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Psychosocial and health-related stressors faced by undergraduate medical students

Fatores de estresse psicossociais e relacionados à saúde enfrentados por estudantes de medicina

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ABSTRACT: Stress is common among medical students and is associated with increased risk of burnout, anxiety and depression, alcohol and drug abuse, social difficulties, suicidal ideation and suicide. The purpose of this literature review was to identify the sources of stress in undergraduate medical students. In order to achieve that, we conducted a search for papers published in the Medline database from 2003 to 2014. Due to the extension of sources of stress identified in this population and our interest on the subject, we chose to include only papers that addressed specifically two main categories of stressors: psychosocial and/or health-related. We divided the psychosocial sources into four groups: social, familial, infrastructural and not specified. Among the most relevant social sources, we found loneliness, social isolation, interpersonal conflict, social relationships and worry about the future. Familial sources of stress included high parental expectation, family problems and financial problems. Among the infrastructural sources, we found relevance for absence of an optimal place to study outside the university and accommodation away from home, particularly for first-year students and for males. Few studies have focused on health-related sources of stress. The most relevant sources of health-related stress were the quality of food in mess and sleeping difficulties. While the relevance of some sources varied according to the medical school, the importance of some sources such as quality of food in mess, sleeping difficulties and worry about the future was consensual among the studies. Of relevance is the fact that most of these sources of stress can be reversed. For example, a healthy relationship has been reported to protect against stress; thus, programmes aimed at the improvement of students' relationships may be effective in decreasing the stress associated with loneliness, social isolation and interpersonal conflict. The relevance of a stressor should be evaluated in each school taking into consideration the influence of its context peculiarities. Although several studies have reported the sources of stress, studies looking specifically at each source, investigating its impact, related factors and feasibility of change are warranted.

KEYWORDS: Stress, psychological; Students, medical/psychology; Social support; Adaptation, psychological; Health education/standards.

RESUMO: O estresse é comum entre os estudantes de medicina e tem sido associado com aumento do risco de *burnout*, ansiedade e depressão, abuso de álcool e drogas, dificuldades sociais, ideação suicida e suicídio. O objetivo desta revisão de literatura foi identificar as causas de estresse em estudantes de medicina. Para isso, realizamos uma busca por artigos publicados na base de dados *Medline*, de 2003 a 2014. Devido à extensão das fontes de estresse identificados nesta população e nosso interesse sobre o assunto, optamos por incluir apenas trabalhos que abordaram especificamente duas principais categorias de estressores: os psicossociais e os relacionados com a saúde. Dividimos as fontes psicossociais em quatro grupos: sociais, familiares, de infra-estrutura e não especificados. Dentre as causas sociais mais relevantes, encontramos solidão, isolamento social, conflitos interpessoais, relações sociais e preocupação com o futuro. As causas familiares de estresse incluíram alta expectativa dos pais, problemas familiares e problemas financeiros. Entre as causas de infra-estrutura, encontramos relevância para a ausência de um lugar ideal para estudar fora da universidade e alojamento longe de casa, especialmente para alunos do primeiro ano e para o sexo masculino. Poucos estudos têm focado nas causas de estresses relacionados com a saúde. As causas mais relevantes relacionadas à saúde foram qualidade ruim dos alimentos e dificuldades com o sono. Enquanto a relevância de algumas causas de estresse variou de acordo com a faculdade, a importância de algumas causas foi consensual entre os estudos, tais como: qualidade ruim de alimentos, dificuldades com o sono e preocupação com o futuro. Destacamos como relevante o fato de que a maioria das causas de estresses encontradas podem ser revertidas. Por exemplo, uma relação saudável tem sido relatada como proteção contra o stress; portanto, programas que visam a melhoria das relações entre os alunos podem ser eficazes em diminuir o estresse associado à solidão, isolamento social e conflitos interpessoais. A relevância de um estressor deve ser avaliada em cada faculdade, levando em consideração a influência das peculiaridades do seu contexto. Embora vários estudos tenham relatado as causas de estresse, são necessários estudos que enfoquem especificamente cada causa, investigando seu impacto, fatores relacionados e, a viabilidade de mudança.

