Stress and Quality of Life Among University Students: A Systematic Literature Review

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Abstract

Purpose: Excessive and continuous stress has effects that go beyond mere health commitment, by triggering various diseases, and it is well stablish that this stress-related somatic events can affect the quality of life. Based on the exposed, the following questions were raised: There is association between quality of life and stress level in university students? What are the potential variables that influences this association? Therefore, this research aimed to analyze recent scientific productions about stress and quality of life in university students.

Methods: A systematic review was conducted on the recent scientific production (i.e., published papers along the last five (5) years) in Scopus, Web of Science, Science Direct, PubMed and Virtual Health Library (BVS). For this it was used the following search terms: "quality of life", restricted to the title, "Stress" and "students" in the title, abstract or keywords, all entered in a single search and connected by the Boolean operator "AND".

Results: This study identified 142 articles in the scientific literature, but only 13 articles were classified as eligible according to the previously established criteria, highlighting the lack of studies that address the theme under investigation. Among these, quality of life was frequently negatively associated to stress and factors as insomnia and burnout were also associated with its deterioration.

Discussion: This systematic review highlights the negative association between stress and QoL in university students, through the deterioration of various aspects related to physical and mental health.

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1. Introduction

Quality of life (QoL) is defined as an individual's perception of their position in life in the context of culture and value system where they are inserted, which also involves their goals, perspectives, standards and concerns.[1] Then, it is plausible to infer that QoL can be impacted by many factors, including stress.

From the 70s, the assessment of QoL grew, with a coherent theoretical framework, established methods and various applications. In recent years, the assessment of QoL became useful to determine the impact of illnesses/diseases and many interventions. However, little attention has been given to QoL of university students during their educational process, which is recognized as a high-stress period.[2,3]

The said somatic events can cause damage to human QoL, a fact that has generated interest in the causes and methods used to mitigate the stress, as well as ways to sustain a good QoL.[4] Excessive and continuous stress has effects that go beyond the mere health commitment, being the onset to the development of many diseases.

The demands of modern life have often caused the onset of somatic events in young people (i.e., adolescents), so the endogenous and exogenous demands interact to affect negatively the academic performance and achievement of the students.[5]

The emotions experienced in the academic environment are known to be related to important outcomes, such as academic adaptation and success, and also to the student health and well-being. However, factors such as anxiety and stress can lead to poor academic performance and illness.[6,7]

Based on the exposed, the following questions were raised: there is association between quality of life and stress level in university students? What are the potential variables that influences this association? Therefore, this research aimed to analyze recent scientific productions about stress and quality of life in university students.

2. Methods

2.1. Study design

A systematic review was conducted on the recent scientific production (i.e., published papers along the last five (5) years), following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).[8]

2.2. Search strategy

Article searching was performed electronically to locate peer reviewed articles using the following search terms: "quality of life", restricted to the title, "stress" and "students" in the title, abstract or keywords, all entered in a single search and connected by the Boolean operator "AND".

The following databases were assessed Web of Science, Scopus, Science Direct, PubMed and Virtual Health Library (BVS) databases, between November and December 2015.

2.3. Inclusion and exclusion criteria

For inclusion in the subset of studies for data extraction, the screened studies had to be published in English, between 2011 and 2015, and address "quality of life" and "stress" among university students as the main goal. The use of the term "quality of life" restricted to the title during the search procedure is justified by its multidimensional feature, being often used as a generic term to indicate a good general state and not as an objective outcome, as proposed here.

Narrative reviews, non-peer reviewed articles, theses, books or chapters, abstracts and editorials were excluded from the search. Articles with incomplete information or with full text not available were also excluded, because this may limit the analysis.
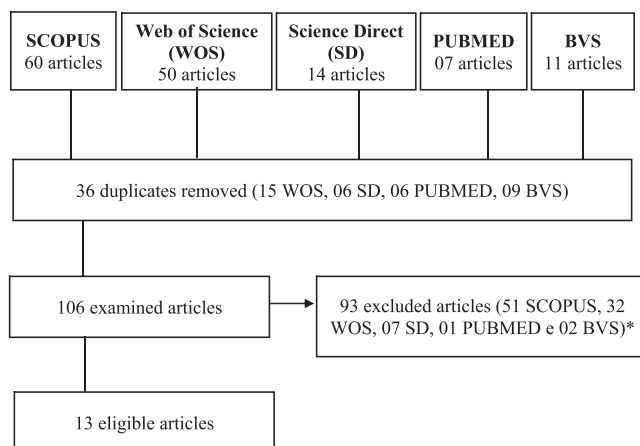
Fig. 1. Flowchart of articles selected on the systematic review. *Articles were excluded mainly because: 1) the study presents unsuitability in the proposed outcome (i.e., not address quality of life and stress jointly); 2) the study population does not meet the proposed criteria (i.e., does not included university students); 3) full text with incomplete information or unavailable.

