

**Psychiatric and psychological follow-up of
undergraduate and postgraduate medical students:
prevalence and associated factors. Results from the
national BOURBON study**

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Burnout in French physicians: a systematic review and Meta-analysis

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Abstract:

Background. Burnout syndrome is the consequence of chronic work-related stress exposure and is 2 to 3 times higher than in physicians than in other professions. Many studies exploring burnout in French physicians have been published with inconsistent data regarding its prevalence and associated factors.

Objective. To assess the prevalence of burnout and associated factors in French physicians in a systematic review and meta-analysis.

Material and methods Studies assessing the prevalence of French physician's burnout and its three dimensions Emotional Exhaustion (EE), Depersonalization (DP) and Personal Accomplishment (PA) were selected in the following databases from 2000 to April 2017: MEDLINE, BIOSIS WEB OF SCIENCE, PASCAL ET FRANCIS, SCIENCES DIRECT, PSYCHinfo, and BDSP. Burnout was defined by one abnormal score in one or more of the 3 dimensions of the MBI scale (EE, DP or PA). Severe burnout was defined by the association of high scores of EE and DP, and low score of PA. High EE was defined by an EE score ≥ 27 . High DP was defined by a score ≥ 10 . Low PA was defined by a score ≤ 33 .

Results.

A total of 37 studies and 15,183 French physicians were included in the present meta-analysis. The random effects pooled prevalence estimate was 49% (95% CI 45–53%, $P < 0.001$, $I^2 = 93.1\%$) for burnout, 5% (95% CI 4–7, $P < 0.001$, $I^2 = 92.7\%$) for severe burnout, 21% (95% CI 19–24, $P < 0.001$, $I^2 = 94.7\%$) for high EE, 29% (95% CI 25–33, $P < 0.001$, $I^2 = 96.7\%$) for high DP, and 29% (95% CI 24–34, $P < 0.001$, $I^2 = 97.7\%$) for low PA. Emergency physicians were found to have a trend to higher rates of burnout ($p=0.051$), and significantly more severe burnout compared to other physicians ($b = 0.05$, $se[b] = 0.02$, $P = 0.019$). Junior residents were found to have higher rates of DP; junior residents, sample size, and monthly number of night shifts were associated with lower PA; and anesthesiologists were found to have lower rates of high EE and high DP.

Conclusion.

Burnout is highly prevalent in French physicians. Some recommendations may be suggested to reduce this rate, including reducing the number or duration of night shifts to increase personal accomplishment and targeting emergency physicians and junior residents in priority. Other specialties should be explored in future studies.

Key words: Burnout, physicians, prevalence, risk factors, specialties, France

Introduction

Burnout is a psychological syndrome that results from exposure to chronic work-related stress (Lee et al., 2010). It has been described by Maslach as a condition in which professionals “lose all concern, all emotional feeling for the people they work with, and come to treat them in a detached or even dehumanized way”. Burnout includes 3 dimensions assessed with the Maslach Burnout Inventory scale (MBI)(Maslach and Jackson, 1981): emotional exhaustion (EE) (tiredness, somatic symptoms and decreased emotional resources), depersonalization (DP) (developing negative, cynical attitudes and impersonal feelings towards their patients) and lack of personal accomplishment (PA) (feelings of incompetence, inefficiency and inadequacy) (Kumar, 2007). Burnout has been extensively associated with increased risk of major depressive disorder, suicide, cardio-vascular diseases and substance abuse (Center et al., 2003; Wallace et al., 2009).

The mean prevalence of physician’s burnout is two to three times higher rate than in other professions (Shanafelt et al., 2012; Spinelli, 2013; Veyssier-Belot, 2015) and has a negative impact on the quality of patients’ care through increased medical errors, decreased empathy and productivity at work (Shanafelt et al., 2010). While burnout syndrome has been described for the first time by Claude Veil in France in 1959 (Mion et al., 2013), and further by Freudenberger in 1975 (Veyssier-Belot, 2015), this phenomenon has been poorly evaluated until the 2000s in France. The findings of the literature regarding prevalence and associated factors of burnout are currently discrepant, especially regarding its prevalence ranking from 28% (Yven and Gurrera, 2013) to 73% (Sende et al., 2012). A quantitative analysis is therefore needed to synthetize data to guide public health policies and to compare international rates of burnout in physicians. Beyond the nationality of the authors, France has been chosen because of its unique health care system that may influence burnout rates (Marc, 2009). With more than 67.2 million inhabitants and more than 215,000 physicians in 2017, France is also the second most populated country of Europe.

