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Original article

Are French orthopedic and trauma surgeons affected by burnout? Results of a nationwide survey

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Abstract

Introduction

Burnout is a pathology that can affect care-giving professionals. It associates emotional exhaustion (EE), depersonalization (DP) and impaired personal accomplishment (PA). Surgery entails great responsibility and frequently heavy workloads, incurring risk of burnout. Data, however, are not available for French orthopedic and trauma surgeons. We therefore conducted a prospective survey to 1) assess burnout prevalence in French orthopedic surgeons, and 2) investigate risk factors and protective factors.

Hypothesis

Burnout prevalence is at least as high in French orthopedic surgeons as in other medical and surgical specialties.

Materials and methods

A nationwide survey was conducted in France between February and April 2017, using a digitized questionnaire sent out by e-mail. Burnout was assessed on the MBI (Maslach Burnout Inventory), and depressive symptoms on the GHQ-12 (General Health Questionnaire-12). Demographic and occupational data were also collected.

Results

Out of 1,900 surgeons contacted, 441 (23%) responded. Mean age was 50.2 ± 10.1 years; 413 (93.7%) were male. Sixty one (14%) reported elevated EE, 100 (23%) elevated DP, and 82 (19%) impaired AP. One hundred and seventy two (39%) showed burnout symptomatology (i.e., pathologic score on one MBI scale), while 47 (10%) had pathologic scores on 2 or 3 scales, indicating severe burnout. One hundred and ninety three (43%) would not advise their children to take up orthopedic surgery. Thirty eight (8%) expressed suicidal ideation. Statistical analysis identified public-sector practice (OR = 4.6; 95% CI: 2.1-10.7; $p=0.0002$)

and pathologic GHQ-12 score (OR = 6.3; 95% CI: 2.2-17.8; p=0.0006) as risk factors for burnout. Outside activity (OR = 0.39; 95% CI: 0.1-0.9; p=0.0406) and male gender (OR = 0.2; 95% CI: 0.05-0.7; p=0.0160) emerged as protective factors.

Discussion

Despite a response rate of only 23% (n=441/1,900), the present study sheds light on burnout rates in French orthopedic surgeons, with 39% burnout symptoms and 10% severe burnout.

Burnout impacts personal and occupational life, with increased suicidal ideation and impaired quality of life. The present results confirm the importance of screening and treatment in care-providers.

Type of study: level IV, prospective descriptive transverse study without control group.

Key-words: burnout, orthopedic surgery, suicide, Maslach Burnout Inventory

1. Introduction

In the early 1970s, Freudenberger pioneered the concept of burnout [1]; then the American psychiatrist Maslach [2] went on to define a syndrome associating emotional exhaustion (EE), impaired personal accomplishment (PA), and depersonalization (DP) (i.e., considering patients as objects). By definition, burnout develops chronically over several years, and affects care-giving professionals: e.g., in the medical and legal worlds. It may be associated with a genuine depressive syndrome, but can be distinguished on certain points: chronic onset without significant trigger factors or prior psychopathology, and restriction to occupational life, at least in the early stages.

Consequences are varied, impacting personal and occupational life. At the personal level, there is negative impact on family life and quality of life [3]. There are associations with cardiovascular pathology, type-2 diabetes [4] and addictive substance abuse (alcohol, smoking). Suicidal behavior is the most severe consequence [5]. Patients are secondary victims of physician burnout, with increased rates of medical error [6] and diminished care quality [7,8].

Medical professions are especially exposed [9], and particularly surgery [10]. Over their career, surgeons face a multitude of situations that are stressful for themselves and also for their family [11,12]. In the US, burnout affects about a third of surgeons, with differences according to specialty: vascular, urologic and head and neck surgeons are among the most affected [10,13]. In France, data on burnout in orthopedic surgery residents have been reported [14], but there have been no studies in senior orthopedic surgeons. We therefore conducted a prospective survey, to 1) assess burnout prevalence in French orthopedic and trauma surgeons, 2) investigate risk factors and protective factors. The study hypothesis was

that burnout prevalence in French orthopedic and trauma surgeons is at least as high as in other medical and surgical specialties.

2. Materials and methods

2.1 Study population

A nationwide transverse survey contacted French orthopedic and trauma surgeons as a whole: an estimated 1,900 contacts. The survey design was approved by the French data protection commission (*Commission Nationale de l'Informatique et des Libertés*: CNIL) and review board (*Comité de Protection des Personnes*: CPP). Data collection used the LimeSurvey™ web application, version 2.73.0+.

2.2 Data collection

The survey questionnaire was e-mailed to a list compiled using the data-base of the French Society of Orthopedic Surgery and Traumatology (SoFCOT), which contained 2,222 addresses, 15% of which were false or out of date, leaving 1,900. Data were collected between February and April 2017. The e-mail comprised a request to respond, explanations about the study, and a hypertext link to the on-line survey form. A reminder was sent on the 15th day of data collection. Participation was voluntary and data were anonymous.

