

Burnout in Medical Students: The Impact of Lifestyle and Health Behaviours in Development of Burnout

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Abstract

Background/Objective: There is an increased impact of burnout among medical students, with prevalence above 50%. Despite the contribution of demographic and personal factors, aspects related to the learning environment seem to be the most influential; therefore many organizational strategies have been developed. Studies have described associations between burnout and lifestyles or health behaviours, especially in doctors and residents. The aim of this work is to review the studies that directly investigate this relationship in medical students, to understand what behaviours can be adopted to prevent and reduce burnout.

Methods: A MEDLINE and Google Scholar review of the recent medical literature from January 2007, through September 2017, was conducted, using combinations of terms: burnout, burnout syndrome, and medical students.

Results: 10 cross-sectional studies, survey-based were included. The *Maslach Burnout Inventory* (MBI) was the screening instrument more used to evaluate burnout. Dysfunctional sleeping habits, low levels of physical activity, alcohol abuse/dependence, social activities involvement and being an ex-smoker were associated with higher risk of burnout. Music-related activities were correlated with better outcomes. Reading and dietary behaviour had an unclear association.

Conclusions: The use of different versions of the MBI and different criteria to evaluate common behaviours make these findings difficult to generalize. Strategies based on sleep education (sleeping 7-9 hours per night), increasing physical exercise, moderating alcohol consumption and practicing music-related activities may be helpful to prevent and reduce burnout. Further studies are required to better understand these relationships.

Keywords: Burnout; Physical Exercise; Drug Addicts; Emotional Exhaustion (EE); Maslach Burnout Inventory (MBI)

Introduction

Burnout is used as a metaphor for the draining of

energy and refers to the “smothering of a fire” or the “extinguishing of a candle” [1]. Freudenberg (1974), an American psychoanalyst, was the first to suggest this term

to describe the gradual emotional depletion, loss of motivation, and reduced commitment among many of the volunteers with whom he was working in free clinics for drug addicts and homeless people. Nearly at the same time, Maslach (1976), a social psychological researcher, while studying the ways in which human services workers cope with emotional arousal on the job, saw that they often felt emotionally exhausted, developed negative perceptions and feelings about their clients or patients, and experienced crisis in professional competence as a result of the emotional turmoil. So, like practitioners, Maslach and her colleagues adopted the term *burnout* to refer to this syndrome [1,2].

More than 40 years have passed since the term first appeared and still there isn't a generally valid and agreed definition of burnout. It is predominantly identified by Maslach's definition (1982): "Burnout is a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who work with people in some capacity" [3].

There are several burnout screening instruments available, among which the Maslach Burnout Inventory (MBI) is the most commonly used. It includes three subscales to assess the three dimensions of burnout - emotional exhaustion (EE) (feelings of being emotionally overextended and exhausted by the emotional demands of one's work), depersonalization (unfeeling, detached and impersonal response towards recipients of one's service or care) and personal accomplishment (PA) (feelings of competence and successful achievement in one's work with people) [3].

Unlike what was initially thought, researchers and practitioners recognized that burnout wasn't restricted to the human services related jobs, occurring also in workers without direct personal contact or with only casual contact with people. This change led to an update in the designation of the original MBI to MBI-Human Services Survey (MBI-HSS) and to the development of new versions of the MBI like MBI-General Survey (MBI-GS). In this scale, burnout is seen like a crisis in one's relationship with work or, in other words, "burnout is a state of exhaustion in which one is cynical about the value of one's occupation and doubtful of one's capacity to perform".

It also includes three subscales parallel to those of MBI - exhaustion (emotional and physical fatigue), cynicism (indifference or a distant attitude towards work) and professional efficacy (PE) (satisfaction with past and

present work accomplishments and individual's expectations of continued effectiveness at work) [3].

Medical education is a long process in which students are constantly exposed to multiple stressors that can persist and lead to burnout. In fact, publications about burnout in medical students increased exponentially over the last years. Studies reported a significant prevalence of burnout in medical students and this is a global picture: in the USA, studies show that, at least, 50% of medical students have burnout [4-6].