The objective of the present work was to synthetize in a comprehensive systematic review and meta-analysis the data exploring burnout syndrome prevalence and associated factors in French physicians.

Method

Definitions

All definitions were based on the MBI scale (Maslach and Jackson, 1981). Burnout was defined by one abnormal score in one or more of the 3 dimensions of the MBI scale (EE, DP or PA).

Severe burnout was defined by the association of high scores of EE and DP, and low score of PA. High EE was defined by an EE score ≥ 27 . High DP is defined by score higher than 10. Low PA was defined by a score lower than 33 (Maslach and Jackson, 1981).

Study selection

All epidemiological studies assessing the prevalence of physician's burnout, severe burnout, high EE, high DP, and low PA in France were included in the present work. To guarantee the timeliness of the data, the following databases were explored from January 2000 to April 2017: MEDLINE, BIOSIS WEB OF SCIENCE, PASCAL ET FRANCIS, SCIENCES DIRECT, PSYCHARTICLES PSYCHINFO, and a French database: Banque de données en santé publique (BDSP). A specific search strategy was developed based on a combination of the following terms: [burnout AND physicians AND France]. For the BDSP, the following search strategy was used: [épuisement professionnel], [médecins] AND [France]. Two persons on the reviewing team (LB and ZK) independently reviewed the references and abstracts retrieved by the search and assessed the comprehensiveness of the data abstraction. A structured data abstraction form was used to ensure the consistency of the appraisals of each study. Three investigators were requested by mail to provide data to supplement incomplete reports in the original articles, two of them responded. In addition, the reference lists of retrieved articles and thesis were hand-searched to identify relevant additional studies. The study has been registered in PROSPERO (CRD42018095435).

Inclusion criteria

1. Design: epidemiological study.
2. Participants: physicians/physicians practicing medicine in France.
3. Burnout diagnosis with sub dimensions (EE, DP, and PA) based on the MBI scale.
4. The prevalence rates were reported for burnout and/or its three dimensions.

Study selection and data extraction

Two authors (LB and ZK) screened the titles and abstracts of the database records and retrieved the full texts for eligibility assessment and independently examined the full-text records for eligibility. Disagreements were resolved by consensus discussion with a third author (MH).

The articles of the studies were independently reviewed by LB and ZK. The data was independently extracted into an excel table that included the following variables: author name, year of publication, sample mean age, sex ratio, study methodological quality, sample size, specialty, and participation rate. Other criteria were identified in a second table: number of physicians with burnout, severe burnout, high EE, high DP, and low PA; work-hours per week, night shifts per month, marital status, percentage of physicians having children, intention to quit work, feeling to be in burnout, and suicidal thoughts. Any discrepancies were resolved by consensus with a third reviewer (MH).

Assessing the Methodological Qualities of Included Studies:

The methodological qualities of the included studies were assessed independently by 2 of the authors (ZK and MH) using a validated checklist of items for cross sectional studies in epidemiology, the strengthening the Reporting of Observational Studies in Epidemiology (STROBE)(Vandenbroucke et al., 2007). Any discrepancies were resolved by consensus with a third reviewer (LB).

Statistical analyses:

The overall pooled-prevalence was estimated with a random effect model (DerSimonian and Laird, 1986) that accounted for between-study heterogeneity. Heterogeneity was assessed using the I^2 statistic, which represents the percentage of variance that is due to between-study factors rather than sampling error(Higgins et al., 2002, 2003). I^2 values $>50\%$ were considered as indicative of large heterogeneity. We used funnel plots and the Egger regression intercept (which assesses the degree of funnel plot asymmetry based on the intercept from the regression of the standard normal deviates against the precision) to estimate the risk of bias(Borenstein, 2009). Forest plots were generated to demonstrate the prevalence with the corresponding confidence intervals (CIs) for each study and the overall random effects pooled estimate. The potential sources of heterogeneity were investigated by arranging groups of studies according to potentially relevant characteristics into subgroups and meta-regression analyses. The factors that

were individually examined included the following: date of publication (in years), participation rate (2 groups: 70% and <70%), sample size, study quality, mean age, sex ratio, work hours per week, night shifts per month, marital status, having children, intention to quit work, feeling to be in burnout, suicidal thoughts, outpatient/inpatient physician, specialty (4 groups: GPs, residents and juniors physicians, intensive care and anesthesiologists, and emergency physicians). The factors associated with heterogeneity at $P < 0.20$ were subsequently included in multivariate meta-regression models.