2.3 Assessment methods

Burnout was assessed on the Maslach Burnout Inventory (MBI) [2], a validated 22-item questionnaire widely used in the literature [15]. It explores the 3 dimensions of burnout on 3 scales. A high score on one scale is considered to be a symptom of burnout; pathologic scores on 2 or 3 scales strongly suggest severe burnout [2]. Depressive symptoms were assessed on GHQ-12 [16,17], a validated 12-item questionnaire; responses were recorded on a bimodal scale, with scores ≥ 4 indicating strong probability of clinically significant

psychological distress. Additional questions assessed demographic characteristics, satisfaction at work, occupational data and suicidal ideation.

2.4 Statistics

Statistical analysis used SAS™ software, version 9.3 (SAS Institute Inc., Cary, NC). For initial descriptive analysis, quantitative variables were reported as mean with standard deviation and qualitative variables by numbers, modality and percentage. The questionnaire was designed to avoid missing data for the main endpoint (MBI). All variables were tested on univariate analysis according to MBI EE, DP and PA score. Multivariate analysis by logistic regression then assessed relations between the 3 MBI dimensions and questionnaire variables; variables with p-value <0.2 on univariate analysis or having particular clinical interest were introduced in the multivariate analysis, as were age and gender. Linearity was checked for each quantitative variable. All tests had type-1 2-tailed error set at 0.05.

3. Results

Four hundred and forty one French orthopedic and trauma surgeons out of 1,900 responded (23%). **Table 1** shows demographic and occupational data; no further details, such as geographic origin, were requested, to ensure anonymity. There were 413 males (93.7%); mean age was 50.2±10.1 years, with 151 older than 55 years (34%) and 48 younger than 35 (10.9%). Two hundred and thirty (52%) worked in the private sector. Respondents reported a mean 56.9±12.8 hours' work per week, with 19.5±6 hours in the operating room; 86 (19%) reported working more than 65 hours per week.

Concerning burnout (**Table 2**), there was a 14% rate of EE (n=61), 23% of DP (n=100), and

19% (n=82) of impaired AP. One hundred and seventy two respondents (39%) showed burnout symptoms, with a pathologic score on 1 MBI scale; 47 (10%) showed severe burnout, with pathologic scores on 2 or 3 scales. There was a 27% rate of severe burnout in young surgeons (n=7/26), 10% (n=38/374) in hospital practitioners, and 4.8% (n=2/41) in university professors and lecturers. One hundred and thirty respondents (29.5%) showed depressive symptoms on the GHQ-12. Women showed significantly more burnout symptoms than men (p=0.0282) on MBI (Table 3). There was no significant difference in MBI according to private (n=230) or public sector practice (n=211) (Table 3).

On univariate analysis (Table 4), public sector practice (OR = 4.6; 95% CI: 2.1-10.7; p=0.0002) and depressive symptoms (OR = 6.3; 95% CI: 2.2-17.8; p=0.0006) emerged as risk factors for burnout. Male gender (OR = 0.2; 95% CI: 0.05-0.76; p=0.0160) and outside activity to manage stress (sports and leisure activity away from home and work) (OR = 0.4; 95% CI: 0.16-0.98; p=0.0406) emerged as protective factors.

Job satisfaction was assessed on several subjective questions (Table 5). Two hundred and four respondents (46%) said they would recommend a career in orthopedic surgery to their children or friends; 229 (51%) would recommend medical studies. Financially, 194 respondents (44%) were "satisfied" or "very satisfied" with their income in relation to workload; 174 (39%) considered taking early retirement.

4. Discussion

In France, there have been few studies of burnout in the medical context and, to our knowledge, none have focused on French orthopedic and trauma surgeons. The present

survey found 14% EE (n=61), 23% DP (n=100) and 19% (n=82) impaired PA. One hundred and seventy two respondents (39%) showed burnout symptoms (pathologic score on 1 MBI scale) and 47 (10%) showed signs of severe burnout (pathologic score on pathologic score on 2 or 3 MBI scales). There have been many studies of burnout in various medical and surgical specialties (Table 6). In the current population, young surgeons were more affected by burnout than their senior colleagues. In young American orthopedic surgeons, Sargent et al. [19] found 28% EE, 24% DP and 10% impaired PA. Forty percent of French orthopedic residents [14] were reported to show signs of severe burnout. Young age and lack of experience thus seem to play a role in onset of burnout. One hypothesis is that growing experience over a surgeon's career improves the handling of stressful situations.