DESCRIPTORIOS: Estresse psicológico; Estudantes de medicina/psicologia; Apoio social; Adaptação psicológica; Educação em saúde/normas.

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INTRODUCTION

Being a medical student has been shown to predispose one to potential exposure to situations that may negatively influence health and life¹. Stress is common among medical students, which increases the risk of burnout², anxiety and depression³⁻⁴, alcohol and drug abuse⁵, social difficulties, suicidal ideation⁶ and suicide⁷. It is notable that both depression and alcohol-related problems are more prevalent among doctors than in the general population⁸.

Medical students face various kinds of stressors during their training process, potentially disturbing their medical training⁹⁻¹⁰. They have been reported to have a prevalence of stress as high as 94%¹¹. Compared with other students, medical students have shown themselves to be more stressed and to have a greater tendency for social isolation^{9,12}. It is also known that stress may affect academic performance¹³; poor academic performance of medical students is directly related to higher levels of stress¹⁴.

The term 'stress' is used in the literature in different ways. In general, stress refers to the body's non-specific response to demands made upon it, and the disturbing events in the environment that generate such demands¹⁵. Increased levels of stress may be related to students' personal aspects (i.e. internal sources) such as personality traits, neuroticism and conscientiousness¹⁶, or related to the medical school training¹⁷, familial, social and other sources of external origin (i.e. external stressors).

It is well known that having good mental health and internal resources is necessary to be a good physician, with empathy, professionalism and tolerance to frustration⁸. However, the maintenance of good mental health and use of coping abilities to undertake alleviation strategies should begin in the undergraduate period. In particular, students should first be able to identify the sources of stress, including both personal and not personal (i.e. external)¹⁸. Due to the extension of the subject, we opted to focus this review on external sources of stress, which also have a great range of factors, including academic, psychosocial and health-related ones. Consequently, we restricted this review to psychosocial and health-related stressors. The definition of this focus was based on our personal interest in the subject. We think that similar reviews focusing on personal and academic sources of stress are also necessary and we hope this can be done soon. We consider stress related to personality characteristics, mental disorders and/or psychological states as internal stressors, therefore they were not included in this literature review. Besides helping students to use coping strategies¹⁸, the identification of the sources of stress at medical school can further assist the

development of strategies/programmes to decrease and/or prevent the sources of stress and possibly contribute to solving problems related to poor academic performance¹⁴.

METHODS

We reviewed the literature using the NCBI-PubMed database searching English publications from 2003 to 2014 with the terms 'sources', 'stress' and 'medical students'. The preliminary scan revealed 60 papers. We included papers that specifically studied psychosocial and health-related sources of stress for undergraduate medical students. We excluded papers focusing only on gender issues (n=3), on academic sources of stress (n=2), on a specific period (e.g. during a period of terror in the country) (n=2), on a specific activity (during clinical practice) (n=1) or on sources of conditions other than stress (e.g. source of anxiety or source of distress) (n=2), focusing on strategies to resolve stress (e.g. an association between stress coping styles) (n=1), papers that studied other undergraduate students (n=18) and papers evaluating programmes (n=16). We also excluded papers focusing on students' personal difficulties such as personality traces/disorders and mental disorders (n=4). We did not get access to the full text of two papers^{19,20}. We identified a total of nine that satisfied our criteria and could be used in this review. We added one extra relevant paper that had been mentioned in the retrieved articles¹². Thus, this review was based on 10 papers.

RESULTS

Analyzing the studies, we concluded that the sources of psychosocial stressors could be divided into four types: social stressors, familial stressors, infrastructural stressors and not specified stressors. Regarding the health-related source of stressors, we did not identify subgroups.

Psychosocial stressors

Social stressors

Among the social stressors (Table 1), **loneliness** has been reported to be the most frequent source of stress by 41% of the students in one study and by 44.3% in another study^{21,22}; in contrast, in another study it was considered as a source of stress by only 19.8% of the students, and was the lowest source of stress¹³. Increase in **social isolation** from the beginning to the end of medical school has also been reported as a relevant source of stress¹². Complementarily, it has been reported that medical students who had close friends to share their stresses and concerns were more frequently considered as being non-stressed than those without such a relationship¹⁵.

