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# Psychological effects of the COVID-2019 pandemic: Perceived stress and coping strategies among healthcare professionals

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## ABSTRACT

Starting from China, the coronavirus disease (COVID-19) contagion spread unexpectedly and quickly all over the world, particularly affecting Italy. In the early stages of the epidemic, healthcare professionals have been in the front-line to manage the infection. The current study aimed to analyse the impact of COVID-19 outbreak on healthcare professionals and to detect some risk and protective factors of their distress levels, with regard to socio-demographic variables, direct exposure to COVID-19 and the coping strategies used to deal with stress. The data were collected during the peak of the infection. A total of 595 healthcare professionals enrolled in the study and completed the measures of socio-demographical and professional data, perceived stress (PSS) and coping strategies (COPE- NVI-25). Overall, we found that a positive attitude towards the stressful situation was the main protective factor, while female gender, seeking social support, avoidance strategies and working with COVID-19 patients were risk factors. Economic status, problem solving ability and turning to religion were not associated with stress levels. This study, one of the first on this topic, highlighted the main coping strategies used by healthcare professionals in facing the highly stressful situation caused by the pandemic.

## 1. Introduction

In 2019 a new coronavirus affected China and spread all over the world in a short period. The World Health Organization (2020) renamed it Coronavirus disease 2019 (COVID-19) and declared a state of pandemic on 11<sup>th</sup> March 2020. Since February 2020 the pandemic took hold in Italy producing a state of emergency, especially in the northern regions of the country (Istituto Superiore di Sanità, 2020). At present there are approximately two hundred thousand of people infected in Italy (Protezione Civile, 2020). Facing this dramatic emergency, the Government implemented extraordinary measures to limit viral transmission (Decreto del Presidente del Consiglio dei Ministri 11 marzo 2020, 2020). In this critical situation everyone's life changed due to restrictions of movement and social contacts. In particular, healthcare professionals uninterruptedly continued to work in such a critical situation, taking the risk to be affected by COVID-19; therefore, they might be considered as one of the most vulnerable categories of professionals to develop psychological stress and other mental health symptoms (Lai et al., 2020; Tian et al., 2020). Stress classically refers to "the bodily processes that result from circumstances that place physical or psychologic demands on an individual" (Selye, 1973); although a

certain degree of stress can facilitate task performance, it becomes problematic when the demands outweigh the perceived resources to cope (Folkman and Lazarus, 1988). According to previous studies, during the past epidemics (SARS and MERS), healthcare workers reported high stress levels (Tam, Pang, Lam, and Chiu, 2004; Lee, Kang, Cho, Kim, and Park, 2018). The impact of this emergency on healthcare workers may increase their stress and this could be associated with other variables like anxiety and depression (Verma, Mythily, Chan, Deslypere, Teo, and Chong, 2004; Liu, Kakade, Fuller, Fan, Fang, Kong, Guan, Wu, 2012).

Excessive levels of stress represented a critical factor that could affect work environment and compromise performance, especially during an emergency (Müller et al., 2009). Furthermore, chronic work stress among healthcare workers may be associated with job satisfaction, physical health and post traumatic symptoms (Rice, Glass, Ogle, and Parsian, 2014; Blau, Bentley, and Eggerichs-Purcell, 2012), also producing long term psychological consequences (Khalid, Khalid, Qabajah, Barnard, and Qushmaq, 2016). A recent review underlined the importance of satisfying basic needs, taking breaks during working hours, following a healthy diet and doing physical exercise. Besides, keeping personal routine may help to gain feelings of security and

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control (Petzold, Plag, and Stroehle, 2020).

The relationship between stress and coping strategies has been a topic of previous studies (Phua, Tang and Tham, 2005; Khalid et al., 2016; Cai et al., 2020), because in critical situations stress affects many people, but individual responses vary according to different coping strategies (Folkman, 2010). Coping strategies refer to behavioural and cognitive efforts that help to reduce the pressure of a stressful situation (Folkman and Lazarus, 1985) and are used when its demands exceed individual resources (Martínez, Méndez, Ruiz-Esteban, Fernández-Sogorb, and García-Fernández, 2020). The use of coping strategies resulted to be related with lower levels of stress (Yin, Huang, and Lv, 2018; Martínez et al., 2020).

A study reported that the most common coping strategies used by healthcare workers included acceptance of the critical situation and use of a positive outlook while working (Wong et al., 2005). Likewise, Khalid et al. (2016) outlined that a positive attitude in the workplace had the biggest impact in reducing staff stress. It was noted that healthcare workers may be inadequately prepared and supported to cope with stressors and this negatively affected working environment (Healy and Tyrrell, 2011). During particularly stressful situations, the most used strategies by clinicians were maintaining a normal life, thinking about solutions, maintaining situational control and information seeking (Xu et al., 2019). Among the resources used to deal with major life events, religion and social support have been suggested to represent adaptive coping strategies (Imperatori et al., 2020; Martínez et al., 2020).