In a very large survey of almost 8,000 American surgeons of all specialties, Shanafelt et al. [6] reported 31% EE, 26% DP and 12% impaired PA. In British vascular and colorectal surgeons, Sharma et al.[20] reported 31% EE, 21% DP and 28% impaired PA. Despite the high rate of burnout in the present study and in the literature, orthopedics seems to be one of the least affected surgical specialties, according to Balch et al. [28]. Burnout also strongly affects non-surgical specialties, such as French intensive care physicians, in whom Embriaco et al. [25] reported 19% EE, 37% DP and 39% impaired PA.

In the current findings, burnout was associated with public-sector practice (OR = 4.6) and depressive symptoms (OR = 6.3). It is impossible to know whether depressive symptoms are a cause or a consequence of burnout. That public sector practitioners were more exposed than their private-sector colleagues is contrary to what Balch et al. [28] found in American surgeons; this difference is probably due to the very different health systems in the two countries. Other notable associated factors are litigation and uncertain occupational prospects [21], and also excessive working hours and number of on-call and night-duty shifts

[22,24]. Male gender emerged as a protective factor (OR = 0.2; 95% CI: 0.05-0.76; p=0.0160) in the current study; but the number of female respondents was very low (n=28). Even so, women do seem more exposed to burnout than their male colleagues [3,23], perhaps due to more acute conflict between private and working life: pregnancy requiring maternity leave of variable duration, hierarchical pressure, etc. Having children and striking a good balance between private and working life are frequently reported protective factors [3].

One hundred and ninety three respondents (44%) would not recommend a career in orthopedic surgery to their children or friends. Similar figures were reported in the USA [13,28]. The worst progression of burnout consists in suicidal behavior. In the present study, 38 respondents (8.6%) reported suicidal ideation during the previous 12 months, which is 2-to-3-fold greater than in the general French population [29], but lower than in Italian (17%) or Swedish surgeons(12%) [5], or in French intensive care staff (32%) [25].

The present study had several biases and limitations. Firstly, the response rate was low, at 23% (n=441/1,900), poorer than usually found in such surveys of addressed to physicians [30], but similar to other studies of burnout in medical and surgical practitioners [13,19,21-23]. Moreover, the e-mail format precluded knowing exactly how many surgeons had actually received and read the invitation, which may have led to underestimation of the response rate. Secondly, this kind of survey tends to introduce a response bias. It is hard to say whether surgeons in a situation of burnout would tend not to participate in such a study due to their fragility, or on the contrary would be more inclined to testify on a subject by which they are concerned. Thirdly, the design was transversal, precluding analysis of cause and effect between factors. Finally, it must be borne in mind that the MBI is a prognostic instrument and in no way represents a diagnosis of burnout, so that any results are to be interpreted with caution. The study also had several strong points. Firstly, to our knowledge

this is the first study of this type focusing on French orthopedic and trauma surgeons. Despite an apparent low response rate, the study population counted more than 400 surgeons, with a sex ratio (M/F ratio 93.7%/6.3%) and mean age (50.2 ± 10.1 years) similar to those found in the French atlas of medical demographics [31], making the study population comparable to the general population of French orthopedic surgeons. Moreover, the questionnaire was based on validated instruments such as the MBI, widely used in the literature, facilitating cross-study comparison. Finally, as well as burnout, the study harvested a range of information on professional practice, enabling multivariate analysis to reveal factors associated with burnout.

5. Conclusion

The current study found a significant rate of burnout in French orthopedic and trauma surgeons: 10% severe burnout, and 40% burnout symptoms. These results are similar to those reported elsewhere. The consequences of this pathology can be severe, both for the physician (suicidal behavior, etc.) and for the patient (medical error, etc.) These conclusions suggest that preventive measures and treatment should be undertaken at local and national level.

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Author contributions: Grégoire Faivre: (1) conception and design of the study, data acquisition, analysis and interpretation, (2) drafting the article and revising it critically for important intellectual content, (3) final approval of the version to be submitted. Guillaume Marillier: (1) conception and design of the study, data acquisition, analysis and interpretation, (2) drafting the article and revising it critically for important intellectual content. Jérémie Nallet: (1) conception and design of the study, data acquisition, analysis and interpretation, (4) statistics. Sylvie Nezelof: (1) conception and design of the study, data acquisition, analysis and interpretation, (2) drafting the article and revising it critically for important intellectual content. Isabelle Clement: (1) conception and design of the study, data acquisition, analysis and interpretation, (2) drafting the article and revising it critically for important intellectual content. Laurent Obert: (3) final approval of the version to be submitted.

