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Original article

COPING STYLES AND MENTAL HEALTH IN HEALTHCARE WORKERS DURING THE COVID-19 PANDEMIC

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Abstract

Introduction: There is limited research on the factors influencing mental health of healthcare workers during the COVID-19 pandemic. Studies show that coping styles variably influence the severity of mental health symptoms. However, no data is available on the effects of coping styles on mental health of healthcare workers in North Macedonia and the wider region of Southeast Europe.

Materials and methods: A cross-sectional web-based study was conducted with 342 participants during the early period of the COVID-19 pandemic. Participants provided sociodemographic data and were assessed in regard to coping styles, and symptoms of depression, anxiety and stress. Associations between the variables were examined using nonparametric tests, and their additive effects were tested using generalized linear models.

Results: Identifying as a woman, single, and of younger age was associated with higher levels of mental health symptoms. The coping styles that contributed to poor mental health outcomes included the use of active coping, instrumental support, substance use, venting, behavioral disengagement, self-blame, and the low use of emotional support and humor.

Conclusion: The findings help identify vulnerable populations, and add to the growing research on gender differences in the impact of COVID-19 on healthcare workers. The study may help in the development of mental health prevention programs for populations at risk during health crises.

Keywords: healthcare workers, coping, mental health, COVID-19

Introduction

In March 2020, the WHO declared the spread of the novel coronavirus SARS-CoV-2 (COVID-19) a global pandemic[1,2]. The rapid spread of the infection posed numerous challenges for healthcare systems throughout the world. Healthcare workers faced multiple concerns, regarding access to protective equipment and psychosocial support, the mortality and morbidity of the virus, the safety of their families, friends and colleagues, increased workload, as well as moral and professional dilemmas in providing care[3]. Research suggests that the COVID-19 outbreak may have a negative mental health impact on individuals and communities[4-6]. Earlier research from previous infectious outbreaks point to an increased risk for mental health problems in healthcare workers[7,8]. Emerging evidence suggests that

healthcare workers experience high levels of mental health problems during the COVID-19 pandemic as well.

A cross-sectional survey-based study conducted by Lai *et al.*[9] evaluated the mental health outcomes of healthcare workers treating patients with COVID-19. A total of 1,257 participants were assessed from 34 hospitals in China. The results indicated that 50.4% of the participants reported symptoms of depression, 44.6% reported symptoms of anxiety, 34% reported symptoms of insomnia, and 71.5% reported symptoms of posttraumatic stress. The results showed that the symptoms of nurses, women and frontline staff were significantly higher compared to other healthcare workers. Studies with similar results have been emerging in Europe as well. For example, a cross-sectional study conducted by Luceno-Moreno *et al.* [10] evaluated levels of posttraumatic stress, anxiety and depression in a total sample of 1,422 healthcare workers in Spain during the COVID-19 pandemic. The results showed that healthcare workers experienced a high-symptom severity on all mental health outcomes. Women and participants have reported significantly higher levels of worry, emotional exhaustion and depersonalization. On the other hand, self-perceived resilience is shown to be negatively associated on all outcomes, while personal accomplishment is negatively associated with depression and anxiety. In addition, a cross-sectional web-based study conducted by Stojanov *et al.*[11] evaluated quality of sleep, health-related quality of life, and levels of depression and anxiety among 201 healthcare workers in a clinical center in Serbia. The results showed high levels of depression and anxiety, poor quality of sleep and poor health-related quality of life. These outcomes were significantly worse for personnel working with COVID-19 patients compared to others. These studies point to healthcare workers as an especially vulnerable group for mental health difficulties.

Recent research emphasizes the importance of enhancing psychological resilience and providing tailored mental health support for healthcare workers[12-14]. One potential pathway in reducing psychological distress during an infectious outbreak is the adoption of effective coping styles[15]. Coping styles are various intentional or automatized strategies that individuals utilize in order to reduce the negative effects of a stressor in specific situations[16]. A literature review conducted by Stanislawski[17] suggests that commonly used effective coping strategies may rely on problem-solving, use of social support, and positive reframing of experienced adversities.

