Original Article

Burnout Syndrome Among Physiotherapists: An Exploratory Cross-Sectional Study from Delhi–NCR

[1]Neha Gupta, [2]Jeyanthi .S

[1]Student Amar Jyoti Institute of Physiotherapy, Delhi, India, [2]Professor, Sri Venkateshwaraa College of Physiotherapy, Pondicherry University, Associate Dean-Research, Sri Venkateshwaraa Group of Institution

How to cite this article: Neha Gupta, Jeyanthi .S. Burnout Syndrome Among Physiotherapists: An Exploratory Cross-Sectional Study from Delhi–NCR. Indian Journal of Physiotherapy and Occupational Therapy / Vol 20 No. 2, April - June 2026

Abstract

Introduction: Burnout among physiotherapists has received limited attention in India, despite growing evidence of its impact on professional well-being and patient care.This study assessed the burnout levels and their associations with demographic and professional variables among physiotherapists practicing in the Delhi–NCR region.

Methodology: A cross-sectional survey was conducted among 140 practicing physiotherapists using the Maslach Burnout Inventory–Human Services Survey. Burnout levels across emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA) subscales were categorized as low, moderate, or high. Associations with demographic and professional variables were analyzed using chi-square tests.

Results: Most participants demonstrated low burnout across all three domains. Emotional exhaustion was predominantly low (51%), while depersonalization (42% low; 37% high) and reduced personal accomplishment (38% low; 34% high) showed greater variability. Gender was significantly associated with personal accomplishment, with females reporting higher PA scores ($\chi^2 = 8.398$, $p = 0.015$).

Conclusion: Physiotherapists in Delhi–NCR exhibited relatively low emotional exhaustion but notable levels of depersonalization and reduced personal accomplishment, indicating emerging occupational strain. Compared with global estimates, emotional exhaustion appeared lower, while depersonalization and reduced personal accomplishment were higher. These findings highlight the need for early preventive measures and organizational strategies to promote physiotherapist well-being.

Keywords: Burnout, Physiotherapists, Maslach Burnout Inventory, Healthcare Worker, Delhi-NCR.

Introduction

Burnout is increasingly recognized as a serious occupational phenomenon resulting from chronic workplace stress[1]. It is characterized by three dimensions – emotional exhaustion, cynicism (depersonalization), and reduced professional efficacy – and in healthcare settings it can undermine

Corresponding Author: Neha Gupta, MPT, Department of Physiotherapy Amar Jyoti Institute of Physiotherapy, Delhi-110092, India

E-mail: neha2532000.ng@email.com

Submission: Nov 8, 2025 **Revision:** December 10, 2025 **Published date:** April 3 , 2026

both provider well-beingand patient care quality[2]. Healthcare workers face particularly high risk because of long hours, heavy workloads and high emotional demands. For example, about one-quarter of medical professionals globally report burnout symptoms[3]. The World Health Organization now classifies burnout as an "occupational phenomenon" (not a medical condition) and emphasizes that it arises when job stress exceeds coping resources[1].

Burnout has been extensively documented among physicians, nurses and allied health staff worldwide. Estimates suggest roughly 20–30% of hospital doctors and nurses meet criteria for high burnout in core domains[3], with risk factors including heavy caseloads, long hours and staffing shortages[4]. Younger age, female gender and difficult working conditions have consistently been associated with higher burnout rates[5].

Physiotherapists share many of the same stressors as other clinicians but have been less often studied. Recent reviews confirm that burnout levels in physiotherapy are substantial. In a 2024 meta-analysis of 5,984 physiotherapists across 17 countries, about one-fourth of physiotherapists reported high burnout symptoms, comparable to other health workers[2]. Notably, Venturini et al. observed that burnout symptoms tended to be more common in studies from developing countries, suggesting context-specific pressures.

In India, the literature on burnout in allied health professionals is sparse. A recent systematic review of Indian healthcare workers (doctors, nurses and allied staff) found that roughly one-quarter of respondents scored high on each major burnout domain[4]. The authors noted that burdens such as heavy patient loads and limited infrastructure likely fuel these rates[4]. To date, only a few small Indian studies have quantified burnout in physiotherapists. For example, Khan et al. (2020) reported that 40% of 100 physiotherapists in Jalgaon (Maharashtra) met criteria for moderately high burnout[6]. Similarly, a cross-sectional study conducted in Ahmedabad found a weak positive correlation between burnout syndrome severity and poor sleep quality among middle-aged physiotherapists working in academic, outpatient, and private clinic settings, highlighting the influence of workplace stressors on burnout in Indian physiotherapy practice[7].

