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Burnout, sleep quality, and resilience among physical therapy students at Taif University: a cross-sectional study

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ABSTRACT

This study aimed to evaluate the prevalence of burnout, sleep disturbances, and resilience among PT students at Taif University, and to examine the interrelationships among these variables. A cross-sectional survey was conducted among 170 PT students (mean age = 21.29±1.38 years; 58.8% female) using validated Arabic versions of the Maslach Burnout Inventory–Student Survey (MBI-SS), the Pittsburgh Sleep Quality Index (PSQI), and the Brief Resilience Scale (BRS). The majority of students (79.4%) reported poor sleep quality (mean PSQI = 7.68±3.45), and 32.4% displayed low resilience. High levels of emotional exhaustion and depersonalization were reported by 43.5% and 24.7% of students, respectively, while 82.9% had low personal accomplishment scores. Female students, third-year students, and those with chronic illnesses experienced significantly higher levels of burnout and poorer sleep quality. Resilience was notably lower among females and students with chronic conditions. Burnout was positively correlated with poor sleep quality ($r=.449$, $p<.001$) and negatively correlated with resilience ($r=–.320$, $p<.001$), while resilience was inversely associated with poor sleep quality ($r=–.283$, $p<.001$). Burnout and sleep disturbances are highly prevalent among PT students at Taif University, with resilience emerging as a protective factor. These findings highlight the need for targeted interventions such as resilience training, stress management, and sleep hygiene programs to enhance student well-being and academic performance.

KEYWORDS

Burnout; Resilience; Sleep Quality; Physical Therapy Students; Emotional Exhaustion

1. INTRODUCTION

Burnout is a well-recognized psychological syndrome characterized by emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment (Maslach et al., 2001). Among healthcare professionals, including physical therapy students, burnout frequently results from prolonged exposure to occupational stressors, such as the demands of clinical training and academic pressure (Siraj et al., 2022). The presence of burnout in this population has been associated with adverse outcomes, including increased susceptibility to physical and psychological health disorders, diminished levels of empathy, compromised quality of patient care, and a higher incidence of clinical errors (Siraj et al., 2022).

Burnout is associated with dysregulation of physiological systems, including changes in cortisol secretion, prolonged activation of the autonomic nervous system, and dysfunction of the sympathetic–adrenal–medullary (SAM) axis. A small number of studies have also indicated changes in other endocrine pathways and immune function. The consequences of burnout are extensive and may encompass elevated allostatic load, structural and functional alterations in the brain, excitotoxicity, systemic inflammation, immunosuppression, metabolic syndrome, increased risk of cardiovascular disease, and premature mortality (Guo et al., 2018).

Resilience is defined as the capacity to recover from or adapt effectively to distressing or adverse experiences (Guo et al., 2018). It is regarded as a dynamic process through which individuals demonstrate positive adaptation despite experiencing significant hardship (Luthar & Cicchetti, 2000). Research has consistently shown that resilience exerts a beneficial influence on both physical and mental health, playing a protective role against burnout. Individuals with higher levels of resilience are better equipped to manage the demanding conditions and elevated workloads frequently encountered by healthcare professionals (Guo et al., 2018).

Resilience has been conceptualized as a trait, a set of individual characteristics, a process, and a systemic capacity. As a trait, it refers to an inherent ability in some individuals to effectively manage adversity. It encompasses personal attributes—such as self-efficacy, planning, control, low anxiety, and persistence—that facilitate positive adaptation following trauma or stress (Almurdi et al., 2024). This adaptive response reflects the capacity to maintain or restore psychological well-being in the face of significant threats (Bahathig et al., 2022; Gärtner, 2010). Resilience theory emphasizes positive development under risk, focusing on strengths rather than deficits (Rothe et al., 2020).

Empirical studies have demonstrated a significant negative correlation between resilience and burnout dimensions—emotional exhaustion, depersonalization, and perceived inefficacy—suggesting that resilience mitigates burnout risk (Deldar et al., 2010). Emotional exhaustion, characterized by chronic fatigue, sleep disturbances, somatic symptoms, and psychological strain, is linked to the depletion of emotional resources. Resilience helps buffer these effects, reducing psychological and motivational impairment.

In a U.S. study of medical students, higher resilience was associated with lower levels of burnout, stress, and depression. Protective resilience factors include positive affect, optimism, perceived social support, and coping flexibility. Thus, resilience training and promotion of adaptive coping are critical for healthcare professionals (Almurdi et al., 2024).

A study at King Saud University involving 337 medical students (response rate: 79.2%; mean age: 21.5 ± 1.46 years; 64.99% male) found that 9.8% reported high burnout, 25.5% high emotional exhaustion, 29.4% high cynicism, and 34.4% low professional efficacy. These findings underscore the urgent need for targeted interventions to enhance resilience and support student mental health (Bahathig et al., 2022).

