



Doctoral School of Medicine

Field of Doctoral Studies: Medicine

ABSTRACT OF THE DOCTORAL THESIS

**BURNOUT AND QUALITY OF PROFESSIONAL LIFE IN
FORENSIC MEDICINE**

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„Dimidium facti, qui coepit, habet; sapere aude”

Horatius, Epistulae I, 2, v. 40

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ABSTRACT OF THE DOCTORAL THESIS

BURNOUT AND QUALITY OF PROFESSIONAL LIFE IN FORENSIC MEDICINE

Burnout syndrome is a complex occupational phenomenon with a major impact on mental health and quality of professional life, particularly in fields characterised by intense emotional demands. Burnout is defined as a syndrome marked by emotional exhaustion, depersonalisation, and reduced personal accomplishment, arising from prolonged exposure to chronic occupational stress. Although extensively studied among healthcare and educational professionals, burnout within the field of forensic medicine has rarely been addressed in a specific manner, despite its evident particularities: direct contact with death, exposure to traumatic cases, high decision-making pressure, institutional demands, and limited resources.

The introduction highlights that forensic medicine personnel face a unique combination of psychological risk factors, which were further exacerbated during the COVID-19 pandemic, generating increased occupational stress and a heightened risk of burnout. Within this context, the present thesis aims to investigate burnout from an integrative perspective, analysing its biological (genetic and epigenetic), organisational, and psychological determinants.

The thesis is structured into two main parts. The first part comprises an extensive theoretical overview of the definitions, causes, pathophysiological mechanisms, and consequences of burnout, with a particular focus on its implications in forensic medicine. The second part, consisting of original contributions, includes three studies: the first is a systematic review of the literature exploring the role of genetic and epigenetic factors in burnout; the second, a longitudinal observational study, analyses burnout among forensic medicine personnel during the COVID-19 pandemic; and the third, a cross-sectional study, examines the relationship between burnout, professional quality of life, and unconditional self-acceptance.

Through this structure, the thesis seeks to substantiate the need for an in-depth and multidisciplinary approach to burnout in forensic medicine, underlining both the practical relevance of this endeavour and its original scientific contribution.

The general part of the thesis provides a complex and comprehensive synthesis of current knowledge on burnout syndrome, with emphasis on medical professions and, in particular, on forensic medicine. It first addresses the historical and conceptual evolution of burnout, from its early theoretical references to its recognition as an occupational phenomenon by the World Health Organization. The three main dimensions of burnout, emotional exhaustion, depersonalisation, and reduced personal accomplishment, are analysed in detail, highlighting the syndrome's multifaceted clinical, psychological, and behavioural manifestations.

The general section also explores the causes and risk factors associated with burnout, distinguishing clearly between individual factors (personality traits, coping mechanisms, lifestyle) and organisational ones (workload, lack of control, institutional climate, and professional recognition). The Job Demands-Resources (JD-R) model is used as the central explanatory framework, illustrating how the imbalance between professional demands and available resources acts as a trigger for burnout.

The central part of the introductory section is devoted to the analysis of the biological and pathophysiological mechanisms underlying burnout. This includes changes in the autonomic nervous system, dysfunctions of the hypothalamic-pituitary-adrenal (HPA) axis, the role of brain-derived neurotrophic factor (BDNF), chronic inflammation, and immune dysregulation. Furthermore, the thesis examines findings concerning the genetic and epigenetic involvement in individual susceptibility to burnout, encompassing genetic variations in the serotonergic system (e.g., SLC6A4, HTR2A), genes regulating the HPA axis (CRHR1, NR3C1), alterations in DNA methylation, and telomere shortening as indicators of accelerated cellular ageing.

Burnout is also discussed from the perspective of diagnosis and treatment. Alongside validated psychological instruments such as the Maslach Burnout Inventory, the thesis considers modern approaches to objective assessment, including biomarkers and digital tools. Finally, potential therapeutic interventions for the prevention and management of burnout are outlined, ranging from organisational strategies and psychological support to mobile applications and digital technologies.

