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Research article

## Assessment of the condition of psychic health of French firefighters: Burnout

*Évaluation de l'état de santé psychique des sapeurs-pompiers français : l'épuisement professionnel*

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### ABSTRACT

To date, there has been little research on burnout in firefighters despite the acknowledged impact of occupational stress on both individuals and society. According to a survey conducted by the French National Research and Security Institute, the annual cost to society of occupational stress in France is 2–3 billion euros. The aim of the present study was to assess the prevalence of occupational burnout in a large and representative sample of French firefighters. A nationwide survey was conducted in 2021, targeting all categories of firefighters (except for military firefighters in Paris and Marseille) both in metropolitan France and in its overseas departments and territories. This survey came in two parts: questions eliciting basic sociodemographic and job-related data, followed by the Burnout Assessment Tool which assesses the intensity of job-related burnout. We collated results for 3038 firefighters: 2418 men (79.59%), 619 women (20.38%), and 1 gender neutral (0.03%). Findings revealed that while 2455 respondents (80.8%) did not meet the criteria for burnout, 345 (11.4%) reported mild/moderate symptoms of burnout, and 238 (7.8%) could be deemed to have severe burnout symptoms. Further research is warranted into the causes of burnout and its prevention in this specific population.

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### RÉSUMÉ

Le burnout chez les sapeurs-pompiers est un sujet peu exploré. Pourtant les conséquences du stress professionnel sur l'individu et la société ne sont pas à négliger. Selon une enquête menée par l'Institut national de recherche et de sécurité, le coût social a été estimé en 2007 entre 2 et 3 milliards d'euros par an en France. L'objectif de cette étude est d'évaluer l'état de santé psychique des sapeurs-pompiers français et plus particulièrement la prévalence de l'épuisement professionnel sur cette population. Pour ce faire, une enquête nationale a été lancée au cours de l'année 2021, elle avait pour cible tous les sapeurs-pompiers qu'ils soient volontaires ou professionnels (hors militaires) présents sur le territoire français et DOM-TOM. Cette enquête était composée de deux parties, la première avait pour but de recueillir des données sociodémographiques et professionnelles, la seconde était de connaître le niveau d'épuisement professionnel chez les sapeurs-pompiers. Nous avons utilisé pour cela le Burnout Assessment Tool de Schaufeli, De Witte et Desart (2019). Nous avons obtenu les réponses de 3038 sapeurs-pompiers. Nous comptabilisons 2418 hommes (79,59 %), 619 femmes (20,38 %) et 1 personne non genrée (0,03) sur cet échantillon. Cette répartition est semblable à celle connue dans la population globale des sapeurs-pompiers. Cette enquête nous a permis d'observer que 2455 pompiers ne présentent pas de burnout soit 80,8 % de l'échantillon, 345 pompiers sont à risque d'avoir un burnout ce qui représente 11,4 % et

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238 pompiers soit 7,8 % de l'échantillon sont quant à eux à risque très élevé d'être en *burnout*. À ce jour il manque encore cruellement de données sur ce sujet et cette population en particulier. Il serait intéressant que d'autres études analysent la santé psychique des sapeurs-pompiers afin que l'on puisse avoir des données de comparaisons et ainsi proposer des politiques de prévention.

