

**VICTOR BABEȘ UNIVERSITY OF MEDICINE
AND PHARMACY TIMIȘOARA
FACULTY OF MEDICINE
DEPARTMENT OF PLASTIC SURGERY**

SECOȘAN ICA



PhD THESIS
**BURNOUT AMONG FRONTLINE HEALTHCARE WORKERS
DURING THE COVID-19 PANDEMIC IN ROMANIA**

A B S T R A C T

Scientific Coordinator
PROF. UNIV. DR. BRATU TIBERIU

**Timișoara
2022**

TABLE OF CONTENTS

List of published papers	VI
List of abbreviation	VII
Figure index	VIII
Table index	IX
Acknowledgements	X
INTRODUCTION	XI
Theoretical background	XI
The present thesis	XIV

THE GENERAL SECTION

1. The burnout syndrome among frontline medical professionals in the battle with the new coronavirus global epidemic	1
2. Factors associated with the burnout syndrome among frontline medical professionals in the battle with the new coronavirus global epidemic: ANXIETY	10
3. Factors associated with the burnout syndrome among frontline medical professionals in the battle with the new coronavirus global epidemic: DEPRESSION	14
4. Factors associated with the burnout syndrome among frontline medical professionals in the battle with the new coronavirus global epidemic: INSOMNIA	18
5. Factors associated with the burnout syndrome among frontline medical professionals in the battle with the new coronavirus global epidemic: MENTAL HEALTH COMPLAINTS	20
6. Factors associated with the burnout syndrome among frontline medical professionals in the battle with the new coronavirus global epidemic: SECONDARY TRAUMATIC STRESS	22
7. Infodemia	25
8. Psychological capital	28

THE SPECIAL SECTION

1. The mediating role of insomnia and exhaustion in the relationship between secondary traumatic stress and mental health complaints among frontline medical staff during COVID-19 pandemic	34
1.1 Introduction	35
1.2. Material and Methods	41
1.2.1. Study Design	41
1.2.2. Participants and Procedure	41
1.2.3. Study Variables and Data Collection	42
1.2.4. Data Analysis	43
1.2.5. Ethical Aspects	44

1.3. Results	44
1.4. Conclusions and Discussion	48
2. Infodemia: another enemy for Romanian frontline healthcare workers to fight during the COVID-19 outbreak	51
2.1. Introduction	52
2.2. Procedure and Participants	55
2.3. Material and Methods	57
2.4. Results	58
2.5. Discussion	61
2.6. Conclusions	66
3. The moderating role of personal resources between demands and ill-being of Romanian healthcare professionals in the COVID-19 pandemic	67
3.1. Introduction	68
3.1.1. Anxiety, burnout, and mental health	69
3.1.2. Depression, burnout, and mental health	71
3.1.3. Psychological capital as moderator	71
3.2. Procedure and Participants	75
3.3. Material and Methods	77
3.4. Data analysis	78
3.5. Results	79
3.6. Conclusion and Discussion	84
3.7. Limitations	87
3.8. Practical implications	87
GENERAL DISCUSSIONS, CONTRIBUTIONS, LIMITATIONS AND CONCLUSIONS	89
1. Discussions and contributions	89
2. Limitations and future research	92
3. Conclusions	93
REFERENCES	94
ANNEX	I

ABSTRACT

Burnout is the state of professional exhaustion that describes various human activities. The medical profession is one of these activities that poses a high risk of occupational stress. Psychotherapist Herbert Freudenberger underlined in 1974 that burnout occurred with a high frequency especially among the professions that provide help (medical professionals, psychologists, social workers, firefighters, police officers, etc.).

The development of burnout is explained in the literature through several conceptual models. One of them is the Job Demands Resources (JD-R) model that considers that two processes trigger and maintain burnout. Firstly, the high demands at the workplace lead to tiredness. Secondly, the job requirements are not fulfilled because of limited resources. These finally lead to inefficacy and lack of involvement in the work (1). The Conservation of Resources (COR) theory supports the fact that burnout occurs as a consequence of the decrease or the absence of resources. Thus, burnout can be associated with incapacity, lack of hope and depression (2).

The three-dimensional model is focused on the structural components of burnout and their development over time (3). Thus, emotional depletion implies lack of energy and motivation, worry, tension and perceiving the professional activity as being very difficult (4). Depersonalisation is the state of detachment from the work content itself, the impersonal attitude towards work and the whole organisational context. Professional inefficacy implies devaluation, loss of trust in one's own strength and loss of motivation (5).