Table 1. Papers reporting psychosocial sources of stress: social

Author(s) and year	Instrument	Sample	Sources of stress										
			Loneliness	Social isolation	Interpersonal conflict	Social relationship	Personal competence	Difficulty in love relationships	Relations with the opposite sex	Security/Law & Order	Political situation in the country	General corruption in the country	
Schmitter et al., 2008	Trier Inventory for assessment of chronic stress	140 Medical students		Increase in social isolation from after beginning medical school to the end of medical school.									
Moffat et al., 2004	General Health Questionnaire	275 Medical students				Mean of 0.81	Mean of 1.53						
Shah et al., 2010	33-item list of potential stressors	200 Medical students	41% of students reported. The most frequent source of stress							24% of students reported		32% of students reported	
Sreeramareddy et al., 2007	General Health Questionnaire	407 Medical students	19.8% of students reported							18% of students reported		22.2% of students reported	
Saipamish, 2003	Focus group discussion; Thai Stress Test questionnaire	686 Medical students						Significantly more reported by students with stress					
Sohail, 2013	Survey questionnaire Stress test to address confounding factors for stress other than examination In-depth structured interviews	120 Medical students									97.0% of female students reported and 85.0% of males. Main source of stress.		90% of students reported. The most frequent source of stress
Yussuf et al., 2013	General Health Questionnaire - 12 (GHQ-12); 28-item source of stress questionnaire; Maslach Burnout Inventory (MBI); Mini International Neuropsychiatric Interview (MINI); COPE questionnaire (Brief COPE)	79 Medical students	44.3% of students reported							46.8% of students reported		55.7% of students reported	
Al-Dubai, 2011	Brief COPE scale	376 Medical and Medical students			54.3% of students reported. The most important source of stress								

Interpersonal conflict was considered the most important source of stress in one study²³. In another study, **social relationship** was considered a relevant source of stress (mean of 0.81), while other sources such as **personal competence** had a mean of 1.53 and **accommodation away from home** a mean of 0.66²⁴. Students with stress have more significantly reported **difficulty in love relationships** than those without stress²⁵. **Relations with the opposite sex** as a source of stress in the category 'often or always' was reported by 46.8% of the students in the first year of medical education in one study²² and by 24% of the students in another study²¹; contrasting, in another study it was reported by only 18%¹³.

General corruption in the country was reported as the most relevant source of stress in a study in Pakistan (90.0% of medical students identified it as the main source of stress)¹⁴. In the same study, '**security, law and order**' was considered one of the main source of stress by 97% of the females and by 85% of the males¹⁴. The **political situation** in the country was considered a source of stress in the category 'often or always' by 55.7% of students in Nigeria²², by 32% of students in Pakistan²¹ and by 22.2% of the students in Nepal¹³.

Familial stressors

With regard to familial sources of stress (Table 2), students with stress reported significantly more difficulty with **family problems** in one study²⁵; contrasting, in another study, familial problems were considered a source of stress in the category of 'often or always' by only 6.3% of the students and was one of the least frequent causes of stress¹³. Studies have reported no association of stress with **family health problems**²⁵ or **location of family**¹¹.

High parental expectations was rated as the most severe source of stress in one study²¹ and in two others as the most frequent stressor, reported by 86.1%²² and by 52.3% of students¹³. In contrast to these results, a study found that students with family expectations of high marks showed an odds ratio of 0.39 of being stressed, compared with students whose family did not have high expectations, although in the crude analysis, stressed students more frequently had parents with high expectations than non-stressed students¹⁵.

The relevance of **financial issues** as a source of stress varies between studies. Students considered finance as the most important source of stress in one study²³, and in another it showed the highest mean scores (0.99) among psychosocial stressors²⁴. In contrast, stress was not associated with family income¹¹ and financial problems²⁵

in other studies. In addition, only 14.1% of students considered financial strain in the category of 'often or always', and this was not included among the most frequent sources of stress¹³. Complementarily, only 15.2% of students in the first year of medical education considered financial instability in the family a source of stress, and it was among the lowest sources of stress²².