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## 1. Introduction

Firefighters are required to carry out their work with the same high degree of rigor regardless of the situations they encounter. The fire brigade is a well-defined, highly hierarchical and codified social group that inculcates values and customs, and shapes both bodies and minds [1]. It is a particularly dangerous profession that makes high physical and psychological demands [2]. Firefighters are represented in society as invincible fire soldiers and heroes [3,4]. In line with this collective imagination, an ideal firefighter profile has been constructed. However, today's firefighters, made up of both male and female officers, are seeing their missions change. Their main mission is now personal assistance, which represents 84% of their interventions, as opposed to actual firefighting, which represents only 6% [5]. They have to deal with new problems and thus deploy new skills adapted to each situation [3]. Generally speaking, any individual can manage a stressful situation by making a number of adaptations. The aim is to maintain a balance between the load that is carried and the load that can be borne [6]. However, the development of effective coping mechanisms can be hindered by various factors, and firefighters may perceive an imbalance between the environmental demands of their job and the adaptive resources that are available to them [7]. Doing a risky job can lead to an accumulation of stress, given that it is encountered on a daily basis, thereby disturbing the balance between demands and resources. Coping mechanisms cease to be adequate, the firefighter's ordinary work becomes a burden, and working conditions become increasingly difficult [6]. The special nature of this profession and the image it projects prevent firefighters from acknowledging their psychological distress, as this would be perceived as a sign of weakness [8]. It is assumed that crisis situations do not affect them and are part of their job. In an attempt to deal with the stressful situation in a many way, they become withdrawn, and this withdrawal can lead to reckless behaviour and risk-taking [6]. Hiding the emotions triggered by the stressful situations they encounter [9] plays an important role in the development of burnout [6,10]. Firefighters may therefore bear the stigmata of their profession not only in the form of physical injuries, but also as a heavy emotional burden that may eventually damage their mental health [11-17]. To the best of our knowledge, there has yet to be a survey of the mental health of French firefighters, which is why the aim of the present study was to assess the mental health of this population, and more specifically the prevalence of burnout, using the Burnout Assessment Tool (BAT; Schaufeli, Witte & Desart, 2019).

## 2. Methods

### 2.1. Participants

A national survey of the health of French firefighters was launched on 6 August 2021. It was distributed via the National Federation of French Firefighters, the National School of Fire Officers, departmental unions of firefighters, and departmental fire and rescue services (FRSs) to the country's 238,900 volunteer and professional firefighters. A total of 3038 firefighters who responded to the survey met the following selection criteria:

- volunteer or professional firefighter (excluding military units: Marseille naval firefighters, Paris firefighters, and civil security intervention unit personnel) currently working in metropolitan France or in a French overseas department or territory;
- no missing responses to the BAT.

The 3038 respondents comprised:

- 296 firefighters with dual status (professional and volunteer);
- 1059 professional firefighters;
- 1683 volunteer firefighters.

### 2.2. Instruments

The firefighters' health survey came in two parts. In the first part, participants were asked to provide sociodemographic and job data about themselves. These included gender, age, status (volunteer or professional), geographical location of their FRS, FRS category, based on the size of the population to be protected (A:  $\geq 900,000$  inhabitants; B:  $\geq 400,000$  inhabitants; or C:  $< 400,000$  inhabitants), work regimen, seniority, rank, and level of physical activity. In the second part, participants were asked to answer the BAT [18]. This new and validated self-report questionnaire measures the symptoms of burnout, and was administered via the LimeSurvey online platform. The BAT is composed of 23 items divided into six subscales probing (evaluating) four main symptoms (exhaustion, mental distance, cognitive disorders, and emotional disorders) and two secondary symptoms (psychological distress, and psychosomatic complaints), which are interpreted together. For the purpose of the present study, we only analyzed the results for the four main symptoms. Items were rated on a 5-point Likert scale ranging from 1 (Never) to 5 (Always). For each main symptom, we summed the ratings of all the relevant items, and divided the result by the number of items. To determine each respondent's degree of burnout, we summed the item ratings for the four main symptoms and divided the result by the number of items, giving us a BAT total score of between 1 and 5. Depending on their score, respondents were placed in either the green ( $< 2.59$ ), amber ( $2.59 \leq x < 3.02$ ), or red ( $< 3.02$ ) category.

### 2.3. Procedure

The survey was constructed on the LimeSurvey online platform. It remained available from 6 August 2021 to 15 November 2021. The survey took approximately 10 minutes to complete and was anonymous. The information collected via LimeSurvey was exported to Excel and JASP.

