionally, Split half reliability was (0.87), which authentiactes the aformentioned parameter. The researcher also re-verified the psychometric properties of the DASS by confirming its internal coherency ;whreas,the Cronbach’s alpha (0.965).

**Ethical consideration:**

The Institutional Review Board(IRB) at the University of Baghdad, College of Nursing approval was received from the Ethical research Committee. The researcher promises to keep the study subjects' personal information confidential and to use the data gathered without harming them in any way. The research tool was created to protect the subjects' right to privacy.

**Statistical analysis:**

Data were entered into the IBM-Statistical Package for the Social Sciences (SPSS) version 21 software program and analyzed by using descriptive and inferential statistics by using Analysis of Variance (ANOVA) teast and Sperman Correlation.

**Table 1: Frequencies and percentages of socio-demographic characteristics**

| | Characteristics | F | % |
|---|---|---|---|
| Age Groups | 18 - 28 Years Old | 7 | 5.0 |
| | 29 - 39 Years Old | 10 | 7.1 |
| | 40 - 50 Years Old | 40 | **28.6** |
| | 51 - 61 Years Old | 24 | 17.1 |
| | 62 - 72 Years Old | 32 | 22.9 |
| | 73 - 83 Years Old | 19 | 13.6 |
| | ≥84 Years Old | 8 | 5.7 |
| Gender | Male | 80 | **57.1** |
| | Female | 60 | 42.9 |
| Marital Status | Single | 20 | 14.3 |
| | Married | 95 | **67.9** |
| | Divorced | 25 | 17.9 |
| Living Status | With family | 133 | **95.0** |
| | Alone | 7 | 5.0 |
| Living Area | Rural | 28 | 20.0 |
| | Urban | 112 | **80.0** |
| Education Level | Don't read and Don't write | 28 | **20.0** |
| | Read and Writes | 24 | 17.1 |
| | Elementary school | 17 | 12.1 |
| | Secondary school | 18 | 12.9 |
| | Higher school | 7 | 5.0 |
| | Diploma | 15 | 10.7 |
| | Bachelor | 25 | 17.9 |
| | Higher education (Master, Doctorate) | 6 | 4.3 |
| Occupational Status | Self-Employee | 40 | **28.6** |
| | Housewife | 40 | **28.6** |
| | Governmental Employee | 31 | 22.1 |
| | Retired | 29 | 20.7 |
| Smoking | Yes | 10 | 7.1 |
| | No | 130 | **92.9** |
| Total | | 140 | 100.0 |

The underlined numbers in table 1, represent the highest percentages of the selected variables. More than a quarter (28.6%) of the study sample were classified as adult patients within age range of 40 - 50 years. More than half (57.1 %) of the study participants were male. The majority (67.9%) were married. Concerning the living status, the highest percentage (95.5%) of the study participants were living with family. Furthermore, most of them (80.0%) were living in an urban area. 20.0% of study participants were not able to read and write on educational level. 28.6% most patients were

self-employee and housewife. The highest percentage of the study samples were not smoking (92.2%) at the time of data collection.

**Table 2: Medical history and types of disease**

| | Characteristics | F | % |
|---|---|---|---|
| **Types of disease** | No Medical History | 54 | **38.6** |
| | Hypertension | 17 | 12.1 |
| | Diabetes Mellitus | 8 | 5.7 |
| | Hypertension & Diabetes Mellitus(DM) | 26 | 18.6 |
| | Hypertension & Cerebral Vascular Accident(CVA) | 2 | 1.4 |
| | Pneumonia | 2 | 1.4 |
| | Asthma | 6 | 4.3 |
| | Hypertension, DM & heart disease(s) | 7 | 5.0 |
| | Heart disease(s) & CVA | 4 | 2.9 |
| | Hypertension, Diabetes Mellitus, asthma, pneumonia , CVA & heart disease(s) | 3 | 2.1 |
| | Diabetes Mellitus, asthma, pneumonia, hypertension | 7 | 5.0 |
| | hypertension, DM, heart disease & CVA | 4 | 2.9 |
| **Total** | | 140 | 100.0 |

The underlined numbers in table 2 represent the highest percentages of the presented variable, more than one third (38.6%) of the study sample had not medical history at the time of data collection.