Table 1
Quality assessment ratings for studies investigating the proposed thematic.

	Methodological items								
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Judgment
Kleiveland et al.[17]	+	+	+	+	+	n/a	+	+	+ +
Pagnin and Queiroz[12]	+	+	+	+	+	n/a	+	+	+ +
Domantay[13]	+	+	+	+	+	n/a	+	+	+ +
Paro et al.[15]	+	+	+	+	+	n/a	+	+	+ +
Van Vendeloo et al.[20]	+	+	+	+	-	n/a	+	+	+
Awadh et al.[21]	+	+	+	+	-	n/a	+	+	+
Taylor et al.[11]	+	+	+	+	-	n/a	+	+	+
Jamali et al.[14]	+	+	+	+	+	n/a	+	+	+ +
Crăciun[18]	+	+	+	-	-	n/a	+	+	+
Bhandari[10]	+	+	+	+	+	n/a	+	+	+ +
Meyer et al.[16]	+	+	+	-	-	n/a	+	+	+
Pekmezovic et al.[3]	+	+	+	-	-	n/a	+	+	+
West et al.[19]	+	+	+	+	+	n/a	+	+	+ +

(+ +) - **All or most** of the criteria have been fulfilled. Where they have not been fulfilled the conclusions of the study or review are thought *very* **unlikely** to alter. (+) - **Some** of the criteria have been fulfilled. Those criteria that have not been fulfilled or not adequately described are thought **unlikely** to alter the conclusions. (-) - Few or no criteria fulfilled The conclusions of the study are thought likely or very likely to alter.

2.4. Quality and adequacy assessment

Two reviewers assessed independently (i.e., blind from each other) the databases and, following the proposed inclusion criteria, selected the retrieved articles. Later, in order to eliminate possible publication or selection bias, the results from each reviewer were crossed and, if the first two reviewers did not agree a third reviewer evaluated the case. The methodological quality of all included studies were assessed by the critical appraisal checklist for Cross sectional.[9]

2.5. Data extraction

With articles properly selected, data were extracted using a form that included: authors name, publication year, population studied, used instruments and main results. As

Table 2
Description of the main findings of the studies identified in literature review.

Author (year)	Population	Instrument/Outcome	Results
Kleiveland et al.[17]	227 nursing students Mean age: 27.4 years old	Stress: Impact of Event Scale (IES) QoL: Quality of life scale (QOLS)	33.9% had moderate or high levels of stress, negatively associated with QoL ($p < 0.01$).
Pagnin and Queiroz[12]	193 medical students Mean age: 21.4 years old	Stress: Social Readjustment Rating Scale QoL: WHOQOL-BREF	Burnout and sleeping difficulties together, explain, respectively 22% and 21% of the variation in the physical and psychological aspects of QoL.
Domantay[13]	527 medical students 78.9% between 19 and 24 years old	Stress: Perceived Stress Scale QoL: SF-36	The average score of the eight domains of QoL varies from 51.36 to 85.83. Depression, stress and burnout were associated with lower QoL scores.
Paro et al.[15]	1350 medical students; Mean age: 22.7 years old	Stress: Maslach Burnout Inventory QoL: WHOQOL-BREF	Women had lower scores of physical and psychological domains of the QoL ($p < 0.05$); Burnout scores were different between the sexes, with higher emotional exhaustion in women and depersonalization values in men ($p < 0.05$).
Van Vendeloo et al.[20]	105 orthopedics residentes Mean age: Not informed	Stress: Maslach Burnout Inventory QoL: Two analogous questions	18% [$n=19$] of the residents had poor QoL and 47% [$n=49$] were dissatisfied with the balance between their personal and professional life; Some symptoms of burnout were found in 28% [$n=29$] of residents.
Awadh et al.[21]	26 master's degree students in pharmacy (MPharma) and 100 master's degree students in other areas that not in pharmacy (Non-MPharm); < 30 years 53.8% [$n=14$] (MPharm) and 67% [$n=67$] (Non-MPharm)	Stress: *Perceived Stress Scale* QoL: SF-12	65.4% [$n=17$] of MPharm reported feeling nervous and often stressed in the month before the interview, against 51% [$n=51$] of the master's in other areas (i.e., Non-MPharm). The average perceived stress scale showed no significant difference among MPharm and Non-MPharm.
Taylor et al.[11]	1039 undergraduate students; Mean age: 20.4 years old;	Stress: Perceived Stress Scale QoL: Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form	The chronic insomnia group had worse sleep patterns, fatigue, depression, anxiety, stress and QoL.
Jamali et al.[14]	1086 medical students Mean age: 22 years old	Stress: SF-36 (*Mental Composite Score*) QoL: SF-36	Being male, living with family and daily physical activity were significantly associated with greater psychological component values and mental score ($p < 0.001$). The mean QoL in all domains of the SF-36 were significantly lower in students in clinical stage.
Crăciun[18]	228 students in psychology and law Mean age: 28.2 years old	Stress: Perceived Stress Scale QoL: Quality of Life Scale	Significant relationship was demonstrated among perceived stress and coping strategies and of these with the maintenance or reduction of stressful experiences and therefore with increasing QoL.
Bhandari[10]	130 undergraduate students 50% between 20 and 29 years old	Stress: Perceived Stress Scale QoL: SF-12	The average perceived stress was 21.6 ($\pm$ 7:43), and was negatively correlated with QoL.
Meyer et al.[16]	302 medical students Mean age: 25.3 years old	Stress: Job Stress Scale QoL: WHOQOL-BREF	It was identified a high stress level; Very weak associations were found between the domains of QoL and the dimensions of occupational stress ($p > 0.05$).

