

Occupational Burnout among Filipino Radiographers in Non-traditional Practice Settings

Mark M. Alipio, RRT, PhD,¹ Grace Meroflor A. Lantajo, DPA² and Joseph Dave M. Pregoner, LPT, MAT³

¹College of Radiologic Technology, Iligan Medical Center, College, Iligan City, Philippines

²College of Development Management, University of Southeastern Philippines, Davao City, Philippines

³Graduate School, Philippine Christian University, Manila, Philippines

ABSTRACT

Background. Occupational burnout is a growing concern in healthcare, which affects professionals across various disciplines. Radiographers working in non-traditional practice settings may face unique stressors that contribute to burnout, yet this population remains understudied, particularly in the Philippines.

Objectives. This study aimed to (1) assess and compare burnout levels among Filipino radiographers in non-traditional roles, (2) investigate the relationship between demographic variables and burnout, and (3) assess burnout severity by imaging role.

Methods. A cross-sectional, quantitative survey design was employed. Participants (n = 188) completed an online survey including demographic questions and the Maslach Burnout Inventory (MBI). Data analysis was performed using SPSS 23. Non-parametric tests were used to assess relationships between demographic variables and MBI scores.

Results. Significant differences in burnout scores were found across imaging roles (p = .000). Mobile imaging professionals reported the highest emotional exhaustion (M = 48.4, SD = 4.7) and depersonalization (M = 21.5, SD = 4.7), and the lowest personal accomplishment (M = 18.1, SD = 7.2). Forensic imaging professionals reported the lowest overall burnout (M = 58.9, SD = 13.8) and depersonalization (M = 7.7, SD = 4.3), and the highest personal accomplishment (M = 29.4, SD = 8.3). Sex differences were observed for depersonalization (p = .045), with males scoring higher. Participants with graduate degrees reported lower personal accomplishment (p = .036). Severe burnout was the dominant category, especially in mobile, military, and veterinary imaging.

Conclusion. Burnout levels vary significantly among Filipino radiographers in non-traditional roles, with mobile imaging professionals at particularly high risk. These findings highlight the need for targeted interventions to mitigate burnout and promote well-being in this population.

Keywords: professional burnout, radiologic technology, Philippines, Maslach Burnout Inventory, cross-sectional study

Corresponding author: Mark M. Alipio, PhD
College of Radiologic Technology
Iligan Medical Center College
San Miguel Village, Pala-o
Iligan City 9200, Philippines
Email: mark.alipio@imcc.edu.ph
ORCID: <https://orcid.org/0000-0001-8360-0287>

INTRODUCTION

Radiography is the art and science of producing diagnostic images using radiation such as x-rays, beta rays, gamma rays, ultrasound, and radio frequency rays.¹ The images produced then play a significant role in the diagnosis and treatment of diseases. While traditionally associated with hospitals and clinics, the field is expanding, with radiographers increasingly finding themselves in non-traditional roles. These roles, encompassing areas like mobile imaging, veterinary radiography, and military imaging, offer distinct challenges and opportunities compared to conventional settings. While this diversification provides new avenues for radiographers, it also raises concerns about their well-being, particularly regarding occupational burnout. The lack of focus on these non-traditional roles in clinical placements and university curricula may leave radiographers ill-equipped to handle the demands of these positions, potentially leading to burnout.²

Occupational burnout, characterized by emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment, is a significant occupational hazard across various professions.³ It stems from chronic workplace stressors that overwhelm an individual's coping mechanisms.⁴ Within the healthcare sector, burnout is a well-documented phenomenon, affecting physicians, nurses, and other allied health professionals.⁵⁻⁷ While research exists on burnout among radiographers in traditional settings, no studies have explored this phenomenon among those working in non-traditional roles.⁸⁻¹²

This gap is particularly concerning in the context of the evolving landscape of radiography in the Philippines. Filipino radiographers, known for their competence and adaptability, are increasingly sought after for these specialized roles, both domestically and internationally. These non-traditional settings often present unique stressors. For example, mobile imaging radiographers may face unpredictable work schedules, travel to remote locations, and deal with limited resources. Veterinary radiographers may encounter the emotional challenges of working with sick animals and their distressed owners. Military imaging radiographers, usually assigned to the Medical Corps of the Armed Forces of the Philippines, may operate in high-stress environments with potential exposure to trauma and conflict. These distinct challenges contribute to different manifestations and levels of burnout compared to those working in traditional healthcare facilities.

