

The Forgotten Health-Care Occupations at Risk of Burnout—A Burnout, Job Demand-Control-Support, and Effort-Reward Imbalance Survey

Claire Sérole, MSc, Candy Auclair, MD, Denis Prunet, MSc, Morteza Charkhabi, PhD,
François-Xavier Lesage, MD, PhD, Julien S. Baker, PhD, Martial Mermillod, PhD,
Laurent Gerbaud, MD, PhD, and Frédéric Dutheil, MD, PhD

Aims: We conducted a cross-sectional study on healthcare workers from the University Hospital in Clermont-Ferrand. They received a self-report questionnaire consisting of the Maslach Burnout Inventory, Job Demand Control Support, Effort-Reward Imbalance model, and questions about ethical conflict in order to investigate on burnout. **Results:** We included 1774 workers. Overinvestment was the only factor explaining the increase in emotional exhaustion, depersonalization, and the decrease in personal accomplishment. Taking into account the absence of burnout as a reference, overinvestment multiplied the risk of high burnout by 22.0 (5.10 to 94.7). **Conclusion:** Some “forgotten” occupations among healthcare workers are at risk of burnout. Overinvestment was the main factor explaining the increase in the three dimensions of burnout. Moreover, the two main models of stress at work were highly predictive of burnout.

Keywords: burnout, health at work, mental health

The term burnout was first defined in the 70s by Dr Herbert Freudenberger and refers to a state of physical, emotional, and mental exhaustion that results from prolonged emotional investment in demanding work situations.¹ According to Maslach burnout is a multidimensional syndrome with three central constructs: emotional exhaustion (feeling emotionally drained and exhausted

by one’s work), depersonalization (negative or very detached feelings toward clients or patients), and reduced personal accomplishments (evaluating oneself negatively and feeling dissatisfied with positive job performance and achievements).² Healthcare workers are particularly at risk of burnout,³ with occupational stress identified as a major risk factor.⁴ However, nearly all studies on burnout in healthcare workers have focused on physicians or nurses and have not compared the prevalence of burnout in all healthcare occupations.^{5,6} The literature regarding other healthcare occupations such as midwives,⁷ caregivers⁸ or childcare assistants,⁹ reeducation or socio-educational workers, and their supervisors is limited and sometimes inconsistent. Some occupations may also have a paradoxical role of care such as cleaners who undertake over duties originally planned for caregiver assistants.¹⁰ Moreover, determining the cause of burnout is particularly needed. The two main approaches are the Job Demand-Control-Support Model (JDSC),¹¹ which assesses job demand, job control and social support, and the Effort-Reward Imbalance Model (ERI) which assesses the imbalance between the efforts required by the work and the rewards received.^{12,13} A high job demand with a low job control and a low social support, as well as an effort-reward imbalance were demonstrated to be strong predictors of mental health, morbidity, and even mortality.^{14–17} However, there are few studies combining burnout, JDSC, and ERI. The few studies published only focus on physicians and nurses, and are specific to one category.^{18,19} Moreover, no studies combining these models in healthcare workers have quantified the risk of burnout based on the results of JDSC and ERI models. Additionally, ethical conflicts have also been proposed as a major determining factor of burnout in healthcare workers.²⁰ In the workplace, ethical conflict occurs when an employee makes or observes decisions that go against his/her core values.²¹ Ethical conflict is characterized by moral distress, moral dilemma, and moral uncertainty.²² This occupational stress situation is identified as a major risk factor of burnout.⁴ Similarly, ethical conflicts have never been studied concomitantly with the use of the JDSC or ERI models.

Therefore, the aim of this study was to assess and compare the prevalence of burnout between all healthcare workers working in a University Hospital, secondary objectives were to determine influencing variables of burnout among the JDSC and ERI models and ethical conflicts, and to quantify the risk of burnout based on those models.

METHODS

Study Design

We conducted a cross-sectional study on healthcare workers at the University Hospital in Clermont-Ferrand, between October 10, 2016 and December 16, 2016. In total, 5592 healthcare workers received a confidential participation code on their work email address. Being a healthcare worker at the University Hospital was the only inclusion criteria. Because of occupational comparison

From the Preventive and Occupational Medicine, University Hospital of Clermont-Ferrand (Ms Serole, Mr Prunet); Université Clermont Auvergne, University Hospital of Clermont-Ferrand, Public Health, Centre National de la Recherche Scientifique, Sigma Clermont, Institut Pascal (Dr Auclair, Dr Gerbaud); National Research University Higher School of Economics, Moscow, Russia (Dr Charkhabi); Laboratory Epsilon EA4556, Dynamic of Human Abilities & Health Behavior, Montpellier, University Hospital of Montpellier, Occupational and Preventive Medicine, University of Montpellier (Dr Lesage); Centre for Health and Exercise Science Research, Hong Kong Baptist University, Hong Kong, China (Dr Baker); Centre National de la Recherche Scientifique, Laboratoire de Psychologie et NeuroCognition, Université Grenoble Alpes (Dr Mermillod); Institut Universitaire de France, Paris (Dr Mermillod); Centre National de la Recherche Scientifique, Laboratoire de Psychologie Sociale et Cognitive, Physiological and Psychosocial Stress, University Hospital of Clermont-Ferrand, Preventive and Occupational Medicine, Université Clermont Auvergne, WittyFit (Dr Dutheil), Clermont-Ferrand, France; Australian Catholic University, Faculty of Health, School of Exercise Science, Melbourne, Victoria, Australia (Dr Dutheil).

Funding Sources: None.

Conflict of Interest: None.

Ethics approval and consent to participate: yes.

ClinicalTrials.gov Identifier: NCT02596737.

Availability of data and materials: yes.

Clinical Significance: This article highlights the prevalence of burnout among healthcare workers and lets show that some “forgotten” occupations are at risk of burnout. Overinvestment was the main factor explaining the increase in the three dimensions of burnout. Moreover, the two main models of stress at work were highly predictive of burnout.

Supplemental digital contents are available for this article. Direct URL citation appears in the printed text and is provided in the HTML and PDF versions of this article on the journal’s Web site (www.joem.org).

Address correspondence to: Claire Sérole, MSc, 58, rue Montalembert, 63003 Clermont-Ferrand Cedex 1, France (claire.serole@outlook.fr).

Copyright © 2021 American College of Occupational and Environmental Medicine

DOI: 10.1097/JOM.0000000000002235

purposes, a representative for occupational categories was required to participate to the study. No other exclusion criteria applied. Cleaners were invited to answer the questionnaire because they have taken over duties originally planned for caregiver assistants. Questionnaires were completed anonymously. The South East VI ethics committee approved the study (clinicaltrials.gov identifying number NCT02596737). However, the ethics committee precluded questions on age and sex to preserve anonymity. The only socio-demographic data authorized by the ethics committee was occupation. Information about the department in which they worked was available only after a minimum requirement of 20 responders. We used “WittyFit” software to build an online questionnaire. Questionnaires were available on the Hospital intranet, website, smartphone, and internal computers, over a period of 2 consecutive months. We informed healthcare workers of this survey by meetings, emails, intranet, and by an explanatory note appended to pay slips.

