The characteristics of burnout syndrome among healthcare professionals before and during the COVID-19 pandemic

Mona Stankovic

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1. List of abbreviations

BDI-H – Shortened Beck Depression Inventory – Hungarian version

CFA – Confirmatory Factor Analysis

CFI – Comparative Fit Index

COVID-19 – Coronavirus, SARS-CoV-2 virus

DAIT – Department of Anaesthesiology and Intensive Therapy

DEM – Department of Emergency Medicine

DS – Department of Surgery

FCV-19S – Fear of COVID-19 Scale

GT – Grounded Theory

ICD-11 – 11th revision of the International Classification of Diseases

ICU – Intensive Care Unit

IQR – Interquartile Range

KW test – Kruskal-Wallis test

M – Mean

Mdn – Median

MW U-test – Mann-Whitney U-test

RMSEA – Root Mean Square Error of Approximation

SD – Standard Deviation

SRMR – Standardized Root Mean Square Residual

STAI – State-Trait Anxiety Inventory

TLI – Tucker-Lewis Index

WHO – World Health Organization

WLSMV estimator – Weighted Least Squares Means and Variance Adjusted estimator

2. Introduction

2.1. Burnout syndrome as a potential consequence of workplace stress

It has never been more important to focus on burnout syndrome and its effect on healthcare personnel's well-being as it is nowadays. The spectra of new stressors introduced by the coronavirus pandemic has dramatically extended the everyday occupational hardships of clinical workers as well as the severity and prevalence of burnout syndrome.

Work and profession can be a facet of life from which people derive satisfaction and fulfillment, however it can also be an ample source of stress. Severe occupational strain throughout long periods of time can lead to chronic stress and exhaustion. The effects of psychological stress on both physiology, mental health and well-being are well documented (Janssen et al., 2018; Yaribeygi et al., 2017), however there are still very few well-established intervention programs reporting efficient management of workplace stress and development of robust resilience.

People identify circumstances as stressful, when regardless of their individual actions the outcome of the situation is perceived as uncontrollable and/or unsolvable (Kopp, 2005). The constant management of situations over which you feel you have no control, solution or coping mechanisms to deal with for prolonged periods of time, can lead to a state of exhaustion. When the stressors are in connection with the job, profession and workplace, burnout syndrome might occur.

Burnout is a syndrome of emotional, mental and cognitive exhaustion. It is an important consequence of chronic emotional and interpersonal workplace stress (Balan et al., 2019; Borys et al., 2019). The 11th revision of the International Classification of Diseases (ICD-11), published in 2019 by the World Health Organization (WHO), includes burnout syndrome as an occupational phenomenon in the chapter on factors influencing health status or contact with health services. According to the ICD-11, burnout syndrome is a phenomenon interpretable in the occupational context, which occurs as a result of chronic workplace stress coupled with unsuccessful stress-management. It is characterized by three dimensions: firstly, feelings of energy depletion or exhaustion; secondly, increased mental distance, feelings of negativism or cynicism related to one's job and finally reduced professional efficacy (WHO, 2019).

Since it has been first documented by Freundenberger in 1974 (Freudenberger, 1974), there have been several theoretical frameworks for the understanding and measurement of burnout syndrome (Kiss et al., 2018). Nonetheless, in present study we base our research and primary understanding of the phenomenon on the work of Christina Maslach and the Maslach Burnout Inventory. According to her work, job burnout is caused by prolonged chronic stressors at work that result in emotional exhaustion, depersonalization, and a sense of inefficacy, decrease in personal accomplishment (Maslach, 2003; Maslach et al., 2001). Emotional exhaustion is the most important indicator of personal burnout, characterized by depletion of psychological and emotional resources, negative attitudes towards work and life, fatigue, loss of energy, resistance to work and feeling of purposelessness (Győrffy & Ádám, 2004). Although it is the primary sign of personal burnout, emotional exhaustion alone is not enough to define the syndrome. Depersonalization is a social component defined by detachment, cynicism, negative response to the various aspects of a job, impersonal attitude in relationships with others, associated with negative emotions. Personal accomplishment dimension describes the relationship between a person and their work, one's assessment of their own work performance, whereas lack of personal accomplishment demonstrates as resistance to work, feeling of purposelessness and loss of a sense of achievement at work (Ádám, Győrffy, et al., 2009; Maslach et al., 2001).

2.2. Stages of burnout syndrome

In the beginning of our careers – ideally – we show great excitement and enthusiasm toward our work. In this honeymoon stage of excessive drive, it is common to undertake more tasks than we can physically and psychologically cope with. In case there is a stable social support in the workplace and we have the ability and resilience to set limits, we will be able to move to a state of stability. It is a state of productive, creative work, with great confidence in our boundaries. It is coupled with a strong awareness of positive and negative aspects of one's job and advanced coping mechanisms for handling everyday hardships. If the organization or the network of co-workers in not supportive enough, or we are unable to cope with the difficulties of the work, the stress can develop into an everyday frustration. In the state of frustration our performance is decreasing, while we perceive that we invest more and more into our work. This discrepancy between the amount of work invested and its results adds on to the stress and feelings of inadequacy. One way of coping with the frustration is to stagnate. In the phase of stagnation, one's work performance is decreased, however their

investment in their job decreases as well. It is often coupled with a negative attitude toward self, the job, colleagues, and the organization. Lastly, in case the coping with the stressors of the job fails, one can enter the state of apathy. In this phase the interest in regard to work decreases dramatically. The state of apathy is often comorbid with feelings of depression and in some cases substance abuse or suicidal thoughts (De Hert, 2020).

It is important to state that the perception of our work is dynamically changing. It should always be a priority to assess the state we are in, while remaining mindful that it can change at any time in our life. A lot of positive life crises, such as marriage, childbirth, move or promotions and several negative ones can result in adjustments in attitudes to our work and can catalyze a change in our perception.

2.3. Effects of burnout syndrome on health and well-being

Even though burnout syndrome is defined as an occupational phenomenon, it effects various aspects of our lives. It has typical somatic, cognitive, affective and behavioral symptoms. Exhaustion, fatigue, loss of energy, insomnia, loss of libido, indigestion, headache, chest pains can all be somatic symptoms associated with burnout (De Hert, 2020). Burnout syndrome is connected to several cognitive symptoms as well, such as difficulties in decision making, decreased performance, inefficiency, decrease in self-esteem and negative attitude toward self and work. It is also coupled with feelings of time pressure, indispensability, helplessness. Frequent mood swings, irritability, nervousness and anger, impatience and dissatisfaction, sense of internal emptiness and loss of control are all common feelings associated with burnout. Finally, hyperactivity followed by decreased performance, avoidance behaviors, decreased creativity, rigidity and addictive behaviors (alcohol consumption, smoking) strongly correlate with burnout (West et al., 2018).

Prolonged exposure to stress affects mental health in various ways. Burnout syndrome is greatly comorbid with insomnia and depressive disorders (Vela-Bueno et al., 2008; Wurm et al., 2016), contrarily, successful stress management, robust resilience and diverse coping mechanisms are all protective factors (McCain et al., 2018).

Besides individual factors, organizational conditions and working environment both present several stressors, such as shift work, long working hours, physically difficult work or understaffing, which can have an extensive effect on physical health, disturb the circadian rhythm and sleeping patterns, but also have a significant impact on the

hypothalamic-pituitary-adrenal axis and stress response. These maladaptive responses can manifest as several different somatic (De Vente et al., 2003) or psychosomatic symptoms such as changes in body weight, cardiovascular symptoms, insomnia or endocrine deficiencies (Salvagioni et al., 2017; Reith, 2018).

2.4. Burnout syndrome among healthcare professionals

The prevalence of burnout syndrome among the helping professions and careers requiring constant work with people (such as teachers or clinical staff) seems to be higher than among other occupations (Maslach et al., 2001; Schaufeli et al., 2008; Ádám & Mészáros, 2012). Long working hours, a delay in positive feedback, the difficulty of maintaining a work-life balance, emotionally stressful patient relationships in a constantly changing healthcare environment all contribute to increased burnout levels among medical professionals (Dimou et al., 2017; Czeglédi & Tandari-Kovács, 2019; Schaufeli et al., 2008).

Healthcare workers are severely exposed to stressful events such as excessive workload and demanding professional responsibilities (Tawfik et al., 2017) in physically challenging conditions. They are dealing with complex interpersonal situations, caring for patients in critical conditions, performing various medical procedures with absolute precision, completing complex tasks under time pressure, responding accurately and quickly to extremely urgent situations, mastering intensive use of sophisticated technology (Czeglédi & Tandari-Kovács, 2019; Dimou et al., 2017; Schaufeli et al., 2008). These high expectations are frequently coupled with working circumstances that allow very limited control, such as the development of new skillsets, influence over workflows and decision-making power (Bakker et al., 2005).

Such organizational characteristics, in accordance with Robert Karasek's job demand-control model, provide ideal conditions for burnout (Karasek, 1979). Exhausting pressure and duties coupled with limited control over job circumstances and the level of authority (control over professional growth, planning, executive power), present a breeding ground for high levels of work-related stress, leaving healthcare professionals especially susceptible to job burnout (Welp et al., 2019).

In past decades burnout research has identified a plethora of organizational risk factors, which are represented in six domains, namely: workload, control, reward, fairness, community and values (Baugh et al., 2020; Maslach & Leiter, 2016). The first two areas are reflected in the demand-control model of job stress previously discussed. Insufficient

recognition and reward devalue both the work and the workers, and are closely associated with feelings of inefficacy. Fairness is the extent to which decisions at work are perceived as being impartial and equitable, while the area of community has to do with the quality of workplace relationships. Finally, the area of values is the alignment of personal and organizational values, ideals and motivations that originally attracted people to their job (Baugh et al., 2020; Maslach & Leiter, 2016).

The occurrence of burnout syndrome among healthcare workers is significantly higher in some specializations, such as surgery, emergency medicine, intensive care, traumatology and general physician practice (Ádám, Győrffy, et al., 2009; Dimou et al., 2017; Maslach et al., 2001; Shanafelt et al., 2012). Among healthcare professionals working in critical care several organizational risk factors have been identified, such as excessive workload and job strain (Moukarzel et al., 2019), lack of manager support (Elder et al., 2020; Hunsaker et al., 2015), work-life and effort-reward imbalance (Hämmig, 2018), burdensome working conditions, for instance, understaffing (Stavropoulou et al., 2020) and shift work (Chuang et al., 2016), all of which increase workplace stress and contribute to demoralization and the development of burnout.

2.5. Hungarian research on burnout syndrome among healthcare professionals

Even though the Central European region is underrepresented in burnout research, there have been studies executed on Hungarian samples (Ádám, Győrffy, et al., 2009; Ádám, Torzsa, et al., 2009; Czeglédi & Tandari-Kovács, 2019; Fejes et al., 2021; Győrffy & Ádám, 2013; Győrffy & Girasek, 2015; Tandari-Kovács, 2010), which partially mapped out the occurrence, the prevalence as well as some protective and risk factors of burnout syndrome among general practitioners, medical students or female physicians (Ádám, Győrffy, et al., 2009; Ádám, Torzsa, et al., 2009; Győrffy & Ádám, 2013). These studies confirm the relationship between work stress, physical and emotional burden and burnout, and define the emotional exhaustion, depersonalization, depletion of performance, poor relationship with colleagues and lack of communication to be key factors contributing to higher levels of burnout (Ádám, Torzsa, et al., 2009; Győrffy, 2019; Győrffy & Ádám, 2004; Győrffy & Girasek, 2015).

A novel study has been published at the University of Pécs finding specialization, age, marital status, job type, the lack of social support and allowance to be independently associated with burnout, while measuring a significant correlation between burnout, depression and dysfunctional attitudes (Fejes et al., 2021).

2.6. Coping with workplace stress: the concept of psychological immune competency

In order to better understand the interactional nature of coping mechanisms manifesting during successful adaptation, Oláh has conceptualized and operationalized the construct of a psychological immune system as a pool of psychological adaptive resources providing protection against the ill effects of stress (Oláh, 2005). Psychological immune competency incorporates coping strategies, protective personality resources, and dimensions of resilience such as control capacity, learned resourcefulness, constructive thinking, hardiness, dispositional optimism, ego resiliency, and emotional intelligence. It combines 16 protective personality traits (namely, positive thinking, sense of control, sense of coherence, creative self-concept, sense of self-growth, challenge orientation, social monitoring capacity, problem-solving capacity, self-efficacy, social mobilizing capacity, social creating capacity, synchronicity, goal orientation, impulse control, emotional control, irritability control) into a specific protective apparatus granting a certain immunity when faced with "psychological pathogens" such as stress, trauma or their negative outcomes (Dubey & Shahi, 2011).

The psychological immune system is a concept designed to reveal the interactions manifested during successful adaptation, an integration of coping skills into a multidimensional complex network providing capabilities for adequate adaptation and stress-management, strengthening invulnerability and raising the coping capacity of individuals (Nagy & Nagy, 2016). It can, theoretically, be compared to the body's immunity. In the same way our bodies protect us from various pathogens using innate and adaptive systems, psychological immunity protects us from several stressors, also using innate and adaptive resources. Psychological immune competency monitors situations, mobilizes resources, designs and executes adaptive pathways. Most importantly, it ensures the integrated functioning of the personality and facilitates development and self-growth (Oláh, 2005; Vargay et al., 2019).

The unique pattern of coping mechanisms activated during adaptation to different situations is specific to an individual and ensures a certain immunity, protection, when facing stressful or traumatic situations. People with stronger psychological immune competence tend to be more adaptable to a changing environment and newly emerging stressors, also, they tend to report higher well-being and life-satisfaction, environmental mastery, purpose in life, personal growth, self-acceptance, positive relations and autonomy (Vargay et al., 2019). Personality's protective qualities, such as the sense of coherence,

sense of self-growth, synchronicity, impulse control, emotional control, and irritability control, have a strong relationship with mental and physical health, while some coping strategies of the psychological immune system mediate the association between personality dimensions and acute psychopathology outcome (Mirnics et al., 2013; Vargay et al., 2019).

A stronger psychological immune competency might be of paramount importance for the management of burnout among clinical professionals. General practitioners with higher psychological immunity measure lower levels of burnout on all three scales (Dubey & Shahi, 2011). So far there is no data on the relationship between the psychological immune competency and burnout syndrome among healthcare employees in critical care, which is particularly important, considering that these healthcare professionals are working in exceptionally high-stress environments.

2.7. Effects of the COVID-19 pandemic on healthcare workers, fear of coronavirus

Two years after the breakout of the COVID-19 epidemic – declared as a global pandemic on 11 March 2020 by the WHO – the spread of coronavirus 2 (SARS-CoV-2) is still rising in several countries around the globe. 225 countries and territories have been affected by the pandemic of coronavirus globally, and governments all around the world have been taking unprecedented measures in order to slow down the spread of the virus. Measures vary from border control, lockdown and contact tracing to public health measures such as physical distancing, self-isolation and handwashing (WHO, 2022).

The spread of coronavirus triggers feelings of depression, fear, stress and anxiety among the general population as well as healthcare professionals (Rajabimajd et al., 2021; Soares et al., 2021; Ullah et al., 2021). The long-term effects of the COVID-19 related fear are connected to with decreased job satisfaction and performance as well as high levels of anxiety among healthcare personnel (Rajabimajd et al., 2021). The burdens of the pandemic, such as social distancing, lockdown, quarantine or isolation (Kato et al., 2020), the long-term consequences, such as job loss, financial insecurities, disruption of daily activities (Fiorillo & Gorwood, 2020; Galea et al., 2020), together with the overestimation of death tolls (Roussel et al., 2020) as well as sensationalistic news and broadcasting all amplify fears and often generate stigma (Amin, 2020a; Lin, 2020; Soraci et al., 2020). To date there is no particular estimation as to the duration of the pandemic, which further deepens feelings of uncertainty (Haktanir et al., 2020).

Negative psychosocial consequences of fear have been reported during former epidemics, establishing that people often oscillate between denial and phobia, while stigmatizing individuals racially perceived as being the source of the infection (Amin, 2020a, 2020b; Blakey et al., 2015; Falagas & Kiriaze, 2006; Pappas et al., 2009). Fear is often accompanied with feelings of anxiety and depression, which adds on to the negative impact on one's well-being and quality of life (Ford et al., 2019; Huang & Zhao, 2020; Lee, 2020; Ohman, 2000; Soraci et al., 2020).

According to Brooks (Brooks et al., 2020), individuals kept in quarantine occasionally experience mental health issues, including anger, anxiety, confusion or PTSD (Blekas et al., 2020; Dutheil et al., 2021; Gonzalez & Martinez, 2014). Concurrently, social isolation is strongly associated with anxiety and depression symptoms in both older and younger populations (Lee, 2020; Matthews et al., 2019; Santini et al., 2020; Soraci et al., 2020).

Several measures have been created in order to assess the effects of coronavirus on mental health (Ransing et al., 2020). Ahorsu et al. recently developed the Fear of COVID-19 Scale (FCV-19S), a measure adequate for the assessment of the fear of coronavirus (Ahorsu et al., 2020). This seven-item scale is a short and easy-to-use tool with very good internal consistency and concurrent validity positively correlating with measures of anxiety and depression (Ahorsu et al., 2020; Winter et al., 2020). Since its development, the FCV-19S has been translated and adapted to several languages (for example Alyami et al., 2020; Barrios et al., 2021; Soraci et al., 2020; Tzur Bitan et al., 2020).

Complementing medical treatments of coronavirus patients (regardless of whether they are healthcare professionals or not) with psychological interventions would result in better-quality patient care and an overall better outcome for the entire population affected (Soraci et al., 2020). From the beginning of 2021 in some Hungarian COVID-19 inpatient facilities, clinical health psychologists have been a part of a medical team taking care of all COVID-19 infected patients. Colleagues working in these fields help patients in coping both with the effects of the infection and hospitalization, while simultaneously relieving some burden from the medical staff.

Adaptation of the FCV-19S to Hungarian ensures healthcare providers with a useful tool when in need of quickly assessing an individual's fear of coronavirus (Ahorsu et al., 2020; Pakpour et al., 2020). With a tool capable of evaluating the fear of COVID-19 we are able to map out the correlation between the fear of the infection, burnout, anxiety and depression among healthcare professionals working in COVID-19 facilities and in traditional medical fields.

3. Aims and objectives

Our primary aim was to assess the prevalence of burnout syndrome among the healthcare professionals at the University of Szeged, Albert Szent-Györgyi Clinical Centre. We attempted to understand how individual factors, such as the strength of psychological immune competency, the strength and width of perceived social support, the somatic symptoms and demographics such as age, gender, the time spent working in healthcare, the number of working hours and the number of children effect burnout, while acknowledging that there are several organizational and situational factors that have not been the focus of this research. Sampling was not selective, it reached out to all occupations of particular organizations, not limited to physicians or nurses. The reason for this approach is the phenomenon of burnout contagion in work teams (Bakker et al., 2005), the notion that burnt out employees have a tendency to cluster and influence one another. The main goal of the initial study was to clarify which psychosocial factors have an impact on burnout syndrome with an explicit intention to develop novel intervention strategies for healthcare professionals, particularly for the employees of critical care fields.

After the onset of the COVID-19 pandemic we aimed to better understand the everyday hardships of the employees working in emergency care through qualitative interviews. With this study our goal was to set up new hypotheses for further burnout research in a vastly changed healthcare environment.

The fear of coronavirus appeared as a recurrent topic in the interviews analyzed in the second study. Responding to this result, we aimed to validate a tool adequate for its measurement: the FCV-19S. Having a novel tool focusing specifically on the measurement of fear of the coronavirus enables us to measure its effect on burnout as well as assess patients currently under care.

Finally, we compared the levels of burnout originally measured with results collected during the coronavirus pandemic among critical care physicians and nurses. In this last study, in addition to burnout results, we present data regarding the fear of COVID-19, but also levels of depression and anxiety. The objective of this study was to compare the initial characteristics of burnout syndrome to those perceived during the pandemic as well as to get a more coherent picture of the mental health status of the healthcare professionals during the epidemic. By measuring depression, state anxiety and the fear of coronavirus together with burnout, we were able to outline the correlations between these conditions and also assess their prevalence in this population.

4. Methods and materials

4.1. STUDY 1: Systematic burnout measurement with the aim of developing interventions

4.1.1. Participants and procedure

Participants were recruited from 11 different clinics of the University of Szeged (Table 1). The questionnaires were prepared both electronically and in paper form: some institutions participated online, and paper tests were handed out in other organizations. 568 questionnaires were collected by the designated deadlines. All personnel had an equal chance to take part in the survey, it was handed out or distributed to the institutional email address of physicians, nurses and other staff (medical clerks, medical orderlies, administrational colleagues, physiotherapists, psychologists, social workers).

Table 1: Departments participating in the survey.

Name of the institute	(n)
Department of Emergency Medicine (DEM)	82
Department of Surgery (DS)	103
Department of Anaesthesiology and Intensive Therapy (DAIT)	83
Department of Neurology	48
Department of Ophthalmology	33
Department of Traumatology	52
1st Department of Internal Medicine	69
Department of Pediatrics	30
Department of Oncotherapy	43*
Department of Urology	6*
Department of Psychiatry	19*

*Note: *In these departments the data collection was prematurely terminated due to the outbreak of COVID-19.*

4.1.2. Measures

Prior to data collection in each clinic, we have held a short briefing to the employees summarizing the importance and the schedule of the research. After this in each organization a dedicated contact person was trained to give additional information about the purpose of the study, data collection and its anonymity. The statements of consent were individual documents and their collection happened separately from the questionnaires, securing the anonymity of the participants. The online surveys were prepared with the EvaSys Automation Software V7.1 (Electric Paper Evaluationssysteme GmbH, Germany) in compliance with all General Data Protection Regulations.

A test battery was created consisting of basic socio-demographic questions including inquiries regarding somatic symptoms and complaints: insomnia, changes in body weight, hypertension, headache, perspiration, diabetes, abdominal pain and other. A

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modified Hungarian adaptation of the Caldwell Support Dimension Scale (Caldwell et al., 1987; Kopp & Kovács, 2006) was used to determine the strength and diversity of social relationships (parent, spouse, partner, neighbor, co-worker, friend, chief, religious community, relative, psychologist, other community). Burnout was measured using the Maslach Burnout Inventory (Maslach et al., 1996) and psychological immunity was measured using the Psychological Immune Competency Questionnaire (Oláh, 2005), a 16-scale, 80-item survey. Lastly, three qualitative questions were asked: *How do you protect yourself against burnout syndrome?*, *What do you like about your job?* and *What measures should your employer implement in order to prevent burnout?*. The data collection started in June 2017 and was finished in March 2020.

The study was conducted with the permission of the Regional Medical and Research Ethics Committee of the University of Szeged (approval No.: 122/2017-SZTE, 127/2018-SZTE and 237/2018-SZTE).

4.1.3. Data analysis

Since the data was not normally distributed, we examined the differences in means using the Kruskal-Wallis test (KW test) and the Mann-Whitney U-test (MW U-test). Spearman correlation was used to map out the relationship between the scales of burnout (emotional exhaustion, depersonalization, personal accomplishment) and various variables (age, number of children, number of years in healthcare, number of weekly working hours, reported number of somatic symptoms, the degree of social support and the psychological immune system). Statistical analysis was performed with the SPSS 23.0 (IBM Corporation, USA), and the significance level was defined at $p < 0.05$.

4.1.4. Effects of the COVID-19 epidemic, change in focus of our research

Initially, we have planned to measure the levels of burnout in all institutes of the Albert Szent-Györgyi Clinical Centre at the University of Szeged and test various intervention and prevention possibilities. This line of research was stopped in March 2020 with the outbreak of the COVID-19 epidemic in Hungary. We decided to end the research as the change in the organizational environment was very significant, and the data prior to the pandemic would have no longer been comparable to the data collected after these changes.

We have decided to develop studies focusing on the changes in working climate, so the target of our research shifted to discovering new stressors introduced by the coronavirus and their effect on clinical professionals' health, well-being and burnout.

4.2. STUDY 2: Finding new focus due to the COVID-19 pandemic – a qualitative study

4.2.1. Aim of the study

In March 2020 the coronavirus pandemic has dramatically changed the environment in public hospitals in Hungary as well as globally. It has become apparent that we are not going to be able to continue the previously described burnout research and pursue the development and fine tuning of the intervention programs that were piloting in the DEM, the DS, the DAIT and the Department of Ophthalmology.

This change compelled us to look for new directions in research. The novelty of the pandemic and the newly introduced stressors made it difficult for us to find a clear course for further work. Due to this loss in objective, we have decided to conduct a qualitative study in order to generate new hypotheses and research questions for forthcoming studies. It was our aim to analyze the newly emerging needs, attitudes and beliefs of healthcare professionals during the pandemic in order to gain ideas for later original studies.

4.2.2. Participants and procedure

We conducted this qualitative study using some elements of the method of grounded theory (GT). GT is a systematic set of techniques and procedures that enables researchers to identify concepts and build theories from qualitative data (Corbin & Strauss, 2008). It is an inductive process whereby theoretical insights are generated from data, and as such it is appropriate for analysis and theory generation.

When selecting participants, we applied theoretical sampling. We started by two people and selected further participants based on the information gathered from the early interviews, as customary in GT method (Corbin & Strauss, 2008). Thirteen employees (two doctors and eleven nurses) of the DEM of the University of Szeged were recruited. The interviews took place in December 2020 and January 2021, just as vaccinations against COVID-19 have started. The aim of the interviews was to map out the attitudes of healthcare professionals working either in coronavirus facilities or in the DEM.

The participants were recruited through internal communicational channels. The interviews were semi-structured and approximately 50 minutes long. They started with an initial question: *"Please tell me your story starting when you realized that there is a coronavirus epidemic in Hungary."* and continued only with facilitating questions, when needed. The facilitating questions were: *"What kind of new skills did you have to acquire due to the pandemic?", "How do you protect your own health and well-being?", "Whose support can you count on?", "Have your personal relationships changed due to the pandemic?", "Have your professional relationships changed due to the pandemic?", "What provides you with a feeling of safety during the epidemic?", "What are some of the beneficial effects the pandemic has on your life?".* The interview guide focused on drawing out the individual's perception of stressful situations at work specifically in regard to the coronavirus pandemic, factors that contributed to stress and the coping strategies they used when exposed to occupational stressors. Interviews were held at times and locations convenient to the participants.

The interviews were audio-recorded, then transcribed and anonymized and these texts were further used during the data analysis. The study was conducted with the permission of the Regional Medical and Research Ethics Committee of the University of Szeged (approval No.: 142/2020-SZTE).

