JMS 2023; Vol 6 (2):147-156
UDC:159.944.4-055.2:[616.98:578.834(497.7)
DOI: 10.55302/JMS2362147i

PANDEMIC-INDUCED STRESS ESCALATION AMONG WOMEN IN NORTH MACEDONIA

Natasha Ilieva[1,3], Verica Poposka[2,3], Darko Iliev[1,3], Irena Aleksioska Papestiev[1,3], Ana Daneva Markova[1,3], Gligor Tofoski[1,3], Viktorija Jovanovska[1,3], Nikola Orovčanec[3],
[1]University Clinic of Obstetrics and Gynaecology, Skopje, North Macedonia
[2]Institute of Forensic Medicine and Criminalistic, Skopje, North Macedonia
[3]Ss Cyril and Methodius University in Skopje, Faculty of Medicine, North Macedonia

Abstract

The COVID-19 pandemic, officially declared by the World Health Organization on 11/03/2020, when the SARS-CoV-2 virus had spread to 114 countries with >118,000 cases, prompted significant changes in daily life and potentially increased stress levels.

This study aimed to investigate the difference in stress levels among women in North Macedonia, both before and during the COVID-19 pandemic.

Materials and Methods: A cross-sectional study was conducted using a questionnaire, which incorporated the Perceived Stress Scale (PSS) to assess stress levels pre- and mid-pandemic. More than 500 women aged 18 to 45, who sought examinations at the University Clinic for Gynaecology and Obstetrics, Skopje, North Macedonia, from March 2022 to March 2023, were invited to participate; 206 women accepted the invitation.

The findings indicated that the participants' stress level scores were significantly higher post-March 2020 compared to pre-March 2020 ($Z = 8.13$, $p < 0.001$).

These results suggest that the COVID-19 pandemic has substantially affected the stress levels experienced by women in North Macedonia. This is aligned with previous studies indicating increased stress levels during the pandemic, primarily attributed to health concerns, financial difficulties, and social isolation.

This study provides substantial evidence of the significant impact of the COVID-19 pandemic on women's stress levels in North Macedonia. Future research should focus on identifying factors contributing to heightened stress levels among women during the pandemic. This will help formulate effective interventions to counteract the negative impact of the pandemic on this population's mental health.

Keywords: stress, women, COVID-19, pandemics, Perceived Stress Scale (PSS).

Introduction

The first case of COVID-19 in the world was retroactively identified on December 31, 2019. The disease, initially presenting as acute atypical respiratory symptoms, was first described in Wuhan, China, where a novel coronavirus (severe acute respiratory syndrome coronavirus 2/SARS-CoV-2) was identified as the causative agent [1].

The World Health Organization (WHO) officially declared the pandemic on March 11, 2020, when COVID-19 had spread to 114 countries with over 118,000 cases [2].

Since then, substantial changes have occurred in daily life, significantly impacting people's physical and mental health. The COVID-19 pandemic has resulted in major lifestyle changes, including social isolation, increased workload, job loss, among others. These factors, coupled with fear of contracting the virus, have led to elevated stress levels in the general population [3].

Women, often the primary caregivers for children, the elderly, or other family members, face the added challenge of balancing work and domestic responsibilities [4, 5].

Hence, understanding the impact of the pandemic on women's stress levels is particularly important.

The health impact of stress has been extensively researched, with many studies demonstrating its negative consequences on physical and mental health [6]. In women, stress can specifically disrupt reproductive health, including the regulation of the menstrual cycle [7]. The menstrual cycle is controlled by a complex hormonal interaction involving the hypothalamus, pituitary gland, and ovaries. Stress can cause hormonal imbalances, leading to menstrual irregularities, such as missed periods, heavy or light bleeding, and prolonged or shortened cycles [8, 9].

Kowal et al. (2020) analyzed over 50,000 individuals from 26 countries and found that women, singles, younger individuals, parents with more children, the less educated, and those living in countries severely affected by COVID-19 experience greater stress [10]. Living alone, particularly during the pandemic when social isolation is recommended for disease prevention, can contribute to higher stress levels. This isolation has been associated with a higher incidence of depression, anxiety, and other mental disorders [11].