Before the pandemic, many studies had described both the high incidence of burnout and the personal and professional consequences of this phenomenon among the medical professions (6, 7, 8, 9). At a personal level, burnout is associated with anxiety, depression, sleep disorders and memory (10), suicide ideation (11), relationship problems and substance abuse (12). At an organisational level, burnout contributes to the lack of patient's compliance (13), medical errors, the lack of satisfaction regarding the medical service and the quality decrease of the medical activity (14), thus leading to negative consequences on the employee as well as on their colleagues, the medical institution and, last but not least, on the patient.

During past epidemics, such as SARS, MERS or Ebola, the medical professionals working in the front lines of the battle with the infectious disease showed high levels of burnout, associated with other psychological manifestations like depression, anxiety, emotional distress and stigmatisation (15, 16, 17, 18).

The onset of the Covid-19 pandemic has brought overwhelming challenges on the frontline professionals as well as on the medical systems around the world. Numerous studies show that, since the beginning of this pandemic, the medical professionals from the affected areas have experienced high levels of emotional depletion and of occupational stress (19, 20),

associated with mental distress, anxiety, depression, insomnia (21) and somatic phenomena (22).

Research conducted in Romania since the beginning of the pandemic has proved that the Covid-19 pandemic represents a stressor for medical professionals in our country as well (23, 24, 25).

Anxiety is one of the challenges faced by the medical professionals in the front line of the battle with the pandemic that is most frequently associated with burnout. Since the beginning of the pandemic, frontline physicians and nurses have constantly been exposed to an extremely tensed work environment, leading to anxiety and stress (26, 27, 28). Some factors associated with the frontline medical professionals' anxiety have been the high workload, the lack of specific treatments, the fear of contagion, stigmatisation, feelings of loss of control, the lack of personal protection equipment, the constant exposure to patients' death, ethical problems and the worry that family members and friends might get infected (29, 30, 31). Therefore, the enormous pressure felt by the frontline medical professionals since the beginning of the pandemic has led to high levels of anxiety and distress (32).

During past epidemics, depression was one of the most frequent psychological reactions among medical professionals (33), especially in association with the fear of self-contagion, uncertainty, stigmatisation and the fear of infecting others (34). Moreover, the enormous pressure on the frontline medical professionals during epidemics led to recording a level of depression three times higher among physicians and nurses than the levels noticed in the general population (35).

The medical professionals in the front line of the battle with the coronavirus, working in Intensive Care Units, Emergency Units and Infectious Diseases Departments, have been reported as facing a double risk of developing depressive symptoms compared to medical professionals from non-Covid departments and units (36).

Physicians and nurses treating patients infected with the new coronavirus in the Red Zones show an additional risk of developing professional exhaustion. The high contagion of this virus, the associated morbidity, the changes in the work environment, the feeling of loss of control, the lack of specific treatments and of personal protection equipment, the high number of patients, the long working hours and the fear that family members and friends might get infected represent only some of the risk factors that develop depressive symptoms among frontline medical professionals during the Covid-19 pandemic (37, 38).

During non-pandemic times, the medical profession reported various levels of mental distress, most of the time correlated with sleep disorders (39). The sudden and unexpected onset of an infectious disease generates a high pressure on medical professionals. The high number of patients, the long working hours and the long shifts done by frontline medical

professionals, the feelings of vulnerability and loss of control, as well as the specific worries related to the pandemic context have contributed to the occurrence of insomnia (40, 41, 42).

Anxiety and stress have a negative impact on sleep and on the professional efficacy of health care workers in the front line of the battle with the Covid-19 pandemic (43). These are more prone to live with sleep disorders and, thus, are exposed to the risk of developing other mental health disorders (44).

The difficult working conditions in the medical field generated by the new coronavirus have contributed to the occurrence of complex psychological reactions among the frontline medical professionals, such as anxiety, burnout, stress, depression, sleep disorders and stigmatisation (45). Moreover, the specific reactions of post-traumatic stress disorder can be experienced a long time after the acute period of the pandemic (46).

Besides the burnout syndrome among frontline medical professionals, psychological manifestations like emotional depletion, depersonalisation, guilt, post-traumatic stress disorder and somatic reactions represent the psychological challenge faced by many physicians and nurses since the onset of the Covid-19 pandemic (47, 48, 49).

The direct contact with patients infected with the novel coronavirus, with their personal suffering and drama, has significantly increased the risk of developing secondary traumatic stress (50). The studies correlate this risk with the time necessary to diagnose and treat patients infected with the new coronavirus, the repeated exposure to the death of patients suffering from Covid-19 disease, as well as the contagion of family members and friends of the medical professionals in the Red Zones (51).

As noticed in the past, the danger of suffering from secondary traumatic stress by medical professionals remains not only during the period of contact with the patient's trauma, but also on a medium term (52).