4.2.3. Data analysis

Interviews were examined using content analysis. The interview texts were read several times to obtain a sense of the whole. Patterns and trends were identified in codes that best summarize, integrate and represent the content. Our research question was *"What processes have an impact on the well-being of healthcare workers during the COVID-19 epidemic?".* We did not use the previously set categories, but have used open coding, looked for meaningful pieces of text answering the research question within and across interviews. Open coding was followed by categorization based on the stressor or the factors influencing the stressor.

We broke down the interview texts into words, phrases or larger pieces of raw data, and looked for common denominators. Our aim in this study was not to extract as many codes and categories as possible and get as clear a picture as possible, but rather to find a new orientation and obtain a new direction of research. For this reason, we stopped the data analysis as soon as we found our new inquiry.

4.3. STUDY 3: Validation of the FCV-19S

4.3.1. Participants and procedure

Participants were a convenience sample of employees and students of the University of Szeged, Faculty of Humanities and Social Sciences, Faculty of Law and Political Sciences, Faculty of Science and Informatics, Faculty of Dentistry and Albert Szent-Györgyi Medical School. Participants were reached through the emailing system used at the university. Study announcements, containing brief information about the data collection and the questionnaire, the aim of the investigation as well as the webpage link to the study were shared via email. All participants were at least 18 years of age. Answers to all questions were mandatory. Data was collected between 18 January and 16 February 2021, during which time potential participants got a weekly reminder. The online survey was prepared using the EvaSys Automation Software V7.1 (Electric Paper Evaluationssysteme GmbH, Germany) in compliance with all General Data Protection Regulations. A final sample comprising of 2175 participants was used to validate the Hungarian version of the FCV-19S.

The study was conducted with the permission of the Regional Medical and Research Ethics Committee of the University (approval No.: 199/2020-SZTE). Participation was voluntary and all participants were ensured in writing about the anonymity of the data as well as the nature and purpose of the data collection prior to consenting.

4.3.2. Adaptation of FCV-19S into Hungarian

Adaptation was carried out in accordance with the Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures (Beaton et al., 2001). The forward-backward translation method was applied to adapt the FCV-19S into Hungarian. One psychologist, as a subject matter expert and two English lectors, experienced in English and Hungarian culture translated the original seven-item scale into Hungarian (forward-translation). The three Hungarian versions were then translated back to English by a second psychologist and two English translators, none of whom have seen the original version of the scale (back translation). Finally, an expert panel of three members evaluated, scrutinized the translated versions, checked for cultural appropriateness and finalized the items. All seven questions were retained. The approved Hungarian translation was piloted among 20 people to examine the scale readability and potential ambiguity. No apparent

problems were found during the pilot trial, no further changes were deemed necessary. The final Hungarian version of the FCV-19S can be found in the Appendix.

4.3.3. Measures

Participants reported gender, marital status, number of children, highest level of education, if they have a chronic illness or mental illness diagnosis, if they take any medication regularly, whether they are a healthcare professional, if they underwent the COVID-19 infection and whether they plan to vaccinate themselves against COVID-19.

The FCV-19S is a unidimensional, 7-item (e.g., "I am most afraid of coronavirus-19") scale that measures one's fear levels of COVID-19 (Ahorsu et al., 2020). In the Hungarian adaptation of the scale, we have decided to use a four-point Likert scale for the ease of use with the rest of the measures. Compared to the original version of the measure, the four-point scale ranged from 1 (*strongly disagree*) to 4 (*strongly agree*) without the "*neither agree nor disagree*" option. The score ranges from 7 to 28 points and the higher score indicates greater fear of coronavirus. The original scale has shown robust psychometric properties including high internal consistency ($\alpha = 0.82$) (Ahorsu et al., 2020).

The Hungarian adaptation (Sipos et al., 1978) of the State-Trait Anxiety Inventory (STAI) questionnaire was used to assess participants' state anxiety (Spielberger et al., 1983). The 20-item questionnaire was used on a 4-point Likert scale. Participants could reach a minimum of 20 and a maximum of 80 points. A higher score on the scale represents a higher state of anxiety. This screening tool is used widely in both non-psychiatric and clinical settings.

Level of depression among participants was assessed using the shortened Hungarian version (Kopp, 2007) of the Beck Depression Inventory (BDI-H), a nine-item questionnaire with a 4-point Likert scale (Beck & Beck, 1972). The shortened version is routinely used as an equivalent to the original and the reliability of the Hungarian version is acceptable (Simor et al., 2009).

4.3.4. Data analysis

Descriptive statistics were used to report the sample characteristics. Skewness, kurtosis and distributions of responses were analyzed with respect to each item. Internal consistency was assessed by Cronbach's alpha coefficient (α), inter-item correlations and

corrected item-total correlations. A Cronbach's α of 0.70 or higher indicated acceptable reliability (DeVellis, 2016), minimum inter-item correlations between 0.15 and 0.50, and minimum corrected item-total correlations of 0.30 were used as indicators of internal consistency reliability. Concurrent validity was assessed by comparing the Spearman correlations between the FCV-19S, the STAI and the BDI-H results. These analyses were conducted using the SPSS 23.0 (IBM Corporation, USA) software.

A confirmatory factor analysis (CFA) was performed to investigate the proposed theoretical domain structure in the Hungarian sample using the mean- and variance-adjusted weighted least squares (WLSMV) estimator. CFA is a multivariate statistical procedure, in which the number of factors and the relationship between measured and latent variables can be specified. Therefore, it is used to test the replicability of the original factor structure of a scale on a different sample, or in a different cultural context. CFA also shows the goodness of fit of the examined model. Due to non-normality of the distribution of several ratings and the categorical nature of the data, we used the WLSMV estimator (Muthén & Muthén, 2017).

Goodness of fit was assessed according to the following criteria: root mean square error of approximation (RMSEA $\leq$ 0.08); comparative fit index (CFI > 0.90 or more desirably $\geq$ 0.95); Tucker–Lewis index (TLI > 0.90); standardized root mean square residual (SRMR < 0.08 or more desirably < 0.05) and chi-square (Brown, 2006; Chen, 2007). CFA was performed with MPlus 8 software (Muthén & Muthén, 2017).

To test for measurement invariance across gender, multiple group CFA analysis was performed. Configural, metric and scalar invariance was examined, invariance was established if ΔCFI and ΔTLI $\leq -$ 0.01; ΔRMSEA < 0.015 as recommended by Chen (Chen, 2007). Factor structure was conducted using the MPlus 8 Software (Muthén & Muthén, 2017)

4.4. STUDY 4: Comparison of burnout results before and during the COVID-19 pandemic among critical care physicians and nurses

4.4.1. Participants and procedure

Participants were the physicians and nurses of the DEM, the DAIT and the DS of the University of Szeged. 65 employees of the DEM, 71 employees of the DS and 80 employees of the DAIT were recruited. Initial measurement was conducted between 2017 and 2019 in paper form (as described in the point 4.1.2. of the Materials and Methods

section). In the summer of 2021, during the COVID-19 pandemic we conducted the second measure using a similar test battery. Participants from the above-mentioned organizations were recruited. In total 124 employees took part in the survey. The surveys were conducted online using the EvaSys Automation Software V7.1 (Electric Paper Evaluationssysteme GmbH, Germany) in compliance with all General Data Protection Regulations. The study was conducted with the permission of the Regional Medical and Research Ethics Committee of the University (approval No.: 122/2017-SZTE, 127/2018-SZTE, 237/2018-SZTE).

4.4.2. Measures

The new test battery consisted of demographic questions: age, marital status, level of education, whether one is affected by a chronic disease, whether they take any medications, whether they have been diagnosed with a mental health disorder, if they work from home, whether they were infected by coronavirus, whether they have vaccinated themselves, or if they plan to. The demographics were followed by the Maslach Burnout Inventory, followed by the FCV-19S validated as a part of the third study of this work and described in point 4.3. The test battery continued with the STAI and finally the BDI-H (see 4.3.3.).

Using the modified test battery, we aimed to gain data that is comparable to the previously collected one, but which, additionally, gives us perspective on the relationship between burnout, the fear of coronavirus, state anxiety and depression. Our other objective was to measure the prevalence of burnout, depression and anxiety among healthcare professionals one year into the pandemic.

4.4.3. Data analysis

The KW test and the MW U-test were used to compare means among groups. Multiple stepwise linear regression analysis was conducted to explore the factors affecting the scales of burnout. Spearman correlation was used to map out the relationship between the scales of burnout (emotional exhaustion, depersonalization, personal accomplishment) and levels of fear of coronavirus, anxiety and depression. Statistical analysis was performed with the SPSS 23.0 (IBM Corporation, USA), and significance level was defined at $p < 0.05$.

5. Results

5.1. STUDY 1: Systematic burnout measurement with the aim of developing interventions

5.1.1. Sample

568 employees of 11 institutes previously listed in Table 1 took part in the survey. 181 doctors, 266 nurses and 115 other staff (in 6 cases the position was not reported). The participants were between 20 and 70 years of age, (*Median (Mdn)* = 40; *Interquartile Range (IQR)* = 31 – 48.75). 25% of the sample was male (n = 142), while 73% of participants (n = 414) were female (in 12 cases gender was not reported).

61% of the participants were in a relationship, while 39% were single, divorced or widowed. 54% of the participants had a university degree, 15% had advanced qualifications, 11% had high-school education, while 17% had a diploma from a vocational school. 42% of the participants did not have children, while 58% had children ranging from one child to five.

The subjects had between 0 and 52 years of experience working in healthcare (*Mdn* = 14; *IQR* = 5 – 25), and between 0 and 49 years in their respective fields (*Mdn* = 7; *IQR* = 3 – 17). The employees worked a median of 40 hours a week (*IQR* = 40 – 50). 27% of participants had a second job, and with the second job they worked a median of 48 (*IQR* = 40 – 55) hours a week.

5.1.2. Burnout Results

66% of the sample showed at least moderate emotional exhaustion (n = 376), 35% moderate or high depersonalization (n = 196), while 73% decline of personal accomplishment (n = 412). 20% of the participants (n = 111) measured at least moderate burnout, while 5% (n = 30) were highly burnt out on all three scales.

The median on emotional exhaustion was 24 points (*IQR* = 14 – 34), on depersonalization 6 points (*IQR* = 2 – 12), while on personal accomplishment 38 points (*IQR* = 43 – 31). The emotional exhaustion falls within the moderate category, while depersonalization and personal accomplishment are on the border between low and moderate (Maslach et al., 1996). Doctors (n = 181) showed higher than average emotional exhaustion (*Mdn* = 28; *IQR* = 18 – 38) and depersonalization (*Mdn* = 8; *IQR* = 4 – 14), and average decline in personal accomplishment (*Mdn* = 38; *IQR* = 32 – 42), while nurses and

other staff (n = 381) showed lower than average emotional exhaustion (*Mdn* = 22; *IQR* = 12 – 32) and depersonalization (*Mdn* = 5; *IQR* = 2 – 10), and also average decline (*Mdn* = 38; *IQR* = 43 – 31) in personal accomplishment. The difference between emotional exhaustion (p < 0.001) and depersonalization (p < 0.001) levels reached by the doctors and nurses was statistically significant, while the difference in personal accomplishment (p = 0.969) was not (Table 2).

Table 2: Summary of burnout results

		Median and IQR	Doctors	Nurses
Burnout	Emotional exhaustion	Mdn = 24 IQR = 14 – 34	Mdn = 28 IQR = 18 – 38	Mdn = 22 IQR = 12 - 32
			MW U - test p < 0.001**	
	Depersonalization	Mdn = 6 IQR = 2 – 12	Mdn = 8 IQR = 4 – 14	Mdn = 5 IQR = 2 – 10
			MW U - test p < 0.001**	
	Personal accomplishment	Mdn = 38 IQR = 43 – 31	Mdn = 38 IQR = 32 – 42	Mdn = 38 IQR = 43 – 31
			MW U - test p = 0.969	

*Note: **p<0,01*

5.1.3. Burnout and Demographic Variables

Age seemed to be inversely proportional with burnout: older test subjects showed lower levels of emotional exhaustion (r = -0.156; p < 0.001), depersonalization (r = -0.231; p < 0.001) and less decline in personal accomplishment (r = 0.115; p = 0.009). Male individuals were more depersonalized than their female colleagues (p = 0.001). Participants with children were significantly less depersonalized (p < 0.001), emotionally exhausted (p = 0.003), and showed a tendency for higher personal accomplishment (p = 0.079). The more children the individual had, the lower the reported burnout on depersonalization (r = -0.204; p < 0.001), emotional exhaustion (r = -0.151; p < 0.001) and personal accomplishment (r = 0.113; p = 0.009) scales (Table 3).

Those, who work longer in healthcare reported lower levels of emotional exhaustion (r = -0.150; p < 0.001), depersonalization (r = -0.204; p < 0.001) and personal accomplishment (r = 0.166; p < 0.001). Participants with a second job declared a higher decline of personal accomplishment (p = 0.001). Additionally, individuals who work a higher number of working hours per week reported higher levels of emotional exhaustion (r = 0.147; p = 0.001) and depersonalization (r = 0,176; p < 0.001). We did not find a relationship between marital status and burnout.

5.1.4. Burnout and Somatic Symptoms

63% of participants admitted to at least one somatic symptom (n = 360). 26% reported insomnia (n = 148), 22% headache (n = 125), 20% high blood pressure (n = 112), 19% changes in body weight (n = 108), 14% abdominal pain (n = 80), 8% higher perspiration (n = 43), 3% diabetes (n = 19) and 21% other somatic symptoms (n = 117), mostly musculoskeletal or endocrine.

Participants who reported having somatic symptoms also reported higher levels of emotional exhaustion (p = 0,011), depersonalization (p < 0.001) and loss of personal accomplishment (p = 0,049), while the number of reported somatic symptoms correlated significantly with all three scales of burnout (Table 3): emotional exhaustion (r = 0.300; p < 0.001), depersonalization (r = 0.163; p < 0.001) and personal accomplishment (r = -0.145; p = 0.001).

Additionally, there was a difference between employees who have suffered from mental illness in the past compared to their colleagues both on personal accomplishment (p = 0.009) and emotional exhaustion scales (p = 0.004). 42% of participants (n = 236) reported regularly taking medication, 16% younger than 40 years of age (n = 89), 40 of whom are doctors and 49 nurses and other staff.

Table 3: Correlations between burnout and several variables

		Age	Number of children	Number of somatic symptoms	Reported social support	Psychological immune competency
Burnout	Emotional exhaustion	r = -0.156; p < 0.001**	r = -0.151; p < 0.001**	r = 0.300; p < 0.001**	r = -0.204; p < 0.001**	r = -0.490; p < 0.001**
	Depersonalization	r = -0.231; p < 0.001**	r = -0.204; p < 0.001**	r = 0.163; p < 0.001**	r = -0.171; p < 0.001**	r = -0.380; p < 0.001**
	Personal accomplishment	r = 0.115; p = 0.009**	r = 0.113; p = 0.009**	r = -0.145; p = 0.001**	r = 0.217; p < 0.001**	r = 0.573; p < 0.001**

Note: **$p<0,01$

5.1.5. Burnout and Social Support

Reported social support correlated significantly with all three scales of burnout (Table 3): emotional exhaustion (r = -0.204; p < 0.001), depersonalization (r = -0.171; p < 0.001) and personal accomplishment (r = 0.217; p < 0.001). The perceived collegial support and the perceived relationship with the chief also had a significant impact on all three scales of burnout (in each case p < 0,011).

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5.1.6. Burnout and Psychological Immune Competency

Comparing the strength of psychological immune system between test subjects who were at least moderately burnt out on at least one of the scales, we found the difference between means to be significant in all cases ($p < 0.001$). The correlation between the results on the Maslach Burnout Inventory and the total value of psychological immune system was significant (Table 3) on the scale of emotional exhaustion ($r = -0.490$; $p < 0.001$), depersonalization ($r = -0.380$; $p < 0.001$) and personal accomplishment ($r = 0.573$; $p < 0.001$).

The scales of psychological immune competency in almost all cases correlated with all three scales of burnout (Table 4). When comparing the highly burnt out and non-burnt-out group of participants we got significant differences in all scales of psychological immune system. However, when comparing the moderately and highly burnt out groups, the following eight scales of psychological immunity showed significant difference ($p < 0,05$): positive thinking, sense of coherence, sense of self-growth, goal orientation, synchronicity, impulse control, emotional control and irritability control. If we extract a subsample ($n = 64$) of participants, who had higher than average scores on all of these scales, their burnout scores fall in the low category (emotional exhaustion: *Mdn* = 11.5; *IQR* = 6.25 – 19; depersonalization: *Mdn* = 2; *IQR* = 0 – 6.25; personal accomplishment: *Mdn* = 43; *IQR* = 40 – 47).

A third of the non-burnt-out test subjects ($n = 24$) had answered the qualitative questions. Most of these participants confessed that they protect themselves against burnout by spending significant time on their hobbies, spending time with family, walking, sleeping/resting and participating in sports. They expressed themselves positively when asked about their job, mostly highlighting, that it is a job involving working with people they can help and give care to. Additionally, they seemed to see their job as interesting, diverse with lots of challenges and they graded their work-place relationships as positive. When asked what the system can do in order to help burnout prevention, some of these participants would like more recreation options, but in most cases their opinion was that everybody needs to individually find their own activities that fulfill them.

Table 4: Correlations between the scales of burnout and psychological immune competency

	Emotional exhaustion	Depersonalization	Personal accomplishment
Positive Thinking	r = -0.420 $p < 0.001^{**}$	r = -0.332 $p < 0.001^{**}$	r = 0.504 $p < 0.001^{**}$
Sense of Control	r = -0.151 $p < 0.001^{**}$	r = -0.182 $p < 0.001^{**}$	r = 0.363 $p < 0.001^{**}$
Sense of Coherence	r = -0.422 $p < 0.001^{**}$	r = -0.385 $p < 0.001^{**}$	r = 0.508 $p < 0.001^{**}$
Sense of Self-Growth	r = -0.490 $p < 0.001^{**}$	r = -0.419 $p < 0.001^{**}$	r = 0.516 $p < 0.001^{**}$
Problem Solving	r = -0.306 $p < 0.001^{**}$	r = -0.217 $p < 0.001^{**}$	r = 0.397 $p < 0.001^{**}$
Change Challenge Orientation	r = -0.324 $p < 0.001^{**}$	r = -0.259 $p < 0.001^{**}$	r = 0.496 $p < 0.001^{**}$
Creative Self Concept	r = -0.172 $p < 0.001^{**}$	r = -0.147 $p = 0.001^{**}$	r = 0.410 $p < 0.001^{**}$
Social Monitoring	r = -0.055 $p = 0.202$	r = -0.038 $p = 0.374$	r = 0.269 $p < 0.001^{**}$
Self-Efficacy	r = -0.265 $p < 0.001^{**}$	r = -0.272 $p < 0.001^{**}$	r = 0.478 $p < 0.001^{**}$
Social Mobilizing Capacity	r = -0.153 $p < 0.001^{**}$	r = -0.110 $p = 0.010^{**}$	r = 0.270 $p < 0.001^{**}$
Social Creating Capacity	r = -0.196 $p < 0.001^{**}$	r = -0.165 $p < 0.001^{**}$	r = 0.435 $p < 0.001^{**}$
Synchronicity	r = -0.531 $p < 0.001^{**}$	r = -0.461 $p < 0.001^{**}$	r = 0.450 $p < 0.001^{**}$
Goal Orientation	r = -0.292 $p < 0.001^{**}$	r = -0.306 $p < 0.001^{**}$	r = 0.352 $p < 0.001^{**}$
Impulse Control	r = -0.289 $p < 0.001^{**}$	r = -0.268 $p < 0.001^{**}$	r = 0.223 $p < 0.001^{**}$
Emotional Control	r = -0.458 $p < 0.001^{**}$	r = -0.298 $p < 0.001^{**}$	r = 0.307 $p < 0.001^{**}$
Irritability Control	r = -0.403 $p < 0.001^{**}$	r = -0.297 $p < 0.001^{**}$	r = 0.295 $p < 0.001^{**}$

Note: **p<0,01

The level of psychological immunity was also significantly higher among individuals who have previously not suffered from mental illness ($p = 0.005$) and among participants who reported no somatic symptoms ($p = 0.001$). Psychological immune competency significantly correlated with the number of reported symptoms ($r = -0.217$; $p < 0.001$).

5.2. STUDY 2: Content analysis of qualitative data with an aim to find a new direction in research

The aim of the content analysis of the semi-structured interviews was to generate new research questions and hypotheses for further studies. When the COVID-19 epidemic was declared a global pandemic in March 2020, it became apparent to us that for the foreseeable future, we are not going to be able to continue our original research. In the beginning of the pandemic all gatherings were banned especially within healthcare

institutions, so holding preventive and interventive trainings and organizing group work was impossible. During this time of uncertainty, we have decided to ask thirteen of our colleagues to tell us their story about the effects of the coronavirus on their life, to try and decide the future direction of our work.

Several topics have emerged during the content analysis of the semi-structured interviews; however, the concept of fear arose effecting multiple aspects of participants' life.

> *"Well, what should I say? Did I get frightened? Did I get scared? Yes. Then I didn't have much time to deal with how scared and how frightened I am, because the work needed to be done."*

In several cases, colleagues have reported the uncertainty and fear to be the new stressors in their jobs.

> *"Last year, even then there were difficulties in the department, but now there is this new thing… uncertainty, fear, for the safety of ourselves, for the safety of my family members, I fear will I take it [coronavirus] home, will I not take it home."*

> *"In the spring the colleagues have adhered to the regulations out of fear, and now, these numbers… They are afraid as well. Everybody has a family, some have children, some have elderly parents, so nobody wants to take it home. So now they work in fear and try to avoid it [the infectious ward] because they feel that they can get infected as well."*

In several cases colleagues formulated existential fear in regard to their own safety or the safety of their family members.

> *"I was afraid that there will not be enough protective gear."*

> *"I was afraid. While I was here [regular Emergency Department], I didn't think about it, how I could catch the coronavirus and die. It ran through my mind there [in the COVID-19 hospital] for the first time, that if I catch it, I could die or I could take it home to my father and he could die."*

Participants considerably talked about feeling objectless fear, fear of the unknown or the stress of uncertainty.

> *"Well, I wouldn't say that it is a real feeling of fear of disease, it's about fear of what's completely new and unknown."*

> *"So, to meet fear every day or to live under such pressure every day is, I think, beyond how much a person can take, or how long we can deal with it. We don't see the end of it. And that's what makes you insecure, or so I don't know. Really the uncertainty."*

The concept of fear was present in most of the interviews, and was reappearing within interviews in regard to different subject matters. Upon the analysis we have decided to look for novel tools that somehow try to conceptualize the feeling of fear in the unconventional environment generated by the pandemic. We have selected the FCV-19S (Ahorsu et al., 2020) and decided to validate the instrument in Hungarian.

5.3. STUDY 3: Validation and psychometric analysis of the Hungarian FCV-19S

5.3.1. Sample

In total 2175 participants completed the survey, 1786 students and 390 employees. The participants were between 19 and 89 years of age ($M = 28.59$, $SD = 10.75$). Among the employees 255 (65.3%) still went to work, while 126 (32.3%) worked from home. In total 93 participants (23.8%) were healthcare workers, while 297 (76.2%) were not. Table 5. shows further, in depth characteristics of the sample. All questions were mandatory, so there was no missing data.

Table 5: Sample characteristics (n = 2175)

Characteristics	Number of participants (n)	%
Sex		
Male	836	38.4
Female	1339	61.6
Marital Status		
Single	1448	66.6
Married	319	14.7
Living with a partner	350	16.1
Divorced	50	2.3
Widowed	8	0.4
Education		
Vocational school or lower	165	7.6
High school diploma	1086	49.9
Higher educational qualification	57	2.6
Bachelor	157	7.2
Postgraduate (Master/PhD)	710	32.6
Living with chronic illness (yes)	339	15.6
Regularly taking medication (yes)	625	28.7
Previously diagnosed with mental illness (yes)	260	12.0
Previously diagnosed with COVID-19 (yes)	384	17.7
Already vaccinated (yes)	275	12.6

5.3.2. Internal Consistency and Concurrent Validity

The Cronbach's α value for the Hungarian FCV-19S was 0.839, indicating a very good internal reliability. The inter-item correlations ranged between 0.41 and 0.60 and corrected item-total correlations varied between 0.59 and 0.68, indicating adequate internal consistency of the Hungarian FCV-19S. The skewness and kurtosis values presented in Table 6 suggested that at least items 3, 4, 6, and 7 are unlikely to be normally distributed, however, all items were found to be reliable.

Table 6: Descriptive details for the FCV-19S

Item	Factor loading	Mean (SD)	Skewness	Kurtosis	Cronbach's α when deleted
1	0.55	1.81 (0.78)	0.74	0.114	0.810
2	0.47	2.25 (1.01)	0.16	-1.125	0.832
3	0.77	1.14 (0.46)	3.87	16.86	0.823
4	0.63	1.34 (0.66)	2.15	4.59	0.813
5	0.58	1.84 (0.88)	0.79	-0.215	0.812
6	0.82	1.11 (0.43)	4.46	21.92	0.822
7	0.84	1.21 (0.55)	3.06	9.94	0.810

Overall Cronbach's α = 0.84

Concurrent validity was supported by the significant correlations with the state anxiety and depression. Fear of COVID-19 significantly and positively correlated with the STAI (r = 0.402; p < 0.001) and the BDI-H (r = 0.270; p < 0.001).

Average variance extracted (AVE) and composite reliability (CR) were calculated. AVE was 0.56 while CR was 0.90, both of which are acceptable values.

5.3.3. Results of CFA

Most items were distributed asymmetrically, with the highest frequencies in the lowest values. Analyzing the asymmetry and kurtosis of the seven items of the FCV-19S, most of the items did not fall within the range of ± 1.5. Shapiro-Wilk normality test confirmed that all items were distributed in a non-normal way ($p < 0.01$). The Hungarian FCV-19S appeared to have a unidimensional structure: it had eigenvalue of 3.91 in a single factor model, suggesting one factor as the optimal usable model.

CFA was performed on the data based on the factor structure provided by Ahorsu et al. in the original study (Ahorsu et al., 2020). A first order CFA was run to determine whether the factor structure of the original form of the scale would be confirmed in the Hungarian sample. The first model of the CFA revealed a poor fit for the seven-item single-factor construct (Table 7). CFI, TLI and RMSEA values were all above desirable thresholds.

