

# Burnout Prevalence and Associated Stressors in Medical Students of Traditional and Problem-Based Learning Curricula in a Saudi University

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## Abstract

**Background:** Medical students are prone to burnout, and several stressors have been associated with it. From the literature, it is yet unclear if type of curricula in medical schools plays a role in burnout among students.

**Aims:** To assess the prevalence of burnout and its associated stressors in medical students in problem-based learning and traditional curricula at Imam Abdulrahman Bin Faisal University.

**Subjects and Methods:** The analytical, cross-sectional study was conducted between February and May 2017 and included all third- to sixth-year medical students of Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. In the 2016–2017 academic year, third- and fourth-year students were in problem-based learning, whereas fifth- and sixth-year students were in traditional learning. All eligible students were verbally invited to complete a 56-item questionnaire comprising three sections eliciting sociodemographic information, level of burnout (using a modified Copenhagen Burnout Inventory with personal, medical school- and faculty-related subsections) and stressors associated with burnout. Burnout was measured using a Likert-type scale, and scores of >50 were considered as high burnout. Chi-square and logistic regression analysis were used for statistical analysis.

**Results:** Of 947 eligible students, 593 (62.6%) completed the questionnaire: 317 (53.5%) were in problem-based learning and 276 (46.5%) in traditional learning. Of these, 329 (55.5%) had high burnout, with no difference between type of curricula (problem-based learning = 178 [56.2%]; traditional = 151 [54.7%];  $P = 0.73$ ). All measured stressors were significantly associated with high burnout, including lack of sleep (odds ratio [OR] = 2.139,  $P = 0.005$ ) and perceiving teaching staff as inflexible and unsupportive (OR = 2.995,  $P < 0.001$ ).

**Conclusions:** This study found high prevalence of burnout among medical students in a university from Saudi Arabia, but no significant difference between students in problem-based learning and traditional curricula. A longitudinal study is recommended to better understand the long-term effect of type of curricula on burnout.

**Keywords:** Burnout, medical education, problem-based learning, stressors, traditional learning

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## INTRODUCTION

Medicine study and training is demanding, and medical students are prone to burnout.<sup>[1]</sup> In a very recent meta-analysis, Frajerman *et al.*<sup>[2]</sup> found that the estimated burnout among medical students worldwide is about 44%, with the prevalence being highest among those from the Middle East and Oceania. Burnout is a prolonged response to chronic emotional and interpersonal stressors and is defined by three dimensions: exhaustion, cynicism and inefficacy.<sup>[2]</sup> Burnout can not only result in inadequate performance, mistakes in practice and dropout from medical schools but can also lead to psychiatric disorders such as depression and anxiety, which have the potential of resulting in suicidal ideation.<sup>[3]</sup>

Several factors and stressors have been attributed to burnout in medical students. Muzafar *et al.*<sup>[4]</sup> found that age, gender and lack of supportive resources, belief in their profession and time off were factors associated with burnout in medical students. Another study found that burnout is higher among those with low confidence in clinical skills as well as those who felt uncomfortable with course activities and did not find the coursework to be a source of pleasure.<sup>[5]</sup>

In medical schools, problem-based learning (PBL) is a teaching method where real-world clinical problems are used to stimulate students' learning of concepts and principles, as opposed to the direct presentation of facts and concepts in traditional teaching, and is being adopted as the primary method of teaching in several medical schools.<sup>[6]</sup> PBL has also shown to enhance students' critical thinking skills, problem-solving abilities and communication skills as well as provide a chance to work in groups, find and evaluate research content and learn to become lifelong learners.<sup>[7]</sup> Studies have been conducted to assess if alterations in medical curricula reduces students' psychological distress and enhances their motivation, but collectively, the results are inconclusive. For example, while Lyndon *et al.*<sup>[8]</sup> found no significant difference in the burnout level between students in the traditional and PBL tracks, Pereira *et al.*<sup>[9]</sup> and Ahmad *et al.*<sup>[10]</sup> reported that students in the PBL curriculum have higher burnout levels than those in the traditional curriculum.