A few Italian studies considered a positive attitude and problem solving as functional coping styles, while avoidance strategies as negative coping styles associated with an increase of emotional distress (Sica et al., 2008; Foà, Tonarelli, Caricati, and Ruggeri, 2015; Flesia, Fietta, Colicino, Segatto, and Monaro, 2020).

With regard to sociodemographic variables, marital status seems to influence perceived stress. In fact, studies on previous epidemics underlined an association between stress and marital status. In particular, being single was predictive of higher depressive symptoms and higher psychological distress among hospital staff (Liu et al., 2012; Vyas, Delaney, Webb-Murphy, Johnston, 2016).

Another factor that could influence perceived stress is having children, as healthcare workers could be afraid of infecting their family and children (Cai et al., 2020); for this reason, many healthcare workers have isolated themselves from their families to protect them from the risk of contagion (Wu, Styra and Gold, 2020).

According to these theoretical premises, we conducted a study on a sample of healthcare workers in Italy. Actually, to the best of our knowledge, no previous study has analysed stress and coping strategies in Italian healthcare workers during the COVID-19 pandemic. Specifically, our main aim was to investigate the response of Italian healthcare professionals to the COVID-19 pandemic, in terms of perceived stress and coping strategies. At first, we explored the association of socio-demographic variables (namely, gender, marital status, having or not children and economic class) with levels of perceived stress. Besides, we analysed if working or not working with COVID-19 patients and coping strategies were predictive of healthcare workers' stress levels. Following previous research on other pandemics, we expected that working with infected patients might predict higher levels of distress. As for coping stiles, we hypothesised that positive strategies (as problem solving, social support, turning to religion and positive attitude) were associated with lower levels of stress, and avoidance strategies were associated with higher levels of stress.

## 2. Methods

### 2.1. Sample

The sample comprised 595 healthcare workers, with an overall mean age of 40.69 years (SD = 11.48); their ages ranged from 21 to 72

**Table 1**

Demographic characteristics of the study sample (N = 595)

Sample characteristics	N(%)
Gender	
Males	117 (19.7)
Females	478 (80.3)
Nationality	
Italian	586 (97.2)
Foreign	17 (2.8)
Household income (euros/year)	
0-15.000	53 (8.8)
15.001- 28.000	227 (37.6)
28.001- 55.000	210 (34.8)
55.001- 75.000	64 (10.6)
> 75.0000	49 (8.1)
Work with COVID-19 patients	
Yes	292 (48.4)
No	311 (51.6)
Geographical Areas	
Northern Italy	223 (37.5)
Central Italy	140 (23.5)
Southern Italy (including islands)	232 (39.0)

years, the majority of the sample were females (80.3%).

Most of the study participants were in a relationship (75.3%) and 51% had children. As for socio-economic conditions, 53.4% of the sample had an average income of over 28,000 euros per year.

The sample consisted of 44.0% nurses, 29.2% physicians, 14.1% technical health professionals (namely, radiologists, biomedical laboratory technicians, etc), 8.1% social health operators and 4.6% other healthcare professions (as physiotherapists, dentists, midwives, etc). The average length of professional experience was 13.83 years (SD = 11.47). Almost half (48.7%) of healthcare workers were directly involved in treating and caring COVID-19 patients, and 33.4% worked in the most affected Italian regions (i.e. Lombardy, Piedmont, Emilia Romagna and Veneto). Only a small part of the sample was infected by COVID-19, with (5.2%) or without (1%) symptoms. We have synthesised the descriptive statistics of the sample in Table 1.

### 2.2. Procedures

This cross-sectional study is a web-based survey designed for involving the healthcare workers of all Italian Regions. The questionnaires were administered online through the mainstream media (namely, Facebook, Whatsapp, Twitter, Telegram and LinkedIn) between April 11<sup>th</sup> and April 16<sup>th</sup>, 2020. Completion time was approximately 15 minutes.

After introducing the purposes and the procedure of the research, participants were requested to give their informed consent. They were informed that their participation was voluntary, that their responses would be anonymous and that they could withdraw from the study at any moment without giving any justification. No incentives were provided to the survey participants.

All procedure study and the administered instruments were fully compliant with the Declaration of Helsinki and with the Ethics Code of the Italian Board of Psychology (i.e. the regulatory Authority providing the national guidelines for research and clinical practice).

### 2.3. Measures

#### 2.3.1. Sociodemographic questionnaire

The sociodemographic questionnaire included personal questions (gender, age, nationality, education, household income, marital status, presence of children), information about their work (e.g., years of working, departments, healthcare profession, work with COVID-19 patients or not).