A study conducted by Gurvich *et al.*[18] evaluated psychosocial responses and coping styles among a sample of the general population in Australia. A total of 1,495 participants were assessed using a web-based survey during the COVID-19 pandemic. The results showed that positive reframing, acceptance and humor were effective coping strategies associated with positive mental health outcomes. On the other hand, self-blame, venting, behavioral disengagement, and self-distraction were associated with negative mental health outcomes. Similarly, an observational study conducted by Wong *et al.*[19] evaluated mental health symptoms and coping styles used by healthcare workers. A total of 466 participants were assessed using a survey after the SARS outbreak in Hong Kong. The results showed weak positive correlations between distress and coping styles that included venting, use of instrumental support, self-distraction, use of emotional support, behavioral disengagement, active coping, denial, and substance use. However, recent research on coping styles utilized by healthcare workers relies primarily on subjective measures. Research on the topic is scarce in Europe [20,21] and is lacking in Southeastern Europe. Therefore, little is still known about the coping styles adopted by healthcare workers in facing adversities and their association with psychological distress during the COVID-19 pandemic.

The aim of the current study was to examine the relationship between sociodemographic factors, coping styles, and mental health symptoms related to the COVID-19 pandemic in healthcare workers in North Macedonia. In order to explore mental health and related coping

styles, the study primarily analyzed the associations between different coping styles and mental health symptoms, in relation to sociodemographic characteristics. The study further explored the potentially influential factors that had impact on the severity of mental health symptoms in healthcare workers during the COVID-19 pandemic.

Materials and methods

Design

The current study represents a cross-sectional web-based study. The sampling strategy included the distribution of a web-based survey from 15 March to 15 June 2020 over social media platforms and mailing lists. The study was conducted in the early period of the declared state of emergency in the country[22]. The snowball technique was used to recruit participants from the general public, healthcare workers, aged 18 or older, and residing in North Macedonia during the COVID-19 pandemic. All participants had to fill out the survey and to provide online informed consent.

The study was approved by the Human Research Ethics Committee, Faculty of Medicine, Skopje, North Macedonia [No. 03-1617/4], in agreement with Directive 2001/20/EC of the European Parliament and of the Council of 04 April 2001, the Declaration of Helsinki, and the European Convention on Human Rights.

Participants

The collected data was filtered for healthcare workers employed at health facilities throughout the country. A total of 342 participants (277 women, 65 men) were included in the analysis. Healthcare workers in the current context include medical personnel (medical doctors, nurses, dentists, and pharmacists) and affiliated personnel (persons with at least a bachelor degree who collaborate with medical personnel)[23].

Measures

Sociodemographic data were self-reported by participants, including gender, age, relationship status, and occupation.

Coping styles were assessed using the Brief COPE Inventory (Brief COPE).[24] The Brief COPE is a self-report measure that assesses the effective and ineffective styles to cope or minimize distress when facing with adversity. It covers intentional and automatized approaches presented over 28 items using a 4-point Likert scale (1='I haven't been doing this at all' to 2='I have been doing this a lot'). The 28 items load into 14 factors or coping styles, including 1) Active coping, i.e. investing effort to remove or circumvent the adversity, 2) Planning, i.e. thinking about ways to confront the adversity, 3) Use of emotional support, i.e. seeking emotional support from others, 4) Use of instrumental support, i.e. seeking assistance or advice from others, 5) Positive reframing, i.e. viewing the situation in a favorable light, 6) Acceptance, i.e. accepting the reality of the situation, 7) Religion, i.e. engagement in religious activities, 8) Humor, i.e. comically approaching the situation, 9) Venting, i.e. discharging emotions relating to the adversity, 10) Denial, i.e. rejecting the reality of the situation, 11) Substance use, i.e. turning to alcohol or drugs as relief, 12) Behavioral disengagement, i.e. giving up or withdrawing effort, 13) Self-distraction, i.e. psychological disengagement such as daydreaming or sleeping, and 14) Self-blame, i.e. being critical of oneself. The coping styles from 1 to 8 are considered effective or adaptive, while those from 9 to 14 are considered ineffective or maladaptive. The measure was administered to healthcare workers during previous infectious disease outbreaks[19]. In the current sample, strong positive correlations were shown between active coping and self-distraction (r_s=.71, p<.001), active coping and planning (r_s=.66, p=.001), as well as between the use of emotional support and instrumental support (r_s=.76, p=.001). However, the Internal consistency of the effective (Cronbach's

Alpha=.89) and ineffective (Cronbach's Alpha=.79) coping scales in the current sample was good. Due to a small number of items, internal consistency was not examined for the 14 subscales separately[25].