Sleep disorders are clinically defined as persistent disturbances in sleep patterns that endure for more than four weeks and lead to marked impairments in critical areas of functioning, such as occupational performance (Gärtner, 2010). Among the general population, the most prevalent forms of sleep disorders are insomnia and hypersomnia (Rothe et al, 2020).

Sleep disturbances and burnout are prevalent issues that can significantly impact overall well-being are interrelated phenomena, with significant prevalence among medical students and healthcare professionals (Pagnin et al., 2014; Jansson-Fröjmark & Lindblom, 2010). The incidence of sleep difficulties among medical students has been reported to be as high as 61% (Rodrigues et al., 2002), while burnout rates have reached 71% in some cohorts (Mazurkiewicz et al., 2012). Faced with demanding academic expectations, students often adopt maladaptive coping strategies—such as sleep deprivation—in an attempt to extend study time. This behavior, however, exacerbates fatigue and perpetuates a cycle wherein sleep disturbances and burnout mutually reinforce each other.

A study conducted in China among psychiatric nurses explored the associations between occupational burnout, psychological distress, and sleep quality. Of the 812 nurses surveyed, 89.82% responded, and 53.08% (n = 431) reported poor sleep quality. Notably, sleep disturbances were more prevalent among shift-working nurses (55.28%) compared to those on day shifts (41.54%) (Wang et

al., 2021). These findings underscore the urgent need for interventions that improve sleep quality and reduce both psychological distress and burnout in this population.

Similarly, a study from Fluminense Federal University in Niterói, Brazil, examined the impact of burnout and sleep problems on the quality of life of second-year preclinical medical students. The results indicated that increased cynicism was associated with poorer psychological well-being, while elevated emotional exhaustion and sleep disturbances were linked to diminished physical and mental health. In contrast, a stronger sense of academic efficacy emerged as a protective factor, positively influencing social relationships, physical health, and psychological well-being. Burnout and sleep-related issues collectively accounted for 22% of the variance in physical health and 21% in psychological well-being (Pagnin & de Queiroz, 2015). These findings highlight the importance of implementing stress management strategies and raising awareness about the critical role of adequate sleep in maintaining the health and academic performance of medical students.

Given the limited research on burnout, resilience, and sleep quality among physical therapy (PT) students in Saudi Arabia, the present study sought to address this important gap. The primary objective was to explore the psychological challenges faced by PT students during their academic training and to assess the impact of academic and professional stressors on burnout levels. Additionally, the study aimed to evaluate sleep quality and resilience, considering resilience as a key factor in managing academic stress.

Accordingly, the specific objectives of this study were as follows:

- To assess the prevalence of burnout among physical therapy students at Taif University (TU).
- To identify factors contributing to burnout in this population.
- To evaluate the levels of resilience among PT students.
- To examine the interrelationships between burnout, sleep quality, and resilience, and to identify potential areas for intervention.

2. METHODS

2.1. Design

A cross-sectional study was conducted among students enrolled in the Physical Therapy Department at the College of Applied Medical Sciences, Taif University, Saudi Arabia. Data were collected over six months, from March 2025 to May 2025, using a self-administered online questionnaire. The study was approved by the research ethics committee at Taif University, western

Saudi Arabia, with letter number (46-209) on 27-02-2025. Written consent was obtained from all participants included in the study.

2.2. Participants, Sampling, Recruitment, and Data Collection

This study employed a convenience sampling approach. Eligible participants included male and female physical therapy (PT) students who were actively enrolled in the PT program at Taif University. The PT curriculum comprises a preparatory year followed by four academic years. The first academic year (pre-clinical phase) focuses on foundational scientific subjects related to physical therapy. The second and third years integrate both theoretical and clinical coursework, while the fourth and final year consists of a full-time clinical internship. During the 12-month internship, students rotate through various inpatient and outpatient clinical settings and are engaged in hands-on training across multiple hospitals and clinics.

Participants were invited to complete an online questionnaire developed using Google Forms. The survey link was distributed via institutional email and popular social media platforms, including WhatsApp and X To enhance participation, QR codes linking to the questionnaire were also displayed in classroom settings. Instructions were provided to guide students on how to complete the questionnaire and how to seek assistance if needed. Completion time was estimated at 15–20 minutes. Collected responses were exported to Microsoft Excel for subsequent analysis.

2.2.1. Sample size calculation

The total number of physical therapy (PT) students at Taif University, including those in the internship phase working in various hospitals across Taif, was 458. Based on calculations using a web-based sample size calculator https://www.calculator.net/sample-size-calculator.html, a minimum of 170 participants was required to achieve a 90% confidence level with a 5% margin of error.

2.3. Instruments

The survey employed a self-administered questionnaire that included a cover page outlining the study's purpose, the time required to complete the questionnaire, and the confidentiality of the data. The study questionnaire had 4 sections containing closed-ended questions.