Instrument Survey

Maslach Burnout Inventory

MBI-Human Service Survey (MBI-HSS) is a self-administered questionnaire for healthcare workers that assesses feelings of emotional exhaustion, depersonalization, and personal accomplishment at work.²³ Internal consistency of MBI-HSS was satisfactory with a Cronbach α coefficient higher than 0.7.²³ Of the 22 items of the Maslach Burnout inventory, nine are designed to measure emotional exhaustion, five to reflect depersonalization, and eight to assess personal accomplishment. All items are scored on a seven-point Likert scale from “never” (zero point) to “every day” (six points). There was no overall score for burnout but there was a score for each dimension evaluated: low, moderate, or high. A high score simultaneously in emotional exhaustion (score more than or equal to 30), depersonalization (score more than or equal to 12), and personal accomplishment (score less than or equal to 33), that is, a high score within the three dimensions, means a high level of burnout. A high score in two of the three dimensions corresponds to a moderate burnout, and a high score in one of the three dimensions corresponds to low burnout. The burnout syndrome is present when at least one of the three dimensions is high. No high score within the three dimensions means no burnout, that is, the absence of high score in emotional exhaustion, and the absence of high score in depersonalization, and the absence of high score in personal accomplishment.²³

Job Demand-Control-Support Model

The JDCS is a self-administered questionnaire that assesses job demand, job control, and social support. Internal consistency of the JDCS was satisfactory, with Cronbach α coefficients higher than 0.65.²⁴ We used the 26 items French version of the JDCS.²⁵ Nine items assess job demand, nine items assess job control, and eight items assess social support. Items of JDCS are scored on a four-point Likert-type scale, ranging from “strongly disagree” (one point) to “strongly agree” (four points). Among the 26 items, five negative statements require reverse scoring. From the French data, the job strain threshold is set for a demand score higher than 20 and a job control score lower than 71. These three aspects make it possible to judge the work situation by placing employees in one of the four categories identified by this model: passive, active, low-strain, high-strain (job-strain). Strong psychological demand and low decision-making latitude (“tense” part) represent a risk situation for workers’ health.^{24,26} Social support is a moderator of jobstrain; workers having a low social-support being even more at-risk. This situation (jobstrain + low social support) is called isostrain. Isostrain combines job strain with having a social support score below 24.^{27,28}

Effort-Reward Imbalance Questionnaire

The ERI is a self-administered test assessing psychological distress and health problems that may occur when an imbalance exists between the efforts required by work and the rewards received. Internal consistency was satisfactory for the three scales of extrinsic effort, reward, and intrinsic effort, with Cronbach α coefficients higher than 0.7.²⁵ We used the 23-item French version of the ERI model, which explores efforts (six items), overcommitment (11 items), and rewards (six items).¹³ Items are scored on a five-point Likert scale, ranging from “strongly disagree” (one point) to “agree and very disturbed” (five points) for efforts and rewards, and ranging from “strongly disagree” (one point) to “strongly agree” (five points) for overcommitment. An effort-reward ratio greater than one defines workers exposed to an imbalance between efforts and rewards,¹³ that predicts mental distress and health issues.^{14–17}

Ethical Conflicts

We included two self-reported questions about ethical conflict in our survey: “In my work, I have to do things that I do not agree with on a moral level” and “In my work, I see decisions and practices that go against my personal values.” These two items were scored on a five-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). High scores reflected a situation of high ethical conflict.

Statistics

We performed statistical analysis using Stata software, version 15.0 (StataCorp, College Station, TX). Continuous data are expressed as mean \pm standard deviation (SD); categorical data are expressed in number (*n*) and percentage (%).

Distribution of continuous data was assessed using the Shapiro-wilk test. When variables did not follow a gaussian distribution, we used non-parametric mean comparisons to compare continuous variables between groups: Mann-Whitney *U* tests or Kruskal-Wallis tests were used to compare two groups or more than two groups, respectively. We used Dunn test to perform multiple pairwise comparisons after the Kruskal-Wallis test. We used chi-square tests to compare categorical variables between groups. We performed pairwise comparisons between groups using Marascuilo tests when a difference between more than two groups was retrieved for a categorical variable (eg, burnout combining three dimensions—no, low, moderate, or high; or levels of burnout within the three dimensions: low, moderate, or high). Marascuilo is a 2×2 comparison tests, allowing to test which specific proportions are different from each other after a significant overall chi-square test. We used Spearman correlation coefficients to examine the relationship between scores of the three burnout dimensions and the dimensions of the Job Content Questionnaire, the effort reward-imbalance test, and the ethical conflicts questions. We then performed multivariate analyses to introduce continuous covariates into the model. We performed multiple linear regression analysis to assess the contribution of explanatory factor (JDCS, ERI, and ethical conflicts as continuous variables, ie, scores for job demand, job control, social support, efforts, rewards, and ethical conflicts) on each dimension of burnout separately (emotional exhaustion, depersonalization, and personal accomplishment as dependent variables). We presented standardized beta coefficients (β) with 95% confidence intervals (CI) and *P*-values for each factor. Additionally, we quantified the risk of burnout (categorical dependent variable) according to the categories of the JDCS and ERI models (job strain, isostrain, effort-reward imbalance, ethical conflict as categorical independent variables), and according to the scores for each dimension of the JDCS and ERI (job demand, job control, social support, efforts, rewards, and ethical conflicts as continuous independent variables). We conducted three sets of multivariate logistic

regression analysis for each dependent variable: low, moderate, and high burnout. We estimated relative risk with 95% CI for these models. To calculate the relative risks of continuous independent variables, we considered each dimension as a binary variable (having a score greater than half).

Statistical significance was set at $P < 0.05$.

RESULTS

Of the 5592 healthcare workers who received a confidential code to participate, 1189 (21.3%) completed the questionnaires. We removed 15 medical interns who answered the survey from the analysis because the representative rate was not reached for this occupation. Therefore, we included 1174 participations in statistical analyses. Of the respondents, 12.1% were physicians, pharmacists or odontologists, 47.2% were nurses, 2.7% were midwives, 20.5% were caregivers or childcare assistants, 3.6% were cleaners, 4.9% were reeducation or socio-educational workers, and 8.9% were supervisors of caregivers, reeducation, socio-educational, or medico-technical workers (Fig. 1).

Prevalence of Burnout

Among the 1174 healthcare workers who participated in the survey, 996 fully completed the MBI. Burnout was detected in 53.1% of staff. One in five had high (5.9%) or moderate (15.5%) burnout, one-third (31.7%) showed low burnout, and less than half of respondents (46.9%) had no burnout. We observed high scores in emotional exhaustion and depersonalization in 32.6% and 19.8% of included healthcare workers, respectively, while 27.6% of participants had low personal accomplishment (Table 1).

Differences Between Occupations

Prevalence of Burnout Combining the Three Dimensions

Comparisons of the prevalence of burnout (categorical data)—at least one high score in one of the three dimensions—using the Marascuilo test demonstrated burnout was significantly higher for

physicians, nurses, caregivers, cleaners, and supervisors than reeducation and socio-educational workers ($P < 0.01$). Moreover, burnout was significantly higher for cleaners than midwives ($P < 0.1$) (Table 1 and Fig. 2).

Burnout Within Each Dimension

Emotional Exhaustion

Comparisons of the prevalence of high burnout in emotional exhaustion (categorical data) using the Marascuilo test demonstrated that emotional exhaustion was significantly higher for physicians, nurses, caregivers, supervisors, and cleaners than for reeducation and socio-educational workers ($P < 0.01$). Furthermore, emotional exhaustion was significantly higher for caregivers and cleaners than midwives ($P < 0.05$). Comparisons of the means (continuous data) using either the Dunn test or linear regression demonstrated that emotional exhaustion was significantly higher for physicians, nurses, caregivers, supervisors, and cleaners than for reeducation and socio-educational workers. ($P < 0.05$ for all comparisons). Moreover, emotional exhaustion was significantly higher for caregivers, nurses, and cleaners than for midwives ($P < 0.1$ using Dunn test) (Table 1 and Fig. 3).

Depersonalization

Comparisons of the prevalence of high burnout (categorical data) using the Marascuilo test demonstrated that depersonalization was higher for physicians and nurses than for reeducation and socio-educational workers ($P < 0.05$). Whatever test was used (Dunn, or multivariate analyses), physicians, nurses, and caregivers exhibited higher depersonalization than reeducation and socio-educational workers and supervisors. Cleaners had a higher depersonalization than supervisors ($P < 0.05$ for all comparisons except $P < 0.1$ for supervisor's vs cleaners) (Table 1 and Fig. 3).