Table 7: Results of the original and modified model fitting

Model	χ^2 (df)	CFI	TLI	RMSEA	90% CI
Original model	1139.64 (21)	0.841	0.789	0.156	0.149-0.164
Modified model	325.56 (18)	0.956	0.932	0.089	0.080-0.097

The pattern of modification and inter-item correlations suggested the presence of notable error co-variance within the cluster of items #1 (I am most afraid of coronavirus-19) and #2 (It makes me uncomfortable to think about coronavirus-19), #1 and #4 (I am afraid of losing my life because of coronavirus-19) and #2 and #5 (When watching news and stories about coronavirus-19 on social media, I become nervous or anxious). When the error of variance of these items was correlated in the Model 2, the above-mentioned values decreased substantially, and were below the required cut-off values. In the second model the goodness of fit values suggested a good fit and were the following: RMSEA = 0.089, CFI = 0.956, TLI = 0.932. Figure 1 presents an overview of the factor solution for the final model, including the factor loadings. All the paths shown in the model in Figure 1 were significant at the level of 0.01. Factor loadings of the items tested with CFA were found as I1 = 0.55, I2 = 0.47, I3 = 0.77, I4 = 0.63 I5 = 0.58, I6 = 0.82, I7 = 0.84. Since all factor loadings are greater than 0.30, these values can be considered adequate.

Figure 1. The results of the final CFA model of the Hungarian FCV-19S
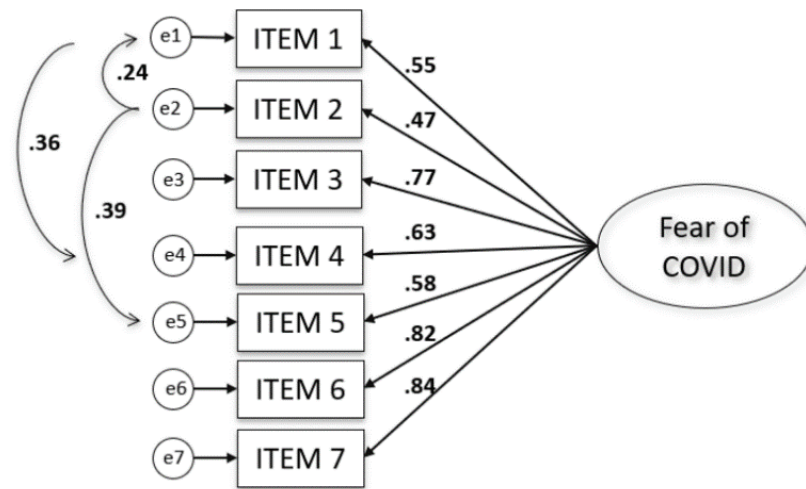
e1 → ITEM 1 .55
.24
e2 → ITEM 2 .47
.36
e3 → ITEM 3 .77
.39
e4 → ITEM 4 .63
.58
e5 → ITEM 5 .82
e6 → ITEM 6 .84
e7 → ITEM 7

Fear of COVID

The factor structure was tested for measurement invariance (configural, metric and scalar) across gender (male and female) (Brown, 2006). To test for measurement invariance across gender, multiple group CFA analyses was performed. The results showed a good fit for the model in both male (N = 836, χ^2 = 65.972, df = 11, RMSEA = 0.077, CFI = 0.983, TLI = 0.967, SRMR = 0.029) and female (N = 1339, χ^2 = 134.768, df = 11, RMSEA = 0.092, CFI = 0.967, TLI = 0.937, SRMR = 0.038) groups. The criteria for configural invariance (one-factor structure) were met. The comparison of the relative fit of the nested models showed that the criteria for metric invariance were also met, but not for the scalar invariance (Table 8), as indices diminished more than the recommended values (0.01 for CFI and TLI; 0.015 for RMSEA) (Chen, 2007).

Table 8: Measurement invariance across gender

Model	χ^2 (df)	CFI	TLI	RMSEA	90% CI	$\Delta\chi^2$ (df)	ΔCFI	ΔTLI	ΔRMSEA
Configural	200.740 (22)	0.974	0.951	0.086	0.076-0.098				
Metric	237.256 (28)	0.970	0.955	0.083	0.073-0.093	36.516 (6)	-0.004	-0.004	-0.003
Scalar	381.416 (34)	0.950	0.938	0.938	0.088-0.106	144.160 (6)	-0.020	-0.017	-0.855

5.4. STUDY 4: Comparison of burnout results before and during the COVID-19 pandemic among critical care physicians and nurses

5.4.1. Results of the initial measurement **before** the pandemic

In total, 65 employees of the DEM, 71 of the DS and 80 of the DAIT took part in the survey. The sample consisted of 71 doctors and 145 nurses and other staff. The participants were between 23 and 69 years of age, ($Mdn = 40; IQR = 31 – 48$). 26% of the sample was male (n = 57), while 73% of participants (n = 157) were female (in 2 cases we are missing data).

63% of the participants were in a relationship, while 36% were single, divorced or widowed (in 2 cases we are missing data). 34% of the participants had a university degree, 18% had advanced qualifications, 17% had high school education, while 31% had a diploma from a vocational school or lower education. 43% of the participants did not have children, while 57% had children ranging from one child to five.

5.4.1.1. Burnout results

78% of the sample showed at least moderate burnout on at least one of the three scales of burnout, 28% on all three scales. 5% of the sample were highly burnt out on all three scales. 66% of the sample showed at least moderate emotional exhaustion, 47% moderate depersonalization, while 50% of participants admitted to at least moderate decline in personal accomplishment.

The median on emotional exhaustion scale was 23 points ($IQR = 14 – 32$), on depersonalization scale 6 points ($IQR = 2 – 12$), while on personal accomplishment scale 38 points ($IQR = 44 – 31$). All three results fall into the moderate category. Doctors (n = 71) showed higher levels of emotional exhaustion ($Mdn = 25.5; IQR = 16 – 35$), higher depersonalization ($Mdn = 9; IQR = 4 – 13$), and no difference in decline in personal accomplishment ($Mdn = 38; IQR = 44 – 33.75$) compared to nurses (n = 145), who reported lower levels of emotional exhaustion ($Mdn = 22; IQR = 13 – 30$) and depersonalization ($Mdn = 5; IQR = 2 – 11$) and average decline ($Mdn = 38; IQR = 43 – 30$) on the personal accomplishment scale. The difference in emotional exhaustion (p = 0.046) and depersonalization (p = 0.007) results reached by the doctors and nurses was statistically significant, while the difference in personal accomplishment (p = 0.255) was not (Table 9).

Results of the KW test found significant differences between the three departments in all cases: emotional exhaustion (p = 0.018), depersonalization (p = 0.001), personal accomplishment (p = 0.001).

Table 9: Summary of Burnout results

		Median and IQR	Doctors	Nurses	DEM	DS	DAIT
Burnout	Emotional exhaustion	Mdn = 23 IQR = 14 – 32	Mdn = 25.5 IQR = 16 – 35	Mdn = 22 IQR = 13 - 30	Mdn = 21 IQR = 13 – 31	Mdn = 20 IQR = 11.5 – 28	Mdn = 26 IQR = 16 – 35.75
			MW U - test p = 0.046*		KW test p = 0,018*		
	Depersonalization	Mdn = 6 IQR = 2 – 12	Mdn = 9 IQR = 4 – 13	Mdn = 5 IQR = 2 – 11	Mdn = 7 IQR = 3 – 13	Mdn = 4 IQR = 1.75 – 7	Mdn = 8 IQR = 4 – 14
			MW U - test p = 0.007**		KW test p = 0.001**		
	Personal accomplishment	Mdn = 38 IQR = 44 – 31	Mdn = 38 IQR = 44 – 33.75	Mdn = 38 IQR = 43 – 30	Mdn = 37 IQR = 42 – 31	Mdn = 42.5 IQR = 45 – 34	Mdn = 36.5 IQR = 42 – 28.25
			MW U - test p = 0.255		KW test p = 0.001**		

*Note: **p<0,01; *0,01<p< 0,5*

5.4.1.2. Burnout and psychological immune competency

Comparing the strength of the psychological immune system between subjects who were at least moderately burnt out on at least one of the scales to their colleagues who were not, we found the difference to be significant (MW U-test, p < 0.001). The correlation between the scores reached on the Maslach Burnout Inventory and the total value of the psychological immune system was significant on the scale of emotional exhaustion (r = -0.478; p < 0.001), depersonalization (r = -0.459; p < 0.001) and personal accomplishment (r = 0.543; p < 0.001).

The scales of the psychological immune competency in almost all cases correlated with all three scales of burnout (Table 10).

Table 10: Correlations between the scales of psychological immune competency and burnout among critical care physicians and nurses

	Emotional exhaustion	Depersonalization	Personal accomplishment
Positive Thinking	r = -0.425 p < 0.001**	r = -0.394 p < 0.001**	r = 0.449 p = 0.001**
Sense of Control	r = -0.118 p = 0.086ᵗ	r = -0.213 p = 0.002**	r = 0.320 p = 0.001**
Sense of Coherence	r = -0.396 p < 0.001**	r = -0.402 p < 0.001**	r = 0.465 p = 0.001**
Creative Self Concept	r = -0.524 p < 0.001**	r = -0.464 p < 0.001**	r = 0.492 p = 0.001**
Sense of Self-Growth	r = -0.524 p < 0.001**	r = -0.464 p < 0.001**	r = 0.492 p = 0.001**
Change Challenge Orientation	r = -0.316 p < 0.001**	r = -0.275 p < 0.001**	r = 0.362 p = 0.001**
Social Monitoring	r = 0.017 p = 0.811	r = -0.035 p = 0.611	r = 0.207 p = 0.002**
Problem Solving	r = -0.264 p < 0.001**	r = -0.292 p < 0.001**	r = 0.452 p < 0.001**
Self-Efficacy	r = -0.331 p < 0.001**	r = -0.404 p < 0.001**	r = 0.464 p < 0.001**
Social Mobilizing Capacity	r = -0.155 p = 0.024*	r = -0.102 p = 0.137	r = 0.198 p = 0.003**
Social Creating Capacity	r = -0.294 p < 0.001**	r = -0.289 p < 0.001**	r = 0.482 p < 0.001**
Synchronicity	r = -0.472 p < 0.001**	r = -0.447 p < 0.001**	r = 0.431 p < 0.001**
Goal Orientation	r = -0.280 p < 0.001**	r = -0.388 p < 0.001**	r = 0.385 p < 0.001**
Impulse Control	r = -0.334 p < 0.001**	r = -0.273 p < 0.001**	r = 0.155 p = 0.023*
Emotional Control	r = -0.419 p < 0.001**	r = -0.359 p < 0.001**	r = 0.218 p = 0.001**
Irritability Control	r = -0.428 p < 0.001**	r = -0.365 p < 0.001**	r = 0.286 p < 0.001**

Note: **p<0,01; *0,01<p< 0,5; t: 0,05<p<0,1.

Between the three subsamples (DEM, DS, DAIT) we found significant difference in results on the following scales: positive thinking (KW test, p = 0.024), sense of self-growth (KW test, p = 0.01), synchronicity (KW test, p = 0.01), impulse control (KW test, p = 0.021) and emotional control (KW test, p = 0.5). In all cases the lowest scores on these scales were recorded at the DAIT, who also presented the highest scores of burnout (Table 11).

Table 11: Comparison of data for designated scales of psychological immunity in three organizations.

	DEM	DS	DAIT
Positive Thinking	Median = 16 IQR = 13 – 19	Median = 16 IQR = 13 – 18	Median = 14 IQR = 13 – 16.75
	KW test p = 0.024*		
Sense of Self-Growth	Median = 17 IQR = 15 – 19	Median = 17 IQR = 15 – 18	Median = 16 IQR = 13 – 18
	KW test p = 0. 010**		
Synchronicity	Median = 16 IQR = 14 – 18	Median = 16 IQR = 13 – 18	Median = 15 IQR = 12 – 17
	KW test p = 0.010**		
Impulse Control	Median = 15 IQR = 13 – 17	Median = 15 IQR = 12 – 17	Median = 14 IQR = 11.25 – 16
	KW test p = 0.021*		
Emotional Control	Median = 14 IQR = 12 – 16	Median = 13 IQR = 11 – 15	Median = 13 IQR = 10 – 16
	KW test p = 0.050*		

Note: **p<0,01; *0,01<p< 0,5.

5.4.1.3. Factors for predicting the level of burnout

In order to identify which significant variables predicted the levels of burnout, multiple regression was employed. Five variables (age, number of children, level of education, marital status and strength of psychological immune competency) were entered into the regression equation using the stepwise solution. The best predictor of emotional exhaustion was psychological immune competency, followed by the level of education and the number of children (adjusted R^2 = 0.341). The best predictor of depersonalization (adjusted R^2 = 0.312) was also the strength of psychological immune competency, followed by the number of children and level of education, while personal accomplishment (adjusted R^2 = 0.347) was best predicted by the strength of psychological immune competency and age (Table 12). Marital status was not a significant predictor of burnout in any case.

Table 12: Results of multiple linear stepwise regression analysis.

Block	Dependent variable / variable entered	Adjusted R²	R square change	Standardized coefficient β	t	p
	Emotional exhaustion					
1	Psychological immune competency	0.280	0.283	-0.578	-9.779	0.000**
2	Level of education	0.328	0.051	0.231	-3.849	0.000**
3	Number of children	0.341	0.017	-0.129	-2.242	0.024*
	Depersonalization					
1	Psychological immune competency	0.244	0.248	-0.532	-8.833	0.000**
2	Number of children	0.283	0.043	-0.202	-3.427	0.001**
3	Level of education	0.312	0.032	0.183	-3.041	0.003**
	Personal Accomplishment					
1	Psychological immune competency	0.325	0.328	0.575	10.063	0.000**
2	Age	0.347	0.026	0.161	2.810	0.005**

Note: **p<0,01; *0,01<p< 0,5.

5.4.2. Results of burnout measurement *during* the COVID-19 pandemic

124 critical care employees took part in the second survey, 45 workers of the DEM, 48 of the DS and 31 employees of the DAIT. 74% of the sample were male (n = 92) and 26% were female (n = 32). The participants were between 23 and 68 years of age (*Mdn* = 43; *IQR* = 32 – 51). 73% of the sample were in a relationship, while 27% were single. 65% of the participants held a university degree, 11% had advanced qualifications, 8% had high-school education, while 16% had a diploma from a vocational school. 58% of participants (n = 72) had children, while 42% (n = 52) were not parents.

5.4.2.1. Burnout results

97% of the sample (n = 120) reported at least moderate burnout on at least one of the scales, 79% (n = 98) moderate levels of burnout on all three scales, while 40% measured high levels of burnout (n = 50) on all three scales. 82% of the sample showed high levels of emotional exhaustion, while 94% at least moderate. 60% of the participants reported high levels of depersonalization, while 92% at least moderate. Lastly, 73% of employees admitted to high decline in personal accomplishment, while 90% of them of them perceived at least moderate decline.

The median on the emotional exhaustion scale was 38.5 points (*IQR* = 31 – 46.8), on the depersonalization scale 15.5 points (*IQR* = 9 – 21), while on the personal accomplishment scale 44 points (*IQR* = 49 – 38). All three results fall into the high category. The employees of the DEM (n = 45) reached a median of 40 points on the emotional exhaustion scale (*IQR* = 25.5 – 48), 15 points on the depersonalization scale (*IQR* = 9 – 22) and 46 points on the personal accomplishment scale (*IQR* = 51 – 39). The participants at the DS (n = 48) reached higher levels of emotional exhaustion (*Mdn* = 43; *IQR* = 39 – 49), higher levels of depersonalization (*Mdn* = 17.5; *IQR* = 12.25 – 23.75) but lower decline in personal accomplishment (*Mdn* = 41.5; *IQR* = 45 – 36). Workers at the DAIT (n = 31) showed lower levels of burnout on both emotional exhaustion (*Mdn* = 33; *IQR* = 29 – 41) and depersonalization (*Mdn* = 11; *IQR* = 8 – 16) scales, and similar results on personal accomplishment scale (*Mdn* = 46; *IQR* = 51 – 39) (Table 13). There was a significant difference between the three departments in all cases: emotional exhaustion (p = 0.003), depersonalization (p < 0.001), and personal accomplishment (p = 0.005).

There was a slight tendency on the depersonalization scale (p = 0.070) showing women as being more depersonalized than their male colleagues. We did not find a difference in burnout results among participants in a relationship compared to single workers. Nonetheless, parents were still less emotionally exhausted (p = 0.025) and less depersonalized (p = 0.040) than their colleagues without children. All three scales of burnout significantly and negatively correlated with age (p < 0.046).

5.4.2.2. Burnout and Fear of COVID-19

Fear of COVID-19 correlated significantly with all three scales of burnout: emotional exhaustion (r = 0.280; p = 0.002), depersonalization (r = 0.223; p = 0.013), and personal accomplishment (r = -0.232; p = 0.010), however, it did not show a correlation with age, level of education or number of children.

Being a parent and being in a relationship did not influence the perceived levels of the fear of coronavirus, however, there was a significant difference between genders (p = 0.042), men showing higher levels of fear than their female colleagues.

5.4.2.3. Burnout and anxiety

Levels of state anxiety showed significant positive correlation with the personal accomplishment scale (r = 0.181; 0.044) meaning that individuals with higher levels of state anxiety perceived their personal accomplishment as better.

Age and level of education did not correlate with levels of anxiety; however, the number of children showed a significant negative correlation (r = -0.188; p = 0.037) meaning that participants with fewer children showed higher levels of anxiety. There was no significant correlation between the fear of COVID-19 and state anxiety.

Difference in means between the three institutions was significant (p = 0.040), and so was the difference between parents and non-parents (p = 0.010). We found a slight tendency between genders (p = 0.085), women showing higher levels of anxiety. There was no difference between participants who are in a relationship and their single colleagues.

5.4.2.4. Burnout and depression

89% of the sample (n = 110) reported at least low levels of depression, 21% reported moderate depression (n = 26). Levels of depression correlated significantly with all three scales of burnout: emotional exhaustion (r = 0.685; p <0.001), depersonalization (r = 0.539, p < 0.001) and personal accomplishment (r = -0.472; p = 0.001). Levels of depression also significantly and positively correlated with levels of the fear of coronavirus (r = 0.436; p < 0.001). The relationship was not significant between depression and age, number of children, level of education or level of anxiety.

There was a significant difference in levels of depression between institutions (p = 0.004), however there was no difference between genders, parents and non-parents, and single participants compared to those who live in a relationship.

5.4.3. Comparison of burnout results **before and during** the COVID-19 pandemic

There was a significant difference (p < 0.001) between means reached during the first and second measurement on all three scales of burnout. This difference stays significant (p < 0.001) among employees of the DEM and the DAIT (p < 0.023). Workers of the DS showed worse burnout on emotional exhaustion and depersonalization scales (p < 0.001), but no difference (p = 0.353) in personal accomplishment (Table 13).

Table 13: Comparison of burnout results before and during coronavirus pandemic

		DEM		DS		DAIT	
		Before pandemic	During pandemic	Before pandemic	During pandemic	Before pandemic	During pandemic
Burnout	Emotional exhaustion	Mdn = 21 IQR = 13 − 31	Mdn = 40 IQR = 25.5 − 48	Mdn = 20 IQR = 11.5 − 28	Mdn = 43 IQR = 39 − 49	Mdn = 26 IQR = 16 − 35.75	Mdn = 33 IQR = 29 − 41
		MW U-test p < 0.001**		MW U-test p < 0.001**		MW U-test p = 0.001**	
	Depersonalization	Mdn = 7 IQR = 3 − 13	Mdn = 15 IQR = 9 − 22	Mdn = 4 IQR = 1.75 − 7	Mdn = 17.5 IQR = 12.25 − 23.75	Mdn = 8 IQR = 4 − 14	Mdn = 11; IQR = 8 − 16
		MW U-test p < 0.001**		MW U-test p < 0.001**		MW U-test p = 0.023*	
	Personal accomplishment	Mdn = 37 IQR = 42 − 31	Mdn = 46 IQR = 51 − 39	Mdn = 42.5 IQR = 45 − 34	Mdn = 41.5; IQR = 45 − 36	Mdn = 36.5 IQR = 42 − 28.25	Mdn = 46; IQR = 51 − 39
		MW U-test p < 0.001**		MW U-test p = 0.353		MW U-test p < 0.001**	

Note. **p<0,01; *0,01<p< 0,5.

6. Discussion

Burnout syndrome is highly prevalent among healthcare professionals, especially among critical care workers. Present thesis aimed to map out the occurrence and the protective and risk factors of burnout syndrome before and during the COVID-19 pandemic, as well as to focus on the role the fear of coronavirus plays in it. Firstly, the eleven institutions of the Albert Szent-Györgyi Clinical Centre participated in the study focusing on risk and protective factors of burnout with the aim of developing novel prevention and intervention strategies. Upon the outbreak of the COVID-19 pandemic, employing the results of a qualitative study, the focus of research was shifted to the concept of fear in regard to the coronavirus. The FCV-19S was validated in Hungarian with an aim to introduce a useful tool available for measurement. Lastly, the thesis presents comparison data collected before and during the COVID-19 pandemic among physicians and nurses in critical care units, focusing on resources in connection to burnout and the relationship between burnout syndrome, fear of COVID-19, depression and state anxiety.

6.1. Discussion of the initial burnout results

In the introductory study carried out before the pandemic, participants exhibited moderate emotional exhaustion and moderate-low depersonalization and loss of personal accomplishment. These findings are similar to previous studies and regional results (Balan et al., 2019; Cubrilo-Turek et al., 2006; Petrelli et al., 2019). Physicians exhibited higher levels of emotional exhaustion and depersonalization than nurses and other staff, while they scored similarly on the personal accomplishment scale.

Burnout syndrome was more prevalent among healthcare workers with lower psychological immune competency. Psychological immune competency is a construct encapsulating coping strategies, whose strength and diversity predict the success of one's adaptation (Oláh, 2005). These results support the theory according to which more adequate coping strategies and a higher degree of resilience contribute to the proper management of increased work-related stress and limit burnout (Győrffy, 2019; Mészáros et al., 2013). In concordance with the previous results, we found the strength of psychological immune competency to be a stable predictor of an individual's burnout (Dubey & Shahi, 2011; Oláh, 2005). Subjects who exhibited no burnout compared to their colleagues who reported high levels significantly differed on all sixteen scales. However, these differences are more delicate between the mildly and highly burnt out groups, where we defined eight important areas of difference: positive thinking, sense of coherence, sense of self-growth, goal orientation, synchronicity, impulse control, emotional control and irritability control. Psychological immune competency consists of three subsystems: the approaching-monitoring subsystem, the mobilizing-creating-executing subsystem and the self-regulation subsystem (Oláh, 2005, 2009). Synchronicity, impulse control, emotional control and irritability control are the four scales of the self-regulation subsystem managing the pressure and emotional burden caused by stress, as well as the control over attention and conscious functioning. The other four scales: positive thinking, sense of coherence, sense of self-growth and goal orientation are a part of the approaching and monitoring subsystem in charge of maintaining a positive attitude towards the world, being capable to interpret the environment as a positive, controllable, understandable, and meaningful whole. High levels of competence on this subsystem help us define ourselves as individuals who are goal-oriented and capable of continuous improvement (Oláh, 2005, 2009). In line with these results, it seems that people who perceive the management of their emotions in stressful situations as successful and are goal-oriented and focused on self-development are well-equipped in the battle against burnout. Psychological immunity was lower among participants with mental health problems, supporting the notion that the primary goal of psychological immunity is to ensure the healthy and integrated functioning of the personality (Vargay et al., 2019).

In their work with breast cancer patients, Vargay reports the increase of psychological immune competency during the active period, when patients received psychological interventions together with their treatment (Vargay et al., 2019). This suggests that psychological immune competency is not a fixed personality trait, but rather that it can be developed and improved over time. For example, impulse control and

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emotional control functions of psychological immunity help in both managing momentarily overwhelming emotions and shifting one's focus toward more realistic and logical actions. As such, these functions are both stabilizing in the process of coping. People with high impulse control think through their decisions thoroughly, while people with high emotional control regulate their negative emotions well, they are able to distance themselves from negative, pessimistic emotions in order to better achieve their goals (Vargay et al., 2019). Both of these capabilities are exceptionally important in managing stressful situations during patientcare. Engaging clinical health psychologists in the development of burnout prevention and intervention programs for healthcare personnel focused on growth of psychological immune competency would present an opportunity for personal development beneficial in managing several types of stressors. Present results indicate that the availability of such individual and group interventions in occupational settings is vital in the prevention of burnout, so drawing the attention of management to these opportunities is as important as the improvement of working conditions and infrastructure. It is, however, important to state that psychological immune competency only partially predicts burnout. Further research is needed in order to map out additional – individual and organizational – predictors dominant in burnout.

Burnout syndrome was also more prevalent among healthcare workers with lower numbers of social relationships. Workers reporting higher number and better-quality social relationships reported lower levels of burnout. The stability and diversity of one's social network seems to be an important protective factor against all three scales of burnout (Rippstein-Leuenberger et al., 2017). The more social relationships an individual has, and the more diverse and stronger those relationships are, the lower their burnout scores. Social connections can be fulfilling and emotionally recharging, nevertheless, they can also be stressors themselves (Dreher et al., 2019). Possibly, this is the reason why in the literature there is no agreement in regard to social networks and burnout (Czeglédi & Tandari-Kovács, 2019; Kállai, 2007; Maslach et al., 2001; Mészáros et al., 2013). Our results point out, however, that having several good relationships, especially a good relationship with colleagues and a supervisor, protects against all three scales of burnout. Focusing on strengthening collegial relationships and interpersonal communication might be a long-lasting burnout prevention strategy in respective institutes.

In addition to occupational relationships, family relationships are a great resource when developing a resistance to burnout. Our research suggests that parents are more protected from burnout than their childfree colleagues on all three scales. Children,

similarly to relationships, are not only a resource, but can be a burden too, especially for women with babies or toddlers, where joggling responsibilities of raising a young child while maintaining a professional career is often a considerable amount of strain (Canadas-De la Fuente et al., 2018; Shanafelt et al., 2009). Nonetheless, children demand attention and require establishing strong barriers between work and private life. Parents are often required to leave the workplace behind and dedicate their time and focus to different tasks, responsibilities and activities. This shift in the aim of their attention seems to protect them from overly centralizing their values on their jobs.

