

PSYCHOSOCIAL AND ORGANISATIONAL WORK ENVIRONMENT OF NURSE MANAGERS AND SELF-REPORTED DEPRESSIVE SYMPTOMS: CROSS-SECTIONAL ANALYSIS FROM A COHORT OF NURSE MANAGERS

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Abstract

Objectives: The association between depressive symptoms and psycho-organisational work environment has been established in the literature. Some studies have evaluated depressive symptoms in healthcare workers, but little research has been carried out among nurse managers. The aim of the study is to evaluate the depressive symptoms prevalence among nurse managers' population and work environment factors. **Material and Methods:** A descriptive correlational research design was used. Data were collected from 296 nurse managers in five hospitals in the eastern area of France between 2007 and 2008. Health outcomes were evaluated by measuring depressive symptoms (CES-D scale), the exposure data by assessing psycho-organisational work environment with effort-reward imbalance-model of Siegrist. Multiple logistic regressions were used to describe the strength of the association between depressive symptoms and effort-reward imbalance adjusted for personal and occupational characteristics of the nurse managers. **Results:** Among the nurse managers, a third had depressive symptoms, and 18% presented an effort-reward imbalance (ratio: ≥ 1). A significant association was found between depressive symptoms and effort-reward imbalance (OR = 10.81, 95% CI: 5.1–23, $p < 10^{-3}$), and with esteem as a reward (OR = 3.21, 95% CI: 1.6–6.3, $p < 10^{-2}$). **Conclusion:** In view of the hierarchical situation of nurse managers and their primary roles in hospitals, it is necessary to take prevention measures to improve their work environment and health.

Key words:

Depression, Mental health, Psychosocial constraints, Effort-reward imbalance, Nurse managers, Health care workers

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INTRODUCTION

Depression is a pathology with a significant prevalence in Europe and in France [1–5]. Annual medical costs of depression can be estimated at 1.9 billion Euros in 2011 in France [6,7]. In terms of costs borne by employers, absenteeism is associated with a high amount of days lost [8,9]. Furthermore, it is known that the risk of recurrence of depressive symptoms is major when patients had to take sick days for depression [10]. But, according to several authors, the cost of presenteeism for workers suffering from depression is higher than the cost of absenteeism [11,12]. Thus, in his study in 2003, Stewart showed that 81% of the lost productive time among depressive workers corresponds to reduced performance while at work. In a recent study on the economic burden of depression in South Korea, indirect costs related to presenteeism represented 44.7% of the total cost of depression, and 28.4% for absenteeism in 2005 [13].

Within the health care workers profession, several studies were conducted among registered nurses [14–16], nurse aids [17,18], physicians [19–23], on their burnout syndrome, their depressive symptoms or their health [24].

Nurse managers in hospital are more scarcely studied compared with other health care workers. Some studies have produced insights about their ill-being, degree of satisfaction, leadership and recruitment [25–27]. But very few studies analysed their health in relation to their organisational work environment. Concerning their health, a study carried out by Lindholm et al. in Sweden investigated self-rated health, sick leave of nurse managers according to their professional networks, psychosocial work conditions, job support, social network and support. An association was found between high job demands and low self-rated health [28]. A study carried out in Japan showed that a lack of assertiveness and satisfaction was associated with burnout among Japanese nurse managers [29]. Another study examined the influence of effort-reward imbalance on burnout level among

nurse managers and showed that personal (lack of core-self evaluation) and situational (effort-reward imbalance ratio) factors were significant predictors of the score of burnout [30].

In France, only 2 studies about the health of nurse managers were published. Fanello et al. [31] analysed the mental health of 97 nurse managers using the standardised mental health questionnaire – GHQ-12 for health – questions to define their social and occupational characteristics and workplace experience. They demonstrated that 1/3 of participants were considered to be in psychological distress, that the lack of reward was associated with psychological distress of nurse managers. The second study was the European Press Next study carried out in France among a population of health care workers including nurse managers [32]. A total of 28% of nurse managers reported suffering from mental diseases.

Associations between the organisational work environment, stress and depressive symptoms have been established in the literature in the general population [33–35]. To describe the psycho-organisational work environment, different scales were established and validated. The 2 models from Karasek [36,37] and Siegrist [38,39] were translated into French, and their psychometric properties were studied in the French population [40–44].

Several studies showed links between the effort-reward imbalance and depressive symptoms or self-health assessments. The risk of depression ranged from 1.5 to 4.6 with the effort-reward imbalance model [33,38,45] and it was lower with the Karasek model, ranging from 1.58 to 3.3 for men and 1.2 to 2.8 for women [34,46,47]. The effort-reward imbalance model allowed evaluating 3 principal dimensions: effort, reward and over commitment. The model was based on the need of reward to balance the effort at work in relation to the social reciprocity theory. High effort and low reward also lead to emerging stress. The third dimension, over commitment, completes the models, thus, a population with higher over commitment

is prone to respond with more stress to effort-reward imbalance [38].

The objectives of the paper are to describe the prevalence of depressive symptoms among a large nurse manager population, and to produce estimates of the association between depressive symptoms measured with the CES-D instrument and effort-reward imbalance according to Siegrist's model.

A lot is at stake since nurse managers, as line managers, are the link between senior management and the health care staff (except physicians) in French hospitals. They play a very important role as team managers. The mental health, the well-being of staff of health care services are better when there is good management carried out by nurse managers. They also play an important role to prevent conflicts in nursing [48–50]. That's why it is important to be aware of the health status of the nurse manager population and to identify the diseases that can be associated with stress at work.