On one hand, while research suggests a link between demographic factors (e.g., age, sex, experience, marital status, education, *et cetera*) and burnout among radiographers in traditional settings, the influence of these same demographic factors on radiographers in these emerging non-traditional roles remains unexplored.⁸⁻¹¹ Investigating this relationship is crucial for developing effective, targeted interventions, particularly in the Philippines. This is particularly important in the Filipino context, where socio-cultural factors like “pakikipagkapwa-tao” (shared identity) and “bayanihan”

(communal unity) may influence burnout levels by shaping workplace dynamics and coping mechanisms.

Therefore, this study aims to (1) assess and compare the level of occupational burnout among Filipino radiographers working in non-traditional roles, (2) investigate the relationship between demographic variables and occupational burnout within this population, and (3) assess the severity of occupational burnout by non-traditional role.

METHODS

Design, Locale and Participants

This study employed an online cross-sectional quantitative survey design, conducted between October and December 2024. Participants were recruited through professional associations, such as the Philippine Association of Radiologic Technologists (PART) accredited by the Professional Regulation Commission (PRC), as well as online and social media channels. Eligible participants included registered Filipino radiographers with a valid PRC license who had been working in non-traditional roles such as veterinary imaging, mobile imaging, military imaging, or other similar settings for at least six months. A purposive sampling method was used to ensure that participants met the study criteria, with potential respondents initially identified through PART membership directories, targeted social media groups, and professional networks. The survey was administered using Google Forms, which provided detailed information about the purpose of the study, emphasized the voluntary nature of participation, and assured participants of confidentiality and anonymity.

Participant numbers were documented at each stage: (1) potentially eligible (unique link click-throughs or survey opens), (2) screened for eligibility (reached eligibility items), (3) confirmed eligible (met all criteria: registered Filipino radiographer, valid PRC license, ≥ 6 months in a non-traditional practice setting), (4) provided consent, (5) started the questionnaire, (6) completed the questionnaire, (7) excluded (pre-specified reasons: ineligible, duplicate entry, incomplete key outcomes, data-quality flags), and (8) included in analyses.

Measures

The survey instrument consisted of two parts. The first part collected demographic data, including the type of non-traditional role (veterinary imaging, mobile imaging, military imaging, or other), age, sex (male or female), years of experience (categorized as 0-3, 4-7, 8-10, and >10), employment status (full-time or part-time), marital status (single, married, separated, or widowed), and highest educational attainment (Bachelor's degree, Graduate degree and higher). The second part utilized the Maslach Burnout Inventory (MBI) questionnaire, a widely used tool for evaluating burnout in healthcare workers.¹³ The MBI assesses three dimensions: emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). This 22-item questionnaire is

divided into three subscales: EE (9 items), DP (5 items), and PA (8 items). Items are rated on a 7-point scale ranging from "never" to "every day." Occupational burnout, as measured by the MBI, is characterized by high scores for EE and DP and low PA scores.¹⁴

EE scores were categorized as "low" (0-18), "moderate" (19-26), or "high" (27-54). DP scores were categorized as "low" (0-5), "moderate" (6-9), or "high" (10-30). PA scores were categorized as "low" (0-33), "moderate" (34-39), or "high" (40-48).¹⁴ Individual total burnout scores were calculated by reversing the scores for PA and then summing all component scores.¹⁵ The possible score ranges were: EE (0-54), DP (0-30), PA (0-48), and total burnout (0-132). Higher scores indicate higher levels of burnout. A four-category burnout variable, based on the three dimensions, was defined as follows: "No Burnout" (0) = neither high EE nor high DP, AND no low PA; "Mild Burnout" (1) = either high EE OR high DP OR low PA; "Moderate Burnout" (2) = high EE AND high DP, OR (high EE OR high DP) AND low PA; "Severe Burnout" (3) = high EE, high DP, AND low PA.¹⁶ The MBI has established reliability and validity across various occupational groups, including healthcare professionals, ensuring accurate and comparable burnout measurement in this study.¹⁷⁻¹⁹

To address potential bias inherent in self-reported online surveys, several steps were taken. First, participation was anonymous, and no personally identifying information (e.g., names, license numbers, IP addresses) was collected. The survey introduction emphasized the voluntary nature of participation, confidentiality, and that there were no right or wrong answers to reduce social desirability pressure. Second, MBI, a widely validated instrument in healthcare populations, was used with neutral wording and established subscales (EE, DP, PA), to minimize measurement bias. Third, to reduce careless responding, the survey included clear instructions and standard response options. To minimize item-level missingness, all MBI items and core demographic variables (sex, age, years of experience, employment status, highest educational attainment, and practice setting) were designated as required fields in the online form.