However, some studies have presented contradictory findings regarding individuals living alone, possibly due to the use of social networks for maintaining connections with others [12].

Gender has been recognized as a factor in stress experiences, with women frequently reporting more sadness, anxiety, and stress than men [13].

During the COVID-19 pandemic, two studies conducted across over 25 countries indicated that women experience greater stress than men [12, 14], although some studies found no such differences [15].

Women are often burdened with increased domestic responsibilities during the pandemic, in addition to their professional duties, further taxing their mental health [16].

Despite COVID-19 posing a greater threat to older individuals, younger people have displayed more severe psychological effects of quarantine [12]. Culturally, countries where collectivism is prevalent, as opposed to individualism, seem to experience lower stress levels as people support one another [18], though this was not corroborated in subsequent studies [12].

The aim of this study is to examine the difference in stress levels among women in North Macedonia before and after March 2020, marking the onset of the COVID-19 pandemic. The study's insights into the impact of stress on women's health during the pandemic could help shape strategies to address these issues in future pandemics and other large-scale stress-inducing events.

Materials and methods

This cross-sectional study invited over 500 women, with 206 responding to the invitation. Women aged 18-45 who attended the University Clinic for Gynaecology and Obstetrics in Skopje, North Macedonia, for an examination between March 2022 and March 2023 were informed about the study and invited to participate. The study was conducted using an online survey distributed via social media platforms and email. The Google Forms platform was used to compile a questionnaire (Appendix 1) due to its proven effectiveness in previous scientific research [19, 20].

The inclusion criteria specified that the participants should be aged 18-45 and be residents of the Republic of North Macedonia. The Perceived Stress Scale (PSS) was used to measure stress levels before and after the onset of the. The Perceived Stress Scale (PSS) was used to measure stress levels before and after the onset of the COVID-19 pandemic [21]. Participants were asked to rate each question on a scale of 0 (never), 1 (rarely), 2 (sometimes), 3 (often), or 4 (very often). All participants were thoroughly informed about the study and given the opportunity to ask questions. They all gave their consent to participate before filling out the questionnaire.

Statistical data were processed using STATISTICA 8.0 and SPSS Statistics 23.0. The data were analyzed using descriptive statistics (mean; standard deviation; ±95.00%CI; median; minimum; maximum, range) for series with numerical marks; data distribution was tested using the Kolmogorov-Smirnov test, Lilliefors test, and Shapiro-Wilks test (p); the difference between series with numerical marks was analyzed using the Wilcoxon Matched Pairs Test (Z/p), and the consistency between the participants' responses was analyzed using Reliability Statistics - Cronbach's Alpha (α). Significance was set at $p<0.05$.

Results

The study encompasses 206 participants aged between 18 and 45, who attended an examination at the Public Health Institution (PHI) - the University Gynaecology and Obstetrics Clinic in Skopje, North Macedonia, from 01.03.2022 to 01.03.2023. The following outlines the results of the questionnaire responses.

3.1. Stress Level Prior to the Outset of the COVID-19 Pandemic (March 2020)

The segment of the questionnaire addressing the respondents' stress level prior to March 2020 comprises 10 items/questions: T33.1 (Before March 2020, how often have you been upset because of something that happened unexpectedly?), T33.2 (Before March 2020, how often have you felt that

you were unable to control the important things in your life?), T33.3 (Before March 2020, how often have you felt nervous and stressed?), T33.4 (Before March 2020, how often have you felt confident about your ability to handle your personal problems?), T33.5 (Before March 2020, how often have you felt that things were going your way?), T33.6 (Before March 2020, how often have you found that you could not cope with all the things that you had to do?), T33.7 (Before March 2020, how often have you been able to control irritations in your life?), T33.8 (Before March 2020, how often have you felt that you were on top of things?), T33.9 (Before March 2020, how often have you felt that you were on top of things?), T33.10 (After March 2020, how often have you felt difficulties were piling up so high that you could not overcome them?).

The total Cronbach's Alpha of 0.84 is very high, demonstrating strong internal consistency among the responses to the 10 items/questions relating to the stress level of the respondents before March 2020 (Table 1.1).