Mental health symptoms were assessed using the Depression, Anxiety, and Stress Scale (DASS-21)[26]. Participants reported the frequency of symptoms on 21 items during the previous week using a 4-point Likert scale (0=Never to 3=Always), where higher scores indicate higher symptom severity. The measure contains three 7-item subscales for depression, anxiety, and stress. The depression subscale covers low levels of positive affect, and the score can be divided into normal (0-9), mild (10-13), moderate (14-20), severe (21-27), and extremely severe (28+). The anxiety scale covers a mixture of anxiety symptoms, such as autonomic arousal and anxious affect, and the score can be divided into normal (0-7), mild (8-9), moderate (10-14), severe (15-19), and extremely severe (20+). The stress scale covers chronic non-specific arousal, and the score can be divided into normal (0-14), mild (15-18), moderate (19-25), severe (26-33), and extremely severe (34+). A total score was derived as an index of general psychological distress, and total scores were also derived for each subscale. DASS-21 is a well-established and widely used measure for depression, anxiety and stress among similar samples and the general population[7,27,28]. The internal consistency for the subscales in the current sample was good (Cronbach's alpha=.86 to .92).

Statistical analysis

Data were analyzed using IBM SPSS Statistics, version 24.0 [29] and the statistical software R[30]. The normal distribution of sociodemographic data and the main outcome variables was determined by the Shapiro-Wilk test of normality. As data of the outcome measures was not normally distributed, descriptive analyses were reported as medians (*Mdn*) and interquartile ranges (*IQR*) for continuous variables, and counts (*N*) and percentages (*%*) for categorical variables. The internal consistency for each scale was computed using Cronbach's alphas. Continuous variables between two groups were compared using the Mann-Whitney *U* test, and between more than two groups using the Kruskal-Wallis *H* test. Mean ranks (*MR*) were additionally shown for continuous variables with significant differences among groups. Variation in general psychological distress, depression, anxiety, and stress were modeled as responses to the additive effects of gender, age, relationship status, occupation, and coping styles using generalized linear models. The Akaike information criterion (*AIC*) was used to estimate model fit starting with the most complex model and successively dropping variables lacking statistical significance ($p<.05$) through a backwards stepwise procedure of all additive combinations[31].

Results

Sociodemographic characteristics

Sociodemographic characteristics of the sample are given in Table 1. A large majority of participants were women. Most of the participants were aged 30 to 59 years, followed by those aged 18 to 29, while a minority of participants were aged 60 and above. A large majority of participants stated they lived with a partner, and a smaller number declared as single. Most of the participants stated they worked as medical personnel, and a smaller number worked as affiliated personnel. Majority of the participants reported depression symptoms within the normal range (*N*=301, 88.0%), followed by mild depression symptoms, moderate symptoms, and severe symptoms. The majority also reported anxiety symptoms within the normal range (*N*=288, 84.2%), followed by moderate symptoms, mild symptoms, severe symptoms, and extremely severe symptoms. Similarly, the majority reported stress symptoms within the normal range (*N*=302, 88.3%), followed by mild and moderate symptoms.