According to our results, burnout syndrome is less prevalent with age. Older test subjects reported lower levels of burnout, similarly to some previous studies (Ádám, Torzsa, et al., 2009; Shanafelt et al., 2009, 2012). However, there is no consensus in the literature regarding age and burnout, as some studies report it as a risk factor (Fejes et al., 2021). Based on our results, colleagues who have spent longer times in healthcare and longer times in their respective fields also reported lower levels of burnout. This supports the notion that with time coping mechanisms can be developed and professional confidence can be gained which helps us navigate through workplace stressors and prevent burnout. It also supports the theory that psychological immunity can be developed and advanced with time, so investing in such practices could be a successful prevention strategy.

Burnout, as well as psychological immune competency, correlated with the number of reported somatic symptoms, as participants experiencing no symptoms also reported lower levels of burnout and higher levels of psychological immunity. Almost two thirds of the sample admitted to at least one somatic symptom or complaint. Most participants reported insomnia, which is closely related to several mental disorders and is a very significant stressor itself. Highly demanding working conditions and the disturbances to the circadian rhythm due to night shifts present perfect environment for the development of insomnia (Welp et al., 2019). High blood pressure, headaches and changes in body weight along with musculoskeletal and endocrine problems were also prevalent somatic symptoms among the participants. Most of these symptoms could be managed with a healthy change in lifestyle habits (Salvagioni et al., 2017; Reith, 2018). The depletion of energy and feeling of aimlessness that is frequently associated with emotional exhaustion could be a strong barrier in applying any changes toward choosing healthier behaviors (Salvagioni et al., 2017). This catch-22 could also be a reason why colleagues with higher burnout scores report less physical activity and less fulfilling activities, hobbies (Petrelli et al., 2019).

Workload and the number of working hours negatively affected the emotional exhaustion and depersonalization of medical professionals, but, interestingly, did not affect their personal accomplishment. In some cases the reported working hours were extremely high, and in most of these cases the employee was working two jobs. 26% of the participants had a second job, and those individuals reported lower personal accomplishment than their colleagues. The high number of working hours and a second job doubles the already high-level responsibilities, and leaves very little room for activities outside of work (Reith, 2018; Pulcrano et al., 2016; Tawfik et al., 2017).

Men were more depersonalized, which is in concordance with some of the literature (Canadas-De la Fuente et al., 2018), however, we have not found a difference in personal accomplishment or emotional exhaustion. Similarly, we have not found a difference in burnout levels among different relationship statuses (Ádám, Torzsa, et al., 2009; Canadas-De la Fuente et al., 2018; Shanafelt et al., 2009, 2012), nevertheless, a methodical error might be at the root of this result. In the questionnaire we asked participants to report their marital status (single, married, in a civil partnership, divorced, widowed), however, these are legal groups. We did not actually get information if a person is currently in a relationship.

We have analyzed the qualitative questions among the subsample of workers who were above average on the eight scales of psychological immunity reported above. The analysis revealed that most of them protect themselves from burnout by focusing on some kind of a hobby activity, similarly to how it has previously been reported in other qualitative studies (Rippstein-Leuenberger et al., 2017). This finding stresses the importance of upholding cherished activities outside the workplace. Additionally, these workers claimed to protect themselves by spending time with their families, which is a second very important pillar in developing a healthy work-life balance (Dreher et al., 2019). In some cases, exercise and walking was highlighted. Healthy behaviors, such as exercise, a healthy diet and sleep all help in maintaining well-being, and as such could also have a significant impact on the prevention of burnout. Lastly, these participants prioritized sleep and relaxation. Most of the healthcare workers who participated in the study work rotational shifts, so they work several nights a week. This alone could disturb the circadian rhythm and healthy sleeping patterns (Salvagioni et al., 2017; Welp et al., 2019). Prioritizing sleep during free time might be of paramount importance in reducing the long-lasting effects of sleep disturbance.

The qualitative knowledge obtained in this study together with a focus on the eight scales of psychological immune competency gave us a perspective for further quantitative research and development of intervention strategies. This research supports the complexity of burnout prevention, as for some colleagues the amelioration of discussed skillsets could be the solution for prevention, while for others the answer may be in planning a more structured, fulfilling free time. As a part of this study a three-part intervention program was developed and implemented at the DEM, the DS, the DAIT and the Department of Ophthalmology. The training sessions were held in groups with a maximum of 10 participants. They were approximately two hours long, and the first focused on psychoeducation on burnout, the second on communication and the third on aggression and impulsivity. The trainings stopped as the COVID-19 pandemic started, so we were unable to fine tune them, and measure their effect.

6.2. Discussion of the validation of the FCV-19S

The primary aim of this study was to examine psychometric properties of the Hungarian FCV-19S. Results suggest that the Hungarian version of the scale has a stable unidimensional structure, as reported in the original study (Ahorsu et al., 2020) and several adaptations (for example, Alyami et al., 2020; Haktanir et al., 2020; Perz et al., 2020; Sakib et al., 2020; Soraci et al., 2020). Across a large sample, the Hungarian FCV-19S has good internal reliability and consistency.

We found the scale to be partially invariant with respect to gender. The measurement of the invariance across gender confirmed configural invariance, meaning that the basic factor structure is invariant across gender groups, men and women conceptualize the fear of coronavirus construct similarly. Metric invariance was also established, meaning that both genders respond to the items the identical way. The scalar invariance was not established. It refers to the condition that the level of the compared latent construct holds across groups (Xu & Tracey, 2017). When not supported it implies differential mean levels of the same latent construct between genders.

The significant correlation between the FCV-19S, the STAI (level of state anxiety) and the BDI-H (level of depression) confirms the concurrent validity of the scale. Similar correlations between the FCV-19S and the STAI have been formerly reported on the sample of Spanish university students (Martínez-Lorca et al., 2020). Previous literature (Ford et al., 2019; Huang & Zhao, 2020; Ullah et al., 2021) supports the finding, that anxiety and

depression are often comorbid with feelings of fear (Hamm, 2020; Ohman, 2000), specifically fear during epidemics (Blakey et al., 2015). This relationship has been reported in several previous adaptations of the scale using various measures of anxiety and depression (for example, Caycho-Rodríguez et al., 2020; Elemo et al., 2020; Haktanir et al., 2020; Huarcaya-Victoria et al., 2020; Sakib et al., 2020; Soraci et al., 2020; Winter et al., 2020) all reporting significant positive correlation between the scales.

The significant positive relationship measured between levels of fear and levels of state anxiety and depression, suggest that individuals who experience high levels of fear of coronavirus have also high probability to comorbidly be affected by these disorders (Soraci et al., 2020). This supports previous findings reporting that long periods of infectious epidemics are a breeding ground for development of psychophysical health issues and negative mental health conditions such as feelings of depression, anxiety, fear and phobias (Amin, 2020a, 2020b; Asmundson & Taylor, 2020; Blakey et al., 2015; Duncan et al., 2009; Pappas et al., 2009; Ropeik, 2004; Soraci et al., 2020). The cross-sectional design prevents the causal interpretation of the data, so it is impossible to determine whether being depressed accelerates the fear of COVID-19 or whether the fear of coronavirus intensifies feelings of depression. Future longitudinal studies are needed to examine causes and consequences of the fear of coronavirus (Sakib et al., 2020; Soraci et al., 2020).

Higher scores on the FCV-19S predict higher scores on the STAI and the BDI-H, however, even though significant, the correlations between the FCV-19S and the STAI and between the FCV-19S and the BDI-H were moderate. This indicates a significant unshared variance between the FCV-19S, the STAI and the BDI-H suggesting that they represent more than one underlying construct, thus the FCV-19S may provide some unique variance to the construct of overall anxiety and depression (Perz et al., 2020). Additionally, while the STAI focuses on individual's state anxiety, their general experience of anxiety regardless of the source, the FCV-19S is more specific, it focuses exclusively on their fear in regard to coronavirus.

The effect of the COVID-19 pandemic is not exclusively physical and psychological, but it raises severe systematic, social and economic issues. For instance, the spread of a viral infection is strongly in connection with the burden placed on the healthcare system and its possible overload (Rajabimajd et al., 2021) which negatively effects the healthcare professionals as well as the general population. Insecurity regarding the stability of the nation's healthcare system (Soraci et al., 2020) increases stress levels among all citizens, which in turn can have a negative effect on both physical and mental health

(Fiorillo & Gorwood, 2020; Hamm, 2020). Increased stress levels often result in higher prevalence of addictive behaviors (e.g., alcohol, tobacco or drug use) influencing person's health and immune system, making them more susceptible to disease and infection (Soraci et al., 2020). Additionally, fear experienced during epidemics formerly often resulted in stigmatization of groups racially perceived as being the source of the infection causing public disturbances, scuffles, in extreme cases civil conflicts (Falagas & Kiriaze, 2006; Pappas et al., 2009; Soraci et al., 2020).

The Hungarian version of the FCV-19S enables future research on causes and consequences of the fear of coronavirus and its effect on behaviors in connection to the pandemic. Secondly, it can be a direct tool used by the staff working in COVID-19 inpatient facilities for assessment of coronavirus-specific fear among patients (Pakpour et al., 2020).

Our sample is not representative of the Hungarian population. Even though the sample size is quite large, it is composed of university students and employees, thus it is not clear how this sample would generalize to Hungarian population. It would be useful to replicate the study on a representative sample. Present study is cross-sectional, however the perception of COVID-19 pandemic is most likely fluctuating as we enter different stages of the epidemic globally and locally as well. For example, since data collection Hungary has had a stable vaccination rate, which could change the perception of the pandemic as well as the levels of fear associated with it. Likewise, present study design provides very little insight into causality. Future studies should include longitudional design to gain knowledge regarding causal relationship between fear of coronavirus, anxiety and depression.

6.3. Discussion of burnout results among critical care physicians and nurses

The pattern of burnout among critical care personnel was similar to previous research, the three scales showed independent correlations with different variables (Dimou et al., 2017; Maslach et al., 2001; Schaufeli et al., 2008; Shanafelt et al., 2009). Burnout was more prevalent than previously reported in the first study, and in the general sample of the Hungarian healthcare professionals (Győrffy & Girasek, 2015). Participants exhibited moderate burnout on all three scales, although the depersonalization results seem to be on the border between moderate and low. Similarly, moderate burnout has been reported among Croatian and Romanian ICU colleagues (Balan et al., 2019; Cubrilo-Turek et al., 2006).

The employees of the DAIT disclosed higher levels of burnout on all three scales, while the lowest depersonalization was recorded at the DS. We are unable to establish direct causation between variables, however, according to some previous studies (Wang et al., 2020), one possible reason for the high depersonalization value measured among employees working in emergency medicine and intensive care is in connection with the difficulties in communication and the lack of responsiveness of the patients. These professionals work in a highly responsible environment, where a decline in performance is not acceptable, however, due to the limited time spent with patients and to communication barriers (as a consequence of patients' critical condition, unconsciousness, intubation or cognitive impairment induced by shock or high levels or pain) depersonalization could be a plausible way for burnout to manifest. Surgery departments are more traditional inpatient facilities, where patients stay responsive and spend several days on the surgical wards during the preoperative and the postoperative period. The longer time spent together presents an opportunity for the clinical staff to gain genuine insight into the patient and form a more complex relationship. Further research is needed in order to define the precise influence responsiveness of patients has on depersonalization and burnout.

Consistent with previous findings, the strength of a person's psychological immune system was a stable predictor of burnout (Oláh, 2009) among critical care professionals as well. In addition to the psychological immune competency, we established that the level of education and number of children also predicted emotional exhaustion and depersonalization, while age was a predictor on personal accomplishment scale (Sinsky et al., 2017). The role of age in predicting the levels of perceived personal accomplishment could be supported by the theory previously explained, that healthcare personnel develop professional confidence and skills over time (Ádám, Győrffy, et al., 2009; Shanafelt et al., 2009, 2012). We hypothesize that clinical employees strengthen certain coping mechanisms through time that guard them in various stressful situations (Ádám, Győrffy, et al., 2009), meanwhile, workers who are unable to cope with the stressors of the healthcare system with time leave the profession and retire (Sinsky et al., 2017). This explains why higher levels of burnout are reported among the younger population (Shanafelt et al., 2012). Emergency medicine and intensive therapy employees report higher numbers of stressors than the general population, and more frequent intention to leave the profession (Estryn-Behar et al., 2011; Lall et al., 2020).

The scores on positive thinking, sense of self-growth, synchronicity, impulse control and emotional control scales were significantly lower at the DAIT compared to the other two units, where the highest rates of burnout were consequently reported. The sense of self-growth, synchronicity, impulse control and emotional control are all protective capabilities, it seems that lacking in these protection skills leaves an individual vulnerable to the effects of stress.

A high number of participants reported having a second job in addition to a full-time position. Employees working two jobs reported higher levels of emotional exhaustion and a greater decline in personal accomplishment. Commonly, the work of employees of intensive care, emergency medicine or surgery includes a high level of physical and mental strain, taking care of critically ill patients, using sophisticated technologies under time pressure, functioning at an intense pace, requiring quick and adequate responses to urgent situations with relatively limited control, influence over work processes, and decision-making powers (Ádám & Mészáros, 2012; Bakker et al., 2005; Shanafelt et al., 2009). Each of these features creates an environment with above-average stress and promotes burnout. The second workplace doubles the workload, and adds to physical and mental fatigue highly contributing to emotional exhaustion (Pulcrano et al., 2016). Working on average 60 to 65 hours a week, half of which is usually at night, greatly influences healthy sleep patterns and leaves very little room for additional activities.

Almost two thirds of respondents admitted to at least one somatic symptom. Although the survey is unsuitable for establishing causation between burnout and the development of symptoms, the number of symptoms significantly correlates with all three scales of burnout. Most of the participants report insomnia followed by high blood pressure, headaches and changes in body weight.

The diversity and strength of the social network is a protective factor against all three scales of burnout, even in the subsample of critical care workers. The more social relationships a worker has, and the stronger these relationships are, the lower their rate of burnout. Although having several good relationships with colleagues and a good relationship with your chief might seem like an evident result, using this data to construct a workshop focusing on the strength of social skills could be an intervention point for some individuals. Knowing that workplace relationships significantly influence one's everyday mood and frame of mind might be motivational for some workers to open and seek the company of others.

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6.4. Comparison of the burnout results prior to and during the COVID-19 pandemic

In the last study of this thesis, we have remeasured the levels of burnout among critical care workers, additionally, we have measured their fear of coronavirus, levels of depression and state anxiety. Lastly, we compared the levels of critical care workers' burnout with data collected before and during the global pandemic of coronavirus.

The prevalence of burnout has significantly risen, almost 80% of the sample showed at least moderate burnout on all three scales, while 40% reported high levels of burnout compared to previously measured 5%. Employees admitted to significantly higher levels of emotional exhaustion and depersonalization; however, the amount of decline is the highest among workers of the DS. The onset of the pandemic and new rules within the healthcare organizations were considerably different for the workers in surgery from those in intensive or emergency care. Surgery wards were closed for a significant amount of time, workers were relocated to different institutions, all of which are novel hardships for surgeons and surgical nurses. Coronavirus has brought a plethora of new stressors to the healthcare environment, one of which is a feeling of hopelessness and helplessness, coupled with negative emotions, commonly depression, that may be tied to a loss of or threat to one's own goals or values. This specific set of emotions, defined as demoralization, can be a significant precursor to physician burnout (Gabel, 2012), and, as such, is associated with a sense of subjective incompetence and loss of control. Healthcare professionals have strong personal ethics related to benevolence, their desire to act for the welfare of others (Gabel, 2012). When the expected high-quality comprehensive care is denied due to organizational or interpersonal reasons, healthcare professionals often become demoralized. Such situations have dramatically risen with the onset of the COVID-19 pandemic. At the beginning of the pandemic, healthcare workers had to adjust their expectations and adapt to changes in their work environment and working conditions. Coping with demoralization involves remoralization, the renewal of an employee's personal values. If not addressed, persistent feelings of demoralization are likely to result in, or contribute to burnout (Gabel, 2012). Interestingly, emergency and intensive care employees perceive their personal accomplishment as higher during the pandemic compared to pre-pandemic levels. It is, however, important to mention that the subsamples are quite small, so the differences between departments described here are merely tendencies; further research is needed in order to paint a clear picture of a degree in change in burnout.

The fear of coronavirus showed a significant positive correlation with burnout, meaning that colleagues who experience higher levels of fear about the pandemic and their own safety are also more likely to burn out. As previously discussed, the significant positive correlation between levels of fear and levels of state anxiety and depression suggest that individuals who experience high levels of fear of the coronavirus also have a high probability to be comorbidly affected by depression and anxiety (Blakey et al., 2015; Duncan et al., 2009; Soraci et al., 2020). A similar connection is found between burnout and depression. Employees reporting higher levels of burnout declared higher levels of depression as well (Wurm et al., 2016). Interestingly, participants effected with state anxiety reported higher levels of personal accomplishment, meaning that they perceive their work as being better. Further studies are needed to understand the background of this data. In summary, burnout syndrome correlates with levels of depression, levels of anxiety and levels of fear of COVID-19, however, while the levels of depression and the fear of coronavirus effect burnout positively, levels of state anxiety seem to effect it negatively.

7. Conclusion and main findings

Burnout syndrome has been prevalent among healthcare professionals, mainly among critical care workers, prior to pandemic; however, with the new stressors being introduced by the epidemic of coronavirus, the situation became even more complex. The importance of present thesis primarily lies in the systematic measurement of burnout syndrome at the Albert Szent-Györgyi Clinical Centre reaching out to all professions with a focus on mapping out protective and risk factors that can be used as building blocks of novel intervention and prevention strategies. To our knowledge this is the first such study in Hungary.

We have defined eight scales of psychological immune competency that significantly influence burnout. Further research is needed to understand the causation between these scales and scales of burnout. Additionally, the qualitative data on non-burnt-out colleagues gives us supplementary information on their attitudes and beliefs, which will be beneficial in formulating future hypotheses. The emphasis of our work is in the utilization of the acquired knowledge through intervention trainings, which should be implemented again as soon as gatherings within healthcare institutions become acceptable. These trainings have focused on burnout education, communication (among colleagues and patient communication) as well as aggression and impulsivity. Learning how to manage emotions in a group setting and exchanging strategies with colleagues is undeniably

constructive in regard to self-regulation. Additionally, acquiring information on specifics, causes and symptoms of burnout can be of paramount importance in determining our own level or workplace well-being. Lastly, learning practical communicational techniques, such as assertive communication or suggestive communication, is both beneficial in managing collegial relationships, as well as relationships with patients.

After the outbreak of the COVID-19 pandemic, we have looked for novel directions in our research relying on the qualitative study and have introduced the concept of the fear of coronavirus. The novelty of our research is in the validation of the FCV-19S in Hungarian. The scale is an easy-to-use tool for determining the fear of coronavirus. Although it is not applicable for diagnostic use yet, it can still assist healthcare workers in COVID-19 inpatient facilities in determining the presence of fear.

Lastly, we have compared burnout results before and during the pandemic among critical care workers, and have measured their fear of COVID-19, state anxiety and depression. We have found the fear of COVID-19 and depression to have a positive correlation with burnout, but not state anxiety. The prevalence of depression and its correlation with burnout is extremely important, as it has an overall effect on critical care employees' life, the quality of their relationships, their well-being, their mental and physical health. Giving special attention to burnout prevention should be one of the primary concerns of healthcare management, as lower levels of burnout would lead to better working environments, benefits to the physical and mental health of employees, less sick leave and, eventually, better quality patient care.

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9. References

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10. Appendix

Hungarian version of the FCV-19S

|	
1	Nagyon félek a koronavírustól.
2	Kellemetlen érzés a koronavírusra gondolnom.
3	Izzad a tenyerem, ha a koronavírusra gondolok.
4	Félek, hogy meghalok koronavírus fertőzésben.
5	Amikor híreket vagy történeteket látok a koronavírusról a közösségi médiában ideges leszek vagy szorongok.
6	Nem tudok aludni az aggodalomtól, hogy elkapom a koronavírust.
7	Gyorsabban dobog a szívem, ha a koronavírusra gondolok.

I.
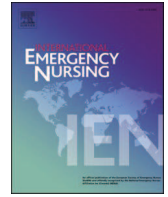
Psychological immune competency predicts burnout syndrome among the high-risk healthcare staff: A cross-sectional study

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ABSTRACT

Background: Burnout and psychological immune competency have not been investigated together among employees of high-risk specializations such as emergency medicine, intensive care or surgery.
Aim: In this study we aim to examine the prevalence of burnout among high-risk clinical staff and explore whether the strength of psychological immune competency predict burnout.
Design: A cross-sectional design utilizing a self-administrated questionnaire was used to collect data from the participants (n = 216). Nurses (n = 145) and physicians (n = 71) from emergency medicine, intensive care and surgery departments participated in the study.
Method: Burnout syndrome was measured using the Maslach Burnout Inventory, while psychological immune competency was measured using the Psychological Immune Competency Questionnaire. The data collection started in June of 2018 and was finished in March of 2019.
Results: Participants with higher psychological immune competency reported lower levels of burnout: emotional exhaustion (r = −0.478; p < 0.001), depersonalization (r = −0.459; p < 0.001) and personal accomplishment (r = 0.543; p < 0.001). Multiple linear stepwise regression analysis revealed the psychological immune competency to be a stable predictor of burnout on all three scales.
Conclusion: Psychological immune competency shows a strong relationship with scales of burnout syndrome and as such should be further examined due to development of successful intervention and prevention programs.

1. Introduction

Burnout is a syndrome of emotional, mental and cognitive exhaustion. It is an important consequence of workplace stress and as such it is receiving increased attention [1,2]. The 11th revision of the International Classification of Diseases, published in 2019 by the World Health Organization, includes burnout syndrome as an occupational phenomenon in the chapter on factors influencing health status or contact with health services. According to the ICD-11, burnout syndrome is a phenomenon interpretable in the occupational context, which occurs as a result of chronic workplace stress coupled with unsuccessful stress-management. It is characterized by three dimensions: feelings of energy depletion or exhaustion; increased mental distance, feelings of negativism or cynicism related to one's job; and reduced professional efficacy [3].

According to the work of Christina Maslach, burnout syndrome is defined by three dimensions: emotional exhaustion, depersonalization, and a sense of inefficacy, decrease in personal accomplishment [4,5]. Emotional exhaustion is the most important indicator of personal burnout, characterized by depletion of psychological and emotional resources, negative attitudes towards work and life, fatigue, loss of energy, resistance to work and feeling of purposelessness [6]. Depersonalization is a social component, defined by cynicism and impersonal attitude in relationships with patients associated with negative emotions. Personal accomplishment dimension describes the relationship between a person and their work, one's assessment of their own work performance [5,7].

The prevalence of burnout syndrome among the helping professions (such as teachers or clinical staff) seems to be higher than among other occupations [5,8,9]. The long working hours, delay in positive feedback,

difficulty in maintaining work-life balance, emotionally stressful patient relationships in a constantly changing healthcare environment all contribute to increased burnout levels among the medical professionals [8,10,11]. The occurrence of burnout syndrome among healthcare workers is significantly higher in some specializations, such as surgery, emergency medicine, intensive care, traumatology or general physician practice [5,7,10,12]. Stronger psychological immune competency might be of paramount importance for clinical professionals working in these fields. The psychological immune competency is an integration of different coping skills for adequate adaptation and stress-management [13], and it has been previously reported that general practitioners with higher psychological immune competency show lower levels of burnout [14].

2. Background

In the field of emergency medicine, intensive therapy and surgery the clinical staff is facing high expectations in terms of professional responsibilities, however they have only limited control and authority over their work. Caring for patients in critical conditions, performing various medical procedures with absolute precision, responding accurately and quickly to extremely urgent situations are all daily tasks for nurses and physicians in these medical fields [15].

Such organizational characteristics, in accordance with Robert Karasek's job demand-control model, provide perfect conditions for burnout [16]. Exhausting pressure and duties coupled with limited control over job circumstances present a breeding ground for high levels of work-related stress. For healthcare professionals in the above-mentioned fields the excessive workload [17,18], the time pressure and task complexity, the intensive use of sophisticated technology all contribute to work-related stress, while the level of control and authority (development of new skillsets, influence over workflows, decision-making power) in many cases stays low [15,16,18]. In past decades burnout research has identified a plethora of organizational risk factors, which are represented in six domains, namely: workload, control, reward, fairness, community and values [18,19]. First two areas are reflected in the previously discussed demand-control model of job stress. Insufficient recognition and reward devalue the work and the workers and is closely associated with feelings of inefficacy. Fairness is the extent to which decisions at work are perceived as being fair and equitable, while the area of community has to do with the quality of workplace relationships. Finally, the area of values is the alignment of personal and organizational values, ideals and motivations that originally attracted people to their job [18,19]. Among healthcare professionals working in critical care several organizational risk factors have been identified, such as excessive workload and job strain [20], lack of manager support [21,22], work-life and effort-reward imbalance [23] or burdensome working conditions for instance understaffing [24] or shift work [25] all of which increase workplace stress and contribute to demoralization and development of burnout.

In present study we attempt to understand how personality traits, specifically the strength of psychological immune competency affect burnout, while acknowledging that there are several organizational and situational factors that have not been the focus of this research. In order to better understand the interactional nature of coping mechanisms manifesting during successful adaptation, Oláh has conceptualized and operationalized the construct of psychological immune system as a pool of psychological adaptive resources providing protection against the ill effects of stress [13]. The psychological immune competency incorporates coping strategies, protective personality resources, and dimensions of resilience such as control capacity, learned resourcefulness, constructive thinking, hardiness, dispositional optimism, ego resiliency, and emotional intelligence. It combines 16 protective personality traits (namely, positive thinking, sense of control, sense of coherence, creative self-concept, sense of self-growth, challenge orientation, social monitoring capacity, problem-solving capacity, self-efficacy, social

mobilizing capacity, social creating capacity, synchronicity, goal orientation, impulse control, emotional control, irritability control) into a specific protective apparatus granting a certain immunity when faced with "psychological pathogens" such as stress, trauma or their negative outcomes [14].

The psychological immune competency integrates different coping skills into a multidimensional complex network providing capabilities of successful adaptation, strengthening invulnerability and raising the coping capacity of individuals [26,27]. It monitors situations, mobilizes resources, designs and executes adaptive pathways, furthermore it ensures the integrated functioning of the personality and facilitates development and self-growth. The psychological immune competency has been reported to have a strong correlation with well-being and life-satisfaction dimensions, for example: environmental mastery, purpose in life, personal growth, self-acceptance, positive relations, and autonomy [28]. Personality's protective qualities, such as sense of coherence, sense of self-growth, synchronicity, impulse control, emotional control, and irritability control, have a strong relationship with mental and physical health, and those, who have higher levels of immunity on these scales show less signs of burnout on all three scales [13,14,28,29]. The coping strategies of psychological immune system, such as positive thinking, sense of control, sense of coherence, and sense of self-growth play a mediating role in psychological adjustment and mental health in cases of acute psychopathology [28,30].