In Saudi Arabia, no study has compared the burnout levels of students studying PBL and traditional curricula. In addition, the literature is not conclusive about the effect of curricular reform on burnout level along with other potential stressors faced by medical students. Therefore, this study aimed to assess and compare the prevalence

of burnout and its associated stressors in medical students studying PBL and traditional curricula at Imam Abdulrahman Bin Faisal University (IAU), Dammam, Saudi Arabia. In 2014, IAU adopted PBL for all new batches, while the older batches remained on the traditional curriculum, thereby providing an opportunity for studying two curricula at the same institution in an academic year.

## SUBJECTS AND METHODS

### Study design and participants

The cross-sectional study was conducted between February and May 2017. In the 2016–2017 academic year, the second- to fourth-year students at IAU were in the PBL curriculum, while the fifth- and sixth-year students were in the traditional curriculum. This study included all third- to sixth-year medical students ( $n = 967$ ; traditional = 524 and PBL = 443); the minimum sample size with 95% confidence interval was 276.

Second-year students were excluded because they are new to medical school, and this may be a confounding factor when comparing burnout between curricula. Although students of both curricula were in different different study years, they were comparable given that they had the same faculty and similar clinical exposure because third- and fourth-year students were taking advanced clinical skills sessions as part of their curriculum. In addition, students of the included years had some shared clinical rotations.

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of IAU (No.: 2018-01-072).

### Data collection instrument and procedure

Data were collected using a 56-item questionnaire comprising three sections. The first section had 14 items that elicited information regarding sociodemographic characteristics such as academic level, gender, marital status and age. The second section had 19 items of the Copenhagen Burnout Inventory (CBI) that measured the level of burnout; this section was divided into personal (6 items), work-related (i.e., medical school/organizational institute) (7 items) and client-related parts (6 items).<sup>[11]</sup> If any CBI subsection had a <50% response, the questionnaire was considered as incomplete and not considered for the final analysis. In the client-related part, the word “client” was changed to “faculty” in all questions to enable assessment of teaching staff as a source of burnout. This change is justifiable given that students deal with faculty in a similar way that employees deal with clients in terms of discipline, seeking approval and receiving overall evaluation.

Finally, the third section had 23 items of stressors that elicited information regarding potential stressors related to each subcategory in the second section. These items were identified from the literature as well as through discussions between authors regarding potential stressors associated with burnout.

The level of burnout was measured based on the second section of the questionnaire. The responses were based on a five-point Likert-type scale of either “never” to “always” or “a very low degree” to “a very high degree,” with the scores ranging from 0 to 100, respectively. The burnout score was calculated as the average score of the items in each scale, and the total burnout score was calculated as the average score of the three scales. Scores of >50 were considered as high burnout, while the remaining was classified as low burnout.<sup>[4]</sup>

The questionnaire contents were validated by a multidisciplinary committee. In addition, it was pilot tested among 20 students: 5 students from each cohort including both males and females. The questionnaire was found to have excellent test–retest reliability (>90%) and internal consistency (Cronbach’s alpha: 0.92), and thus no modification was done. Students who participated in the pilot test were excluded from the study analysis. On average, the questionnaire took about 7 min to complete.

In terms of distribution and collection, all eligible students were approached during classes and breaks at the University and its hospital, and printed questionnaires were distributed and collected on completion at the same time by one of the authors assigned for data collection that day. The students were informed that participation was voluntary, and a verbal consent was obtained before administering the questionnaire. In addition, a study information page was attached in all questionnaires that assured of privacy and anonymity and no personal identification data such as name, academic number or national identification number were requested.

### Data analysis

The data were analyzed using SPSS version 21 (IBM Corporation, Armonk, NY, USA). The study samples were grouped based on their curricular type (i.e., traditional and PBL) and a chi-square test was used to determine any significant differences in the sociodemographic characteristics between the groups. Chi-square was also used to determine the association between sociodemographic characteristics, type of curricula and stressors across burnout levels (high/low) based on the modified CBI scores as the primary outcomes. For each curriculum, the

prevalence of high burnout was further analyzed with Chi-square and mean burnout score using the two-sample independent *t*-test of the three subcategories of burnout. A logistic regression analysis was carried out to identify the significant determinants of high burnout level based on the modified CBI. The burnout level, coded as high and low, was used as a dependent variable and significant stressors on Chi-square were entered as predictor variables.  $P < 0.05$  was considered statistically significant.