MATERIAL AND METHODS

This cross-sectional study was carried out between 2007–2008 in 5 hospitals from the eastern area of France. Among these hospitals, there were 4 teaching hospitals, and 1 general hospital. The principal objective of this study was to describe the health, the work environment and the consumption of health services of the nurse manager population. Their mental health and musculoskeletal disorders were the focus of the evaluation. Data was collected through a self-administered questionnaire.

Before starting the study, in each hospital, information was given in nurse managers meetings and in committees dealing with work conditions. Each nurse manager was individually informed of the purpose and the aim of the study. The nurse managers were to voluntarily answer the anonymous questionnaire.

Study population

Each participating hospital sent the questionnaire to all of their nurse managers, which represents a total population of approximately 500 nurse managers. The inclusion criteria were to manage nurses in hospitalisation units, emergency units or in operating theatre. Three hundred thirty nine nurse managers filled up the questionnaire with a response rate of 67%. Among the 339 respondents, those managing health care workers in radiological units or medical laboratories were excluded ($N = 33$).

Managers not active in management positions were also excluded ($N = 3$). Moreover, 7 questionnaires were not analysed because of missing data. As a result, 296 questionnaires were analysed in this study.

Measurement

Depressive symptoms (dependant variable)

The Center for Epidemiological Study Depression survey (CES-D) questionnaire was used in the 20-item version [51]. The items evaluated the presence of depressive symptoms related to major or clinical depression in the previous week. That is a screening measure, not a diagnostic tool. The items include depressed mood, feelings of guilt, worthlessness and helplessness, psychomotor retardation, loss of appetite and sleep difficulties. Depression was defined by the obtained CES-D score, equal or higher than 17.

To answer, the nurse managers were asked to choose a response from a four-point Likert scale: from “less than one day” (0) to “5 to 7 days” (3). The sum of the score of each response was calculated after the answers to the positive questions were reversed. The sum ranges from 0 to 60. The internal consistency of the questionnaire was appropriate (α Cronbach for our whole sample = 0.921) [52].

Imputation procedure was used for missing data with less than 5 missing answers following usual practice.

A cut-point of ≥ 17 was used to make a dichotomous variable for men and women.

Effort-reward imbalance model (independent variable)

The scale of Siegrist effort-reward imbalance model was used [38]. According to this model, there is an imbalance between the effort and the reward, when the subject produces more effort than it receives rewards. This imbalance causes stress.

The French validated version of the Siegrist model with 23 items was used. Six items were related to effort, eleven to reward and six to over commitment. The reward component includes three subscales: money, esteem and career opportunities. The higher the reward score, the higher the lack of reward. The internal consistency of the effort dimension was verified (α Cronbach: 0.804); along with the reward dimension (α Cronbach: 0.849). They were correct and consistent with psychometric properties [43]. When only 1 piece of data was missing for effort and 2 for reward, they were replaced by their respective median in line with usual practice. To compute the score, we used the method described by Niedhammer and Siegrist [39,42]. A dichotomous variable was defined. People with effort-reward imbalance ratio higher than one were considered as exposed to work stress. Tertiles of the distribution of the effort-reward imbalance were analysed to explore a dose-response relationship between the effort-reward imbalance and the depressive symptoms. For each dimension and subscales, a dichotomous variable was defined according to the median score of the whole population.

Concerning the over commitment scale, the second tertile of the whole population was used to define a dichotomous variable as was recommended by Niedhammer and Siegrist [39,42].

Potential Occupational confounding variables

Participants specified the specialty area of their units (health care service, emergency and intensive care,

operating theatre), their employment status (full time/part time) and their work schedules (days only/other). Data about the organisational work environment over the previous 12 months were also collected concerning: events that might have changed or disturbed the organisation of the work environment, research activity, inexperienced residents, practical restructuring or architectural restructuring, disputes that could disturb organisation, or organisational issues that could be at the root of conflicts. There were also 4 questions about the support given by the administration, the physicians, the nurse chief managers and the technical support.

Those questions had been created for and tested in the ORSOSA study [16,53]. Disputes that disturbed organisation and organisational issues that could be at the root of conflicts were encoded as binary variables. Answers were divided into 2 categories: none versus at least one. Support variables were divided into 2 categories: agree or not agree.

Other potential confounding variables

There were 3 groups of potential confounding variables: sociodemographic factors, behavioural factors, trait anxiety.

Gender and age of nurse managers were collected. Three age classes were created (< 40 , $40-49$, and ≥ 50 years).

The collection of height and weight allowed to calculate the body mass index (BMI), four classes were created following the World Health Organization recommendations (< 18.5 , $18.5-24$, $25-29$, ≥ 30). The smoker status of nurse managers was asked (no smoker, current smoker, and former smoker). Alcohol consumption was collected by the number of French standard glasses per day (10 g of pure alcohol/glass), 2 categories were defined below and over 1 glass per day. The last behavioural factor was sports activity (number of hours of sports activity per week). Two classes were considered: 1 h or more per week and no sports activity.

Trait anxiety was evaluated by the Spielberg scale, the state-trait anxiety inventory (STAI). The Likert 20 items that determine trait anxiety of the Y version were used [54].

STATISTICAL ANALYSIS

Differences in depressive symptoms status were analysed with the chi-squared test or Fisher's exact test when the expected values were below 5. Multivariate logistic regression analysis was used to calculate odd ratios (ORs) and their 95% confidence interval for depressive symptoms.