### 2.4. Analysis

The collected data were analyzed first using Excel, and then JASP. We submitted them to a descriptive analysis, using four parametric statistical tests. First, the chi2 test was used to compare BAT total scores according to gender, status, FRS category, FRS geographical area, rank, and physical activity. Second, we calculated the Pearson correlation coefficients between the BAT total score

**Table 1**  
 Sociodemographic and job characteristics of the sample.

	n	%
Gender		
Men	2418	79.59
Women	619	20.38
Gender neutral	1	0.03
Age (in years)		
Mean	39.47	
Median	40	
Standard deviation	11.14	
Min	16	
Max	67	
Status		
Volunteer firefighter	1683	55.4
Professional firefighter	1059	34.9
Dual status	296	9.7
Rank		
Rank and file	1012	33.5
Noncommissioned officer	1239	41
Officer	696	23
Health and emergency medical service	76	2.5
Total	3023	100
BAT category		
Green (< 2.59)	2455	80.81
Mean	1.88	
Standard deviation	0.39	
Amber (2.59 ≤ x < 3.02)	345	11.36
Mean	2.78	
Standard deviation	0.12	
Red (> 3.02)	238	7.83
Mean	3.42	
Standard deviation	3.42	

and age/seniority. Third, we ran a means comparison for the BAT total score according to gender and level of physical activity, using Student t tests. Fourth, we compared BAT total scores according to status, FRS category, FRS geographical area, and rank using an analysis of variance (ANOVA).

### 3. Results

#### 3.1. Analysis of sociodemographic and job data, as well as total scores on the Burnout Assessment Tool

Data yielded by the first part of our survey allowed us to undertake a descriptive analysis of the sample (Table 1). Results revealed that 20% of participants were women, which is similar to the national percentage of 19% [5]. The same observation could be made for age, as the mean age of our sample was 39.7 years, compared with 38 years at the national level, excluding the health and emergency medical service. There was, however, a difference in status, as professional firefighters were over-represented in our sample (34%), compared with national data (17%). Conversely, volunteer firefighters were under-represented (33.5% vs. 78% at national level). The same trend emerged for rank, with officers (23% vs. 6.4%) and noncommissioned officers (NCOs) (41% vs. 31.1%) being over-represented in our sample, and rank and file (33.5% vs. 52.2%) being under-represented [7]. Concerning BAT total scores, 7.83% of the sample (n = 3038) were at very high risk of burnout, 11.36% were at risk of burnout, and 80.81% were not in burnout.

#### 3.2. Comparison and analysis of different variables

The second part of the survey allowed us to explore the influence on burnout of the following variables: gender, age, seniority, FRS category (A, B or C), FRS geographical area, and physical activity.

Regarding the gender variable, no difference was found on the level of burnout between men and women, either in a percentage comparison analysis,  $\chi^2_{(2)} = 0.63$ ;  $P = 0.729$ , or in a comparison of mean BAT scores for men versus women,  $t_{(3035)} = -1.49$ ;  $P = 0.137$ .

Concerning the status variable, there was a link between level of burnout and status in this sample,  $\chi^2_{(4)} = 140.83$ ;  $P < 0.001$ . We compared the proportions of volunteer and professional firefighters (3.5% vs. 13.7%;  $P = 0.02$ ) who had red BAT total scores. We ran an ANOVA on the numerical scores, which revealed a significant difference in level of burnout according to status,  $F_{(2, 3035)} = 109.91$ ;  $P < 0.001$ . Post hoc tests revealed significant differences between volunteer and professional firefighters,  $t_{(2740)} = 14.48$ ;  $P < 0.001$ , and between volunteer and dual-status firefighters,  $t_{(1977)} = 6.53$ ;  $P < 0.001$ . The difference between dual-status and professional firefighters tended toward significance,  $t_{(1353)} = -2.37$ ;  $P = 0.052$ . Volunteer firefighters were more resistant to burnout than professional firefighters.

Interestingly, there was also a significant difference in level of burnout according to FRS geographical area,  $\chi^2_{(14)} = 28.82$ ;  $P = 0.011$ . A total of 10.5% of firefighters in the southern zone had red BAT total scores, compared with only 4.1% of firefighters in southwestern France. The ANOVA confirmed that there was a statistically significant difference in level of burnout according to FRS geographical area,  $F_{(7, 3027)} = 3.74$ ;  $P < 0.001$ . Post hoc tests revealed significant differences between the eastern and southern zones,  $t_{(1171)} = -3.85$ ;  $P < 0.003$ , between the southern and southeastern zones,  $t_{(1190)} = 3.31$ ;  $P < 0.006$ , and between the southern and southwestern zones,  $t_{(961)} = 3.13$ ;  $P < 0.049$ . Although the southern zone was the most affected by burnout, it did not differ significantly from the other geographical areas.