**Table 2**  
Regression Analysis for Perceived Stress (Dependent Variable)

R = .429; R <sup>2</sup> = .184; Adjusted R <sup>2</sup> = .178 F <sub>(4,590)</sub> = 33.185; P < .001	Δ Adj. R <sup>2</sup>	B	SE	β	t	P level
Positive Attitude	.125	-.501	.054	-.356	-9.272	.000
Social Support	.024	.218	.052	.163	4.200	.000
Working/Not working with COVID-19 patients	.017	1.935	.537	.135	3.603	.000
Avoidance strategies	.012	.203	.065	.119	3.130	.002

### 2.3.2. Perceived stress scale

The Perceived Stress Scale (PSS; Cohen, Kamarck, and Mermelstein, 1983; Cohen and Williamson, 1988) is a widely used self-report tool to assess the perceived stress in terms of degree to which situations in one's life are evaluated as stressful (Cohen et al., 1983). The original version of PSS includes 14 items, while the short form (PSS-10) is a 10-item questionnaire (six negatively stated and four positively stated). Each item, scored on a 5-point Likert scale ranging from 0 (never) to 4 (very often), investigates stressful experiences and responses to stress over the previous 4 weeks (sample items: "In the last month, how often have you been upset because of something that happened unexpectedly?", "In the last month, how often have you been angered because of things that were outside of your control?"). The global PSS-10 score ranges from 0 to 40 with higher scores indicating higher levels of perceived stress. In this survey the Cronbach's alpha was .884.

### 2.3.3. The Coping Orientation to the Problems Experienced-New Italian Version-25

The COPE-New Italian Version (COPE-NVI-25; Sica et al., 2008; Foà et al., 2015) is the Italian validation of the short version of the COPE (Carver, Scheier, and Weintraub, 1989) developed for measuring coping styles. The COPE-NVI-25 consists of 25 items evaluating how often the subject uses that particular coping process in difficult or stressful situations (the individuals should not refer to a specific stress but rather think about how they usually behave in stressful situations). Response choices varied from 1 (I usually don't do this at all) to 4 (I usually do this a lot). This instrument is based on five independent dimensions: social support (sample item: "I try to get advice from someone about what to do"), avoidance strategies (sample item: "I refuse to believe that it has happened"), positive attitude (sample item: "I look for something good in what is happening"), problem solving (sample item: "I focus on dealing with this problem, and if necessary let other things slide a little") and turning to religion (sample item: "I pray more than usual"). The COPE-NVI-25 proved to be an instrument as valid as the original COPE, but easier to administer. In this study the value of Cronbach's alpha was .801.

### 2.4. Data analysis

The distribution of all variables was evaluated by examining Q-Q plots and calculating the values of skewness and kurtosis; a distribution was considered normal when both skewness and kurtosis were within the range [-1, 1] (Marcoulides and Hershberg, 1997).

To test differences on perceived stress according to gender, marital status, having or not children and economic status, a series of univariate analysis of variance (ANOVA) was carried out.

A linear regression analysis with the stepwise method was used to measure the association of working or not working with COVID-19 patients and coping strategies with levels of perceived stress. The total score of the perceived stress scale was set as dependent variable; working or not with COVID-19 patients and the five coping styles as measured by the COPE-NVI-25 (positive attitude, problem solving, avoidance strategies, turning to religion and social support) were entered as independent variables.

### 3. Results

The evaluation of the variable distributions may be considered as acceptably normal.

With regard to gender differences, we found higher levels of perceived stress among females (mean = 19.56; SD = 7.06) than males (mean = 15.38; SD = 6.65) [ $F_{(1,593)} = 33.738, p < .001$ ]. No differences emerged on perceived stress according to marital status [ $F_{(1,593)} = .852; n.s.$ ]; as for the economic status, the ANOVA showed a slight statistical significance [ $F_{(4,590)} = 2.905, p = .027$ ], that disappeared with the Bonferroni correction for multiple comparisons. Having children was associated with lower levels of stress [ $F_{(1,593)} = 10.798; p = .001$ ]. Overall, these findings mean that, among the considered sociodemographic variables, differences on stress levels emerged only according to gender and having or not children.

The results of the linear regression analysis used to test the association of working or not working with COVID-19 patients and coping strategies with stress levels are summarised in Table 2.

The final model accounted for a significant proportion of the variance in the perceived stress level (Adjusted R<sup>2</sup> = .178;  $F_{[4,590]} = 33.185; P < .001$ ). Lower positive attitude, higher social support, working with COVID-19 patients and higher avoidance strategies predicted higher levels of distress. Problem solving and turning to religion were excluded from the equation as not statistically significant.