The concluding section of the general part reviews the field of forensic medicine and its specific professional characteristics, emphasising the heightened exposure of forensic personnel to psycho-emotional stressors that may precipitate burnout. The current state of research suggests that occupational health in forensic medicine remains an underexplored area, despite the evident risks associated with this profession.

The personal contributions presented in this thesis comprise three original studies, designed in response to the need for a deeper understanding of burnout, particularly among forensic medicine personnel in Romania, which is a professional category intensely exposed to stress, yet insufficiently studied. The main motivation was to explore this complex phenomenon from a multidimensional perspective by integrating biological, psychological, and organisational approaches. Accordingly, the first study focused on the genetic and epigenetic dimensions of burnout; the second documented, in a longitudinal manner, the impact of the COVID-19 pandemic on professional exhaustion; and the third examined, on a national scale, the interaction between job satisfaction, self-acceptance, and burnout syndrome. These investigations provide an integrated, contemporary, and applicable perspective on burnout within the field of forensic medicine. The three aforementioned studies are structured as follows:

Study I: The influence of genetic and epigenetic factors in the development of burnout syndrome

The first study within the applied section of the thesis presents a systematic review of the scientific literature, aiming to investigate the contribution of genetic and epigenetic factors to the aetiology of burnout syndrome. This endeavour is based on the analysis of 28 original research articles selected through a systematic search of international databases, conducted according to rigorous eligibility criteria. The included studies encompass a wide range of populations (twin cohorts, physicians, miners, and employees from various sectors) and employ modern genetic analysis methods such as MALDI-TOF MS, PCR, BeadChip, and pyrosequencing.

The study begins with an overview of the literature addressing the hereditary component of burnout, drawing upon twin studies. Findings suggest that genetic factors account for approximately 33-36% of the variance in traits associated with burnout, particularly emotional exhaustion and performance-based self-esteem. Nevertheless, environmental influences play a crucial role in the onset and progression of the syndrome, being mediated by individual reactivity.

Subsequently, the analysis focuses on specific genetic polymorphisms relevant to the neurobiology of stress and the regulation of the stress response:

- Serotonergic system genes (e.g., 5-HTT, HTR2A), where the 5-HTT rs6354 T/T genotype was associated with increased stress sensitivity and a higher risk of burnout.
- The BDNF rs6265 T/T genotype, correlated with elevated levels of emotional exhaustion and depersonalisation in high-demand professional contexts.
- Genes regulating the HPA axis (CRHR1, NR3C1, FKBP5), where variants such as rs5522, rs41423247, and rs110402 were found to be significant in interaction with occupational stress.

An important segment of the study is dedicated to microRNAs (miRNAs)-small, post-transcriptional regulatory molecules whose expression was significantly altered in individuals with burnout. Increased levels of miR-10a, miR-15a, let-7a, and let-7g were linked to impaired neuronal responses to chronic stress and disrupted adaptive mechanisms.

The study also addresses epigenetic modifications, particularly DNA methylation. Research in this field indicates higher methylation levels of NR3C1, BDNF, and SLC6A4 genes in individuals with burnout, suggesting a direct influence of stress on gene expression. Other studies have demonstrated an association between burnout and telomere shortening, an important marker of accelerated cellular ageing.

This study provides a solid theoretical foundation for deepening the understanding of the biological underpinnings of occupational stress, paving the way for translational research in occupational mental health. The data analysed indicate that, while genetic and epigenetic factors

contribute to individual vulnerability, a stressful work environment remains essential in the onset of burnout.

Based on the reviewed evidence, several future research directions were outlined:

- Identification of predictive genetic biomarkers;
- Integration of genetic profiles into preventive programmes;
- Development of psychological and behavioural interventions tailored to individual biological profiles.