The analyses were performed with Comprehensive Meta-Analysis Software (version 2.0, National Institute of Health) and the STATA statistical software package, version 10 (Stata-Corp 2007, College Station, TX) using the command metareg (for meta-regression).

Role of the Funding Source

No drug manufacturing company was involved in the study design, data collection, data analysis, data interpretation, writing of the report, or in the decision to submit the report for publication. All authors saw and approved the final version of the article. The corresponding author had full access to all data and decided to submit for publication.

Results

Literature Search

The PRISMA statement flowchart (Figure 1) describes the literature screening, study selection, and reasons for exclusion. A total of 37 studies (Barbarin b, 2012; Birault et al., 2015a; Blanchard et al., 2010a; BONTOUX, 2016; BUCHLIN, 2011; Cathébras et al., 2004; Chati et al., 2016; Dominique et al., 2013; Dréano-Hartz et al., 2016; Dusmesnil et al., 2007; EL OUALI, 2006; Embriaco et al., 2007a; Faille and Trichard-Salembier, 2012; Fellingner and Henry, 2011; Galam et al., 2013a; Garrouste-Orgeas et al., 2015; Guerin and Verfaillie, 2010; Guinaud and Compagnon, 2006; HERY, 2008; JARRY, 2005; Latourelle and Senon, 2004; Lesage et al., 2013; LETURQUE, 2016; NGUYEN GENOUX, 2006; Philippon and Moreau, 2004; Poly-

Laborderie, 2009; ROMERO VIDAL, 2010; Roumiguie et al., 2011; Sende et al., 2012; Soazic D-z, 2013; TRICHARD et al., 2005; Truchot, 2009, 2003; VAQUIN-VILLEMINEY and Wong, 2007; VIAUD H el ene, 2011; Yven and Gurrera, 2013; ZETER Christophe, 2004) and 15,183 French physicians were included in the present meta-analysis. The methodological qualities of the included studies are presented in supplementary Table 1; and their characteristics in Table 1.

Regarding the type of specialty, 4 studies included emergency physicians (Birault et al., 2015b; Fellingner and Henry, 2011; Sende et al., 2012; Yven and Gurrera, 2013), 4 studies included anesthesiologist and intensive care physicians (Dr eano-Hartz et al., 2016; Embriaco et al., 2007b; Garrouste-Orgeas et al., 2015; Soazic D-z, 2013), 7 studies included junior residents (Barbarin b, 2012; Blanchard et al., 2010b; Chati et al., 2016; Dominique et al., 2013; Galam et al., 2013b; Guinaud and Compagnon, 2006; Roumiguie et al., 2011), and 17 studies included GPs; 18 studies included inpatient physicians and 19 included outpatient physicians. 22 studies were medicine thesis. Four studies reported response rate above 80% (Dusmesnil et al.; Embriaco et al., 2007c; Garrouste-Orgeas et al., 2015; Guinaud and Compagnon, 2006), 15 studies reported response rates between 10% and 50%. Only 1 study did not provide response rate (Yven and Gurrera, 2013).

Prevalence Estimates

Burnout

Twenty-three studies including 9,667 physicians provided data about the prevalence of burnout (figure 2 and 3). The prevalence estimates ranged from 28% to 73%. The random effects pooled prevalence estimate was 49% (95% CI 45–53, $P < 0.001$, $I^2 = 93.1\%$). The mean prevalence of burnout was 48% for GPs (95% CI 45–51, $P = 0.008$, $I^2 = 58.3\%$), 52% for junior residents (95% CI 43–61, $P < 0.001$, $I^2 = 92.8\%$), 44% for anesthesiologists (95% CI 38–50, $P = 0.051$, $I^2 = 73.7\%$) and 57% of emergency physicians (95% CI 35–78, $P < 0.001$, $I^2 = 96.8\%$). No statistical difference has been found between medical specialties (all $p > 0.05$) but a trend toward significance has been found for emergency physician ($p = 0.051$).

In the multivariate meta-regression, only study quality remained associated with burnout ($b = 0.02$, $se[b] = 0.009$, $P = 0.03$) (table 2).