Taking these psychological reactions into account, it is considered that constant exposure to the physical and mental trauma of the patients infected with the new coronavirus may lead to the development of specific symptoms of secondary traumatic stress, fact that increases the risk of other psychological reactions like insomnia, emotional depletion, depersonalisation and cynicism among the medical professionals in the front line of the battle with the Covid-19 disease (53, 54).

Besides the complex psychological reactions experienced by the medical professionals since the onset of the Covid-19 pandemic and during its evolution, fake news and misinformation have been another very serious challenge for medical professionals around the world.

According to the World Health Organisation, fake news related to the pandemic is as dangerous as the virus itself. Thus, it is considered that infodemia represents a serious risk when dealing with prevention, treatment and safety measures (55). Therefore, fake news

published in the medical field represents a danger to public health. Infodemia creates confusion, lack of trust in the medical professionals, undermines the huge efforts of the health systems to cope with the overwhelming impact of the pandemic, becoming a systemic challenge around the world.

The spread of fake news related to the new coronavirus has affected both the general population and the health care personnel. Beyond the treatment of Covid-19 infected patients, the health care professionals have taken on the task of communicating accurate information and fighting misinformation spread in the pandemic context, dealing at the same time with high levels of anxiety and stress (56).

The Covid-19 pandemic has exposed medical professionals to an unprecedented level of stress. Very many frontline medical professionals have managed, however, to cope with the challenges of the global epidemic, and to keep a high level of professional performance and satisfaction.

Psychological capital is a vital resource that significantly contributes to personal balance. This is formed of four elements: a) trust in assigning and making the necessary effort to be successful in challenging tasks (self-efficacy); b) positive assignments regarding personal success in the present and in the future (optimism); c) perseverance in achieving goals and redirecting ways towards goals for accomplishment (hope); d) endurance in going through adversity (resilience).

A high level of Psychological Capital is negatively correlated with professional stress, prior studies showing that the medical professionals with high levels of Psychological Capital have many resources to cope with a demanding organisational environment (57). Therefore, Psychological Capital is a psychological resource that can significantly influence the occurrence and the development of burnout among medical professionals (58). On the other hand, Psychological Capital is a protection factor among medical professionals in the face of anxiety, depression, emotional depletion, professional dissatisfaction and other mental health disorders (59, 60, 61, 62).

Medical professionals with a high level of Psychological Capital show a high level of professional performance (63), satisfaction and commitment to work (64, 65).

In the Covid-19 pandemic context, Psychological Capital among frontline medical professionals influences the level of stress perceived (66), representing a major protection factor when coping with the unprecedented challenges posed by the crisis created by the spread of the new coronavirus.

The current research is conducted at the “Pius Brânzeu” County Emergency Hospital from Timișoara, between March and April 2020, among 126 medical professionals (32 nurses and 94 physicians) within the Emergency Unit and the Clinical Anaesthetics and Intensive Care Unit.

In the first study, we have tested the three-dimensional model of mediation, considering insomnia and exhaustion as mediators between secondary traumatic stress and mental health complaints among frontline medical professionals during the Covid-19 global epidemics. Therefore, we have tested the assumption that frontline medical professionals suffering from secondary traumatic stress are more prone to experience insomnia. Insomnia is positively correlated with exhaustion, which, in turn, is positively correlated with mental health complaints. We have drawn up the following hypotheses:

Hypothesis 1: *There is a positive correlation between secondary traumatic stress and insomnia.*

Hypothesis 2: *Insomnia is positively correlated with exhaustion.*

Hypothesis 3: *There is a positive correlation between exhaustion and mental health complaints.*

Hypothesis 4: *There is a positive and indirect correlation between secondary traumatic stress and mental health complaints, mediated by insomnia and exhaustion.*

Our hypotheses have been confirmed. Frontline medical professionals showing reactions specific to secondary traumatic stress are more prone to develop sleep disorders. We have identified a positive relation between insomnia and exhaustion, the latter showing a positive relation with mental health complaints. Finally, our results have confirmed the fact that medical professionals showing high levels of secondary traumatic stress are more prone to develop insomnia. Thus, they will experience professional exhaustion, leading to the increase of mental health complaints.