## RESULTS

Of the total 967 eligible students, 20 students were used in the pilot testing, and from the remaining 947 eligible students, 605 responded. However, 12 of these had lower than the minimal required responses and were not included,<sup>[11]</sup> and thus 593 responses (62.6%) were considered in the final analysis. Of these, 317 (53.5%) students were from PBL and 276 (46.5%) were from traditional learning; all students were Saudis. In the PBL group, the majority of the respondents were third-year students (182; 57.4%), while in the traditional group, the majority were sixth-year students (146; 52.9%). There was a significant difference between the two groups in terms of demographic characteristics such as gender and having children ( $P < 0.05$ ) [Table 1].

A total of 329 (55.5%) students had high burnout levels: 178 (56.2%) students were in PBL and 151 (54.7%) in traditional learning, but there was no significant association between the type of curriculum and burnout level ( $P = 0.73$ ). Of the three subcategories of the modified CBI, there was only a significant difference in the teaching staff-related burnout between the traditional and PBL curricula (56.9% vs. 48.6%, respectively;  $P = 0.04$ ) [Figure 1]. The mean overall

**Table 1: Sociodemographic characteristics of the respondents (n = 593)**

Demographic characteristics	Curriculum, n (%)		P <sup>§</sup>
	PBL (n = 317)	Traditional (n = 276)	
Gender			
Male	145 (45.7)	99 (35.9)	0.015**
Female	172 (54.3)	177 (64.1)	
Age (Mean ± SD)	21 (1)	23 (1)	<0.001**
Marital status			
Married	26 (8.2)	89 (32.2)	0.443
Unmarried	291 (91.8)	187 (67.8)	
Children			
Yes	6 (1.9)	37 (13.4)	<0.001**
No	311 (98.1)	239 (86.6)	
Accommodation			
In campus	45 (14.2)	32 (11.6)	0.347
Off campus	272 (85.8)	244 (88.4)	

<sup>§</sup>P value has been calculated using Chi-square test; \*\*Significant at  $P \leq 0.05$ . PBL – Problem-based learning

burnout was 50.8% and 52.4% in the traditional and PBL groups, respectively ( $P = 0.21$ ). There was a significant difference in the medical school-related mean burnout levels of PBL and traditional learning students (56.7% vs. 53.5%, respectively;  $P = 0.03$ ); there was no statistical difference in the other two subcategories [Figure 2].

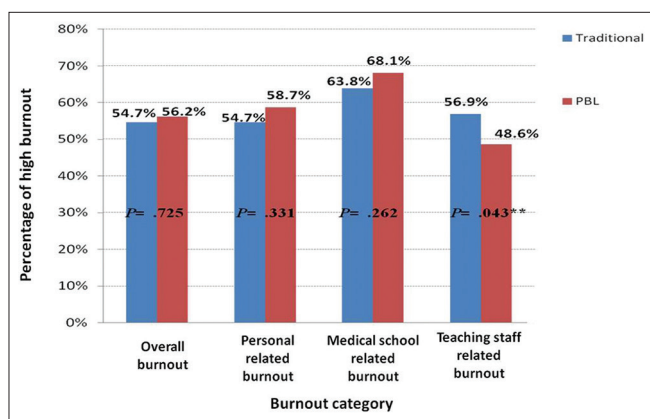
**Bivariate analysis of sociodemographic characteristics and stressors versus burnout level**

The prevalence of high burnout was 58.7% (205) in females and 50.8% (124) in males; there was no significant association between gender and high burnout level ( $P = 0.06$ ). The highest prevalence of high burnout was among the third-year medical students (61.0%), which was not statistically significant ( $P = 0.22$ ) [Table 2]. All the stressors were

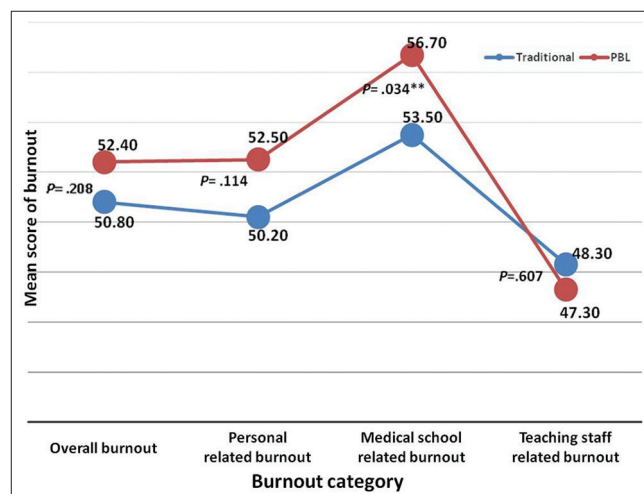
positively associated with high burnout and were statistically significant ( $P < 0.05$ ) [Table 3].