Table 2 (*continued*)

Author (year)	Population	Instrument/Outcome	Results
Pekmezovic et al.[3]	1624 undergraduate students Mean age: 20.8 years old	Stress: SF-36 (*Mental Composite Score*) QoL: SF-36	Students living with parents had higher scores in all domains of the SF-36, however, among these, the students of medical sciences presented the worst scores. All domains of SF-36 were negatively associated with the issues raised by Beck Depression Inventory ($p < 0.05$)
West et al.[19]	19831 medical residents	Stress: Maslach Burnout Inventory QoL: single-item linear analogue self-assessment (LASA)	QoL was said to be "as bad as could be" or "any way bad" by 14.8% respondents; Burnout, high levels of emotional exhaustion and depersonalization were reported by 51.5%, 45.8% and 28.9% respectively.

done in the selection process, the extracted data were reviewed by three researchers to ensure the data reliability.

3. Results

Fig. 1 provided a flow diagram outlining the systematic review process. The initial literature screening identified 142 articles.

After read the titles and abstracts and exclude duplicated articles, 106 articles were examined, of which, after read the full texts and apply the inclusion criteria, only 13 articles were considered eligible. Table 1 exhibits the scores in the checklist for quality evaluation of selected articles.

Information about author (year), population, instruments/outcome and main results from the selected articles were extracted and summarize on Table 2.

Three of the selected articles evaluated undergraduate students from different study area. They found that the perceived stress was negatively correlated to physical and mental domains of the QoL, as well as to acculturative stress.[10] One of those studies pointed out that individuals with chronic insomnia exhibited significantly lower quality of life.[11] Finally, students of medical sciences had the lowest scores in almost all QoL domains and it was associated to depression symptoms.[3]

Previous finds also revealed that medical students present a worse physical health associated to emotional exhaustion and sleep difficulties. Burnout dimensions and sleep difficulties explained 22 and 21% of the variance in the physical and psychological domains of QoL, respectively.[12] Notwithstanding, another study showed that medical students with moderate to major perceived stress had lower QoL.[13] Additionally, previous finds pointed that QoL domain scores did not differ significantly among medical students from different medical schools, and also indicated that male sex, daily physical activity, and

studying in the basic sciences stage, are independent predictors of higher QoL scores.[14]

In fact, compared with males, the female medical students had lower scores on the physical and psychological domains of QoL. For males, personal distress scores were inversely correlated with the psychological domain of QoL, while for females, the personal accomplishment scores were moderately correlated with the personal distress.[15] In other hand, a Brazilian study showed weak association between quality of life domains and the stress dimension.[16]