As the coronavirus was spreading around the world, fake news and misinformation increased. In the second study, our aim has been to research whether the medical professionals in the front line of the battle with the Covid-19 pandemic stating to be affected by fake news are more prone to develop stress, anxiety, depression and insomnia, compared to the frontline medical professionals considering not to be affected by fake news in their professional activity. We have drawn up the following hypotheses:

Hypothesis 1: *Frontline medical professionals stating to be affected by infodemia show a higher level of stress than the medical professionals stating not to be affected by fake news.*

Hypothesis 2: *Frontline medical professionals stating to be affected by infodemia show a higher level of anxiety than the medical professionals stating not to be affected by fake news.*

Hypothesis 3: *Frontline medical professionals stating to be affected by infodemia show a higher level of depression than the medical professionals stating not to be affected by fake news.*

Hypothesis 4: *Frontline medical professionals stating to be affected by infodemia show a higher level of insomnia than the medical professionals stating not to be affected by fake news.*

The spread of fake news related to the new coronavirus has affected both the general population and the health care personnel. Almost half of the participants in our study have stated that they are affected by fake news in the professional activity. Unlike the medical professionals unaffected by infodemia, the ones affected by fake news have shown higher levels of stress, anxiety and insomnia. Regarding the direct impact of misinformation on medical professionals, the most frequent answers to the question “In what way is fake news affecting you?” have been: “The physician-patient relationship has been affected. People do not trust physicians and medical professionals anymore, because they are confused by fake news.” (23% of the respondents): “It affects me emotionally.” (30% of the respondents): “It creates confusion.” (19% of the respondents). As to naming a word to best describe the media position (audio-visual, online and written press) regarding the medical professionals during the Covid-19 pandemic, we have recorded the following words: “appreciation” (33% of the respondents), “distortion” (33% of the respondents), “objectiveness” (15% of the respondents).

With all the challenges posed by the Covid-19 pandemic around the world, part of the frontline medical professionals has managed to preserve a high level of professional performance and satisfaction, showing low levels of anxiety, depression or stress or none. Therefore, in the third study, we have investigated Psychological Capital as a moderator between anxiety, burnout and mental health complaints, as well as between depression, burnout and mental health complaints among the medical professionals in the front lines of the battle with the novel coronavirus. We have drawn up the following hypotheses:

Hypothesis 1: *Psychological Capital moderates the relationship between the frontline medical professionals’ anxiety and: a) emotional depletion, b) cynicism, c) inefficacy and d) mental health complaints.*

Hypothesis 2: *Psychological Capital moderates the relationship between the frontline medical professionals’ depression and: a) emotional depletion, b) cynicism, c) inefficacy and d) mental health complaints.*

Our results have revealed that a high level of anxiety represents a prediction factor for a low level of emotional depletion when the level of Psychological Capital is high. The high

level of anxiety is a prediction factor for a high level of mental health complaints when Psychological Capital is low.

A high level of depression also represents a prediction factor for a low level of inefficacy when Psychological Capital is high, and a prediction factor for a high level of mental health complaints when the level of Psychological Capital is low. Our results emphasise the importance of Psychological Capital as a protection factor that can mitigate the impact of anxiety and depression on emotional exhaustion, inefficacy and mental health complaints.

The onset of a global epidemic represents one of the most significant dangers to the whole world. The rapid spread of the novel coronavirus has generated complex psychological reactions among the general population and among medical professionals, especially those in the front line of the battle with the pandemic.

We consider that our first study introduces the unique perspective of mediators in the relationship between secondary traumatic stress and mental health complaints, and it could be considered a first step in identifying and implementing psychological intervention methods specific to the connections between the studied variables (67).

Infodemia represents another factor to be considered as a stressor among frontline medical professionals, alongside the other professional stress factors identified in the literature. Nevertheless, as shown in the last study, Psychological Capital represents an essential personal resource in coping with anxiety, depression, emotional depletion, inefficacy and other mental health complaints among frontline physicians and nurses (68). Therefore, psychological interventions focused on increasing the medical professionals' Psychological Capital must be a desideratum of all the medical systems.

Considering a series of limitations of the current research, such as the study design that has not allowed the identification of causal connections between variables, the small sample and the potential contribution of other elements like sociodemographic variables, future longitudinal studies can extend the understanding of the connections and of the impact of the variables studied in the current research.

The Covid-19 pandemic represents an unprecedented challenge for the physical and mental health of the whole population. Although many medical professionals in the front lines of the battle with the global epidemic have described their mental world in terms of complex psychological reactions like anxiety, depression, sleep deprivation, secondary traumatic stress and mainly burnout, personal resources like Psychological Capital prove to be vital in preserving the efficacy and the performance of the medical service, nowadays carried out in extraordinary conditions, on the "battlefield".