### 4. Discussion

The current study aimed to analyse the impact of COVID-19 outbreak on healthcare professionals, analysing the relationship between some risk and protective factors and distress levels. Specifically, we investigated the role of some socio-demographic variables (gender, having or not children, marital and socio-economic status), direct exposure to COVID-19 (working or not working with patients affected by this disease) and coping strategies on stress levels. Due to the correlational nature of our study, no causal conclusions can be drawn among the considered variables; nevertheless, our findings may contribute to the understanding of stress reactions of healthcare workers involved in the COVID-19 outbreak.

As for the socio-demographic variables, overall we found that differences on stress emerged only according to gender and having or not children. Indeed, females showed higher levels of distress than males. This result was in line with previous literature on the theme (Matud, 2004; West, Dyrbye, and Shanafelt, 2018; Hirsch et al., 2020), with a recent study carried out on Italian general population during the current COVID-19 outbreak (Flesia et al., 2020) and also with the normative data collected in Italy (Mondo, Sechi, and Cabras, 2019).

Furthermore, healthcare workers with children reported lower levels of perceived stress than their colleagues without children. Another study during the COVID-19 pandemic found that healthcare workers with children at home, perceived less distress (Evanoff et al., 2020). Having children could represent a protective factor from perceived stress, allowing healthcare workers to focus on positive aspects of their life (Walton et al., 2020). It may be argued that children could represent a "break" from exhausting working hours, working demands, subsequent frustration of dealing with patients and fatigue.

We did not observe differences in stress levels according to the



socio-economic status and this result was not consistent with a recent research (Flesia et al., 2020) that found a negative correlation between stress and income levels in the general population during the current outbreak caused by SAR-Cov-2. Flesia and colleagues (2020) explained this result stating that higher income could be associated with more comfortable housing solutions during the lockdown and may produce less concerns about the economic outcomes. We might hypothesise that this explanation was not adequate for the specific population we examined, as healthcare professionals were the category of people who worked hard and continuously during this outbreak, without benefiting from the concrete advantages given by having a high income (as, for example, comfortable housing solutions and smart-working). This could explain the absence of stress differences among the different socio-economic levels of our sample.

With regard to marital status, we have not observed an association with perceived stress; in fact, there were no differences between those who were in a couple relationship and those who were not. This data is not in agreement with previous studies on epidemic which highlighted that being single was predictive of higher depressive symptoms and higher psychological distress among hospital staff (Liu et al., 2012; Vyas et al., 2016). Indeed, previous studies on COVID-19 investigated this variable in association with mental health status during the outbreak. Specifically, Li et al. (2020) found that marital status was a risk factor for insomnia in at home medical staff population, Tan et al. (2020) showed that marital status was associated with the severity of psychiatric symptoms in general population and Doshi et al. (2020) found that married people had higher risk of having greater fear towards COVID-19 in Indian general population. As can be seen, the association between perceived stress and marital status has not yet examined in a population of healthcare workers during COVID-19 emergency, for this reason our data must be supported by other research.

A further objective of our study was to explore if working or not with COVID-19 patients and coping strategies were predictive of stress levels. In line with our hypothesis, working with COVID-19 patients was associated with higher distress. This result is self-explanatory but what surprised us was that it explained only a small portion of the stress variance. In other words, if it was true that working with COVID-19 patients increased stress, it was equally true that this increase was small.

With regard to coping styles, we found that a positive attitude was the strongest protective factors against distress. In fact, the higher the positive attitude, the lower distress levels. This finding was consistent with previous studies that found positive attitude in the workplace as the strategy with the biggest impact in reducing stress (Khalid et al., 2016; Cai et al., 2020). This factor refers to a functional coping strategy that allows individuals to positively reinterpret negative situations, as it is related with self-efficacy, greater psychological wellbeing and better quality of life (Flesia et al., 2020).

We also observed that two other coping strategies, namely social support and avoidance, constituted risk factors, since they predicted distress levels in our sample: higher levels of those strategies were associated with higher stress. The finding about avoidance strategies was in line with what we expected. This coping mechanism is grouped among dysfunctional reactions to stressful situations as it deals with the likelihood with which individuals adopt strategies based on avoidance (such as denial) when they face problematic situations. These results are in line with previous literature on the relation between coping and response to epidemics (Phua et al., 2005; Teasdale, Yardley, Schlotz, and Michie, 2012). Contrary to our expectations, higher social support predicted higher distress. Previous research on social support considered it as a functional strategy to cope with problematic situations (Litman, 2006; Martínez et al., 2020), but a study on Italian general population during the COVID-19 pandemic found that social support was positively related to, but not predictive of perceived stress (Flesia et al., 2020). This finding may be explained arguing that,

according to Litman (2006), the support factor of the COPE instrument comprises several items (as emotional social support, instrumental social support, venting emotions and focusing on emotions), which can be more or less adaptive. Besides, our result seems to underline the critical situation that the healthcare workers lived and should be interpreted within the specific situation of the current pandemic. Indeed, healthcare workers could be fatigued due to an increase of working hours, worried about the possibility to infect their families and colleagues; furthermore, in many cases healthcare workers chose to live far from their families to protect them from the risk of contagion (Wu et al., 2020). Moreover, the Italian Government issued a decree that imposed social distancing measures for all people, particularly for those in contact with symptomatic patients. According to these premises, seeking social support could be frustrating for healthcare workers and could be more stressful than in other situations. However, this result has to be considered cautiously as further research is needed to explore it.

