Version of Record: https://www.sciencedirect.com/science/article/pii/S0013700621001597
Manuscript_6b1ebc36aa409c4a148d52b774fd3316

Risk factors for burnout and depression in healthcare workers: the national AMADEUS study protocol.

Facteurs de risque de burnout et de dépression chez les soignants : protocole de l'étude nationale AMADEUS.

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Abstract

Context. Burnout is an international phenomenon defined as a state of professional exhaustion. It can lead to depression and have major economic and organizational impacts. Previous studies of healthcare professionals in France have focused on physicians, but none to date have explored other healthcare professions. **Objectives**. The main objective of our study is to determine the prevalence of burnout among healthcare workers. The secondary objectives are to explore the associations of burnout with professional and psycho-social factors and the risk of depression, professional harassment, sexual harassment, sexual-orientation based discrimination, consumption of antidepressants, anxiolytics and also the lifestyle of the individual: smoking, alcohol consumption, coffee consumption, physical activity and sleep quality. **Materials and methods**. The survey will take the form of a voluntary and anonymous online questionnaire carried out on the FramaForm1® platform and will be disseminated via social networks, professional networks and mailings. **Study population**. Senior doctors, interns, directors of care, nurses, head nurses and senior head nurses, physiotherapists and occupational therapists, dieticians, radiology technicians, laboratory technicians, psychologists, nurses' aides, auxiliary nurses and midwives will be included. **Collected data**. Burnout will be measured with the Maslach Inventory burnout (MBI) questionnaire, work environment with the Karasek questionnaire and anxiety, depression risk with the Center for Epidemiologic Studies- Depression (CES-D), physical activity with the Global Physical Activity Questionnaire (GPAQ) and sleep quality with the Pittsburgh Sleep Quality Index (PSQI). **Ethics**. This protocol has been accepted by the ethical committee (IRB n°C08 / 21.01.06.93911 , CNIL). **Expected results**. Based on international studies, we expect a high rate of burnout with disparities according to profession, socio-demographic data, seniority and type of service. We also expect a significant rate of untreated depression. This study will provide evidence for policy makers to implement collective strategies to reduce burnout and depression in the different populations studied.

Keywords: psychiatry, public health, nurse, physician, burnout, depression

Résumé

Contexte. Le burnout est un phénomène international défini comme un état d'épuisement professionnel. Il peut conduire à la dépression et avoir des impacts économiques et organisationnels majeurs. Les études précédentes sur les professionnels de santé en France se sont concentrées sur les médecins, mais aucune à ce jour n'a exploré les autres professions de santé. **Objectifs**. L'objectif principal de notre étude est de déterminer la prévalence du burnout chez les professionnels de santé. Les objectifs secondaires sont d'explorer les associations du burnout avec des facteurs professionnels et psycho-sociaux et le risque de dépression, le harcèlement moral et sexuel, la discrimination basée sur l'orientation sexuelle, la consommation d'antidépresseurs, d'anxiolytiques mais aussi le mode de vie de l'individu : tabagisme, consommation d'alcool, consommation de café, activité physique et qualité du sommeil. **Matériel et méthodes**. L'enquête prendra la forme d'un questionnaire en ligne volontaire et anonyme réalisé sur la plateforme FramaForm1® et sera diffusée via les réseaux sociaux, les réseaux professionnels et les mailings. **Population étudiée**. Seront inclus les médecins chefs, les internes, les directeurs de soins, les infirmiers, les cadres de santé et les cadres supérieurs de santé, les kinésithérapeutes et les ergothérapeutes, les diététiciens, les techniciens de radiologie, les techniciens de laboratoire, les psychologues, les aides-soignants, les auxiliaires de puériculture et les sages-femmes. **Données recueillies**. L'épuisement professionnel sera mesuré avec le questionnaire Maslach Inventory burnout (MBI), l'environnement de travail avec le questionnaire Karasek et l'anxiété, le risque de dépression avec le Center for Epidemiologic Studies-

Depression (CES-D), l'activité physique avec le Global Physical Activity Questionnaire (GPAQ) et la qualité du sommeil avec le Pittsburgh Sleep Quality Index (PSQI). **Éthique**. Ce protocole a été accepté par le comité d'éthique (IRB n°C08 / 21.01.06.93911 , CNIL). **Résultats attendus**. Sur la base d'études internationales, nous attendons un taux élevé de burnout avec des disparités selon la profession, les données socio-démographiques, l'ancienneté et le type de service. Nous attendons également un taux important de dépression non traitée. Cette étude permettra de fournir des éléments aux décideurs politiques pour mettre en place des stratégies collectives visant à réduire le burnout et la dépression dans les différentes populations étudiées.