Because existing evidence in India is limited and localized, especially outside Gujarat/Maharashtra, it remains unknown how burnout affects physiotherapists working in Delhi–NCR region. The current exploratory study therefore aims to fill this gap. We conducted a cross-sectional survey of practicing physiotherapists in Delhi-NCR. Using the Maslach Burnout Inventory, we aimed to estimate the distribution of burnout levels in this group and examine associations with demographic and professional variables. The study's research question was: What is the level of occupational burnout among physiotherapists in Delhi–NCR region, and which demographic or professional variables are associated with higher burnout levels? Insights from this research will help inform strategies to support physiotherapy professionals and mitigate burnout in the Indian healthcare system.

Methodology

Study design and setting

Anexploratory cross-sectional study was conducted among physiotherapists practicing in Delhi–NCR region between February and July 2025. A total of 140 practising physiotherapists participated in the study, working in a variety of clinical settings (hospitals, clinics, rehabilitation centre, and home care). Exclusion criteria were Physiotherapy students (not yet in clinical practice) and physiotherapists not currently practicing as a profession. Convenience sampling was used to recruit participants. Incomplete responses and those not meeting inclusion criteria were excluded.

Data Collection Procedure

Data were collected using a structured Google Form. The form consisted of an electronic informed consent statement, demographic and professional questions (age, gender, years of experience, and workplace type), and a self-assessment questionnaire adapted from items of the Maslach Burnout Inventory. Participation was voluntary

and anonymous, and no personal identification information was collected. The data were compiled in Google Sheets and later transferred to Microsoft Excel and SPSS for analysis.

Outcome Measure

Burnout was assessed using a freely available burnout self-assessment questionnaire adapted from items of the Maslach Burnout Inventory[9]. The tool includes three sections that reflect emotional exhaustion, depersonalization, and personal accomplishment. Each item uses a 7-point frequency scale ranging from 0 ("Never") to 6 ("Every day"). Because this version is not the original copyrighted MBI-HSS, it should be considered an adaptation rather than the official instrument.

Scoring followed the interpretation guidelines provided in the tool:

- Emotional Exhaustion (≤17 low, 18–29 moderate, ≥30 high)
- Depersonalization (≤5 low, 6–11 moderate, ≥12 high)
- Personal Accomplishment (≥40 low burnout, 34–39 moderate, ≤33 high burnout)

Participation in the study was voluntary, and informed consent was obtained from all participants prior to data collection. The survey collected no identifiable personal information and involved no intervention or deception. The study adhered to the ethical principles outlined in the Declaration of Helsinki (2013 revision).

Data Analysis

Statistical analysis was performed using IBM SPSS Statistics (Version 27). Descriptive statistics including frequency, percentage, mean, and standard deviation were computed to summarize the demographic and professional variables as well as burnout levels. Burnout scores for each of the three MBI subscales were categorized into low, moderate, and high levels for comparison. The Chi-square test for association was applied to examine the relationship between burnout levels and selected demographic and professional variables such as gender, age, specialization, years of experience, and clinical setting. A p-value less than 0.05 was considered statistically significant.

Results

A total of 140 physiotherapists participated in the study. The demographic and professional characteristics of the participants are presented in Table 1. The majority of participants were female (74.3%) and below 26 years of age (70%). Most respondents were having less than 3 years of experience (75.7%)and were primarily employed in hospital settings (39.3%).

The mean and standard deviation for each burnout subscale are presented in Table 2.

Table 1. Sociodemographic and professional char-acteristics of participants (N = 140)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	36	25.7%
	Female	104	74.3%
Age group	<26 years	98	70.0%
	26–35 years	37	26.4%
	>35 years	5	3.6%
Specialization	Neurology	27	19.3%
	Orthopaedics	24	17.1%

Continue....