**Table 3: Descriptive statistics of patients' health-related variables**

| Variables | Characteristic | 1st Measure | | 2nd Measure | |
|---|---|---|---|---|---|
| | | f | % | f | % |
| Pulse rate | Bradycardia <60 beat /min, | 5 | 3.6 | 2 | 1.4 |
| | Normal 60-100 beat/min | 108 | 77.1 | 101 | 72.1 |
| | Tachycardia > 100 beat/min | 27 | 19.3 | 37 | 26.4 |
| Respiratory rate | Bradypnea <12 breath/min | 1 | .7 | 0 | 0.00 |
| | Eupnea 12-20 breath/min | 19 | 13.6 | 27 | 19.3 |
| | Tachypnea >20 breath/min | 120 | 85.7 | 113 | 80.7 |

| | | | | | |
|---|---|---|---|---|---|
| Blood Pressure | Hypotension <90/60 mmHg | 29 | 20.7 | 37 | 26.4 |
| | Normotensive 120/80 mmHg | 64 | 45.7 | 57 | 40.7 |
| | Hypertension >130/89 mmHg | 47 | 33.6 | 46 | 32.9 |
| Body Temperature | Hypothermia <35.0 C | 38 | 27.1 | 43 | 30.7 |
| | Euthermia 36.5 - 37.5 C | 82 | 58.6 | 72 | 51.4 |
| | Hyperthermia >37.5 – 38.3 C | 20 | 14.3 | 25 | 17.9 |
| | Total | 140 | 100.0 | 140 | 100.0 |

More than three quarters (77.1%) of the study sample recorded normal pulse during the first measure; similarly, (72.1%) of the study sample were classified as having normal pulse rate during the second measure. Additionally, the highest percentages (85.7%), (80.7%) respectively of the study sample were having tachypnea in both the first measure and the second measure. The majority, almost half (45.7%), (40.7%) of respondents recorded having a normal blood pressure in the first measure, and the second measure. More than half (58.6%), (51.4%) respectively of the study sample in both the first and the second measure were within normal body temperature level.

**Table 4: Differences in the pulse rate in response to psychological stress (1st & 2nd measures).**

| Pulse Rate | Pulse Rate (1st Measure) * psychological stress | | | | | Pulse rate (2nd Measure) * psychological stress | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | F | Sig | N | Mean | SD | F | Sig |
| Bradycardia <60 beat/min | 5 | 1.4476 | 1.13019 | **0.942** | **0.392** | 2 | 1.0476 | 1.14484 | **14.132** | **0.001** |
| Normal 60-100 beat/min | 108 | 1.4202 | .98745 | | | 101 | 1.2357 | .92730 | | |
| Tachycardia >100 beat/min | 27 | 1.7143 | 1.01489 | | | 37 | 2.1622 | .86885 | | |
| Total | 140 | 1.4779 | .99673 | | | 140 | 1.4779 | .99673 | | |

ANOVA test show there is a statistically no significant difference of pulse rate levels in response to psychological stress between the first measure (F=0.392, P=0.001) and second measure (F=35.999, P=0.001).

**Table 6: Differences in the respiratory rate in response to psychological stress (1st and 2nd measures).**

| Respiratory Rate | Respiratory Rate (1st Measure) * psychological stress | | | | | Respiratory Rate (2nd Measure) * psychological stress | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | F | Sig | N | Mean | SD | F | Sig |
| Bradypnea<12breth/min | 1 | .8095 | . | **5.679** | **0.004** | 0 | 0 | 0 | **28.839** | **0.001** |
| Eupnea 12-20 breath/min | 19 | .8045 | 1.0364 | | | 27 | .6332 | .76074 | | |
| Tachypnea >20 bearth/min | 120 | 1.5901 | .95347 | | | 113 | 1.6797 | .94101 | | |
| Total | 140 | 1.4779 | .99673 | | | 140 | 1.4779 | .99673 | | |

ANOVA test show there is a statistically significant difference in the respiratory rate in response to psychological stress between the first measure (F=5.679, P=0.004) and the second measure (F=28.839, Sig=0.0

**Table 7: Differences in the blood pressure in response to psychological stress (1st and 2nd measures).**

| Blood Pressure | Blood Pressure (1st Measure) * psychological stress | | | | | Blood Pressure (2nd Measure) * psychological stress | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | F | Sig | N | Mean | SD | F | Sig |
| Hypotension <90 /60 mmHg | 29 | 1.6125 | .88985 | **.401** | **0.671** | 37 | 1.6203 | .90910 | **5.163** | **0.007** |
| Normotensive 120/80 mmHg | 64 | 1.4122 | 1.02396 | | | 57 | 1.1662 | .97532 | | |
| Hypertension>130/89 mmHg | 47 | 1.4843 | 1.03275 | | | 46 | 1.7495 | 1.00432 | | |
| Total | 140 | 1.4779 | .99673 | | | 140 | 1.4779 | .99673 | | |

ANOVA test shows that there is no statistically significant difference in response to psychological stress (F=0.401, P=0.671) of blood pressure levels during the first measure. However, such difference (F=5.163, Sig=0.007) was authenticated during the second measure.