Study II: Assessment of burnout syndrome among forensic and pathology personnel - an observational study conducted in three stages of the COVID-19 pandemic

This study aimed to evaluate the evolution of burnout among personnel working in forensic medicine and pathology departments in Sibiu County, Romania, over three distinct time periods corresponding to the onset of the COVID-19 pandemic (Phase 1), the peak of the pandemic (Phase 2), and the post-pandemic period (Phase 3). Designed as a longitudinal observational study with both descriptive and analytical components, it included 37 participants representing diverse professional categories (medical doctors, nurses, and auxiliary staff). Burnout levels were assessed using the Maslach Burnout Inventory (MBI), the most widely used instrument for measuring burnout.

The findings revealed a marked increase in burnout during the peak of the pandemic (Phase 2) compared with the initial phase (Phase 1). In Phase 2, 18 participants exhibited moderate burnout scores and two reported high levels of burnout. Although a slight decrease was observed in Phase 3, the scores did not return to baseline levels, suggesting the persistence of long-term psychological effects of the pandemic.

The three burnout dimensions evolved differently:

- Emotional exhaustion (EE) was the most affected dimension, showing a significant increase during Phase 2 followed by a partial reduction thereafter;
- Depersonalisation (DP) remained relatively stable across all three phases, indicating greater resistance to contextual fluctuations;
- Reduced personal accomplishment (PA) was already present in Phase 1, increased during the pandemic, and showed partial recovery in Phase 3.

Gender-based analysis revealed an interesting pattern: female participants reported higher levels of burnout during the peak of the pandemic, particularly in the EE dimension, while male participants consistently displayed higher DP scores across all three phases. This trend aligns with international findings, which indicate that women are more vulnerable to emotional exhaustion, whereas men tend to exhibit higher levels of professional cynicism.

Demographic factors played an important role:

- Married employees and those with children showed lower burnout scores throughout the study, confirming the protective role of family support;
- Participants without children reported a steady increase in DP, peaking in the post-pandemic period;
- Employees under 40 years of age and those over 49 exhibited the highest increases in burnout during the pandemic, though through different mechanisms (increased EE in younger workers and reduced PA in older ones).

From an occupational perspective, medical doctors recorded the highest burnout scores, particularly in the EE and DP subscales, likely reflecting their greater decision-making responsibilities and crisis management demands. Auxiliary staff exhibited the most pronounced decrease in PA, especially during the post-pandemic phase. Those holding managerial positions reported moderate burnout levels overall but experienced a significant increase during Phase 2.

Pre-existing contextual factors such as limited institutional support, lack of psychological assistance, and constant exposure to traumatic cases reached critical levels during the pandemic, further contributing to elevated burnout risk.

The results of this second study underscore the urgent need for targeted institutional interventions at the local level, including psychological support programmes, workload adjustment, and tailored strategies based on gender and age.

Study III: A cross-sectional analysis of burnout syndrome in forensic medicine in Romania in relation to job satisfaction and unconditional self-acceptance

The third study of the thesis explores a deeper psychological dimension of burnout syndrome, additionally examining, through specific questionnaires, the extent to which job satisfaction and unconditional self-acceptance influence and mediate burnout levels among forensic medicine personnel. This study also extended the scope of assessment nationwide, encompassing forensic medicine professionals from across Romania. Conducted in 2024 as a cross-sectional observational study, it included 153 professionals from 31 forensic institutions representing diverse geographical regions and professional categories, such as forensic pathologists, resident doctors, mortuary staff, and auxiliary personnel.

The study pursued multiple objectives: to measure the prevalence of burnout and its main dimensions (emotional exhaustion, cynicism, and professional inefficacy); to analyse demographic and occupational factors associated with these variations; and to investigate the relationship between job satisfaction and burnout. Moreover, it aimed to explore the potential role of unconditional self-acceptance in mitigating burnout-related effects.

The following validated instruments were employed:

- Maslach Burnout Inventory - General Survey (MBI-GS);
- Job Satisfaction Survey (JSS);
- Unconditional Self-Acceptance Questionnaire (USA-Q).