Data Analysis

Data analysis was performed using SPSS 23 Version (IBM, Chicago, Illinois, USA). The analytic cohort was derived by excluding: (a) ineligible respondents, (b) duplicate submissions (identical demographic fingerprints/time stamps), (c) incomplete MBI outcomes, and (d) responses flagged by pre-specified data-quality checks (extreme speeding, straight-lining). Quantitative variables were described using mean and standard deviation, while qualitative variables were represented by frequency and percentage. Association analysis between MBI dimension scores and the demographic characteristics was conducted using the non-parametric Mann-Whitney and Kruskal-Wallis tests, as appropriate. A p-value of less than 0.05 was considered statistically significant for all analyses.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Review Committee of Iligan Medical Center College. All data collection and analysis procedures adhered to relevant ethical guidelines. To ensure confidentiality and anonymity, several measures were implemented. The Google Form included a link to an online consent form detailing the study purpose, procedures, and the voluntary nature of participation, which participants were required to acknowledge before accessing the questionnaire. Data collection was anonymous; no personally identifiable information was collected, and responses were recorded without any connection to participant identities. The online platform used for the questionnaire was secured to protect data privacy, and access to the anonymized data was restricted to the research team.

RESULTS

In the sample demographics, a total of 188 participants were included, with a variety of non-traditional imaging

Table 1. Participant Characteristics in Non-traditional Roles (N = 188)

	n	%
Type of non-traditional role		
Forensic imaging	15	8.0
Military imaging	26	13.8
Mobile imaging	94	50.0
Sports imaging	9	4.8
Veterinary imaging	44	23.4
Age, in years		
22-26	30	16.0
27-31	61	32.4
32-36	76	40.4
≥37	21	11.2
Sex		
Female	49	26.1
Male	139	73.9
Years of experience		
0-3	25	13.3
4-7	67	35.6
8-10	74	39.4
>10	22	11.7
Employment status		
Full-time	174	92.6
Part-time	14	7.4
Marital status		
Single	80	42.6
Married	87	46.3
Separated	8	4.3
Widowed	13	6.9
Highest educational attainment		
Bachelor's degree	178	94.7
Graduate degree and higher	10	5.3
Total	188	100.0

roles (Table 1). The majority of participants were involved in mobile imaging (50.0%), followed by veterinary imaging (23.4%), military imaging (13.8%), forensic imaging (8.0%), and sports imaging (4.8%). In terms of age, the largest group was between 32-36 years (40.4%), followed by those aged 27-31 years (32.4%), 22-26 years (16.0%), and those older than 37 years (11.2%).

Regarding sex, most participants were male (73.9%), while 26.1% were female. In terms of professional experience, the majority of participants had 4-7 years (35.6%) or 8-10 years (39.4%) of experience, while 13.3% had 0-3 years and 11.7% had more than 10 years. Regarding employment status, 92.6% of participants were employed full-time, while 7.4% were employed part-time.

In terms of marital status, most participants were married (46.3%), followed by those who were single (42.6%), widowed (6.9%), and separated (4.3%). The highest level of educational attainment for the majority was a bachelor's degree (94.7%), with 5.3% holding a graduate degree or higher.

The burnout scores across various demographic characteristics are presented in Table 2. Analysis revealed significant

differences in burnout scores by the type of non-traditional imaging role ($p = .000$). The mobile imaging group exhibited the highest EE ($M = 48.4, SD = 4.7$), highest DP ($M = 21.5, SD = 4.7$), lowest PA ($M = 18.1, SD = 7.2$) and overall burnout scores ($M = 107.9, SD = 13.2$). Sports imaging, on the other hand, showed the lowest score in EE ($M = 21.9, SD = 7.4$). Forensic imaging demonstrated the lowest scores in DP ($M = 7.7, SD = 4.3$) and overall burnout ($M = 58.9, SD = 13.8$) and the highest score in PA ($M = 29.4, SD = 8.3$).

Age did not show significant differences in EE, DP, PA, or overall burnout (all p -values $>.05$). Sex differences were significant only for DP ($p = .045$), with males scoring higher ($M = 18.7, SD = 6.4$) than females ($M = 16.9, SD = 6.9$). However, there were no significant differences in EE, PA, or overall burnout based on sex.