Personal Accomplishment

Comparisons of the prevalence of high burnout (categorical data) using the Marascuilo test demonstrated that personal

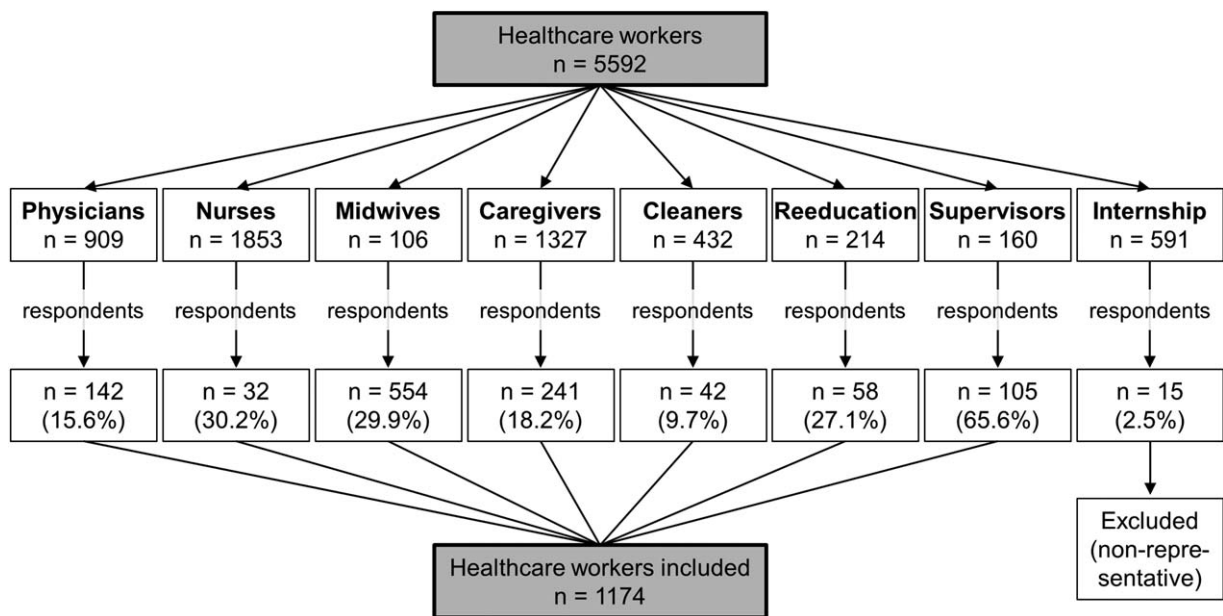


FIGURE 1. Flow chart. Physicians: physicians, pharmacists, odontologists. Nurses: nurses, anesthetist nurses, pediatric nurses. Caregivers: caregivers, childcare assistants. Reeducation: other's healthcare workers, reeducation, socio-educational. Supervisors: supervisor caregivers, reeducation, socio-educational. Internship: internship students.

TABLE 1. Burnout by Occupation, in Health-Care Workers

	Occupations						
	Physician, Pharmacist, Odontologist <i>n</i> = 117	Nurse <i>n</i> = 479	Midwife <i>n</i> = 29	Supervisor Healthcare Worker <i>n</i> = 79	Caregiver, Childcare Assistant <i>n</i> = 203	Reeducation Socio-Educational <i>n</i> = 51	Cleaner <i>n</i> = 35
Burnout combining the three dimensions							
No burnout— <i>n</i> (%)	50 (42.7)	227 (47.1)	20 (69.0)	39 (39.4)	82 (40.4)	39 (76.5)	10 (28.2)
Burnout— <i>n</i> (%)	67 (57.3)	252 (52.9)	9 (31.0)	40 (60.6)	121 (59.6)	12 (23.5)	25 (71.8)
Low— <i>n</i> (%)	41 (35.0)	152 (31.5)	5 (17.2)	18 (22.8)	79 (38.9)	9 (17.6)	12 (34.4)
Moderate— <i>n</i> (%)	15 (12.8)	76 (16.4)	3 (10.3)	18 (22.8)	30 (14.8)	2 (3.9)	7 (20.0)
High— <i>n</i> (%)	11 (9.4)	24 (5.0)	1 (3.4)	4 (5.1)	12 (5.9)	1 (2.0)	6 (17.1)
Comparisons of prevalence of burnout (qualitative data) using Marascuilo test	Higher than: - Reeducation*	Higher than: - Reeducation*	Lower than: - Cleaner†	-	Higher than: - Reeducation**	Lower than: - Physician* - Nurse* - Caregiver** - Cleaner**	Higher than: - Midwife† - Reeducation**
Burnout within each dimension							
Emotional exhaustion							
Means ± SD	22.8 ± 12.5	23.4 ± 12.4	20.0 ± 9.8	24.4 ± 12.8	24.2 ± 12.9	15.4 ± 11.1	24.8 ± 13.9
Low— <i>n</i> (%)	48 (38.1)	189 (37.5)	12 (38.7)	34 (36.6)	77 (35.0)	31 (56.4)	15 (37.5)
Medium— <i>n</i> (%)	39 (31.0)	148 (29.4)	15 (48.4)	24 (25.8)	60 (27.3)	20 (36.4)	8 (20.0)
High— <i>n</i> (%)	39 (31.0)	167 (33.1)	4 (12.9)	35 (37.6)	83 (37.7)	4 (7.3)	17 (42.5)
Comparisons of means (quantitative data)—using Dunn test	Higher than: - Reeducation***	Higher than: - Reeducation***	Higher than: - Nurse† Lower than: - Cleaner*	Higher than: - Reeducation***	Higher than: - Reeducation**	Lower than: - Physician*** - Nurse*** - Midwife* - Supervisor*** - Caregiver** - Cleaner***	Higher than: - Reeducation*** - Midwife*
Comparisons of means (quantitative data) using multivariate analysis	Higher than: - Reeducation***	Higher than: - Reeducation***	Higher than: - Nurse† - Reeducation†	Higher than: - Reeducation***	Higher than: - Reeducation***	Lower than: - Physician*** - Nurse*** - Supervisor*** - Caregiver** - Cleaner***	Higher than: - Reeducation***
Comparisons of prevalence of high burnout (qualitative data) using Marascuilo test	Higher than: - Reeducation*	Higher than: - Reeducation**	Lower than: - Caregiver*	Higher than: - Reeducation**	Higher than: - Reeducation** - Midwife*	Lower than: - Physician* - Nurse** - Supervisor** - Caregiver* - Cleaner*	Higher than: - Reeducation*
Depersonalization							
Means ± SD	7.4 ± 6.5	7.2 ± 6.3	5.6 ± 5.7	5.1 ± 5.8	7.0 ± 6.2	4.6 ± 4.4	7.2 ± 6.9
Low— <i>n</i> (%)	63 (48.8)	250 (48.3)	16 (53.3)	53 (61.6)	107 (47.6)	37 (66.1)	17 (44.7)
Medium— <i>n</i> (%)	33 (25.6)	155 (29.9)	9 (30.0)	24 (27.9)	78 (34.7)	15 (26.8)	11 (28.9)
High— <i>n</i> (%)	33 (25.6)	113 (21.8)	5 (16.7)	9 (10.5)	40 (17.8)	4 (7.1)	10 (26.3)
Comparisons of means (quantitative data)—using Dunn test	Higher than: - Supervisor*** - Reeducation***	Higher than: - Supervisor*** - Reeducation**	-	Lower than: - Physician*** - Nurse*** - Caregiver** - Cleaner*	Higher than: - Supervisors** - Reeducation**	Lower than: - Physician*** - Nurse** - Caregiver** - Cleaner†	Higher than: - Supervisor* - Reeducation†
Comparisons of means (quantitative data) using multivariate analysis	Higher than: - Supervisor** - Reeducation**	Higher than: - Supervisor** - Reeducation**	-	Lower than: - Physician** - Nurse** - Caregiver* - Cleaner†	Higher than: - Supervisor* - Reeducation*	Lower than: - Physician** - Nurse** - Caregiver** - Cleaner†	Higher than: - Supervisor* - Reeducation†
Comparisons of prevalence of high burnout (qualitative data) using Marascuilo test	Higher than: - Reeducation*	Higher than: - Reeducation*	-	-	-	Lower than: - Physician* - Nurse*	-
Personal accomplishment							
Means ± SD	37.6 ± 6.9	37.0 ± 7.1	39.5 ± 5.5	35.9 ± 8.7	36.7 ± 7.4	39.2 ± 6.8	30.6 ± 11.0
Low— <i>n</i> (%)	57 (46.7)	198 (39.1)	19 (61.3)	53 (61.6)	91 (42.7)	29 (55.8)	9 (25.7)
Medium— <i>n</i> (%)	32 (26.2)	181 (35.7)	6 (19.4)	24 (27.9)	58 (27.2)	12 (23.1)	7 (20.0)
High— <i>n</i> (%)	33 (27.0)	128 (25.2)	6 (19.4)	9 (10.5)	64 (30.0)	11 (21.2)	19 (54.3)