Mots-clés : psychiatrie, santé publique, infirmier, médecin, burnout, dépression

INTRODUCTION

Burnout (or professional exhaustion) is defined as a state of psychological exhaustion experienced in the face of so-called "demanding" professional situations [1] with 3 dimensions: emotional exhaustion, depersonalization and lack of personal accomplishment [2].

The work environment, a risk factor for burnout

We have published a meta-analysis of 37 studies, which revealed that one out of two French doctors met the diagnostic criteria for burnout as defined by the Maslach Burnout Inventory (MBI) [3]. While burnout has been extremely well studied in the medical profession, it has not been explored in other health professions. Our target population will therefore be Senior doctors, interns, directors of care, nurses, head nurses and senior head nurses, physiotherapists and occupational therapists, dieticians, radiology technicians, laboratory technicians, psychologists, nurses' aides, auxiliary nurses and midwives, who will be referred to hereafter as "MICKPAS" for ease of reading.

A stressful and inadequate work environment is associated with an increased rate of burnout in both novice and experienced nurses [4]. The scientific literature exploring the impact of the work environment on the risk of burnout and associated psychological disorders has identified the following risk factors [5][6]*[7–9]*:

- too high a care load, lack of autonomy or control over work. The intensification of working conditions in connection with budgetary restrictions has contributed to the deterioration of the nurses' working environment [10]. While the World Health Organization (WHO) [11] in 2016 estimated a global shortage of approximately 7.6 million nurses by 2030, burnout is contributing to increased caregiver absenteeism as well as increased turnover[12]. This process increases the shortage of nurses, which is exacerbated by the departure of burned-out staff and recruitment difficulties. According to an international study, approximately 17.5% of new nurses leave their first job within a year of starting their employment [13] and the proportion of nurses considering or intending to leave the profession ranges from 4% to 54% by specialty [14].

- the vicious circle of absenteeism. Burnout is one of the first avoidable causes of absenteeism [15]. The hospital system in France, is affected by absenteeism among caregivers. In 2017, the Direction de la Recherche, des Études, de l'Evaluation et des Statistiques (DREES) showed that employees in health care institutions were the ones who had the most recourse to sick leave: 10 days of absence declared for illness per year on average, compared to 7.9 in all professional sectors. Absenteeism of hospital staff, even temporary, can have repercussions on the continuity of care, workload and organization, especially in a context of seeking productivity gains [16]. It also leads to a vicious circle of desertion of the workstation [17]: staff turnover,

dissatisfaction with working conditions, mechanical decline in the quality of care and increased risk of malpractice [18]. These factors were summarized by the Projet Hospitalier Absentéisme, Recherche Efficience et organisation, Santé au travail (PHARES) [19] which has concluded that while healthcare absenteeism is a marker of the organizational situation in French healthcare institutions, the number of days of work stoppage increases significantly as a function of the physical load [20], work intensification or a bad team atmosphere [21].

- lack of support from supervisors and lack of recognition [22].

- lack of support from colleagues, even moral harassment. In France, moral harassment has been defined in the Penal Code and the Labour Code as "repeated remarks or acts that have the effect of deteriorating working conditions, that could undermine rights and dignity, alter physical or mental health or compromise career development [23]. Workplace harassment is an international phenomenon [24] which we recently estimated to be more than 40% prevalent among medical students and young physicians [25] while it remains unexplored in the rest of the MICKPAS.

- the current COVID-19 pandemic has strongly impacted physicians and healthcare workers [26].

- sexual harassment [27] defined as insults, inappropriate propositions, touching or rape [28]

- discrimination based on sexual orientation through direct or indirect homophobic comments as demonstrated in one of our previous studies among young physicians [29].