Inconsistently with previous studies on the general population (Imperator et al., 2020; Martínez et al., 2020), we did not find associations of problem solving and turning to religion with perceived stress. Problem solving refers to an active strategy, aimed to focus on the resolution of an issue by suppressing competing activities and planning actions (Litman, 2006). A possible explanation of our result is linked with the dramatic situation associated with the COVID-19 outbreak, as an unknown and uncontrollable disease might have produced a sensation of inadequacy, affecting healthcare professional's coping abilities. In the current pandemic, at the time of the survey administration, no vaccines or drugs had been proven to be effective for the prevention or treatment of COVID-19 and this might have influenced the healthcare professionals' perception of their own problem solving ability. Hence, it could be hypothesised that this pandemic, at least in the first months of its spreading, represented a stressor that went beyond the use of problem-focused strategies.

Also the lack of associations between religiousness and perceived stress was an unexpected result that may probably be linked to the exceptional and unprecedented nature of the event that healthcare professionals faced in the climax of this pandemic. Religious coping is a "multifaceted phenomenon" (Perera et al., 2018) and, according to Ano and Vasconcelles (2005), in order to better understand religion's role in the coping process, it is important to analyse the dynamic ways in which people use their religion in specific situations. We can argue that the extreme working conditions during the pandemic, such as the exhausting work shifts, left little time to professional healthcare workers to spend in prayer and religion. Besides, the items of the COPE scale turning to religion likely fail to grasp the aspect of spirituality, which may be quite different from that of religion, as it refers to the development of a personal value system and the search for a deeper meaning of life, that may go beyond religious boundaries (Perera et al., 2018). Hence, we may not exclude that the absence of associations between stress and religiousness was linked to this limitation of the tool we used. However, as for the previous findings inconsistent with the existing literature, this data has to be considered with caution and needs further exploration.

Overall, our study highlighted the importance of coping strategies used by healthcare professionals in facing the highly stressful situation caused by the COVID-19 pandemic. This category of Italian individuals was the most directly involved in managing the emergency produced by the very rapid spread of the Sars-Cov-2, that caused a high number of people infected in serious medical conditions and a high number of deaths. Our study found that being female and not having children were associated with higher levels of distress; furthermore, in the whole sample, a positive attitude towards the stressful situation was the main protective factor, while seeking social support, working with COVID-19 patients and avoidance strategies were risk factors.

This study has a number of limitations, which need to be taken into account as the findings are not generalizable to other professional

groups and situations different from the current COVID-19 pandemic. First, the cross-sectional design of the study precluded the evaluation of the effects of healthcare professionals' characteristics on distress levels; therefore, longitudinal studies are recommended. Second, the sample was not equally distributed with respect to gender and this may have affected our results; third, the use of self-report questionnaires rather than a clinical assessment reduced the power of our findings.

Notwithstanding these weaknesses, our findings suggest some general reflections about the management of distress in healthcare workers during an exceptional situation as the COVID-19 pandemic was. As already mentioned, this category of workers has been in the frontline during the outbreak, facing conditions that, at least in Italy, had never occurred before, with very hard working shifts, social distancing and isolation from family and friends. Besides, against this new Coronavirus no drugs or vaccines were ready and effective during the first wave of the pandemic. We can assume that these extreme conditions found medical staff unprepared to deal with them but, despite this, all the healthcare workers have faced this hard condition. This unprecedented situation could be the basis for explaining some of our results inconsistent with the existing literature. However, further research on the topic is needed, also considering that future pandemics may be more frequent than in the past. Also considering this perspective, it is necessary to think and plan support programs specifically dedicated to healthcare workers. Overall, our results highlighted that being female, not having children and working in the frontline were associated with higher distress levels. In the future, it could be useful to screen medical staff with those characteristics in order to offer them specific psychological support. This last should be delivered remotely (through social media) and scheduled in order to adapt to the work shifts of the professionals. Finally, psychological programs for healthcare workers could be realized with the purpose of increasing coping strategies, above all the positive attitude style (that resulted to be the most effective in our study) to face extremely stressful events and possible future epidemics.