Despite this burden, medical students start their path in medical school with similar or better mental health than age-similar colleague graduates pursuing other careers: they have lower rates of burnout and depression symptoms and higher scores in quality of life domains (mental, emotional, physical, overall). This further supports the negative impact of the training process and atmosphere on the deterioration of mental health in medical students and that being a physician is a high-risk profession [7].

A complex array of factors may contribute to this phenomenon including demographic factors, personal constraints, and the learning environment. Regarding demographic factors associated with burnout, social minorities students seem to experience less burnout than those in non-minorities groups. However, social minorities students who felt racial discrimination or prejudice, isolation, and cultural differences were also more likely to have burnout [8]. A study made with the specific intent to find gender differences in academic stress and burnout reported no significant differences between males and females, although female students seem to be more vulnerable to stress [9]. In a lot of studies being male was significantly related to increased burnout risk [7,10]. Considering personality factors, high burnout in medical students is predicted by impulsivity traits and it is also correlated with higher levels of neuroticism [10,11]. In relation to life events, a study found that students who experienced one or more positive life events had less burnout but couldn't show that experiencing negative life events predicted a higher risk of burnout. However, the same authors had previously reported that negative life events, particularly the personal experience of serious illness in the last 12 months, were associated with burnout [12,13]. Financial concerns and depressive symptoms during the first-year are risk factors for third-year burnout [11]. Regarding the learning environment, dissatisfaction with the overall experience and the perceived level of support provided by the faculty, a clerkship organization in which students

have to be on hospital ward rotations or on rotations requiring overnight calls and having a cynical resident, seemed to have a critical association with burnout [12]. Besides that, grading schemes with three or more categories rather than a strict approve or fail system were correlated with an increased risk of burnout [14]. The role of the workload in medical students burnout is controversial: although a multicenter study didn't find a relation between workload characteristics and students burnout [12], a prospective study showed that workload in the third-year was a significant predictor for burnout in that year [11]. Recurrent mistreatment by faculty or by residents was another factor that literature proved to be associated with high burnout in medical students [15]. Between all the contributive factors, the learning environment aspects seem to have the greatest influence in medical students burnout [12].

As expected, burnout leads to important consequences that affect not only the personal sphere but also the professional one. In relation to professionalism, data suggests that medical students with burnout are more likely to engage in one or more unprofessional behaviours, like cheating, as well as in dishonest clinical behaviours. They are also less likely to hold altruistic views regarding a physicians' responsibility to society, including personally wanting to provide care for medically underserved [16]. Even residency specialty choice can be influenced by burnout: choosing a specialty that allows a more controllable lifestyle is associated with being burnt-out, with a particularly higher level on the EE subscale, while choosing a higher-income specialty is associated with lower degree of PA - although this correlation is weaker [17]. Moreover, a number of studies already showed an association between higher burnout and lower medical students empathy scores [18-20]. Burnout at baseline predicts serious thoughts of dropping out of medical school in the following year (threefold increased risk) [21], and it also predicts suicidal ideation over the following year (two to threefold increased risk) [22]. It's important to note that many medical students experience more than one manifestation of distress, including burnout, depressive symptoms, stress, poor quality of life and fatigue, and the more forms of distress experienced the greater the risk for suicidal ideation and thoughts of dropping out of medical school [6].

The above mentioned problem can take even bigger proportions if we think that only a third of medical students with burnout seek help. Students with burnout have higher perceived stigma scores (as if it is a sign of personal weakness or inadequacy to receive treatment for

an emotional/mental health problem) and greater fears of discrimination and of confidentiality breaches (for example, students with burnout were more likely to agree that the dean and residency program directors could access their personal medical record and that seeking care for an emotional/mental health problem might end up in their academic record) [23].

Despite the magnitude of this problem reversibility of burnout in medical students is possible. A longitudinal study shows that 26,8% of the students with burnout at the baseline were no longer burnt-out at one-year follow-up without any specific intervention [22]. There are some factors that promote recovery from burnout such as: perceiving student education as a priority for faculty staff, experiencing less stress and fatigue, not being employed and being a minority [24]. Furthermore, recovery from burnout is associated with markedly less suicidal ideation [22] and less serious thoughts of dropping out [21].

While some students with burnout can recover within a year, 73.2% remain burnt-out at one-year follow-up; as only a little part of those will seek help, a higher number will develop the serious consequences of this continuum threatening syndrome [22]. In order to mitigate those consequences, it is important to introduce early interventions during the medical education.