TABLE 1. (Continued)

	Occupations						
	Physician, Pharmacist, Odontologist <i>n</i> = 117	Nurse <i>n</i> = 479	Midwife <i>n</i> = 29	Supervisor Healthcare Worker <i>n</i> = 79	Caregiver, Childcare Assistant <i>n</i> = 203	Reeducation Socio-Educational <i>n</i> = 51	Cleaner <i>n</i> = 35
	Comparisons of means (quantitative data)—using Dunn test	Higher than: - Supervisor† - Cleaner*** Lower than: - Reeducation†	Higher than: - Cleaner*** Lower than: - Midwife* - Reeducation*	Higher than: - Nurse* - Supervisor* - Caregiver* - Cleaner***	Higher than: - Cleaner** Lower than: - Midwife* - Reeducation**	Higher than: - Cleaner*** Lower than: - Midwife* - Reeducation**	Higher than: - Physician† - Nurse* - Supervisor** - Caregiver** - Cleaner***
Comparisons of means (quantitative data) using multivariate analysis	Higher than: - Cleaner***	Higher than: - Cleaner*** Lower than: - Midwife† - Reeducation*	Higher than: - Nurse† - Supervisor* - Caregiver* - Cleaner***	Higher than: - Cleaner*** Lower than: - Midwife* - Reeducation*	Higher than: - Cleaner*** Lower than: - Reeducation* - Midwife*	Higher than: - Nurse* - Supervisor* - Caregiver* - Cleaner***	Lower than: - Physician*** - Nurse*** - Midwife*** - Supervisor*** - Caregiver*** - Reeducation***
Comparisons of prevalence of high burnout (qualitative data) using Marascuilo test	-	Higher than: - Cleaner†	-	-	-	Higher than: - Cleaner†	Lower than: - Nurse† - Reeducation†

Nurse includes surgical nurse and anesthetist nurse.
 Supervisor healthcare workers are caregiver supervisors, reeducation supervisors, socio-educational supervisors, and medico-technical supervisors.
 **P* < 0.05.
 ***P* < 0.01.
 ****P* < 0.001.
 †*P* < 0.1.

accomplishment was significantly lower for cleaners than nurses and reeducation and socio-educational workers (*P* < 0.1). However, whatever the test used (Dunn, or multivariate analyses), cleaners exhibited lower personal accomplishment than physicians, nurses, midwives, supervisors, caregivers, and reeducation and socioeducational workers (*P* < 0.01 for all comparisons). Midwives and reeducation and socioeducational workers exhibited higher personal accomplishment than cleaners, supervisors, nurses, and caregivers

(*P* < 0.05 for all comparisons except *P* < 0.1 for midwives, vs nurses using linear regression) (Table 1 and Fig. 3).

Predictors of Burnout—Multivariate Analyses

Although all factors were linked (burnout, JDCS, ERI, and ethical conflict), the three main correlations (*r* > 0.50) were efforts (*r* = 0.63, *P* < 0.0001), job demand (*r* = 0.62, *P* < 0.0001), and overinvestment (*r* = 0.56, *P* < 0.0001), which were all linked with

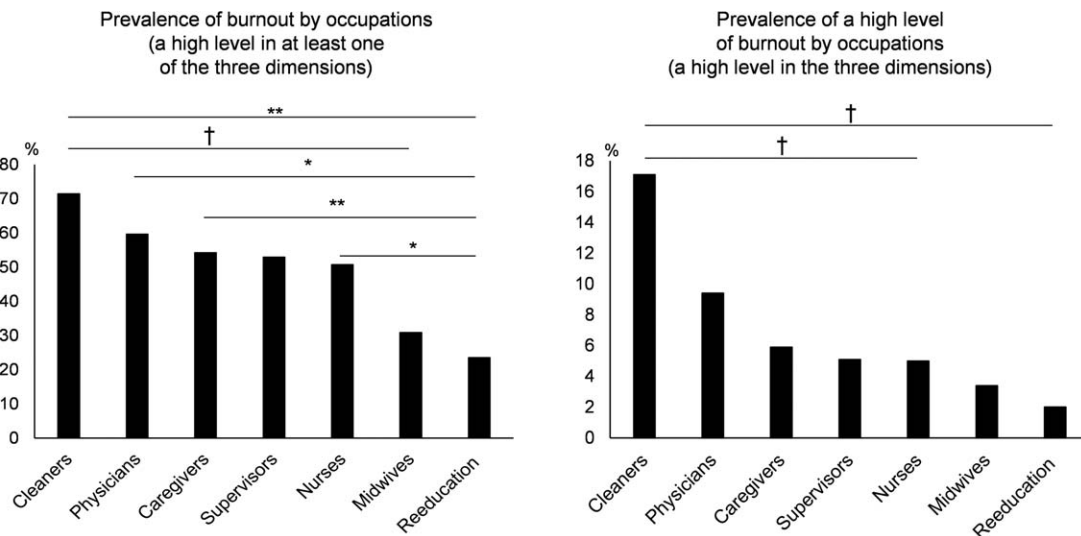


FIGURE 2. Prevalence of burnout by occupation. *: *P* < 0.05; **: *P* < 0.01; †: *P* < 0.1.

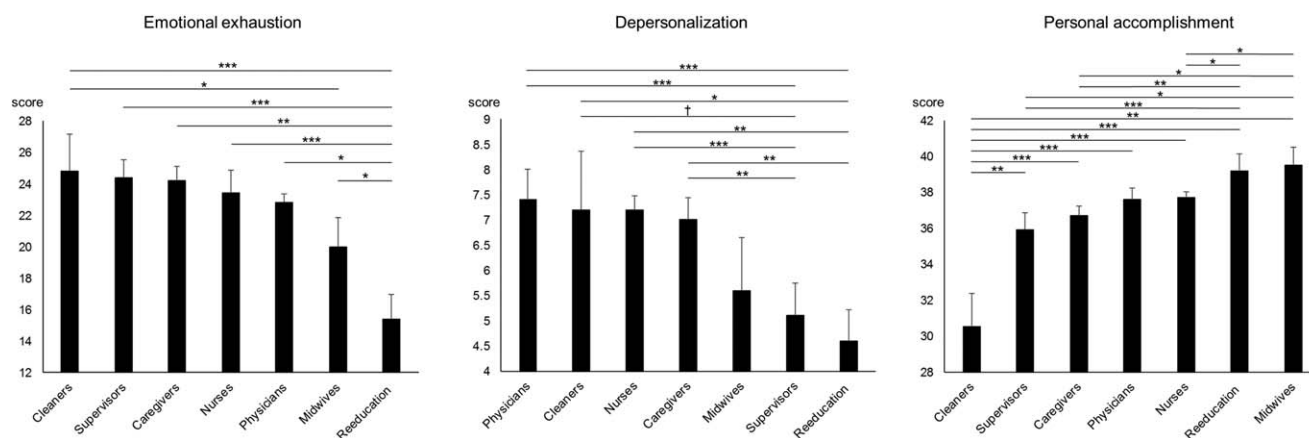


FIGURE 3. Mean score (±SE) at each dimension of burnout, by occupation. *: $P < 0.05$; **: $P < 0.01$; ***: $P < 0.001$; †: $P < 0.1$.

emotional exhaustion (see (see S1 Table, <http://links.lww.com/JOM/A923>). Thus, we entered all factors in the multivariate analyses.