References:

1. Schaufeli WB, Taris TW. A critical review of the job demands-resources model: Implications for improving work and health. *Bridging occ, organiz and pub heal: A trans app.* 2014; 43–68. Available from: doi.org/10.1007/978-94-007-5640-34.
2. Hobfoll SE, Freedy J. Conservation of resources: A general stress theory applied to burnout. In: Schaufeli WB, Maslach C, Marek T. (eds.), *Professional burnout: Recent developments in theory and research*. Taylor & Francis; 1993. p. 115–133.
3. Maslach C, Jackson SE. The measurement of experienced burnout. *J Organiz Behav.* 1981; 2: 99-113. Available from: doi.org/10.1002/job.4030020205.
4. Maslach C, Schaufeli B, Leiter MP. [Job Burnout](#). *Ann Rev of Psychol.* 2001; 52(1):397-422. Available from: doi: [10.1146/annurev.psych.52.1.397](https://doi.org/10.1146/annurev.psych.52.1.397).
5. Maslach C. *Burnout: The Cost of Caring*. Englewood Cliffs, NJ: Prentice-Hall; 1982.
6. Goldberg R, Boss RW, Chan L, Goldberg J, Mallon WK, Moradzadeh D, et al. Burnout and its correlates in emergency physicians: four years' experience with a wellness booth. *Acad Emerg Med.* 1996;3(12):1156-64. Available from: doi: 10.1111/j.1553-2712.1996.tb03379.x.
7. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med.* 2002;136(5):358-67. Available from: doi: 10.7326/0003-4819-136-5-200203050-00008.
8. Sanfilippo F, Noto A, Foresta G, Santonocito C, Palumbo GJ, Arcadipane A, et al. Incidence and Factors Associated with Burnout in Anesthesiology: A Systematic Review. *BioMed resear internat*, 2017; Available from: doi.org/10.1155/2017/8648925.
9. Shanafelt TD, Balch CM, Bechamps G, Russell T, Dyrbye L, Satele D, et al. Burnout and medical errors among American surgeons. *Ann Surg.* 2010; 251(6):995-1000. Available from: doi: 10.1097/SLA.0b013e3181bfdab3.
10. Peterson U, Demerouti E, Bergström G, Samuelsson M, Asberg M, Nygren A. Burnout and physical and mental health among Swedish healthcare workers. *J Adv Nurs.* 2008; 62(1):84-95. Available from: doi: 10.1111/j.1365-2648.2007.04580.x.
11. Dyrbye LN, Thomas MR, Massie FS, Power DV, Eacker A, Harper W, et al. Burnout and suicidal ideation among U.S. medical students. *Ann Intern Med.* 2008; 149(5):334-41. Available from: doi: 10.7326/0003-4819-149-5-200809020-00008.
12. Shanafelt TD, Balch CM, Dyrbye L, Bechamps G, Russell T, Satele D, et al. Special report: suicidal ideation among American surgeons. *Arch Surg.* 2011; 146(1):54-62. Available from: doi: 10.1001/archsurg.2010.292.

13. DiMatteo MR, Sherbourne CD, Hays RD, Ordway L, Kravitz RL, McGlynn EA, et al. Physicians' characteristics influence patients' adherence to medical treatment: results from the Medical Outcomes Study. *Health Psychol.* 1993;12(2):93-102. Available from: doi: 10.1037/0278-6133.12.2.93.
14. Haas JS, Cook EF, Puopolo AL, Burstin HR, Cleary PD, Brennan TA. Is the professional satisfaction of general internists associated with patient satisfaction? *J Gen Intern Med.* 2000; 15(2):122-8. Available from: doi: 10.1046/j.1525-1497.2000.02219.x.
15. Nickell LA, Crighton EJ, Tracy CS, Al-Enazy H, Bolaji Y, Hanjrah S, et al. Psychosocial effects of SARS on hospital staff: survey of a large tertiary care institution. *CMAJ.* 2004; 170(5):793-8. Available from: doi: 10.1503/cmaj.1031077.
16. Tam CW, Pang EP, Lam LC, Chiu HF. Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers. *Psychol Med.* 2004; 34(7):1197-204. Available from: doi: 10.1017/s0033291704002247.
17. Wong TW, Yau JK, Chan CL, Kwong RS, Ho SM, Lau CC, et al. The psychological impact of severe acute respiratory syndrome outbreak on healthcare workers in emergency departments and how they cope. *Eur J Emerg Med.* 2005; 12(1):13-8. Available from: doi: 10.1097/00063110-200502000-00005.
18. Verma S, Mythily S, Chan YH, Deslypere JP, Teo EK, Chong SA. Post-SARS psychological morbidity and stigma among general practitioners and traditional Chinese medicine practitioners in Singapore. *Ann Acad Med Singap.* 2004; 33(6):743-8. Available from: PMID: 15608831.
19. Hu D, Kong Y, Li W, Han Q, Zhang X, Zhu LX, et al. Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: A large-scale cross-sectional study. *E Clin Med.* 2020; 24:100424. Available from: doi: 10.1016/j.eclinm.2020.100424.
20. Zhang Y, Wang C, Pan W, Zheng J, Gao J, Huang X, et al. Stress, Burnout, and Coping Strategies of Frontline Nurses During the COVID-19 Epidemic in Wuhan and Shanghai, China. *Front Psychiatry.* 2020; 11:565520. Available from: doi: 10.3389/fpsy.2020.565520.
21. Khasne RW, Dhakulkar BS, Mahajan HC, Kulkarni AP. Burnout among Healthcare Workers during COVID-19 Pandemic in India: Results of a Questionnaire-based Survey. *Indian J Crit Care Med.* 2020; 24(8):664-671. Available from: doi: 10.5005/jp-journals-10071-23518.
22. Barello S, Palamenghi L, Graffigna G. Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. *Psychiatry Res.* 2020; 290:113129. Available from: doi: 10.1016/j.psychres.2020.113129.
23. Dimitriu M, Pantea-Stoian A, Smaranda AC, Nica AA, Carap AC, Constantin VD, et al. Burnout syndrome in Romanian medical residents in time of the COVID-19 pandemic. *Medical hypoth.* 2020; 144:109972. Available from: doi.org/10.1016/j.mehy.2020.109972.