Personal and academic data

The first section contained socio-demographic information, such as age, gender, height, weight, body mass index (BMI), cumulative grade point average (GPA), and academic level.

Arabic Version of the Maslach Burnout Inventory–Student Survey (MBI-SS)

The second section of the survey utilized the Arabic version of the Maslach Burnout Inventory–Student Survey (MBI-SS) (AlShahrani et al., 2022) to assess the prevalence of burnout among participants. The MBI-SS consists of 22 items, distributed across three core dimensions: Emotional Exhaustion (EE) (7 items), which measures feelings of emotional strain and fatigue; Depersonalization (DP) (7 items), which assesses a detached or impersonal attitude toward patients or academic tasks; and Personal Accomplishment (PA) (8 items), which evaluates perceived inefficacy and lack of achievement in academic or clinical performance.

Each item is rated on a 7-point Likert scale, ranging from 0 ("never") to 6 ("every day"), with intermediate options such as 1 ("a few times per year"), 2 ("once a month"), 3 ("a few times per month"), 4 ("once a week"), and 5 ("a few times per week"). Subscale scores are calculated by summing the responses for each dimension. These scores are then categorized as low, moderate, or high based on established thresholds.

A high level of burnout is characterized by an EE score ≥30, a DP score ≥12, and a PA score ≤33. Moderate burnout corresponds to an EE score between 18–29, a DP score between 6–11, and a PA score between 34–39. Low burnout is defined by an EE score ≤17, a DP score ≤5, and a PA score ≥40 (Siraj et al., 2022; Maslach & Jackson, 1981; Maslach & Schaufeli, 2018).

The MBI-SS is recognized as a psychometrically robust instrument, with high internal consistency demonstrated by Cronbach's alpha coefficients of 0.90 for EE, 0.79 for DP, and 0.71 for PA (Maslach & Jackson, 1981; Maslach & Schaufeli, 2018).

The Arabic Version of the Brief Resilience Scale (BRS-A)

The third section of the questionnaire included the Arabic version of the Brief Resilience Scale (BRS-A) (Baattaiah et al., 2023), adapted from the original instrument developed by Smith et al. (2008) to assess individuals' ability to recover from stress. The BRS-A consists of six items: items 1, 3, and 5 are positively worded, while items 2, 4, and 6 are negatively worded. Participants respond using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The overall resilience score is calculated by summing the item responses and dividing by six. Scores are categorized as low resilience (1.00–2.99), moderate resilience (3.00–4.30), or high resilience (4.31–5.00) (Siraj et al., 2022; Smith et al., 2008). The BRS-A has demonstrated strong psychometric properties, with a Cronbach's alpha coefficient of 0.83, indicating its reliability and validity for resilience assessment (Alsharif, 2020; Rodríguez-Rey et al., 2016).

The Arabic Version of the Pittsburgh Sleep Quality Index (PSQI-A)

The fourth section of the questionnaire incorporated the Arabic version of the Pittsburgh Sleep Quality Index (PSQI-A) (Alqarni et al., 2025) is a standardized, self-administered instrument designed to evaluate sleep quality. The scale comprises 19 items and 5 additional questions, assessing seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored from 0 to 3, with higher scores indicating poorer sleep quality. The global score, obtained by summing the component scores, ranges from 0 to 21. A total score exceeding 5 denotes significant sleep difficulties, reflecting notable impairment in at least two components or moderate disturbances in more than three components (Liu et al., 2021). The internal consistency of the Arabic version of PSQI, as measured by Cronbach's alpha, yielded favorable results. The overall PSQI score, the sleep disturbance component, and the composite seven-component scores demonstrated acceptable reliability, with values ranging between 0.678 and 0.690, consistent with previous findings. Notably, the "subjective sleep quality" item exhibited the strongest test-retest correlation ($R = 0.5788$, $p < 0.001$), confirming its validity, as correlations with p-values below 0.05 indicate high reliability. These findings underscore the importance of developing robust instruments suitable for both clinical and nonclinical settings to effectively assess various sleep parameters (Alqarni et al., 2025).

2.4. Statistical Analyses

Data were analyzed using IBM SPSS Statistics version 29 (IBM Corp., Armonk, NY, USA). Questionnaire responses were automatically exported to Microsoft Excel and then imported into SPSS for statistical processing.

Descriptive statistics were applied to summarize participant characteristics and study variables. Differences in burnout subscale scores—Emotional Exhaustion (EE), Depersonalization (DP), and Personal Achievement (PA)—across demographic variables such as gender, academic year, and GPA were analyzed using the chi-square (χ^2) test. The relationships between resilience and burnout subscales were evaluated using Pearson's correlation coefficient.