The two main factors explaining an increase in emotional exhaustion were an increase in job demand ($\beta = 0.39$, 95% CI: 0.30 to 0.47, $P < 0.001$) and in overinvestment ($\beta = 0.37$, 95% CI: 0.29 to 0.44, $P < 0.001$). Other factors explaining an increase in emotional

exhaustion were extrinsic effort ($\beta = 0.14$, 95% CI: 0.10 to 0.18), ethical conflict ($\beta = 0.08$, 95% CI: 0.04 to 0.12), and a decrease in rewards ($\beta = -0.16$, 95% CI: -0.21 to -0.12) job control ($\beta = -0.13$, 95% CI: -0.20 to -0.05), and social support ($\beta = -0.09$, 95% CI: -0.16 to -0.02) ($P < 0.05$ for all variables) (Fig. 4).

The three main factors explaining an increase in depersonalization were an increase in overinvestment ($\beta = 0.20$, 95% CI: 0.10

Variables	β (95% CI)	p-value
Emotional exhaustion		
Effort	0,14 (0,10, 0,18)	<0,001
Reward	-0,16 (-0,21, -0,12)	<0,001
Overinvestment	0,37 (0,29, 0,44)	<0,001
Job demand	0,39 (0,30, 0,47)	<0,001
Job control	-0,13 (-0,20, -0,05)	<0,001
Social support	-0,09 (-0,16, -0,02)	0,007
Ethical conflict	0,08 (0,04, 0,12)	<0,001
Depersonalization		
Effort	0,04 (0, 0,09)	0,047
Reward	-0,08 (-0,13, -0,02)	0,005
Overinvestment	0,20 (0,1, 0,29)	<0,001
Job demand	0,15 (0,04, 0,26)	0,005
Job control	-0,12 (-0,21, -0,03)	0,009
Social support	0,01 (-0,06, 0,1)	0,682
Ethical conflict	0,14 (0,09, 0,19)	<0,001
Personal accomplishment		
Effort	-0,01 (-0,05, 0,01)	0,357
Reward	0,01 (-0,02, 0,06)	0,482
Overinvestment	-0,15 (-0,22, -0,07)	<0,001
Job demand	0,01 (-0,06, 0,1)	0,706
Job control	0,27 (0,2, 0,35)	<0,001
Social support	0,06 (-0,01, 0,13)	0,063
Ethical conflict	-0,04 (-0,08, -0,01)	0,038

FIGURE 4. Multivariate analysis of factors influencing each dimension of burnout (emotional exhaustion, depersonalization, and personal accomplishment). 95% CI, 95% confident intervals.

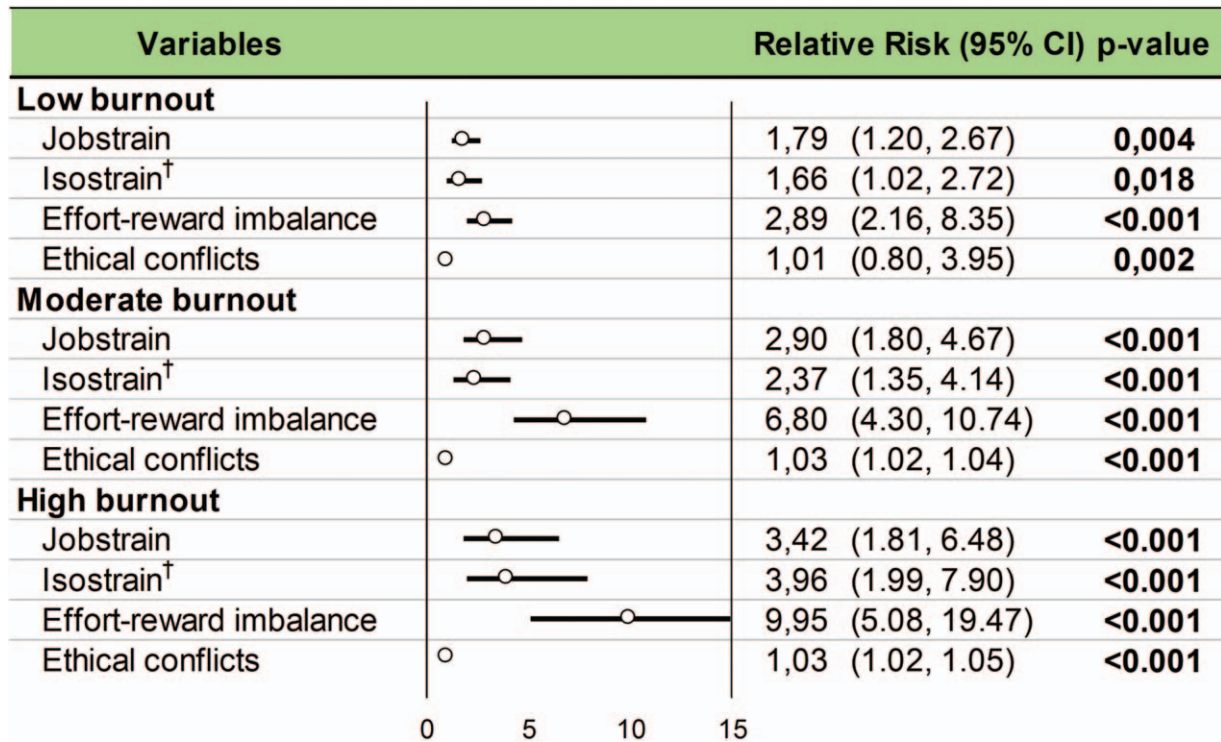


FIGURE 5. Quantification of the risk of burnout according to the categories of the JDCS and ERI models. ERI, Effort-Reward Imbalance Model; JDCS, Job Demand-Control-Support Model.

to 0.29, $P < 0.001$), job demand ($\beta = 0.15$, 95% CI: 0.04 to 0.26, $P < 0.05$), and ethical conflicts ($\beta = 0.14$, 95% CI: 0.09 to 0.19, $P < 0.001$). Other factors explaining an increase in depersonalization were an increase in extrinsic effort ($\beta = 0.04$, 95% CI: 0.005 to 0.09), and a decrease in job control ($\beta = -0.12$, 95% CI: -0.21 to -0.03) and rewards ($\beta = -0.08$, 95% CI: -0.13 to -0.02) ($P < 0.05$ for all variables). Social support had no significant effect on depersonalization (Fig. 4).

The two main factors explaining an increase in personal accomplishment were an increase in job control ($\beta = 0.27$, 95% CI: 0.20 to 0.35, $P < 0.001$), and a decrease in overinvestment ($\beta = -0.15$, 95% CI: -0.22 to -0.07, $P < 0.001$). The other factor explaining an increase in personal accomplishment was ethical conflict ($\beta = -0.04$, 95% CI: -0.08 to -0.01, $P < 0.05$). Job demand, extrinsic effort, rewards, and social support had no significant effects on personal accomplishment (Fig. 4).

Levels of job demand, job control, social support, effort reward imbalance, and ethical conflicts are described by occupations in see S2 Table, <http://links.lww.com/JOM/A924>.

Quantification of the Risk of Burnout

Effort reward imbalance was the main explaining factor for burnout. We demonstrated a strong dose-response relationship between burnout and ERI. Taking into account the absence of burnout as a reference, an effort-reward imbalance multiplied the risk of low burnout by 2.89 (95% CI: 2.16 to 8.35; $P < 0.001$), the risk of moderate burnout by 6.80 (95% CI: 4.30 to 10.74; $P < 0.001$), and the risk of high burnout by 9.95 (95% CI: 5.08 to 19.47; Fig. 5). Considering the three dimensions of ERI, overinvestment was the main factor explaining burnout with a strong dose-response relationship (Fig. 6). Taking into account the absence of burnout as a reference, overinvestment multiplied the risk of low burnout by 4.25 (95% CI: 2.16 to 8.35, $P < 0.001$), the risk of moderate burnout by 23.50 (95% CI: 8.17

to 67.41, $P < 0.001$), and the risk of high burnout by 22.0 (95% CI: 5.06 to 94.71, $P < 0.001$). There was also a dose-response relationship for effort. Taking into account the absence of burnout as a reference effort respectively multiplied the risk of low burnout by 1.75 (95% CI: 1.27 to 2.29, $P < 0.001$), the risk of moderate burnout by 2.11 (95% CI: 1.33 to 3.35, $P < 0.01$), and the risk of high burnout by 3.40 (95% CI: 1.71 to 6.74, $P < 0.001$). There was no dose-response relationship for rewards (Fig. 6).