Since the learning environment seems to be the major contributive factor, medical schools should be able to provide specific improvements in this area, like adapting approve or fail grading in preclinical years; reorganize a large group of students into smaller learning communities to build group cohesion and social support; include organization of rotation, opportunity for meaningful work, adequacy of supervision, perceived support, learning atmosphere and other controllable factors during program evaluation; monitor and respond to absences to support trainees during major life events and facilitate detection of distress; organize social activities to foster peer-peer and peer-faculty relationships; and promote a culture of no tolerance of mistreatment [25]. Educating trainees and faculty staff about confidentiality policies and procedures and monitor and respond to reports of discrimination due to mental health problems may help reduce the stigma of mental health problems and barriers to seek for help [25].

Research has described associations between burnout and lifestyle and health behaviours. A multinational study with a sample of 627 doctors, 1431 nurses and 565 residents from seven European countries (including

Portugal) shows that burnout was significantly positively associated with fast food consumption, alcohol drinking and painkillers usage and negatively associated with frequency of weekly exercise [26]. Some studies have also directly investigated the relationship between burnout, lifestyle, and modifiable health behaviours in medical students. Considering that organizational-level strategies are often difficult to implement, it's important to understand this relationship because these behaviours can be included in personal strategies focused on preventing and reducing burnout. Thus, the aim of this study is to review the current knowledge about the association between lifestyle or health behaviours and burnout in medical students.

Methods

A MEDLINE and Google Scholar review of the recent medical literature, written in English and Portuguese, from January 1, 2007, through September 26, 2017, using combinations of medical subject heading (MeSH) terms - burnout, burnout syndrome and medical students - was conducted.

Papers were critically reviewed in a three-stage process (Figure 1). In stage one, titles and abstracts were reviewed. Then, studies addressing the prevalence and correlations of medical student burnout, lifestyle and modifiable health behaviours on medical students were selected. In stage two, the full text was analysed to ensure that these articles directly investigated the relationship between burnout and lifestyle or modifiable health behaviours and so were relevant to the aim of this study. In stage three, the references of included articles were reviewed to find other relevant studies. In this stage, other found pertinent studies were included.

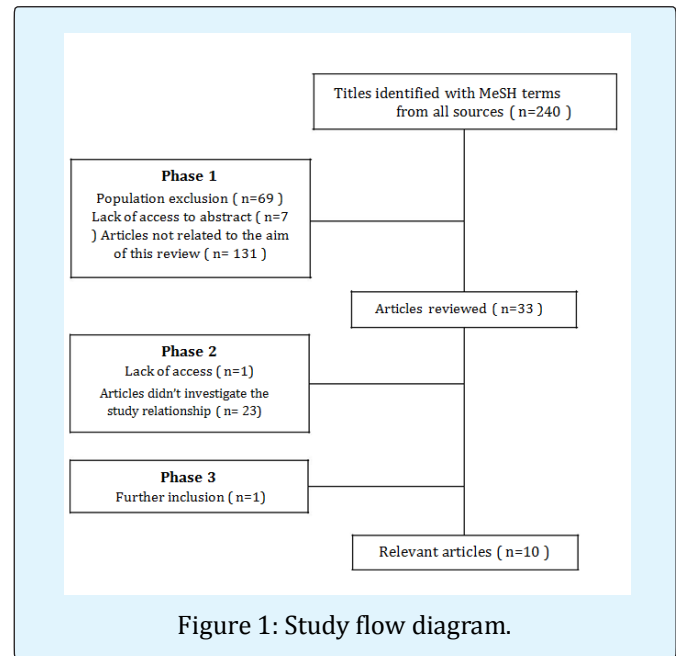
Inclusion Criteria

Studies containing original information, quantitative or qualitative, evaluating a potential association of behaviours with overall burnout or some dimensions of burnout in a medical student population were included.

Exclusion Criteria

This review is focused on medical students. All studies that also included medical doctors, residents or interns were not included. Studies about organizational-level strategies to prevent and reduce burnout were avoided. This review was limited to analysed burnout although some studies also assessed other psychiatric disorders like anxiety, depression and distress. Fourteen studies

were excluded because they could not be accessed.