3. RESULTS

3.1. Sociodemographic and personal characteristics of physical therapy students at Taif University

The current study involved 170 physical therapy students at Taif University, with a mean age of 21.29±1.38 years. More than half of the participants were female students (58.8%), most of the

participants were living with their families (95.9%), and the mean BMI was 22.89±4.40. Overall, 55.9% of the participants had normal weight, while 18.2% were overweight. The majority of participants did not have chronic disease (93.5%), with 2nd-year students representing 32.9% and 4th-year students 31.8%. The mean GPA was 3.20±0.549 and the mean internship period was 8.30±2.78 months (Table 1).

Table 1. Sociodemographic and personal characteristics of physical therapy students at Taif University

Sociodemographic Variables		**Participants** (Total=170) N (%)	
Age (years)	**≤ 21years**	98	57.6
Mean ±SD (21.29±1.38)	**>21 years**	72	42.4
Gender	**Male**	70	(41.2)
	Female	100	(58.8)
Living arrangement	**Living with family**	163	(95.9)
	Living elsewhere	7	(4.1)
Body Mass Index (kg/m2)	**Obese**	16	9.4
Mean ±SD	**Overweight**	31	18.2
22.89± 4.40	**Normal weight**	95	55.9
	Under weight	28	16.5
Chronic disease	**No**	159	93.5
	Respiratory disease	8	4.7
	Diabetes Mellitus	2	1.2
	Hypertension	1	0.6
Academic year	**2nd year**	56	32.9
	3rd year	32	18.8
	4th year	54	31.8
	5th year	28	16.5
Cumulative grade point average (C-GPA) (out of 4)	**3.5-4**	66	38.8
Mean±SD	**3-3.49**	62	36.5
3.20±.549	**2.5-3**	24	14.1
	≤ 2.4	16	9.4
Clinical training	**≤6**		
During the internship year [months]	**>6**	2	7.14
Mean±SD (8.30±2.78)		26	92.86

3.2. Resilience score among the studied participants

3.2.1. General characteristics of the resilience score among the studied students

In the current study, 67.1% of the participants had a moderate resilience level, while only 0.6% had a high resilience level. The mean resilience score was 3.06±0.517 (Table 2).

Table 2. Distribution of characteristics of burnout and its subscales, resilience, and PSQI scores

Burnout score & its subscales	Participants N	(%)	M±SD 57.98± 20.79
Emotional Exhaustion			27.67± 14.40
Low	44	25.9	
Moderate	52	30.6	
High	74	43.5	
Depersonalization			
Low	85	50.0	7.28± 6.66
Moderate	43	25.3	
High	42	24.7	
Personal Achievement			
Low	141	82.9	23.02± 10.58
Moderate	21	12.4	
High	8	4.7	
Overall resilience			
Low	55	32.4	3.06± .517
Moderate	114	67.1	
High	1	0.6	
Overall PSQI			
Good Sleep Quality	35	20.6	7.68± 3.45
Poor Sleep Quality	135	79.4	

3.2.2. Comparison between sociodemographic characteristics regarding resilience levels among the studied participants

There was a highly statistically significant association (p=.004) between male and female students regarding resilience levels, where 41.0% of females and 20.0% of males had low resilience levels (Table 3).

Table 3. Comparison between sociodemographic characteristics regarding resilience levels among the studied participants

Variables	Low resilience		Moderate resilience		High resilience		X^2 test *p* value
Age							.400
≤ 21years	34	34.7%	64	65.3%	0	0.0%	Fisher's Exact Test
>21 years	21	29.2%	50	69.4%	1	1.4%	
Gender							.004**
Male	14	20.0%	55	78.6%	1	1.4%	Fisher's Exact Test
Female	41	41.0%	59	59.0%	0	0.0%	
Living arrangements	54	33.1%	108	66.3%	1	0.6%	.453
Living with family	1	14.3%	6	85.7%	0	0.0%	
Living elsewhere							

BMI levels							.171
Obese	2	12.5%	14	87.5%	0	0.0%	Fisher's Exact Test
Overweight	8	25.8%	22	71.0%	1	3.2%	
Normal weight	35	36.8%	60	63.2%	0	0.0%	
Under weight	10	35.7%	18	64.3%	0	0.0%	
Chronic disease							.011*
No	47	29.6%	111	69.8%	1	0.6%	
Yes	8	72.7%	3	27.3%	0	0.0%	
GPA							.920
3.5-4	22	33.3%	44	66.7%	0	0.0%	Fisher's Exact
3-3.49	19	30.6%	42	67.7%	1	1.6%	Test
2.5-3	9	37.5%	15	62.5%	0	0.0%	
≤ 2.4	5	27.8%	13	72.2%	0	0.0%	
Academic year							.168
Second year	16	28.6%	40	71.4%	0	0.0%	
Third year	16	50.0%	16	50.0%	0	0.0%	
4th year	14	25.9%	39	72.2%	1	1.9%	
5th year	9	32.1%	19	67.9%	0	0.0%	

Note. ** Significant at ≤0.05; ** Highly significant at ≤ 0.01*

There was also a statistically significant association (p=.011) between chronic disease status and resilience levels, with a high proportion of participants with chronic disease (72.7%) and 29.6% of those without chronic disease having low resilience levels (Table 3).