Independent variables to include in the models of multivariate logistic regression were chosen according to p value calculated for univariate analyses. The criteria for including a variable was a p value lower than 0.20.

A correlation table was made (not shown) and if two explanatory variables were very highly correlated, the variable with the highest association with depressive symptoms was included in the models.

The association between depressive symptoms and the effort-reward imbalance ratio was analysed separately in 4 stepwise adjusted models:

- Model 1 was adjusted for personal characteristics: socio-demographic variable (gender), behavioural variables (sports activity and smoking status).
- Model 2 was adjusted for occupational characteristics: experience, employment status, specialty area, events that happened over the previous 12 months.
- Model 3 was adjusted for personal and occupational characteristics.
- Model 4 is a logistic backward stepwise regression adjusted for personal and occupational characteristics.

Three other models were made without effort-reward imbalance ratio, but with effort and reward scores (dichotomous variables according to median) in model 5; and effort, esteem, career opportunity and money (dichotomous variables according to median) in models 6 and 7.

The statistical significance level for all of the analyses was set at 0.05. All of the analyses were carried out using SPSS version 21.

RESULTS

This sample comprised 296 French nurse managers (mean age: 46.2, SD = 7.4), there were 32 (11%) males and 264 (89%) females. Thirty-one percent had depressive symptoms during the previous 7 days. The mean depression score was 13.3 (SD = 9.1).

In terms of personal factors, about 36 percent of the nurse managers were overweight (BMI \geq 25) and 58% had never smoked.

Almost all of the nurse managers worked full time (96.9%), days only (81.6%) in a health care unit (72%), in emergency and intensive care unit (17%) or operating theatre (11%). The median of their experience was 7 years. The nurse managers reported inadequate physician support (42.5%), inadequate administration support (66.2%), inadequate technical support (71.1%) and inadequate nurse chief manager support (only 15.8%). Concerning the events that happened over the previous 12 months, the nurse managers reported practical restructuring (76.3%), architectural restructuring (24.1%), at least one dispute that could disturb work organisation (52.9%), at least one dispute rising from organisational issues that could be at the root of conflicts (69.9%). Table 1 shows these results.

Concerning the psycho-organisational factors of Siegrist's model, about 17.6% were considered to perceive a high level of effort-reward imbalance (ratio: \geq 1). The median effort-reward ratio was at 0.68, with the median of effort dimension at 17 and reward dimension at 21. For over commitment, 37.8% of the nurse managers were over the upper tertile.

Table 2 presents the work psychosocial environment results of Siegrist's model.

Table 1. Medical, socio demographic, behavioural, anthropometric and occupational characteristics of the population according to depressive symptoms

| Variables | Whole population | | Depressive symptoms [n (%)] | | p |
|-------------------------------------|---------------------|-----------|--------------------------------|------------|--------------------|
| | observations (n) | n (%) | yes | no | |
| Whole population | 296 | 296 (100) | 91 (31.0) | 205 (69.0) | – |
| Anxiety trait – STAI YB > 45 | 296 | 73 (25) | 55 (60.4) | 18 (8.8) | < 10 ⁻³ |
| Age (years) | 296 | | | | 0.48 |
| < 40 | | 65 (22) | 16 (17.6) | 49 (23.6) | |
| 40–49 | | 120 (40) | 39 (42.9) | 81 (39.5) | |
| ≥ 50 | | 111 (38) | 36 (39.6) | 75 (36.6) | |
| Gender | 296 | | | | < 10 ⁻² |
| female | | 264 (89) | 88 (96.7) | 176 (85.9) | |
| male | | 32 (11) | 3 (14.1) | 29 (3.3) | |
| Body mass index | 295 | | | | 0.22 |
| < 18.5 | | 4 (1) | | | |
| 18.5–25 | | 186 (63) | 62 (68.1) | 124 (60.8) | |
| 25–30 | | 78 (26) | 18 (19.8) | 60 (29.4) | |
| ≥ 30 | | 31 (11) | 11 (12.1) | 20 (9.8) | |
| Smoking status | 296 | | | | 0.19 |
| no smoking | | 171 (58) | 53 (58.2) | 118 (57.6) | |
| former smoking | | 68 (23) | 16 (17.6) | 52 (25.4) | |
| current smoking | | 57 (19) | 22 (24.2) | 35 (17.1) | |
| Sports activity ≥ 1 h/week | 296 | 208 (30) | 53 (58.2) | 155 (75.6) | < 10 ⁻² |
| Alcohol consumption ≥ 1 glass/day | 295 | 43 (15) | 12 (13.2) | 31 (15.2) | 0.65 |
| Work time | 292 | | | | 0.13 |
| full time | | 283 (97) | 83 (94.3) | 204 (98.0) | |
| part time | | 9 (3) | 5 (5.7) | 4 (2.0) | |
| Schedule | 293 | | | | 0.84 |
| days only | | 239 (82) | 74 (82.2) | 165 (81.3) | |
| other | | 54 (18) | 16 (17.8) | 38 (18.7) | |
| Seniority (years) | 296 | | | | 0.54 |
| ≤ 3 | | 101 (34) | 30 (33.0) | 71 (34.6) | |
| 4–10 | | 78 (26) | 21 (23.1) | 57 (27.8) | |
| ≥ 11 | | 117 (40) | 40 (44.0) | 77 (37.6) | |
| Specialty area | 296 | | | | 0.02 |
| health care service | | 212 (72) | 55 (60.4) | 157 (76.6) | |
| emergency and intensive care | | 51 (17) | 21 (23.1) | 30 (14.6) | |
| operating theatre | | 33 (11) | 15 (16.5) | 18 (8.8) | |
| Inadequate support by physicians | 294 | 125 (42) | 56 (61.5) | 69 (34.0) | < 10 ⁻³ |