**Regression analysis of the significant stressors versus total burnout level**

Of all the studied stressors, linear regression analysis found that not getting enough sleep; stress of failure in attaining personal goals; fear of failing medical school; feeling that there is under appreciation of their work by the college, a never-ending competition with their colleagues, that medical school puts them at risk of harm (through hazardous exposure such as chemicals, toxins and infections) and teaching staff were personalizing issues; and perceiving the number of tasks as too many to handle and the teaching staff being unsupportive/inflexible were significantly associated with high burnout levels [Table 4].



**Figure 1:** High burnout levels in traditional and problem-based learning students based on the modified Copenhagen Burnout Inventory



**Figure 2:** Mean burnout score of the three subcategories of the modified Copenhagen Burnout Inventory

**Table 2: Bivariate analysis of sociodemographic characteristics against the total burnout level (n = 593)**

Factors associated with burnout	Burnout level, n (%)		P <sup>s</sup>
	High burnout	Low burnout	
<b>Demographic characteristic</b>			
<b>Gender</b>			
Male	124 (50.8)	120 (49.2)	0.056
Female	205 (58.7)	144 (41.3)	
<b>Marital status</b>			
Married	67 (58.3)	48 (41.7)	0.504
Unmarried	262 (54.8)	216 (45.2)	
<b>Academic level</b>			
Third year	111 (61.0)	71 (39.0)	0.218
Fourth year	67 (49.6)	68 (50.4)	
Fifth year	69 (53.1)	61 (46.9)	
Sixth year	82 (56.2)	64 (43.8)	
<b>Children</b>			
Yes	24 (55.8)	19 (44.2)	0.964
No	305 (55.5)	245 (44.5)	
<b>Accommodation</b>			
In campus	44 (57.1)	33 (42.9)	0.753
Off campus	285 (55.2)	231 (44.8)	

**Table 3: Bivariate analysis of stressors against the total burnout level (n = 593)**

Factors associated with burnout	Burnout level, n (%)		P <sup>s</sup>
	High burnout	Low burnout	
Stressors			
Not getting enough sleep			<0.001**
Yes	283 (60.2)	187 (39.8)	
No	46 (37.4)	77 (62.6)	
Not getting enough exercise			0.004**
Yes	288 (58.1)	208 (41.9)	
No	41 (42.3)	56 (57.7)	
High family expectations			0.033**
Yes	303 (57.0)	229 (43.0)	
No	26 (42.6)	35 (57.4)	
Entered medical school against will			0.036**
Yes	44 (67.7)	21 (32.3)	
No	285 (54.0)	264 (44.5)	
Grades unsatisfactory			0.041**
Yes	290 (57.2)	217 (42.8)	
No	39 (45.3)	47 (54.7)	
Hostile environment with colleagues			<0.001**
Yes	290 (57.2)	217 (42.8)	
No	39 (45.3)	47 (54.7)	
Performance lower than colleagues			<0.001**
Yes	254 (65.1)	136 (34.9)	
No	75 (36.9)	128 (63.1)	
Failure in meeting personal goals			<0.001**
Yes	295 (64.4)	163 (35.6)	
No	34 (25.2)	101 (74.8)	
Fear of failing medical school			<0.001**
Yes	240 (71.9)	94 (28.1)	
No	89 (34.4)	170 (65.6)	
Worried about securing a preferred residency program			<0.001**
Yes	293 (60.3)	193 (39.7)	
No	36 (33.6)	71 (66.4)	
Underappreciated by college			<0.001**
Yes	222 (64.9)	120 (35.1)	
No	107 (42.6)	144 (57.4)	
Curricula instruction are not clear			<0.001**
Yes	291 (59.6)	197 (40.4)	
No	38 (36.2)	67 (63.8)	
Not getting enough guidance from my seniors			<0.001**
Yes	283 (59.7)	191 (40.3)	
No	46 (38.7)	73 (61.3)	
Number of tests are too much			<0.001**
Yes	198 (68.8)	90 (31.3)	
No	131 (43.0)	174 (57.0)	
Number of tasks are too much			<0.001**
Yes	262 (65.7)	137 (34.3)	
No	67 (34.5)	127 (65.5)	
Never-ending competition with my colleagues			<0.001**
Yes	240 (66.7)	120 (33.3)	
No	89 (38.2)	144 (61.8)	
Assessments do not reflect performance			<0.001**
Yes	310 (59.2)	214 (40.8)	
No	19 (27.5)	50 (72.5)	
Medical school puts me at risk of harm (infection, abuse, injuries etc.)			<0.001**
Yes	156 (75.0)	52 (25.0)	
No	173 (44.9)	212 (55.1)	
Faculty are inflexible and unsupportive			<0.001**
Yes	271 (67.2)	132 (32.8)	
No	58 (30.5)	132 (69.5)	
Faculty have poor leadership skills			<0.001**
Yes	257 (65.2)	137 (34.8)	
No	72 (36.2)	127 (63.8)	