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Table 1: Demographic data

Demographic and occupational data	n (441)	%
Gender		
Male/female sex ratio	413/28	93.7%/6.3%
Age		
≤ 35 years	48	10.9%
36-45 years	94	21.3%
46-55 years	148	33.6%
>55 years	151	34.2%
Work structure		
Private sector	230	52.1%
University hospital	106	24.0%
General/regional hospital	76	17.2%
Other	29	6.6%
Hours worked per week		
≤45	86	19.5%
46-55	134	30.4%
56-65	135	30.6%
>65	86	19.5%
Number of on-call/night duties per month		
≤4	160	36.3%
5-8	159	36.1%
9-12	72	16.3%
>12	50	11.3%
Litigation during previous 5 years		
Yes	218	49.4%
No	213	48.3%
No data	10	2.3%

Table 2: Maslach Burnout Inventory (MBI) [2] and General Health Questionnaire-12 (GHQ-12) [16,17] scores

Burnout syndrome and depressive disorder	n (441)	%
Score MBI :		
Emotional exhaustion		
High (≥ 30) (pathological)	61	14%
Moderate (18-30)	111	25%
Low (≤ 17)	268	61%
Depersonalization		
High (≥ 12) (pathological)	100	23%
Moderate (6-11)	167	38%
Low (≤ 5)	174	39%
Personal accomplishment		
Low (≤ 33) (pathological)	82	19%
Moderate (34-39)	106	24%
High (≥ 40)	253	57%
At least 1 pathological score	172	38.9%
On 1 scale	125	28.3%
On 2 scales	39	8.8%
On 3 scales	8	1.8%
GHQ-12 score		
≥ 12 (pathological)	130	29.5%
<12	311	70.5%

MBI: Maslach Burnout Inventory; GHQ-12: General Health Questionnaire-12

Table 3: Maslach Burnout Inventory (MBI) score [2] according to gender and sector (private, public)

	Public sector (n=211)	Private sector (n=230)	p
Pathologic score on 1 MBI scale	65	60	0.2911
Pathologic score on 2 or 3 MBI scales	27	20	0.1685
	Female (n=28)	Male (n=413)	
Pathologic score on 1 MBI scale	13	112	0.0282
Pathologic score on 2 or 3 MBI scales	1	46	0.3413

MBI: Maslach Burnout Inventory

Table 4: Factors associated with burnout on multivariate analysis

Factors associated with burnout on multivariate analysis	OR	95% CI	p
Risk factors			
Pathological GHQ12 score	6.0321	2.2275 – 17.8877	0.0006
Public environment practice	4.6820	2.1086 - 10.7316	0.0002
Protective factors			
Outside activities to manage stress	0.3984	0.1671 - 0.9855	0.0406
Male gender	0.2003	0.0540 - 0.7624	0.0160

OR: Odds Ratio; 95% CI: 95% confidence interval; GHQ-12: General Health Questionnaire-12

[16,17]

Table 5: Job satisfaction, suicidal ideation and harassment at work.

Job satisfaction, suicidal ideation, harassment at work	n (441)	%
Would recommend orthopedic surgery career to children		
Yes	204	46.3%
No	193	43.8%
Don't know	44	10.0%
Satisfaction with income in relation to workload		
Very dissatisfied	46	10.4%
Dissatisfied	101	22.9%
Neither satisfied nor dissatisfied	100	22.7%
Satisfied	149	33.8%
Very satisfied	45	10.2%
Considering early retirement		
Yes	174	39.5%
No	244	55.3%
Don't know	23	5.2%
Suicidal ideation in previous 12 months		
Yes	38	8.6%
No	398	90.2%
Don't know	5	1.1%
Situations of harassment at work during previous year		
Yes	77	17.5%
No	341	77.3%
Don't know	23	5.2%

Table 6: Burnout rates according to medical and surgical specialty in senior practitioners.

Authors	Specialties, country	Number of participants	Participation rate (%)	EE (%)	DP (%)	Impaired PA (%)
Present study	Orthopedic surgery, France	441	22	14	23	19
Surgical						
Streu et al. [18]	Plastic surgery, USA	506	71	29	16	5
Sargent et al. [19]	Young orthopedic surgeons, USA	264	24	28.4	24.8	10
Shanafelt et al. [13]	All surgical specialties, USA	7905	32	31	26	12.8
Sharma et al. [20]	Vascular and colorectal surgery, UK	501	58	31.7	21.2	28.8
McAbee et al. [21]	Neurosurgery, USA	750	24	35.1	31.3	28
Kuerer et al. [22]	Oncologic surgery, USA	549	36	24.1	15.2	9.6
Rath et al. [23]	Gynecology, USA	369	34	30	10	11
Medical						
Kluger et al. [24]	Anesthesia, Australia	422	60	20	20	36
Embriaco et al. [25]	Intensive care, France	978	82.5	19	37	39
Soler et al. [26]	General medicine, Europe (12 countries)	1393	41	43	35	32
Arigoni et al. [27]	Pediatrics, oncology, general medicine, Switzerland	371	66	33	22	20

EE: motional exhaustion; DP: depersonalization, PA: personal accomplishment.