In terms of years of experience, no significant differences were observed across groups (0-3 years, 4-7 years, 8-10 years, >10 years) for EE, DP, PA, or overall burnout (all p -values $>.05$). Employment status (full-time vs. part-time) did not show significant differences in overall burnout and its dimensions.

Table 2. Burnout Scores of the Sample according to Demographic Characteristics

Demographic characteristics	EE			DP			PA			Total Burnout		
	Mean	SD	P	Mean	SD	P	Mean	SD	P	Mean	SD	P
Type of non-traditional role												
Forensic imaging	24.5	3.7	.000	7.7	4.3	.000	29.4	8.3	.000	58.9	13.8	.000
Military imaging	37.0	4.3		14.4	4.9		23.5	8.6		83.9	14.6	
Mobile imaging	48.4	4.7		21.5	4.8		18.1	7.2		107.9	13.2	
Sports imaging	21.9	7.4		12.9	6.7		26.4	3.6		64.3	13.0	
Veterinary imaging	38.9	3.4		18.0	5.6		24.2	9.7		88.6	14.0	
Age, in years												
22-26	41.2	8.4	.618	18.7	5.5	.936	21.7	7.2	.241	94.2	18.6	.692
27-31	42.7	7.8		18.3	6.8		22.1	10.4		94.9	23.6	
32-36	40.2	7.9		18.0	6.9		21.9	7.8		92.2	20.3	
≥37	42.7	6.7		18.0	6.2		18.5	8.8		98.1	19.3	
Sex												
Female	40.5	7.8	.392	16.9	6.9	.045	21.6	9.3	.755	91.8	21.2	.372
Male	41.8	7.9		18.7	6.4		21.6	8.6		94.9	20.9	
Years of experience												
0-3	39.5	4.9	.382	17.9	6.8	.700	23.6	9.2	.597	89.9	21.0	.772
4-7	42.2	8.0		18.5	6.1		21.2	8.7		95.6	19.3	
8-10	40.9	7.6		18.3	7.1		21.2	8.3		94.0	21.7	
>10	43.1	6.8		17.1	6.2		21.7	10.3		94.5	24.1	
Employment status												
Full-time	41.2	7.9	.336	18.3	6.4	.616	21.6	8.9	.874	93.8	21.3	.588
Part-time	44.4	6.4		17.3	8.2		20.6	7.4		97.0	17.5	
Marital status												
Single	41.0	7.6	.817	18.6	5.8	.658	21.1	9.0	.813	94.5	20.6	.968
Married	42.0	8.1		18.2	7.4		22.1	8.8		94.1	21.8	
Separated	39.0	5.2		17.3	4.7		21.1	7.7		91.1	16.1	
Widowed	41.6	9.5		16.3	5.9		21.3	8.7		92.6	22.0	
Highest educational attainment												
Bachelor's degree	41.6	7.8	.538	18.0	6.6	.153	21.8	8.8	.036	93.7	21.1	.368
Graduate degree and higher	39.3	7.7		21.4	5.3		16.8	5.7		99.9	18.5	