3.2.3. Multivariate linear regression analysis for the predictors of resilience score among the studied population

Gender (p=.0001) and chronic disease (p=.002) were statistically significant predictors of resilience score, while GPA was not statistically significant at the 0.05 level (p=.053).

3.3. Burnout overall score and its subscales among the studied participants

3.3.1. General characteristics of burnout overall score and its subscales among the studied students

In this study, the mean burnout score was 57.98±20.79, and the mean Emotional Exhaustion score was 27.67±14.40, with 43.5% of the participants having a high level of emotional exhaustion. The mean Depersonalization score was 7.28±6.66, with 50.0% of the participants having a low depersonalization level and 24.7% having a high depersonalization level. The mean Personal Achievement score was 23.02±10.58, with 82.9% having a high level of personal achievement.

3.3.2. Comparison between sociodemographic characteristics regarding burnout total score and its subscales among the studied participants

In the current study, there were statistically significant differences in mean total burnout (p=.001) and emotional exhaustion (p=.002) scores between females and males, with higher scores

among females. There was a statistically highly significant higher total burnout score among overweight students (p=.008), a statistically significant higher score of emotional exhaustion (p=.035) among underweight students, while there was a statistically significant (p=.048) lower score of personal achievement among obese individuals. There was a statistically significant higher total burnout score among those with chronic diseases (p=.049), while statistically significant higher mean scores of emotional exhaustion (p=.002) and depersonalization (p=.003), as well as a statistically significant lower mean personal achievement score (P=.035), were observed among those with chronic disease. There was a statistically significant higher emotional exhaustion score among 3rd-year students (p=.005) and a statistically significant lower personal achievement mean score among 3rd-year students (p=.035). There was a statistically significant (p=.020) lower personal achievement score among students with the lowest GPA levels (Table 4).

Table 4. Comparison between sociodemographic characteristics regarding burnout total score and its subscales among the studied participants

Variables	Total burnout score	EE	DP	PA
Age				
≤ 21 years	58.79±20.98	29.31± 14.518	7.43± 7.10	22.04± 10.53
>21 years	56.87±20.62	25.44± 14.04	7.06± 6.06	24.36± 10.57
***p* value**	.553	.083	.722	.158
Gender				
Male	51.60±23.88	23.55± 14.85	6.74± 7.36	21.30± 11.89
Female	62.45±17.07	30.56± 13.42	7.66±6.14	24.23± 9.43
***p* value**	.001**	.002**	.379	.076
Living arrangements	58.26±20.87			
Living with family	51.42± 18.89	27.89± 14.37	7.26± 6.70	23.09± 10.58
Living elsewhere		22.57± 15.27	7.57± 6.37	21.28± 11.16
***p* value**	.396	0.340	.907	0.659
BMI levels				
Obese	41.50±22.59	18.62± 11.79	6.25± 6.90	16.62± 11.41
Overweight	61.83±20.59	28.87± 15.17	8.80± 7.22	24.16± 10.94
Normal weight	58.83± 19.65	27.67± 14.29	7.00± 6.32	24.15± 10.03
Under weight	60.25±20.50	31.53± 13.71	7.14± 7.13	21.57± 10.62
***p* value**	.008**	0.035*	.539	.048*
Chronic disease	57.15±20.86	26.79± 14.12	6.88± 6.42	23.47± 10.64
No	69.90±16.13	40.36± 12.85	13.00± 7.77	16.54± 7.21
Yes				
***p* value**	.049*	0.002**	0.003**	.035*
Academic year				
Second year	58.25±23.95	28.50± 14.94	8.19± 7.53	21.55± 11.10
Third year	60.68±17.38	33.46± 13.73	7.53± 6.75	19.68± 8.32
4th year	59.18±18.42	27.11± 13.37	6.22± 5.75	25.85± 10.89

5th year	52.03±21.81	20.50± 13.46	7.21± 6.43	24.32± 10.10
***p* value**	.391	0.005**	0.485	.035*
GPA				
3.5-4	59.43± 13.73	26.80± 11.79	7.40± 6.20	25.22± 9.03
3-3.49	59.61±22.22	28.64± 15.73	8.16± 7.05	22.80± 10.56
2.5-3	54.00±25.67	28.37± 16.35	5.12± 6.06	20.50± 10.58
≤ 2.4	52.33±28.95	26.50± 17.27	6.50± 7.59	16.87± 13.61
***p* value**	.408	.880	281	.020*

Note. ** Significant at ≤0.05; ** Highly significant at ≤ 0.01; EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Achievement*

3.3.3. Multivariate linear regression analysis for the predictors of burnout score among the studied population

In the present study, chronic disease was a statistically highly significant (p=.008) predictor of overall burnout score.