Table 1. Medical, socio demographic, behavioural, anthropometric and occupational characteristics of the population according to depressive symptoms – cont.

| Variables | Whole population | | Depressive symptoms [n (%)] | | p |
|---|---------------------|------------|--------------------------------|------------|--------------------|
| | observations (n) | n (%) | yes | no | |
| by administration | 293 | 194 (66) | 66 (72.5) | 128 (63.4) | 0.12 |
| by nurse manager chief | 292 | 46 (16) | 25 (27.8) | 21 (10.4) | < 10 ⁻³ |
| technical support | 291 | 207 (71) | 67 (77.0) | 140 (68.6) | 0.15 |
| Over the 12 previous months | | | | | |
| research activity | 293 | 180 (61.4) | 56 (61.5) | 124 (61.4) | 0.9 |
| inexperienced residents | 292 | 136 (46.6) | 26 (28.6) | 110 (54.7) | < 10 ⁻³ |
| practical restructuring | 295 | 225 (76) | 77 (84.6) | 148 (72.5) | 0.02 |
| architectural restructuring | 295 | 71 (24) | 19 (20.9) | 52 (25.5) | 0.39 |
| to have at least once dispute that disturbs organisation | 293 | 155 (53) | 60 (38.7) | 95 (61.3) | < 10 ⁻² |
| to have at least once reorganisation that creates dispute | 296 | 207 (70) | 78 (37.7) | 129 (62.3) | < 10 ⁻³ |
| one training session at least | 296 | 207 (69.9) | 66 (72.5) | 141 (68.8) | 0.52 |

STAI YB – state-trait anxiety inventory form Y.

Table 2. Psycho-organisational factors in nurse managers according to depressive symptoms

| Psycho-organisational factors | Whole population | | Depressive symptoms [n (%)] | | p |
|---|---------------------|------------|--------------------------------|------------|--------------------|
| | observations (n) | n (%) | yes | no | |
| Siegrist | | | | | |
| mean effort-reward imbalance (continuous) | 296 | 0.78±0.4* | 1.03±0.4* | 0.67±0.3* | < 10 ⁻³ |
| effort reward imbalance ratio (> 1) | 296 | 52 (18) | 39 (42.9) | 13 (6.3) | < 10 ⁻³ |
| effort reward ratio divided in tertiles | | | | | |
| low effort reward ratio | 106 | 106 (35.8) | 9 (9.9) | 97 (47.3) | |
| medium effort reward ratio | 91 | 91 (30.7) | 26 (28.6) | 65 (31.7) | |
| high effort reward ratio | 99 | 99 (33.4) | 56 (61.5) | 43 (21.0) | |
| Effort (> median) | 296 | 154 (52.0) | 73 (80.2) | 81 (39.5) | < 10 ⁻³ |
| Rewards (> median) | 296 | 153 (51.7) | 74 (81.3) | 79 (38.5) | < 10 ⁻³ |
| Esteem (> median) | 296 | 164 (55.4) | 72 (79.1) | 92 (44.9) | < 10 ⁻³ |
| Career opportunity (> median) | 296 | 174 (58.8) | 70 (76.9) | 104 (50.7) | < 10 ⁻³ |
| Money (> median) | 296 | 203 (68.6) | 69 (75.8) | 134 (65.4) | 0.07 |
| Over commitment (≥ upper tertile) | 296 | 112 (38.0) | 56 (61.5) | 56 (27.3) | < 10 ⁻³ |

* Mean ± standard deviation.

Table 3. Each dimension and subscale of effort-reward model according to depressive symptoms

| Scale and subscale of effort-reward model | Whole population | | | | | Depressive symptoms | | | | | | | |
|---|------------------|-------|-------|-------|--------------------|---------------------|-------|-------|-------|----|-------|-------|-------|
| | | | | | | yes | | | | no | | | |
| | n | Me | min. | max | p | n | Me | min. | max | n | Me | min. | max |
| Effort-reward ratio | 296 | 0.68 | 0.27 | 2.75 | < 10 ⁻³ | 205 | 0.62 | 0.27 | 2.53 | 91 | 0.94 | 0.48 | 2.75 |
| Over commitment | 296 | 17.00 | 10.00 | 30.00 | < 10 ⁻³ | 205 | 17.00 | 10.00 | 30.00 | 91 | 19.00 | 13.00 | 25.00 |
| Effort | 296 | 17.00 | 8.00 | 29.00 | < 10 ⁻³ | 205 | 16.00 | 8.00 | 29.00 | 91 | 19.00 | 11.00 | 28.00 |
| Reward | 296 | 21.00 | 11.00 | 52.00 | < 10 ⁻³ | 205 | 19.00 | 11.00 | 46.00 | 91 | 27.00 | 13.00 | 52.00 |
| Esteem | 296 | 8.00 | 5.00 | 24.00 | < 10 ⁻³ | 205 | 7.00 | 5.00 | 23.00 | 91 | 13.00 | 5.00 | 24.00 |
| Career opportunity | 296 | 7.00 | 1.00 | 24.00 | < 10 ⁻³ | 205 | 7.00 | 1.00 | 21.00 | 91 | 11.00 | 1.00 | 24.00 |
| Money | 296 | 3.00 | 1.00 | 5.00 | 0.08 | 205 | 3.00 | 1.00 | 5.00 | 91 | 3.00 | 1.00 | 5.00 |

Me – median; min. – minimal value; max – maximal value.