- Finally, a Spanish study carried out in public health centers in Andalusia with 676 nurses revealed a significant association between different levels of emotional exhaustion according to age, gender, marital status, having children, type of position, service or hours [30].

To our knowledge, the share of each of these factors has never been evaluated in France, although it is likely that the same phenomena are identified in French MICKPAS.

Burnout, a risk factor for depression

On May 28, 2019, the WHO in the 11th revision of the International Classification of Diseases (ICD-11) recognizes that burnout is a major public health problem, even though it is not recognized as a disease as such but resulting from a "chronic stress at the workspace that has not been successfully managed" [15].

Burnout affects the individual by generating both psychological symptoms such as depression, anxiety or sleep disorders [31], addictive behaviors and sometimes suicide [32–34].

In economic terms, the impact of mental disorders is major. 50% of chronic illness discharges are attributable to depression [35]. The cost of mood disorders in the European Union is approximately 170 billion Euros per year. Despite these disturbing data, the risk of depression disorders in MICKPAS has never been evaluated in France.

Objectives

The main objective of our study is to determine the prevalence of burnout among healthcare professionals.

Secondary objectives are:

- Measuring the impact of factors related to the work environment.

- To study the association of burnout and factors related to the work environment with the risk of depression, professional harassment, consumption of antidepressants, anxiolytics and also the lifestyle of the individual: consumption of tobacco, alcohol, coffee, physical activity and sleep quality

POPULATION AND METHOD

Scheme of the study and conduct of the survey

This study is a national cross-sectional descriptive survey conducted with an online questionnaire through the FramaForm1® platform. Framaform® is an open-source software that guarantees that the information collected cannot be disseminated/reused unlike other software such as googleform® (data collection under the RGPD regime and not the "cloud act" - American regime) (https://framaforms.org/content/creez-et-diffusez-vos-formulaires-facilement).

Participation in this questionnaire is voluntary and anonymous. Participants can withdraw from the study at any time. Completion of the questionnaire takes an average of 15 minutes. No intervention on the included population is envisaged for this study.

Study population

Inclusion criteria: In this study will be included: senior doctors, interns, directors of care, nurses, head nurses and senior head nurses, physiotherapists and occupational therapists, radiology technicians, laboratory technicians, psychologists, nurses' aides, auxiliary nurses and midwives (MICKPAS).

Criteria for non-inclusion: minors who are not emancipated, protected adults or adults who are unable to express their consent according to the conditions of article L. 1122-2 of the Public Health Code

Participants will indicate their agreement to participate in the study by means of a non-opposition form (with no access to the questionnaire in case of opposition) because the study is non-interventional and falls under category 3 of the Jardé law.

Collected data

The questionnaire will be divided into 7 parts:

- Professional category

- Sociodemographic data and work organization

- Burnout

- Psychosocial and environmental factors

- Risk of depression

- Consumption of antidepressants, tobacco, coffee, alcohol and the average duration of physical exercise

- Quality and habits of sleep

- Professional category

The status of the professionals will be identified by the following question: What is your status? (Senior physician / Medical intern / State-qualified nurse / Nursery nurse / Operating room nurse / State-qualified

anesthesiologist nurse / Advanced practice nurse / Head nurse / Senior head nurse / Physiotherapist / Occupational therapist / Psychologist / Care assistant / Midwife / Other)

- Sociodemographic data and work organization

- Demographic and social data will be collected: sex (men or women), gender (man, woman or non-binary), age, height, weight, postal code of place of residence, type of institution (public, private, health/medical, medico-social), number of years in practice, family environment (number of dependent children at home), friendly support (binary response) and if the person is a caregiver (binary).

- Zip code is collected to assess differences in levels of anxiety and depressive symptoms based on the level of "social deprivation." Social deprivation is represented by the French Social Deprivation Index (FDEP), which is calculated based on the average social deprivation index for each zip code *[39]*.