Results

After a review of the 240 papers in a three-stage process and the inclusion of one more study in stage three, 10 studies remained as relevant according to the aim of this work. Four studies examined the prevalence of burnout and associated factors while the other six directly investigated the relationship between one or more health behaviours and burnout. Three studies exclusively examined students from preclinical years whereas in the others all students were considered for the sample. These studies analysed eight different lifestyles and modifiable health behaviours (Table 1). A summary description of each study is presented below.

Wolf MR and Rosenstock JB studied the association between sleeping habits, exercise, depression, and burnout. They ran web-based questionnaire surveys from first- to fourth-year medical students in two time periods: in the beginning of the school year and in the middle of the same school year. The MBI-GS was used as a burnout measurement tool within its three subscales: exhaustion, cynicism, and professional efficacy. Using these subscales, burnout could be reported as tri-dimensional (high-risk screen on three subscales) or as bi-dimensional (high-risk screen in the two of the three subscales). The response rate was 28.7% in the beginning of the year and decreased to 22.6% in the middle of the same school year

without significant difference between the cohorts. The rates of burnout were 58.6% in the beginning of the year and 49.2% in the middle of the year when burnout was reported as bi-dimensional. When burnout was reported as tri-dimensional the rates of burnout decreased to 22.4% and 19.2% in the beginning and in the middle of the year respectively. Regarding sleep, they showed that sleeping 7-9 h per night had significantly lowered the risk of low PE and exhaustion than sleeping less than 7h per night. Sleeping less than or equal to 5h per night and pathological sleepiness significantly increased the risk and consequently the prevalence of burnout in all the three subscales. Considering exercise, they demonstrated that lower exercise frequency was significantly correlated with lower PE and with a higher risk of exhaustion, a difference that trended towards significance ($p=0.06$). In the multivariate analysis, sleeping less than 7h per night and pathological sleepiness were independent predictors of burnout – the first one in the exhaustion subscale and the second in exhaustion and cynicism subscales. Increased exercise frequency wasn't a significant predictor of burnout but in the PE subscale it tended toward significance [27].

Jackson ER, et al. conducted a cross-sectional study to explore the relationship between alcohol abuse/dependence with burnout and other forms of distress. The MBI-HSS was used to evaluate burnout with its three dimensions. Participants who scored high on either the EE (≥ 27) or depersonalization (≥ 10) subscale were considered to have burnout. They obtained a response rate of 35.2%. In this study, 32.4% of the students who completed the Alcohol Use Disorders Identification Test met diagnostic criteria for alcohol abuse/dependence. They found a higher prevalence of alcohol abuse/dependence among medical students with burnout, high EE, high depersonalization, depression and low mental and emotional quality of life. In the multivariable analysis to identify factors independently associated with an increased risk of alcohol abuse/dependence burnout was one of the factors that remained associated [28].

Youssef FF, led a study to explore the prevalence of stress, burnout, and depressive symptoms and associated risk factors through a correlational cross-sectional design. The MBI-HSS was used to evaluate burnout and students with high scores on either the EE (≥ 27) or depersonalization (≥ 13) subscale were considered to have burnout. The response rate was 85%. The prevalence of burnout in the study sample was 53%. Regular physical exercise practice was one of the

associated risk factors studied with a 3-point Likert scale ("I exercise on a regular basis" – agree, disagree, neither). Regarding this factor, the author observed that students who exercise regularly had significantly lower rates of burnout in comparison to students who didn't exercise on a regular basis (49% vs. 62%) [29].

Arbabisarjou A, et al. investigated the relationship between sleep quality, social intimacy, and academic burnout through a descriptive and correlational study. Social intimacy was defined as the creation of intimacy with people or the ability for openness of and participation in bilateral relationships with other people. Berso, et al. Academic Burnout Questionnaire was used to assess the three dimensions of academic burnout – academic fatigue, lack of academic interest and academic failure. The results showed a significant relationship between sleep quality and academic burnout and between social intimacy and academic burnout, both with a significance level of 0.001. Moreover, the multiple regression analysis demonstrated that both behaviours are predictive factors of academic burnout in medical students, explaining 30% of the variance – each one explained 15% of the variance. The authors concluded that if sleep quality and social intimacy are higher, people are less likely to suffer from burnout [30].