The results indicated that:

- Approximately 23.5% of participants exhibited high total burnout levels;
- The most frequently affected dimensions were emotional exhaustion and professional inefficacy, while cynicism was present in about one fifth of respondents;
- Burnout was more prevalent among younger professionals, particularly those under 30 years of age and among forensic medicine residents;
- Lower burnout levels were observed among married participants, those with children, and individuals in managerial positions, suggesting a protective role of these variables;
- Over half of respondents reported being satisfied with their job, although dissatisfaction was more common among women, younger employees, and residents;
- Notable regional differences emerged, with Bucharest recording the highest rate of job dissatisfaction and Oltenia the highest level of professional satisfaction.

With regard to unconditional self-acceptance (USA-Q):

- Nearly half of the participants reported low or very low levels of self-acceptance;
- Only 20% recorded high values for this parameter;
- Self-acceptance was lower among men, participants without children, younger professionals, and residents.

The mediation analysis demonstrated that unconditional self-acceptance mediates the relationship between job satisfaction and burnout. Specifically, lower job satisfaction was directly correlated with higher burnout levels; however, this effect was attenuated in the presence of greater self-acceptance. The indirect effect explained by the mediator was statistically significant and accounted for approximately 10% of the total effect.

The findings of this study suggest that promoting self-acceptance may serve as an effective psychological intervention for reducing burnout among forensic medicine personnel, particularly in contexts of professional dissatisfaction. The results support the implementation of psychological support programmes, personal development workshops, and organisational interventions aimed at enhancing work-life balance, increasing professional recognition, and strengthening emotional resilience.

General conclusions

The general conclusions reflect the integrated synthesis of the results obtained across the three studies, in accordance with the proposed general and specific objectives:

- Through the present research, the burnout syndrome in forensic medicine was explored from an integrative perspective, focusing on three central aspects: the analysis of genetic and epigenetic factors influencing individual susceptibility, the examination of the contextual impact generated by the COVID-19 pandemic, and the identification of psychosocial correlations among professionals working within Romania's forensic medicine network.

- A review of the scientific literature revealed that burnout has a significant genetic component, supported by twin studies on monozygotic pairs, the identification of relevant genetic polymorphisms, and the discovery of epigenetic alterations such as DNA methylation and telomere shortening.

- Variations in genes involved in serotonergic neurotransmission, such as 5-HTT and HTR2A, influence susceptibility to burnout under chronic stress conditions. The 5-HTT rs6354 T/T genotype, as well as decreased SLC6A4 expression through methylation, have been associated with heightened stress sensitivity and an increased risk of developing burnout syndrome.

- The brain-derived neurotrophic factor (BDNF) plays an essential role in neuronal plasticity and in regulating emotional responses to occupational stress. Genetic alterations, including polymorphisms and changes in gene expression, were correlated with a higher risk of burnout. In particular, the BDNF rs6265 T/T genotype or reduced BDNF expression via methylation were associated with elevated levels of emotional exhaustion and depersonalisation.

- The research also highlighted the central role of the hypothalamic-pituitary-adrenal (HPA) axis in the pathophysiology of chronic stress, primarily through cortisol secretion, regulated by genes such as NR3C1, CRHR1, and FKBP5. Certain polymorphisms located on these loci (NR3C1 rs5522, rs41423247, and CRHR1 rs110402), together with reduced NR3C1 expression due to methylation, may contribute to dysregulated stress responses, thereby increasing susceptibility to burnout, particularly under occupational stress.

- The findings further indicate that individual susceptibility to burnout may be amplified by genetic predispositions; however, the onset of the syndrome is most frequently conditioned by external and personal factors.

- A particularly relevant observation is that burnout may not only occur more readily in individuals with a genetic predisposition but may, in turn, induce genetic-level alterations. Specifically, burnout can lead to increased expression of microRNAs such as miR-10a, miR-15a, let-7a, and let-7g, which may modulate gene expression, contributing to a vicious cycle of molecular dysregulation. Chronic stress and burnout may also accelerate telomere shortening, suggesting potential effects on premature cellular ageing and an increased risk of chronic disease.