	Cardiopulmonary	6	4.3%
	Paediatrics	6	4.3%
	Sports	17	12.1%
	None	60	42.9%
Years of experience	1–3 years	106	75.7%
	3–10 years	27	19.3%
	>10 years	7	5.0%
Clinical setting	Hospital	55	39.3%
	Clinic	28	20.0%
	Rehabilitation centre	26	18.6%
	Home care	31	22.1%

Table 2. Mean and standard deviation of burnout subscale scores (N = 140)

Subscale	Minimum	Maximum	Mean	Standard Deviation
Emotional Exhaustion (EE)	0	42	18.06	8.74
Depersonalization (DP)	0	31	9.58	7.36
Personal Achievement (PA)	14	48	35.41	8.31

Burnout Levels among Participants

Based on the predefined cut-off scores for the Maslach Burnout Inventory, 11.4% of participants exhibited high levels of Emotional Exhaustion, 37.9% moderate, and 50.7%low. For Depersonalization, 36.4% demonstrated high burnout, 21.4% moderate, and 42.1% low. In contrast, for Personal Accomplishment, 34.3% of the participants exhibited high levels burnout (low accomplishment), 27.9% reported moderate, and 37.9% exhibited low (refer to Figure 1).

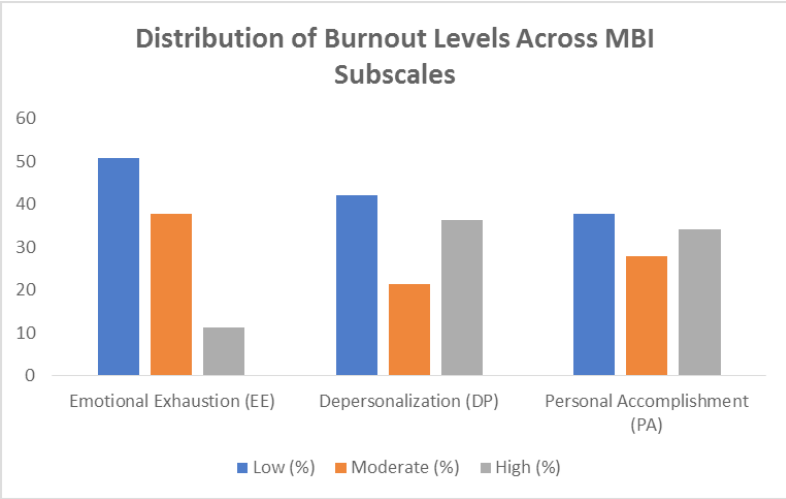

Figure 1: Distribution of burnout levels across the three subscales of the Maslach Burnout Inventory (N = 140)

Association Between Burnout Levels and Demographic and Professional Variables

The Chi-square test was applied to examine the association between the levels of burnout (low, moderate, high) in each MBI subscale and selected characteristics (gender, age group, years of experience, specialization, and clinical setting). No statistically significant associations were observed between Emotional Exhaustion and any variable ($p>0.05$) (Table 3). Similarly, Depersonalization did not show significant associations, although clinical setting approached significance ($p = 0.065$) (Table 4). A statistically significant association was observed between gender and Personal Accomplishment ($\chi^2 = 8.398$, $p = 0.015$), with females reporting higher levels of personal accomplishment (Table 5).

Table 3. Association between emotional exhaustion(EE)levels and demographic and professional variables

Variable	Category	Low n(%)	Moderate n(%)	High n(%)	χ^2	p-value
Gender	Male	19 (52.8%)	13 (36.1%)	4 (11.1%)	.084	.959
	Female	52 (50.0%)	40 (38.5%)	12 (11.5%)		
Age group	<26 years	50 (51.0%)	38 (38.8%)	10 (10.2%)	2.898	.575
	26–35 years	17 (45.9%)	14 (37.8%)	6 (16.2%)		
	>35 years	4 (80.0%)	1 (20.0%)	0 (0.0%)		
Specialization	Neurology	12 (44.4%)	12 (44.4%)	3 (11.1%)	6.591	.763
	Orthopaedics	10 (41.7%)	12 (50.0%)	2 (8.3%)		
	Cardiopulmonary	2 (33.3%)	3 (50.0%)	1 (16.7%)		
	Paediatrics	4 (66.7%)	2 (33.3%)	0 (0.0%)		
	Sports	11 (64.7%)	5 (29.4%)	1 (5.9%)		
	None	32 (53.3%)	19 (31.7%)	9 (15.0%)		
Years of experience	1–3 years	50 (47.2%)	44 (41.5%)	12 (11.3%)	3.181	.528
	3–10 years	16 (59.3%)	8 (29.6%)	3 (11.1%)		
	>10 years	5 (71.4%)	1 (14.3%)	1 (14.3%)		
Clinical setting	Hospital	25 (45.5%)	23 (41.8%)	7 (12.7%)	4.276	.639
	Clinic	18 (64.3%)	8 (28.6%)	2 (7.1%)		
	Rehabilitation centre	15 (57.7%)	8 (30.8%)	3 (11.5%)		
	Home care	13 (41.9%)	14 (45.2%)	4 (12.9%)		

Table 4. Association between depersonalization(DP) levels and demographic and professional variables

Variable	Category	Low n(%)	Moderate n(%)	High n(%)	χ^2	p-value
Gender	Male	15 (41.7%)	5 (13.9%)	16 (44.4%)	2.143	.342
	Female	52 (42.3%)	40 (24.0%)	12 (33.7%)		

Continue....