Fares J, et al. conducted a cross-sectional survey to evaluate the prevalence of burnout and distress among preclinical medical students and the correlation between these and the extracurricular activities/life. They used the MBI-Student Survey (MBI-SS) to measure burnout, a modified version of MBI-GS that was adapted to be used in students. This scale also includes three subscales: EE (severe fatigue caused by emotional demands), cynicism (students' mental distance from classes) and academic efficacy (academic accomplishment). The presence of burnout was defined by the high scores on EE, cynicism and low scores on academic efficacy. To assess distress level, the 12-item General Health Questionnaire was used where a score ≥ 3 indicated distress. The prevalence of burnout and distress was 75.2% and 61.8%, respectively. In the whole sample, 76% of the students reported participating in extracurricular activities. Regarding these, in bivariate analysis, reading had a significant association with high EE; music-related activities were significantly associated with low burnout and with low academic efficacy; social activities were significantly correlated with low cynicism but also with low academic efficacy; and physical exercise was associated with low stress but not with burnout. Correlations between music-related activities and low

burnout, as well as social activities and low academic efficacy were the only which remained significant in logistic regression multivariate analysis [31].

Cecil J, et al. examined whether health behaviours such as alcohol consumption, physical activity, diet and smoking predict burnout in medical students from two medical schools. MBI-HSS was the tool used to measure burnout and a high score in EE (≥ 27) and depersonalization subscales (≥ 10) identified participants as having burnout. The response rate was 27.2% and 10.5% from St Andrews and from Manchester students, respectively. 26.7% of the medical students met the burnout criteria and 54.8% reported high levels of EE and 34% high levels of depersonalization, and 46.6% reported low levels of PA. The authors conducted a multiple linear regression analysis to test the hypothesis in the study. Regarding alcohol use, higher alcohol binge scores were significantly associated with higher PA. Low levels of physical activity, in comparison to high levels, significantly predicted higher EE scores and moderate or low levels of physical activity were also significant predictors of lower PA score. This was the most predictive of all the lifestyle and health behaviour variables. In relation to diet, although sweet food consumption scores (foods high in fat and sugar) were important to explain the variance of EE scores and savoury food consumption scores (foods high in fat) were important to explain the variance of depersonalization scores, usual dietary behaviour was not found to be a significant predictor of burnout. The number of participants that reported being ex-smokers (6.2%) or current smokers (5.1%) was too small. The multiple regression analysis showed that being an ex-smoker in comparison to having never smoked significantly predicted higher EE scores. The authors concluded that these health behaviours, particularly physical activity, predict burnout dimension scores in medical students [32].

Pagnin D, et al. developed a cross-sectional study to assess the mutual influence between burnout and sleep disorders in preclinical medical students. To evaluate burnout, they used the MBI-SS within each of three subscales, considering it as a continuous variable and a regular occurrence of burnout dimensions was established by mean scores greater than or equal to 4. The response rate was 87.6%. Burnout and sleep disorders were shown to be prevalent in medical students: 59.8% had a regular occurrence of EE, 64.6% and 62.9% had moderate/severe difficulties in sleep quality and a pathological daytime sleepiness, respectively. The first logistic regression using sleep quality and daytime

sleepiness as independent variables to burnout showed that poor sleep quality was strongly and significantly associated with cynicism. Between the seven components of sleep quality evaluated (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, and daytime dysfunction) only daytime dysfunction was correlated with cynicism. This analysis also showed that pathological daytime sleepiness was significantly associated with increased EE and decreased academic efficacy. Insufficient sleep (considered as less than or equal to 7h per night) was present in 80% of the total sample, in 79% of those with daytime sleepiness and in 86% of emotionally exhausted students. They performed a second logistic regression now using the burnout dimensions as independent variables. They verified that EE was the only dimension significantly and positively associated with pathological daytime sleepiness. Associations between burnout dimensions and moderate/severe difficulties in sleep quality weren't found. Therefore, the authors concluded that EE and pathological daytime sleepiness had a bidirectional influence while pathological daytime sleepiness and daytime sleep disturbances were linked unidirectionally with academic efficacy and cynicism, respectively [33].

