

Burnout syndrome of coastal fishermen

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ABSTRACT

Background: Coastal fishermen are particularly affected by occupational stress and burnout because they are exposed to high psychosocial factors at work and organizational constraints related to difficult working conditions.

Materials and methods: This survey aimed to assess the prevalence of burnout syndrome (BOS) of fishermen and its relationship with sociodemographic and occupational parameters. This cross-sectional study involved a representative sample of 761 fishermen. We used an individual questionnaire including socio-demographic and occupational parameters, the Karasek's Job Content Questionnaire, and Maslach BO Inventory. BOS includes three dimensions: emotional exhaustion, depersonalisation, and loss of self-efficacy. The positive diagnosis of BOS is retained if the scores of the three dimensions are abnormal (high for the first two and low for the third).

Results: Five hundred and twenty-six people agreed to answer the questionnaire. Of these, 16.1% had a high emotional exhaustion, 13.9% high depersonalisation, and 11.2% low personal accomplishment. Furthermore, 37.1% had at least one abnormal dimension of BOS: 16.9% had one abnormal dimension, 12.2% two, and 8% three (BOS). The prevalence of abnormal dimensions of BOS was significantly higher in pilots-copilots (67.9%), and in mechanics (63.5%) than in sailors (27.8%). It was higher in fishermen living alone (44.4%), having seasonal job (57.9%), suffering of job strain (42.1%) or isostrain (57.9%), and sleep disorders (55.4%). The multivariate logistic regression showed that job strain, isostrain, fatigue, sleep disorders, seasonal job and daily working > 14 h constituted a major risk factor of abnormal dimension of BOS.

Conclusions: It is imperative to identify priority actions to improve the working conditions of fishermen, and to develop a genuine prevention policy.

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Keywords: burnout, stress, fishermen, Morocco

INTRODUCTION

The combination of an unsafe work environment, job strain and socio-economic difficulties is a major risk factor for chronic stress that can lead to burnout syndrome [1]. Burnout syndrome (BOS) comprises three dimensions: emotional exhaustion, depersonalisation or dehumanisation, and loss of a sense of personal accomplishment, all of which can

occur in people working in some way with other human beings [2]. According to Karasek [3], BOS is a consequence of everyday stress reactions that have worn the individual down. It has its roots in response to a number of long-lasting occupational stressors that exhaust people to the point where their energy resources are insufficient to survive the pressure of the situation [4–7]. Occupational stress is

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a physical and psychological condition resulting from the accumulation of stressors that impact on individuals on a daily basis [2–6, 8]. Chronic work-related tension contributes to unhealthy behaviours, mental illness and multiple organic disorders (cardiovascular, musculoskeletal, gastrointestinal, etc.) [9]. Inshore fishermen are particularly affected by stress and BOS, as they are exposed to numerous health risks due to increasingly demanding work situations, high workloads, poor work organization and unfavourable socio-economic factors [10, 11]. BOS has been associated with negative workplace behaviours, including resignation, increased psychoactive substances consumption and social and economic problems [12, 13]. However, few studies [10, 11] have analysed, in any way, the psychosocial risks of inshore fishermen in Morocco. The aim of this survey was to assess the prevalence of BOS of fishermen and its relationship with sociodemographic and occupational parameters.

MATERIALS AND METHODS

SCOPE AND TYPE OF STUDY

This cross-sectional study was conducted in 2019 in a port in northern Morocco.

TARGET POPULATION

The survey involved a representative sample of 761 fishermen (33.3% of the exhaustive administrative list of 2,285 fishermen). All participants were male and had been fishing regularly for at least 2 years. They worked, every day except Friday, in the coastal sector in small embarkations (trawlers, longliners, sardiners).