Infrastructural stressors

With regard to infrastructural stressors (Table 3), **accommodation away from home** was considered a source of stress by 25.9%¹³ and 35%²¹ of students, and was the highest psychosocial source of stress in one study²¹. It was considered a relevant source of stress for first-year students¹¹ and mostly for male students²⁴. **Difficulties with accommodation** were reported as a source of stress by 21.5% of first-year students²². It was shown that students with an optimal **place for studying outside the university** had an odds ratio of 0.35 of being stressed compared to those not having such a place¹⁵. **Difficulty in the journey back home** was evaluated in three studies and was considered as a source of stress respectively by 34%²¹, 30.4%²² and 25.8% of the students¹³. Complementarily, 66.7% of students identified **unavailability of transportation** as a source of stress and 58.3% identified traffic jams as a source of stress¹⁴.

Not specified

We identified two psychosocial stressors that we could not include in the above categories (Table 4). In one study, the **hearing of bad news** was considered the most important stressor and was reported as a source of stress by 58.5% of students²³. Four studies evaluated **worrying about the future** as a source of stress. This was reported as a source of stress by 58.2%²² and 71.0%²³ of students, and was the most frequent source of stress in one study²³ and the most severe source of stress in two studies^{13,21}. Importantly, among first-year students, the relevance of **worrying about the future** as a source of stress was not different between students with and without morbidity²².

Health-related stressors

Among health-related stressors (Table 5), **quality of food in mess** was considered the most frequent source of stress by three studies^{13,21,22} and the most severe in one study¹³. **Sleeping difficulties** was reported as the most severe stressor and was classified as 'often and always' by 48%²¹, 38%²² and 25.3%¹³ of medical students.

Table 2. Papers reporting psychosocial sources of stress: familial

Author (s) and year	Instrument	Sample	Sources of stress					
			Financial issues	High parental expectations	Family problems	Family health problems	Location of family	
Reang; Bhattacharjya, 2013	General Health Questionnaire	146 Medical students	No significant association of psychological stress with family income					No significant association of stress with location of family
Moffat et al., 2004	General Health Questionnaire	275 Medical students	Mean of 0.99					
Shah et al., 2010	Demographic information and academics, perceived stress scale, 33-item list of potential stressors	200 Medical students		Rated as most severe source of stress				
Sreeramreddy et al., 2007	General Health Questionnaire	407 Medical students	14.1% of students reported	52.3% of students reported . The most frequent source of stress	6.3% of students reported			
Rahman et al., 2013	Self administered questionnaire	244 Medical students		0.39 odds of being stressed compared with students whose family did not have high expectation				
Yussuf et al., 2013	General Health Questionnaire - 12 (GHQ-12); 28-item source of stress questionnaire; Maslach Burnout Inventory (MBI); Mini International Neuropsychiatric Interview (MINI); COPE questionnaire (Brief COPE)	79 Medical students	15.2% of students reported	86.1% of students reported				
Saipanish, 2003	Focus group discussion; Thai Stress Test questionnaire	686 Medical students	No significant association of stress status with financial problems		Students with stress reported significantly more difficulty	No association between stress status and family health problems		
AL-Dubai, 2011	Brief COPE scale	376 Medical and Medical students	68.6% of students reported. The most frequent source of stress					

Table 3. Papers reporting psychosocial sources of stress: infrastructural

Author(s) and year	Instrument	Sample	Sources of stress					
			Accommodation away from home	Accommodation at home	Difficulty with accommodation	Transportation / Difficulty in the journey back home	Place for studying outside university	
Reang; Bhattacharya, 2013	General Health Questionnaire	150 medical students, 146 completed the questionnaire	Predominantly experienced by the first-year students					
Moffat et al., 2004	General Health Questionnaire	275 Medical students	Male students had significantly higher scores for accommodation. Mean of 0.66	Higher severity mean among the psychosocial stressors				
Sreeramareddy et al., 2007	General Health Questionnaire	407 Medical students	25.9% of students reported			25.8% of students reported difficulty in the journey back home		
Sohail, 2013	Survey questionnaire Stress test to address confounding factors for stress other than examination In –depth structured interviews	120 Medical students				66.7% of students reported unavailability of transportation and 58.3% of students reported traffic jams as sources of stress		
Yussuf et al., 2013	General Health Questionnaire - 12 (GHQ-12); 28-item source of stress questionnaire; Maslach Burnout Inventory (MBI); Mini International Neuropsychiatric Interview (MINI); COPE questionnaire (Brief COPE)	79 Medical students			21.5% of students reported	30.4% of students reported difficulty in the journey back home		
Shah et al., 2010	Demographic information and academics, perceived stress scale, 33-item list of potential stressors	200 Medical students	35% of students reported			34% of students reported difficulty in the journey back home		
Saipanish, 2003	Focus group discussion; Thai Stress Test questionnaire	686 Medical students						
Rahman et al., 2013	Self administered questionnaire	244 Medical students						Odds ratio of 0.35 of been stressed compared to those not having such place