Costa E, et al. conducted a study to evaluate the prevalence of burnout, to identify associated factors and also analysed the association between physical activity and burnout. The MBI-SS and a system of score with the values of each burnout's subscale were used to measure and classify burnout in low, moderate or high level. Criteria to be considered as having burnout were met by 10.3% of the students. 52.2% of the students reported regular practice of physical activity. A bivariate analysis did not find a significant association between physical activity and burnout. There was no significant difference between students who practiced and students who did not practice physical activity with burnout [34].

Mazurkiewicz R, et al. administered a cross-sectional survey to assess the prevalence of burnout and correlated factors in preclinical years. The MBI-GS was the instrument used to screen burnout and it was present if a high score in exhaustion (>3.2) or cynicism (>2.2) subscale was obtained. The response rate was 70%. They observed that 71% of the students met the criteria for burnout and those were significantly more likely to have pathological daytime sleepiness [35].

Santen A, Holt D, Kemp J and Hemphill R, evaluated the association between inadequate sleep and burnout in a

study made to determine the prevalence of burnout and its contributing factors. The MBI-HSS was used to assess burnout and it was defined as a high degree (high scores on EE and depersonalization subscales and low scores on PA subscale) or a moderate degree (moderate or high scores on EE and depersonalization subscales, with low or moderate scores on PA subscale). The response rate was 78%. A moderate or high degree of burnout was present

in 33% of the students. In the whole sample, students felt receiving adequate sleep only three nights per week. In univariate analysis, a higher number of nights per week with inadequate sleep was significantly associated with burnout. However, in multiple logistic regression, nights without sleep weren't a significant contributor to risk of burnout [36].

	Number	Year	Sample	Scales	Health behaviors and lifestyle studied	Significant correlations with burnout
2017, Wolf MR & Rosenstock JB. [27]	190 and 149	Fall 2012 and Winter 2013	Medical students at the University of Pittsburgh School of Medicine, at the beginning of the school year and at the middle of the same school year	MBI-GS ESS GLTEQ	Sleep duration	Sleep 7-9 h per night: lower risk of exhaustion and low professional efficacy Sleep less than or equal 5h per night: higher levels of all three dimensions of burnout
					Pathological daytime sleepiness	Higher levels of burnout in all dimensions
					Low exercise frequency	Lower levels of professional efficacy
2016, Jackson ER, et al. [28]	4402	2012	Medical students listed in the American Medical Association's Physician Masterfile	MBI-HSS AUDIT-C	Alcohol abuse/dependence	Higher prevalence among medical students with burnout, high emotional exhaustion and high depersonalization
2016, Youssef FF, [29]	381		Medical students of the Faculty of Medical Sciences, The University of the West Indies, Trinidad and Tobago	MBI - HSS 3- pLS	Regular physical exercise	Lower levels of burnout
2016, Arbabisarjou A, et al. [30]	196		Medical students of Tabriz University of Medical Sciences, Iran	Berso et al. Academic Burnout Questionnaire e PSQI MSIS	Sleep quality	Significant relationship with academic burnout: higher sleep quality, less academic burnout
					Social intimacy	Significant relationship with academic burnout: higher sleep quality, less academic burnout
2016, Fares J, et al. [31]	165	Jan-15	Preclinical medical students from Faculty of Medicine at the American University of Beirut, Lebanon	MBI-SS	Physical exercise	No significant association with burnout.
					Music-related activities	Lower levels of burnout.
					Reading	Higher levels of emotional exhaustion.
					Social activities	Lower levels of cynicism.
2014, Cecil J, et al. [32]	356	2012	Medical students at the Universities of St Andrews and Manchester, UK	MBI-HSS AUQ IPAQ FFQ	Alcohol consumption - higher alcohol binge scores	Higher levels of personal accomplishment.
					Physical activity	Low levels of physical activity: higher emotional exhaustion scores. Moderate or low levels of physical activity: lower personal accomplishment scores
					Dietary behavior	No significant association with burnout