FRS categories differed significantly on burnout,  $\chi^2_{(4)} = 30.47$ ;  $P < 0.001$ . The ANOVA revealed statistically significant differences in level of burnout according to FRS category,  $F_{(2, 3035)} = 12.26$ ;  $P < 0.001$ . Post hoc tests showed significant differences between Categories A and B,  $t_{(2227)} = 4.52$ ;  $P < 0.001$ , and between Categories A and C,  $t_{(1870)} = 3.91$ ;  $P < 0.001$ . However, there was no significant difference between Categories B and C,  $t_{(1973)} = -0.20$ ;  $P = 1.000$ . Burnout was more prevalent in Category A.

There was a statistically significant difference in level of burnout according to physical activity,  $\chi^2_{(2)} = 12.98$ ;  $P = 0.002$ . The same results were observed with the means comparison,  $t_{(3036)} = 3.52$ ;  $P < 0.001$ . Firefighters who engaged in physical activity were less likely to develop burnout.

According to statistical tests, rank was associated with burnout level,  $\chi^2_{(6)} = 43.73$ ;  $P < 0.001$ . The ANOVA also revealed a significant difference in level of burnout according to rank,  $F_{(3, 3019)} = 30.1$ ;  $P < 0.001$ . Post hoc tests highlighted significant differences between NCOs and officers,  $t_{(1706)} = -7.39$ ;  $P < 0.001$ , between NCOs and health and emergency medical service personnel,  $t_{(1086)} = -3.78$ ;  $P < 0.001$ , and between rank and file and NCOs,  $t_{(2249)} = -8.50$ ;  $P < 0.001$ . However, there were no significant differences between officers and health and emergency medical service personnel, officers and NCOs, and health and emergency medical service personnel and NCOs. Rank-and-file firefighters were less subject to burnout.

There was a significant positive correlation between level of burnout and age in this sample,  $r = 0.15$ ;  $P < 0.001$ . The ANOVA highlighted a large number of differences between age groups,  $F_{(9, 3027)} = 14.6$ ;  $P < 0.001$ .

The final analysis also revealed a significant positive correlation between level of burnout and seniority,  $r = 0.17$ ;  $P < 0.001$  (Fig. 1). The ANOVA and post hoc tests revealed significant differences between the 0–9 years and 10–19 years seniority categories,  $t_{(1660)} = -7.58$ ;  $P < 0.001$ , 0–9 years and 20–29 years seniority categories,  $t_{(1662)} = -11.11$ ;  $P < 0.001$ , 0–9 years and 30–39 years seniority categories,  $t_{(1263)} = -8.24$ ;  $P < 0.001$ , and 10–19.

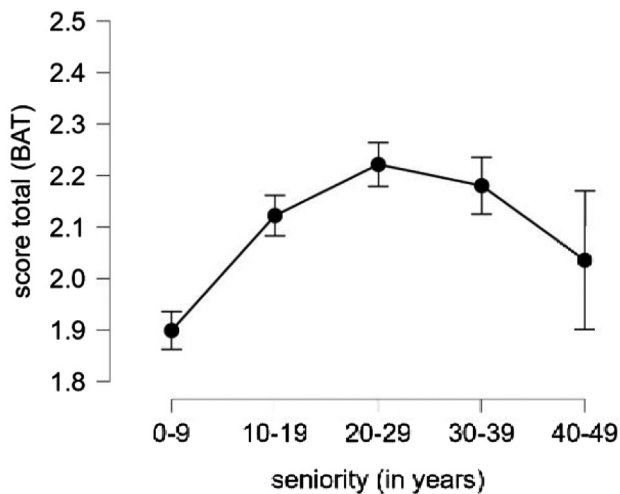


Fig. 1. BAT total scores (dot: mean; whiskers: 95 percent confidence interval) according to seniority. The full dataset can be obtained from the corresponding author upon reasonable request.