- The findings from Study I emphasise the need for a multidimensional approach to burnout that encompasses not only the psychological dimension but also biological risk factors. Burnout should therefore not be regarded solely as an emotional disorder but as a phenomenon with significant biological implications and potential effects on general health and chronic disease development.

- The longitudinal assessment of burnout among forensic and pathology personnel in Sibiu County, conducted in three distinct phases (September 2020, October 2021, and October 2024), showed that periods of intense occupational stress, such as the COVID-19 pandemic, can significantly contribute to burnout development, with the highest total scores recorded during the peak pandemic phase.

- The observational study demonstrated that the end of a prolonged stress period (the COVID-19 pandemic) resulted in decreased burnout levels compared with the peak pandemic period, although these levels did not return to the baseline values recorded during the initial phase.

- Among all burnout components, emotional exhaustion was the most affected during the pandemic, showing a significant increase during the health crisis, followed by partial post-pandemic recovery, though not reaching pre-pandemic levels.

- Personal accomplishment declined progressively throughout the study period, while depersonalisation evolved gradually but steadily, being more pronounced among male employees.

- Female participants experienced a marked increase in emotional exhaustion during the peak of the pandemic and reported diminished personal accomplishment, whereas male participants did not exhibit significant variations.

- In terms of age groups, employees under 40 were most affected by emotional exhaustion, while those over 49 experienced a pronounced reduction in personal accomplishment.

- Medical doctors recorded the highest total burnout scores during the pandemic peak, particularly in the emotional exhaustion and depersonalisation dimensions. Specialists were the most susceptible to burnout under crisis conditions, reflecting greater vulnerability to intense professional overload.

- Auxiliary staff displayed a consistent and pronounced decline in personal accomplishment throughout and following the pandemic, suggesting a progressive reduction in job satisfaction under demanding circumstances.

- Both marital and parental status appeared to act as protective factors, as married employees and those with children displayed lower burnout levels compared with single or childless participants across all study phases.

- The nationwide evaluation revealed that approximately one quarter of forensic medicine professionals presented high total burnout scores. The most affected dimensions were emotional

exhaustion and reduced professional efficacy, with this trend being more pronounced among younger professionals and resident doctors.

- The early career stage proved to be a critical period of heightened vulnerability to burnout, as professionals under 30 years recorded the highest scores.

- At the national level, physicians reported the highest total burnout scores both during and outside the pandemic. Resident doctors emerged as one of the most vulnerable professional categories, characterised by elevated emotional exhaustion and professional dissatisfaction, particularly in the absence of institutional support mechanisms.

- Employees in leadership positions generally exhibited moderate burnout levels; however, they experienced significant increases in emotional exhaustion and depersonalisation during the pandemic peak. Conversely, non-leadership employees showed higher burnout levels during normal periods, which may be explained by the additional pressure associated with managerial responsibilities and the challenges of crisis management.

- Although most respondents reported job satisfaction, dissatisfaction remained high among women, younger employees, and residents, groups particularly vulnerable to discrepancies between professional expectations and workplace realities.

- The highest job satisfaction levels were recorded among employees aged 30-39, those in relationships, individuals with managerial roles, and staff not directly involved in morgue-related activities.

- Regional differences were also identified: Bucharest registered the highest dissatisfaction rates, whereas the Oltenia region reported the highest satisfaction levels.

- Low professional satisfaction directly contributed to burnout development, especially through intensified emotional exhaustion and reduced perceived efficacy.

- Nearly half of participants reported low or very low levels of unconditional self-acceptance, a phenomenon more frequently observed among men, employees without children, and younger professionals. Only one fifth of participants exhibited high levels of self-acceptance.

- Unconditional self-acceptance acted as a protective factor mediating the relationship between professional dissatisfaction and burnout, exerting a partial mediation effect. Through this mechanism, self-acceptance mitigates the negative impact of job dissatisfaction on the clinical manifestations of burnout.