Table 1. Sociodemographic characteristics and levels of distress reported by participants

Characteristics	N (%)
Gender	
Men	65(19.0)
Women	277(81.0)
Age group	
18 – 29	65(19.0)
30 – 59	242(70.8)
60 >	35(10.2)
Relationship status	
Married/with a partner	291(85.1)
Single	51(14.9)
Occupation	
Medical personnel	283(82.7)
Affiliated personnel	59(17.3)
Stress	
Mild	27(7.9)
Moderate	13(3.8)
Depression	
Mild	26(7.6)
Moderate	14(4.1)
Severe	1(0.3)
Anxiety	
Mild	19(5.6)
Moderate	25(7.3)
Severe	7(2.0)

Group comparisons

Associations between sociodemographic characteristics, psychological distress and coping styles are shown in Table 2. It was found that women reported significantly more severe symptoms of general psychological distress, depression, anxiety, and depression (MR= 179.1, 179.8, 179.3, 177.5) compared to men (MR=139.3, 136.2, 138.2, 145.8). Women also had significantly higher scores on the general use of effective coping styles (MR=177.6), where higher scores were shown on the use of emotional support, instrumental support, and positive reframing (MR=179.4, 176.5, 179.0) compared to men (MR=145.3, 137.8, 150.2, 139.4). Regarding ineffective coping styles, women also had significantly higher scores on the use of venting and self-distraction (MR=180.7, 180.4) compared to men (MR=132.5, 133.6).

Within the three age groups, it was found that participants aged 18-29 had significantly more severe symptoms of anxiety (MR=188.0), compared to participants aged 30-59 (MR= 172.4) and those 60 years and over (MR=134.7). Participants aged 18-29 also had significantly higher scores on the use of emotional support (MR=196.9), compared to those aged 30-59 (MR=168.6) and those 60 years and over (MR=144.2). Participants who were single had significantly more severe symptoms of general psychological distress, depression, anxiety, and stress (MR=212.4, 213.6, 200.9, 206.6), compared to participants who reported to live with a partner (MR=164.3, 164.1, 166.4, 165.4). Participants who were single had significantly higher scores on the use of effective copying styles, planning, instrumental support, and positive reframing (MR=201.6, 205.6, 198.0, 198.3), compared to participants who lived with a partner (MR=166.2, 165.5, 166.9, 166.8). Significantly higher scores were also reported by single participants on the use of ineffective coping styles and self-blame (MR=209.7, 206.7), compared to participants who lived with a partner (MR=164.9, 165.3). Lastly, it was found that affiliated personnel scored significantly higher on the use of venting as a coping style (MR=196.2), compared to medical personnel (MR=166.3).

Table 2. Associations between sociodemographic characteristics, psychological distress and coping styles

