JMSR
Journal of Medical and Surgical Research

Research Article

ISSN: 2351-8200

JMSR 2017, Vol III; N°3: 327-334

BURNOUT AND LEARNING-CLIMATE AMONG GENERAL SURGERY RESIDENTS IN RABAT.

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ABSTRACT

Introduction: This study aimed to investigate burnout rates and the impact of the learning climate on general surgery residents in Rabat, Morocco.
Methods: Between September and November 2015, all general surgery residents in the Mohammed the Vth University in Rabat were contacted to participate in the study via an online questionnaire. The online questionnaire included four sections. The first one assessed demographics and professional activity. The second section included 8 satisfaction questions, using a five point Likert scale. The third section assessed burnout using the validated Maslash Burnout inventory. The fourth section assessed the learning climate using the Dutch Residents Educational Climate Test (D-RECT). Factors associated to burnout were analyzed using adequate statistical methodology.
Results : Among 32 residents contacted by mail, 24 (75%) volunteered to respond to the questionnaire. The mean age was 30.9 years. Fourteen residents (58.3%) had a burnout. Residents with burnout had significantly lower rates of leisure activity (28.5% vs. 100%. p=0.01). Concerning satisfaction questions, residents with burnout had significantly lower rates of satisfaction with their work-life balance (0% vs. 50. p=0.006), global quality of life (7.1% vs. 60%. p=0.009), health (7.1% vs. 90%). They also had lower rates of satisfaction with the work environment (7.1% vs. 50%. p=0.05). The mean global D-RECT score was lower in the burnout residents (2.73 vs. 3.12. p=0.08). Except for the domain “Peer collaboration”, the mean scores for the other domains were lower among the burnout residents group. However, the difference was significant only for the “Team work” domain (2.51 vs. 3.50. p=0.02).
Conclusion: This study highlights the importance and consequences of burnout among general surgery residents and its strong relationship with the learning climate. Using objective assessment tools such as the D-RECT score may be helpful to identify work related factors associated to burnout and develop and monitor effective strategies for improvement.

Keywords:

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INTRODUCTION

Numerous studies showed a high rate of burnout among medical professionals. The negative consequences of burnout include depression, decreased job performance and satisfaction, risk of medical errors, and negative effects on patients’ safety [1, 2]. Whereas, there is a raising awareness about the importance of the well being of physicians [1, 3, 4].

Medical residents are also concerned by the burnout syndrome. Martini et al.[3] reported a 50% rate of burnout among American residents, ranging from 75% (obstetrics/gynecology) to 27% (family medicine). In Morocco, two studies reported severe burnout from 39.7% among medical trainees to 83% rate among residents respectively in Casablanca and Rabat [5][6].
Another important aspect in medical residency is the learning climate, defined as the formal and informal

ISSN: 2351-8200
JMSR 2017, Vol III; N°3: 327-334

context in which learning takes place, and incorporates the context in which residents' learning takes place in terms of the setting, shared perceptions on policies, practices and procedures [7–9] . It is well established that the learning climate could have negative consequences on learners' motivation, self-confidence, academic achievements, medication errors and even teaching performance [7, 8, 10, 11]. In some training programs worldwide, the evaluation of the learning climate is a quality indicator for the curriculum and is administered annually [8].

Considering the importance and consequences of a negative learning climate in the residency training, it may have an important role in the occurrence of burnout among residents. In fact, two studies reported higher burnout rates in medical students and residents with lower perception of the learning climate [12, 13].

Only few studies analyzed burnout in general surgery resident in the literature, but, none of investigated the relationship between burnout and learning climate. This study aimed to investigate burnout rates and the impact of the learning climate on burnout in general surgery residents in Rabat, Morocco.

METHODS

Study setting and Participants

Between September and November 2015, all the general surgery residents in Mohamed Vth University in Rabat were contacted to participate in the study via an online questionnaire (Google Form). Residents were contacted via electronic mail and 2 reminders were sent at a 15 days interval. The participation was voluntary and anonymous. Since there were only 2 female residents in the group, gender was removed from the questionnaire to ensure anonymity. The study was conducted by an independent academic organization (the Moroccan Society of Surgery) to ensure the neutrality of the investigations. The study was approved by the local ethics committee of the university.

The questionnaire

The online questionnaire included four sections. The first one assessed demographics (age, marital status, number of children, year of residency) and professional activity (workload, operating room activity and night and weekend shifts). The second section included 8 satisfaction questions, using a five point Likert scale (1 to 5: totally dissatisfied to totally satisfied). The third section assessed burnout using the validated Maslash Burnout inventory [14]. The fourth section assessed the learning climate using the Dutch Residents Educational Climate Test (D-RECT) [15].