Even though the Central European region is underrepresented in burnout research, there have been some studies on burnout syndrome executed on Hungarian samples [6,31–33], which partially mapped out the occurrence, background factors and risk factors of burnout syndrome among general practitioners, medical students or female physicians [7,31,34]. These studies confirm the relationship between work stress, physical and emotional burden and burnout, and define the emotional exhaustion, depersonalization, depletion of performance, poor relationship with colleagues and lack of communication to be key factors contributing to higher levels of burnout [6,31–33]. There is so far no data on relationship between the psychological immune competency and burnout syndrome among employees of emergency departments, intensive care units or surgery departments, which is particularly important, as these healthcare professionals are working in high-stress environments.

Aim: The aim of this study is to assess the prevalence of burnout syndrome among critical care professionals in three organizations of University Hospital and to understand the role psychological immunity plays in development of burnout. This is the first study in Hungary, to our knowledge, targeting these high-risk specializations.

3. Methods

3.1. Participants

A sample of the working age population was recruited from three different organizations: Department of Emergency Medicine, Department of Surgery and Department of Anaesthesiology and Intensive Care at the University of Szeged, Hungary. In each organization the distribution of the questionnaires was organized by one contact person, who was previously trained in providing clear and comprehensive verbal instructions to the participants. Participants were informed verbally and in writing, that participation in the study is voluntary and anonym. The questionnaires and the statements of consent were separate documents and were collected independently from one another, so the anonymity stayed guarded. A total of 400 questionnaires were distributed, and 222 were returned by the specified deadline, amounting to a response rate of 56%. 6 participants were excluded due to incomplete burnout inventory. The final sample consisted of 216 physicians and nurses.

3.2. Data collection

Data was collected using a test battery consisting of sociodemographic questions, Maslach Burnout Inventory and Psychological Immune Competency Questionnaire. Burnout syndrome was measured by the 22-item Hungarian version of the Maslach Burnout Inventory [9,35]. When evaluating the Maslach Burnout Inventory, higher scores on the emotional exhaustion and depersonalization scales indicate a stronger burnout level, whereas the personal accomplishment scale is to be interpreted in the opposite direction, so a lower score means higher burnout [36]. The Psychological Immune Competency Questionnaire was used to assess the psychological immunity, an 80-item, 16-factor (positive thinking, sense of control, sense of coherence, creative self-concept, sense of self-growth, challenge orientation, social monitoring capacity, problem-solving capacity, self-efficacy, social mobilizing capacity, social creating capacity, synchronicity, goal orientation, impulse control, emotional control, irritability control) inquiry [13]. The responses are made on a 4-point scale ranging from (1) completely does not describe me to (4) completely describes me. The higher the scores the stronger and more active the psychological immune system when confronting stress. The Cronbach Alpha ranged from 0.62 to 0.80 and the retest reliability ranged from 0.77 to 0.89 for all the sixteen scales. The test battery took approximately 15–20 min to complete and was completed in paper form during work time. The data collection started in June of 2018 and was finished in March of 2019.

The study was conducted with the permission of the Regional Medical and Research Ethics Committee of the University of Szeged (approval No.: 237/2018-SZTE).

3.3. Data analysis

Since the data was not normally distributed we examined the differences in means using Kruskal-Wallis test (KW test) and Mann-Whitney U test (MW U test). Spearman correlation, was used to map out the relationship between the scales of burnout (emotional exhaustion, depersonalization, personal accomplishment) and the psychological immune system. Multiple stepwise linear regression analysis was conducted to explore the factors affecting the scales of burnout. Statistical analysis was performed with the SPSS 23.0 (IBM Corporation, USA), and significance level was defined at $p < 0.05$.

4. Results

4.1. Sample

In total, 65 employees of the Department of Emergency Medicine (DEM), 71 of the Department of Surgery (DS) and 80 of the Department of Anaesthesiology and Intensive Therapy (DAIT) took part in the survey. The sample consisted of 71 doctors and 145 nurses. The participants were between 23 and 69 years of age, ($Mdn = 40$; $IQR = 31–48$). 26% of the sample was male (n = 57), while 73% of participants (n = 157) were female.

63% of the participants are in a relationship, while 36% are single, divorced or widowed. 34% of the participants have university degree, 18% have advanced qualifications, 17% have high-school education, while 16% have a diploma from a vocational school. 43% of the participants don't have children, while 57% have children ranging from one child to five.

4.2. Burnout results

78% of the sample shows at least moderate burnout on at least one of the three scales. 66% of the sample shows at least moderate emotional exhaustion, 47% moderate depersonalization, while 50% of participants admit to at least moderate decline in personal accomplishment.

The median on emotional exhaustion scale was 23 points (IQR = 14–32), on depersonalization scale 6 points ($IQR = 2–12$), while on personal accomplishment scale 38 points ($IQR = 44–31$). All three results fall into moderate category. Doctors (n = 71) show higher levels of emotional exhaustion ($Mdn = 25.5$; $IQR = 16–35$), higher depersonalization ($Mdn = 9$; $IQR = 4–13$), and no difference in decline in personal accomplishment ($Mdn = 38$; $IQR = 44–33.75$) compared to nurses (n = 145) who report lower levels of emotional exhaustion ($Mdn = 22$; $IQR = 13–30$) and depersonalization ($Mdn = 5$; $IQR = 2–11$) and average decline ($Mdn = 38$; $IQR = 43–30$) on personal accomplishment scale. The difference in emotional exhaustion ($p = 0.046$) and depersonalization ($p = 0.007$) results reached by the doctors and nurses is statistically significant, while the difference in personal accomplishment ($p = 0.255$) is not (Table 1).

Results of Kruskal-Wallis test found significant differences between the three departments in all cases: emotional exhaustion ($p = 0.018$), depersonalization ($p = 0.001$), personal accomplishment ($p = 0.001$).

4.3. Burnout and psychological immune competency

Comparing the strength of psychological immune system between subjects who are at least moderately burnt out on at least one of the scales to their colleagues who are not, we find the difference to be significant (MW U test, $p < 0.001$). The correlation between the scores reached on the Maslach Burnout Inventory and the total value of psychological immune system is significant on the scale of emotional exhaustion ($r = -0.478$; $p < 0.001$), depersonalization ($r = -0.459$; $p < 0.001$) and personal accomplishment ($r = 0.543$; $p < 0.001$).

The scales of the psychological immune competency almost in all cases correlate with all three scales of burnout (Table 2).

Between the three subsamples we found significant difference in results on the following scales: Positive Thinking (KW test, $p = 0.024$), Sense of Self-Growth (KW test, $p = 0.01$), Synchronicity (KW test, $p = 0.01$), Impulse Control (KW test, $p = 0.021$) and Emotional Control (KW test, $p = 0.5$). In all cases the lowest scores on these scales were recorded at the Department of Anaesthesiology and Intensive Therapy, who also presented with the highest scores of burnout (Table 3).

4.4. Factors for predicting the level of burnout

In order to identify which significant variables predict the levels of burnout, multiple regression was employed. Five variables (age, number of children, level of education, marital status and strength of psychological immune competency) were entered into the regression equation using the stepwise solution. The best predictor of emotional exhaustion is psychological immune competency, followed by the level of education and the number of children (adjusted $R^2 = 0.341$). The best predictor of depersonalization (adjusted $R^2 = 0.312$) is also the strength of psychological immune competency, followed by the number of children and level of education, while the personal accomplishment (adjusted $R^2 = 0.347$) is best predicted by the strength of psychological immune competency and age (Table 4). Marital status was not a significant predictor of burnout in any case.

5. Discussion

The prevalence of burnout in current study is higher, than previously reported in general sample of the Hungarian healthcare professionals [32]. Participants exhibit moderate burnout on all three scales, although the depersonalization results seem to be on the border between moderate and low. Similarly, moderate burnout has been reported among Croatian and Romanian ICU colleagues [1,37]. Even though previous findings suggest some variables which may influence the level of burnout like improvements in working conditions, better work-life balance [32], higher levels of autonomy or more focus on quality relationships [22], the exact nature of the connection between all these factors and burnout remain unclear without comparative studies.

Table 1
Summary of Burnout results.

		Median and IQR	Doctors	Nurses	DEM	DS	DAIT
Burnout	Emotional exhaustion	Mdn = 23 IQR = 14–32	Mdn = 25.5 IQR = 16–35	Mdn = 22 IQR = 13–30	Mdn = 21 IQR = 13–31	Mdn = 20 IQR = 11.5–28	Mdn = 26 IQR = 16–35.75
			MW *U* test p = 0.046*		KW test p = 0,018*		
	Depersonalization	Mdn = 6 IQR = 2–12	Mdn = 9 IQR = 4–13	Mdn = 5 IQR = 2–11	Mdn = 7 IQR = 3–13	Mdn = 4 IQR = 1.75–7	Mdn = 8 IQR = 4–14
			MW *U* test p = 0.007**		KW test p = 0.001**		
	Personal accomplishment	Mdn = 38 IQR = 44–31	Mdn = 38 IQR = 44–33.75	Mdn = 38 IQR = 43–30	Mdn = 37 IQR = 42–31	Mdn = 42.5 IQR = 45–34	Mdn = 36.5 IQR = 42–28.25
			MW *U* test p = 0.255		KW test p = 0.001**		

Note: **p < 0,01; *0,01 < p < 0,5; [t]: 0,05 < p < 0,1.

Table 2
Correlations between the scales of psychological immune competency and burnout.

	Emotional exhaustion	Depersonalization	Personal accomplishment
Positive Thinking	r = −0.425	r = −0.394	r = 0.449
	p < 0.001**	p < 0.001**	p = 0.001**
Sense of Control	r = −0.118	r = −0.213	r = 0.320
	p = 0.086 [t]	p = 0.002**	p = 0.001**
Sense of Coherence	r = −0.396	r = −0.402	r = 0.465
	p < 0.001**	p < 0.001**	p = 0.001**
Creative Self Concept	r = −0.524	r = −0.464	r = 0.492
	p < 0.001**	p < 0.001**	p = 0.001**
Sense of Self-Growth	r = −0.524	r = −0.464	r = 0.492
	p < 0.001**	p < 0.001**	p = 0.001**
Change Challenge Orientation	r = −0.316	r = −0.275	r = 0.362
	p < 0.001**	p < 0.001**	p = 0.001**
Social Monitoring	r = 0.017	r = −0.035	r = 0.207
	p = 0.811	p = 0.611	p = 0.002**
Problem Solving	r = −0.264	r = −0.292	r = 0.452
	p < 0.001**	p < 0.001**	p < 0.001**
Self-Efficacy	r = −0.331	r = −0.404	r = 0.464
	p < 0.001**	p < 0.001**	p < 0.001**
Social Mobilizing Capacity	r = −0.155	r = −0.102	r = 0.198
	p = 0.024*	p = 0.137	p = 0.003**
Social Creating Capacity	r = −0.294	r = −0.289	r = 0.482
	p < 0.001**	p < 0.001**	p < 0.001**
Synchronicity	r = −0.472	r = −0.447	r = 0.431
	p < 0.001**	p < 0.001**	p < 0.001**
Goal Orientation	r = −0.280	r = −0.388	r = 0.385
	p < 0.001**	p < 0.001**	p < 0.001**
Impulse Control	r = −0.334	r = −0.273	r = 0.155
	p < 0.001**	p < 0.001**	p = 0.023*
Emotional Control	r = −0.419	r = −0.359	r = 0.218
	p < 0.001**	p < 0.001**	p = 0.001**
Irritability Control	r = −0.428	r = −0.365	r = 0.286
	p < 0.001**	p < 0.001**	p < 0.001**

Note: **p < 0,01; *0,01 < p < 0,5; t: 0,05 < p < 0,1.

Table 3
Comparison of data for designated scales of psychological immunity in three organizations.

	DEM	DS	DAIT
Positive Thinking	Median = 16	Median = 16	Median = 14
	IQR = 13–19	IQR = 13–18	IQR = 13–16.75
	KW test p = 0.024*		
Sense of Self-Growth	Median = 17	Median = 17	Median = 16
	IQR = 15–19	IQR = 15–18	IQR = 13–18
	KW test p = 0. 010**		
Synchronicity	Median = 16	Median = 16	Median = 15
	IQR = 14–18	IQR = 13–18	IQR = 12–17
	KW test p = 0.010**		
Impulse Control	Median = 15	Median = 15	Median = 14
	IQR = 13–17	IQR = 12–17	IQR = 11.25–16
	KW test p = 0.021*		
Emotional Control	Median = 14	Median = 13	Median = 13
	IQR = 12–16	IQR = 11–15	IQR = 10–16
	KW test p = 0.050*		

Note: **p < 0,01; *0,01 < p < 0,5; [t]: 0,05 < p < 0,1.

Surgery departments are more traditional inpatient facilities, where the patients stay responsive and spend several days on the surgical wards during the preoperative and the postoperative period. The longer time spent together presents an opportunity for the clinical staff to gain genuine insight into the patient and form a more complex relationship. Further research is needed in order to define the precise influence responsiveness of patients has on depersonalization and burnout.

Consistent with previous findings, the strength of person's psychological immune system is a stable predictor of burnout [29]. In addition to the psychological immune competency, we established that the level of education and number of children also predict emotional exhaustion and depersonalization, while age predicts personal accomplishment. The role of age in predicting the levels of perceived personal accomplishment could be supported by the theory, that healthcare workers develop skills and gain professional confidence over time, as it has been previously reported that age is a protective factor in burnout [7,12,39,40]. Clinical employees develop certain coping mechanisms through time that guard them in various stressful situations [7], meanwhile, workers who are unable to cope with the stressors of the healthcare system with time leave the profession and retire [41], explaining why higher levels of burnout are reported among younger population [12]. Professionals in emergency medicine and critical care report higher numbers of stressors than general population and more frequent intention to leave [42,43]. Similarly, in some international findings the number of children has been listed as a protective factor [39,44]. Our data suggests some connection between age, number of children and burnout levels as well, but this requires further qualitative exploration.

Psychological immune competency is a construct encapsulating coping strategies, whose strength and diversity predict the success of one's adaptation. These results support the theory according to which more adequate coping strategies and a higher degree of resilience

Physicians report higher scores than nurses on both emotional exhaustion and depersonalization scales, while there is no difference in decline of personal accomplishment between the two groups. The employees of the Department of Anaesthesiology and Intensive Therapy disclose higher levels of burnout on all three scales, while lowest depersonalization was recorded at the Department of Surgery. We are unable to establish direct causation between variables, however according to some previous studies [38] one possible reason for high depersonalization value measured among employees working in emergency medicine and intensive care is in connection to the difficulties in communication and unresponsiveness of the patients. These professionals work in a highly responsible environment, where loss of performance is not acceptable, however due to the limited time spent with patients and due to the communicational barriers (as a consequence of patients' critical condition, unconsciousness, intubation or cognitive impairment because of shock or high levels or pain) the depersonalization could be a plausible way for burnout to manifest.

Table 4
Results of multiple linear stepwise regression analysis.

Block	Dependent variable/variable entered	Adjusted R^2	R square change	Standardized coefficient β	t	p
Emotional exhaustion						
1	Psychological immune competency	0.280	0.283	−0.578	−9.779	0.000
2	Level of education	0.328	0.051	0.231	−3.849	0.000
3	Number of children	0.341	0.017	−0.129	−2.242	0.024
Depersonalization						
1	Psychological immune competency	0.244	0.248	−0.532	−8.833	0.000
2	Number of children	0.283	0.043	−0.202	−3.427	0.001
3	Level of education	0.312	0.032	0.183	−3.041	0.003
Personal accomplishment						
1	Psychological immune competency	0.325	0.328	0.575	10.063	0.000
2	Age	0.347	0.026	0.161	2.810	0.005

contribute to the proper management of increased work-related stress and limit burnout [33,45]. The scales of the psychological immune competency all correlated with the scales of burnout, meaning that investing in development of these capabilities would be a reliable point of intervention when confronting burnout. We identified the scores on positive thinking, sense of self-growth, synchronicity, impulse control and emotional control scales to be significantly lower at the Department of Anaesthesiology and Intensive Therapy, compared to the other two units. Since the intensive therapy colleagues reached the highest scores on burnout scales, further investigation of these coping strategies would be important, in order to clarify whether there is a pattern of strengths and weaknesses of non-burnt out clinical staff. The sense of self-growth, synchronicity, impulse control and emotional control are all personalities protective capabilities, it seems that lacking in these protection skills leaves a person vulnerable to the effects of stress and development of burnout.

In their work with breast cancer patients, Vargay reports the increase of psychological immune competency during the active period, when patients received psychological interventions together with their treatment [28]. This suggests, that psychological immune competency is not a fixed personality trait, but rather that it can be developed and improved over time. For example, impulse control and emotional control functions of psychological immunity both help in managing momentarily overwhelming emotions and shifting one's focus toward more realistic and logical actions. As such, these functions are both stabilizing in the process of coping. People with high impulse control think through their decisions thoroughly, while people with high emotional control regulate their negative emotions well, they are able to distance themselves from negative, pessimistic emotions in order to better achieve their goals [28]. Both of these capabilities are exceptionally important in managing stressful situations during intensive or emergency patientcare. Engaging clinical health psychologists in development of burnout prevention and intervention programs for healthcare personnel focused on growth of psychological immune competency would present an opportunity for personal development beneficial in managing several types of stressors. Present results indicate that availability of such individual and group interventions in occupational setting is vital in prevention of burnout, so drawing the attention of management of high-risk departments to these psychological intervention opportunities is as important as improvement of working conditions and infrastructure. It is, however important to state, that the psychological immune competency only partially predicts burnout. Further research is needed in order to map out additional – individual and organizational – predictors dominant in burnout.

6. Limitations

Present study is a cross-sectional design, which prevents the causal interpretation of the data. Future research should focus on better definition of causes and consequences of burnout among intensive care professionals through experimental or causal data sets, focusing not only on personal, but organizational aspects as well. We recommend further qualitative research which would enrich the findings of this work by painting a clearer picture of relations between present variables, as well as through discovery of new variables, their influence on burnout and through forming new hypotheses.

Although the used measures were carefully selected and are validated as suitable self-report tools, the study is limited by reliance on self-reported data, which could have led to bias in responses. Convenience sample was used in this study, resulting in findings that may not necessarily be representative. The generalizability of the findings also might be limited, since the sample was selected from only one clinic. We recommend the inclusion of further healthcare facilities in future research.

We did not focus on organizational and situational components of burnout, but rather individual. Broadening the focus to impacts of working environment on burnout in the future studies would give a more detailed result.

7. Conclusion

This study reveals that 78% of workers of emergency department, intensive care unit and department of surgery report at least moderate burnout. The research presents the importance of psychological immune competency in protection from burnout syndrome, which could be an adequate intervention point for development of prevention programs.

Ethics

The study was conducted with the permission of the Regional Medical and Research Ethics Committee of the University of Szeged, Hungary (approval No.: 237/2018-SZTE).

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CRediT authorship contribution statement

Mona Stankovic: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft. **László Papp:** Methodology, Formal analysis, Writing - review & editing. **László Ivánkovits:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft. **György Lázár:** Resources, Writing - review & editing, Supervision. **Zoltán Pető:** Conceptualization, Resources, Writing - review & editing, Supervision. **Annamária Töreki:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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II.

RESEARCH ARTICLE

Adaptation and psychometric evaluation of Hungarian version of the Fear of COVID-19 Scale

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Abstract

Background

COVID-19 pandemic has had a global major healthcare, social and economic impact. In present study we aim to adapt the Fear of COVID-19 Scale to Hungarian.

Materials and methods

Forward-backward translation method was used to translate the English version of the scale to Hungarian. Participants were a convenience sample of 2175 university students and employees. The study was conducted between January 18th and February 12th 2021. The test battery included Hungarian versions of Fear of COVID-19 scale, short Beck Depression Inventory (BDI-H) and State-Trait Anxiety Inventory (STAI).

Results

The scale showed one-factor structure, the loadings on the factor were significant and strong (from .47 to .84). Internal consistency was very good (α = .84). Construct validity for the Fear of COVID-19 Scale was supported by significant and positive correlations with STAI (r = 0.402; p < 0.001) and BDI-H (r = 0.270; p < 0.001).

Conclusion

The Hungarian version of Fear of COVID-19 Scale is a reliable and valid tool in assessing fear of coronavirus.

Introduction

Over a year after the breakout of the COVID-19 epidemic–declared as global pandemic on March 11th, 2020 by the World Health Organization–coronavirus 2 (SARS-CoV-2) spread is still in uprise in several countries around the globe. At the time of writing of this paper globally 173.315.599 cases of coronavirus were reported and the infection caused in total 3.729.410 deaths. In Hungary alone there have been 806.008 reported cases and 29.854 deaths according to the Coronavirus Resource Center [1].

Vaccination against SARS-CoV-2 has started throughout 2020 and up until now in total 2.109.878.745 doses of vaccine were administered globally [1]. At the time of data collection in January of 2021, vaccination has just started in Hungary, and vaccines were accessible only to healthcare professionals. Since then, according to the official site of the Hungarian government 5.260.418 citizens received one (54% of the population) and 3.989.525 (41% of the population) received both doses of the vaccine [2]. However, even though Hungary has good vaccination rate for over a month, the number of daily new cases and death rates are decreasing slowly.

Globally 220 countries and territories have been affected by the pandemic of coronavirus and governments all around the world have been taking unprecedented measures in order to slow down the spread of the virus. Measures vary from border control, lockdown, contact tracing to public health measures such as physical distancing, self-isolation and handwashing [3]. The spread of coronavirus triggers feelings of depression, fear, stress and anxiety among general population as well as healthcare professionals [4–6]. The long-term effects of the COVID-19 related fear are in connection with decreased job satisfaction and performance as well as high levels of anxiety among healthcare personnel [6]. The burdens of the pandemic, such as social distancing, lockdown, quarantine or isolation [7], the long-term consequences, such as job loss, financial insecurities, disruption of daily activities [8, 9], together with the overestimation of death tolls [10] as well as sensationalistic news and broadcasting all amplify fears and often generate stigma [11–13]. To date there is no particular estimation as to the duration of the pandemic, which further deepens the feelings of uncertainty [14]. Negative psychosocial consequences of fear have been reported, during former epidemics establishing that people often oscillate between denial and phobia, while stigmatizing persons racially perceived as being the source of the infection [12, 15–18]. Fear is often accompanied with feelings of anxiety and depression, which additionally negatively impact one's well-being and quality of life [13, 19–22].

According to Brooks [23], individuals kept in quarantine occasionally experience mental health issues, including anger, anxiety, confusion or PTSD [24–26]. Concurrently social isolation is strongly associated with anxiety and depression symptoms in both older and younger populations [13, 21, 27, 28]. Complementing medical treatments of coronavirus patients with psychological interventions would result in better-quality patientcare and overall better outcome for the entire population affected [13]. From the beginning of 2021 in some Hungarian COVID-19 inpatient facilities, clinical health psychologists have been a part of a medical team taking care of all COVID-19 infected patients. Colleagues working in these fields both help patients in coping with the effects of the infection and hospitalization, simultaneously relieving some burden of the medical staff.

Several measures have been created in order to assess the effect of coronavirus on mental health [29]. Ahorsu et al. [30] recently developed the Fear of COVID-19 Scale (FCV-19S), a measure adequate for assessment of the fear of coronavirus. This seven-item scale is a short and easy-to-use tool with very good internal consistency and concurrent validity positively correlating with measures of anxiety and depression [30, 31]. Since its development, the Fear of COVID-19 Scale has been translated and adapted to several languages [13, 14, 31–50]. The

initial study examined the validity against the Hospital Anxiety and Depression Scale and Perceived Vulnerability to Disease Scale [30], similarly to the Portuguese [5], English [31], Italian [13], Arabic [46], Spanish [44] and Japanese [37] adaptations, while other studies confirmed the validity using various other measures of depression and anxiety [14, 32–35, 38, 39, 42, 43, 45, 47, 49, 50]. The Fear of COVID-19 Scale has high reliability across translations and cultural adaptations [4].

There is debate whether the Fear of COVID-19 Scale has a stable single-factor structure [4] as reported in the initial study [30] and several adaptations [5, 13, 14, 31, 32, 34, 36, 38–43, 46, 50–53] or if it is bi-factorial as reported in Paraguayan [44], Israeli [45], Chinese [47], Norwegian [49], Argentinian [33], Peruvian [35], Japanese [37] and Eastern European [54] populations. The two-factor models define a cognitive and somatic fear [49] or emotional and psychological [37] fear. Due to the high correlation between the factors Iversen [49] proposes a second-order hierarchical model with two latent factors (somatic and cognitive fear) serving as indicators of a second-order general fear of COVID-19 factor. According to the developers of the initial scale, items were designed to examine both types of fear responses (physical and psychological) [55] however they are confident in the scale's single-factor structure [56, 57].

Lin et al. has investigated the invariance and psychometric properties of the Fear of COVID-19 Scale in the original and ten translated datasets and confirmed one-factor structure of the measure in different ethnic populations [56]. The study found the invariance to be supported across gender and age groups, but only partially across ethnic populations [56].

Adaptation of the Fear of COVID-19 Scale to Hungarian would be a useful tool for healthcare providers when in need to quickly assess an individual's fear of coronavirus [30, 57, 58]. We aim to report psychometric properties, reliability qualities, concurrent validity and confirmatory validity of the Hungarian version of the Fear of COVID-19 Scale (FCV-19S) and examine factorial invariance across genders.

Materials and methods

Participants and procedure

Participants were a convenience sample of employees and students of the University of Szeged in Hungary. Participants were reached through the emailing system used at the university. Study announcements, containing brief information about the data collection and the questionnaire, the aim of the investigation as well as the webpage link to the study, were shared via email. All participants were at least 18 years of age. Answers to all questions were mandatory. Data was collected between January 18th and February 16th, 2021 during which time potential participants got a weekly reminder. The online survey was prepared using the EvaSys Automation Software V7.1 (Electric Paper Evaluationssysteme GmbH, Germany) in compliance with all General Data Protection Regulations. A final sample comprising 2175 participants was used to validate the Hungarian version of the FCV-19S.

Ethical considerations

The study was conducted with the permission of the Regional Medical and Research Ethics Committee of the University of Szeged (approval No.: 199/2020-SZTE). The study adhered to the guidelines of the Helsinki Declaration, 1975. Participation was voluntary and all participants were ensured in writing concerning the anonymity of the data as well as the nature and purpose of the data collection prior to consenting.