	Men	**Women**		**18–29**	**30–59**	**60 >**		**Married/with a partner**	**Single**		**Medical**	**Affiliated**	
Variable	***Mdn (IQR)***	***Mdn (IQR)***	***U***	***Mdn (IQR)***	***Mdn (IQR)***	***Mdn (IQR)***	***H***	***Mdn (IQR)***	***Mdn (IQR)***	***U***	***Mdn (IQR)***	***Mdn (IQR)***	***U***
Distress	8(14)	12(17)	6910.0**	13(18)	11(18)	8(12)	2.36	10(16)	17(18)	5334.0**	10(17)	12(19)	7929.0
Depression	1(5)	3(5)	6704.5**	3(9)	2(5)	3(5)	1.49	2(5)	5(8)	5272.0**	2(6)	2(5)	8288.5
Anxiety	1(3)	2(6)	6837.0**	3(5)	2(6)	1(3)	6.91*	2(5)	4(8)	5923.5*	2(5)	2(7)	7729.5
Stress	5(7)	6(7)	7331.0*	6(8)	6(8)	5(7)	0.99	5(7)	7(6)	5632.0**	6(8)	6(7)	7946.5
Effective coping	20(17)	24(14)	7302.0*	24(16)	23(14)	17(16)	4.09	22(14)	26(12)	5887.0*	23(15)	22(10)	8320.0
Active	2(4)	3(4)	7843.0	3(3)	3(3)	3(4)	0.89	3(3)	3(3)	6675.5	3(3)	3(3)	7897.5
Planning	3(3)	3(3)	8641.0	4(3)	3(3)	3(3)	2.05	3(3)	4(4)	5682.0**	3(3)	3(4)	8236.0
Emotional support	2(3)	2(3)	6813.0**	3(4)	2(3)	2(3)	7.38*	2(4)	3(3)	6588.5	2(4)	2(3)	8308.5
Instrumental support	1(2)	1(3)	7620.5*	2(4)	1(3)	1(2)	4.91	1(3)	2(3)	6068.5*	1(3)	1(2)	8176.5
Reframing	2(3)	4(3)	6915.5**	3(3)	3(3)	3(4)	2.82	3(3)	4(4)	6052.0*	3(3)	3(3)	7944.0
Acceptance	4(3)	5(2)	7968.0	4(2)	5(2)	4(2)	2.64	5(2)	5(2)	6820.5	5(3)	5(2)	7967.0
Religion	1(2)	1(3)	8443.5	1(2)	1(3)	0(2)	3.33	1(3)	2(3)	7048.5	1(3)	1(3)	8345.0
Humor	2(2)	2(2)	8491.5	2(2)	2(2)	2(2)	1.53	2(2)	2(2)	6536.0	2(2)	2(2)	7463.5
Ineffective coping	8(9)	10(7)	7640.0	11(8)	9(8)	9(7)	2.59	9(8)	12(7)	5504.5*	9(8)	10(6)	7608.5
Venting	2(3)	2(3)	6467.0**	3(3)	2(3)	2(2)	2.39	2(3)	3(2)	6289.5	2(2)	3(2)	6889.0*
Denial	1(2)	1(2)	8862.5	0(2)	0.5(2)	1(1)	0.18	0(2)	1(2)	6392.0	1(2)	0(2)	7765.5
Substance use	0(0)	0(0)	8415.5	0(0)	0(0)	0(0)	0.00	0(0)	0(0)	7128.0	0(0)	0(0)	8347.0
Disengagement	0(1)	0(1)	8905.5	0(2)	0(1)	0(1)	4.83	0(1)	0(2)	6474.5	0(1)	0(2)	7470.0
Self-distraction	2(3)	4(3)	6539.5**	4(3)	4(3)	3(2)	0.58	3(3)	4(3)	6218.5	4(3)	2(3)	8113.5
Self-blame	2(3)	2(3)	8361.5	2(3)	2(3)	1(2)	3.94	2(3)	2(3)	5624.5*	2(3)	2(2)	7980.0

*$p < .05$, **$p < .01$

Model selection

The analysis showed that the best-fit model explaining higher mental health symptoms included identifying as a woman (β=3.11, t=2.29, *p*=.02), the use of active coping (β=0.96, t=3.05, *p*<.001), low use of humor (β=-1.34, t=-3.65, *p*<.001), use of venting (β=1.73, t=4.07, *p*<.001), substance use (β=1.77, t=3.29, *p*<.001), disengagement (β=3.49, t=7.05, *p*<.001), and self-blame (β=1.42, t=3.68, *p*<.001). The best-fit model explaining higher depression symptoms included identifying as a woman (β=1.28, t=2.65, *p*<.01), low use of emotional support (β=-0.23, t=-2.01, *p*=.04), low use of humor (β=-0.33, t=-2.54, *p*<.01), use of venting (β=0.59, t=3.91, *p*<.001), substance use (β=0.69, t=3.58, *p*<.001), disengagement (β=1.28, t=7.21, *p*<.001), and self-blame (β=0.55, t=4.01, *p*<.001). The best-fit model explaining higher anxiety symptoms included the use of instrumental support (β=0.31, t=2.28, *p*=.02), low use of humor (β=-0.38, *t*=-2.83, *p*<.001), substance use (β=0.60, t=3.02, *p*<.001), use of venting (β=0.81, t=5.74, *p*<.001), and disengagement (β=1.05, t=6.32, *p*<.001). The best-fit model explaining higher stress symptoms included active coping (β=0.57, t=4.26, *p*<.001), low use of humor (β=-0.62, t=-3.92, *p*<.001), use of venting (β=0.79, t=4.49, *p*<.001), substance use (β=0.54, t=2.33, *p*=.02), disengagement (β=1.21, t=5.67, *p*<.001), and self-blame (β=0.57, t=3.48, *p*<.001).