Age group	<26 years	39 (39.8%)	22 (22.4%)	37 (37.8%)	3.889	.421
	26–35 years	16 (43.2%)	7 (18.9%)	14 (37.8%)		
	>35 years	4 (80.0%)	1 (20.0%)	0 (0.0%)		
Specialization	Neurology	11 (40.7%)	4 (14.8%)	12 (44.4%)	6.714	.752
	Orthopaedics	9 (37.5%)	8 (33.3%)	7 (29.2%)		
	Cardiopulmonary	2 (33.3%)	1 (16.7%)	3 (50.0%)		
	Paediatrics	4 (66.7%)	0 (0.0%)	2 (33.3%)		
	Sports	9 (52.9%)	3 (17.6%)	5 (29.4%)		
	None	24 (40.0%)	14 (23.3%)	22 (36.7%)		
Years of experience	1–3 years	42 (48.6%)	20 (18.9%)	44 (41.5%)	7.084	.132
	3–10 years	12 (44.4%)	9 (33.3%)	6 (22.2%)		
	>10 years	5 (71.4%)	1 (14.3%)	1 (14.3%)		
Clinical setting	Hospital	22 (40.0%)	12 (21.8%)	21 (38.2%)	11.848	.065
	Clinic	19 (67.9%)	5 (17.9%)	4 (14.3%)		
	Rehabilitation centre	8 (30.8%)	7 (26.9%)	11 (42.3%)		
	Home care	10 (32.3%)	6 (19.4%)	15 (48.4%)		

Table 5. Association between personal accomplishment levels(PA) and demographic and professional variables

Variable	**Category**	**Low n(%)**	**Moderate n(%)**	**High n(%)**	χ^2	**p-value**
Gender	Male	20 (55.6%)	10 (27.8%)	6 (16.7%)	8.398	.015*
	Female	33 (31.7%)	29 (27.9%)	42 (40.4%)		
Age group	<26 years	33 (33.7%)	29 (29.6%)	36 (36.7%)	5.388	.250
	26–35 years	16 (43.2%)	9 (24.3%)	12 (32.4%)		
	>35 years	4 (80.0%)	1 (20.0%)	0 (0.0%)		
Specialization	Neurology	13 (48.1%)	6 (22.2%)	8 (29.6%)	9.708	.466
	Orthopaedics	7 (29.2%)	8 (33.3%)	9 (37.5%)		
	Cardiopulmonary	2 (33.3%)	1 (16.7%)	3 (50.0%)		
	Paediatrics	3 (50.0%)	0 (0.0%)	3 (50.0%)		
	Sports	8 (47.1%)	7 (41.2%)	2 (11.8%)		
	None	20 (33.3%)	17 (28.3%)	23 (38.3%)		

Continue....

Years of experience	1–3 years	36 (34.0%)	31 (29.2%)	39 (36.8%)	5.802	.214
	3–10 years	12 (44.4%)	6 (22.2%)	9 (33.3%)		
	>10 years	5 (71.4%)	2 (28.6%)	0 (0.0%)		
Clinical setting	Hospital	22 (40.0%)	14 (25.5%)	19 (34.5%)	8.364	.213
	Clinic	14 (50.0%)	4 (14.3%)	10 (35.7%)		
	Rehabilitation centre	5 (19.2%)	10 (38.5%)	11 (42.3%)		
	Home care	12 (38.7%)	11 (35.5%)	8 (25.8%)		

Overall, the findings indicate that participants experienced predominantly moderateburnout across all three domains. Demographic and Professional Variables showed minimal influence, except for gender differences in personal accomplishment.

Discussion

In this study of 140 Indian physiotherapists, burnout levels were predominantly low across the three Maslach subscales, although variation was evident between domains. Most participants scored low on emotional exhaustion (EE), indicating generally good emotional well-being. However, a notable proportion showed higher burnout on depersonalization (DP) and low personal accomplishment (PA) subscales—suggesting that, while therapists were not emotionally drained, some experienced emotional distancing or reduced professional fulfilment. Only about 11% had high emotional exhaustion (EE), whereas 36% had high depersonalization (DP) and 34% had high (i.e. low personal accomplishment) burnout.