Table 4. Papers reporting psychosocial sources of stress: not specified

Author(s) and year	Instrument	Sample	Sources of stress	
			Hearing bad news	Worrying about the future
Sreeramareddy et al., 2007	General Health Questionnaire	407 Medical students		Rated as most severe source of stress
Yussuf, et al., 2013	General Health Questionnaire - 12 (GHQ-12); 28-item source of stress questionnaire; Maslach Burnout Inventory (MBI); Mini International Neuropsychiatric Interview (MINI); COPE questionnaire (Brief COPE)	79 Medical students		58.2% of students reported
Shah et al., 2010	Demographic information and academics, perceived stress scale, 33-item list of potential stressors	200 Medical students		Rated as most severe source of stress
Al-Dubai, 2011	Brief COPE scale	376 Medical and Medical students	58.5% of students reported. The most important sources of stress	71.0% of students reported. The most frequent source of stress

Table 5. Papers reporting health-related sources of stress

Author(s) and year	Instrument	Sample	Sources of stress	
			Sleeping difficulties	Quality of food in mess
Yussuf et al., 2013	General Health Questionnaire - 12 (GHQ-12); 28-item source of stress questionnaire; Maslach Burnout Inventory (MBI); Mini International Neuropsychiatric Interview (MINI); COPE questionnaire (Brief COPE)	79 Medical students	38% of students reported	68.4% of students reported. The most frequent source of stress
Shah et al., 2010	Demographic information and academics, perceived stress scale, 33-item list of potential stressors	200 Medical students	48% of students reported	35% of students reported. The most frequent source of stress
Sreeramareddy et al., 2007	General Health Questionnaire	407 Medical students	25.3% of students reported	60.4% of students reported. The most frequent source of stress and rated the most severe source of stress

DISCUSSION

In this review, we found that sources of psychosocial stressors could be divided into four types: social stressors, familial stressors, infrastructural stressors and not specified

stressors. Regarding health-related sources of stressors, we did not identify subgroups.

Among the social stressors, studies have highlighted

the relevance of **loneliness, social isolation, not having a close friend to share the stress, interpersonal conflict, social relationships, difficulty in love and relations with the opposite sex** as potential sources of stress. The relevance of **loneliness** varies among the studies; while it was the most relevant in two studies²¹⁻²², in another it was one of the least relevant¹³. Possibly, at the Manipal College of Medical Sciences in Nepal, where **loneliness** was not a relevant source of stress, the teaching method of focusing on simulated problems may facilitate integration among students and contribute to decreasing the condition of **loneliness** and its impact¹³. **Social isolation** has also been considered a relevant source of stress; however it has been evaluated in only one paper¹². Complementary to these data, having close friends to share stresses and concerns has been shown to be a protective factor against stress¹⁵. However, close relationships in general are not always a protection against stress; **interpersonal conflict**²³, **social relationships**²⁴, **difficulty in love**²⁵ and **relations with the opposite sex**²² have been reported as relevant sources of stress.

Social stressors may contribute to the perceived stress during the undergraduate years of medical education even if the source is not within the medical school. For example, **general corruption in the country** and ‘**security, law and order**’ were considered the main source of stress among medical students in two studies^{14,23}, underlining the relevance of specific cultural aspects of a country for the stress in medical students. Interestingly, the **political situation in the country** as a source of stress has been studied particularly in Asian countries^{13,21,22}.