Table 1.1 Reliability Statistics (Prior to March 2020).

Cronbach's Alpha	N of Items
, 836	10

Further analysis demonstrates the ranges within which scores fluctuate for each item/question, starting from item/question 33.

The highest value lies in T 33.5 (Before March 2020, how often have you felt that things were going your way?), which ranges within 2.35 ±0.95; and the value in T33.8 (Before March 2020, how often have you felt that you were on top of things?), which ranges within 2.35 ±0.98.

The lowest value is in T 33.2 (Before March 2020, how often have you felt that you were unable to control the important things in your life?), which ranges within 1.54 ±0.85 (Table 1.2).

Table 1.2 Item Statistics (Prior to March 2020).

Points/questions	Mean	Std. Deviation	N
T33.1	1.80	,829	206
T33.2	1.54	,847	206
T33.3	1.89	,860	206
T33.4	2.34	1,123	206
T33 .5	2.35	,950	206
T33.6	1.59	,837	206
T33.7	2.07	,965	206
T33.8	2.35	,976	206
T33.9	1.64	,972	206
T33.10	1.57	,874	206

Subsequent analysis involves the corrected total Cronbach's Alpha values for each item in the section of the questionnaire addressing the stress level among respondents before the pandemic commenced, i.e., before March 2020 (Table 1.3).

Table 1.3 Item-Total Statistics (Prior to March 2020).

Points/questions	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
T33.1	17.35	28,454	,628	,544	,812
T33.2	17.61	29,439	,494	,518	,824
T33.3	17,26	28,448	,601	,577	,814
T33.4	16.81	27,491	,505	,456	,825
T 33 .5	16.80	29,565	,409	,511	,832
T33.6	17.56	29,047	,548	,428	,819
T33.7	17.09	27,778	,588	,505	,814
T33.8	16.80	29,048	,447	,522	,829
T33.9	17.52	27,890	,571	,492	,816
T33.10	17.59	29,024	,521	,533	,821

Table 1.4 and Figure 1 include descriptive statistics of the composite values of the total score (Total 33) as well as the average value (Average 33) of the evaluations related to the respondents' stress level before March 2020. The value of the total score (Total 33), pertaining to the respondents' stress level, fluctuates within the range of 17.35 ± 5.33; ±95.00% CI: 16.62 - 18.09; the median is 18; the minimum value is 0 and the maximum value is 30. The value of the average score (Average 33), pertaining to the respondents' stress level, fluctuates within the range of 1.75 ± 0.53; ± 95.00% CI: 1.66 - 1.81; the median is 1.8; the minimum value is 0 and the maximum value is 3.

Table 1.4. Stress Level Among Respondents Prior to March 2020.

Variable	Valid N	Mean	Confidence -95.00%	Confidence +95.00%	Median	Minimum	Maximum	Std.Dev .
Total 33	206	17.35	16.62	18.0 9	18	0	30	5.33
Average 33	206	1.74	1.66	1.81	1.80	0	3	0.53

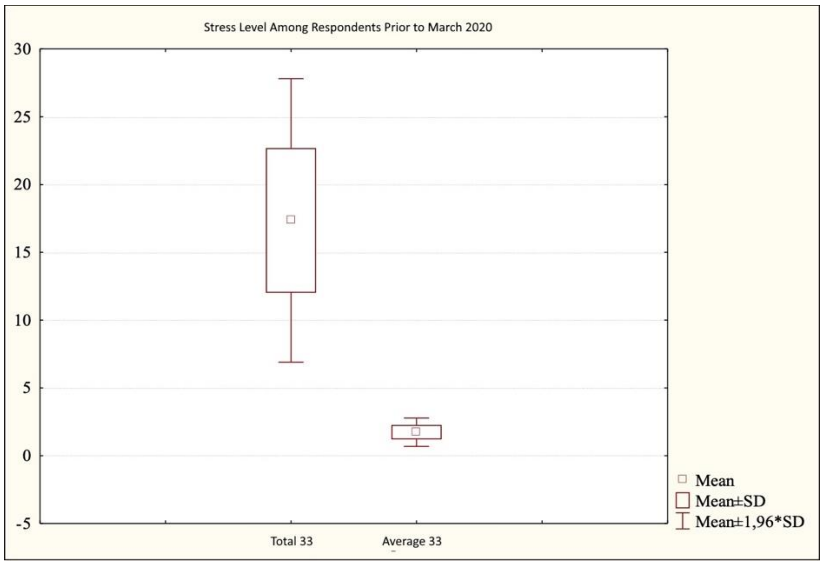

Figure 1. Stress Level Among Respondents Prior to March 2020.