It could be useful to extend this research also to the healthcare workers' main personal characteristics playing a role in the post-epidemic period, in order to compare these different situations.

## Author statement contributors

The authors contributed equally and meaningfully to this study and the final manuscript.

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## Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2020.113366.

## References

- Ano, G.G., Vasconcelles, E.B., 2005. Religious coping and psychological adjustment to stress: a meta-analysis. *J. Clin. Psychol.* 61, 461–480. <https://doi.org/10.1002/jclp.20049>.
- Blau, G., Bentley, M.A., Eggerichs-Purcell, J., 2012. Testing the impact of emotional labor on work exhaustion for three distinct emergency medical service (EMS) samples. *Career Develop. Int.* 17 (7), 626–645. <https://doi.org/10.1108/13620431211283788>.
- Cai, H., Tu, B., Ma, J., Chen, L., Fu, L., Jiang, Y., Zhuang, Q., 2020. Psychological impact and coping strategies of frontline medical staff in Hubei between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID-19) in Hubei, China. *Med. Sci. Monit.* 26, e9241711. <https://doi.org/10.12659/2FMSM.924171>.
- Carver, C.S., Scheier, M.F., Weintraub, J.K., 1989. Assessing coping strategies: a theoretically based approach. *J. Pers. Soc. Psychol.* 56 (2), 267–283. <https://doi.org/10.1037/0022-3514.56.2.267>.
- Cohen, S., Williamson, G., 1988. Perceived stress in a probability sample of the United States. In: Spacapan, S., Oskamp, S. (Eds.), *The Social Psychology of Health: Claremont Symposium on Applied Social Psychology*. Sage, Newbury Park, CA, pp. 31–67.
- Cohen, S., Kamarck, T., Mermelstein, R., 1983. A global measure of perceived stress. *J. Health Soc. Behav.* 24 (4), 385–396. <https://doi.org/10.2307/2136404>.
- Decreto del Presidente del Consiglio dei Ministri 11 marzo 2020, 2020. Ulteriori disposizioni attuative del decreto-legge 23 febbraio 2020, n. 6, recante misure urgenti in materia di contenimento e gestione dell'emergenza epidemiologica da COVID-19. Applicabili Retrieved from: <https://www.gazzettaufficiale.it/eli/id/2020/03/11/20A01605/sg>.
- Doshi, D., Karunakar, P., Sukhabogi, J.R., Prasanna, J.S., Mahajan, S.V., 2020. Assessing Coronavirus Fear in Indian Population Using the Fear of COVID-19 Scale. *Int. J. Mental Health and Addiction*. <https://doi.org/10.1007/s11469-020-00332-x>. Published online <https://doi.org/>.
- Foa, C., Tonarelli, A., Caricati, L., Fruggeri, L., 2015. COPE-NVI-25: Validazione italiana della versione ridotta della Coping Orientation to the Problems Experienced (COPE-NVI) 2015. *Psicologia della Salute* 2, 123–140. <https://doi.org/10.3280/PDS2015-002007>.
- Folkman, S., Lazarus, R.S., 1985. If it changes it must be a process: study of emotion and coping during three stages of a college examination. *J. Pers. Soc. Psychol.* 48 (1), 150. <https://doi.org/10.1037/0022-3514.48.1.150>.
- Folkman, S., Lazarus, R.S., 1988. Coping as a mediator of emotion. *J. Pers. Soc. Psychol.* 54 (3), 466–475. <https://doi.org/10.1037/0022-3514.54.3.466>.