- Work organization: Area of activity (multiple responses possible): Department aimed to receive Covid-19 patients / Anesthesia - Intensive Care / Pediatrics (excluding neonatology) / Occupational Medicine/ Public Health / Neonatology/ Gyneco-Obstetrics/ Medical Gynecology/ Biology/ Psychiatry/ General Medicine/ Medical Specialty (Ana-pathology, Cardiology, Dermatology, Endocrinology, Gastroenterology, Genetics, Hematology, Internal Medicine, Nuclear Medicine, Nephrology, Neuro, Oncology, Pneumology, Radiology, Rheumatology) Surgical Specialty (General Surgery, Neurosurgery, Ophthalmology, Otorhinolaryngology, Pediatric Surgery, Maxillofacial, Stomatology, Face and Neck Surgery, Orthopedics, Plastic Surgery, Thoracic and Cardiac Surgery, Urology, Vascular, Visceral and Digestive) / Education/Training

- Working hours (full or part-time), daily work cycle (7:00/7:30/7:48/10:00/12:00 or no daily work cycle), knowledge at least 2 weeks in advance of the work schedule (binary answer), the number of weekends worked per month (from 0 to 4), the number of days off work in the last 12 months (drop-down menu from 0 to 365), the presence of a chronic illness (binary response) and Long Term Disability Allowance (binary response), financial difficulties due to inadequate income and perception of adequation between work and income (binary)

- Burnout

- The prevalence of burnout among health professionals will be measured using a standardized and validated scale, the Maslach Burnout Inventory (MBI), in order to study the degree of burnout in relation to three dimensions: emotional exhaustion, depersonalization and the dimension of personal accomplishment *[40]*.

- Psychosocial and environmental factors

Factors related to the work environment will be assessed with the Karasek scale *[41]*. Karasek's model makes it possible to establish a link between work experience and health risks. It is based on a questionnaire that makes it possible to evaluate for each employee: the intensity of the psychological demand to which he or she is subjected, the decision latitude available to him or her, and the social support that he or she receives in the workplace. Psychological demand is evaluated by the amount of work, its intensity and its more or less fragmented nature felt by the employees. Decision latitude refers to the leeway employees feel they have to influence work decisions and the opportunities to use and develop their skills. Social support describes the assistance that employees can receive from their superiors or colleagues. The fear of making a medication error that could jeopardize patient safety will be assessed by a frequency scale. - Moral and/or sexual harassment; sexual orientation discrimination will be explored through binary questions.

- Risk of depression

The level of depression will be assessed using a standardized and validated questionnaire: the Center for Epidemiologic Studies-Depression scale (CES-D) *[44]*, containing 20 items and six components: depressed mood; feelings of guilt and worthlessness; feelings of helplessness and hopelessness; psychomotor delay; loss of appetite; and sleep disturbance. Participants indicate how often they have experienced the symptoms in the past week, responding: "rarely or not at all" (0); "sometimes or not very much" (1); "occasionally or moderately" (2); and "most or all of the time" (3). The scores of the 20 items are added together, giving possible total scores from 0 to 60 *[45]*. Based on research conducted on the French version of the CES-D, the suggested threshold for a characterized depressive episode is 17 for men and 23 for women. This scale is validated on a large samples, which makes it useful in epidemiological studies *[46]*.

- Consumption of antidepressants, tobacco, coffee, alcohol and the average duration of physical exercise

The use of antidepressants, anxiolytics, tobacco and coffee as well as current follow-up by a psychologist or psychiatrist will be explored by binary questions. Alcohol consumption will be assessed with the CAGE-DETA questionnaire consisting of 4 items with binary questions *[42]*. Physical activity will be assessed using the World Health Organization's Global Physical Activity Questionnaire (GPAQ) *[43]*. The GPAQ is a 2-item self-report questionnaire that assesses the amount of time spent per week (hours, minutes) in moderate-intensity (slight increase in breathing and/or heart rate: brisk walking, dancing, gardening, housework and chores, games and sports with children, outings with pets, crafts) or high-intensity (significant increase in breathing or heart rate: running, climbing a hill, cycling and swimming at high speed; training; competitive sports and games, soccer, volleyball, field hockey, basketball, heavy lifting and moving, work requiring strength).