3.2. Stress Level Among Respondents Following the Outset of the COVID-19 Pandemic (Post March 2020)

The portion of the questionnaire addressing the stress level among respondents after March 2020 consists of 10 items/questions: T34.1 (After March 2020, how often have you been upset because of something that happened unexpectedly?), T34.2 (After March 2020, how often have you felt that you were unable to control the important things in your life?), T34.3 (After March 2020, how often have you felt nervous and stressed?), T34.4 (After March 2020, how often have you felt confident about your ability to handle your personal problems?), T34.5 (After March 2020, how often have you felt that things were going your way?), T34.6 (After March 2020, how often have you found that you could not cope with all the things that you had to do?), T34.7 (After March 2020, how often have you been able to control irritations in your life?), T34.8 (After March 2020, how often have you felt that you were on top of things?), T34.9 (After March 2020, how often have you felt that you were on top of things?), T34.10 (After March 2020, how often have you felt difficulties were piling up so high that you could not overcome them?).

The total Cronbach's Alpha of 0.84 is very high, demonstrating strong internal consistency among the responses to the 10 items/questions related to the stress level of the respondents post March 2020 (Table 2.1).

Table 2.1. Reliability Statistics (After March 2020)

Cronbach's Alpha	N of Items
, 83 9	10

Further analysis displays the intervals in which scores fluctuate for each item/question from item/question 34. The highest value is found in T34.3 (After March 2020. How often have you felt nervous and stressed?), ranging within 2.41 ±1.08. The lowest value is found in T34.5 (After March 2020, how often have you felt that things were going your way?), ranging within 1.86 ±1.02, and in T34.7 (After March 2020, how often have you been able to control irritations in your life?), ranging within 1.86 ±0.95 (Table 2.2).

Table 2.2. Item Statistics (After March 2020).

Points/questions	Mean	Std. Deviation	N
T34.1	2.20	1.00	206
T34.2	2.16	1.03	206
T34.3	2.41	1.0 8	206
T34.4	2.20	,9 9	206
T34 .5	1.86	1.0 2	206
T34.6	2.01	1.00	206
T34.7	1.86	,95	206
T34.8	1.88	,98	206
T34.9	2.14	1.19	206
T34.10	2.10	1.13	206

Subsequent analysis presents the corrected total Cronbach's Alpha values for each item in the section of the questionnaire that refers to the stress level among respondents after March 2020 (Table 2.3).

Table 2.3 Item-Total Statistics.

Points/questions	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
T34.1	18.63	35,113	,679	,725	,811
T34.2	18.67	35,102	,654	,751	,813
T34.3	18.41	34,429	,677	,681	,810
T34.4	18.63	37,757	,448	,395	,832
T34 .5	18.97	39,984	,243	,499	,850
T34.6	18.82	35,556	,635	,496	,815
T34.7	18.97	38,501	,403	,473	,836
T34.8	18.94	40,611	,207	,520	,852
T34.9	18.68	33,105	,703	,655	,806
T34.10	18.72	33,879	,682	,724	,809

Table 2.4 and Figure 2 depict descriptive statistics of the composite values of the total score (Total 34) as well as the average value (Average 34) of the evaluations related to the stress level among respondents post March 2020. The value of the total score (Total 34), concerning the respondents' stress level, fluctuates within the range of 20.83 ± 6.65; ±95.00% CI: 19.92 - 21.74; the median is 21; the minimum value is 1 and the maximum value is 40. The value of the average score (Average 34), concerning the respondents' stress level, fluctuates within the range of 2.08 ± 0.66; ±95.00% CI: 1.99 - 2.17; the median is 2.10; the minimum value is 0.10 and the maximum value is 4.