- Folkman, S., 2010. Stress, coping, and hope. *Psycho-oncology* 19 (9), 901–908. <https://doi.org/10.1002/pon.1836>.
- Healy, S., Tyrrell, M., 2011. Stress in emergency departments: experiences of nurses and doctors. *Emerg. Nurse* 19 (4), 31–37. <https://doi.org/10.7748/en2011.07.19.4.31.c8611>.
- Hirsch, J.D., Nemlekar, P., Phuong, P., Hollenbach, K.A., Lee, K.L., Adler, D.S., Morello, C.M., 2020. Patterns of Stress, Coping and Health-Related Quality of Life in Doctor of Pharmacy Students. *Am. J. Pharm. Educ.* 84 (3), 7547. <https://doi.org/10.5688/ajpe7547>.
- Imperatori, C., Bersani, F.S., Massullo, C., Carbone, G.A., Salvati, A., Mazzi, G., Cicera, G., Carrara, A., Farina, B., 2020. Neurophysiological correlates of religious coping to stress: a preliminary eeg power spectra investigation. *Neurosci. Lett.* 728, 134956. <https://doi.org/10.1016/j.neulet.2020.134956>.
- Istituto Superiore di Sanità, 2020, 04, 27. L'epidemiologia per la sanità pubblica, aggiornamenti sul coronavirus. [Epidemiology for public health, updates on coronavirus] Retrieved from: <https://www.epicentro.iss.it/coronavirus/aggiornamenti>.
- Khalid, I., Khalid, T.J., Qabajah, M.R., Barnard, A.G., Qushmaq, I.A., 2016. Healthcare workers emotions, perceived stressors and coping strategies during a MERS-CoV outbreak. *Clin. Med. and Res.* 14 (1), 7–14. <https://doi.org/10.3121/cmr.2016.1303>.
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., Hu, S., 2020. Factor associated with mental health outcomes among health care workers exposed to Coronavirus Disease 2019. *Jama Network Open* 3 (3). <https://doi.org/10.1001/jamanetworkopen.2020.3976>.
- Lee, S.M., Kang, W.S., Cho, A.R., Kim, T., Park, J.K., 2018. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr. Psychiatry* 87, 123–127. <https://doi.org/10.1016/j.comppsy.2018.10.003>.
- Li, X., Yu, H., Bian, G., Hu, Z., Liu, X., Zhou, Q., Yua, C., Wu, X., Yuan, T., Zhou, D., 2020. Prevalence, risk factors, and clinical correlates of insomnia in volunteer and at home medical staff during the COVID-19. *Brain Behav. Immun.* <https://doi.org/10.1016/j.bbi.2020.05.008>. published online May 5 <https://doi.org/>.
- Litman, J.A., 2006. The COPE inventory: Dimensionality and relationships with approach- and avoidance-motives and positive and negative traits. *Personality and Individual Differences* 41 (2), 273–284. <https://doi.org/10.1016/j.paid.2005.11.032>. <https://doi.org/>.
- Liu, X., Kakade, M., Fuller, C.J., Fan, B., Fang, Y., Kong, J., Guan, Z., Wu, P., 2012. Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. *Comprehensive Psychiatry* 53 (1), 15–23.
- Marcoulides, G.A., Hershberger, S.L., 1997. *Multivariate statistical methods. A first course*. Erlbaum, Mahwah.
- Martínez, J.P., Méndez, I., Ruiz-Esteban, C., Fernández-Sogorb, A., García-Fernández, J.M., 2020. Profiles of Burnout, Coping Strategies and Depressive Symptomatology. *Frontiers in Psychol.* 11, 591. <https://doi.org/10.3389/fpsyg.2020.00591>.
- Matud, M.P., 2004. Gender differences in stress and coping styles. *Personality and Individual Differences* 37, 7. <https://doi.org/10.1016/j.paid.2004.01.010>.