Evaluating nursing students, it was observed that 33.92% experienced moderate or high levels of stress, which was negatively associated with QoL.[17] Another research involving psychology students showed that QoL was direct related to coping strategies, once this are able to reduce the stressful experiences, preventing impacts in the QoL.[18]

Finally, three articles addressed the QoL and stress among postgraduate students (i.e., residents, master degree students). The screened study with the biggest studied population in this review, is one of those, and showed that QoL was classified as being "as bad as it can be" or "somewhat bad" by 14.8% of postgraduate students, and symptoms of emotional exhaustion, at least weekly, were reported by 45.8%.[19] In a study including only orthopedic trainees, poor quality of life were found in 18.1% and some symptoms of burnout were seen in 27.6% of studied sample.[20] Only one study evaluated master's degree students and found a negative correlation between perceived stress levels and mental health among Pharmacy and non-pharmacy master's students.[21]

4. Discussion

This study identified 142 articles in the scientific literature, but only 13 articles were classified as eligible

according to the previously established criteria, highlighting the lack of studies that address the theme under investigation. Among these, quality of life was frequently negatively associated to stress and factors as insomnia and burnout were also associated with QoL deterioration.

University students, at graduate or postgraduate level, are in sociodemographic age span in which stress-related disorders are more common. Additionally, the academic period involves the employment of time and financial resources by the students, without guarantees of a satisfactory return.[22] This pressure can lead to a worse QoL perception in its various aspects (health, physical, psychological, environmental and social).[3,14]

The studies involving university students usually show a close relationship between high stress levels and consequent deterioration of QoL, being associated to factors such as insomnia or poor sleep quality,[11] lower values of mental components measured by different instruments,[3,10,14] high levels of depression and adaptive strategies of ineffective coping.[18]

Despite only few selected articles in the review process addresses sleep problems, the prevalence among college students is remarkably high, and often their consequences are unknown by students.[23] The sleep quality is influenced by multiple factors, such as stress, and has significant effects on cognitive performance.[24] These problems are related to the increase in health concerns, irritability, depression, fatigue, impaired attention and concentration and poor school performance.[25]

As previously mentioned, studies involving medical students were the majority in this review, resulting in a total of 2609 students evaluated. Taken together, the findings point to the QoL deterioration of the studied population, being associated with burnout syndrome,[12,13,15] sleep disturbances,[12] stress and depression.[13,16] Depression, in its turn, has also been reported as a major problem and of growing prevalence in university students, being associated to anguish and concerns that afflict the students.[26,27]

Along the healthcare training students faced situations that generate stress, as the requirement of practical skills, such as performing invasive procedures. For them, stress levels can lead to learning disabilities, increasing the possibility of errors.[28] Then, the stress impacts on their careers cause concerns, so that, it is important to develop adaptive coping mechanisms that result in students less prone to maladaptive strategies such as alcohol consumption, isolation, anxiety, depression, or even ignore the stress.[29]

The healthcare training is emotionally demanding and therefore at some point can be stressful. The stress is due to, among other factors, academic pressure, perfectionist standards and the demanding nature of the healthcare practice, which involve emotionally stressful situations.[30,31] Thus, the impact may not be restricted to the student QoL impairments, but also the patient care and the relationship established with the same.[32,33]

High levels of stress during medical school can lead to the development of burnout syndrome, which is characterized by a state of physical and mental exhaustion connected to work or activities of care.[34] To deal with this highly prevalent condition, educators must develop a greater awareness and understanding of the aspects of the medical learning, proposing interventions focused on creating welfare.[35]

Stress is involved in the genesis of several organ dysfunctions, may compromise the health status independently of age, gender or socioeconomic status, so that, the stress-related disturbances are among the most common causes of medical consultations and psychologists.[36] Nevertheless, the period of academic training, a key period to the development of the countries and, therefore, encouraged by the state to achieve better development indices, is characterized by exposure to stressful situations.[5]

It is important to note that, only three studies were developed with postgraduate level students. In which students were engaged in medical residency programs, it was evidenced that between 105 orthopedic residents[20] and among 16394 medical residents of the United States[19] a poor quality of life and some Burnout symptoms.