Table 2.4. Stress Level Among Respondents Post March 2020

Variable	Valid N	Mean	Confidence -95.00%	Confidence +95.00%	Median	Minimum	Maximum	Std.Dev .
Total 34	206	20.83	19.9 2	21.74	21	1	40	6.6 5
Average 34	206	2.08	1.99	2.17	2.10	0.10	4.00	0.66

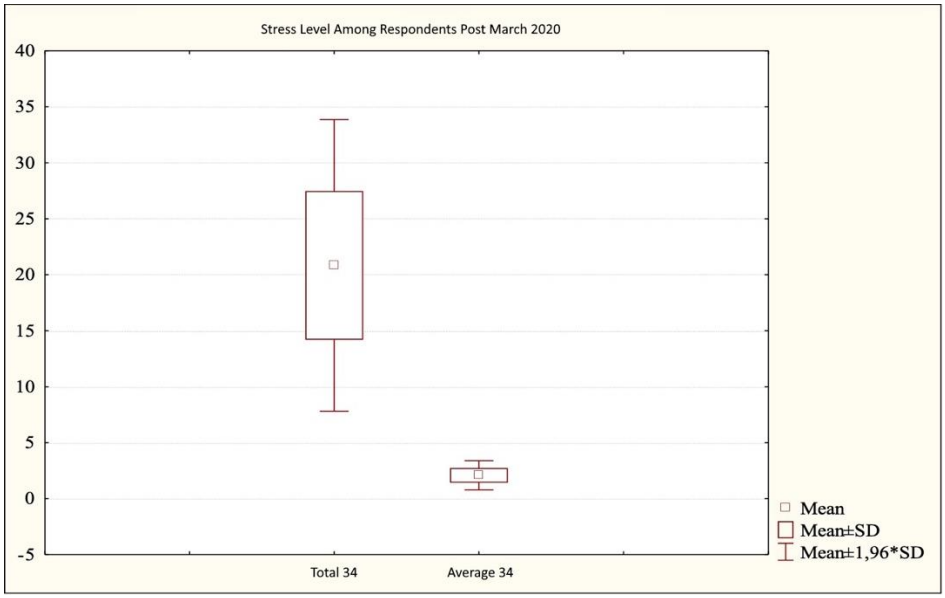

Figure 2. Stress Level Among Respondents After March 2020

3.3. Difference in Stress Levels among Respondents Before and After March 2020

The difference in the stress levels, comparing the "stress levels among respondents before March 2020" and the "stress levels among respondents after March 2020," is displayed in Table 3. With

Z=8.13 and $p < 0.001$ ($p = 0.000$), there is a significant increase in the respondents' stress level after March 2020.

Table 3. Difference in Stress Levels among Respondents Before and After March 2020

Pair of Variables	Valid	T	Z	p-level
Average 33 & Average 34	206	2946.00	8,13	**0.000**

Discussion

Stress, a factor influencing people's health, was a topical issue even before the COVID-19 pandemic. However, the lifestyle changes initiated by the pandemic have highlighted stress and its impacts on health even further. Raising awareness about the detrimental effects of stress on women's health, as well as the importance of addressing it to prevent numerous psychosomatic conditions, is crucial at both individual and societal levels.

Our study confirms that women's stress levels in the Republic of North Macedonia significantly escalated during the COVID-19 pandemic compared to the period prior to it.

Impact of Stress on Women's Health Before the COVID-19 Pandemic:

Women exposed to trauma and presenting symptoms of post-traumatic stress syndrome face an elevated risk of cardiovascular disease, which can be further influenced by their lifestyle choices [22]. A higher incidence of stress-related disorders was noted among women working in the public sector in Sweden, generally attributed to a disturbed work-life balance, lack of control over time and energy, and disrupted personal relationships [23].

Elevated cumulative stress levels were observed among younger women, those who are divorced, and those with a higher prevalence of obesity, smoking, diabetes, depression, and anxiety. A study encompassing over 25,000 women confirmed that those with higher cumulative stress levels had a greater risk of cardiovascular disease (CVD) [24].