24. Cotel A, Golu F, Pantea Stoian A, Dimitriu M, Socea B, Cirstoveanu C, et al. Predictors of Burnout in Healthcare Workers during the COVID-19 Pandemic. *Healthcare*.2021; 9(3): 304. Available from: doi.org/10.3390/healthcare9030304.
25. Bredicean C, Tamasan SC, Lungeanu D, Giurgi-Onocu C, Stoica IP, Panfil AL, et al. Burnout Toll on Empathy Would Mediate the Missing Professional Support in the COVID-19 Outbreak. *Risk Manag Healthc Policy*. 2021; 14:2231-2244. Available from: doi: 10.2147/RMHP.S300578.
26. Salari N, Hosseini-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Glob Health*. 2020; 16(1):57. Available from: doi: 10.1186/s12992-020-00589-w.
27. Vilagut G, Forero CG, Barbaglia G, Alonso J. Screening for Depression in the General Population with the Center for Epidemiologic Studies Depression (CES-D): A Systematic Review with Meta-Analysis. *PLoS One*. 2016; 11(5):e0155431. Available from: doi: 10.1371/journal.pone.0155431.
28. Zhang C, Yang L, Liu S, Ma S, Wang Y, Cai, Z, et al. Survey of Insomnia and Related Social Psychological Factors Among Medical Staff Involved in the 2019 Novel Coronavirus Disease Outbreak. *Front in psych*, 2020; 11:306. Available from: doi.org/10.3389/fpsy.2020.00306.
29. Temsah MH, Al-Sohime F, Alamro N, Al-Eyadhy A, Al-Hasan K, Jamal A, et al. The psychological impact of COVID-19 pandemic on health care workers in a MERS-CoV endemic country. *J Infect Public Health*. 2020; 13(6):877-882. Available from: doi: 10.1016/j.jiph.2020.05.021.
30. Blake H, Bermingham F, Johnson G, Tabner A. Mitigating the Psychological Impact of COVID-19 on Healthcare Workers: A Digital Learning Package. *Int J Environ Res Public Health*. 2020; 17(9):2997. Available from: doi: 10.3390/ijerph17092997.
31. Mohd Noor N, Che Yusof R, Yacob MA. Anxiety in Frontline and Non-Frontline Healthcare Providers in Kelantan, Malaysia. *Int J Environ Res Public Health*. 2021; 18(3):861. Available from: doi: 10.3390/ijerph18030861.
32. Liu CY, Yang YZ, Zhang XM, Xu X, Dou Q L, Zhang WW, Cheng A. The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey. *Epidemiol and infection*. 2020; 148, e98. Available from: doi.org/10.1017/S0950268820001107.
33. Maunder R, Hunter J, Vincent L, Bennett J, Peladeau N, Leszcz M, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ*. 2003 May; 168(10):1245-51. Available from: PMID: 12743065.
34. Bai Y, Lin CC, Lin CY, Chen JY, Chue CM, Chou P. Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatr Serv*. 2004; 55(9):1055-7. Available from: doi: 10.1176/appi.ps.55.9.1055.