Adaptation of FCV-19S into Hungarian

Adaptation was carried out in accordance with *Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures* [59]. The forward-backward translation method was applied to adapt the FCV-19S into Hungarian. One psychologist, as a subject matter expert and two English lectors, experienced in English and Hungarian culture translated the original seven-item scale into Hungarian (forward-translation). The three Hungarian versions were then translated back to English by a second psychologist and two English translators none of whom have seen the original version of the scale (back translation). Finally, an expert panel of three members evaluated, scrutinized the translated versions, checked for cultural appropriateness and finalized the items. All seven questions were retained. The approved Hungarian translation was piloted among 20 people to examine the scale readability and potential ambiguity. No apparent problems were found during the pilot trial, no further changes were deemed necessary. The final Hungarian version of the Fear of COVID-19 Scale can be found in the S1 Appendix.

Measures

Demographic information.   Participants reported gender, marital status, number of children, highest level of education, if they have a chronic illness or mental illness diagnosis, if they regularly take any medication, whether they are a healthcare professional, if they underwent the COVID-19 infection and whether they plan to vaccinate themselves against COVID-19.

Hungarian Fear of COVID-19 Scale.   The FCV-19S is a unidimensional, 7-item (e.g., "I am most afraid of coronavirus-19") scale that measures one's fear levels of COVID-19 [30]. In Hungarian adaptation of the scale, we have decided to use a four-point Likert scale for the ease of use with the rest of the measures. Compared to the original version of the measure, the four-point scale ranged from 1 (*strongly disagree*) to 4 (*strongly agree*) without the "neither agree nor disagree" option. The score ranges from 7 to 28 points and the higher score indicates greater fear of coronavirus-19. The original scale has shown robust psychometric properties including high internal consistency (α = .82) [30].

State-Trait Anxiety Inventory (STAI).   The Hungarian adaptation [60] of the State-Trait Anxiety Inventory (STAI) questionnaire was used to assess participant's state anxiety [61]. The 20-item questionnaire was used on a 4-point Likert scale. Participants could reach a minimum of 20 and a maximum of 80 points. Higher score on scale represents higher state of anxiety. This screening tool is used widely in both non-psychiatric and clinical settings.

Beck Depression Scale (BDI-H).   Level of depression among participants was assessed using the shortened Hungarian version [62] of Beck Depression Scale [63], a nine-item questionnaire with a 4-point Likert scale. The shortened version is routinely used as equivalent to the original and the reliability of the Hungarian version is acceptable [64].

Data analysis

Descriptive statistics were used to report the sample characteristics. Skewness, kurtosis and distributions of responses were analyzed with respect to each item. Internal consistency was assessed by Cronbach's alpha coefficients (α), inter-item correlations and corrected item-total correlations. A Cronbach's α of .70 or higher indicated acceptable reliability [65], minimum inter-item correlations between .15 and .50, and minimum corrected item-total correlations of .30 were used as indicators of internal consistency reliability. Concurrent validity was assessed by comparing the Spearman correlations between the FCV-19S and STAI and BDI-H results. These analyses were conducted using the IBM SPSS Statistics v 26 software.

A confirmatory factor analysis (CFA) was performed to investigate the proposed theoretical domain structure in the Hungarian sample using the mean- and variance-adjusted weighted least squares (WLSMV) estimator. Goodness of fit was assessed according to the following criteria: root mean square error of approximation (RMSEA $\leq$ .08); comparative fit index (CFI > .90 or more desirably $\geq$ .95); Tucker–Lewis index (TLI > .90) and chi-square.

To test for measurement invariance across gender, multiple group CFA analysis (MGCFA) was performed. Configural, metric and scalar invariance was examined, invariance was established if ΔCFI and ΔTLI $\leq$ −.01; ΔRMSEA < .015 as recommended by Chen [66]. Factor structure was conducted using the MPlus 8 Software [67, 68].

Results

In total 2175 participants completed the survey, 1786 students and 390 employees. The participants were between 19 and 89 years of age (M = 28.59, SD = 10.75). Among the employees 255 (65.3%) still went to work, while 126 (32.3%) worked from home. In total 93 participants (23.8%) were healthcare workers, while 297 (76.2%) were not. Table 1. shows in depth further characteristics of the sample. All questions were mandatory, so there was no missing data.

Internal consistency and concurrent validity

The Cronbach's α value for the Hungarian FCV-19S was .839, indicating a very good internal reliability. The inter-item correlations ranged between .41 and .60 and corrected item-total correlations varied between .59 and .68 indicating adequate internal consistency of the Hungarian FCV-19S. The skewness and kurtosis values presented in Table 2. suggest that at least items 3, 4, 6, and 7 are unlikely to be normally distributed, however all items were found to be reliable.

Table 1. Sample characteristics (n = 2175).

Characteristics		Frequency (n)	%
Sex			
	Male	836	38.4
	Female	1339	61.6
Marital Status			
	Single	1448	66.6
	Married	319	14.7
	Living with a partner	350	16.1
	Divorced	50	2.3
	Widowed	8	0.4
Education			
	Vocational school or lower	165	7.6
	Highschool diploma	1086	49.9
	Higher educational qualification	57	2.6
	Bachelor	157	7.2
	Postgraduate (Master/PhD)	710	32.6
Living with chronic illness (yes)		339	15.6
Regularly taking medication (yes)		625	28.7
Previously diagnosed with mental illness (yes)		260	12.0
Previously diagnosed with COVID-19 (yes)		384	17.7
Already vaccinated (yes)		275	12.6

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Table 2. Descriptive details for the FCV-19S.

Item	Factor loading	Mean (SD)	Skewness	Kurtosis	Cronbach's α when deleted
1	.55	1.81 (0.78)	.744	.114	.810
2	.47	2.25 (1.01)	.164	-1.125	.832
3	.77	1.14 (0.46)	3.87	16.86	.823
4	.63	1.34 (0.66)	2.15	4.59	.813
5	.58	1.84 (0.88)	.785	-.215	.812
6	.82	1.11 (0.43)	4.46	21.92	.822
7	.84	1.21 (0.55)	3.06	9.94	.810

Overall Cronbach's α = .84

Concurrent validity was supported by the significant correlations with the state anxiety and depression. Fear of COVID-19 significantly and positively correlated with STAI ($r = 0.402$; $p < 0.001$) and BDI-H ($r = 0.270$; $p < 0.001$).

Average variance extracted (AVE) and composite reliability (CR) were calculated. AVE was .56 while CR was .90 both of which are acceptable values.

Confirmatory Factor Analysis (CFA)

Most items were distributed asymmetrically, with the highest frequencies in the lowest values. Analyzing the asymmetry and kurtosis of the seven items of the FCV-19S most of the items did not fall within the range of ± 1,5. Shapiro-Wilk normality test confirmed that all items were distributed in a non-normal way ($p < .01$). The Hungarian FCV-19S appeared to have a unidimensional structure: it had eigenvalue of 3.91 in a single factor model suggesting one factor as the optimal usable model.

Confirmatory factor analysis (CFA) was performed on the data based on the factor structure provided by Ahorsu et al. [30] in the original study. CFA is a multivariate statistical procedure, in which the number of factors and the relationship between measured and latent variables can be specified. Therefore, it is used to test the replicability of the original factor structure of a scale on a different sample or in a different cultural context. CFA also shows the goodness of fit of the examined model. Due to non-normality of the distribution of several ratings and the categorical nature of the data, we used the WLSMV estimator [67]. CFA was performed with MPlus 8 software [68]. Regarding the fit indexes, a satisfactory degree of fit of comparative fit index (CFI) and Tucker-Lewis Index (TLI) is close or higher than .95 [69]. The root mean square error of approximation (RMSEA) below .05 indicates excellent, around .08 adequate, and above .10 a poor fit. Standardized Root Mean Square Residual (SRMR) is an index of the average of standardized residuals between the observed and the hypothesized covariance matrices [66]. The value of SRMR indicates good fit under .05 and adequate around .08

A first order confirmatory factor analysis was ran to determine whether the factor structure of the original form of the scale would be confirmed in the Hungarian sample. The first model of the CFA revealed a poor fit for the seven-item single-factor construct (Table 3). CFI, TLI and RMSEA values were all above desirable thresholds.

Table 3. Results of the original and modified model fitting.

Model	χ2 (df)	CFI	TLI	RMSEA	90% CI
Original model	1139.64 (21)	.841	.789	.156	.149-.164
Modified model	325.56 (18)	.956	.932	.089	.080-.097
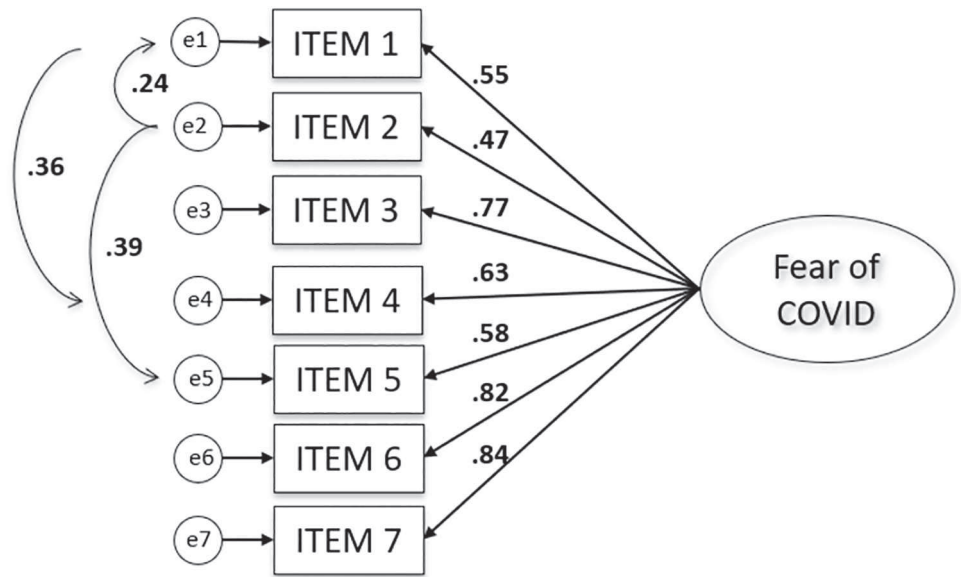
Fig 1. The results of the final CFA model of the Hungarian Fear of COVID-19 Scale.

The pattern of modification and inter-item correlations suggested the presence of notable error co-variance within the cluster of items #1 (I am most afraid of coronavirus-19) and #2 (It makes me uncomfortable to think about coronavirus-19), #1 and #4 (I am afraid of losing my life because of coronavirus-19) and #2 and #5 (When watching news and stories about coronavirus-19 on social media, I become nervous or anxious). When the error of variance of these items was correlated in the Model 2, the above-mentioned values decreased substantially and were below the required cut-off values. In the second model the goodness of fit values suggested a good fit and were the following: RMSEA = .089, CFI = .956, TLI = .932. Fig 1 presents an overview of the factor solution for the final model, including the factor loadings. All the paths shown in the model in Fig 1 were significant at the level of 0.01. Factor loadings of the items tested with CFA were found as I1 = .55, I2 = .47, I3 = .77, I4 = .63 I5 = .58, I6 = .82, I7 = .84. Since all factor loadings are greater than .30 these values can be considered adequate.

The factor structure was tested for measurement invariance (configural, metric and scalar) across gender (male and female) [69]. To test for measurement invariance across gender multiple group CFA analyses (MGCFA) was performed. The results showed a good fit for the model in both male (N = 836, χ^2 = 65.972, df = 11, RMSEA = .077, CFI = .983, TLI = .967, SRMR = .029) and female (N = 1339, χ^2 = 134.768, df = 11, RMSEA = .092, CFI = .967, TLI = .937, SRMR = .038) groups. The criteria for configural invariance (one-factor structure) were met. The comparison of the relative fit of the nested models showed that the criteria for metric invariance were also met, but not for the scalar invariance (Table 4), as indices diminished more than the recommended values (.01 for CFI and TLI; .015 for RMSEA) [66].

Table 4. Measurement invariance across gender.

Model	χ^2 (df)	CFI	TLI	RMSEA	90% CI	$\Delta\chi^2$ (df)	ΔCFI	ΔTLI	ΔRMSEA
Configural	200.740 (22)	.974	.951	.086	.076-.098				
Metric	237.256 (28)	.970	.955	.083	.073-.093	36.516 (6)	-0.004	-0.004	-0.003
Scalar	381.416 (34)	.950	.938	.938	.088-.106	144.160 (6)	-0.020	-0.017	0.855

Discussion

The primary aim of the present study was to examine psychometric properties of the Hungarian Fear of COVID-19 Scale (FCV-19S). Results suggest that the Hungarian version of the scale has a stable unidimensional structure, as reported in the original study [30] and several adaptations [13, 14, 31, 32, 34, 36, 38–43, 46, 50–53]. Across a large sample, the Hungarian Fear of COVID-19 Scale has good internal reliability and consistency.

We found the scale to be partially invariant with respect to gender. The measurement of the invariance across gender confirmed configural invariance, meaning that the basic factor structure is invariant across gender groups, men and women conceptualize the fear of coronavirus construct similarly. Metric invariance was also established, meaning that both genders respond to the items the identical way. The scalar invariance was not established. It refers to the condition that the level of the compared latent construct holds across groups [70]. When not supported it implies differential mean levels of the same latent construct between genders.

The significant correlation between the FCV-19S, STAI (level of state anxiety) and BDI-H (level of depression) confirms the concurrent validity of the scale. Similar correlations between FCV-19S and STAI have been formerly reported on the sample of Spanish university students [36]. Previous literature [4, 20, 22] supports the finding, that anxiety and depression are often comorbid with feelings of fear [19, 71], specifically fear during epidemics [15]. This relationship has been reported in several previous adaptations of the scale using various measures of anxiety and depression [13, 14, 31–39, 42–47, 49, 50] all reporting significant positive correlation between the scales.

The significant positive relationship measured between levels of fear and levels of state anxiety and depression, suggest that individuals who experience high levels of fear of coronavirus have also high probability to comorbidly be affected by these disorders [13]. This supports previous findings reporting that long periods of infectious epidemics are a breeding ground for development of psychophysical health issues and negative mental health conditions such as feelings of depression, anxiety, fear and phobias [12, 13, 15, 16, 18, 72–74]. The cross-sectional design prevents the causal interpretation of the data, so it is impossible to determine whether being depressed accelerates the fear of COVID-19 or whether the fear of coronavirus intensifies feelings of depression. Future longitudinal studies are needed to examine causes and consequences of the fear of coronavirus [13, 32].

Higher scores on FCV-19S predict higher scores on STAI and BDI-H, however, even though significant, the correlations between FCV-19S and STAI (r = .40) and between FCV-19S and BDI-H (r = .27) were moderate. This indicates a significant unshared variance between the FCV-19S, STAI and BDI-H suggesting that they represent more than one underlying construct, thus the Fear of COVID-19 Scale may provide some unique variance to the construct of overall anxiety and depression [50]. Additionally, while STAI focuses on individual's state anxiety, their general experience of anxiety regardless of the source, FCV-19S is more specific, it focuses exclusively on their fear in regard to coronavirus.

The effect of the COVID-19 pandemic is not exclusively physical and psychological, but it raises severe systematic, social and economic issues. For instance, the spread of a viral infection is strongly in connection with the burden placed on the healthcare system and its possible overload [6] which negatively effects the healthcare professionals as well as the general population. Insecurity regarding the stability of the nation's healthcare system, especially in poor public health contexts [13] increases stress levels among all citizens, which in turn can have a negative effect on both physical and mental health [8, 71]. Increased stress levels often result in higher prevalence of addictive behaviors (e.g., alcohol, tobacco or drug use) influencing person's health and immune system, making them more susceptible to disease and infection [13].

Additionally, fear experienced during epidemics formerly often resulted in stigmatization of groups racially perceived as being the source of the infection causing public disturbances, scuffles, in extreme cases civil conflicts [13, 16, 17].

The Hungarian version of the Fear of COVID-19 Scale enables future research on causes and consequences of the fear of coronavirus and its effect on behaviors in connection to the pandemic. Secondly, it can be a direct tool used by the staff working in COVID-19 inpatient facilities for assessment of coronavirus-specific fear among patients [58].

These results come with limitations. Our sample is not representative of the Hungarian population. Even though the sample size is quite large, it is composed of university students and employees, thus it is not clear how this sample would generalize to Hungarian population. It would be useful to replicate the study on a representative sample.

Present study is cross-sectional, however the perception of COVID-19 pandemic is most likely fluctuating as we enter different stages of the epidemic globally and locally as well. For example, since data collection Hungary has had a stable vaccination rate, which could change the perception of the pandemic as well as the levels of fear associated with it. Likewise, present study design provides very little insight into causality. Future studies should include longitudional design to gain knowledge regarding causal relationship between fear of coronavirus, anxiety and depression.

In present study we investigated the psychometric properties of the Hungarian version of the FCV-19S with 2175 university students and employees. The psychometric testing of the Hungarian FCV-19S demonstrates that the measure is psychometrically robust and the final model shows a single-factor structure. It is a reliable and valid tool for assessing the severity of fear of COVID-19 among Hungarian adults.

Supporting information

S1 Appendix.
(DOCX)

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III.

A kiégésszindróma vizsgálata a Szegedi Tudományegyetem Aneszteziológiai és Intenzív Terápiás Intézet dolgozói körében

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ÖSSZEFOGLALÁS

A vizsgálat célja: A kiégésszindróma vizsgálata dinamikusan fejlődő kutatási terület hazai és nemzetközi viszonylatban egyaránt. Az egészségügyi dolgozók körében a kiégésszindróma jobb megértése, továbbá elérhető intervenciós program kidolgozása kimagasló fontossággal bír. Célunk felmérni a Szegedi Tudományegyetem Szent-Györgyi Albert Klinikai Központ Aneszteziológiai és Intenzív Terápiás Intézet munkatársai kiégését, majd az eredmények ismeretében tovább pontosítani a számukra elérhető prevenciós és intervenciós tréninget.

Anyag és módszer: Kérdőíves vizsgálat, amellyel a demográfiai adatok, a társas támogatottság, a szomatikus panaszok adatfelvétele mellett Oláh-féle Pszichológiai Immunkompetencia Kérdőívvel felmértük a pszichológiai immunrendszert, míg a kiégés szindrómát Maslach Kiégés Kérdőívvel vizsgáltuk.

Eredmények: Statisztikai elemzés alapján a kiégés magasabb azon vizsgálati személyeknél, akik heti több munkaórát dolgoznak, illetve akik több szomatikus tünetről számolnak be, míg alacsonyabb azon válaszadóknál, akik több jó minőségű társas kapcsolatról és erősebb pszichológiai immunrendszerről számolnak be.

Következtetések: Az egészségügyi dolgozók kiégése közvetlen hatással van a munkahelyi jóllétükre és közvetetten a betegellátás minőségére. Protektív-, és rizikófaktorok ismeretében jobb intervenciós és prevenciós módszerek dolgozhatók ki.

Kulcsszavak: kiégésszindróma, aneszteziológiai és intenzív terápia dolgozói, pszichológiai immunrendszer

Investigation of the burnout syndrome among the employees of the Department of Anaesthesiology and Intensive Therapy at the University of Szeged
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SUMMARY

The aim of the study: Research on burnout syndrome among healthcare professionals is of predominant importance and enables improvement of intervention programs. Our aim is to evaluate the burnout syndrome among the employees of the Department of Anaesthesiology and Intensive Therapy at the University of Szeged.

Material and method: Cross-sectioned design utilizing a self-administrated questionnaire was used to collect data from the staff. Burnout was measured using the Maslach Burnout Inventory, while psychological immune competence was measured using the Psychological Immune Competence Questionnaire.

Results: Burnout is higher among subjects who work more weekly hours and who report more somatic symptoms. Burnout levels are lower among participants who report more social relationships and stronger psychological immune system.

Conclusions: Burnout of healthcare professionals has an impact on their well-being as well as indirectly on the quality of patient care. With better knowledge of the protective and risk factors, better intervention and prevention methods can be developed.

Keywords: burnout syndrome, employees of anaesthesiology and intensive therapy, psychological immune system

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Bevezetés

A kiégésszindróma vizsgálata nemzetközi viszonylatban dinamikusan fejlődő kutatási terület (Borys et al., 2019; Cubrilo-Turek et al., 2006; Balan et al., 2019; Győrffy, 2019). 2019 tavaszán, az Egészségügyi Világszervezet által publikált BNO-11 – a betegségek nemzetközi osztályozásának 11. revíziója – QD85 kód alatt megjeleníti a kiégésszindrómát, mint az egészségi állapotot vagy az egészségügyi szolgáltatásokkal kapcsolatos befolyásoló tényezőt. A BNO-11 sikertelenül menedzselt, krónikus munkahelyi stressz következményeként definiálja a kiégésszindrómát. Három dimenzióval jellemzi: az energiavesztesség vagy kimerültség érzése; a munkához kapcsolódó megnövekedett mentális távolság, a negativizmus vagy cinizmus érzése; továbbá a csökkent szakmai hatékonyság. A kiégésszindróma kifejezetten a munkahelyi környezetben jelentkező jelenségekre vonatkozik és nem alkalmazható az élet más területein bekövetkező tapasztalatok leírására (Egészségügyi Világszervezet [WHO], 2019).

Az intenzív terápia területén dolgozó szakemberek munkáját magasfokú felelősség, de csak korlátozott kontroll jellemzi. A kritikus állapotú betegekről való gondoskodás, a különböző eljárások rendkívüli pontossággal történő végrehajtása és a sürgős helyzetekre való gondos és gyors reakció mind napi feladatai az intenzív terápiát nyújtó orvosok és ápolók számára. Az ilyen szervezeti jellemzők, a követelmény-kontroll modell értelmében, táptalajt biztosítanak a kiégésszindróma kialakulásához. Az elmélet értelmében a nagyfokú munkahelyi stressz akkor jelentkezik, ha a személyt érő munkahelyi terhelések magasak, míg a kontrolljuk korlátozott szintű. Az intenzív terápiás dolgozók esetében a feszített munkatempó, az időnyomás, a megterhelő munka, a kifinomult technológiák használata mind hozzájárulnak a munkahelyi stressz kialakulásához, míg a kontroll szintje: a képességek kibontakoztatásának lehetősége, a munkavégzés feletti befolyás, a döntési jogkör; számos esetben alacsony szintű (Bakker et al., 2005; Karasek, 1979).

Nemrégiben közzétettük a Szegedi Tudományegyetem Sürgősségi Betegellátó Önálló Osztályán (Hompoth et al., 2018), valamint a Szegedi Tudományegyetem Sebészeti Klinikán végzett kutatásunk eredményeit, továbbá a két munkahelyen nyert adatok összehasonlítását (Stankovic et al., 2019). Jelen vizsgálattal megegyező módszertant használva, feltérképezzük a Szegedi Tudományegyetem Aneszteziológiai és Intenzív Terápiás Intézet (AITI) dolgozóinak kiégését. A korábbiakban kapott eredményekre támaszkodva azt várjuk, hogy

az életkor, a gyermekek száma, az egészségügyben töltött évek száma, az intézetben töltött évek száma mind protektív faktor. Ezen túl összefüggést várunk a kiégésszindróma és a megélt szociális támogatás mértéke között, ahogy a kiégésszindróma és a pszichológiai immunrendszer között is. Szintén várható összefüggés a kiégés mértéke és a nem vagy a családi állapot között.

A jelen vizsgálat azon kutatássorozat része, amellyel megkísérlünk feltérképezni a Szegedi Tudományegyetem, Szent-Györgyi Albert Klinikai Központ fekvőbetegellátó intézményeiben dolgozó szakemberek kiégését. A kutatássorozatot azon osztályokkal, intézetekkel indítottuk, amelyek a szakirodalom alapján veszélyeztetettebbek a kiégésszindróma kialakulása szempontjából (Bakker et al., 2005; Shanafelt et al., 2009; Shanafelt et al., 2012; Győrffy és Girasek, 2015) így az idáig közzétett eredményeket az Aneszteziológiai és Intenzív Terápiás Intézet dolgozóinak felmérésével bővítjük. Célunk egyrészt a kiégésszindróma prevalenciájának feltérképezése a szegedi Klinikai Központban, másrészt azon prevenciós és intervenciós program továbbcsiszolása, amely elérhető a szegedi dolgozók számára.

Anyag és módszer

A kutatásban a Szegedi Tudományegyetem Aneszteziológiai és Intenzív Terápiás Intézet dolgozói (kb. 200 fő) vehettek részt. A kitöltés önkéntes volt. A dolgozók 42%-a döntött a kérdőívcsomag kitöltése mellett; összesen 83 fő.

Eszközök, módszer

2019 áprilisában tettük elérhetővé az Aneszteziológiai és Intenzív Terápiás Intézet dolgozói számára a kérdőívcsomagot és a beleegyező nyilatkozatot. Minden dolgozó a kitöltött kérdőívet név nélküli lezárt borítékban, a beleegyező nyilatkozattól külön egy gyűjtőállomáson adta le. A beleegyező nyilatkozatok és a kérdőívek külön gyűjtése biztosította a résztvevők anonimitását.

A tesztbattéria egy rövid tájékoztatóval kezdődik, amely ismerteti a kitöltővel a kutatás célját, menetét, az adatfeldolgozás módját. A kérdőív szociodemográfiai adatok felvételével folytatódik, amit követnek a testi tünetekre, panaszokra vonatkozó kérdések. A szomatikus tünetlistát a korábbi kutatásokban egyaránt alkalmaztuk (Hompoth et al., 2018; Stankovic et al., 2019), így jelen vizsgálatban sem módosítottunk rajta. A feltüntetett panaszok az alvászavar, a testsúlyváltozás, a magas vérnyomás, a

I. táblázat: A minta demográfiai adatai

	Életkor (n = 83)	Gyermekek száma (n = 83)	Egészségügyben eltöltött évek száma (n = 83)	AITI-n eltöltött évek száma (n = 83)	Heti munkaórák száma (n = 81)	Nem (n)	
Átlag	38,4	0,88	14,26	11,09	51,8	Férfi	25
Szórás	9,7	1,02	10,67	9,03	11,41	Nő	58

fejfájás, az izzadás, a cukorbetegség, a gyomorpanaszok és egyéb. Ezt követően felmérjük a szociális támogatás mértékének megélését Caldwell-féle Társas Támogatás Kérdőív (Caldwell Support Dimension Scale) (Caldwell et al., 1987) hazai adaptációjának (Kopp és Kovács, 2006) módosított változatával, ahol az eredeti 14 kérdésből 11-re kérdeztünk rá (nehézség esetén mennyire számíthat segítségre: szülő, házastárs, élettárs, szomszéd, munkatárs, barát, főnök, egyház, rokon, pszichológus, más közösség). A korábbi vizsgálatokban szintén a rövidített listát alkalmaztuk (Hompoth et al., 2018; Stankovic et al., 2019) 4-fokú skálával (egyáltalán nem – 0; keveset – 1; átlagosan – 2; nagyon – 3). A kérdőívcsomag Maslach Kiégés Kérdőív 22 tételes magyar nyelvű változatával folytatódik, amely 7-fokú skálán történő válaszadásra ad lehetőséget (Ádám és Mészáros, 2012; Tandari-Kovács, 2010). A Maslach Kiégés Kérdőív kiértékelésénél az érzelmi kimerülés és a deperszonalizáció skálák magasabb pontszáma erősebb kiégési szintre utal, míg a teljesítmény skála fordított, így az alacsonyabb pontszám jelenti a magasabb kiégést (Maslach et al., 1996). A tesztbattéria Oláh-féle Pszichológiai Immunkompetencia Kérdőívvel zárul (Oláh, 2005), ahol a válaszadónak 4-fokú skálán kell értékelnie a 80 állítást. Értékelésekor a magasabb pontszám az erősebb pszichológiai immunkompetenciára utal.