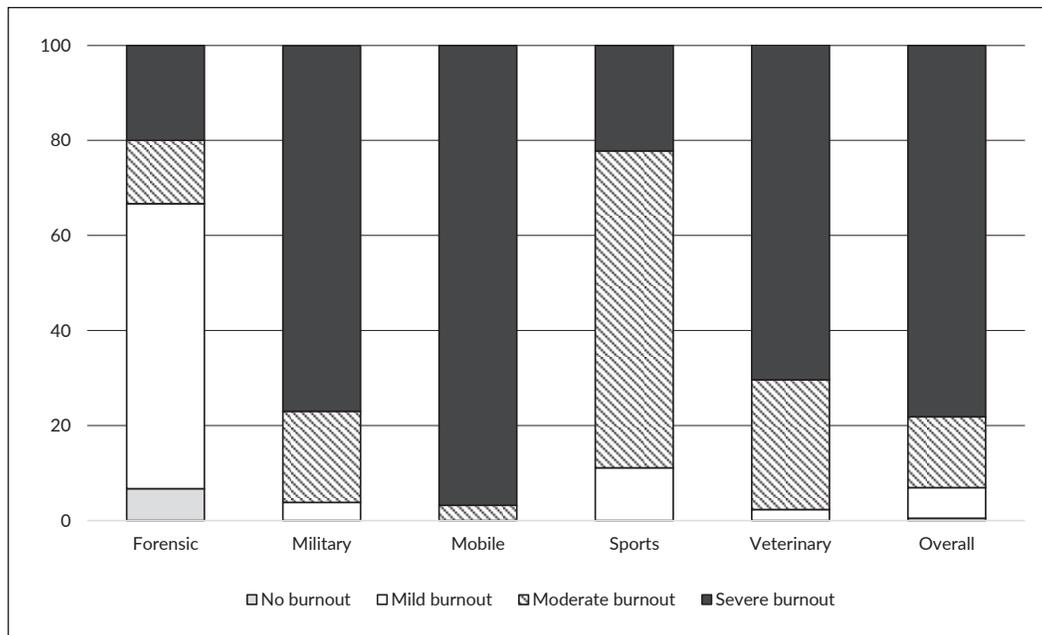


Figure 1. Distribution of burnout category per type of non-traditional role.

Marital status and highest educational attainment also did not significantly impact burnout scores. However, participants with a graduate degree or higher demonstrated a lower mean score for PA ($M = 16.8$, $SD = 5.7$, $p = .036$) compared to those with a bachelor's degree ($M = 21.8$, $SD = 8.8$).

Figure 1 demonstrates notable differences in burnout severity by role. Forensic imaging had the highest proportion of individuals experiencing mild burnout, while no participants in forensic, mobile, sports, or veterinary imaging reported no burnout. Military and mobile imaging roles had a high percentage of participants reporting severe burnout, with military imaging showing the highest proportion of severe burnout.

Moderate burnout was most common in sports imaging. Moderate burnout was more common in veterinary imaging than in mobile imaging. However, mobile imaging showed a near-total proportion of severe burnout. Across all roles, severe burnout emerged as the dominant category, with a particularly high percentage in mobile, military, and veterinary imaging. Overall, the majority of the participants reported severe burnout.

DISCUSSION

The results of this study indicate significant variations in burnout levels across different non-traditional imaging roles, with mobile imaging exhibiting the highest overall burnout scores. These findings are consistent with previous research suggesting that individuals in high-stress healthcare professions are particularly susceptible to burnout.^{20,21} The mobile imaging group demonstrated the highest levels of emotional exhaustion (EE), depersonalization (DP), and

the lowest personal accomplishment (PA), as well as the highest overall burnout scores. This is in line with studies that report healthcare workers in mobile or field settings, who may face logistical challenges, unpredictable work environments, and higher patient loads, often experience increased burnout.^{22,23} These challenges may exacerbate stress, contributing to the particularly high burnout rates seen in this subgroup.

In contrast, forensic imaging showed the lowest DP scores and overall burnout. Forensic imaging workers also had the highest scores for PA, suggesting that those in this field may feel a greater sense of professional fulfillment. This finding is somewhat unexpected, as previous studies have indicated that forensic workers, particularly in high-stress environments like legal and criminal investigations, often experience high burnout.^{24,25} However, it is possible that the relatively lower intensity and perhaps more predictable nature of forensic imaging work compared to mobile or military imaging could contribute to lower burnout scores in this role.

The analysis did not find significant differences in burnout scores across age, years of experience, or employment status, which contrasts with some previous studies that have found that younger workers or those with less experience tend to report higher burnout levels due to a combination of less developed coping mechanisms for work-related stress and the types of stressors they encounter, such as more challenging assignments or less autonomy.⁸⁻¹⁰ In this study, the lack of significant differences across these demographic variables could be explained by the relative homogeneity of the sample, particularly the prevalence of full-time employment, which may result in similar work demands and job expectations across these demographic groups.

The only significant difference in sex was found in DP, with males reporting higher levels than females. While sex differences in burnout have been reported in some studies,^{9,10} the findings here are consistent with the literature suggesting that men in high-demand jobs may experience more depersonalization due to emotional distancing as a coping mechanism.²⁶ However, the lack of significant differences in EE and PA suggests that the emotional labor demands may be similar for both sexes in this study, contradicting some studies that found women more likely to experience emotional exhaustion due to greater caregiving roles.²⁷⁻²⁹

Interestingly, marital status and educational attainment did not significantly affect burnout levels in most categories. However, those with higher educational attainment (graduate degree and above) demonstrated significantly lower PA scores compared to those with only a bachelor's degree. This suggests that individuals with advanced degrees may have higher expectations or more critical self-assessments of their professional effectiveness, potentially leading to a lower sense of accomplishment. This aligns with previous research showing that higher educational attainment is often associated with higher self-expectations and, in turn, greater vulnerability to burnout.³⁰

The analysis of burnout severity by role revealed a pronounced trend of severe burnout across most imaging roles, particularly in military, mobile, and veterinary imaging. These roles had the highest proportions of individuals reporting severe burnout, which supports the hypothesis that roles with high demands, high stakes, and high levels of responsibility contribute to elevated burnout. The significant portion of participants in sports imaging experiencing moderate burnout suggests that, while the stress in this role may not be as intense as in other fields, burnout is still prevalent. These findings contrast with studies suggesting that less intense work environments could reduce the likelihood of severe burnout,^{31,32} which highlights the complex interplay between job demands, personal coping mechanisms, and burnout outcomes.