- The results of the present research highlight the need for multidimensional strategies aimed at preventing and, where necessary, mitigating burnout manifestations among forensic medicine personnel. Such strategies should address both organisational and individual dimensions. Psychologically, interventions should focus on strengthening internal coping mechanisms—particularly by cultivating unconditional self-acceptance, which has proven protective against chronic

occupational stress. At the organisational level, measures should include systematic support for young professionals, recognition of individual contributions, and ensuring transparency and fairness in defining professional roles and responsibilities.

- Finally, the development of an institutional support framework within Romania's national forensic medicine network is strongly recommended. Such a framework would facilitate the sharing of experience, dissemination of good practices, and identification of common prevention strategies. This collaborative approach could ultimately contribute to creating a unified intervention model tailored to the specific needs of forensic medicine personnel.

Statement of originality

- The present research represents one of the first initiatives in the specialised literature to approach burnout syndrome from a multidimensional perspective, combining empirical data obtained through the assessment of a professional population exposed to occupational stressors (personnel involved in post-mortem activities) with an extensive analysis of studies addressing the genetic and epigenetic factors associated with this syndrome.

- The first study offers an original contribution by providing an updated and critical synthesis of the specialised literature regarding the genetic and epigenetic mechanisms implicated in burnout syndrome, with a particular focus on BDNF and 5-HTT gene polymorphisms, the hypothalamic-pituitary-adrenal (HPA) axis, and DNA methylation levels. This integrative approach represents one of the few existing attempts to investigate burnout from a translational research perspective. Based on these findings, new premises can be formulated for the development of future genetic analyses aimed at the early identification of burnout, thereby contributing to the personalisation of prevention and intervention strategies.

- The second study constitutes the first longitudinal investigation in Romania analysing burnout syndrome among forensic and pathology personnel across three distinct stages of the COVID-19 pandemic. It provides a dynamic perspective on how health crises can influence the psychological well-being and emotional adjustment of these professionals. Conducted in the context of an unprecedented public health emergency, the study offers a unique and unrepeatable insight into the pandemic's impact on mental health and professional balance within the field of forensic medicine.

- The third study is the first in Romania to examine the relationship between professional satisfaction, unconditional self-acceptance, and burnout levels in an extended sample of forensic medicine professionals, using an advanced mediation-based statistical model. The originality of this study also lies in applying the construct of unconditional self-acceptance as a moderating psychological variable, laying the foundation for future interventions aimed at optimising employees' internal psychological resources.

- Through these studies, a nationally relevant empirical database was established, integrating essential information regarding the prevalence of burnout, professional satisfaction, and self-acceptance among forensic medicine personnel. This database may serve as a valuable reference point for international comparative research and for the development of predictive models in occupational health.

- The present doctoral research aimed to design an integrative model for analysing burnout syndrome, encompassing biological, psychological, and organisational dimensions, thus providing an original and contemporary contribution to the field. Through this interdisciplinary approach, the thesis offers a broad and comprehensive perspective on burnout within forensic medical practice in Romania. The proposed model may serve as a valuable conceptual basis for the development of occupational health policies and the optimisation of multidimensional interventions in high-risk professional environments, particularly with regard to personalised prevention strategies.

- By its interdisciplinary character, the thesis strengthens the connection between forensic medicine, behavioural sciences, and molecular biology, offering new directions for understanding and preventing burnout syndrome in medical professions. Consequently, this work enriches the specialised literature in occupational health and provides concrete premises for the development of public policies and practical interventions applicable to forensic medicine practice.

Future research directions

- It is considered appropriate to deepen research into the role of genetic and epigenetic biomarkers in burnout syndrome through case-control or cohort studies integrating direct molecular testing methods. Such investigations are essential for validating the hypotheses formulated in the theoretical analysis presented in Study I.

- Future research should explore the interactions between genetic polymorphisms and environmental factors, with the aim of developing robust predictive models with relevant clinical applicability.

- A detailed investigation of epigenetic mechanisms, such as DNA methylation and microRNA expression, is recommended, given their potentially modifiable role in the development of burnout and their value as possible therapeutic targets or diagnostic biomarkers.