35. Chong MY, Wang WC, Hsieh WC, Lee CY, Chiu NM, Yeh WC, et al. Psychological impact of severe acute respiratory syndrome on health workers in a tertiary hospital. *Br J Psychiatry*. 2004; 185:127-33. Available from: doi: 10.1192/bjp.185.2.127.
36. Lu W, Wang H, Lin Y, Li L. Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. *Psychiatry Res*. 2020; 288:112936. Available from: doi: 10.1016/j.psychres.2020.112936.
37. Lai J, Ma S, Wang Y, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open*. 2020; 3(3):e203976. Available from: doi:10.1001/jamanetworkopen.2020.3976.
38. Wang W, Tang J, Wei F. Updated understanding of the outbreak of 2019 novel coronavirus (2019-nCoV) in Wuhan, China. *Jour of med virol*. 2020; 92(4): 441–447. Available from: doi.org/10.1002/jmv.25689.
39. Vargas de Barros V, Martins LF, Saitz R, Bastos RR, Ronzani TM. Mental health conditions, individual and job characteristics and sleep disturbances among firefighters. *J Health Psychol*. 2013; 18(3):350-8. Available from: doi: 10.1177/1359105312443402.
40. **Secosan I**, Bredicean C, Crainiceanu ZP, Virga D, Giurgi-Onocu C, Bratu T. Mental Health in Emergency Medical Clinicians: Burnout, STS, Sleep Disorders. A Cross-Sectional Descriptive Multicentric Study. *CEACR*. 2019; 1(1):5. Available from: doi:[10.35995/ceacr1010005](https://doi.org/10.35995/ceacr1010005).
41. Spoorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic-A review. *Asian J Psychiatr*. 2020; 51:102119. Available from: doi: 10.1016/j.ajp.2020.102119
42. Shaukat N, Ali DM, Razzak J. Physical and mental health impacts of COVID-19 on healthcare workers: a scoping review. *Int J Emerg Med*. 2020; 13(1):40. Available from: doi: 10.1186/s12245-020-00299-5.
43. Xiao H, Zhang Y, Kong D, Li S, Yang N. The Effects of Social Support on Sleep Quality of Medical Staff Treating Patients with Coronavirus Disease 2019 (COVID-19) in January and February 2020 in China. *Med Sci Monit*. 2020; 26:e923549. Available from: doi: 10.12659/MSM.923549.
44. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry Res*. 2020; 288:112954. Available from: doi: 10.1016/j.psychres.2020.112954.
45. Li W, Yang Y, Ng CH, Zhang L, Zhang Q, Cheung T, Xiang YT. Global imperative to combat stigma associated with the coronavirus disease 2019 pandemic. *Psychol Med*. 2021; 51(11):1957-1958. Available from: doi: 10.1017/S0033291720001993.
46. Wu P, Fang Y, Guan Z, Fan B, Kong J, Yao Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Canad jour of psych*. 2009; 54(5), 302–311. Available from: doi.org/10.1177/070674370905400504.

47. Chew N, Lee G, Tan B, Jing M, Goh Y, Ngiam N. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain, behav, and imm.* 2020; 88: 559–565. Available from: doi.org/10.1016/j.bbi.2020.04.049.
48. Vittori A, Marchetti G, Pedone R, Francia E, Mascilini I, Marinangeli F, Picardo SG. COVID-19 pandemic mental health risks among anesthesiologists: it is not only burnout. *Braz J Anesthesiol.* 2021; 71(2):201-203. Available from: doi: 10.1016/j.bjane.2021.01.002.
49. Lázaro-Pérez C, Martínez-López JÁ, Gómez-Galán J, López-Meneses E. Anxiety About the Risk of Death of Their Patients in Health Professionals in Spain: Analysis at the Peak of the COVID-19 Pandemic. *Internat jour of environm research and pub health.* 2020; 17(16): 5938. Available from: doi.org/10.3390/ijerph17165938.
50. Conversano C, Di Giuseppe M, Miccoli M, Ciacchini R, Gemignani A, Orrù G. Mindfulness, Age and Gender as Protective Factors Against Psychological Distress During COVID-19 Pandemic. *Frontiers in psychol.* 2020; 11:1900. Available from: doi.org/10.3389/fpsyg.2020.01900.
51. Orrù G, Marzetti F, Conversano C, Vagheggini G, Miccoli M, Ciacchini R, et al. Secondary Traumatic Stress and Burnout in Healthcare Workers during COVID-19 Outbreak. *Int J Environ Res Public Health.* 2021; 18(1):337. Available from: doi: 10.3390/ijerph18010337.
52. Liu X, Kakade M, Fuller CJ, Fan B, Fang Y, Kong J, et al. Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. *Compr Psychiatry.* 2012; 53(1):15-23. Available from: doi: 10.1016/j.comppsy.2011.02.003.
53. Arpacioğlu S, Gurler M, Cakiroğlu S. Secondary Traumatization Outcomes and Associated Factors Among the Health Care Workers Exposed to the COVID-19. *The Internat jour of soc psych.* 2021; 67(1):84-89. Available from: doi.org/10.1177/0020764020940742.
54. Zhou Q, Lai X, Wan Z, Zhang X, Tan L. Impact of burnout, secondary traumatic stress and compassion satisfaction on hand hygiene of healthcare workers during the COVID-19 pandemic. *Nurs Open.* 2021; 8: 2551-2557. Available from: doi.org/10.1002/nop2.786.
55. Giordani RCF, Donasolo JPG, Ames VDB, Giordani RL. The science between the infodemic and other post-truth narratives: challenges during the pandemic. *Cien Saude Colet.* 2021; 26(7):2863-2872. Available from: doi:10.1590/1413-81232021267.05892021.
56. **Secosan I**, Virga D, Crainiceanu ZP, Bratu LM, Bratu T. Infodemia: Another Enemy for Romanian Frontline Healthcare Workers to Fight during the COVID-19 Outbreak. *Medicina.* 2020; 56(12):679. Available from: doi.org/10.3390/medicina56120679
57. Herbert M. An exploration of the relationships between psychological capital (hope, optimism, self-efficacy, resilience), occupational stress, burnout and employee engagement. Thesis (MComm)--Stellenbosch University, 2011.