Severe burnout

Twenty studies including 9,672 physicians provided data about the prevalence of severe burnout (figure 4 and 3). The prevalence estimates ranged from 1% to 23%. The random effects pooled prevalence estimate was 5% (95% CI 4–7, $P < 0.001$, $I^2 = 92.7\%$). The prevalence of severe burnout was 5% for GPs (95% CI 3–6, $P < 0.001$, $I^2 = 84.6\%$), 5% for junior residents (95% CI 2–8, $P = 0.017$, $I^2 = 75.4\%$) and 12% for emergency physicians (95% CI 2–19, $P = 0.001$, $I^2 = 86.7\%$).

In a meta-regression model, higher study quality and emergency physicians remained associated with higher rates of severe burnout ($b = 0.007$, $se[b] = 0.002$, $P = 0.003$; and $b = 0.05$, $se[b] = 0.02$, $P = 0.019$, respectively) (table 2).

Emotional exhaustion (EE)

Thirty-seven studies including 15,183 physicians provided data about the prevalence of high EE (figure 5 and 3). The prevalence estimates ranged from 8% to 43%. The random effects pooled prevalence estimate was 21% (95% CI 19–24, $P < 0.001$, $I^2 = 94.7\%$). High rates of EE were found in 24% of GPs (95% CI 20–28, $P < 0.001$, $I^2 = 87.8\%$), 16% of junior residents (95% CI 12–29, $P < 0.001$, $I^2 = 92.6\%$), 13% of anesthesiologists (95% CI 7–19, $P < 0.001$, $I^2 = 90.3\%$) and 22% of emergency physicians (95% CI 10–35, $P < 0.001$, $I^2 = 93.5\%$).

In a meta-regression model, junior residents and anesthesiologist remain associated with lower rates of high EE ($b = -0.08$, $se[b] = 0.03$, $P = 0.031$; and $b = -0.1$, $se[b] = 0.04$, $P = 0.011$, respectively) (table 2).

Depersonalization (DP)

Thirty-seven studies including 15,183 physicians provided data about the prevalence of DP (figure 6 and 3). The prevalence estimates ranged from 4% to 57%. The random effects pooled prevalence estimate was 29% (95% CI 25–33, $P < 0.001$, $I^2 = 96.7\%$). High rates of DP were reported in 27% of GPs (95% CI 23–30, $P < 0.001$, $I^2 = 86.3\%$), 34% of junior residents (95% CI 30–38, $P < 0.001$, $I^2 = 82.0\%$), 18% of anesthesiologists (95% CI -1–36, $P < 0.001$, $I^2 = 99.1\%$) and 43% of emergency physicians (95% CI 30–56, $P < 0.001$, $I^2 = 90.5\%$).

In a meta-regression model, junior residents and emergency physicians remained at higher risk of DP ($b = 0.09$, $se[b] = 0.04$, $P = 0.03$; and $b = 0.2$, $se[b] = 0.05$, $P = 0.001$, respectively) (table 2).

Low personal accomplishment (PA)

Thirty-six studies including 14,979 physicians provided data about the prevalence of PA (figure 7 and 3). The prevalence estimates ranged from 7% to 64%. The random effects pooled prevalence estimate was 29% (95% CI 24–34, $P < 0.001$, $I^2 = 97.7\%$). Low rates of PA were reported in 25% of GPs (95% CI 20–29, $P < 0.001$, $I^2 = 93.4\%$), 36% of junior residents (95% CI 29–42, $P < 0.001$, $I^2 = 92.4\%$), 28% of anesthesiologists (95% CI 19–38, $P < 0.001$, $I^2 = 92.9\%$) and 32% of emergency physicians (95% CI 19–38, $P < 0.001$, $I^2 = 92.9\%$).

In a meta-regression model: junior residents, sample size, and night shifts remained associated with higher prevalence of low PA (respectively $b = 0.1$, $se[b] = 0.04$, $P = 0.009$; $b = 0.00004$, $se[b] = 0.00002$, $P = 0.007$; and $b = 0.02$, $se[b] = 0.01$, $P = 0.014$, respectively) table 2.

The funnel plots were rather asymmetrical for all of the five parameters, which suggested potential publication bias (supplementary figure 1). However, the asymmetry was statistically non-significant (Egger regression intercept $P > 0.05$).