This study has some limitations. The cross-sectional nature of the data limits the ability to draw causal inferences about the relationships between variables. Future research employing longitudinal designs would be valuable. The reliance on self-report measures may introduce bias. Objective measures of workload and other relevant factors should be included in future studies to provide a more comprehensive assessment of burnout. Disaggregation of respondents by recruitment source was not possible because the survey link was cross-posted and no referral data were collected to preserve anonymity; future studies may include a non-identifying item (e.g., "How did you learn about this survey?") or use distinct links to estimate channel yield. Additionally, the specific inclusion criteria for defining a "non-traditional imaging role" within the present study could limit the generalizability of these findings. Future research could explore burnout within more discrete and clearly defined roles. Finally, given the nature of the specific

groups examined in this study, future research should also explore the potential impact of vicarious trauma (or other occupational-specific trauma exposure) and its relationship to burnout in non-traditional imaging professionals.

Despite these limitations, this study provides valuable insights into the prevalence and distribution of burnout among non-traditional imaging professionals. The findings highlight the need for targeted interventions to address the unique challenges faced by professionals in different imaging roles, particularly mobile, military, and veterinary imaging. Future research should focus on identifying specific workplace stressors and developing evidence-based strategies to mitigate burnout and promote well-being in this important sector of the healthcare workforce.

CONCLUSION

This study assessed and compared burnout levels among Filipino radiographers in non-traditional imaging roles. Mobile imaging radiographers exhibited the highest burnout scores, while those in forensic imaging reported the lowest. Demographic factors demonstrated no relationships with burnout, with the exception of DP by sex and PA by educational attainment. Furthermore, the study assessed burnout severity by role, revealing a concerning trend of predominantly severe burnout, particularly in mobile, military, and veterinary imaging. These findings underscore the importance of considering the specific demands and stressors inherent in each non-traditional imaging role when addressing burnout. Targeted interventions are needed to mitigate burnout, particularly in high-risk specialties like mobile imaging, and to promote well-being within this vital segment of the healthcare workforce. Future research should investigate specific workplace stressors and explore the impact of role-specific factors such as vicarious trauma to develop more effective, tailored interventions.

Acknowledgments

The authors gratefully acknowledge the data collectors and various Radiologic Technology professional organizations for their invaluable assistance in the data collection process.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

Funding Source

None.