#### 4. Discussion

The results from the present survey are difficult to compare with past findings from related studies. First, to our knowledge, no previous study had analyzed the prevalence of burnout and the possible links between burnout and sociodemographic data among French firefighters. Second, studies close to our subject, such as those conducted by Lavillunière et al. [16], Bordon et al. [8] and Marein et al. [7], used a different burnout measure (i.e., Maslach Burnout Inventory [19]). Although the MBI is the one most widely used instrument in past and contemporary research, it has several technical and practical limitations [18,20]. We therefore chose to use a new self-assessment tool. The BAT [18] has the advantage of being the most recent self-report measure of burnout [21]. In addition, it has good reliability, factorial, and construct validity. Internal consistency in the current study was very satisfactory (Cronbach's  $\alpha > 0.90$ ) [20].

The present study made it possible to evaluate firefighters' mental health on a large scale. The data we collected concerned almost all the FRSs in metropolitan France, as well as in its overseas departments and territories. However, the unevenness of response rates across the FRSs cannot be ignored. These results were analyzed from various perspectives. From a geographical point of view, the southern zone was the one most affected by burnout. This difference could be types of work constraints which may vary between geographical regions in France. Indeed, southern regions in France contain more Category A FRSs, and firefighters usually have to deal with more extreme climate-related events (wildfires, floods, etc). These explanations are only hypotheses based on statistical data in the literature [5,22]. The data yielded by our own study showed that Category A FRSs were most exposed to burnout, presumably because the higher number of daily interventions had a significantly greater impact on firefighters. A higher number of interventions and greater exposure to human distress, as well as more frequent disasters caused by fires and floods, may elicit a higher level of emotional involvement that affects individual firefighters' mental health [23]. Volunteer firefighters, who represent 78% of the national workforce [5], are said to be more resistant to burnout, perhaps because they can regulate their activity. However, FRSs are reporting high numbers of departures among volunteer firefighters [24]. The reasons for these departures certainly are multifaceted, but may include burnout. The firefighters most at risk of developing burnout are health and emergency medical service personnel,

followed by NCOs, then officers. This can no doubt be explained by the greater responsibilities they have to bear. Further descriptive studies are needed to focus on the relationship between burnout and status. It would also be interesting to examine the correlations between age, seniority, rank, career development, and the links that these variables may have with burnout. Firefighters aged 40–50 years who have completed 20–29 years of service may well have encountered difficulties in the course of their career. Similarly, we know from recent meta-analyses that physical activity protects against burnout [25]. Our study confirmed this finding. In our sample, firefighters who practiced regular physical activity were better protected against burnout. Regular physical activity is significantly linked to lower levels of stress. One possible explanation is that improved physical condition has been shown to attenuate the cardiovascular response to stress [26]. Moreover, sport provides a means of releasing pent-up energy, thus allowing for better control of emotions [27].

In conclusion, it is important to bear in mind that firefighters are a population at risk of developing burnout. It is estimated that only 30% of the national population experience a potentially traumatic event in their lifetime, compared with 90% of firefighters in a single year of service [28]. This profession is characterized by risk factors such as work overload, emotional burden, and high personal and emotional investment. It is therefore plausible that during their career, firefighters feel that there is too great a gap between the expectations or representations they have of their job and the reality of the work. This situation presumably exhausts and emotionally drains them, thereby calling into question their initial investment [29]. Several years ago, health at work in the civil service plans were developed, but inspectors from the General Inspectorate of Civil Security (IGSC) have highlighted a continuing lack of communication on health and quality of life between trade unions and IGSC services [30]. Our study is an initial attempt to better understand disparity in burnout. Further studies are needed to analyze the mental health of firefighters so that we can have the comparative data needed to better understand burnout in this population. A collective effort by academics and representatives of these different organizations is needed to apply the plans relating to mental health and thus prevent burnout more effectively.

#### Disclosure of interest

The authors declare that they have no competing interest.

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