*Contd...*



**Table 3: Contd...**

Factors associated with burnout	Burnout level, n (%)		P <sup>§</sup>
	High burnout	Low burnout	
Seniors are overly cynical			
Yes	231 (65.6)	121 (34.4)	<0.001**
No	98 (40.7)	143 (59.3)	
Faculty personalize issues			
Yes	223 (71.7)	88 (28.3)	<0.001**
No	106 (37.6)	176 (62.4)	
Faculty lack ethical manners			
Yes	222 (66.5)	112 (33.5)	<0.001**
No	107 (41.3)	152 (58.7)	

§P value has been calculated using chi-square test; \*\*Significant at  $P \leq 0.05$

**Table 4: Regression analysis of the significant stressors versus the total burnout level (n = 593)**

Stressors	OR	95% CI	P
Not getting enough sleep	2.139	1.265-3.618	0.005**
Failure in meeting personal goals	3.894	2.265-6.694	<0.001**
Fear of failing medical school	2.981	1.931-4.602	<0.001**
Underappreciated by college	1.787	1.164-2.745	0.008**
Number of tasks are too much	1.973	1.249-3.117	0.004**
Never-ending competition with my colleagues	2.173	1.164-2.776	0.001**
Medical school puts me at risk of harm (infection, abuse, injuries etc.)	2.995	1.366-3.459	<0.001**
Faculty are inflexible and unsupportive	2.787	1.896-4.731	<0.001**
Faculty personalize issues	1.798	1.821-4.264	0.008**

\*\*Significant at  $P \leq 0.05$  level. CI – Confidence interval; OR – Odds ratio

## DISCUSSION

Burnout among medical students is common and curriculum may play a role in it.<sup>[2]</sup> However, previous studies did not find a consensus regarding either PBL or traditional curricula resulting in lower burnout level compared with the other.<sup>[8-10]</sup> Accordingly, the current study found that in a major university of Saudi Arabia, where medical students of different years were concurrently learning through either PBL or traditional curricula, there was no significant difference between the type of curriculum and burnout level. The students included in the study dealt with the same faculty and experienced similar situations in both the college and the hospital, thereby eliminating a few confounding factors that could have affected the results. The findings of the current study are in line with those reported by Lyndon *et al.*,<sup>[8]</sup> but in contrast with those of Pereira *et al.*<sup>[9]</sup> and Ahmad *et al.*,<sup>[10]</sup> who reported burnout levels were significantly higher among students in PBL than those in traditional learning.

In terms of the subcategories of the modified CBI, this study found that teaching staff-related burnout was higher among students in PBL than those in traditional curricula. This finding is understandable given that students in traditional learning are more in contact with the teaching staff compared with those in PBL, which is more oriented

toward self-directed learning. Similarly, it was found that the mean score of medical school-related (workplace) burnout was significantly higher among students in PBL. As stated above, the differences in the mode of delivery between PBL and traditional learning could be a contributing factor to this finding. It should also be noted that the study was conducted only a couple of years after IAU had implemented the PBL curriculum and, given its dynamic nature, this may have resulted in the initial teething problems that contributed to these results.