Jobstrain and isostrain also showed a dose-response effect on burnout. Taking into account the absence of burnout as a reference, jobstrain, and isostrain respectively, multiplied the risk of low burnout by 1.79 (95% CI: 1.20 to 2.67; $P < 0.05$) and 1.66 (95% CI: 1.02 to 2.72; $P < 0.05$), the risk of moderate burnout by 2.90 (95% CI: 1.80 to 4.67, $P < 0.001$) and 2.37 (95% CI: 1.35 to 4.14, $P < 0.05$), and the risk of high burnout by 3.42 (95% CI: 1.81 to 6.48, $P < 0.001$) and 3.96 (95% CI: 1.99 to 7.90, $P < 0.001$) (Fig. 5). Considering the three dimensions of JDCS, job demand was the main explaining factor for burnout. Taking into account the absence of burnout as a reference, job demand multiplied the risk of low burnout by 1.78 (95% CI: 0.80 to 3.95, $P < 0.001$), the risk of moderate burnout by 5.53 (95% CI: 1.87 to 16.37, $P < 0.01$), and the risk of high burnout by 3.85 (95% CI: 0.84 to 17.55, $P < 0.1$). There was no dose-response relationship for job control and social support (Fig. 6).

Ethical conflict also exhibited a dose-response effect on burnout. Taking into account the absence of burnout as a reference, ethical conflict multiplied the risk of moderate burnout by 3.15 (95% CI: 1.83 to 5.42; $P < 0.001$), and the risk of high burnout by 2.79 (95% CI: 1.29 to 6.04, $P < 0.01$) (Fig. 6).

DISCUSSION

One of the main findings of this study was that not only physicians and nurses but also other less studied healthcare categories are at risk of burnout, such as cleaners, who had the least personal accomplishment. A second finding shows that

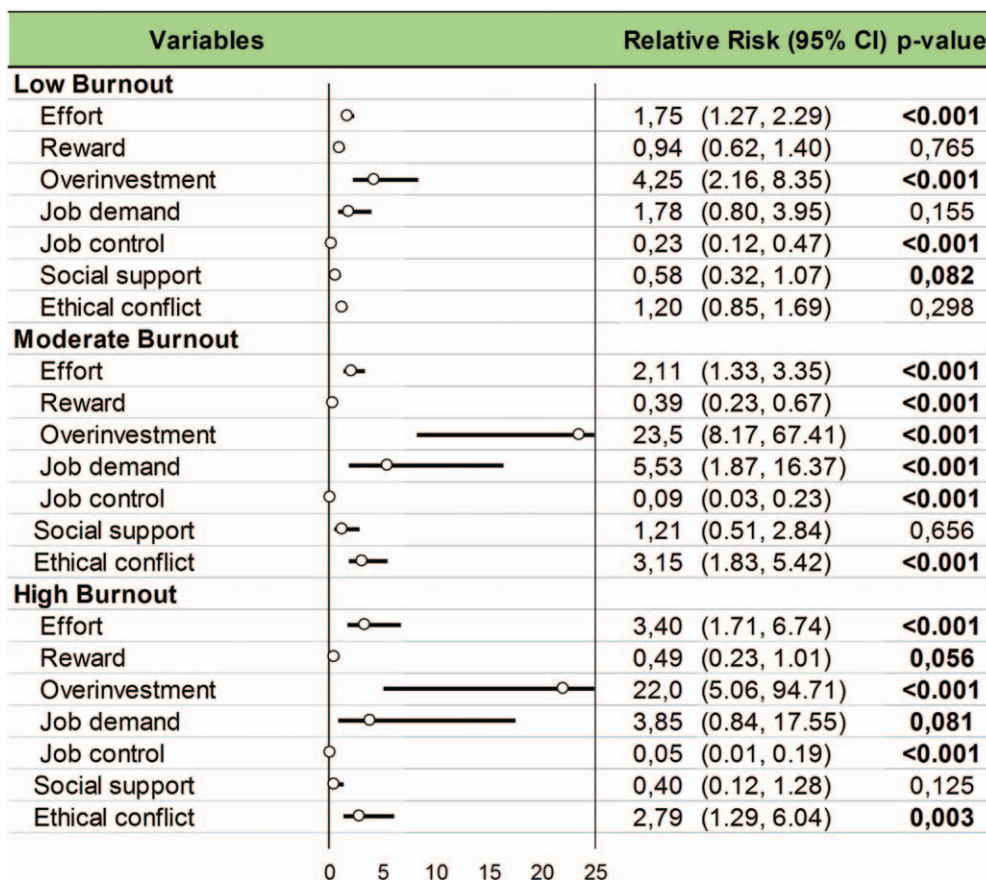


FIGURE 6. Quantification of the risk of burnout according to levels of each dimension of JDCS and ERI. ERI, Effort-Reward Imbalance Model; JDCS, Job Demand-Control-Support Model.

overinvestment was the main factor explaining an increase in emotional exhaustion, depersonalization, and personal accomplishment. Last, but not least, we also highlighted a dose-response relationship between ERI, JDCS, and burnout.

Prevalence of Burnout in Healthcare Workers

Burnout in healthcare workers is not limited to isolated cases. In our study, burnout was detected in half of healthcare workers (53%). Although this seems high, it is in line with several meta-analyses including more than 200 articles in total and demonstrating a prevalence of burnout of over 50%.^{5,6} It should be noted that an exhaustive review focusing on specific occupations (medical doctors), even reported a prevalence of burnout of 67%.⁵ Our study is novel because it is the first to report data on all healthcare workers and therefore comparisons of the prevalence between studies does not seem relevant because of the differences in the included populations. Nevertheless, the prevalence of burnout is high and underpins negative consequences for both workers and the patients,²⁹ in particular, burnout and increased physical illness. Burnout has also been associated with cardiovascular diseases and musculoskeletal disorders.³⁰ Moreover, burnout may increase intention to leave the job.³¹ Also, burnout increases the risk of medical malpractice by up to six fold.³² Conversely, healthcare workers are able to provide a higher standard of care when their work satisfaction is high.³³ The prevalence of burnout in physicians and nurses is consistent with the results found in the literature.³⁴ Despite the fact that we only performed a cross-sectional study, burnout in physicians seems to have increased over time.³⁴ Despite

the prevalence of burnout in caregivers and midwives being poorly studied, our results seem to agree with the results available in the literature.³⁵ However, it is necessary to be cautious with cross-sectional comparisons of burnout because there are important differences in professional status and the roles of professionals in the healthcare systems around the world. Also, transnational differences in the perception and scoring of the MBI-items might result in differences in the composite scores on the burnout dimensions.³⁶

The Forgotten Healthcare Workers at Risk of Burnout

No research has focused on the prevalence of burnout among cleaners, supervisors, or reeducation and socio-educational healthcare workers. We demonstrated that cleaners were particularly at risk, with the majority (71%) in a state of burnout. A lower personal accomplishment is particularly noted. Several hypotheses can explain these scores. First, the occupation of hospital cleaner is particularly physically demanding because of time pressure, economic constraints, and heavy loads, such as patients (even if not typically in their duties).³⁶ Cleaners, particularly female ones, reported using poor work postures much of the time. There is also a discrepancy between physical capacity and the expected output of (especially aging) women who are involved in physical jobs, which promotes physical and mental symptoms. Moreover, a low position in the occupational hierarchy and an over run of initial functions could also be a source of stress in cleaners. Hierarchy influences perception and experiences of occupational stress, as well as the responses to it.³³ In addition to cleaners, we demonstrated that a

prevalence of a high level of burnout was similar in supervisors, nurses, and caregivers. Managing a team has previously been reported to have a high risk of burnout.³⁷ However, supervisor healthcare workers have putative additional causes of stress, such as contact with patients.³⁸ Despite reeducation and socio-educational healthcare workers having the lowest prevalence of burnout, burnout remained non-negligible (more than 20%). Further studies should be carried out in order to better understand burnout and determine better preventive strategies. The thesaurus of “Organizational, Relational, Ethical and other Contributing Factors” (FOREC) linked with the onset of mental and behavioral disorders could be used as a basis for identifying specific prevention programs in the workplace.³⁹