					Smoking status - Ex-smokers (VS never smokers)	Higher emotional exhaustion scores
2014, Pagnin D, et al. [33]	127	?	Preclinical medical students(second-year) in the Fulminense Federal University Niterói, Brazil	MBI-SS PSQ ESS	Poor sleep quality	Strongly associated with high levels of cynicism
					Pathological daytime sleepiness	Higher levels of emotional exhaustion and lower levels of academic efficacy
2012, Costa E et al. [34]	369	October to December 2009	Medical students at the Universidade Federal de Sergipe, Brazil	MBI-SS	Physical activity	No significant association with burnout
2012, Mazurkiewicz R, et al. [35]	86	2008/2009 academic year	Preclinical medical students (beginning of third-year) at the Mount Sinai School of Medicine, New York	MBI-GS ESS	Pathological daytime	Students in burnout are more likely to have
					sleepiness	pathological daytime sleepiness
2010, Santen A, Holt D, Kemp J & Hemphill R, [36]	249	2003/2004 academic year	Medical students of medical school at Vanderbilt School of Medicine	MBI-HSS	Number of nights per week with inadequate sleep	Positive significant association with burnout.

Table 1: Demographic and methodological characteristics of studies that investigate the relationship between burnout and lifestyle or modifiable health behaviors in medical student. MBI-GS: Maslach Burnout Inventory-General Survey; ESS: Epworth Sleepiness Scale; GLTEQ: Godin Leisure Time Exercise Questionnaire; MBI-HSS: Maslach Burnout Inventory-Human Services Survey; AUDIT-C: Alcohol Use Disorders Identification Test; 3-pLS: 3-point Likert Scale; PSQI: Pittsburgh Sleep Quality Index; MSIS: Miller Social Intimacy Scale; MBI-SS: Maslach Burnout Inventory-Student Survey; AUQ: Alcohol Use Questionnaire; IPAQ: International Physical Activity Questionnaire; FFQ: Food Frequency Questionnaire.

Discussion

Sleeping Habits

Studies that evaluated the relationship between sleeping habits and burnout had consensual results. Pathological daytime sleepiness (defined by a score of 11 or more on the Epworth sleepiness scale) and poor sleep quality (analysed by the Pittsburgh Sleep Quality Index) are associated with higher risk of burnout [27,30,33,35,36]. Pathological daytime sleepiness seems to have repercussions on all three dimensions of burnout, especially in EE [27,33,35]. Moreover, EE appears to be the only component of burnout which also influences this sleeping behaviour [33].

Daytime dysfunction and sleep duration seem to be the major contributors to explain the relationship between poor sleep quality and burnout, particularly to the association with cynicism and EE respectively [27,33]. Such inadequate sleeping habits can affect the coping mechanisms, intensifying the sensitivity to negative emotions and stressful events. They can also reduce the capabilities and performance needed to achieve a successful learning process which ends up in a sense of

dissatisfaction with academic accomplishments. It also decreases motivation for learning which consequently lowering dedication to medical school leading to cynical attitudes [30,33].

Physical Exercise

Five studies that analysed this health behaviour showed some discrepancies. In general, regular physical exercise practice is associated with better burnout outcomes (globally or in some dimensions). In fact, low levels of physical exercise are particularly associated with lower professional efficacy/professional accomplishment (according to the version of the MBI used) and with higher levels of EE [27,29,32]. Physical exercise can improve the sense of self-control and social interaction and therefore reduce mental distress and burnout [27,29,32]. Two studies didn't find a significant association between physical exercise practice and burnout or its dimensions [31,34].

Alcohol Consumption

Distinct alcohol patterns were related in different ways to the development of burnout. On one hand, alcohol

abuse /dependence is more common among medical students with burnout, particularly with high EE and high depersonalization, with burnout representing an increased risk factor for this pattern of consumption.(29) On the other hand, alcohol binge consumption is associated with high levels of PA.(32) This suggests that alcohol may be used as a coping strategy to deal with stress and burnout but when compulsively consumed it can be used as a source of pleasure [32].

Social Activities and Social Intimacy

Social activities including political or religious involvement, university club involvement, community service, and volunteering, are significantly associated with low academic efficacy. Social activities can have negative repercussions in academic performance because they also require energy and time [27]. However, higher levels of social intimacy are correlated with a lower risk of all three dimensions of burnout [30].

Music-Related Activities

Activities like listening to music, playing an instrument and even being part of a choir or a band are associated with low burnout [31]. Music seems to exert direct physiological effects through the autonomic nervous system and have positive effects on mood in terms of perceived stress [31].