- Expanding longitudinal studies among forensic medicine personnel, using larger and geographically diverse samples, could help to identify post-pandemic trends in burnout and to assess the long-term psychological effects of the COVID-19 pandemic on mental health.

- From a psychological perspective, continued research into the role of unconditional self-acceptance is warranted, along with the examination of other personal psychological resources (e.g., self-compassion, emotional self-regulation) as protective factors against burnout.

- The findings of the present research, particularly those of the third study, support the need to design structured psychological interventions for forensic medicine personnel, aimed at enhancing professional satisfaction and self-esteem.
- It is also of interest to integrate physiological and objective indicators (such as biological stress markers, cardiovascular parameters, and cortisol levels) in future studies, in order to achieve a multidimensional validation of burnout.
- Another innovative direction of research concerns the analysis of mobile applications for burnout prevention and management, through a scoping review approach. This project aims to systematically explore applications available in the Google Play Store and Apple App Store, evaluating their functionality, scientific foundation, integrated psychological interventions, and level of empirical validation. The results of this endeavour will contribute to identifying gaps in the current digital landscape and to establishing future directions for the development of validated, accessible, and effective digital tools for burnout prevention, reflecting the growing need for digital solutions in occupational mental health.

Research limitations

- An important limitation that should be noted is that no direct genetic measurements were performed on a specific population sample in the first study, which was conceived as a theoretical and synthetic analysis of previously published research. Nevertheless, the study integrates recent and relevant sources, contributing to a deeper understanding of the subject matter. It should also be emphasised that the methodological and conceptual heterogeneity of the studies analysed (differences in populations, varied designs, etc.) may affect the consistency of interpretation and partially limit the generalisability of the findings, an aspect inherent to review-based research.
- With regard to the second study, the fact that it was conducted exclusively among post-mortem personnel from Sibiu County may limit the generalisation of the results to the national level or to other occupational categories. In addition, the absence of statistically significant findings for one burnout component could reflect a degree of self-selection bias; however, such bias is unlikely to have had a major impact, as the majority of employees from both departments completed the questionnaire, supporting the representativeness of the sample for the local workforce.
- A methodological limitation of the third study lies in the exclusive use of self-report questionnaires, which may introduce recall bias and subjective item interpretation. Relying solely on self-reported data did not allow control over potentially confounding variables such as personality traits, psychiatric history, or social support, which could have influenced the relationship between job satisfaction, self-acceptance, and burnout. Moreover, the quantitative design did not permit an in-depth exploration of participants' subjective experiences (e.g., recent personal events or cultural

influences) that might have affected the outcomes. Furthermore, although questionnaires were distributed to all forensic institutions, the response rate among certain professional subgroups, such as autopsy technicians, drivers, and auxiliary staff, was low, limiting comparisons between professional categories. The geographical distribution of responses was also uneven, with a higher concentration from certain regions, which may affect the generalisability of the results and warrants caution in interpreting causal relationships.

- In relation to the descriptive analysis of the prevalence of burnout, job satisfaction, and unconditional self-acceptance, no statistical significance tests between subgroups were conducted, as the sample size did not allow for adequate statistical power. Consequently, the analysis was descriptive in nature, aiming to estimate prevalence rates and identify general trends within the studied population.

- With respect to the statistical analysis conducted in the third study, an important limitation was the absence of confirmatory factor analysis (CFA) for the psychometric validation of the instruments used. Although well-established scales with previously validated factorial structures were employed, a CFA was not conducted on the present sample due to resource constraints.

- Regarding the mediation analysis performed in Study III, it was carried out within a cross-sectional framework, without a longitudinal component, which precludes causal inferences between the variables (job satisfaction, unconditional self-acceptance, and burnout). The construct of “unconditional self-acceptance” was measured using a single scale, and the lack of triangulation with other psychological instruments or qualitative interviews limits the depth of psychological interpretation.

- Despite these limitations, the conducted research provides a solid foundation for future explorations, underscoring the need for multidimensional studies that integrate biological, psychological, sociological, and organisational data.

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