3.4. PSQI score among the studied participants

A total of 79.4% of the participants had poor sleep quality, with a mean total PSQI score of 7.68±3.45.

There were statistically highly significant differences in overall sleep quality between males and females (p=.002), those with and without chronic disease (p=.003), and different academic levels (p=.004), with higher PSQI scores among females, those with chronic disease, and 3rd-year physical therapy students. There was no statistically significant difference in overall PSQI score according to BMI levels (p=.115). However, the distribution of poor and good sleep quality according to BMI levels showed a p value of .051 (Table 5).

Table 5. Comparison between sociodemographic characteristics regarding sleep quality among the studied participants

Variables	**Overall PSQI score M±SD**	***p* value**	**Poor sleep quality N %**	**Good sleep quality N %**	***p* value**
Age		.149			.703
≤ 21 years	8.01±3.66		79 58.5%	19 54.3%	
>21 years	7.23±3.11		56 41.5%	16 45.7%	
Gender		.002			.011*
Male	6.70±3.04		49 36.3%	21 60.0%	
Female	8.37±3.57		86 63.7%	14 40.0%	
Living arrangements	7.68±3.49	.931			1.000
Living with family	7.57±2.50		129 95.6%	34 97.1%	Fisher's Exact Test
Living elsewhere			6 4.4%	1 2.9%	

BMI levels	6.62±2.68	.115					.051*
Obese	6.96±3.87		11	8.1%	5	14.3%	Fisher's Exact Test
Overweight	7.75±3.13		20	14.8%	11	31.4%	
Normal weight	8.82±4.13		81	60.0%	14	40.0%	
Under weight	7.68±3.45		23	17.0%	5	14.3%	
Chronic disease	7.47±3.38	.003					.123
No	10.63±3.20		124	91.9%	35	100.0%	Fisher's Exact Test
Yes			11	8.1%	0	0.0%	
GPA	7.87±3.67	.910	54	40.6%	12	34.3%	.259
3.5-4	7.48±3.33		48	36.1%	14	40.0%	Fisher's Exact Test
3-3.49	7.83±2.95		21	15.8%	3	8.6%	
2.5-3	7.44±3.85		10	7.5%	6	17.1%	
≤ 2.4							
Academic year		.004					.563
Second year	7.73±3.50		45	33.3%	11	31.4%	
Third year	9.53±3.627		28	20.7%	4	11.4%	
4th year	6.87±3.04		41	30.4%	13	37.1%	
5th year	7.03±3.26		21	15.6%	7	20.0%	

Note. ** Significant at ≤0.05; ** Highly significant at ≤ 0.01*

Gender (p=.003) and chronic disease (p=.008) were statistically significant predictors of overall sleep quality score (Table 6).

Table 6. Multivariate linear regression analysis for the predictors of burnout, resilience, and PSQI scores among the studied population

The predictors of the overall burnout score	**Multivariate analysis**			
	B	***p* value**	**95% C.I. for EXP(B)**	
			Lower	**Upper**
Age	38.53	.338	-40.598-	117.659
Gender (ref: female)	.215	.917	-3.854-	4.284
Chronic disease (Ref: Yes)	9.75	.008**	2.535	16.966
BMI	11.06	.082	-1.417-	23.538
GPA	-.315-	.412	-1.072-	.441
Academic year	.389	.902	-5.844-	6.622
The predictors of the resilience scale score				
Age	.447	.124	1.813	23.969
Gender (ref: female)	-2.225-	.0001**	-.123-	1.016
Chronic disease (Ref: Yes)	-2.831-	.002**	-3.235-	-1.215-
BMI	.021	.691	-4.578-	-1.084-
GPA	.861	.053*	-.085-	.127
Academic year	-.211-	.565	-.011-	1.734
The predictors of the overall Sleep quality scale score				
Age	-.080-	.813	-.744-	.584
Gender (ref: female)	1.804	.003**	.627	2.981
Chronic disease	2.764	.008**	.729	4.800

BMI	-.032-	.609	-.155-	.091
GPA	-.536-	.299	-1.553-	.481
Academic year	-.333-	.434	-1.173-	.506

Note. ** Significant at ≤0.05; ** Highly significant at ≤ 0.01*

3.5. Pearson's correlation between overall resilience, burnout, and PSQI scores among the studied participants

The current study found a statistically highly significant (p<.001) negative weak correlation (r=-.320) between resilience score and overall burnout score, and a statistically highly significant (p<.001) negative weak correlation (r=-.283) between resilience score and PSQI score. There was a statistically highly significant (p<.001) positive moderate correlation between the overall burnout score and PSQI score (r=.449) (Table 7).