Factors of JDCS, ERI, and Ethical Conflict Influencing Burnout

We investigated the relationship between JDCS, ERI, ethical conflict, and burnout. All were linked with burnout, but the ERI was the main model predicting burnout, and was in agreement with the literature.⁴⁰ ERI was demonstrated to impact self-esteem and thus long-term well-being, which can lead to insomnia and depression.⁴¹ ERI, unlike JDCS, is also a good predictor of mortality and somatic diseases.¹⁵ Specifically, when looking at dimensions within each model, we demonstrated that overinvestment was a better predictive factor of burnout than job demand, job control, efforts—in line with the literature—or ethical conflict, which has never been combined with ERI and JDCS. Overinvestment is a behavior that reflects a very high ambition to work, in combination with the need for approval and to be esteemed.³⁸ Overinvestment is a motivational pattern of maladaptive coping strategies,¹³ adopted to handle stressful situations. Stress arises when workers receive inadequate rewards for their efforts, and overinvestment increases frustration if reward expectancies are not met.¹³ This process may increase emotional exhaustion and burnout.⁴² Interestingly, burnout can also lead people to overinvest, as an inappropriate adaptation behavior, which further increases burnout.⁴³ In addition, overinvestment may come from a high job demand but also from high job control. Having the ability to control one’s own work without supervision can promote overinvestment to maintain this freedom.⁴⁴

Overinvestment can lead to addiction to work with adverse work outcomes and health consequences. Overinvestment has also been associated with coronary heart disease, and the level of stress hormones such as norepinephrine and cortisol, which are linked to anxiety and depression.⁴⁵ In contrast, work engagement promotes performance at the individual and unit levels, well-being in the absence of disease and turnover. Thus, workers must be engaged in their work but not overinvested, and must also perceive adequate rewards to promote positive emotional states such as self-achievement and accomplishment, and to be protected from emotional exhaustion, anxiety, and burnout.⁴³

Limitations

We noted several limitations in this study. First, the percentage of respondents may seem low, however 20% of respondents to a questionnaire on burnout is in line with previous literature with a similar cross-sectional design.^{5,46} Moreover, we retrieved over 1000 respondents, which is a larger sample size than most studies on burnout.⁵ We also have a hundred respondents among the forgotten health-care occupations at risk of burnout (midwives, caregivers or childcare assistants, reeducation or socio-educational workers, and supervisors of those categories) which seems a very large sample size compared with the literature. We did not collect socio-demographic characteristics. Indeed, age, sex, and grade were precluded from analyses by the ethical committee to preserve anonymity. Despite demographics not always being related to burnout,⁴⁵ several studies demonstrated that demographics have an impact on burnout.

Middle aged people seem less at risk of burnout, with extreme ages more at risk (less than 35 years and more than 55 years old).⁴⁷ Older workers seem particularly at risk of depersonalization and low personal accomplishment.⁴⁸ Moreover, women seem to experience slightly higher burnout levels than men.⁴⁹ The study lacks on information and data about health outcome. The fact that we did not assess demographics may have limited the bias of social desirability. The bias of social desirability occurs when too many questions are related to socio-demographic characteristics; respondents may adapt answers to meet social expectations and not to be stigmatized. Second, there is a lack of involvement of interns, with only 7.9% of interns responding. Although our study cannot provide reliable results regarding burnout among interns, it has been demonstrated that this population is particularly at risk, with up to one out of two interns experiencing burnout.⁵⁰ Paradoxically, they may not have responded because their workload is too heavy. This non-response may reflect other issues for which further investigation would be relevant. Third, we did not assess the health consequences of burnout, such as mental and physical health. It could also have been important considering the mounting evidence that burnout can cause depressive conditions.^{51–53} We also did not assess the use of psychotropic drugs. Indeed, some workers use psychotropic drugs to improve their deficits in concentration, fatigue, physical exhaustion or to treat mental health issues such as depressive symptoms or anxiety.⁵⁴ Moreover, our cross-sectional design made it difficult to study causal relationships and this study is mono-centric, thus precluding generalizability. Finally, the MBI subscales are not diagnostic but are dimensional.⁵⁵ Maslach herself stays away from the idea of diagnosis. Because there are no diagnostic criteria for burnout, unlike generalized anxiety disorder or an episode of major depression, it is impossible to estimate the prevalence of burnout.⁵⁵ However, even if there are no diagnostic criteria for burnout, there is a huge literature base available including high-ranking journals that used the MBI to estimate the prevalence of burnout,⁵ using the definition used in our article. Moreover, in order to limit the problem of overestimation, we consistently reported the prevalence of workers with a high score in only one of the three dimensions, the prevalence of workers with a high score in two of the three dimension and the prevalence of workers with a high score in the three dimensions. The use of diagnostic scales of burnout and cut-off for burnout could be an interesting article that should be considered for a specific methodological publication. However, we have provided new insights into the prevalence of burnout among all healthcare workers and allowed the most predictable variables to be determined.

CONCLUSION

Some forgotten occupations among healthcare workers have never previously been studied, and are particularly at risk of burnout, such as cleaners. Overinvestment was the main factor explaining the increase in the three dimensions of burnout. Moreover, the two major models of stress at work, effort reward-imbalance, and demand control support, were highly predictive of burnout, with strong dose–response relationships. Therefore, using these models to assess burnout may be of benefit for developing efficient preventive strategies.

ACKNOWLEDGMENTS

The authors would like to express our gratitude to the workers who were included.

REFERENCES

1. Schaufeli WB, Greenglass ER. Introduction to special issue on burnout and health. *Psychol Health*. 2001;16:501–510.
2. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol*. 2001;52:397–422.