As the moment of academic medical training, medical residency, also configures itself in a high level stress environment and risk of impairment to mental health,[37] since the emotional imbalances, depression, and burnout are commonly reported during this period.[38,39] Thus, it is plausible to consider that the improvement of the learning environment can contribute to improving QoL and reducing the risk of burnout in this population.[20]

The academic environment, especially at master's or doctoral level, is replete of methodological requirements, such as short deadlines to conclude disciplines and dissertation/thesis, need for publications in high-concept journals,[40] among other factors, which was investigated by only one study.[21]

The psychological suffering is inherent in academic life, being labeled and identified in different ways and levels. The difficulties encountered in the institution itself to conduct projects, disseminate the research and in the "scientific independence" process are the most reported as psychological distress sources.[40] The obvious exposure of masters and doctoral students to stress and the scarcity of studies assessing the impact of

this phase of academic life on QoL deserve attention, constituting, therefore, a gap in the literature and an issue that needed to be deeply investigated.

Therefore, it is evident the need for conducting researches involving large samples and more diverse techniques, such as longitudinal and intervention studies, in order to propose strategies to mitigate potential consequences from the high stress levels exposure during academic life and the subsequent deterioration of quality of life these students. Moreover, it is important to point that QoL and stress are outcomes that could be evaluated by different psychometric instruments, difficulting comparisons among different studies.

5. Conclusion

In sum, the results of this systematic review highlights the negative association between stress and QoL in university students, through the deterioration of various aspects related to physical and mental health. Also pointed that factors as Burnout, sleep disorders and depression can maximize this negative association, deteriorating even more the QoL. It is pointed out, the reduced number of studies that address the raised issues together (i.e., stress and QoL in university students), as well as, their restriction to the students from medical sciences and the small number of studies - only one identified item – of postgraduate students in master's or doctoral degree from several knowledge areas.

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References

1. WHO WHO. The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. *Soc Sci Med.* 1995;41(10):1403–1409.

2. Berlim MT, Fleck MPA. "Quality of life": a brand new concept for research and practice in psychiatry. *Rev Bras Psiquiatr.* 2003;25(4):249–252.

3. Pekmezovic T, Popovic A, Tepavcevic DK, Gazibara T, Paunic M. Factors associated with health-related quality of life among Belgrade University students. *Qual Life Res.* 2011;20(3):391–397.

4. Sadir MA, Bignotto MM, Lipp MEN. Stress e qualidade de vida: influência de algumas variáveis pessoais. *Paid (Ribeirão Preto).* 2010;20(45):73-81.

5. Pozos-Radillo BE, Preciado-Serrano M de L, Acosta-Fernández M, Aguilera-Velasco M de los Á, Delgado-García DD. Academic stress as a predictor of chronic stress in university students. *Psicol Educ.* 2014;20(1):47–52.

6. Austin E, Saklofske D, Mastoras S. Emotional intelligence, coping and exam-related stress in Canadian undergraduate students. *Aust J Psychol.* 2010;62(1):42–50.

7. Saklofske DH, Austin EJ, Mastoras SM, Beaton L, Osborne SE. Relationships of personality, affect, emotional intelligence and coping with student stress and academic success: different patterns of association for stress and success. *Learn Individ Differ.* 2012;22(2):251–257.

8. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med.* 2009;6(7):e1000097.

9. Health Evidence Bulletin W. Critical appraisal checklist: Cross sectional; 2004.

10. Bhandari P. Stress and health related quality of life of Nepalese students studying in South Korea: a cross sectional study. *Health Qual Life Outcomes.* 2012;10(1):26.

11. Taylor DJ, Bramoweth AD, Grieser EA, Tatum JI, Roane BM. Epidemiology of insomnia in college students: relationship with mental health, quality of life, and substance use difficulties. *Behav Ther.* 2013;44(3):339–348.

12. Pagnin D, de Queiroz V. Influence of burnout and sleep difficulties on the quality of life among medical students. *Springerplus* 2015;4(1):676.

13. Domantay JAA. Health-related quality of life of future physicians at a medical school in the Philippines: a cross-sectional study. *SAGE Open.* 2014;4(3). [2158244014545459-].

14. Jamali A, Tofangchiha S, Jamali, R, et al. Medical students' health-related quality of life: roles of social and behavioural factors. *Med Educ.* 2013;47(10):1001–1012.

15. Paro HBMS, Silveira PSP, Perotta, B, et al. Empathy among medical students: is there a relation with quality of life and burnout? *PLoS One* 2014;9(4):e94133.

16. Meyer C, Guimarães AC de A, Machado Z, Parcias SR. Qualidade de vida e estresse ocupacional em estudantes de medicina. *Rev Bras Educ Med.* 2012;36(4):489–498.