REFERENCES

- Törnroos S, Leino-Kilpi H, Metsälä E. Phenomena of radiography science-a scoping review. *Radiography*. 2021 Nov 1;27(4):1231-40. doi: 10.1016/j.radi.2021.07.005. PMID: 34340876.
- Kasita RE, Daniels ER, Karera A. Preparedness to assume professional roles: experiences of recently qualified radiographers: a qualitative study. *J Med Radiat Sci*. 2023 Sep;70(3):262-9. doi: 10.1002/jmrs.690. PMID: 37219064; PMCID: PMC10500110.
- Sahebi A, Golitaleb M, Jahangiri K. Occupational burnout in pre-hospital emergency personnel in Iran: a systematic review and meta-analysis. *Iran J Nurs Midwifery Res*. 2021 Jan 1;26(1):11-7. doi: 10.4103/ijnmr.IJNMR_175_20. PMID: 33954093; PMCID: PMC8074727.
- Shoman Y, El May E, Marca SC, Wild P, Bianchi R, Bugge MD, et al. Predictors of occupational burnout: a systematic review. *Int J Environ Res Public Health*. 2021 Aug 31;18(17):9188. doi: 10.3390/ijerph18179188. PMID: 34501782; PMCID: PMC8430894.
- Christiansen F, Gynning BE, Lashari A, Johansson G, Brulin E. Associations between effort-reward imbalance and risk of burnout among Swedish physicians. *Occup Med*. 2024 Jun;74(5):355-63. doi: 10.1093/occmed/kqae039. PMID: 38970463; PMCID: PMC11285157.
- Chang YP, Lee DC, Lee YH, Chiu MH. Nurses' perceived health and occupational burnout: a focus on sleep quality, workplace violence, and organizational culture. *Int Nurs Rev*. 2024 Dec;71(4):912-923. doi: 10.1111/inr.12932. PMID: 38263534.
- Katsogiannis I, Manara E, Peletidi A, Bistaraki A, Constantinides T, Kontogiorgis C. Occupational burnout and job satisfaction among community pharmacists. *Explor Res Clin Soc Pharm*. 2024 Apr 17;14:100445. doi: 10.1016/j.rcsop.2024.100445. PMID: 38726241; PMCID: PMC11078698.
- Sipos D, Jenéi T, Kövesdi OL, Novák P, Freihat O, Tollár J, et al. Burnout and occupational stress among Hungarian radiographers working in emergency and non-emergency departments during COVID-19 pandemic. *Radiography*. 2023 May 1;29(3):466-72. doi: 10.1016/j.radi.2023.02.013. PMID: 36871472; PMCID: PMC9939395.
- Pereira JM, Silva C, Freitas D, Salgado A. Burnout among Portuguese radiographers during the COVID-19 pandemic. *Radiography*. 2021 Nov 1;27(4):1118-23. doi: 10.1016/j.radi.2021.05.001. PMID: 34053854; PMCID: PMC8130549.
- Alsultan KD, Gameraddin M, Talal S, Alhujaili MO, Alshoabi SA, Salih S, et al. Risk Manag Healthc Policy. 2024 May 30;17:1427-1435. doi: 10.2147/RMHP.S464635. PMID: 38832307; PMCID: PMC11146606.
- Alakhras M, Al-Mousa DS, Lewis S. Assessment and correlation between job satisfaction and burnout among radiographers. *Radiography*. 2022 May 1;28(2):283-7. doi: 10.1016/j.radi.2021.11.003. PMID: 34838438.
- Sipos D, Kunstar O, Kovács A, Csima MP. Burnout among oncologists, nurses, and radiographers working in oncology patient care during the COVID-19 pandemic. *Radiography*. 2023 May 1;29(3):503-8. doi: 10.1016/j.radi.2023.02.008. PMID: 36893716; PMCID: PMC9922570.
- Maslach C, Jackson S, Leiter M, Schaufeli W, Schwab R. *Maslach Burnout Inventory Manual*. 4th ed. Mind Garden Inc; 2016.
- Elmore LC, Jeffe DB, Jin L, Awad MM, Turnbull IR. National survey of burnout among US general surgery residents. *J Am Coll Surg*. 2016 Sep;223(3):440-51. doi: 10.1016/j.jamcollsurg.2016.05.014. PMID: 27238875; PMCID: PMC5476455.
- Franco PI, Palileo-Villanueva LM, Cuaño PM, Marquez ME, Bayan MR, Mendoza JA. Burnout and resilience of internal medicine physician trainees in a tertiary government hospital in the Philippines during the COVID-19 pandemic: A mixed-method study. *Acta Med Philipp*. 2022 Apr 8;56(6):7-16. doi: 10.47895/amp.v56i6.3535.
- Akl A, Mohiyaldeen I, Alshatti R, Alenezi O, Dougherty R, Al-Raihan A, et al. The prevalence of burnout and its associated factors among surgical specialists in Kuwait ministry of health hospitals. *Front Public Health*. 2022 Jan 31;10:679834. doi: 10.3389/fpubh.2022.679834. PMID: 35174119; PMCID: PMC8841660.
- Méndez RM, Sánchez-Broncano J, De La Cruz-Valdiviano C, Quiñones-Anaya I, Navarro ER. Psychometric properties of the Maslach Burnout Inventory in healthcare professionals, Ancash Region, Peru. *F1000Res*. 2024 Mar 5;12:1253. doi: 10.12688/f1000research.139258.1. PMID: 38464739; PMCID: PMC10925071.