- Quality and habits of sleep

The last part of the questionnaire deals with sleep quality using the validated and standardized Pittsburgh Sleep Quality Index (PSQI) *[47],* which allows to determine different binary or quantitative sub-scores: Subjective sleep quality, Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disorders, Use of a sleep medication, Daytime dysfunction.

In accordance with the recommendations of the CNIL, the data will be archived on a secure server. The CNIL recommends that the contact information of a participant who does not respond to any solicitation for 3 years be deleted (https://www.cnil.fr/fr/limiter-la-conservation-des-donnees).

PRACTICAL PROCEDURE

The Directions de Soins de France and the Agences Régionales de Santé will be contacted to distribute the link of the questionnaire to healthcare professionals. A message will be distributed on professional social networks (LinkedIn) or not (Instagram, Twitter, Facebook) as well as on specialized health websites. In parallel to the distribution through professional mailings, the link of the questionnaire will be sent to the various associations and unions.

A reminder will be planned one week and then one month later, specifying that each person can only participate once in the study (the identification of the IP address will avoid duplicates).

Inclusions will be closed three months after the start of the study. An extension of six months will be provided in case of insufficient completion of the questionnaires and failure to reach the required number of subjects.

NUMBER OF SUBJECTS NEEDED

The primary endpoint for our study is the prevalence of burnout among French MICKPAS.

As no study has been carried out previously on the prevalence of burnout among French MICKPAS, the reference prevalence (f) will be based on our meta-analysis among physicians and will be approximately estimated at 50%.

Thus, considering a risk of 5% (Z = 1.96 according to the normal distribution table) and a precision (i) also of 5%, the number of necessary subjects (NSN) was calculated according to the following formula: $NSN = Z^2 \times f(1-f)/i^2 = 1537$.

This minimum sample size will be sufficient to apply correction techniques such as the adjustment weighting described in the statistical analysis section in case of non-response bias.

STATISTICAL ANALYSIS STRATEGY

The statistical analysis will only be started after the validity of the database has been checked (consistency checks). The database will be frozen after this control step. After freezing the database, the consolidated data will be processed by the statistician. Data analysis will be carried out using SPSS software under Windows, R software (...) by a statistician from the Centre for Studies and Research on Health Services and Quality of Life, CEReSS and Public Health Laboratory, Aix-Marseille University.

The significance level will be set at 0.05. First, a descriptive analysis of the entire sample and each trade will be performed. The qualitative variables will be presented in the form of proportions and numbers, and the quantitative variables will be presented using the means and standard deviation, or median and quartiles. For each variable, the proportion of missing data will be specified. The scores of the different standardized questionnaires will be calculated according to the algorithms provided by the scale designers.

Uni- and multivariate approaches will be performed to meet the objectives of the study. Comparisons will be made using Student's t test or Mann-Whitney test or ANOVA or chi2 test or Fisher exact test. Pearson correlations will be performed to explore relationships between quantitative data. Multivariate approaches will be performed using regression models to determine the factors associated with burnout and depression scores. The selection of explanatory variables will be based on the univariate approach, which will identify variables for which the level of significance is less than or equal to 0.20, and on the prior identification of variables potentially associated with the dependent variable. The results will be presented in the form of standardized beta coefficients with a confidence interval. The analyses will follow the following plan:

For the main objective, the prevalence of burnout will be determined by the response score to the MBI scale. This scale will be also used to determine the prevalence of severe burnout.

For secondary objectives: the association of the presence of burnout (and respectively of severe burnout) with the following factors will be tested:

- working conditions: working time (full or part-time), working hours (binary response), daily work cycle (categorical variable), knowledge of the work schedule at least 2 weeks in advance (binary response), number of weekends worked per month (quantitative variable),

- absenteeism: the number of days off work over the last 12 months (binary response: presence or absence of at least 3 days off work, quantitative response)

- the work environment assessed by the items of the Karasek questionnaire (quantitative variables exploring the work environment), the presence of moral or sexual harassment or discrimination based on sexual orientation to identify the factors related to the work environment that are significantly associated with a higher prevalence of burnout

- the CES-D score (which will be interpreted as a binary variable: presence or absence of a probable characterized depressive episode, or as a quantitative variable: severity of depressive symptoms)