Reading

The impact of reading in burnout is unclear. While in bivariate analysis, reading had a significant association with high EE, this relationship wasn't observed in multivariate analysis [31].

Dietary Behaviour

The relationship between diet and burnout is doubtful. Sweet and savoury food consumption scores weren't significant predictors of higher EE levels and higher depersonalization, respectively, but remained in the final models to explain the variance of EE and depersonalization. This may suggest the existence of a relationship between diet and some dimensions of burnout [32]. Students with higher levels of EE and depersonalization could be making poorer dietary choices as a maladaptation to their busy schedule and/or as a coping mechanism to deal with increased feelings of mental distress [32].

Smoking Status

Being an ex-smoker in comparison to never have

smoked is a significant predictor of higher EE levels. However, only one study analysed this behaviour [32].

Conclusions

Burnout is an epidemic problem in medical student's population and warrants serious attention concerning its disastrous consequences. The current knowledge that explores the relationship between lifestyle and health behaviours with burnout in medical students suggests the existence of some important correlations. Dysfunctional sleeping habits (sleeping outside 7-9h recommended per night, poor sleep quality and pathological daytime sleepiness), low levels of physical activity, alcohol abuse/dependence, social activities involvement and being an ex-smoker were associated with higher risk of burnout. Social intimacy and music-related activities were correlated with better burnout outcomes. Reading and dietary behaviour had an unclear association with this problem.

Those findings should be cautiously interpreted. Studies that explored physical exercise had mixed results, with two studies not showing any association [31,34] (one made only in preclinical students and other conducted to examine the prevalence and associated factors with burnout), three studies (two of them made to analyse directly this relationship) showing a significant or a trended toward significance correlation [27,29,32]. In a study that assesses the association between alcohol abuse/dependence and burnout, a multivariate logistic regression was made to confirm the association found in a descriptive statistical analysis. The authors used alcohol abuse/dependence as the independent variable so, we cannot conclude if that behaviour is independently associated with an increased risk of burnout ²⁸. Another study demonstrated that being an ex-smoker is predictive of a higher burnout risk, although the number of smokers and ex-smokers in comparison to non-smokers in the study sample was low making the interpretation of the results more difficult [32]. All these studies had a cross-sectional design so causality of the relationships is unable to be determined. Moreover, a response bias may be present since studies were survey-based. Some studies that directly analysed the relationship between these behaviours and burnout had low response rates which can justify the introduction of a selection bias. Three studies were done exclusively in preclinical medical students so the results may not be generalizable to the students in the clinical years [31,33,35]. At last, publication bias may have overestimated the impact of these behaviours in medical students with burnout due to

non-published studies where this association wasn't seen.

Limitations of this review include the exclusion of studies that we could not access and inherent limitations to the MeSH terms used in our findings. Although almost all studies used the MBI as the screening instrument to evaluate burnout, different versions and subscales of the MBI were used to assess different dimensions of burnout. The use of the MBI -GS or -SS instead of the MBI- HSS was justified by the limited patient interaction of medical students, especially in preclinical years. However, this interaction is highly variable between different medical schools. Also, during clinical years, the patient interaction is higher which makes the use of MBI-HSS more appropriate. The diversity of instruments and the criteria used to measure and define burnout, combined with the differences in medical course curricula between medical schools make it difficult to generalize these findings to other contexts. Moreover, a lot of different tools were used to measure behaviour common to several studies, like physical exercise, making the comparison of the findings more problematic.

Further studies, ideally with a longitudinal approach, are required to provide a more definitive understanding about causality and to better understand the relationship between lifestyle and health behaviours with burnout in medical students. A better investigation of the reported behaviours, namely smoking, dietary choices, reading, social activities, the genres of music associated with less burnout, and more types of modifiable lifestyle and health behaviours is needed. Strategies focused on sleep education (sleeping 7-9h per night), physical exercise promotion, moderate alcohol consumption recommendation, practice of music-related activities and social intimacy promotion may be helpful to prevent and reduce burnout. Empowering medical students with this knowledge might help them to adopt lifestyle and health behaviours that lead to improved burnout levels and, consequently, to successfully face the challenges of medical education.

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