**Table 8: Differences in the body temperature in response to psychological stress (1st & 2nd measures).**

| Body Temperature | Body Temp (1st Measure) * psychological stress | | | | | Body Temp (2nd Measure) * psychological stress | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | F | Sig | N | Mean | SD | F | Sig |
| Hyperthermia >37.5-38.3 C | 38 | 1.5877 | .95433 | **.443** | **0.643** | 43 | 1.2924 | .87031 | **1.197** | **0.305** |
| Euthermia 36.5 - 37.5 C | 82 | 1.4419 | .99164 | | | 72 | 1.5311 | 1.03543 | | |
| Hypothermia < 35.0 C | 19 | 1.3459 | 1.11053 | | | 25 | 1.6438 | 1.07601 | | |
| Total | 139 | 1.4687 | .99430 | | | 140 | 1.4779 | .99673 | | |

ANOVA test show there is no statistically significant difference of temperature in response to psychological stress between the first measure (F=0.443, P=0.643) and the second measure (F=1.197, P=0.305).

**Desiccation**

This section analyzes the study's findings and draws parallels between the findings and current global research. This part was designed to respond to the study's key question(s), testing the research hypotheses, and achieve all of the study's goals. When compared stressed and non-stressed hospitalized adult patients with Corona Virus Diseas-2019, how does the prognosis of stressed hospitalized adult patients with Corona Virus Diseases-2019 differ, was the primary research question. The major hypothesis of the study was that psychological stress has a consistent influence on the change vital signs prognosis of Covid-19 patients.

More than a quarter of the study sample were classified as adult patients within the age range of 40 - 50 years. The results of the study surprised the researchers considering the fact that vulnerable age group is not consistent with this finding. The literatures show a higher risk of infection, and the severity of the disease increases, starting from 50-60 years of age (Romero Starke et al,.2020; Chen et al., 2020; Verity et al,.2020 ).

More than one-third of the study sample had no medical history at the time of data collection. However, the highest number of the study sample were those with a history of chronic diseases. The result however was not surprising. People with underlying chronic disease had a higher likelihood of getting Covid-19 infection, as well as a higher chance of dying from the viral infections( Haybar, Kazemnia, & Rahim, 2020).

More than three-quarters of the study sample recorded normal pulse during the first

measure; similarly, of the study sample was classified as having a increases pulse rate during the second measure. Other studies were not consistent with the current research findings (Caruso et al, 2020). Despite the majority of the sample have a normal heart rate; some have a rapid heart rate and, consistent with the current research findings (Raj, 2021)

Regarding respiratory rate, the highest percentages respectively of the study sample were having tachypnea in both the first measure and the second measure. The result was consistent with the researcher's expectations because the patients were suffering from acute respiratory syndrome. The studies showed that Covid-19 patients had an increased frequency of respiratory rate episodes (Caruso et al, 2020; Pimentel et al, 2020).

Tachypnea, hyperpnoea, and decreased oxygenation caused by hypoxemia indicate clinical deterioration caused by disease severity (Woyke, Rauch, Ströhle, & Gatterer, 2021). There is also evidence that in SARS-CoV-2 pneumonia (like in pneumococcal pneumonia), the dynamic compliance of the remaining ventilated lung is decreased, most likely due to a loss in surfactant activity, increasing the labor of breathing, due to decreased blood flow produced by intravascular thrombi, physiological dead space is also rising. Importantly, Covid-19 patients' anxiety has an impact on the cerebral input to the respiratory centers. As a result, dyspnea becomes more noticeable as the illness develops (Dhont, Derom, Van Braeckel, Depuydt, & Lambrecht,2020).

Regarding blood pressure, almost half of respondents recorded having normal blood pressure in the first measure and the second measure. These findings are supported by a study that found that most patients with Covid-19 have normal blood pressure (Pimentel et al,. 2020). Despite the majority of the study sample were normal blood pressures; but, some of participants were having abnormal level of blood pressure; which may worsen the prognosis.