The Maslash Burnout Inventory (MBI)

The MBI consists of_22 items written in the form of statements about personal feelings or attitudes (eg, "I feel burned-out from my work"). The items are answered in terms of frequency with which the respondent experiences these feelings, on a 7-point Likert scale (ranging from 0 = "never" to 6 = "every day"). The items are divided into 3 subscales: 9 questions for emotional exhaustion (a drained, depletion feeling arising because of excessive psychological and emotional demands), 5 items for depersonalisation (tendency to view others in an excessively detached, impersonal manner), and 8 items for personal accomplishment (a sense of competence and accomplishments). Scores on each subscale are computed by summing the numerical responses [14, 16].

High levels of emotional exhaustion (EE) and depersonalization (DP) correlate with burnout among physicians, whereas personal achievement (PA) is inversely proportional to burnout. The emotional exhaustion (EE) subscale score ranged from 0 to 54, high scores being above 26. The DP subscale score ranged from 0 to 30, high being above 12. The PA subscale score ranged from 0 to 48, low scores being lower than 32[14, 17].

The Dutch Residents Educational Climate Test (D-RECT)

D-RECT is a validated quantitative scale developed in the Netherland to evaluate the learning climate as perceived by the residents [15]. It contains 50 items that can be answered on a five point Likert-scale (1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = totally agree). These items cover 11 domains: Supervision; Coaching and assessment; Feedback; Teamwork; Peer Collaboration; Professional relations between attending; Work is adapted to residents' competence; Attendings' role; Formal education; Role of the speciality tutor and Patient sign-out [15]. The last domain (Patient sign-out) was replaced by "Meetings", which is more appropriate to our residency setting. Scores are expressed as mean +/- standard deviations for all the items and for each domain. They range from 1 to 5, with the high score meaning better educational climate.

Data analysis

Qualitative data is presented as frequencies and percentages. Quantitative data is presented as means with standard deviations or medians with quartiles, as appropriate. Satisfaction questions were dichotomized into two categories: satisfied (very satisfied and satisfied versus others).

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Journal of Medical and Surgical Research
Research Article
ISSN: 2351-8200
JMSR 2017, Vol III; N°3: 327-334

Burnout was defined by a high score in the EE sub-scale,T or/and a high score in the DP sub-scale or/and a low score in the PA subscale.
Overall and each domain D-RECT scores are presented as mean with standard deviation.
Missing data was assumed to be missing at random and imputed, calculated using the expectation-maximization.
In order to analyze factors associated to the occurrence of Burnout, residents with and without burnout were compared using appropriate tests (Chi2 or Fisher tests, "t" or Mann Whitney U).

RESULTS

Among 32 residents contacted by mail, 24 (75%) volunteered to respond to the questionnaire. The mean age was 30.9 years. Eleven residents (45.9%) were married and four (16.7%) had children. According to residents' self appreciation of their workload, the mean work time by week was 59 hours. The median number of days for night shifts and on-call shifts were 5 and 8 per month respectively. Twelve (50%) residents had a regular leisure activity (at least 30 mn, three times a week). Table I summarizes residents' demographic and workload characteristics.

Table 1: Residents' demographic and workload characteristics.

Variable	Results
Age (years)	30,9 (2,5)
Gender number (%)	
Men	22 (91,7)
Women	2 (8,3)
Marital status number (%)	
Single	13 (54,2)
Married	11 (45,9)
Children number (%)	
No	20 (83,3)
Yes	4 (16,7)
Partner's job number (%)	
Physician	7 (29,2)
Not Physician	17 (70,8)
Year of residency number (%)	
1stYear	8 (33,3)
2ndYear	2 (8,3)
3thYear	4 (16,7)
4th Year	7 (29,2)
5thYear	3 (12,5)

TableII: Results of the satisfaction questionnaire.

Hours Worked/weak mean (standard deviation)	**59 (10,8)**
Days de bloc/weak median (quartiles)	3 (3 - 4)
Night shifts/month median days (quartiles)	5 (4 - 6)
Call shifts/month median days (quartiles)	8 (7 - 14,75)
Days Worked in weekends/month median(quartiles)	2 (2 - 4)
Regular leisure activity number (%)	
Yes	12 (50)
No	**12 (50)**

Twenty-one residents (87. 5%) were satisfied (very satisfied and/or satisfied) with their choice of general surgery as a specialization. Six residents (25%) were satisfied with their work environment and four (16.7%) were satisfied with their training. Five residents (20.8%) were satisfied with their work and life balance and 7 residents (21.1%) were satisfied about their global quality of life. Only three residents (12.5%) expressed their satisfaction with their salary and 6 (25%) about their future perspectives after the residency.
For Sixteen (66.6%) residents, general surgery was their primary choice before the residency. To the question "would you choose general surgery as a specialization again?", 18 residents (75%) responded "yes".