Table 7. Pearson's correlation between overall resilience, burnout, and PSQI scores

		Resilience score	**Burnout score**	**PSQI score**
Resilience score	Pearson Correlation	1	-.320-**	-.283-**
	Sig. (2-tailed)		.000	.000
Burnout score	Pearson Correlation	-.320-**	1	.449**
	Sig. (2-tailed)	.000		.000

Note. ** Significant at ≤0.05; ** Highly significant at ≤ 0.01*

4. DISCUSSION

This study explored the interrelationships among burnout, resilience, and sleep quality among physical therapy (PT) students at Taif University. The findings revealed concerning levels of burnout and poor sleep quality, alongside moderate levels of resilience. These results highlight the psychological challenges PT students face and underscore the need for effective interventions to promote mental well-being.

The current study revealed a moderate overall level of burnout among physical therapy students, with a mean score of 57.98 ± 20.79. However, a detailed analysis of the subscales of the Maslach Burnout Inventory–Student Survey (MBI-SS) showed important disparities in specific dimensions. Notably, 43.5% of students reported high levels of Emotional Exhaustion (EE), suggesting that a significant portion of students experienced persistent emotional fatigue likely stemming from academic pressure, time demands, or psychological strain. Additionally, 24.7% exhibited high levels of Depersonalization (DP), indicating some degree of detachment or impersonal

attitudes toward academic responsibilities, which may reflect early signs of disengagement or stress-related coping mechanisms.

In contrast, the Personal Achievement (PA) subscale revealed that 82.9% of students scored in the low range, which is interpreted as a high level of burnout in this domain, as lower PA scores indicate reduced feelings of competence and accomplishment. This pattern suggests that, while students may not be overwhelmingly emotionally exhausted or depersonalized, they are likely experiencing low confidence in their academic or clinical performance, especially in the earlier stages of their training. This aligns with previous findings, such as those from AlShahrani et al. (2022) which reported similar results among students with limited clinical exposure.

Moreover, these results are consistent with prior studies by Siraj et al. (2022); Altannir et.al. (2019) which have documented elevated burnout levels in students across medical and allied health disciplines. The high levels of EE and low PA observed in this study may reflect the cumulative effects of academic stress, limited hands-on training, and possibly the mismatch between students' expectations and the realities of professional education.

The findings suggest that emotional fatigue and reduced self-efficacy are key dimensions of burnout in this population. The high prevalence of low personal accomplishment may be particularly concerning, as it can impair motivation, learning engagement, and long-term professional identity formation. These results underscore the importance of early interventions focused on enhancing students' clinical confidence and emotional resilience. Strategies might include structured mentoring, hands-on skills labs, academic support, and stress management programs to improve self-perception and prevent progression toward more severe burnout symptoms

In this study, female students were more likely to experience burnout than males. A systematic review identified gender as a significant predictor of burnout or at least one of its subcomponents (Chunming et al., 2017). Similarly, a study on osteopathic medical students found that females had 1.5 times higher burnout rates than males, with increased EE and lower PA (Lapinski et al., 2016).

Most studies have reported that female students may experience higher levels of stress and burnout than their male counterparts, although the reasons for these differences remain unclear (Almurdi et al., 2024; Altannir et al., 2019; Peisah et al., 2009). Some researchers have suggested that differences in the perception and appraisal of stressful situations may contribute to gender differences in stress and burnout (Lapinski et al., 2016). Among medical students in Saudi Arabia,

higher levels of burnout among female students may also be influenced by cultural and social factors that shape their academic and clinical experiences. Cultural norms regarding gender mixing may affect the nature and availability of some clinical training experiences for female students, while societal expectations concerning family responsibilities may require women to balance academic demands with household and family duties (Hamdan, 2005; Abdulghani et al., 2014). These additional social and role-related demands may contribute to greater psychological burden and may partly explain differences in reported stress and burnout between female and male students (Altannir et al., 2019; Hamdan, 2005).

Burnout levels varied across academic years, with third-year students experiencing the highest emotional exhaustion (EE) (33.46 ± 13.73; $p = .005$) and the lowest personal accomplishment (PA) (19.68 ± 8.32; $p = .035$). Although total burnout and depersonalization (DP) scores did not show significant differences across academic years, the elevated EE observed among third-year students may suggest increased stress associated with the transition to clinical training. By the fifth year, EE decreased and PA improved, possibly reflecting better coping strategies and adaptation to academic and clinical demands. These findings highlight the potential need for targeted support during the third year to address increased stress and reduce the risk of burnout. These findings are consistent with previous research reporting differences in burnout across stages of medical and health-professional education (Almurdi et al., 2024; Altannir et al., 2019).

This study found that the majority of participants (67.1%) exhibited moderate levels of resilience, with only a small proportion (0.6%) reporting high resilience. These findings align closely with Siraj et al. (2022) where 66% of respiratory therapy (RT) students demonstrated moderate resilience, 32% showed low resilience, and only a few (3%) reported high resilience. The consistency across studies suggests that moderate resilience is common among healthcare students, while high resilience remains relatively rare.