17. Kleiveland B, Natvig GK, Jepsen R. Stress, sense of coherence and quality of life among Norwegian nurse students after a period of clinical practice. *Peer J.* 2015;3:e1286.

18. Crăciun B. Coping strategies, self-criticism and gender factor in relation to quality of life. *Proc - Soc Behav Sci.* 2013;78:466–470.

19. West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *J Am Med Assoc.* 2011;306(9):952–960.

20. van Vendeloo SN, Brand PLP, Verheyen CCPM. Burnout and quality of life among orthopaedic trainees in a modern educational programme: importance of the learning climate. *Bone Jt J.* 2014;96-B(8):1133–1138.

21. Awadh AI, Aziz NA, Yaseen SN, Abdulameer SA, Sahib MN, Al-Lela OQB. A comparison study of perceived stress and quality of life among Master of Pharmacy and non-pharmacy master's students. *Pharm Educ.* 2013;13(1):22–28.

22. Adlaf EM, Gliksman L, Demers A, Newton-Taylor B. The prevalence of elevated psychological distress among Canadian undergraduates: findings from the 1998 Canadian Campus Survey. *J Am Coll Health.* 2001;50(2):67–72.

23. Cheng SH, Shih C-C, Lee, IH, et al. A study on the sleep quality of incoming university students. *Psychiatry Res.* 2012;197(3):270–274.

24. Ahrberg K, Dresler M, Niedermaier S, Steiger A, Genzel L. The interaction between sleep quality and academic performance. *J Psychiatr Res.* 2012;46(12):1618–1622.

25. Angelone A, Mattei A, Sbarbati M, Orio F Di. Prevalence and correlates for self-reported sleep problems among nursing students. *J Prev Med Hyg.* 2011;52(4):201–208.

26. Christensson A, Vaez M, Dickman PW, Runeson B. Self-reported depression in first-year nursing students in relation to socio-demographic and educational factors: a nationwide cross-sectional study in Sweden. *Soc Psychiatry Psychiatr Epidemiol.* 2011;46(4):299–310.

27. Kulsoom B, Afsar NA. Stress, anxiety, and depression among medical students in a multiethnic setting. *Neuropsychiatr Dis Treat.* 2015;11:1713–1722.

28. Zyga S. Stress in nursing students. *Int J Caring Sci.* 2013;6(1). [1-1].

29. Reeve KL, Shumaker CJ, Yearwood EL, Crowell NA, Riley JB. Perceived stress and social support in undergraduate nursing students' educational experiences. *Nurse Educ Today.* 2013;33(4):419–424.

30. Nechita F, Nechita D, Pîrlog MC, Rogoveanu I. Stress in medical students. *Rom J Morphol Embryol.* 2014;55(3 Suppl):1263–1266.

31. Ray I, Joseph D. Stress in medical students. *JK Sci.* 2010;12(4):163–164.

32. Abdulghani HM, AlKanhal AA, Mahmoud ES, Ponnamperuma GG, Alfaris EA. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *J Health Popul Nutr.* 2011;29(5):516–522.

33. Troyer D, Ullrich IH, Yeater RA, Hopewell R. Physical activity and condition, dietary habits, and serum lipids in second-year medical students. *J Am Coll Nutr.* 1990;9(4):303–307.

34. Maslach C. Job burnout. *Annu Rev Psychol.* 2001;52:397–422.

35. Ishak W, Nikravesh R, Lederer S, Perry R, Ogunyemi D, Bernstein C. Burnout in medical students: a systematic review. *Clin Teach.* 2013;10(4):242–245.

36. Cohen S, Janicki-Deverts D. Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 20091. *J Appl Soc Psychol.* 2012;42(6):1320–1334.

37. Abdulghani HM, Al-Harbi MM, Irshad M. Stress and its association with working efficiency of junior doctors during three postgraduate residency training programs. *Neuropsychiatr Dis Treat.* 2015;11:3023–3029.

38. Rubin R. Recent suicides highlight need to address depression in medical students and residents. *J Am Med Assoc.* 2014;312(17):1725–1727.

39. Yousuf A, Ishaque S, Qidwai W. Depression and its associated risk factors in medical and surgical post graduate trainees at a teaching hospital: a cross sectional survey from a developing country. *J Pak Med Assoc.* 2011;61(10):968–973.

40. Louzada R de CR, Silva Filho JF da. Formação do pesquisador e sofrimento mental: um estudo de caso. *Psicol Estud.* 2005;10(3):451–461.

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