The Maslash burnout inventory

Fourteen residents (58.3%) had a burnout according to the Maslash burnout inventory (high EE or /and high DP or/and low PA scores). Specifically, 14 resident had high EE scores (58.3%), seven (29.2%) had high DP scores and four (16.7%) had low PA scores. The results of the MBI are shown in table III.

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ISSN: 2351-8200
Research Article
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Table III: Maslash Burnout Inventory scores

Variable	Results
Choice of Specialty number (%)	
Very unsatisfied	2 (8,3)
Unsatisfied	0
Neutral	1 (4,2)
Satisfied	10 (41,7)
Very satisfied	11 (45,8)
Work Environment number (%)	
Very unsatisfied	2 (8,3)
Unsatisfied	11 (45,8)
Neutral	5 (20,8)
Satisfied	5 (20,8)
Very satisfied	1 (4,2)
Training number (%)	
Very unsatisfied	2 (8,3)
Unsatisfied	10 (41,7)
Neutral	8 (33,3)
Satisfied	4 (16,7)
Very satisfied	0
Work-life balance number (%)	
Very unsatisfied	7 (29,2)
Unsatisfied	7 (29,2)
Neutral	5 (20,8)
Satisfied	3 (12,5)
Very satisfied	2 (8,3)
Global quality of life number (%)	
Very unsatisfied	6 (25)
Unsatisfied	6 (25)
Neutral	5 (20,8)
Satisfied	5 (20,8)
Very satisfied	2 (8,3)
Health number (%)	
Very unsatisfied	0
Unsatisfied	4 (16,7)
Neutral	7 (29,2)
Satisfied	12 (50)
Very satisfied	1 (4,2)
Salary number (%)	
Very unsatisfied	7 (29,2)
Unsatisfied	12 (50)
Neutral	2 (8,3)
Satisfied	3 (12,5)
Very satisfied	0
Future perspectives number (%)	
Very unsatisfied	2 (8,3)
Unsatisfied	5 (20,8)
Neutral	11 (45,8)
Satisfied	5 (20,8)
Very satisfied	1 (4,2)
Surgery as first choice number (%)	
Yes	16 (66,7)
No	7 (29,2)
Not Sure	1 (4,2)
Choose surgery again? number (%)	
Yes	18 (75)
No	1 (4,2)
Not Sure	**5 (20,8)**

D-RECT scale

The mean overall mean D-RECT score was 2.92. The means of each domain score are shown in table IV. The two domains that had the higher scores were “Peer collaboration” (3.6) and “Meetings” (3.33). The two domains that had the lowest scores were “Formal education” (2.64) and “Feedback” (2.41). The results of the D-RECT scale are shown in table III.

Comparison between Burnout and non-burnout residents

All the variables were compared between the burnout and non-burnout residents (Table IV). None of the demographic or workload data was different between the two groups. Residents with burnout had significantly lower rates of leisure activity (28.5% vs. 100%. p=0.01).
Concerning satisfaction questions, residents with burnout had significantly lower rates of satisfaction with their work-life balance (0% vs. 50. p=0.006), global quality of life (7.1% vs. 60%. p=0.009), health (7.1% vs. 90%). They also had lower rates of satisfaction with the work environment (7.1% vs. 50%. p=0.05).

Table IV: Comparison between Burnout and non-burnout residents

Variable	Results
Emotional exhaustion	
Mean (standard deviation)	26 (13,4)
Low Score	5 (20,8)
Moderate Score	5 (20,8)
High Score	**14 (58,3)**
Depersonalization	
Mean (standard deviation)	8,9 (6,3)
Low Score	10 (41,7)
Moderate Score	7 (29,2)
High Score	**7 (29,2)**
Personal accomplishment	
Mean (standard deviation)	33,7 (7,3)
High Score	4 (16.7)
Moderate Score	8 (33.3)
Low Score	**12 (50%)**
Burnout *	
Yes	14 (58,3)
No	**10 (41,7)**

* **Burnout: high score of Emotional exhaustion and/or high score of Depersonalization and/or low score of Personal accomplishment**