DISCUSSION

The findings of the present systematic review and meta-analysis including 37 studies and 15,183 subjects may be summarized as follows: almost an half of French physicians reported burnout syndrome, and 5% severe burnout combining high emotional exhaustion, high depersonalization and low personal accomplishment. In multivariate regression analyses, the following significant associations have been yielded: (i) Emergency physicians were associated with higher prevalence of severe burnout and high DP, (ii) Anesthesiologists were associated with lower prevalence of high EE, (iii) Junior residents were associated with lower prevalence of high EE, but higher prevalence of high DP and low PA. (iv) Sample size and nightshifts were associated with higher prevalence of low PA. High study quality was associated with higher prevalence of burnout and severe burnout. In comparison with paramedical workers, the 49% pooled prevalence of burnout estimated in our meta-analysis is higher than the 30% prevalence in pediatric nurses (Gómez-Urquiza et al., 2017), the 26% in emergency nurses (Adriaenssens et al., 2015).

The 49% pooled prevalence of burnout estimated in our meta-analysis is almost similar to the 50% prevalence in physicians in the united states (David A. Rothenberger, 2017) and the 49% prevalence in American pediatric physicians (Shenoi et al., 2018). It is higher than those of surgeons (32% in UK surgeons (Sharma et al., 2008); and 34.6% in US surgeons in 2006 (Oskrochi et al., 2016)); non-consultant doctors in Ireland (26%) (Sulaiman et al., 2017); American neurosurgery residents (36%) (Shakir et al., 2017), and lower than Chinese neurologists (53%) (Zhou et al., 2017), Chinese anesthesiologists (69%) (Li et al., 2018), and Singaporean residents (80%) (Lee et al., 2018). It may be concluded from these results that burnout rates seem higher in Asia compared to Western countries, and that US and France have similar rates of burnout, among the higher rates of Western countries. This rate may appear as very high, remembering that the definition was based on the presence of one of the three dimensions of burnout (high EE, high DP or low PA). Finding similar rates of burnout in French and US physicians was unexpected, because of discrepancies between healthcare systems. These similar rates suggest that physicians may experience similar difficulties whatever the

organization and the health system (including night shifts, time pressure, healthcare workplace environment, dealing with colleagues and patients aggressiveness, responsibilities, weak recognition of their work, loss of autonomy and limited resources(David A Rothenberger, 2017)). Another explanation may also be that Western healthcare systems experiment all cost reduction (especially after the 2008 financial crisis) that may play a role in the burnout risk of physicians. While the rates of burnout are similar, the risk factors may be different. However, it should be mentioned that the 5% pooled prevalence for severe burnout estimated by our meta-analysis is lower than the 12% pooled prevalence among GPs in Europe(Soler et al., 2008), and than the 11.7% of Yemen physicians in 2010(Al-Dubai and Rampal, 2010). Burnout and severe burnout rates should therefore be always analyzed together to estimate this phenomenon. In a previous meta-analysis, burnout (and specifically EE) has been positively associated with workload, constraining organizational structure, incivility/conflicts/violence, low quality and safety standards, negative work attitudes, work-life conflict, and contributors to poor mental health, all these factors may explain the discrepancies across countries (Lee et al., 2013a). In our study we explored workload using the following variables (worked hours per week, night shifts per month), both these association have not remained significant in the meta-regression model. Administrative tasks have been shown to decrease career satisfaction and increase burnout levels, the most burdensome being prior authorization, clinical documentation and medication reconciliation(Rao et al., 2017).

In the present results, high number of night shifts was associated with low PA, which is consistent with the results of three meta-analyses suggesting that work overload and work during the weekend or at night were associated with higher burnout rates (Sablík et al., 2013). A meta-analysis including 65 samples of physicians from various regions and specialties showed that the improvement of work processes, flow and inter- personal relationships (quality and safety) were drivers associated with reduced EE. A positive work attitude was another driver associated with reduced EE(Lee et al., 2013b).

Among all specialties, French emergency physicians have been found to have significantly higher rates of burnout (57% vs. 52%, 48%, and 44% respectively for residents, GPs and anesthesiologists). This is consistent with the results of the US (72% for ER vs. 64% for GPs and 55% for anesthesiologists)(Shanafelt et al., 2015). This suggests that this phenomenon is due to the Emergency work and not to the French Emergency healthcare organization.