The family may be a relevant source of stress in different ways, including **financial issues** and **high parental expectations**. **Financial issues** were assessed in six studies and were one of the most frequently investigated sources of stress^{11,13,22,23,24,25}. Intriguingly, its relevance varied considerably among the studies^{23,24}. Although there was no clear explanation, studies have investigated the influence of different financial aspects, which may explain part of this diversity. For example, the absence of an association between stress and **family income**¹¹ reported in one study does not preclude that students may have financial problems and that these may be a relevant source of stress. Additionally, the relevance of **financial issues** as a source of stress may be related to peculiarities of the educational system in a country. For example, medical education is free of charge for students in governmental medical schools in some countries, while it is paid for in other countries. The necessity of payment, even in public schools, may lead medical students to become plagued by financial worries, and may consequently be an important source of stress²⁶. Differences among the methods of assessment may also have contributed to some discrepancies in the results. For example, **family problems** were considered a significant source of stress in a study that used focal groups²⁵, but was

rarely reported as a source of stress in a study that used a questionnaire¹³. Thus, the detection of **family problems** as a stressor may not be automatic and focal groups²⁵ may be a good strategy for detecting this and other sources of stress. **High parental expectations** was considered one of the greatest stressors in three^{13,21,22} out of four studies¹⁵. The relevance of parental expectation is illustrated by one study in which the odds ratio of being stressed was greater for psychosocial factors (including parental expectation) than for academic factors²¹.

Infrastructural issues may also be a source of stress. **Accommodation away from home** is a relevant source of stress predominantly for first-year students¹¹. Over the following years, there was a decrease in the stress caused by **living away from home**¹¹. This decrease in stress may possibly be a consequence of successful coping strategies, support from colleagues and use of the school infrastructural system. With regard to gender, **living away from home** has been reported to be more stressful for males than females²⁴, a difference that was not explained by authors. The journey back home, traffic jams and unavailability of transportation were also considered sources of stress in various studies^{13,14,21,22}. Although the journey back home and commuting difficulties may be sources of stress for some students, having an optimal **place for studying outside the university** had an odds ratio of 0.35 of being stressed compared to those not having such a place¹⁵.

Health-related stressors have received little attention in the literature. There was a consensus among the studies that **quality of food in mess** was the most common stressor¹³⁻²¹. The importance of **sleeping difficulties** was also agreed in the literature^{11,13,21}. **Sleeping difficulties** is relevant for its potential impact on students’ performance and mental health. For example, sleep deprivation due to night shift work in medical students has been proven to have a negative impact on their attention performance²⁷, and medical students with sleep troubles have been reported to have an odds ratio of 5.96 for positivity in screening for psychiatric disorder²⁸.

The relevance of **worry about the future** as one of the most important sources of stress is agreed among the studies^{13,21,23}. Additionally, worrying about the future as a source of stress has been shown to be relevant for students both with and without morbidity²².

CONCLUSION

This review showed that during the undergraduate course, medical students are submitted to several sources of psychosocial and health-related sources of stress. We propose categorizing psychosocial stressors into four types: social stressors, familial stressors, infrastructural stressors and not specified to assist with their identification by students and teachers.

The importance of some sources of stress was

consensual in the literature, such as quality of food in mess, sleeping difficulties and worry about the future, while the relevance of other factors varied according to the medical school. Of relevance was the fact that strategic programmes can reverse most of the sources. For example, healthy relationships have been reported to protect against stress, thus programmes aimed at the improvement of students' relationships may be effective in decreasing the stress associated with loneliness, social isolation and interpersonal conflict. In other situations, identifying the source of stress, such as family problems or high parental expectations, allows students to develop strategies to cope with them and decreases their negative impact. Some sources of stress, such as quality of food in mess, deserve institutional changes. However, we cannot generalize these

results because few studies have investigated psychosocial sources of stress and most of them were from Asiatic countries.

The relevance of a stressor should be evaluated in each student and school taking into consideration the influence of its context peculiarities. Studies have been conducted aiming at the decrease of stress among medical students. However, studies investigating each source of stress, its impact, related factors and feasibility of change, are still warranted.

LIMITATIONS

The results of this review are limited by the heterogeneity in the methodology of the studies and the low number of studies in countries outside the Asiatic continent.

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