In comparison, a recent meta-analysis of 5984 physiotherapists worldwide found that roughly 27% had high EE, 23% had high DP, and 25% had low personal accomplishment[2]. In an Indian context, Kesarwani et al. (2020) meta-analyzed healthcare workers and found pooled burnout rates of about 24–27% in each MBI domain[4]. Hence, our participants exhibited relatively lower high-EE but somewhat higher DP and low-PA rates than the pooled international averages.

The only significant association observed was between gender and personal accomplishment, with female therapists reporting higher scores (lower burnout) than males, consistent with previous findings[5], while men had higher depersonalization (and no gender difference in exhaustion). Similarly, Corrado et al. found that male therapists in an Italian sample experienced greater depersonalization than their female counterparts[11]. Kesarwani et al. noted female gender as a general risk factor for burnout in Indian healthcare workers[4], although that meta did not report PA specifically. The gender gap in personal accomplishment may stem from differing social roles and work experiences, with men tending toward greater depersonalization and women maintaining higher professional efficacy[12]. In our cohort no gender differences emerged for exhaustion or depersonalization.

Apart from gender, no other variables (age, specialization, experience, setting) showed significant associations. This partly contrasts with other studies: younger and less experienced physiotherapists often report greater burnout[13]. For example, Scutter &Goold (1995) emphasized that new graduates had unusually high exhaustion[13], and Lee (2021) found therapists in their 20s had higher burnout scores than older colleagues[5]. In our sample, however, 70% were under 26 years and 75% had <3 years' experience, so limited variability may have obscured age effects.

Similarly, no specialization differences were found here, although previous research suggests that field of practice can influence burnout levels.

Corrado et al. reported lower accomplishment among neurological therapists[11]. WhileCelik and Sezgin (2025) found orthopaedic physiotherapists showed the highest personal accomplishment and neurology/paediatrics specialists greater exhaustion and depersonalization[14]. These discrepancies could reflect cultural or work environment differences, as well as sample characteristics (our cohort was predominantly young and female).

Participants in home-care and rehabilitation settings showed slightly higher depersonalization, though not statistically significant. In contrast, Donohoe et al. (1993) reported moderate burnout among inpatient rehabilitation therapists[15], while U.S. data show greater emotional exhaustion in home health care[16]. Conversely, private or outpatient settings appear protective—Polish physiotherapists in private clinics reported significantly lower burnout than those in public institutions[17]. Overall, burnout tends to be higher in high-demand settings and lower in private practice.

Practical Implications

Although overall burnout was low, the elevated proportion of participants showing high DP or low PA warrants attention. As Venturini et al. note, burnout "can negatively impact both staff well-being and the quality of care delivered to patients"[2]. Burnout arises when chronic job stress exceeds coping capacity, driven by workload, staffing issues, and patient demands[4,5]. The Job Demands–Resources model emphasizes enhancing job resources—such as autonomy, competence, and respect—to buffer burnout[18]. More broadly, organizational strategies are warranted. Skamagki et al. recommend systemic changes such as "robust support systems, flexible working conditions, and opportunities for professional development" to mitigate burnout[19].

Limitations and Future Directions

This study has several limitations. As a cross-sectional design, it cannot establish causal relationships between variables; longitudinal research is needed to examine how burnout evolves over time among physiotherapists. Self-reported MBI data may be subject to response or social desirability bias, and cultural influences could have affected how burnout symptoms were perceived or expressed. Moreover, the predominance of young, early-career, and female participants may limit generalizability to older or more diverse populations. The convenience sampling and restricted geographical coverage constrain external validity. Additionally, important contextual variables—such as workload, work environment, personality traits, coping strategies, and mental health—were not assessed and could have provided deeper insights.

Future research should involve larger samples of physiotherapists to assess the generalizability of findings. Qualitative studies could explore contextual influences, such as perceived support or workplace discrimination, underlying gender and age differences. Intervention studies are warranted to test strategies suggested by the job demands-resources framework (e.g. autonomy-enhancing programs, respect-building initiatives[18]. Finally, examining the impact of interventions on patient care quality and therapist retention will help translate findings into practice.