58. Peng J, Jiang X, Zhang J, Xiao R, Song Y, Feng X, et al. The Impact of Psychological Capital on Job Burnout of Chinese Nurses: The Mediator Role of Organizational Commitment. *PLoS ONE*. 2013; 8(12): e84193. Available from: doi.org/10.1371/journal.pone.0084193.
59. Xirui L, Kan D, Liu L, Shi M, Wang Y, Yang X, et al. The Mediating Role of Psychological Capital on the Association between Occupational Stress and Job Burnout among Bank Employees in China. *Internat Jour of Environm Res and Pub Health*. 2015; 3: 2984-3001. Available from: doi.org/10.3390/ijerph120302984.
60. Avey JB, Luthans F, Jensen SM. Psychological capital: A positive resource for combating employee stress and turnover. *Hum Resour Manage*. 2009; 48: 677-693. Available from: doi.org/10.1002/hrm.20294.
61. Muñoz ÁSA, López MFP, Vieitez JC. Self-efficacy and anxiety in female hospital healthcare workers. *Ansiedad y Estrés*. 2018; 24(2-3):99–104. Available from: doi.org/10.1016/j.anyes.2018.08.002.
62. Zhou J, Yang Y, Qiu X, Yang X, Pan H, Ban B, et al. Serial multiple mediation of organizational commitment and job burnout in the relationship between psychological capital and anxiety in Chinese female nurses: A cross-sectional questionnaire survey. *Int J Nurs Stud*. 2018; 83:75-82. Available from: doi: 10.1016/j.ijnurstu.2018.03.016.
63. Abbas M, Raja U. Impact of psychological capital on innovative performance and job stress. *Can J Adm Sci*. 2015; 32: 128– 138. Available from: doi: [10.1002/cjas.1314](https://doi.org/10.1002/cjas.1314).
64. Sun T, Zhao XW, Yang LB, Fan LH. The impact of psychological capital on job embeddedness and job performance among nurses: a structural equation approach. *J Adv Nurs*. 2012; 68(1):69-79. Available from: doi: 10.1111/j.1365-2648.2011.05715.x.
65. Sweetman D, Luthans F. The power of positive psychology: Psychological capital and work engagement. In AB Bakker (Ed.), MP Leiter, *Work engagement: A handbook of essential theory and research*. Psychol Press. 2010; p. 54–68.
66. Rodríguez-Jiménez M, Guerrero-Barona E, García-Gómez A. Salud mental y capital psicológico en profesionales sanitarios españoles durante la pandemia de COVID-19. *Med Clin*. 2021; 156:357–358. Available from: doi: [10.1016/j.medcli.2020.12.008](https://doi.org/10.1016/j.medcli.2020.12.008).
67. **Secosan I**, Virga D, Crainiceanu ZP, Bratu T. The Mediating Role of Insomnia and Exhaustion in the Relationship between Secondary Traumatic Stress and Mental Health Complaints among Frontline Medical Staff during the COVID-19 Pandemic. *Behav Sc*. 2010; 10(11): 164. Available from: doi.org/10.3390/bs10110164.
68. **Secosan I**, Virga D, Crainiceanu ZP, Bratu LM, Bratu T. The Moderating Role of Personal Resources Between Demands and Ill-Being of Romanian Healthcare Professionals in the COVID-19 Pandemic. *Front. Public Health*. 2021; 9:736099. Available from: doi: 10.3389/fpubh.2021.736099.