In Table 1 and 2, univariate analyses between depressive symptoms and personal and occupational characteristics are also presented. Different subscales of effort-reward imbalance are presented in Table 3. Only the money subscale was not significantly associated with depressive symptoms.

As shown in Table 4, effort-reward imbalance and the following covariables, gender, sports activity, specialty area, were all significantly associated with depressive symptoms after adjustment for all of the other factors and with a logistic backward stepwise regression. The effort-reward imbalance has a very high significant association with the depressive symptoms (OR = 10.81, 95% CI: 5.1–23). There were more significantly depressive symptoms among females (OR = 6.25, 95% CI: 1.6–23.9), among the nurse managers of emergency and intensive care units (OR = 2.41, 95% CI: 1.1–5.2) and operating theatres (OR = 2.56, 95% CI: 1.7–6.2). Sports activity was associated with protective effect (OR = 0.37, 95% CI: 0.20–0.77).

The use of categorical variables of effort-reward ratio showed a dose-response relationship, nurse managers with higher effort-reward ratio (OR = 14.04, 95% CI: 6.4–40.4) reported depressive symptoms significantly more often after adjustment for all of the other factors

than the nurse managers with medium effort-reward ratio (OR = 4.50, 95% CI: 1.8–11.4).

A new model, based (model 5) on model 3, was analysed; it included effort and reward scores in the place of the effort-reward imbalance ratio. There was a significant association between the depressive symptoms and effort (OR = 4.22, 95% CI: 2.1–8.6), and reward (OR = 3.67, 95% CI: 1.0–7.6). When the reward dimension was replaced with the subscales of reward: esteem, career opportunity and money (models 6 and 7), only esteem was significant (OR = 3.21, 95% CI: 1.6–6.6). The results of models 5, 6 and 7 are presented in Table 5.

DISCUSSION

This cross-sectional analysis evaluated the effect of organisational work environment and personal factors on the prevalence of depressive symptoms among nurse manager population. Two work environment factors (effort-reward imbalance, specialty area) and two personal covariables (gender and sports activity) were found to be significantly associated with depressive symptoms in nurse managers, after adjustment for the other covariables. To the best of our knowledge, this is the first study to report the prevalence of depression symptoms of nurse managers and to

Table 4. Association between depressive symptoms and personal, occupational, and psycho-organisational characteristics

| Variables | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|--|-----------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|
| | OR (95% CI) | p | OR (95% CI) | p | OR (95% CI) | p | OR (95% CI) | p |
| Gender (ref: male) | 5.40 (1.4–20.4) | 0.01 | | | 5.70 (1.4–23.0) | 0.01 | 6.25 (1.6–23.9) | < 10 ⁻² |
| Behaviour factors | | | | | | | | |
| sports activities (≥ 1 h/week) (ref.: no sport) | 0.43 (0.2–0.8) | < 10 ⁻² | | | 0.39 (0.2–0.8) | < 10 ⁻² | 0.37 (0.2–0.7) | < 10 ⁻² |
| smoking status | | | | | | | | |
| no smoking (ref.) | 1.00 | | | | 1.00 | | | |
| former smoker | 0.70 (0.3–1.5) | 0.37 | | | 0.54 (0.2–1.3) | 0.17 | | |
| current smoker | 1.28 (0.6–2.6) | 0.51 | | | 1.19 (0.5–2.6) | 0.67 | | |
| Work characteristics | | | | | | | | |
| seniority (years) | | | | | | | | |
| ≤ 3 (ref.) | | | 1.00 | | 1.00 | | | |
| 4–11 | | | 0.71 (0.3–1.6) | 0.41 | 0.79 (0.3–1.8) | 0.58 | | |
| ≥ 12 | | | 0.99 (0.5–2.0) | 0.98 | 0.93 (0.4–1.9) | 0.84 | | |
| work time (ref.: full time) | | | 2.64 (0.51–3.1) | 0.23 | 0.45 (0.1–2.3) | 0.34 | | |
| specialty area | | | | | | | | |
| health care service (ref.) | | | 1.00 | | 1.00 | | 1.00 | |
| emergency and intensive care | | | 1.80 (0.8–4.0) | 0.15 | 2.30 (1.0–5.4) | 0.06 | 2.41 (1.1–5.2) | 0.02 |
| operating theatre | | | 2.13 (0.9–5.2) | 0.10 | 2.68 (1.0–7.1) | 0.05 | 2.56 (1.7–6.2) | 0.04 |
| happening over the previous 12 months | | | | | | | | |
| practical restructuring | | | 1.92 (0.9–4.2) | 0.11 | 2.27 (1.0–5.3) | 0.06 | 1.99 (0.9–4.2) | 0.07 |
| technical support | | | 1.27 (0.6–2.5) | 0.49 | 1.39 (0.7–2.9) | 0.37 | | |
| administration's support | | | 0.76 (0.4–1.5) | 0.42 | 0.79 (0.4–1.6) | 0.50 | | |
| Effort-reward imbalance ratio ≥ 1 (ref.: ratio < 1) | 12.58 (6–26.6) | 0.00 | 12.06 (5.7–25.6) | < 10 ⁻³ | 13.87 (6.1–31.3) | < 10 ⁻³ | 10.81 (5.1–23.0) | < 10 ⁻³ |

Model 1 – psychosocial factor effort-reward imbalance and personal characteristics (gender, smoking status and sports activities).