Our rate of burnout in junior residents was also similar to those of the US (50%) (Ishak et al., 2009; Martini et al., 2004). Residents and junior physicians have been found to report lower prevalence of high EE, but higher prevalences of high DP and low PA in the present meta-analysis, which is consistent with previous results finding high DP and low PA in international junior residents (Bria et al., 2012; Ozyurt et al., 2006). This is consistent with the results of a nationwide study that showed that EE raised to a pick after 3 years of work (Popa et al., 2010). The same finding was suggested in a systematic review including European data that showed that high EE is associated with older age while high DP was associated with younger age (Bria et al., 2012), which is not consistent with our results where no association has been found. These discrepancies may be explained by different empathy levels and job satisfaction, which have been shown to impact burnout rates and have not been explored in the present results (Lee et al., 2018; Tarcan et al., 2017; Walocha et al., 2013; Yuguero et al., 2017).

French GPs were found to have lower burnout scores compared to other European GPs, which is consistent with the results of the European General Practice Research Network Burnout Study Group Study (EGPRN) including 1400 family doctors in 12 European countries (Soler et al., 2008). These results should be balanced by the fact that higher study quality was associated with higher burnout and severe burnout rates, which suggests that the assessment of burnout may play a crucial role in its detection. In the present meta-analysis, GP studies were found to have lower quality, which was due to the fact that most of them were medicine theses. This lower quality may have underestimated GPs burnout prevalence; further studies of good quality are therefore warranted in GPs.

We found that anesthetist had lower EE rates, which is consistent with the SESMAT study including 3,196 French physicians and pharmacists, in which anesthetists were found to have lower rates of burnout compared to other specialties (38.4% vs. 42.4%) (Doppia et al., 2011). In summary, these results suggest that the burnout in France has comparable rates with the USA for emergency and junior residents and that French GPs seem to have lower rates of burnout compared to other European countries.

Emergency physicians were associated with higher prevalence of severe burnout and high DP, which is consistent with the results of the SESMAT study (51.5% for emergency versus 42.4% for other specialties) (Estryn-Behar et al., 2011) and with the findings of a literature review (60% for emergency vs. 38% for other specialties) (Arora et al., 2013). High DP could be

explained by lowest levels of empathy among emergency physicians (Yuguero et al., 2017). This may be explained by higher exposure to violence in patients, which has been previously associated with higher EE, DP and burnout syndrome (M. et al., 2015).

Strengths

The large number of included studies and the global sample size, the number of sensitivity analyses, the quality check and the exploration of unpublished literature may be mentioned in the strengths of the present work.

Limits and perspectives

The methodological quality of the included studies was heterogeneous, and few studies used a whole population approach with random selection. Most of these studies were from single regions and focused on one medical specialty, which thus limited the generalizability of the findings. The exploration of heterogeneity was limited by the lack of information about covariates in several of the studies. Organizational factors, stress, personality variables, coping mechanisms, public vs. private practice, other specialties than GPs, emergency and anesthetists have not been reported and should be explored in future studies (Bria et al., 2012). More specifically, the effect of night working and administrative tasks on burnout risk should be explored. In our study we explored the associations between burnout and workload using respectively worked hours per week and night shifts per month. Both these associations have not remained significant in the meta-regression model.

Another limit is the fact that our data was drawn from the published papers and not directly from the investigators' databases. 15 out of 37 studies have response rate lower than 50%. Reasons for nonparticipation in research may be related to severe illness or burnout, so investigators should consider gathering information from other sources to estimate the degree of underestimation or attempt to reinterview those who did not participate. To date, the medical school programs do not include teachings about coping adversity and dealing with pressure. Prevention in medical students may be the best way to improve burnout rates in future physicians (Fond et al., 2018a, 2018b). The French government has also declared its intention to remove the *numerus clausus*, a process of selection of medical students that was an initial cause of pressure and a global cause

for strong reduction in the number of French physicians (Ecoffey, 2018). The reduction of the number of MD may also be a cause of increased burnout in French physicians.

Reporting accurate epidemiological data about physician's burnout in France is warranted to guide public policy. In the light of the present results, some recommendations may be suggested. Reducing the number or the duration of night shifts and decreasing exposure to patient violence could reduce the prevalence of burnout among physicians by improving their PA and decreasing EE and DP. Emergency physicians and junior residents should be targeted in priority to develop prevention programs on stress at work. Large sample sizes and discriminating all specialties is warranted. A recent study has suggested that interns in psychiatry may be at higher risk of burnout compared to other interns (Fond et al., 2018c).

Conclusion

High rates of burnout have been identified in French physicians, comparable to those of the USA. Emergency practice and junior residents are at higher risk of burnout and should be targeted in priority for prevention programs. Alleviating professional burden, especially the number of night shifts, may be suggested in the prior prevention actions that may be carried out in these specific groups.

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