- Lin CY, Alimoradi Z, Griffiths MD, Pakpour AH. Psychometric properties of the maslach burnout inventory for medical personnel (MBI-HSS-MP). *Heliyon*. 2022 Feb 1;8(2). doi: 10.1016/j.heliyon.2022.e08868. PMID: 35169645; PMCID: PMC8829575.
- Glaría-López R, Pérez-Villalobos C, Ortega-Bastidas P, Schulz-Bañares B, Espinoza-Melgarejo P. Maslach Burnout Inventory: Factorial structure and reliability in university students in the health area of Chile-MBI-HSS in students in the health area of Chile. *Rev Argent Clin Psicol*. 2021;30(2):26. doi: 10.24205/03276716.2020.4003.
- Izdebski Z, Kozakiewicz A, Białorudzki M, Dec-Pietrowska J, Mazur J. Occupational burnout in healthcare workers, stress and other symptoms of work overload during the COVID-19 pandemic in Poland. *Int J Environ Res Public Health*. 2023 Jan 30;20(3):2428. doi: 10.3390/ijerph20032428. PMID: 36767797; PMCID: PMC9916221.
- Akova İ, Kiliç E, Özdemir ME. Prevalence of burnout, depression, anxiety, stress, and hopelessness among healthcare workers in COVID-19 pandemic in Turkey. *Inquiry*. 2022 Jan-Dec;59:469580221079684. doi: 10.1177/00469580221079684. PMID: 35232291; PMCID: PMC8891902.
- Hanson GC, Perrin NA, Moss H, Laharnar N, Glass N. Workplace violence against homecare workers and its relationship with workers health outcomes: a cross-sectional study. *BMC public health*. 2015 Dec;15:1-3. doi: 10.1186/s12889-014-1340-7. PMID: 25595487; PMCID: PMC4308913.
- Wang Y, Zhang H, Lei J, Yu Y. Burnout in Chinese social work: Differential predictability of the components of the Maslach Burnout Inventory. *International Journal of Social Welfare*. 2019 Apr;28(2):217-28. doi: 10.1111/ijsw.12339
- Lombardo C, Capasso E, Li Rosi G, Salerno M, Chisari M, Esposito M, Di Mauro L, Sessa F. Burnout and stress in Forensic Science Jobs: A systematic review. *Healthcare*. 2024 Oct 12;12(20):2032. doi: 10.3390/healthcare12202032. PMID: 39451448; PMCID: PMC11506976.
- Spaan P, van den Boogert F, Bouman YH, Hoogendijk WJ, Roza SJ. How are you coping? Stress, coping, burnout, and aggression in forensic mental healthcare workers. *Front Psychol*. 2024 Jan 11;14:1301878. doi: 10.3389/fpsyg.2023.1301878. PMID: 38274695; PMCID: PMC10808574.
- Artz B, Kaya I, Kaya O. Gender role perspectives and job burnout. *Rev Econ Househ*. 2022;20(2):447-70. doi: 10.1007/s11150-021-09579-2. PMID: 34429716; PMCID: PMC8375289.
- Dillon EC, Stults CD, Deng S, Martinez M, Szweringi N, Koenig PT, et al. Women, younger clinicians', and caregivers' experiences of burnout and well-being during COVID-19 in a US healthcare system. *J Gen Intern Med*. 2022 Jan;37(1):145-53. doi: 10.1007/s11606-021-07134-4. PMID: 34729697. PMCID: PMC8562379.
- Cottingham MD, Chapman JJ, Erickson RJ. The constant caregiver: work-family spillover among men and women in nursing. *Work, Employment and Society*. 2020 Apr;34(2):281-98. doi: 10.1177/09500170198850.
- Stefanova V, Farrell L, Latu I. Gender and the pandemic: Associations between caregiving, working from home, personal and career outcomes for women and men. *Curr Psychol*. 2021 Dec 30;1-17. doi: 10.1007/s12144-021-02630-6. PMID: 35002182; PMCID: PMC8717695.
- Haddad Y, Shoob AE, Sadeghi J. The structural relationship between academic self-efficacy and stress due to academic expectations mediating by difficulty in emotion regulations in junior high-school students. *Iran J Learn Mem*. 2023 Nov 20;6(23):60-70. doi: 10.22034/iepa.2023.414764.1443.
- Adamopoulos IP, Syrou NF. Associations and correlations of job stress, job satisfaction and burn out in public health sector. *Eur J Environ Public Health*. 2022 Jun 16;6(2):em0113. doi: 10.21601/ejeph/12166.
- Al Sabei SD, Al-Rawajfah O, AbuAlRub R, Labrague LJ, Burney IA. Nurses' job burnout and its association with work environment, empowerment, and psychological stress during COVID-19 pandemic. *Int J Nurs Pract*. 2022 Oct;28(5):e13077. doi: 10.1111/ijn.13077. PMID: 35770445; PMCID: PMC9349741.