Model 2 – psychosocial factor effort-reward imbalance and occupational characteristics (experience, employment status, specialty area, supports, reorganization).

Model 3 – psychosocial factor effort-reward imbalance, personal and occupational characteristics.

Model 4 – logistic backward stepwise regression adjusted for personal and occupational characteristics.

OR – odds ratio; CI – confidence interval.

Ref. – referent.

Table 5. Association between depressive symptoms and the subscale of effort-reward imbalance and other characteristics

| Variables | Model 5 | | Model 6 | | Model 7 | |
|---------------------------------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|
| | OR (95% CI) | p | OR (95% CI) | p | OR (95% CI) | p |
| Gender (ref.: male) | 5.53 (1.4–22.2) | 0.02 | 5.16 (1.3–21.2) | 0.02 | 5.94 (1.5–22.9) | 0.01 |
| Behaviour factors | | | | | | |
| sports activities (≥ 1 h/week) | 0.40 (0.2–0.8) | $< 10^{-2}$ | 0.39 (0.2–0.8) | $< 10^{-2}$ | 0.33 (0.2–0.6) | $< 10^{-2}$ |
| (ref.: no sport) | | | | | | |
| smoking status | | | | | | |
| no smoking (ref.) | 1.00 | | 1.00 | | – | |
| former smoker | 0.65 (0.3–1.5) | 0.31 | 0.59 (0.3–1.3) | 0.21 | – | |
| current smoker | 1.09 (0.5–2.4) | 0.83 | 1.13 (0.5–2.6) | 0.76 | – | |
| Work characteristics | | | | | | |
| seniority (years) | | | | | | |
| ≤ 3 (ref.) | 1.00 | | 1.00 | | – | |
| 4–11 | 0.68 (0.3–1.6) | 0.37 | 0.69 (0.3–1.6) | 0.40 | – | |
| ≥ 12 | 0.88 (0.4–1.8) | 0.73 | 0.74 (0.3–1.6) | 0.44 | – | |
| work time (ref.: full time) | 2.13 (0.5–9.9) | 0.33 | 2.91 (0.6–15.2) | 0.21 | – | |
| specialty area | | | | | | |
| health care service (ref.) | 1.00 | | 1.00 | | 1.00 | |
| emergency and intensive care | 2.28 (1.0–5.2) | 0.05 | 2.26 (1.0–5.2) | 0.05 | 2.25 (1.0–4.9) | 0.04 |
| operating theatre | 2.51 (1.0–6.4) | 0.05 | 3.27 (1.2–8.6) | 0.02 | 3.18 (1.3–7.8) | 0.01 |
| happening over the previous 12 months | | | | | | |
| practical restructuring | 1.86 (0.8–4.2) | 0.14 | 2.41 (1.0–5.5) | 0.04 | 2.10 (1.0–4.5) | 0.06 |
| technical support | 0.94 (0.4–2.0) | 0.86 | 0.82 (0.4–1.8) | 0.62 | – | |
| administration's support | 0.64 (0.3–1.3) | 0.21 | 0.69 (0.3–1.3) | 0.28 | – | |
| Model effort-rewards | | | | | | |
| effort (ref.: $< Me$) | 4.22 (2.1–8.6) | $< 10^{-3}$ | 5.03 (2.5–10.3) | $< 10^{-3}$ | 4.34 (2.2–8.8) | $< 10^{-3}$ |
| reward (ref.: $< Me$) | 3.67 (1.8–7.6) | $< 10^{-3}$ | – | | – | |
| esteem (ref.: $< Me$) | – | | 3.21 (1.6–6.6) | $< 10^{-2}$ | 3.21 (1.6–6.3) | $< 10^{-2}$ |
| career opportunity (ref.: $< Me$) | – | | 1.98 (1.0–4.0) | 0.05 | 1.86 (1.0–3.6) | 0.06 |
| money (ref.: $< Me$) | – | | 0.71 (0.3–1.5) | 0.37 | – | |

Model 5 – psychosocial factor of effort-reward imbalance, personal characteristics (gender, smoking status and sports activities) and occupational characteristics.

Model 6 – psychosocial factor of effort, of all subscales of reward, personal and occupational characteristics (experience, employment status, specialty area, supports, reorganization).

Model 7 – psychosocial factor of effort, esteem and career opportunity, personal and occupational characteristics.

Me – median. Other abbreviations as in Table 4.

evaluate the strength of association between the effort-reward imbalance and depressive symptoms for this population in France.

The prevalence of depressive symptoms in the previous 7 days was 30% in this study. The evaluation of depressive symptoms in this study was based on the CES-D scale (with a cut-point ≥ 17), the mean score was 13.3. In France, a multi-site study was achieved between 1999 and 2003 to assess the prevalence of major psychiatric disorders using the Mini International Neuropsychiatric Interview [1]. They found a depressive occurrence in the previous 2 weeks representing a prevalence of about 11%. The prevalence measured in other studies ranges from 5.8 over 12 months, to 11.9 over one month [5,55,56]. In a more recent study, Lamboy et al. (2005) measured a prevalence of 10% among females and 5.7% in males, and von Dem Knesebeck estimated the French depressive symptoms prevalence at about 9% (CES-D with 8 items) [57]. Indeed, differences in depression prevalence between studies based on standardised diagnostic instruments (such as MINI) and on screening instruments (such as CES-D) can be significant.