In the present study, male students and those without chronic illnesses showed significantly higher resilience levels, indicating that gender and health status are key predictors of resilience. This expands upon previous research, as Siraj et al. (2022) did not examine the factors associated with resilience, highlighting a gap that this study helps to address.

A significant inverse correlation was observed between resilience and burnout, particularly in emotional exhaustion (EE) and depersonalization (DP). These findings reinforce previous results by Siraj et al. (2022) who reported negative correlations between resilience and EE ($\rho = –0.41$, $p <$

0.001) and DP ($\rho = –0.32$, $p = 0.03$), as well as a positive correlation with personal accomplishment (PA) ($\rho = 0.46$, $p < 0.001$). Although our study did not find a significant correlation with PA, the protective role of resilience against core dimensions of burnout is supported.

Differences in the strength of correlations between studies could be attributed to variations in sample characteristics, academic programs, or institutional settings. Nevertheless, both studies underscore the relevance of resilience in mitigating burnout, particularly in reducing EE and DP, which are core components of burnout syndrome.

These findings point to the need for resilience-enhancing interventions, such as mindfulness training, cognitive-behavioral strategies, social support development, and self-compassion practices. Such programs may be especially beneficial for students with lower baseline resilience, including female students and those with chronic illnesses (Smith et al., 2008; McCain et al., 2017).

Sleep quality was notably poor among the majority of students (79.4%), with a mean PSQI score of 7.68 ± 3.45. Female students, third-year students, and those with chronic conditions reported significantly worse sleep quality. These findings are consistent with international data showing high rates of sleep disturbance among healthcare students due to academic pressure and irregular schedules (Pagnin et al., 2014; Wang et al., 2021).

Moreover, sleep quality was positively associated with burnout and negatively associated with resilience. These relationships support the bidirectional model proposed by Jansson-Fröjmark & Lindblom, suggesting that poor sleep exacerbates emotional exhaustion while reducing one's capacity to recover from stress (Jansson-Fröjmark & Lindblom, 2010). The association between burnout and sleep disturbances has also been highlighted in studies by Rodrigues et al. (2002) and Mazurkiewicz et al. (2012), who found that academic overload can contribute to maladaptive coping strategies, such as sleep deprivation, potentially further worsening mental health.

Poor sleep quality was prevalent among the majority of students (79.4%), as indicated by a mean PSQI score of 7.68 ± 3.45. Female students, third-year students, and those with chronic health conditions reported significantly worse sleep quality. These findings align with the international literature, which highlights the high prevalence of sleep disturbances among healthcare students due to academic pressure, emotional stress, and irregular schedules (Pagnin et al., 2014; Wang et al., 2021). Notably, sleep quality was positively associated with burnout and negatively associated with resilience. This finding supports the bidirectional model proposed by Jansson-Fröjmark & Lindblom (2010), which suggests that poor sleep may contribute to emotional exhaustion and reduce an

individual's ability to recover from stress. Similar associations have been reported by Rodrigues et al. (2002); Mazurkiewicz et al. (2012), who emphasized that academic overload can contribute to maladaptive coping mechanisms, such as chronic sleep deprivation, which may further impair mental health.

Comparable findings have been reported in related research, where emotional exhaustion and daytime sleepiness were found to be interrelated. Sleep disturbances may compromise the restorative functions of sleep, thereby contributing to burnout and increasing vulnerability to mental health difficulties (Söderström et al., 2012). Inadequate sleep has been shown to increase sensitivity to stress and negative emotional responses (Vandekerckhove & Cluydts, 2010), while also contributing to daytime sleepiness (Hublin et al., 2001), which may impair students' emotional regulation and coping mechanisms in high-stress academic environments (Zohar et al., 2005). Moreover, emotional stress can disrupt sleep physiology, including REM sleep, which plays an important role in emotional processing. This may create a vicious cycle in which sleep disruption further compromises emotional resilience and contributes to dysfunctional attitudes toward learning (Vandekerckhove & Cluydts, 2010). In this context, daytime sleep dysfunctions were notably associated with increased cynicism and disengagement in the medical education setting.

5. CONCLUSIONS

This study highlights the high prevalence of burnout and poor sleep quality, along with moderate resilience among physical therapy students at Taif University. The significant relationships between burnout, resilience, and sleep quality suggest an urgent need for multi-faceted interventions to promote student mental health. Gender, academic level, and chronic illness emerged as influential factors that should be considered in future program design and policy implementation. By fostering resilience, promoting sleep health, and proactively addressing burnout, institutions can better support student success and well-being throughout their educational journey.

Universities should implement resilience-building programs, stress management training, and sleep hygiene education to support student well-being. Mentorship, academic counseling, and flexible workload policies are also recommended to reduce burnout risk. Targeted support for vulnerable groups is essential to foster a healthier, more resilient student body and ensure academic and professional success.

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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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