Women experiencing stressful situations, depression, and anxiety during pregnancy face an increased risk of adverse pregnancy outcomes. A multidisciplinary approach involving gynaecologists, obstetricians, and psychiatrists is crucial to improve these outcomes [25]. Additionally, assessing stress levels during pregnancy serves as a significant predictor for postpartum depression [26]. Women experiencing perinatal loss often suffer from prolonged depression and post-traumatic stress syndrome, thus requiring sustained monitoring and treatment to improve their mental health [27].

Professional caregivers or those caring for family members tend to exhibit higher stress levels and depressive symptoms, especially when caregiving at home [28].

Impact of Stress on Women's Health During the COVID-19 Pandemic:

In the Republic of North Macedonia, few studies have examined women's stress levels during the COVID-19 pandemic. A study involving students at the North-eastern European University in the country found that female students exhibited greater stress due to concerns about following online teaching and their technological readiness [29].

A similar study found that female medical students showed higher stress levels compared to their male counterparts [30].

The Republic of North Macedonia demonstrates strong labor market segmentation, leading certain social groups, including women, to face an increased risk of unemployment, thereby elevating stress levels [31].

Job loss and unemployment stress have been exacerbated during the pandemic [32], with women 24% more likely to lose their jobs compared to men [33].

Women working in healthcare, police, and the military have faced significantly increased stress levels and instances of post-traumatic stress syndrome during the pandemic [34].

Pregnant women, new mothers, those who have experienced miscarriage, or those exposed to intimate partner violence during the pandemic face a significantly higher risk of developing mental health disorders [35].

While men exhibit higher morbidity and mortality from SARS-CoV-2 infection, a systematic review by Connor et al. (2020) found that the health risks and outcomes of the COVID-19 pandemic disproportionately impact women [36].

With increased household and childcare responsibilities during the pandemic, along with changes to reproductive healthcare services due to the burden of numerous COVID-19 cases, women's stress levels have escalated [37].

Instances of intimate partner violence and gender-based violence have surged during the COVID-19 pandemic [38], paralleling the trend observed during previous infectious epidemics like Ebola (2014) and Zika (2016) [39].

The increased number of stress factors for women during the pandemic has resulted in higher stress levels and post-traumatic stress syndrome occurrences compared to men [40].

Strengths and Limitations of the Study:

This is the first study in the Republic of North Macedonia that examines women's stress levels before and after March 2020, marked as the onset of the COVID-19 pandemic.

However, the sample size is relatively small, potentially limiting the generalizability of the findings. The study primarily focused on comparing stress levels before and during the pandemic, without investigating potential contributing factors.

Conclusion

The results indicate that the average stress level was significantly higher during the pandemic compared to before. The study emphasizes the substantial impact of the COVID-19 pandemic on women's stress levels in North Macedonia. Future research should aim to identify the factors associated with the increased stress levels among women during the pandemic. Such insights will help devise effective interventions to mitigate the negative impacts of the pandemic on mental health in this population.

References

1. Gorbalenya AE, Baker SC, Baric RS, de Groot RJ, Drosten C, Gulyaeva AA, Haagmans BL, Lauber C, Leontovich AM, Neuman BW, Penzar D. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019- nCoV and naming it SARS-CoV-2. *Nature microbiology.* 2020 Apr 1;5(4):536-44.
2. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta bio medica : Atenei parmensis* . 2020;91(1):157.
3. Xiong J, Lipsitz O, Nasri F, Lui LM, Gill H, Phan L, Chen-Li D, Iacobucci M, Ho R, Majeed A, McIntyre RS. Impact of the COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of affective disorders.* 2020 Dec 1;277:55-64.
4. Ruzungunde VS, Zhou S. Work-life balance in the face of COVID-19: The gendered impact. *Gender and Behaviour.* 2021 Jun 1;19(2):18098-106.
5. Matulevicius SA, Kho KA, Reisch J, Yin H. Academic medicine faculty perceptions of work-life balance before and since the COVID-19 pandemic. *JAMA network open.* 2021 Jun 1;4(6):e2113539-.
6. O'Connor DB, Thayer JF, Vedhara K. Stress and health: A review of psychobiological processes. *Annual review of psychology.* 2021 Jan 4;72:663-88.
7. Liu, Y., Gold, EB, Lasley , BL, & Johnson, WO (2017). Factors affecting menstrual cycle characteristics. *American Journal of Epidemiology,* 146(2), 131-140.
8. Bae J, Park S, Kwon JW. Factors associated with menstrual cycle irregularity and menopause. *BMC women's health.* 2018 Dec;18(1):1-1.
9. Kim T, Nam GE, Han B, Cho SJ, Kim J, Eum DH, Lee SW, Min SH, Lee W, Han K, Park YG. Associations of mental health and sleep duration with menstrual cycle irregularity: a population-based study. *Archives of Women's Mental Health.* 2018 Dec;21:619-26.