Whatever method used, depressive symptoms among nurse managers are much higher [1,4,5]. It has to be noted that, in most population-based studies, the highest level of depression was found in the lower social classes [58].

In his study, Fanello also found a third of nurse managers with psychological distress assessed using GHQ-12 (mean score: 11.69; SD = 5.43). In the Press Next European study, 27% of nurse managers reported suffering of mental distress, 8.1% declaring to be followed by a physician [31,32]. Other studies showed that prevalence among registered nurses was lower than among nurse managers, whatever method used, but always higher than in the French general population [16,18,24].

The higher prevalence could be secondary of the choice of cut-point (≥ 17). The analysis was also done with a different cut-point according to gender (female: ≥ 23 ,

male: ≥ 17). The population being mainly female, the prevalence was clearly lower (15.9%) but still higher than the French general population prevalence [4,5,57].

Assessment of a stressful psychosocial work environment in this study was based on the effort-reward imbalance model. A total of 18% of nurse managers had an effort-reward imbalance with a mean effort-reward ratio of 0.78 ± 0.4 and a median reward score of 21. Comparison with other results was difficult because the number of items used and the methods of calculating the effort-reward ratio were different. The results of the main studies for which the comparison of figures is appropriate are summarized in Table 6.

No study of nurse managers has used the effort-reward model in France. Only one was found, it was carried out in Ontario, the effort-reward ratio was 0.69 (SD = 0.85), 10% of nurse managers had effort-reward ratio over one [30].

Jolivet et al. [16] also used the effort-reward imbalance model in the same way, on a sample of French health care workers population. For registered nurses and nursing aids, they found a mean effort score of 18.6 (SD = 4.4) and 16.9 (SD = 4.4), respectively, and a mean reward score of 18.5 (SD = 4.9) and 18.3 (SD = 4.4) [16]. Li et al. [27] described the results of the Press Next study, among the French sample of female registered nurses. They had a mean effort score of 15.4 ± 4.2 and a mean reward score of 18.8 ± 6.3 [27]. In Shanghai, Xie et al. studied a female nurse population with a mean effort-score of 18.9 ± 5.4 and a mean reward score of 21.1 ± 8.11 [59]. In other studies of health care workers, the effort-reward ratio (expressed in percentage or mean score) was higher or lower than our results, but the reward results of the other studies were still lower [14,60,61].

In France, the GAZEL study used the effort-reward model, 5.92% of males and 7.34% of females had an effort-reward ratio over one. The studied population was a cohort that included 10 174 subjects who were working at a French national electric and gas company (EDF-GDF) [42].

Table 6. Studies used ERI to describe psycho-organisational work environment among nurse managers and other health care workers

| Population | Nurse managers | | | France | | Europe | | Other continents | |
|---------------------------------------|----------------------------|---|-----------------------------------|----------------------------|---------------------------------|--------------------------------|---|-----------------------------|---------------------------------|
| | current study ^a | Spence Laschinger, 2008 [30] ^a | Canadian nurse managers | Li, 2011 [27] ^a | Jolivet, 2009 [16] ^a | Bakker, 2000 [14] ^b | Hämmig, 2012 [61] ^c | Xie, 2010 [59] ^a | Kikuchi, 2010 [60] ^a |
| French nurse managers | 0.78±0.4 | 0.69±0.4 | press next only results of nurses | female nurses | female nurse aids | Dutch female nurses | Swiss hospital workers including administration and logistics | Shanghai female nurses | Japanese nurses |
| Mean effort ratio continuous (M±SD) | 0.78±0.4 | 0.62±0.2 | 0.62±0.2 | - | - | - | 0.8±0.3 | 0.82±0.7 | 0.86±0.4 |
| Effort-reward ratio (> 1) (%) | 18 | 10.1 | - | - | - | 40 | 18 | 26.05 | - |
| Over commitment (> upper tertile) (%) | 38 | - | - | - | - | - | - | - | - |
| Mean effort score (M±SD) | 17.0±8.3 | - | 15.4±4.2 | 18.6±4.4 | 16.9±4.4 | - | - | 18.9±5.4 | - |
| Mean reward score (M±SD) | 22.6±4.0 | - | 18.8±6.3 | 18.5±4.9 | 18.3±5.1 | - | - | 21.1±8.1 | - |
| Mean over commitment (M±SD) | 17.2±2.9 | - | 14.0±3.4 | 15.7±3.6 | 14.8±3.7 | - | - | 15.6±2.9 | 15.8±3.5 |

^a Effort-reward model with 11 reward items and 6 effort items.

^b Effort-reward ratio with 9 reward items and 5 effort items.

^c Effort-reward ratio with 5 reward items and 5 effort items.

M – mean; SD – standard deviation.

In a previous analysis of the GAZEL cohort, the mean reward score was significantly decreasing from ordinary workers to managers. However, they had no significant difference between occupational grades for mean effort score (for males) and over commitment (females and males) [43]. This is against our results because nurse managers had a higher reward and over commitment score than nurses or nurse aids [16,27,59] and even physicians, according to one study [62]. Two hypotheses may explain these contradictory results. Indeed, there is a gap of 10 years between the 2 studies. Since in all of the sectors, work environment was modified, including the 35-hour work week that has been in place in France since 1998, this resulted in the intensification of workload.