- Mondo, M., Sechi, C., Cabras, C., 2019. Psychometric evaluation of three versions of the Italian Perceived Stress Scale. *Current Psychol.* 1, 9. <https://doi.org/10.1007/s12144-019-0132-8>.
- Müller, M.P., Hänsel, M., Fichtner, A., Hardt, F., Weber, S., Kirschbaum, C., Eich, C., Rudera, S., Walchers, F., Kocha, T., Eiche, C., 2009. Excellence in performance and stress reduction during two different full scale simulator training courses: a pilot study. *Resuscitation* 80 (8), 919–924. <https://doi.org/10.1016/j.resuscitation.2009.04.027>.
- Perera, C.K., Pandey, R., Srivastava, A.K., 2018. Role of religion and spirituality in stress management among nurses. *Psychol. Stud.* 63, 187–199. <https://doi.org/10.1007/s12646-018-0454-x>.
- Petzold, M.B., Plag, J., Stroehle, A., 2020. Dealing with psychological distress by healthcare professionals during the COVID-19 pandemic. *Nervenarzt* 1–5. <https://doi.org/10.1007/s00115-020-00905-0>.
- Phua, D.H., Tang, H.K., Tham, K.Y., 2005. Coping responses of emergency physicians and nurses to the 2003 severe acute respiratory syndrome outbreak. *Acad. Emerg. Med.* 12 (4), 322–328. <https://doi.org/10.1197/j.aem.2004.11.015>.
- Protezione civile, 2020, 04, 27. Dipartimento della Protezione Civile, sezione comunicati stampa. [Department of Civil Protection, press releases section] Retrieved from. <http://www.protezionecivile.gov.it/web/guest/media-comunicazione/comunicati-stampa>.
- Rice, V., Glass, N., Ogle, K.R., Parsian, N., 2014. Exploring physical health perceptions, fatigue and stress among health care professionals. *J. Multidiscip. Healthc.* 7, 155. <https://doi.org/10.2147/2FJMDH.S59462>. <https://dx.doi.org/>.
- Selye, H., 1973. The evolution of the stress concept. *Am. Scientist* 61, 692–699.
- Sica, C., Magni, C., Ghisi, M., Altoè, G., Sighinolfi, C., Chiri, L.R., Franceschini, S., 2008. Coping orientation to the problems experiences-new italian version (COPE-NVI). *Psicoterapia Cognitiva e Comportamentale* 14 (1), 27–53.
- Tam, C.W.C., Pang, E.P.F., Lam, L.C.W., Chiu, H.F.K., 2004. Severe acute respiratory syndrome (SARS) in Hong Kong in, 2003: Stress and psychological impact among frontline healthcare workers. *Psychol. Med.* 34 (7), 1197–1204. <https://doi.org/10.1017/S0033291704002247>.
- Tan, W., Hao, F., McIntyre, R.S., Jiang, L., Jiange, X., Zhang, L., Zhao, X., Zou, Y., Huc, Y., Luoc, X., Zhange, Z., Laif, A., Hob, R., Tran, B., Hog, C., Tam, W., 2020. Is returning to work during the COVID-19 pandemic stressful? A study on immediate mental health status and psychoneuroimmunity prevention measures of Chinese workforce. *Brain Behav. and Immunity* S0889-1591(20)30603-6.
- Teasdale, E., Yardley, L., Schlotz, W., Michie, S., 2012. The importance of coping appraisal in behavioural responses to pandemic flu. *Br. J. Health Psychol.* 17, 44–59. <https://doi.org/10.1111/j.2044-8287.2011.02017.x>.
- Tian, F., Li, H., Tian, S., Yang, J., Shao, J., Tian, C., 2020. Psychological symptoms of ordinary Chinese citizens based on SCL-90 during the level I emergency response to COVID-19. *Psychiatry Res.* 288, 112992. <https://doi.org/10.1016/j.psychres.2020.112992>.
- Verma, S., Mythily, S., Chan, Y.H., Deslypere, J.P., Teo, E.K., Chong, S.A., 2004. Post-SARS psychological morbidity and stigma among general practitioners and traditional Chinese medicine practitioners in Singapore. *Ann. Acad. Med. Singapore* 33 (6), 743–748.
- Vyas, K.J., Delaney, E.M., Webb-Murphy, J.A., Johnston, S.L., 2016. Psychological impact of deploying in support of the US response to ebola: a systematic review and meta-analysis of past outbreaks. *Mil. Med.* 181 (11), E1515–E1531. <https://doi.org/10.7205/MILMED-D-15-00473>.
- Walton, M., Murray, E., Christian, M.D., 2020. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *Eur. heart J. Acute Cardiovascular Care* 9 (3), 241–247. <https://doi.org/10.1177/2048872620922795>.
- West, C.P., Dyrbye, L.N., Shanafelt, T.D., 2018. Physician burnout: contributors, consequences and solutions. *J. Intern. Med.* 283 (6), 516–529. <https://doi.org/10.1111/joim.12752>.
- Wong, T.W., Yau, J.K., Chan, C.L., Kwong, R.S., Ho, S.M., Lau, C.C., Lit, C.H., 2005. The psychological impact of severe acute respiratory syndrome outbreak on healthcare workers in emergency departments and how they cope. *Eur. J. Emerg. Med.* 12 (1), 13–18. <https://doi.org/10.1097/00063110-200502000-00005>.
- Wu, P., Styra, R., Gold, W.L., 2020. Mitigating the psychological effects of COVID-19 on health care workers. *CMAJ, Commentary.* <https://doi.org/10.1503/cmaj.200519>.
- Xu, H.G., Johnston, A.N., Greenslade, J.H., Wallis, M., Elder, E., Abraham, L., Thom, O., e., Carlstrom, Crilly, J., 2019. Stressors and coping strategies of emergency department nurses and doctors: A cross-sectional study. *Aus. Emergency C.* 22 (3), 180–186. <https://doi.org/10.1016/j.aucc.2018.10.005>.
- Yin, H., Huang, S., Lv, L., 2018. A multilevel analysis of job characteristics, emotion regulation, and teacher well-being: a job demands-resources model. *Frontiers in Psychol.* 9, 2395. <https://doi.org/10.3389/fpsyg.2018.02395>.
- Flesia, L., Fietta, V., Colicino, E., Segatto, B., and Monaro, M. (2020). Stable psychological traits predict perceived stress related to the COVID-19 outbreak. doi:10.31234/osf.io/yb2h8.
- Evanoff, B. A., Strickland, J. R., Dale, A. M., Hayibor, L., Page, E., Duncan, J. G., Kannampallil, T., and Gray, D. L. (2020). Work-related and personal factors associated with mental well-being during COVID-19 response: a survey of health care and other workers. doi:10.1101/2020.06.09.20126722.
- World Health Organization (2020). WHO Director-General's opening remarks at the mission briefing on COVID-19. Retrieved from <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-mission-briefing-on-covid-19>.