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MBI and D-RECT score (Table V)

Table V: Correlation between DRECT and the Maslash Burnout Inventory

Variable	Burn-out (n=14)	No burn-out (n=10)	p
Age mean	30,93	30,20	0,53
Married (Yes) n (%)	8 (57,1)	3 (30)	0,24
Children (Yes) n (%)	2 (14,3)	2 (20)	1,00
Partner is physician (Yes) n(%)	5 (35,7) 2 (20)	0,35	
Year of residency n (%)			0,20
1stYear	5 (35,7) 3 (30)		
2ndYear	0 (0)	2 (20)	
3thYear	2 (50)	2 (20)	
4ème Year	6 (42,8)	1 (10)	
5thYear	1 (7,1)	2 (20)	
Hours Worked/weak mean	58,14	58,50	0,94
Days in OR/weak median	3,00	4,00	0,17
Days of night shifts/month median	5,00	4,00	0,47
Days of call shifts /month median	7,50	8,00	0,79
Days Worked the weekend/month median	3,00	2	0,17
Leisure activity (Yes) n (%)	4 (28,5)	10 (100)	**0,01**
Satisfaction mean			
Choice of specialty	3,79	4,70	**0,04**
Work environment	2,14	3,40	**0,005**
Training	2,29	3,00	0,07
Work-life balance	1,64	3,50	**0,0001**
Global quality of life	1,86	3,70	**0,0001**
Health	3,00	4,00	**0,005**
Salary	3,00	4,00	**0,34**
Future Perspectives	2,79	3,1	**0,47**
Surgery as first Choice (Yes) n (%)	9 (64,2)	5 (50)	1,00
Do surgery again (Yes) **n (%)**	**9 (64,2)**	**5 (50)**	**0,34**

The mean global D-RECT score was lower in the burnout residents (2.73 vs. 3.12. p=0.08). Except for the domain "Peer collaboration", the mean scores for the other domains were lower among the burnout residents group. However, the difference was significant only for the "Team work" domain (2.51 vs. 3.50. p=0.02).

DISCUSSION

This study showed that general surgery residents in Rabat had high rate of Burn-out (58.3%) and low rates of satisfaction with their training and work environment. It also showed that the burnt-out residents had statistically lower satisfaction rates with their work-life balance, global quality of life and health. The global D-RECT score was lower in the burnout group, and the only statistically significant sub-scale associated with burnout was the "teamwork" subscale. This is the first study objectively evaluating the burnout and the learning climate among general surgery residents using internationally validated scores.

In this study, 7 residents (29.1%) had high scores in at least two sub-scales and 3 residents (12.5%) in the three subscales of the Maslash-Burnout inventory. These residents should be identified and benefit from a specific management by the academic team. Burnout is a serious and frequent condition among general surgery residents. The reported rates of burn-out among general surgery residents in the literature vary from 40% to 69% [3, 4, 18]. Burnout has dramatic consequences on residents' well-being. In this study, burnt-out residents had significantly lower satisfaction rates about their global quality of life and work-life balance and health. Health problem may seem paradoxal in a young population of doctors. In a recent review, burnout during residency may negatively impact physical condition with symptoms such as insomnia, fatigue, flu, headaches, gastrointestinal disorders and cardiovascular disease were reported in burnt-out physicians [1]. More serious consequences such as depression, suicidal ideas, and an increasing risk of medical errors were also reported [1, 19–23]. Therefore, prevention and management of burnout should be a priority in any general surgery residency program. Identifying risk factors is a key step in order to develop effective preventive strategies [24].

We tried to identify factors associated with the burn-out among general surgery residents in Rabat. None of the demographics factors were associated to the burnout. These factors were extensively analyzed in the literature leading to conflicting

ISSN: 2351-8200
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results [1]. Some studies have suggested that female residents had higher burnout rates than males [4]. At the opposite, in a review by Thomas et al. about residents burnout, there was no gender differences in 15 studies reporting about the subject [25]. In our study, there were only two females residents and therefore, gender difference could not be evaluated. The impact of age and marital status was also extensively evaluated in the literature with conflicting results. However, very few studies concerned general surgery residents [1, 3, 4, 17].