Conclusion

The present study found that the majority of physiotherapists practicing in Delhi–NCR region demonstrated low levels of burnout across all three Maslach subscales. Emotional exhaustion was predominantly low, whereas depersonalization and reduced personal accomplishment showed a more varied distribution, with a considerable proportion experiencing high burnout in these domains. Compared with the global estimates from recent meta-analysis, the present cohort exhibited relatively lower emotional exhaustion but comparable levels of depersonalization and reduced personal accomplishment. Gender emerged as the only significant factor associated with burnout, with females reporting higher personal accomplishment. Although severe burnout was uncommon, the coexistence of elevated depersonalization and diminished personal accomplishment indicates emerging occupational strain and warrants further investigation through larger, multi-centre studies.

Funding Sources: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical Clearance: The study involved voluntary, anonymous participation of physiotherapists through an online questionnaire. No personally identifiable data were collected. The study complied with the ethical principles of the Declaration of Helsinki (2013 revision). Formal institutional ethical approval was not required as per local and national research guidelines for minimal-risk survey studies.

Declaration of Conflicts of Interest Statement: The authors report no conflicts of interest.

References

1. Burn-out an "occupational phenomenon": International Classification of Diseases [Internet]. [cited 2025 Nov 3]. Available from: https://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases
2. Venturini E, Ugolini A, Bianchi L, Di Bari M, Paci M. Prevalence of burnout among physiotherapists: a systematic review and meta-analysis. Physiotherapy. 2024 Sept;124:164–79.
3. Wang XJ. Evaluating burnout syndrome among healthcare workers: Prevalence and risk factors. World J Psychiatry. 2025 May 19;15(5):104880.
4. Kesarwani V, Husaain ZG, George J. Prevalence and Factors Associated with Burnout among Healthcare Professionals in India: A Systematic Review and Meta-Analysis. Indian J Psychol Med. 2020;42(2):108–15.
5. Lee SJ, Jung SI, Kim MG, Park E, Kim AR, Kim CH, et al. The Influencing Factors of Gender Differences on Mental Burdens in Young Physiotherapists and Occupational Therapist. Int J Environ Res Public Health. 2021 Mar 11;18(6):2858.
6. Khan N. Prevalence of burnout syndrome among physiotherapists in Jalgaon. Int J Allied Med Sci Clin Res. 2018;6(2):321–9.
7. UdayanbhaiBarotDrN, M. Patel DrA. Correlation of Burnout Syndrome Severity with Sleep Quality Among Middle Aged Physiotherapist Across Ahmedabad City. Int J Health Sci Res. 2023 July 4;13(7):40–4.
8. Maslach C, Jackson S, Leiter M. The Maslach Burnout Inventory Manual. In: Evaluating Stress: A Book of Resources. 1997. p. 191–218.
9. Corrado B, Ciardi G, Fortunato L, Servodio Iammarrone C. Burnout syndrome among Italian physiotherapists: a cross-sectional study. Eur J Physiother. 2019 Oct 2;21(4):240–5.
10. Purvanova RK, Muros JP. Gender differences in burnout: A meta-analysis. J VocatBehav. 2010 Oct;77(2):168–85.
11. Scutter S, Goold M. Burnout in recently qualified physiotherapists in South Australia. Aust J Physiother. 1995;41(2):115–8.
12. Çelik E, Şevgin Ö. Comparison of occupational satisfaction, burnout, musculoskeletal pain and coping strategies of physiotherapists working in different fields: An observational study. Work Read Mass. 2025 July;81(3):2967–78.
13. Donohoe E, Nawawi A, Wilker L, Schindler T, Jette DU. Factors associated with burnout of physical therapists in Massachusetts rehabilitation hospitals. Phys Ther. 1993 Nov;73(11):750–6; discussion 756-761.
14. Kessler S. The Prevalence and Experience of Burnout Among Physical Therapists in Home Health Care: A Mixed Methods Study.
15. Buchholz A, Kloze A. Occupational Burnout and Psychological Resilience Levels Among Physiotherapists. Phys Cult Sport Stud Res. 2024 July 9;106.
16. Patel RM, Bartholomew J. Impact of Job Resources and Job Demands on Burnout among Physical Therapy Providers. Int J Environ Res Public Health. 2021 Nov 28;18(23):12521.
17. Skamagki G, Blackburn L, Biggs D, Kolitsida M, Black C, Shanmugam S. Exploring burnout, perfectionism, and moral injury among UK physiotherapists: A qualitative study on professional fulfilment and well-being. PloS One. 2025;20(2):e0313730.