The second hypothesis is based on the particular situation of nurse managers in health care units. They are the only staff in the health care units that provide non or hardly any healthcare when it used to be their main responsibility. The role of nurse managers is the least visible activity in health care units; so they receive much less reward than the other workers in the staff.

Effort-reward ratio, effort, reward subscales in our study were each statistically significantly associated with depressive symptoms after adjustment for sociodemographic, behavioural and occupational factors. Our results confirmed those of several studies reporting significant associations between effort-reward imbalance and depressive symptoms [33,38,45]. The analysis with the ratio divided into tertiles showed a dose-dependent response as described in the literature [12,17,30,59,62,63].

The association between depressive symptoms and effort reward imbalance is very strong in our study. This is also found in a few studies, especially among physicians. Thus, Hamming, in Switzerland, found an association between effort-reward imbalance and burnout with odds ratio ranging from 3.8 to 22.5 according to different professional categories of health care workers. The highest odds ratio was found for physicians [61]. Another Japanese study

among hospital physicians showed an association between depressive symptoms and effort-reward imbalance, they also used the CES-D scale (cut-point ≥ 17). The odds ratio ranged from 1.8 (1.0–2.0) to 8.7 (5.3–14.3) [62]. The situation of nurse managers may appear to be similar to that of physicians.

It can also be speculated that the high odds ratio was due to the choice of the cut-point of CES-D. The analysis was carried out a second time with a different cut-point for males and females. With the same variables as in model 3, the associations between depressive symptoms and gender, as well as specialty area, were no more significant. This can probably be explained by gender repartition in specialty areas. The gender distribution of specialty areas shows that there were a lot more males in emergency services (15.7%) and operating theatres (12.1%) than in health care units (9.4%), but the difference was not significant.

The analysis with the subscales of reward shows that there is no association between gratification and depressive symptoms. Lindholm et al., in their study about Sweden nurse managers, found no significant association between psychosocial characteristics and salary either [28].

In the different models, a practical restructuring over the previous 12 months seems to be associated with depressive symptoms, while the architectural one was absolutely not associated.

This could be explained by higher and better resources, which might have been provided to carry out the architectural project.

Specialty area is also significantly associated with depressive symptoms. Specialty area was a dependent variable with a lot of other variables, including anxiety trait and gender. Other models (not shown) were made with anxiety trait and over commitment. The association between specialty area declined or was no more significant. Paterniti et al. in another analysis of GAZEL, showed that depressive symptoms (using CES-D) were significantly

associated with psychosocial work environment irrespective of personality traits and covariates [64]. It is difficult to eliminate a reverse effect, but in terms of prevention, the nurse managers in emergency and intensive care units and operating theatres need special attention.

All in all, the nurse manager population presented more depressive symptoms than other occupational populations, and the results including the psychosocial organisational environment suggested an important issue. It is necessary to promote special interventions for them.

This study has several strengths. It is the first to assess depressive symptoms with a validated scale and the psycho-organisational work environment among such a large French population of nurse managers. Furthermore, their psycho-organisational work environment was not only based on the effort-reward model, but also questioned events that happened over the previous 12 months.

The sample contains only nurse managers, and not nurse manager chiefs. The proportion of males and females is similar to the one in the national population of nurse managers. Recruitment was carried out in various hospitals. Participation rate was satisfactory.

This study presents some limitations as well. First, recruitment was on a voluntary basis. Anonymous data collection did not allow to know the characteristics of the non-respondents. Thus, the frequency of depressive symptoms could be overrepresented, since, nurse managers suffering from depressive symptoms might have been more likely to participate in the study. On the other hand, nurse managers with a major depression might have been on sick leave, and not participated. However, this limitation counter-balanced the participation rate of at least 60%, which is a satisfactory participation rate.

The design of this study: cross-sectional design, is a limitation, and using self-perceived measures, too. A reverse causation cannot be excluded either. Depressive respondents may perceive their work environment less well. In our study, the univariate analysis showed there was a strong

association between effort-reward ratio, over commitment and anxiety trait. We have opted to not include anxiety trait and over commitment in the models presented here. Their absence in the model does not change the odds ratio of the effort-reward ratio.

In spite of the cross-sectional design of this study, our findings clearly support the hypothesis of a high prevalence of depressive symptoms among nurse managers and a strong association with effort-reward imbalance. However, a more appropriate longitudinal study design is necessary to confirm the findings.

Past medical history of depression, stressful life events and stressful factors in home life were not available in this study. They are known risk factors of depression [65]. In this study, the primary purpose was to know the prevalence of depressive symptoms and of the effort-reward imbalance. To obtain the best rate of participation, it was opted not to include some questions about personal risk factors.

CONCLUSION

The study shows that nurse managers exposed to high effort-reward imbalance have a significantly increased odds ratio for depressive symptoms. Among reward, the lack of esteem is significantly associated with depressive symptoms and effort, too. The occurrence of practical restructuring appears to be associated with depressive symptoms. The study shows that nurse managers working in emergency and intensive care units, or operating theatres, have more depressive symptoms.

According to our findings, it seems necessary to continue research to explain the determinant factors of the effort-reward imbalance and to find precisely which ones influence the health and mental health of nurse managers. A comparison with other health care workers, especially physicians and registered nurses, should be initiated to determine similarities and differences in order to adapt or develop appropriate preventive measures.

These results allow to put forward possible measures for improvement of the psychological work environment of nurse managers. The first recommendation could be to improve reward, and especially esteem, which would be cheap. The second recommendation would be to pay more attention to nurse managers working in restructuring units, operating theatres and emergency and intensive care.

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