Unexpectedly, workload factors (hours worked per week, shifts and operative room activity) were not associated with the occurrence of burnout. The mean number of hours worked per week (60 hours), was lower than what is reported in American studies (80 hours). However, even in these settings, many studies showed no association between burn-out and the number of hours worked [3, 4, 18, 26]. In fact, a quantitative approach of the workload may not be the accurate way to explore this variable however the quality of time spent at work may be more adapted. For this reason, we decided to analyze the relationship between burnout and the learning climate as evaluated using the D-RECT tool. The D-RECT has proven to be reliable to evaluate the learning climate of residency programs [15] and its subscales cover many aspects of everyday residents' work.

In this study, the mean D-RECT score was lower in the burnout residents group (2.73 vs. 3.12. P=0.08) but did not reach the significance probably due to the small size of the population. The only D-RECT subscale score statistically associated with burnout was "team work" (2.51 Vs. 3.50 P=0.02). This subscale evaluated the work between attending, residents and nursing staff and the presence of teamwork culture in the training program. This result suggests the importance of a healthy team-work culture and its importance for the wellbeing of residents. Also, the subscale "Work is adapted to residents' competence" was lower in the burnout group, without reaching statistical significance (2.51 vs. 3.07. P=0.08). This subscale evaluated the adequacy between the work performed by the residents and their experience, competency and learning objectives and if residents workload allowed them enough time to learn new skills. The qualitative approach to work conditions seems to be helpful to explain the occurrence of burnout and objective tools such as the D-RECT may be helpful to identify specific areas compromising the wellbeing of residents.

D-RECT score also allows identifying areas of the learning climate that would need improvement [7, 8]. In this study, the subscales that had lower scores were "Feedback", "formal education" and "coaching and assessment" and would explain why only 16.7% of residents were satisfied with their training.

Surgery and surgery training are very demanding physically and psychologically [27]. Residents play an integral role in the coordination and delivery of patient care in their departments [4]. Therefore, well-being strategies and programs should be designed and implemented to prevent and manage the burnout syndrome. However, and despite the high reported rates of burnout among surgeons and training surgeons, these strategies are rare, especially in surgery [19]. The interventions may be classified in two categories: individual-driven behavioral interventions and workplace driven interventions [1].

In the individual-driven category, having a regular leisure activity was associated with less burnout rate (0 vs. 28.5 %. P= 0.01) in this study. It is one of the most effective strategies in the literature to prevent and manage burnout [1]. Activities such as meditation, physical exercise and music have been shown to be effective for burnout [1, 28]. Outside the surgery field, many studies analysed the impact of specific programs such as stress management, positive psychology, time and priority management, and discussion groups [19, 29]. However, these interventions are rare and their results are not conclusive enough to reach a recommendation level [19]. We could find only one study within the surgery field. Salles et al. investigated in a randomized trial the impact of an intervention designed to improve general surgery residents sense of belonging. In the belonging group, junior residents were asked to read anecdotes from senior residents about the challenges they had faced earlier in their residency. They found that residents in the intervention group had significantly lower rates of burnout [30].

One example of a workplace-driven strategy was proposed by Chung et al. They evaluated the effect of a reorganization of work activities according to a goal oriented strategy on residents activity and well-being before and after the reintervention [31]. After the reorganization, there were a qualitative improvement in the work organization and the team work. Additionally, residents' stress decreased and their work satisfaction improved, even though work hours and physical fatigue did not decrease. It is therefore important to analyze objectively factors that would deteriorate the organization and the team work culture within surgical teams. Then, develop strategies for improvements. In the context of residency, tools such as D-RECT might be valuable to identify areas of improvement and to monitor the impact of corrective strategies.

ISSN: 2351-8200
JMSR 2017, Vol III; N°3: 327-334

The main limitation of this study is the limited number of residents that did not allow us to perform a multivariate analysis. However, the participation rate was relatively high (75%), even though the total number of participants was low (24). The D-RECT instrument was found to be reliable and valid, needing only 3 to 11 resident evaluations for a reliable evaluation of each residency program's learning climate [7, 15]. Therefore, this study was able to evaluate reliably the learning climate in our context. And since the participation rate was high, the evaluation of burnout can be considered as reliable for our residency program.

This study suggests that residency programs should include regular evaluations of burnout and its risk factors, particularly those related to the learning climate. It reinforces the fact that the evaluation of the learning climate is a quality indicator for the curriculum and should be administered annually [8]. The D-RECT score with its sub-scales may strongly help to identify specific areas associated with burnout and therefore, develop effective and specific strategies to improve residents' well-being.

CONCLUSIONS

This study highlights the importance and consequences of burnout among general surgery residents and its strong relationship with the learning climate. Using objective assessment tools such as the D-RECT score may be helpful to identify work related factors associated to burnout and develop and monitor effective strategies for improvement.

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