A vizsgálatra a Szegedi Tudományegyetem, Szent Györgyi Albert Klinikai Központ Regionális Humán Orvosbiológiai és Kutatásetikai Bizottságának etikai engedélyével került sor. Az etikai engedély száma: 237/2018-SZTE.

Statisztika

Korrelációs vizsgálattal szemügyre vettük a kiégésszindróma három skálája (érzelmi kimerülés, deperszonalizáció, teljesítmény) és a különböző változók – az életkor, a gyermekszám, az egészségügyben eltöltött évek száma, az intenzív terápiás osztályon eltöltött évek száma, a heti munkaóraszám, a testi tünetek száma, a társas támogatottság érzésének mértéke és a pszichológiai immunrendszer – közötti kapcsolatot. A családi állapot és a kiégés skálák közötti kapcsolatot függetlenmintás t-próbával

vizsgáltuk, míg a nem és a kiégés kapcsolatát Mann-Whitney-féle U-teszttel.

A statisztikai elemzésekhez az SPSS statisztikai program 23-as verzióját használtuk, a szignifikancia szintet p<0,05 határoztuk meg.

Eredmények

A vizsgálati személyek 24 és 59 év közötti dolgozók. A kitöltők átlagéletkora 38,4 év (SD=9,7). Női orvosok esetében az átlag 38,9 év (SD=9,6), női ápolóknál 38,9 év (SD=10,4), míg férfi orvosoknál 35,2 év (SD=6,2) és férfi ápolóknál 36,5 év (SD=9,6). Öszszesen 43 orvos (52%), 36 ápoló (43%) és 4 egyéb dolgozó (5%) vett részt a felmérésben: 70% nő (58 fő), 30% férfi (25 fő).

A kitöltők 67%, összesen 56 fő, kapcsolatban él (házas, élettársi kapcsolatban van), míg 33% (27 fő) egyedülálló (hajadon/nőtlen, elvált, özvegy). Egy háztartásban átlagosan 2,3 fő él. A gyermekek száma a gyermektelenségtől 3 gyermekig terjedt, az átlag 0,88 (SD=1,02).

Iskolai végzettség tekintetében a minta 55%-a egyetemi diplomával, 22%-a főiskolai diplomával rendelkezik. A kitöltők 6%-a felsőfokú képesítéssel, 1%-a gimnáziumi érettségivel, 12%-a szakközépiskolai érettségivel és 4%-a szakmunkásképző végzettséggel rendelkezik.

Ahogy az **I. számú táblázatban** is feltüntettük, az intézet dolgozói átlagosan 14,26 éve (SD=10,67) dolgoznak az egészségügyben, míg intenzív terápiás osztályon átlagosan 11,09 éve (SD=9,03). Hetente a munkavállalók átlagosan 48,93 órát (SD=10,31) töltenek munkavégzéssel. A vizsgálati személyek 19%-a másik munkahellyel is rendelkezik, amellyel együtt átlagosan 51,8 órát (SD=11,41) dolgozik.

A kiégés eredményei

A Maslach Kiégés Kérdőíven kapott eredmények érzelmi kimerülési skálán átlag 26,07 pont (SD=12,21), a deperszonalizáció skálán átlag 8,78 pont (SD=6,75) és a teljesítmény skálán átlag 34,98 pont (SD=9,29). Az orvosok (n=43) az érzelmi kimerülési skálán átlag 26,86 pontot (SD=12,08) értek el, a deperszonalizáció skálán 8,5 pontot (SD=5,75),

II. táblázat: Maslach Kiégés Kérdőíven kapott eredmények

	Érzelmi kimerülés	Deperszonalizáció	Teljesítmény
Teljes minta (n = 83)	Átl. = 26,07 SD = 12,21	Átl. = 8,78 SD = 6,75	Átl. = 34,98 SD = 9,29
Orvosok (n = 43)	Átl. = 26,86 SD = 12,08	Átl. = 8,5 SD = 5,75	Átl. = 37 SD = 6,86
Ápolók (n = 36)	Átl. = 24,75 SD = 12,12	Átl. = 8,86 SD = 7,15	Átl. = 32,64 SD = 11,18

a teljesítmény skálán 37 pontot (SD=6,86). Az ápolók (n=36) átlagosan 24,75 pontot (SD=12,12) értek el az érzelmi kimerülési skálán, 8,86 pontot (SD=7,15) a deperszonalizáció skálán és 32,64 pontot (SD=11,18) a teljesítmény skálán **(II. táblázat)**.

A demográfiai adatok és a kiégés kapcsolata

A korrelációs vizsgálatok alapján magasabb érzelmi kimerülés (r=-0,217; p=0,049) és deperszonalizáció (r=-0,223; p=0,044) jellemző alacsonyabb gyermekszám mellett **(III. táblázat)**. Hasonlóan szoros összefüggés található a kiégés teljesítmény skálája és az összes heti munkaóra között (r=0,296; p=0,007).

A családi állapot és a kiégés kapcsolatának felderítésére függetlenmintás t-próbát alkalmaztunk, azonban nem találtunk szignifikáns összefüggést (p=0,260). Egyaránt nem találtunk nemi különbséget a kiégés három skáláján elért pontszámátlagok között (p=0,509).

Egyéb változók és a kiégés

A kitöltők átlag 1,42 (SD=1,29) szomatikus tünetről nyilatkoznak. A vizsgálati személyek 56,2%-a számol be alvászavarról, 24,1%-a fejfájásról, 21,7%-a testsúlyváltozásról, 16,9%-a magas vérnyomásról, 15,7%-a gyomorpanaszokról, 10,8%-a izzadásról, 4,8%-a cukorbetegségről és 18,1%-a egyéb betegségről, amelyek legtöbbje mozgásszervi panasz. Az

orvosok átlagosan 1,07 tünet/főről számolnak be (40 évnél fiatalabb orvosok 1 tünet/fő, 40 évnél idősebb orvosok 1,19 tünet/fő); míg az ápolók átlagosan 1,73 tünet/főről (40 évnél fiatalabb ápolóknál 1,55 tünet/fő, 40 évnél idősebb ápolók 1,9 tünet/fő). Az orvosok 47%-a szed gyógyszert (40 évnél fiatalabb orvosok 44%) és 12%-nak volt diagnosztizált mentális betegsége. Az ápolók 38%-a számol be gyógyszerszedésről: a 40 évnél fiatalabbaknál 25%, míg a 40 évnél idősebbeknél 50%. Az ápolók 15%-ának volt diagnosztizált mentális betegsége élete során.

A szomatikus tünetek száma együtt járást mutat a kiégés érzelmi kimerülési skálával (r=0,31; p=0,003) és tendenciaszinten a teljesítmény skálával (r=-0,213; p=0,056).

A társas támogatottság érzésének mértéke és a pszichológiai immunrendszer erőssége szignifikánsan korrelál a kiégés mindhárom skálájával. Társas támogatás esetén p = 0,038, míg pszichológiai immunrendszer esetében p<0,01 **(IV. táblázat)**.

Külön megvizsgálva az orvosok és az ápolók mintáját, azt tapasztaljuk, hogy az ápolók esetében a testi tünetek száma szignifikánsan korrelál a kiégés mindhárom skálájával (p=0,034). A társas támogatás érzésének mértéke az orvosoknál csak az érzelmi kimerülés (r=-0,317; p=0,038) és a teljesítmény (r=0,323; p=0,034) skálával mutat szignifikáns együtt járást.

Megbeszélés

Az Aneszteziológiai és Intenzív Terápiás Intézetben kapott eredményeink hasonló mintázatot mutatnak a korábbi vizsgálatokhoz, ahol a kiégés három skálája különböző mértékű korrelációt mutat egyes változókkal (Hompoth et al., 2018; Stankovic et al., 2019).

Az AITI dolgozók körében mindhárom skálán közepes kiégést mértünk. Az érzelmi kimerülés skálán legrosszabb eredményt értek el a válaszadók, az ott elért pontszám határérték közepes és magas szintű kiégés között. Az orvosok rosszabbul teljesíte-

III. táblázat: Korrelációs elemzés a demográfiai adatok és a kiégés között

		Életkor (n = 83)	Gyermekek száma (n = 83)	Egészségügyben eltöltött évek száma (n = 83)	AITI-n eltöltött évek száma (n = 83)	Heti munkaórák száma (n = 81)
Kiégés	Érzelmi kimerülés	r = -0,097 p = 0,381	r = -0,217 p = 0,049*	r = -0,075 p = 0,505	r = -0,082 p = 0,464	r = -0,027 p = 0,809
	Deperszonalizáció	r = -0,167 p = 0,134	r = -0,223 p = 0,044*	r = -0,179 p = 0,109	r = -0,101 p = 0,371	r = -0,093 p = 0,414
	Teljesítmény	r = 0,062 p = 0,579	r = -0,002 p = 0,989	r = 0,026 p = 0,820	r = -0,023 p = 0,839	r = 0,296 p = 0,007**

* esetén p<0,05; ** esetén p < 0,01

nek az érzelmi kimerülési és a teljesítmény skálákon: erősen kimerültek és magas fokú a teljesítményvesztésük, míg kevésbé deperszonalizáltak az osztály átlagnál. Az ápolók ezzel szemben közepesen érzelmileg kimerültek, alacsony és közepes szint határán van a teljesítményvesztésük, de deperszonalizáltabbak az intézeti átlagnál. Hasonlóan közepes értékeket találtak mindhárom skálán a horvát és a román intenzív osztályokon dolgozó kollégák körében (Cubrilo-Turek et al., 2006; Balan et al., 2019).

Együtt járást tapasztalunk a kiégés és a gyermekszám, a heti munkaórák száma, a testi tünetek száma, a szociális támogatás megélése és a pszichológiai immunrendszer között, míg nem találtunk kapcsolatot a kiégés és az életkor, az egészségügyben eltöltött évek száma és az AITI-n eltöltött évek száma között. Nem találtunk különbséget nemek között, illetve a kapcsolatban élők és az egyedülállók átlagpontjai között sem fedeztünk fel szignifikáns eltérést.

Az érzelmi kimerülési skála a gyermekek számával és a testi tünetek számával, a deperszonalizáció skála a gyermekek számával, míg a teljesítmény skála a heti munkaórák számával és a testi tünetek számával korrelál szignifikánsan. Kiemelendő, hogy mindhárom skála (érzelmi kimerülés, deperszonalizáció, teljesítmény) szignifikáns összefüggést mutat a társas támogatás mértékével és a pszichológiai immunrendszer erősségével.

A korábbi eredményeinkkel összhangban, a személy pszichológiai immunrendszerének erőssége stabil prediktora a kiégés kialakulásnak (Hompoth et al., 2018; Stankovic et al., 2019). A pszichológiai immunkompetencia a megküzdési stratégiákat összefoglaló fogalom, amely szerteágazottsága és erőssége előrejelzi a stresszel szembeni megküzdés sikerességét. Ezek az eredmények támogatják azt az elméletet, mely szerint az adekvátabb megküzdési stratégiák (Mészáros et al., 2013; Ádám et al., 2014; Shin et al., 2014) és a reziliencia (Győrffy, 2019) magasabb foka hozzájárulnak a megnövekedett munkahelyi stressz megfelelő kezeléséhez és korlátozzák a kiégés kialakulását. Ily módon a pszichológiai immunrendszer fejlesztése, a megküzdési stratégiák erősítése, gyarapítása és gyakorlása mind megfelelő intervenciós pontok lehetnek a kiégés elleni küzdelemben.

Jelen adatok alapján a szociális háló sokrétűsége, valamint erőssége is protektív faktor a kiégés mindhárom skálájával szemben. Minél többféle társas kapcsolattal rendelkezik a dolgozó, és minél erősebbnek ítéli meg ezeket a kötelékeket, annál alacsonyabb szintű kiégésről számol be. Bár a társas támogatás szerepével kapcsolatban a szakirodalom megosztottan nyilatkozik, (Mészáros et al., 2013; Maslach et al., 2001; Czeglédi és Tandari-Kovács,

IV. táblázat: A kiégés összefüggése a testi tünetek számával, a társas támogatottság érzésének mértékével és a pszichológiai immunrendszerrel

		Testi tünetek száma (n = 84)	Társas támogatottság érzésének mértéke (n = 83)	Pszichológiai immunrend-szer (n = 82)
Kiégés	Érzelmi kimerülés	r = 0,319 p = 0,003**	r = -0,276 p = 0,012*	r = -0,571 p < 0,001**
	Deperszonalizáció	r = 0,096 p = 0,389	r = -0,229 p = 0,038*	r = -0,631 p < 0,001**
	Teljesítmény	r = -0,203 p = 0,066ᵗ	r = 0,389 p < 0,001**	r = 0,546 p < 0,001**

* esetén p<0,05; ** esetén p<0,01; ᵗ a tendenciát jelöli

2019; Kállai, 2007) mi úgy találjuk, hogy a stabil szociális háló, a jó minőségű társas kapcsolatok csökkentik a kiégés kialakulásának veszélyét. Feltételezhető, hogy a megfelelő társas kapcsolatok erős támaszt és segítséget jelentenek a stressz elleni megküzdésben és közvetetten segítenek a kiégés elleni prevencióban (Tandari-Kovács, 2010; Czeglédi és Tandari-Kovács, 2019; Kállai, 2007; Hyman et al., 2011).

A munkaórák magas száma, illetve a több munkahelyen való megfelelés számos kutatásban fontos rizikótényezője a kiégés kialakulásnak (Borys et al., 2019; Balan et al., 2019; Győrffy és Girasek, 2015; Ádám és Mészáros, 2012). Jelen eredmény is azt támasztja alá, hogy a munkaórák megnövekedett száma a teljesítmény megítélésére van negatív hatással. Fontos megemlíteni, hogy az aneszteziológia és az intenzív terápia területén dolgozó munkavállalók veszélyeztetett csoportot jelentenek az egészségügyben foglalkoztatottak körében is (Győrffy és Girasek, 2015; Bartosiewicz és Januszewicz, 2019). Munkájukat magasfokú fizikai és mentális terhelés jellemzi, kritikus állapotú betegek ellátásáért felelősek, fokozott időnyomásban, feszített munkatempóban szofisztikált technológiákat használnak, sürgős helyzetekre gyorsan és adekvátan kötelesek reagálni. Ugyanekkor, a munkavállalók kontrolja, a munkavégzés feletti befolyása, döntési jogköre viszonylag korlátozott. Ezen jellemzők mindegyike átlagon felüli stressz környezetet teremt és elősegíti a kiégés kialakulását.

A szomatikus tünetek száma összefüggést mutat a kiégés érzelmi kimerülési skálával és a teljesítmény skálával. Kiemelendő, hogy a válaszadók több, mint egy negyede számol be alvászavarról, míg majdnem egy negyedük számol be fejfájásról. 40 évnél idősebb dolgozók fele rendszeres gyógyszerszedésről vall. Az egészségügyi dolgozók kiégése tradicionálisan

korrelál a szomatikus panaszok számával (Németh, 2016; Canadas-De la Fuente et al., 2018).

Meglehetősen ellentmondásos képet mutat a kiégés és az életkor, a munkatapasztalat, a párkapcsolat vagy a gyermekszám kapcsolata. Jelen vizsgálatban a gyermekek száma kimondottan protektív faktornak mutatkozik. A szülők alacsonyabb szintű érzelmi kimerülésről és alacsonyabb deperszonalizációról számolnak be. Úgy tűnik, hogy a gyermekvállalás hozta terhelés könnyítő tényező a munkahelyi nehézségekkel való megküzdésben (Győrffy, 2019; Shanafelt et al., 2009; Győrffy és Girasek, 2015; Ádám et al., 2008). Nem találtunk kapcsolatot a kiégés és az életkor, az egészségügyben töltött évek száma és az intenzív osztályon töltött évek száma között. Sok tanulmány alapján a rezidensek, fiatal orvosok körében a kiégés prevalenciája magasabb, hiszen a fiatal és tapasztalatlan munkavállalók még nem fejlesztették ki a munkahelyi nehézségek megküzdéséhez szükséges eszköztárt (Shanafelt et al., 2012; Győrffy és Girasek, 2015). Az erős fizikai, mentális és érzelmi megterhelés, a magas szintű felelősség és az alacsony szintű kontroll mind hozzájárulnak a fiatal dolgozók kiégéséhez. A szegedi AITI-ben nem találtunk ilyen összefüggést, ami a minta nagyságának vagy inhomogenitásának lehet köszönhető.

Nem találtunk nemi különbséget a kiégés három skáláján elért pontszámok között és eredményeink alapján nem volt hatással a kiégésre a párkapcsolati státusz. Ennek oka módszertani hiba is lehet, mert az elkülönítő kategóriáink: nőtlen/hajadon, házas, élettársi kapcsolat, elvált és özvegy. Ez alapján azon munkavállalók, akik párkapcsolatban élnek, de még nem házasok vagy nincsenek élettársi kapcsolatban is az „egyedülálló" csoportba kerülnek besorolásra. A családi állapotot a szakirodalom egyes esetekben protektív tényezőként említi (Shanafelt et al., 2009; Shanafelt et al., 2012; Ádám et al., 2008) és míg jelen esetben a családi állapot nem volt hatással a kiégésre, a társas támogatottság megélésének mértéke igen, ami egyebek mellett a párkapcsolatokra is vonatkozik.

Kutatásunk erőssége, hogy új ismeretekkel bővíti a magyar fekvőbetegellátásban dolgozók kiégésével kapcsolatos tudásunkat, amellyel tovább tudjuk csiszolni a Szegedi Tudományegyetem Szent-Györgyi Albert Klinikai Központ dolgozói számára elérhető tréninget. A tréning jelenleg három témakört dolgoz fel: kiégés, kommunikáció és agresszió, indulatkezelés. A továbbiakban a mintanagyság növelése és a további fekvőbetegellátó vizsgálati helyek bevonása mellett kvalitatív kérdések bevezetését is tervezzük, amelyek segítségével jobban fel tudjuk térképezni milyen intézkedésekre, prevenciós és intervenciós lépésekre van szükség a kiégés elleni küzdelemben.

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SZABADON VÁLASZTHATÓ ELMÉLETI TOVÁBBKÉPZÉSI PONT SZERZÉSI LEHETŐSÉG

A tanulmányok, kutatási beszámoló publikációk mellett a NŐVÉR szakfolyóirat 2020. évi lapszámaiban is megtalálhatóak voltak a továbbképző cikkek. Olvasóink számára e friss kéziratokhoz tartozó tesztkérdések kitöltésére hamarosan lehetőség nyílik, a MESZK honlapján keresztül, online módon. A kéziratot őrizze meg, mert a teszt kitöltéséhez a későbbiekben még szüksége lesz rá!

IV.

A kiégésszindróma vizsgálata a Szegedi Tudományegyetem Sebészeti Klinikájának dolgozói körében és összehasonlítása a Sürgősségi Betegellátó Önálló Osztályon kapott eredményekkel

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Bevezetés: A kiégésszindróma vizsgálata a különböző egészségügyi szakterületeken kiemelten fontos és elengedhetetlen a tünetegyüttes átfogó megértéséhez, a megfelelő preventív és intervenciós program kialakításához. A sebészeten dolgozók rizikócsoportot jelentenek az egészségügyi dolgozók körében, így a jelen vizsgálattal igyekszünk tovább bővíteni a hazai ismereteket, továbbá fényt deríteni a kiégésszindróma jellemzőire a Szegedi Tudományegyetem Sebészeti Klinikáján dolgozók körében. Az ott kapott vizsgálati eredményeket összehasonlítjuk a Szegedi Tudományegyetem Sürgősségi Betegellátó Önálló Osztályának eredményeivel.
Célkitűzés: Célunk a Szegedi Tudományegyetem Sebészeti Klinikáján dolgozók kiégésének felmérése és különböző változókkal való összefüggésének elemzése, továbbá az adatok összehasonlítása a Szegedi Tudományegyetem Sürgősségi Betegellátó Önálló Osztályának korábban már publikált adataival.
Módszer: Kérdőíves vizsgálat, amellyel a demográfiai adatok, a társas támogatottság, a szomatikus panaszok adatfelvétele mellett Oláh-féle Pszichológiai Immunkompetencia Kérdőívvel felmértük a pszichológiai immunrendszert, míg a kiégésszindrómát a Maslach Kiégés Kérdőívvel vizsgáltuk.
Eredmények: Statisztikai elemzésünk alapján a kiégés mértéke szignifikánsan magasabb minél több munkaórát vállal a vizsgálati személy, illetve minél több szomatikus tünetről számol be. Szignifikánsan alacsonyabb a kiégés azon dolgozóknál, akiknek nagyobb számú, jó minőségű társas kapcsolatuk van, és akiknek erősebb a pszichológiai immunrendszerük. A Szegedi Tudományegyetem Sebészeti Klinikájának és Sürgősségi Osztályának mintáját összehasonlítva különbséget találtunk az életkornak és az egészségügyben töltött évek számának vonatkozásában, ahogy a társas támogatás érzésének megélésében és a kiégésnek a deperszonalizációskálán elért pontszámában.
Következtetés: A kapott eredmények további összefüggéseket mutatnak, és fényt derítenek protektív és rizikófaktorokra, amelyek kulcsfontosságúak lehetnek a kiégésszindróma leküzdésére tervezett preventív és intervenciós programokban.
Orv Hetil. 2019; 160(20): 784–791.

Kulcsszavak: kiégés, sebészeti klinika dolgozói, sürgősségi osztály dolgozói, pszichológiai immunrendszer

Investigation of the burnout syndrome among the employees of the Department of Surgery at the University of Szeged and comparison with the results of the Department of Emergency Medicine

Introduction: Examination of the burnout syndrome in various healthcare fields has paramount importance for a better understanding of the disorder as well as for the establishment of a suitable preventive and intervention program. The surgical departments' employees are at risk among healthcare workers, so it is our objective to further expand

the knowledge on the characteristics of the burnout syndrome among the Hungarian surgical staff. Additionally, we compare the results obtained from the Department of Surgery at the University of Szeged with the results of the Department of Emergency Medicine.

Aim: Aim of this study is to examine the burnout syndrome and its associations with different variables among the workers of the Department of Surgery at the University of Szeged, and to compare the data with a previous study conducted at the Department of Emergency Medicine at the University of Szeged.

Method: Cross-sectional design utilizing a self-administered questionnaire was used to collect data from the staff. Burnout was measured using the Maslach Burnout Inventory, while psychological immune competence was measured using the Psychological Immune Competence Questionnaire.

Results: Based on statistical analysis, the number of weekly working hours and the number of somatic symptoms have a negative impact on burnout, while the greater number of high-quality social relationships and the stronger psychological immune competence have proven to be protective factors. Comparing the Department of Surgery and Department of Emergency Medicine at the University of Szeged, we found a difference in the age of the workers, the number of years spent in the healthcare as well as the scores on the burnout depersonalization scale.

Conclusions: The results obtained show further correlations and reveal protective and risk factors in burnout which can be a key to establishing preventive and intervention strategies.

Keywords: burnout syndrome, employees of surgery department, employees of emergency department, psychological immune system

A kiégésszindróma emocionális, mentális, kognitív kimerülési tünetegyüttes, amely a munkahelyen előforduló érzelmi megterhelés és a stressz hatására jelentkezhet. Azon munkavállalók, akik ún. segítő szakmákban tevékenykednek (például egészségügyi dolgozók vagy pedagógusok) rizikócsoportot jelentenek a kiégésszindróma kialakulása szempontjából [1, 2]. Az egészségügyi dolgozók esetében a hosszú munkaidő, a késleltetett jutalmazás és pozitív visszajelzés, a nehezen megtartható egyensúly a munka és a magánélet között, az érzelmileg megterhelő betegkapcsolatok változó egészségügyi környezetben mind hozzájárulnak a nagyobb mértékű kiégés kialakulásához [3–5]. A kiégés legfőbb jellemzői az önmagunkkal, a munkával és az élettel szembeni negatív beállítódás, a fáradtságérzés, a munkavégzéssel szemben érzett ellenállás, a céltudatosság, az energia elvesztése [6].

A kiégés tünetei három tárgykör köré csoportosíthatók: érzelmi kimerülés, deperszonalizáció és teljesítmény. Az érzelmi kimerülés a legjelentősebb mutatója a személyes kiégésnek: a pszichés és emocionális erőforrások gyengülése jellemzi. A deperszonalizáció társkapcsolati jellemző, főleg a betegkapcsolatokban mutatkozik, cinikus, negatív érzelmekkel társuló, személytelen viszonyulást jelent a beteg felé. A teljesítmény a személy és munkája közötti kapcsolatot leíró dimenzió, a személy saját munkateljesítményének értékelésére vonatkozik [1, 7].

Győrffy és munkacsoportja magyarországi orvosok körében térképezte fel a kiégés előfordulását, háttértényezőit és rizikófaktorait. Kutatásaik alátámasztották a munkastressz, az erős fizikai és érzelmi megterhelés és a kiégés közötti kapcsolatot, továbbá meghatározó tényezőnek bizonyult az emocionális kimerülés, a deperszonalizáció, a teljesítményvesztés, a kollégákkal való kapcsolat és a kommunikáció megromlása [6–9].