More than half of the study sample in both the first and the second measure respectively, were within normal body temperature level. These findings are supported by a study which found that most patients with Covid-19 have a normal temperature (Pimentel et al,.2020) Despite the majority of the study sample were normal temperature but some of the participants were having abnormal finding which may worsen the prognosis**.**

**Conclusion**

The impact of the pandemic on all age groups within the research sample, especially the middle age group, The clients with a higher level of psychological stress are more likely to have a tachypnea. The clients with a higher level of psychological stress are more likely to have higher pulse rate in 2$^{nd}$ measurement. The mean plot shows that client with higher level of psychological stress are

not likely to have fluctuations in blood pressure in 1st & 2nd measurements. The mean plot show that client with higher level of psychological stress are not likely to develop fluctuations of body temperature in 1st & 2nd measurement.

**Refrenses**


Caruso, P. F., Angelotti, G., Greco, M., Albini, M., Savevski, V., Azzolini, E., ... & Cecconi, M. (2021). The effect of COVID-19 epidemic on vital signs in hospitalized patients: a pre-post heat-map study from a large teaching hospital. Journal of Clinical Monitoring and Computing, 1-9. https://doi.org/10.1007/s10877-021-00715-y

Dhont, S., Derom, E., Van Braeckel, E., Depuydt, P., & Lambrecht, B. N. (2020). The pathophysiology of 'happy'hypoxemia in COVID-19. Respiratory research, 21(1), 1-9 https://doi.org/10.1186/s12931-020-01462-5

Hamer, M., & Steptoe, A. (2012). Cortisol responses to mental stress and incident hypertension in healthy men and women. The Journal of Clinical Endocrinology & Metabolism, 97(1), E29-E34.women. J. Clin. Endocrinol. Metab. 97:E29–34, https://doi.org/10.1210/jc.2011-2132

Moussa, M. T., Lovibond, P. F., & Laube, R. (2001). Psychometric properties of a Chinese version of the 21-item depression anxiety stress scales (DASS21). Sydney, NSW: Transcultural Mental Health Centre. Cumberland Hospital. Retrived from http://www2.psy.unsw.edu.au/Groups/dass/Chinese/Chinese%20DASS21%20Paper.pdf.

O'Connor, D. B., Thayer, J. F., & Vedhara, K. (2020). Stress and health: A review of psychobiological processes. Annual review of psychology, 72. https://doi.org/10.1146/annurev-psych-062520-122331

Pimentel, M. A., Redfern, O. C., Hatch, R., Young, J. D., Tarassenko, L., & Watkinson, P. J. (2020).

Trajectories of vital signs in patients with COVID-19. Resuscitation, 156, 99-106. https://doi.org/10.1016/j.resuscitation.2020.09.002

Polit, B., & Beck, C. T. Hungler.(2001). *Essentials of nursing research: Methods, appraisal and utilization*.

Raj, S. R., Arnold, A. C., Barboi, A., Claydon, V. E., Limberg, J. K., Lucci, V. E. M., ... & Vernino, S. (2021). Long-COVID postural tachycardia syndrome: an American Autonomic Society statement. Clinical Autonomic Research, 1-4. 8https://doi.org/10.1007/s10286-021-00798-2

Romero Starke, K., Petereit-Haack, G., Schubert, M., Kämpf, D., Schliebner, A., Hegewald, J., & Seidler, A. (2020). The age-related risk of severe outcomes due to COVID-19 Infection: a rapid review, meta-analysis, and meta-regression. International journal of environmental research and public health, 17(16), 5974. https://doi.org/10.3390/ijerph17165974

Salleh, M. R. (2008). Life event, stress and illness. The Malaysian journal of medical sciences: MJMS, 15(4), 9. Retrived from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3341916/

Verity, R.; Okell, L.C.; Dorigatti, I.; Winskill, P.; Whittaker, C.; Imai, N.; Cuomo-Dannenburg, G.; Thompson, H.; Walker, P.G.T.; Fu, H.; et al. Estimates of the severity of coronavirus disease 2019: A model-based analysis. Lancet Infect. Dis. 2020, 20, 669–677. [Google Scholar] [CrossRef] https://doi.org/10.1016/S1473-3099(20)30243-7

Woyke, S., Rauch, S., Ströhle, M., & Gatterer, H. (2021). Modulation of Hb-O2 affinity to improve hypoxemia in COVID-19 patients. Clinical Nutrition, 40(1), 38-39. https://doi.org/10.1016/j.clnu.2020.04.036