The current study found that the overall prevalence of burnout among medical students was 55.5%, which is considerably higher than that reported by Frajerman *et al.* (44.2%),<sup>[2]</sup> Muzafar *et al.* (47%),<sup>[4]</sup> Talih *et al.* (43%)<sup>[12]</sup> and Altannir *et al.* (13.4%),<sup>[13]</sup> but lower than that reported by Almalki *et al.* (67%).<sup>[14]</sup> Regarding demographic data, there was no significant difference in the overall burnout prevalence between males and females, which is similar to the results of Backović *et al.*,<sup>[15]</sup> but in contrast with those of Dahlin *et al.*,<sup>[16]</sup> who found that burnout was higher among female than male medical students.

All the stressors studied in the current study were found to be significantly associated with high levels of burnout, with sleep deprivation being one of them. This finding is in accord with several studies by Arbabisarjou *et al.*<sup>[17]</sup> and Moore *et al.*,<sup>[18]</sup> wherein sleep disturbances were shown to affect many processes that overlap with aspects of burnout such as academic performance, learning and depressed mood. The current study also found a significant association between high burnout level and fear of failing to meet personal goals and expectations, which is likely because trying to achieve unrealistic goals and self-expectations can lead to chronic psychological stress, and eventually burnout.<sup>[19]</sup>

Unsurprisingly, there was a significant association between the overwhelming fear of failure in medical school and overall burnout. It is well known from the literature that

failure in medical school is a highly distressing event for students, as it results in prolonging study years and joining a different cohort of students, and thus losing their colleagues and friends.<sup>[20]</sup> Similarly, there was a significant association between never-ending competition with colleagues and high burnout; medical schools tend to create a competitive environment, which adds to the stress, and thus to burnout.<sup>[20]</sup> Another stressor significantly associated with high burnout was feeling underappreciated; similarly, underappreciation has previously been shown to result in a lower sense of fulfillment and self-satisfaction in resident doctors.<sup>[21]</sup>

Medical school study is stressful and having additional tasks with limited time can increase stress.<sup>[22]</sup> This explains the current study's finding that imbalance between the number of tasks and time at hand was significantly associated with high burnout level. Students' perception of medical school being a source of hazard and harm will increase the psychological stress associated with it, and thus lead to high burnout. Other significant factors contributing to high burnout were perceived inflexibility and lack of professionalism from the faculty. The feeling of inflexibility can be perceived as a lack of understanding and empathy toward students' problems and struggles. Moreover, lack of support from faculty may leave students bereft of essential guidance and contribute to burnout.<sup>[16]</sup> The authors recommend that given their influence on burnout, teaching staff should be involved in the process of students' stress management.

The inherent requirements of medicine study and training are demanding. Although this education must be thorough and prioritized, the findings of the current study and that of similar studies in the literature indicate the need for more efforts to focus on the mental welfare of the medical students.

This study has a few limitations such as being limited to a single university, using the modified CBI in English rather than the students' native Arabic and using a cross-sectional design, thereby limiting the ability to infer about causality and temporality. In addition, the study could not perform an inter-curricular comparison of students in the same year as each cohort only follows one curriculum, rendering the isolation of curriculum as an independent factor difficult. Being in different cohorts did result in significant differences in the sociodemographic characteristics such as age and having children, which can act as confounding factors. Nonetheless, to eliminate such effect and isolate the absolute potential stressors that contributed to high burnout, a logistic regression was carried out wherein all the

stressors, sociodemographic characteristics and educational curricula were assessed as independent factors in predicting the high burnout.

To the best of the authors knowledge, this is the first such comparative study from Saudi Arabia. Therefore, there is need for similar studies in the country and the region to provide a better perspective regarding the role of curriculum in burnout in medical students. The authors also recommend that universities in Saudi Arabia should consider adopting stress management programs and encourage activities that reduce stress and burnout levels.

## CONCLUSIONS

This study found that burnout is highly prevalent among medical students of a major university in Saudi Arabia, but the type of curricula (i.e., PBL and traditional learning) did not play a significant role in it. In the subcategories of the modified CBI, there was a significant difference in the teaching staff- and medical school-related burnout between the traditional and PBL curricula. Finally, several stressors were identified to be significantly associated with high burnout level in medical students.

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## Ethical considerations

This study was approved by the Institutional Review Board of IAU, Dammam, Saudi Arabia (No.: 2018-01-072). Verbal informed consent was obtained from all respondents before administering the questionnaire.

## Peer review

This article was peer reviewed by three independent and anonymous reviewers.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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