- consumption of antidepressants, anxiolytics, psychiatric and psychological follow-up (binary variables)

- tobacco consumption (binary: smoker/non-smoker status, quantitative: average number of cigarettes smoked per day)

- alcohol use disorder (binary: CAGE-DETA questionnaire)

- coffee consumption (binary: coffee user/non-consumer, quantitative: number of cups of coffee consumed per day)

- physical activity (analyzed as a binary variable according to the WHO GPAQ questionnaire and as a quantitative variable: physical activity level)

- sleep quality assessed by the PSQI questionnaire total score and subscores

- Presence of a chronic disease and/or chronic disease allowance (binary variables)

In multivariate models, these results will be adjusted for age and gender, which will be forced. For models targeting burnout as an explanatory variable, all factors associated with burnout risk with a p-value <0.2 will be entered into the model. For models where burnout is an explanatory variable, the results will be adjusted for age, sex and the variables that appear relevant for each model according to the hypothesis to be tested.

These analyses will be conducted on the entire MICKPAS group, then on each sub-group of professional categories and according to the sectors of activity.

As web surveys can suffer from non-response, we will apply a weighting adjustment if necessary as practiced in our previous studies [28,48]. Weighting adjustment is a family of techniques that aim to improve the precision of survey estimates by using auxiliary information. Auxiliary information is defined as a set of variables that were measured in the survey, and for which information about their distribution in the population (or about the distribution of the full sample) is available. By comparing the distribution of responses for an auxiliary variable with its population distribution, one can assess whether or not the sample is representative of the population (with respect to that variable). If these distributions differ significantly, one must conclude that the sample is selective. To correct this, adjustment weights are calculated. Weights are assigned to all records of the observed items. Estimates of population characteristics are then calculated using the weighted values instead of the unweighted values. Adjustment weights are often used to correct surveys that are affected by nonresponse (23,24).

ETHICAL CONCERNS

This study has received the approval of the ethical committee (Comité d'Éthique de la Recherche IRB n°C08 / 21.01.06.93911, CNIL).

Volunteerism and anonymity

The study will be voluntary, and participants will be informed that they can withdraw from the survey at any time before submitting their questionnaire. Personal data will be anonymous. Our survey will not record any identifiable data in order to protect the anonymity of the subjects. We will ensure that IP addresses are removed from the data set. Data will be stored in an offline database for further analysis on a secure server in our department. An information notice and a no-objection form will precede the questionnaire. The information notice will be written in accordance with regulatory recommendations, including the purpose of the study, the benefits and risks of the study, the status of the study, and any legal provisions to which participants are entitled.

The study will be conducted in accordance with:

- the ethical principles for medical research involving human beings (Declaration of Helsinki of the World Medical Association) and the Jardé law,

-the reference methodology MR003 of the Commission Nationale de l'Informatique et des Libertés (CNIL)

In application of the recommendations of the CNIL, the data will be stored on a secured server of the Assistance Publique des Hôpitaux de Marseille in partnership with the Digital Services Department and the Medical Information Department. The CNIL recommends deleting the contact information of a candidate who does not respond to any solicitation for 3 years (https://www.cnil.fr/fr/limiter-la-conservation-des-donnees).

Benefit/risk balance

The expected benefits to participants are collective benefits. Our study will provide important data to guide prevention and public health policies in primary care. This study will also provide unprecedented data on the prevalence of burnout among MICKPAS and the potential association with work environment, socio-demographics, and depression.

Risks can be considered minimal, with participants under time constraints necessary to complete the questionnaire. No interventions will be implemented in the population. Participation in the questionnaire is voluntary. The data are made anonymous and no feedback to the participant is possible. Thus, the benefit/risk ratio of this survey can be considered very favorable.

EXPECTED RESULTS

The general perspectives of our study are to assess the prevalence of burnout of MICKPAS and to document the associations between the prevalence of burnout, depression, socio-demographic data and the work environment in this population.

Based on international studies, we expect a high rate of burnout with disparities by occupation, socio-demographics and work environment. We also expect a significant rate of untreated depression.

This study will provide evidence for public authorities to implement collective strategies to reduce burnout and prevent depression among health professionals.

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