3. Mateen FJ, Dorji C. Health-care worker burnout and the mental health imperative. *Lancet Lond Engl*. 2009;374:595–597.
4. Escrivà-Agüir V, Martín-Baena D, Pérez-Hoyos S. Psychosocial work environment and burnout among emergency medical and nursing staff. *Int Arch Occup Environ Health*. 2006;80:127–133.
5. Rotenstein LS, Torre M, Ramos MA, et al. Prevalence of burnout among physicians: a systematic review. *JAMA*. 2018;320:1131–1150.
6. Zhang Y-Y, Han W-L, Qin W, et al. Extent of compassion satisfaction, compassion fatigue and burnout in nursing: a meta-analysis. *J Nurs Manag*. 2018;26:810–819.
7. Jiang XM, Huang XX, Xie HZ. [Analysis on the status of job burnout of midwife in a province]. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi*. 2017;35:604–607.
8. Alves LCS, Monteiro DQ, Bento SR, et al. Burnout syndrome in informal caregivers of older adults with dementia: a systematic review. *Dement Neuropsychol*. 2019;13:415–421.
9. Bhana A, Haffeejee N. Relation among measures of burnout, job satisfaction, and role dynamics for a sample of South African child-care social workers. *Psychol Rep*. 1996;79:431–434.
10. Nalule Y, Buxton H, Flynn E, et al. Hygiene along the continuum of care in the early post-natal period: an observational study in Nigeria. *BMC Pregnancy Childbirth*. 2020;20:589.
11. Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol*. 1998;3:322–355.
12. Siegrist J. Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol*. 1996;1:27–41.
13. Siegrist J, Starke D, Chandola T, et al. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med*. 2004;58:1483–1499.
14. Clinchamps M, Auclair C, Prunet D, et al. Burnout among hospital non-healthcare staff: influence of job-demand-control support, and effort-reward imbalance. *J Occup Environ Med*. 2020;63:e13–e20.
15. Kivimäki M, Pentti J, Ferrie JE, et al. Work stress and risk of death in men and women with and without cardiometabolic disease: a multicohort study. *Lancet Diabetes Endocrinol*. 2018;6:705–713.
16. Kivimäki M, Leino-Arjas P, Luukkonen R, Riihimäki H, Vahtera J, Kirjonen J. Work stress and risk of cardiovascular mortality: prospective cohort study of industrial employees. *BMJ*. 2002;325:857.
17. Schmidt B, Bosch JA, Jarczok MN, et al. Effort-reward imbalance is associated with the metabolic syndrome - findings from the Mannheim Industrial Cohort Study (MICS). *Int J Cardiol*. 2015;178:24–28.
18. Wang Z, Xie Z, Dai J, Zhang L, Huang Y, Chen B. Physician burnout and its associated factors: a cross-sectional study in Shanghai. *J Occup Health*. 2014;56:73–83.
19. Wang Y, Ramos A, Wu H, et al. Relationship between occupational stress and burnout among Chinese teachers: a cross-sectional survey in Liaoning, China. *Int Arch Occup Environ Health*. 2015;88:589–597.
20. Włodarczyk D, Lazarewicz M. Frequency and burden with ethical conflicts and burnout in nurses. *Nurs Ethics*. 2011;18:847–861.
21. Thorne L. The association between ethical conflict and adverse outcomes. *J Bus Ethics*. 2010;92:269–276.
22. Jameton A. *Nursing practice: the ethical issues*. London: Prentice-Hall; 1984, 356 p.
23. Maslach C, Jackson S, Leiter M. *The Maslach Burnout Inventory Manual*. 3rd ed. Palo Alto: Consulting Psychologists Press; 1996.
24. Niedhammer I, Ganem V, Gendrey L, David S, Degioanni S. Propriétés psychométriques de la version française des échelles de la demande psychologique, de la latitude décisionnelle et du soutien social du «Job Content Questionnaire» de Karasek: résultats de l'enquête nationale SUMER. *Sante Publique (Bucur)*. 2006;18:413–427.
25. Niedhammer I, Siegrist J, Landre MF, Goldberg M, Leclerc A. [Psychometric properties of the French version of the Effort-Reward Imbalance model]. *Rev Epidemiol Sante Publique*. 2000;48:419–437.
26. Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. *Adm Sci Q*. 1979;24:285–308.
27. Dutheil F, Charkhabi M, Ravoux H, et al. Exploring the link between work addiction risk and health-related outcomes using job-demand-control model. *Int J Environ Res Public Health*. 2020;17:7594.
28. Trousselard M, Dutheil F, Naughton G, et al. Stress among nurses working in emergency, anesthesiology and intensive care units depends on qualification: a Job Demand-Control survey. *Int Arch Occup Environ Health*. 2016;89:221–229.
29. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet Lond Engl*. 2016;388:2272–2281.
30. Honkonen T, Ahola K, Pertovaara M, et al. The association between burnout and physical illness in the general population—results from the Finnish Health 2000 Study. *J Psychosom Res*. 2006;61:59–66.
31. Chang H-Y, Friesner D, Chu T-L, Huang T-L, Liao Y-N, Teng C-I. The impact of burnout on self-efficacy, outcome expectations, career interest and nurse turnover. *J Adv Nurs*. 2018;74:2555–2565.
32. Chen K-Y, Yang C-M, Lien C-H, et al. Burnout, job satisfaction, and medical malpractice among physicians. *Int J Med Sci*. 2013;10:1471–1478.
33. Van Thanh L. Relationship at work as a cause of occupational stress: the case of academic women in Vietnam. *Int J Ment Health Syst*. 2016;10:42.
34. Shanafelt TD, Hasan O, Dyrbye LN, et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clin Proc*. 2015;90:1600–1613.
35. Frade Mera MJ, Vinagre Gaspar R, Zaragoza García I, et al. Burnout syndrome in different intensive care units. *Enferm Intensiva*. 2009;20:131–140.
36. Schaufeli WB, Van Dierendonck D. A cautionary note about the cross-national and clinical validity of cut-off points for the Maslach Burnout Inventory. *Psychol Rep*. 1995;76(3 pt 2):1083–1090.
37. Karsavuran S, Kaya S. The relationship between burnout and mobbing among hospital managers. *Nurs Ethics*. 2017;24:337–348.
38. Hanson EK, Schaufeli W, Vrijkotte T, Plomp NH, Godaert GL. The validity and reliability of the Dutch Effort-Reward Imbalance Questionnaire. *J Occup Health Psychol*. 2000;5:142–155.
39. Chamoux A, Lambert C, Vilmant A, et al. Occupational exposure factors for mental and behavioral disorders at work: The FOREC thesaurus. *PLoS One*. 2018;13:e0198719.
40. Dai JM, Collins S, Yu HZ, Fu H. Combining job stress models in predicting burnout by hierarchical multiple regressions: a cross-sectional investigation in Shanghai. *J Occup Environ Med*. 2008;50:785–790.
41. Wang Y, Li Z. Authenticity as a mediator of the relationship between power contingent self-esteem and subjective well-being. *Front Psychol*. 2018;9:1066.
42. Siegrist J, Dragano N. [Psychosocial stress and disease risks in occupational life. Results of international studies on the demand-control and the effort-reward imbalance models]. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2008;51:305–312.
43. Avanzi L, Zaniboni S, Balducci C, Fraccaroli F. The relation between overcommitment and burnout: does it depend on employee job satisfaction? *Anxiety Stress Coping*. 2014;27:455–465.
44. Andreassen CS, Nielsen MB, Pallesen S, Gjerstad J. The relationship between psychosocial work variables and workaholism: findings from a nationally representative survey. *Int J Stress Manag*. 2017;26:1–10.
45. Mark G, Smith AP. Occupational stress, job characteristics, coping, and the mental health of nurses. *Br J Health Psychol*. 2012;17:505–521.
46. Cañadas-de la Fuente GA, Albendín-García L, R Cañadas G, San Luis-Costas C, Ortega-Campos E, de la Fuente-Solana EI. Nurse burnout in critical care units and emergency departments: intensity and associated factors. *Emergencias*. 2018;30:328–331.
47. Marchand A, Blanc M-E, Beauregard N. Do age and gender contribute to workers' burnout symptoms? *Occup Med Oxf Engl*. 2018;68:405–411.
48. O'Connor K, Muller Neff D, Pitman S. Burnout in mental health professionals: a systematic review and meta-analysis of prevalence and determinants. *Eur Psychiatry J Assoc Eur Psychiatr*. 2018;53:74–99.
49. Innstrand ST, Langballe EM, Falkum E, Aasland OG. Exploring within- and between-gender differences in burnout: 8 different occupational groups. *Int Arch Occup Environ Health*. 2011;84:813–824.
50. Dyrbye LN, Thomas MR, Massie FS, et al. Burnout and suicidal ideation among U.S. medical students. *Ann Intern Med*. 2008;149:334–341.
51. Bianchi R, Schonfeld IS, Verkuilen J. A five-sample confirmatory factor analytic study of burnout-depression overlap. *J Clin Psychol*. 2020;76:801–821.
52. Rössler W, Hengartner MP, Ajdacic-Gross V, Angst J. Predictors of burnout: results from a prospective community study. *Eur Arch Psychiatry Clin Neurosci*. 2015;265:19–25.
53. Schonfeld IS. When We Say 'Physician Burnout,' We Really Mean Depression [Internet]. Medscape; 2018. Available at: <http://www.medscape.com/viewarticle/898662>. Accessed November 27, 2020.
54. Franke AG, Bagusat C, Dietz P, et al. Use of illicit and prescription drugs for cognitive or mood enhancement among surgeons. *BMC Med*. 2013;11:102.
55. Lesage F-X, Choron G, Dutheil F. Multifaceted program to reduce job strain in ICU nurses. *JAMA*. 2019;321:1410–1411.