10. Kowal, M., Sorokowski , P., Sorokowska , A., Dobrowolska , M., Pisanski , K., Oleszkiewicz , A., . . . Zupan_ci_c , M. Reasons for Facebook usage: Data from 46 countries. *Frontiers in Psychology*, 2020 ; 11, 711. https://doi.org/10.3389/fpsyg.2020.00711 .
11. Jacob, L., Haro , JM, & Koyanagi , A. Relationship between living alone and common mental disorders in the 1993, 2000 and 2007 National Psychiatric Morbidity
12. Surveys. *PloS ONE* , 2019; 14(5), e0215182. https://doi.org/10.1371/journal.pone.0215182 .
13. Kowal M, Coll-Martín T, Ikizer G, Rasmussen J, Eichel K, Studzińska A, Koszałkowska K, Karwowski M, Najmussaqib A, Pankowski D, Lieberoth A. Who is the most stressed during the COVID-19 pandemic ? Data from 26 countries and areas. *Applied Psychology: Health and Well-Being,* 2020; 12(4):946-66.
14. Gao, W., Ping, S., & Liu, X. Gender differences in depression, anxiety, and stress among college students: A longitudinal study from China. *Journal of Affective Disorders*, 2019; 263, 292–300. https://doi.org/10.1016/j.jad.2019.11.121 .
15. Limcaoco , RSG, Mateos , ME, Fernandez, MJ, & Roncero , C. Anxiety, worry and perceived stress in the world due to the COVID-19 pandemic . *medRxiv* . 2020; doi :https://doi.org/10.1101/2020.04.03.20043992 .
16. Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, CS, & Ho, RC Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 2020; 17(5), 1729. https://doi.org/10.3390/ijerph17051729 .
17. Minello A. The pandemic and the female academic. *Nature.* 2020 Apr 17;17(1).
World Health Organization. Coronavirus disease (COVID-2019) situation reports. 2020; Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports. Accessed on: 14.02.2023
18. Oarga , C., Stavrova , O., & Fetchenhauer , D. When and why is helping others good for well-being? The role of belief in reciprocity and conformity to society's expectations. *European Journal of Social Psychology*, 2015; 45(2), 242–254. https://doi.org/10.1002/ejsp.2092.
19. Mondal, H., Mondal, S., Ghosal, T., & Mondal, S. Using Google Forms for Medical Survey: A Technical Note. *International Journal of Clinical and Experimental Physiology* , 2019; *5* (4), 216–218. Available at: https://doi.org/10.5530/ijcep.2018.5.4.26 ; Accessed on: 21.02.2021
20. Lohengramm , R. von. *7 steps to create surveys using Google Forms Questionnaire.* Re: Starting Life in Google World above the Cloud, 2019; Available at: https://digital-transformation.media/en/g-suite/google-forms/questionnaire/ ; Accessed on: 01.02.2021
21. Chan SF, and La Greca AM. Perceived stress scale (PSS). *InEncyclopedia of Behavioral Medicine* 2020 Oct 20 (pp. 1646-1648). Cham: Springer International Publishing.
22. Sumner JA, Kubzansky LD, Elkind MS, Roberts AL, Agnew- Blais J, Chen Q, Cerdá M, Rexrode KM, Rich-Edwards JW, Spiegelman D, Suglia SF. Trauma exposure and posttraumatic stress disorder symptoms predict onset of cardiovascular events in women. *Circulation.* 2015 Jul 28;132(4):251-9.
23. Håkansson C, Ahlborg Jr G. Occupations, perceived stress, and stress-related disorders among women and men in the public sector in Sweden. *Scandinavian journal of occupational therapy.* 2017 Jan 2;24(1):10-7.
24. Albert MA, Durazo EM, Slopen N, Zaslavsky AM, Buring JE, Silva T, Chasman D, Williams DR. Cumulative psychological stress and cardiovascular disease risk in middle-aged and older women: Rationale, design, and baseline characteristics. *American heart journal.* 2017 Oct 1;192:1-2.
25. Staneva A, Bogossian F, Pritchard M, Wittkowski A. The effects of maternal depression, anxiety, and perceived stress during pregnancy on preterm birth: A systematic review. *Women and birth.* 2015 Sep 1;28(3):179-93.
26. Alvarenga P, Frizzo GB. Stressful Life Events and Women's Mental Health During Pregnancy and Postpartum Period1. *Paidéia (Ribeirão Preto).* 2017 Jan;27:51-9.
27. Gold KJ, Leon I, Boggs ME, Sen A. Depression and posttraumatic stress symptoms after perinatal loss in a population-based sample. *Journal of women's health.* 2016 Mar 1;25(3):263-9.