Discussion

The study explored the relationship between sociodemographic factors, dimensions of coping styles, and the severity of general psychological distress, depression, anxiety, and stress of healthcare workers during the COVID-19 pandemic in North Macedonia. The majority of participants were women, aged 30-59, living with a partner, and working as medical personnel. With regard to mental health symptoms, 12% reported higher than normal depression symptoms, 15.8% reported higher than normal anxiety symptoms, and 11.7% reported higher than normal stress symptoms. The study further indicated that identifying as a woman, single, and being of younger age (ages 18-29) were associated with more severe mental health symptoms. The coping styles that contributed to worse mental health outcomes in healthcare workers included the use of active coping, instrumental support, substance use, venting, behavioral disengagement, self-blame, as well as the low use of emotional support and humor.

The current sample reported relatively low levels of perceived depression, anxiety, and stress symptoms compared to studies that assessed healthcare workers as the pandemic progressed[32]. As in other web-based surveys[9,11], it is possible that the current study recruited highly motivated participants with lower self-perceived levels of distress. It is also possible that the various concerns experienced by healthcare workers, such as higher workload, possible limited resources, and the high morbidity and mortality of the virus [3], may have not yet impacted the assessed participants. For example, worse mental health outcomes are evident in similar studies that were conducted during the peak of the pandemic[21], and in countries where the infectious disease spread earlier[10,33].

Women being at higher risk for more severe mental health symptoms is a finding in line with studies conducted during previous pandemics[34]. It represents a result consistently shown in studies conducted with healthcare workers during the COVID-19 pandemic globally[9,10,33]. This may be explained by the higher prevalence of women in healthcare, different sociocultural roles and expectations compared to men, a higher likelihood to report symptoms and seek help, and a generally higher prevalence of affective disorders among women[35,36]. These findings point to the need for paying particular attention to the psychological wellbeing of female healthcare workers during the infectious disease outbreak.

Coping behaviors consist of complex, multilayered, and often inclusive constructs[17]. This may explain the possible overlapping utilized coping styles by healthcare workers. The

literature also points that the use of some ineffective coping styles may interfere the implementation of strategies that are considered effective, such as the possible interference of venting on instrumental actions[16]. In addition, the findings of the current study may be difficult to compare with similar studies that rely on difficult-to-match measures for coping behaviors. However, the current findings show some comparable results for similar contexts in relation to mental health outcomes. For example, the utilization of ineffective coping styles, such as substance use, self-blame, venting, behavioral disengagement, and low use of humor, have been shown as potential risk factors for poor mental health outcomes. This is evident in studies including the general population and healthcare workers during infectious disease outbreaks[18,19]. In the available studies on coping behaviors in healthcare workers, self-blame has also been associated with more severe mental health symptoms[37], venting has been associated with depression and anxiety symptoms[38], and the low use of humor has been associated with traumatic stress outcomes as well[37]. In line with previous research, the current findings may direct more attention to some specific coping strategies that have shown to particularly worsen mental health outcomes in healthcare workers during the COVID-19 pandemic.

The current study should be interpreted in light of several limitations. First, the study was carried out during the early period of the pandemic. Second, data collection was initially aimed at the general population and did not specifically target healthcare workers. Third, as the study relied on a web-based survey, it was not possible to assess participation rates. Forth, there was an uneven distribution among sociodemographic characteristics, especially gender, different age groups, and occupations, with which some valuable data may have been omitted. Fifth, there may be a response bias in the collected data, where motivated participants responded to the survey and non-responders could have been either more distressed or simply not interested in the study. Accordingly, future research could specifically target healthcare workers, collect longitudinal follow-up data during the pandemic, and aim at collecting representative samples for various sociodemographic characteristics.

Conclusion

The current study has shown that women, single, and younger healthcare workers may be especially at risk in developing mental health problems during the COVID-19 pandemic in North Macedonia. Encouraging the development and use of effective coping styles, while being mindful of ineffective coping styles, could potentially lead to better mental health outcomes for healthcare workers. In order to relieve the psychological distress experienced by this population, the findings of the current study may aid in the development of mental health programs by focusing on specific coping behaviors. As the negative mental health impact of the public health crisis may continue[39], the findings could also inform policy-makers, the management of healthcare facilities, families, and communities in the support of healthcare workers in the future.

Conflict of interest statement. None declared.

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