Az egészségügyi dolgozók körében a kiégés prevalenciája egyes szakterületeken jelentősen magasabb: ilyenek például a sebészeti osztályok, a sürgősségi osztályok, az intenzív osztályok, a háziorvosi praxis [3, 7, 10]. A korábbiakban már közzétettük a Szegedi Tudományegyetem Sürgősségi Betegellátó Önálló Osztályának eredményeit [11]. Megegyező módszertannal megvizsgáltuk a szintén veszélyeztetett szakterületek közé tartozó szegedi Sebészeti Klinika dolgozóinak kiégését. Ezen osztályok kiégésprofilja hazai viszonylatban kevéssé ismert, ezért fontosnak tartjuk az ismeretek bővítését. A Sürgősségi Osztályon kapott eredmények és a szakirodalmi adatok alapján összefüggést várunk a kiégésszindróma és a nem, a családi állapot, az életkor, a munkapasztalat, a gyermekszám, a társas támogatás megélésének mértéke és a pszichológiai immunrendszer között.

Célkitűzés

Kutatásunk célkitűzése azon egészségügyi osztályok adataival bővíteni a tudományos ismereteket, amelyek a szakirodalom alapján veszélyeztetettebbek a kiégésszindróma kialakulása szempontjából [10, 12]. Egyrészt a Szegedi Tudományegyetem Sebészeti Klinikája dolgozóinak felmérésével átfogó képet kaphatunk a szegedi

sebészeti osztályok állapotáról, ami elősegíti az ezen dolgozók számára elérhető, a kiégést megcélzó prevenciós és intervenciós program finomhangolását. Másrészt a jelen vizsgálatban ezeket az eredményeket összehasonlítottuk a Sürgősségi Betegellátó Önálló Osztály korábban publikált eredményeivel [11]. Célunk a két osztály közötti különbségek és hasonlóságok feltérképezése, továbbá a kapott eredmények összehasonlítása a szakirodalomban fellelhető adatokkal.

Módszer

Minta

A jelen vizsgálat a Szegedi Tudományegyetem Sebészeti Klinikáján dolgozók (200 fő) kiégésének feltérképezésére irányult. A részvétel önkéntes volt, a munkavállalók 52%-a töltötte ki a kérdőívcsomagot; összesen 103 fő. A kiégéskérdőív valamely skálájának hiányos kitöltése miatt kilenc főt zártunk ki, így statisztikai kiértékelés 94 kérdőív alapján történt.

Az eredményeket összehasonlítjuk a Szegedi Tudományegyetem Sürgősségi Betegellátó Önálló Osztályán kapott adatokkal, ahol az ott dolgozók (190 fő) 42%-a (80 fő) töltötte ki a kérdőívet. A kiégéskérdőív hiányos kitöltése miatt nyolc fő került kizárásra, így statisztikai elemzés 72 fő adataival készült [11].

Eszközök, módszer

A kérdőívcsomagot és a beleegyező nyilatkozatot 2018 júniusában–júliusában adtuk oda a Sebészeti Klinika dolgozóinak. A kitöltött kérdőíveket név nélküli lezárt borítékban külön gyűjtöttük a beleegyező nyilatkozatoktól, amivel biztosítva maradt az anonimitás.

A kérdőívcsomag bemutató bevezetővel kezdődik, amely ismerteti a kitöltővel a kutatás célját és menetét, továbbá jelige megadásával lehetőséget nyújt a majdani egyéni kiértékelésre. Kezdésként a szociodemográfiai adatok felvételére került sor. Ezt követték a testi tünetek, panaszok meglétére vonatkozó kérdések. A szomatikus tünetek felméréséhez használt tünetlistát a Szegedi Tudományegyetem Sürgősségi Betegellátó Önálló Osztályán folytatott kutatásban szintén alkalmaztuk [11]. Ezen tünetek az alvászavar, a testsúlyváltozás, a magas vérnyomás, a fejfájás, az izzadás, a cukorbetegség, a gyomorpanaszok és egyéb. A tünetlistát követte a társas támogatottság felmérése a Caldwell-féle Társas Támogatás Kérdőív (Caldwell Support Dimension Scale) [13] hazai adaptációjának [14] módosított változatával, amelyen az eredeti 14 kérdésből 11-re kérdeztünk rá (nehézség esetén mennyire számíthat segítségre: szülő, házastárs, élettárs, szomszéd, munkatárs, barát, főnök, egyház, rokon, pszichológus, más közösség). Azért döntöttünk a szűkítés mellett, mert a korábbi felmérésben szintén ezeket a kapcsolatokat térképeztük fel [11], amelyeket a kitöltő 4 fokú skálán értékelhetett (egyáltalán nem – 0; keveset –

1; átlagosan – 2; nagyon – 3). Ezt követően felvettük a Maslach Kiégés Kérdőív 22 tételes magyar nyelvű változatát, amelyen a válaszok 7 fokú gyakorisági skálán jelentek meg 0-tól 6-ig terjedő pontszámozással [2, 15]. A Maslach Kiégés Kérdőív három skálájából az érzelmi kimerülés és a deperszonalizáció skáláján a magasabb pontszám erősebb kiégési szintre utal, míg a teljesítménskálán az alacsonyabb pontszám jelzi a kiégés erősebb mivoltát [16]. A kérdőívcsomag utolsó eleme az Oláh-féle Pszichológiai Immunkompetencia Kérdőív [17]. A 80 tételes kérdőívben a válaszadás 4 fokú skálán történt (1–4 pontszámmal), ahol a magasabb pontszám az erősebb pszichológiai immunkompetenciára utal.

A vizsgálatra a Szegedi Tudományegyetem Szent Györgyi Albert Klinikai Központ Regionális Humán Orvosbiológiai és Kutatásetikai Bizottságának etikai engedélyével került sor. Az etikai engedély száma: 127/2018-SZTE.

Statisztika

A kiégés három skáláját (érzelmi kimerülés, deperszonalizáció, teljesítmény) korrelációs elemzésnek vetettük alá, és megvizsgáltuk az életkorral, a gyermekszámmal, az egészségügyben eltöltött évek számával, a sebészeti osztályon eltöltött évek számával, a heti munkaóraszámmal, a testi tünetek számával, a társas támogatottság érzésének mértékével és a pszichológiai immunrendszerrel való kapcsolatukat. A családi állapot és a kiégésskálák közötti kapcsolatot független mintás t-próbával vizsgáltuk, míg a nem és a kiégés kapcsolatát Mann–Whitney-féle U-teszttel. Végezetül, a Sebészeti Klinikán és a Sürgősségi Osztályon kapott adatokat független mintás t-próbával hasonlítottuk össze.

A statisztikai elemzésekhez az SPSS statisztikai program 23-as verzióját (IBM Corporation, Armonk, NY, Amerikai Egyesült Államok) használtuk, a szignifikanciaszintet $p<0,05$ értékben határoztuk meg.

Eredmények

Minta

A kutatásban 19 és 67 év közötti dolgozók vettek részt, átlagéletkoruk 42,02 (SD = 11,31). A válaszadók 62%-a ápoló (58 fő), míg 25% egyéb dolgozó (24 fő) és 13% orvos (12 fő). Az egyéb dolgozók beteghordók, orvosírnokok és adminisztrátorok. Nemi eloszlásban a válaszadók 79%-a nő (74 fő), 21%-a férfi (20 fő). 56% kapcsolatban él (házas, élettársi kapcsolatban él), míg 44% egyedülálló (hajadon/nőtlen, elvált, özvegy). A gyermekek száma a gyermektelenségtől 5 gyermekig terjedt, az átlag 1,23 (SD = 1,08). Az egészségügyben eltöltött évek száma kevesebb mint egy év és 49 év között változott, átlaga 19,12 év (SD = 12,9), míg a sebészeti osztályon töltött idő szintén kevesebb mint egy évtől 49 évig terjedt, átlaga 12,83 év (SD = 11). A heti munkaóraszám

20 és 129 óra között alakult, átlagosan a munkavállalók 48,24 órát töltöttek az osztályon (SD = 19,05) *(1. táblázat)*.

A demográfiai adatok és a kiégés kapcsolata

Korrelációs vizsgálatok alapján szignifikáns összefüggést találtunk a heti munkaórák száma és a kiégés érzelmi kimerülési skálája között (r = 0,266; p = 0,01), míg tendenciaszerű a kapcsolat az érzelmi kimerülési skála és a sebészeti osztályon eltöltött évek száma között (r = 0,177; p = 0,089).

Hasonlóan tendenciaszerű kapcsolat fedezhető fel a kiégés teljesítményskálája és a gyermekszám (r = 0,196; p = 0,058), az egészségügyben eltöltött évek száma (r = 0,180; p = 0,085), továbbá a heti munkaórák száma között (r = 0,194; p = 0,061) *(2. táblázat)*.

Az egészségügyben töltött évek száma és a kiégés teljesítményskálája közötti kapcsolat (tendencia) csak az ápolóknál lelhető fel (r = 0,201; p = 0,071), míg a heti munkaóraszám és a kiégés teljesítményskálája közötti szignifikáns kapcsolat csak az orvosoknál tapasztalható (r = –0,194; p = 0,004).

A családi állapot és a kiégés kapcsolatának felderítésére független mintás t-próbát alkalmaztunk, adataink azonban nem mutattak különbséget (p>0,167). A nem és a kiégés kapcsolatának vizsgálatában a férfiak és a nők között szignifikáns különbség mutatkozott a deperszonalizációskálán kapott átlagpontszám esetében (p = 0,013), míg tendenciaszerű a különbség a teljesítményskálán elért átlagoknál (p = 0,074) *(3. táblázat)*.

Egyéb változók és a kiégés

A teljes mintán a testi tünetek száma együtt járást mutat a kiégés érzelmi kimerülési skálájával (r = 0,225; p = 0,029) és a társas támogatottság érzésének mértékével (r = –0,272; p = 0,008), míg a pszichológiai immunrendszer erőssége szignifikánsan korrelál a kiégés mindhárom skálájával (p<0,01) *(4. táblázat)*.

Külön megvizsgálva az orvosok és az ápolók mintáját, azt tapasztaljuk, hogy a testi tünetek száma és az érzelmi kimerülési skála kapcsolata csak az ápolók esetében mutatható ki (r = 0,255; p = 0,021). Ugyancsak kizárólag az ápolóknál tapasztalható a társas támogatottság érzésének mértéke és az érzelmi kimerülési skála kapcsolata (r = –0,322; p = 0,003), ahogy a társas támogatottság érzésének mértéke és a deperszonalizációskála kapcsolata is (r = –0,257; p = 0,002). Az orvosok esetében ezek az adatok nem bizonyultak szignifikánsnak, továbbá a pszichológiai immunrendszer és a deperszonalizációskála kapcsolata orvosoknál csak tendencia (r = –0,553; p = 0,078).

A Szegedi Tudományegyetem Sebészeti Klinikája és a Sürgősségi Betegellátó Önálló Osztály eredményeinek összehasonlítása

A Sebészeti Klinikának a Maslach Kiégés Kérdőíven kapott átlagpontszáma az érzelmi kimerülési skálán 21,17 pont (SD = 10,61), ami közepes erősségűnek tekinthető. A deperszonalizációskálán az átlag 5,37 (SD = 5,33), ami az alacsony és közepes deperszonalizáció határérté-

1. táblázat | A minta demográfiai adatai

	Életkor (n = 85)	Gyermekek száma (n = 94)	Az egészségügyben eltöltött évek száma (n = 93)	A Sebészeti Klinikán eltöltött évek száma (n = 93)	Heti munkaórák száma (n = 91)	Nem (n)	
Átlag	42,02	1,23	19,12	12,83	48,24	Férfi	20
Szórás	11,31	1,08	12,9	11	19,05	Nő	74

n = mintaelemszám

2. táblázat | Korrelációs elemzés a demográfiai adatok és a kiégés között

		Életkor (n = 85)	Gyermekek száma (n = 94)	Az egészségügyben eltöltött évek száma (n = 93)	A Sebészeti Klinikán eltöltött évek száma (n = 93)	A heti munkaórák száma (n = 91)
Kiégés	Érzelmi kimerülés	r = 0,151 p = 0,171	r = 0,011 p = 0,920	r = 0,046 p = 0,662	r = 0,177 p = 0,089[t]	r = 0,266 p = 0,010**
	Deperszonalizáció	r = –0,076 p = 0,493	r = –0,148 p = 0,155	r = –0,037 p = 0,723	r = 0,105 p = 0,315	r = 0,134 p = 0,196
	Teljesítmény	r = 0,136 p = 0,217	r = 0,196 p = 0,058[t]	r = 0,180 p = 0,085[t]	r = 0,172 p = 0,100	r = 0,194 p = 0,061[t]

**esetén p<0,01; [t]a tendenciát jelöli

n = mintaelemszám
p = szignifikanciaszint
r = korrelációs együttható

3. táblázat | A kiégés összefüggése a nemmel és a családi állapottal

		Nem			Családi állapot		
		Férfi (n = 20)	Nő (n = 74)	p	Egyedülálló (n = 41)	Párkapcsolatban él (n = 53)	p
Kiégés	Érzelmi kimerülés	Átl. = 23,5 SD = 14,14	Átl. = 20,77 SD = 9,68	p = 0,451	Átl. = 20,68 SD = 12,05	Átl. = 21,55 SD = 9,44	p = 0,706
	Deperszonalizáció	Átl. = 8,44 SD = 5,83	Átl. = 4,72 SD = 5,01	p = 0,013*	Átl. = 5,49 SD = 6,05	Átl. = 5,28 SD = 4,75	p = 0,859
	Teljesítmény	Átl. = 39,56 SD = 11,27	Átl. = 37,81 SD = 7,59	p = 0,074ᵗ	Átl. = 36,61 SD = 10,58	Átl. = 39,06 SD = 6,33	p = 0,167

*esetén p<0,05; ᵗa tendenciát jelöli
n = mintaelemszám
p = szignifikanciaszint
SD = standard deviáció

4. táblázat | A kiégés összefüggése a testi tünetek számával, a társas támogatottság érzésének mértékével és a pszichológiai immunrendszerrel

		A testi tünetek száma (n = 94)	A társas támogatottság érzésének mértéke (n = 93)	Pszichológiai immunrendszer (n = 84)
Kiégés	Érzelmi kimerülés	r = 0,225 p = 0,029*	r = −0,272 p = 0,008**	r = −0,432 p<0,001**
	Deperszonalizáció	r = 0,116 p = 0,266	r = −0,156 p = 0,135	r = −0,279 p = 0,010*
	Teljesítmény	r = −0,049 p = 0,641	r = 0,129 p = 0,217	r = 0,484 p<0,001**

*esetén p<0,05; **esetén p<0,01
n = mintaelemszám
p = szignifikanciaszint
r = korrelációs együttható

5. táblázat | A Sebészeti Klinikán és a Sürgősségi Betegellátó Önálló Osztályon (SBO) dolgozók kiégésének összehasonlítása

	Érzelmi kimerülés		Deperszonalizáció		Teljesítmény	
SBO (n = 72)	Átl. = 22,58 SD = 12,28	p = 0,420	Átl. = 8,42 SD = 6,95	p = 0,001**	Átl. = 36,94 SD = 6,96	p = 0,383
Sebészeti Klinika (n = 94)	Átl. = 21,17 SD = 10,61		Átl. = 5,37 SD = 5,33		Átl. = 37,99 SD = 8,49	

**esetén p<0,01
SD = standard deviáció

ke, míg a teljesítményskálán az átlag 37,99 (SD = 8,49), ami közepes teljesítménycsökkenésként értelmezhető. A Sürgősségi Osztályon mért adatoknál az érzelmi kimerülési skálán az átlagpontszám 22,58 (SD = 12,28), a deperszonalizációskálán elért pontszám 8,42 (SD = 6,95), míg a teljesítményskálán 36,94 (SD = 6,96). Ezek az értékek mind közepes erősségű kiégésre utalnak.

A kiégésskálák összehasonlításakor egyedül a deperszonalizációskálán találtunk szignifikáns különbséget (p = 0,001) *(5. táblázat)*. Ez a különbség csak az ápolók esetében maradt szignifikáns (p = 0,006), az orvosok esetében nem (p = 0,155).

Eltérést tapasztaltunk a két minta életkori átlaga között (p = 0,020), továbbá az egészségügyben eltöltött évek számának átlaga között (p = 0,001). A társas támogatottságra vonatkozó kérdőív pontszámának átlaga szintén eltért a két minta kitöltői között (p = 0,039) *(6. táblázat)*. A fenti különbségek csak az ápolókra jellemzők (életkor: p = 0,02; az egészségügyben töltött évek száma: p = 0,008; társas támogatottság érzése: p = 0,034), míg az orvosok esetében ezek a különbségek nem bizonyultak szignifikánsnak (életkor: p = 0,957; az egészségügyben töltött évek száma: p = 0,103; társas támogatottság érzése: p = 0,918).

6. táblázat | A Sebészeti Klinikán és a Sürgősségi Betegellátó Önálló Osztályon (SBO) dolgozók adatainak összehasonlítása

	Életkor		Az egészségügyben eltöltött évek száma		A társas támogatottság érzésének mértéke	
SBO (n = 72)	Átl. = 38,17 SD = 9,01	p = 0,020*	Átl. = 13,20 SD = 10,33	p = 0,001**	Átl. = 13,61 SD = 4,69	p = 0,039*
Sebészeti Klinika (n = 94)	Átl. = 42,02 SD = 11,31		Átl. = 19,12 SD = 12,9		Átl. = 12,06 SD = 5,00	

*esetén p<0,05; **esetén p<0,01
SD = standard deviáció

Megbeszélés

Kapott eredményeink összhangban vannak a korábbi hazai és külföldi vizsgálatok adataival [1, 3, 4, 8, 9, 12]. Együtt járást tapasztaltunk az alacsonyabb kiégés és a munkaórák alacsonyabb száma, a társas támogatottság érzésének magasabb mértéke, a kevesebb testi tünet, továbbá az erősebb pszichológiai immunrendszer között. Tendenciaszerű kapcsolatot fedeztünk fel a kiégésszindróma és a gyermekszám, illetve az egészségügyben eltöltött évek száma között, míg nem találtunk kapcsolatot a kiégés és az életkor vagy a kiégés és a családi állapot között [5, 18].

A Sürgősségi Osztályon végzett korábbi vizsgálathoz hasonlóan azt tapasztaljuk, hogy a kiégés három skálája különböző együtt járást mutat egyes változókkal [11]. Míg az érzelmi kimerülési skála a testi tünetek számával, a heti munkaórák számával és a társas támogatottság érzésének mértékével szignifikánsan, az egészségügyben eltöltött évek számával tendenciaszerűen korrelál, addig a kiégés teljesítményskálája a gyermekek számával és az egészségügyben eltöltött évek számával mutat együtt járást. Kiemelendő, hogy mindhárom skála (érzelmi kimerülés, deperszonalizáció, teljesítmény) szignifikáns összefüggést mutat a pszichológiai immunrendszer erősségével, miszerint a személy pszichológiai immunrendszerének erőssége a legjobb előrejelzője a kiégésre való hajlamnak. Ily módon a pszichológiai immunkompetencia fejlesztése megfelelő intervenciós pont lehet az egészségügyi dolgozók kiégési prevenciójára kialakított programok számára. A pszichológiai immunkompetenciának mint a stresszel való megküzdési stratégiákat összefoglaló eszköztárnak a kiégéssel való kapcsolata egy irányba mutat azokkal a külföldi és hazai eredményekkel, amelyek kiemelik a megküzdési stratégiák mediáló szerepét a munkastressz és a kiégésszindróma kialakulása között [19–21].

Eredményeink alapján a munkaórák magas száma magasabb fokú érzelmi kimerüléshez vezet. A szakirodalomban nincs egységes vélemény a munkaidő és a kiégésszindróma közötti kapcsolatról. Míg egyes vizsgálatok – ahogy jelen eredményeink is – azt támasztják alá, hogy a sebészeti osztályon dolgozók körében a munkaterhelés jelentős rizikótényező a kiégésszindróma kialakulásában, más tanulmányok nem találtak összefüggést a munkaidő és a kiégés között [3, 12, 22]. A szegedi Sebészeti Klinika kitöltői között vannak dolgozók, akik másodállással együtt heti 108 vagy akár 126 órát töltenek munkavégzéssel, ami igen kevés időt hagy más tevékenységek végzésére, kapcsolatok ápolására és a kiégés elleni védőfrontok kiépítésére [12].

A munkaterheléshez hasonlóan a társas támogatottság szerepe a kiégés kialakulásában még tisztázatlan [1, 5, 18, 19]. Eredményeink összecsengenek azokkal a tanulmányokkal, amelyek amellett érvelnek, hogy a jó minőségű személyközi kapcsolatokból kiépített szociális háló csökkenti a kiégésszindróma kialakulásának veszélyét. Ezek a társas kapcsolatok „pufferként" is szolgálhatnak a munkahelyi nehézségek ellen, és megkönnyíthetik a stresszel való megküzdést [1, 5, 15, 18].

Kapcsolatot találtunk az egészségügyben eltöltött évek száma, illetve a sebészeti osztályon töltött évek száma és a kiégés között. Eredményeink szerint a nagyobb munkatapasztalat kisebb mértékű kiégéssel jár együtt. Ennek lehetséges oka, hogy aki hosszú ideje dolgozik az egészségügyben és a sebészeti osztályon, idővel kidolgozza azokat a megküzdési stratégiákat és védőmechanizmusokat, amelyek segítségével szembe tud nézni a mindennapi stresszel, és ezáltal kevésbé van kitéve a kiégés veszélyének [10]. Szintén tendenciaszerű kapcsolatot fedeztünk fel a gyermekek száma és a kiégés között. Minél több gyermeket nevel egy dolgozó, annál kisebb mértékű kiégésről számol be, méghozzá annál kevésbé csökken a munkahelyi teljesítménye. A gyermekszám kiégéssel való összefüggése összhangban van a szakirodalommal [8, 9, 12, 23]. Ennek egyik lehetséges oka, hogy azok a munkavállalók, akik egy időben szülők is, kevésbé vonódnak be a munkahelyi problémákba, és szigorúbban választják el a munkaidőt a magánélettől. A gyermeknevelés számos olyan tevékenységet megkövetel, amely munkahelytől független, ellenben feltöltődésre ad lehetőséget. Ezenfelül feltételezhető, hogy azok a dolgozók, akik jobban ki vannak téve a kiégés tüneteinek, vagy akiknek megküzdési stratégiái kevésbé adaptívak, kevesebb gyermeket is vállalnak.

Nemi különbséget a deperszonalizáció- és teljesítményskálán találtunk. Míg a férfiak jelentősen magasabb pontszámot értek el a deperszonalizációskálán, a női dolgozókra jellemzőbb volt a teljesítmény csökkenése [23]. Eredményeink alapján nem volt hatással a kiégésre az

életkor vagy a családi állapot. Az életkor jellemzően védőfaktor a kiégésszindróma kialakulásában [7, 10, 12]. Ezt a jelen vizsgálattal nem tudtuk alátámasztani, azonban kapcsolatot találtunk az egészségügyben eltöltött idő és a kiégés között, ami rendszerint magasabb életkorral jár. A családi állapotot a szakirodalom szintén protektív tényezőként említi [7, 10, 12, 23]. Ebben a vizsgálatban a családi állapot nem volt hatással a kiégésre, ellenben a társas támogatottság megélésének mértéke igen, ami egyebek mellett a párkapcsolatokra szintén vonatkozik.

A Szegedi Tudományegyetem Sebészeti Klinikája és a Sürgősségi Betegellátó Önálló Osztály eredményeinek összehasonlítása

A Sebészeti Klinika és a Sürgősségi Osztály eredményeinek összehasonlításakor azt tapasztaltuk, hogy a Sürgősségi Osztály dolgozói fiatalabbak, mint a Sebészeti Klinika dolgozói [11]. Szintén különbséget találtunk az egészségügyben eltöltött évek számában, ami magyarázható a minta magasabb életkorával. Jelentősen több jó minőségű társas kapcsolattal rendelkeznek a Sürgősségi Osztály dolgozói, amiből azt várnánk, hogy összehasonlításban kisebb mértékű a kiégés is. Ezt azonban nem találtuk; eredményeink szerint egyedül a deperszonalizációskálán tapasztalható eltérés a két csoport között, méghozzá a Sürgősségi Osztály dolgozói esetében találtunk magasabb deperszonalizációértéket. A kiégés mértéke mindhárom skála tekintetében erősebbnek mutatkozott a Sürgősségi Osztály mintáján, de szignifikáns eltérést csak a deperszonalizációskálán találtunk.

Az eredmények bemutatásakor több ízben kitérünk az orvosok és az ápolók közötti különbségekre. Ezen különbségek a minta nagysága miatt egyedül az ápolók esetében informatívak. Az orvosi minta mindkét esetben kis elemszámú (Sebészeti Klinika: 12 fő; SBO: 13 fő), ezért ezen adatok összehasonlításának megbeszélésére a mintaelemszám növelése után térnénk ki, amikor a minta nagysága lehetőséget biztosít következtetések levonására.

Kutatásunk erőssége, hogy tovább bővíti az ismereteket a hazai veszélyeztetett egészségügyi osztályok adataival, amivel árnyaltabb képet kapunk a kiégésszindróma kialakulásáról. A leírt összefüggések ismeretében tervünk tovább pontosítani a célzott prevenciós és intervenciós programot, amely ezen osztályok dolgozói számára elérhető. A Szegedi Tudományegyetem Sürgősségi Osztályának és Sebészeti Klinikájának dolgozói számára jelenleg elérhető három témakört feldolgozó tréning, amely megcélozza a kiégés prevencióját és a kiégés tüneteivel való megküzdési készségek fejlesztését. A tréning háromalkalmas, ahol a kiégés, a kommunikáció, továbbá az agresszió és indulatkezelés témakörök kerülnek megvitatásra.

Vizsgálatunk viszonylag alacsony mintaszámmal készült, ennek bővítése a leendő kutatások célkitűzése. A jövőben a mintaszámot további osztályok bevonásával tervezzük gyarapítani. Kiemelkedő fontosságúnak tartjuk a hazai sebészeti és sürgősségi osztályok dolgozóinak edukációját a kiégésszindróma tünetegyütteséről, továbbá elérhető program megszervezését, amellyel a dolgozók élettel való elégedettsége javítható, ahogy közvetetten a betegellátás is.

Szerzői munkamegosztás: S. M.: Az adatok bevitele és elemzése, a kézirat megszövegezése, a hipotézisek megfogalmazása. T. A.: Az adatok bevitele és elemzése, a kézirat többszöri javítása és lektorálása, a hipotézisek megfogalmazása. L. Gy.: A kézirat lektorálása, a kutatás koordinálása. P. Z.: A kézirat lektorálása, a kutatás koordinálása. A kézirat végleges változatát valamennyi szerző elolvasta és jóváhagyta.

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