28. Caputo J, Pavalko EK, Hardy MA. The long-term effects of caregiving on women's health and mortality. Journal of Marriage and Family. 2016 Oct;78(5):1382-98.
29. Zeqiri J, Kareva V, Alija S, Bach MP. Challenges and opportunities for higher education in North Macedonia during the COVID-19 pandemic: a survey of student satisfaction and gender-related anxiety. *International Journal of Technology Enhanced Learning.* 2022;14(2):163-79.
30. Mancevska S, Gligoroska JP, Velickovska LA. Levels of anxiety and depression in second year medical students during the COVID-19 pandemic spring lockdown in Skopje, North Macedonia. *Research in Physical Education, Sport and Health.* 2020.
31. Nikoloski D, Pechijareski L. The unemployed workers' perceptions of stress and employment prospects in Macedonia: The role of alternative adjustment mechanisms. *South East European Journal of Economics and Business.* 2017 Apr 1;12(1):68-79.
32. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, Agha M, Agha R. The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International journal of surgery.* 2020 Jun 1;78:185-93.
33. Dang HA, Nguyen CV. Gender inequality during the COVID-19 pandemic: Income, expenditure, savings, and job loss. *World Development.* 2021 Apr 1;140:105296.
34. Ristevska-Dimitrovska G, Batic DP 863 The impact of COVID-19 on mental health of healthcare workers and police/army forces in the Republic of North Macedonia. *European neuropsychopharmacology.* 2020 Nov;40:S479.
35. Almeida M, Shrestha AD, Stojanac D, Miller LJ. The impact of the COVID-19 pandemic on women's mental health. *Archives of women's mental health.* 2020 Dec;23:741-8.
36. Connor J, Madhavan S, Mokashi M, Amanuel H, Johnson NR, Pace LE, Bartz D. Health risks and outcomes that disproportionately affect women during the Covid-19 pandemic: A review. *Social science & medicine.* 2020 Dec 1;266:113364.
37. Alon, T., Doepke , M., Olmstead-Rumsey, J., Tertilt , M., 2020. The impact of Covid-19 on gender equality. *NBER Work. Pap.* https://doi.org/10.3386/w26947, 2020:w26947.
38. North, A., 2020, March 26. When Home Isn't Safe: what the Coronavirus Pandemic Means for Domestic Violence Survivors. *Vox.* https://www.vox.com/2020/3/2 6/21193814/coronavirus-domestic-violence-shelters-covid-19-abuse.
39. Davies, SE, Bennett, B. A gendered human rights analysis of Ebola and Zika: locating gender in global health emergencies. *Int. Aff* . 2016; 92 (5), 1041–1060. https:// doi.org/10.1111/1468-2346.12704.
40. Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., Wu, L., Sun, Z., Zhou, Y., Wang, Y., Liu, W. Prevalence and predictors of PTSS during Covid-19 outbreak in China hardest-hit areas: gender differences matter. *Psychiatr . Res.* 2020; 287, 112921. https://doi.org/10.1016/j.psychres.2020.112921.