QUESTIONNAIRE

We used an individual questionnaire inspired by those of the Institut National de Recherche et de Sécurité de France [14], the Karasek Job Content Questionnaire (KJCQ) [3], and the Maslach BO Inventory (MBI) [4, 15]. It consists of four parts:

- Socio-demographic and occupational parameters: age, family situation, job seniority, daily and weekly working hours, type of employment (permanent or seasonal), history of incidents or accidents in the last 12 months, and work-related stress factors;
- Health parameters: regular physical activity – sports (at least 3 times a week), consumption of psychoactive substances, psychosomatic manifestations of stress and reported chronic diseases. Daily consumption of coffee or tea was considered excessive when it exceeded 4 cups or glasses. For stress-related psychosomatic symptoms, items were assessed by responses on a 4-point Likert-type scale between never and often. “Never” and “rarely” responses were considered as rejected, and “always”, “sometimes” and “often” responses as present;
- Karasek’s Job Content Questionnaire (KJCQ) identifies three dimensions of the psychosocial work environment. Psychological demand (PD) assesses the quantity, speed, complexity, intensity, fragmentation and predictability of work. Decision latitude (DL) assesses the ability to make work-related decisions, use of prior learning and skills development. Social support (SS) values occupational and emotional support from superiors and colleagues. The questionnaire comprises 26 questions: 9 for PD, 9 for DL and 8 for SS. Responses are given on a discontinuous 4-point Likert-type scale ranging from “strongly disagree” to “strongly agree”. These three dimensions are used to identify at-risk situations. Job strain is the combination of low DL (score below 71) and high PD (score above 20). Isostrain is the combination of a job strain situation and a low SS (score below 24) [3];
- Maslach’s BO inventory: the MBI comprises 22 questions and is made up of three dimensions: emotional exhaustion (EE), dehumanisation or depersonalisation (DP) and sense of personal accomplishment (PA) at work. Responses are rated on a 7-point Likert-type scale ranging from 0 (never) to 6 (every day). The sum of responses defines a low or high level for each dimension. The EE, which comprises 9 items, ranges from 0 to 54, with a low score of less than 27 and a high score of 27 or more. The DP, with 5 items, ranges from 0 to 30, and is low if its score is below 13 and high if it is greater than or equal to 13. The feeling of PA, with 8 items, is evaluated from 0 to 48. It is low if its score is less than 31 and high if it is greater than or equal to 31. A positive diagnosis of BOS is made if scores on all three dimensions are abnormal (high for the first two and low for the third) [16, 17]. In this study, we opted to compare the group of fishermen with no abnormal BOS dimensions with those with at least one abnormal BOS dimension.

ETHICAL AND DEONTOLOGICAL ASPECTS

Beforehand, we contacted the delegate from the Ministry of Fisheries, representatives of fishermen’s associations and occupational physicians from the seafarers’ health offices, to explain the purpose of the study and obtain their support. The interviews took place at the fishermen’s occupational health department and lasted around 20 minutes for each person. The individual discussions with each fisherman took place in the strictest confidence.

STATISTICAL ANALYSES

The statistical analysis was performed using the SPSS version 11.5 software package. The differences between groups were compared using t-tests (Student) for continuous variables and chi-square tests for categorical ones. The sta-

Table 1. Socio-demographic and occupational data

Parameters	Total N = 526	Pilots/copilots N = 78 (14.8%)	Mechanics N = 52 (9.9%)	Sailors N = 396 (75.3%)
Age [years]:				
≤ 30	112 (21.3%)	8 (10.3%)	5 (9.6%)	99 (25%)
31–40	108 (20.5%)	14 (17.9%)	19 (36.5%)	79 (19.9%)
41–50	152 (28.9%)	36 (46.2%)	17 (32.7%)	102 (25.8%)
> 50	154 (29.3%)	20 (25.6%)	11 (21.2%)	116 (29.3%)
Average age	41.6 ± 9.1	43.7 ± 9.4	41.5 ± 8.9	40.9 ± 8.6
Family status:				
Living in a couple	348 (66.2%)	60 (76.9%)	27 (51.9%)	262 (66.2%)
Living alone	178 (33.8%)	18 (23.1%)	25 (48.1%)	134 (33.8%)
Living with dependents	315 (59.9%)	34 (43.6%)	25 (48.1%)	256 (64.6%)
Work seniority [years]:				
≤ 5	84 (16%)	5 (6.4%)	3 (5.8%)	76 (19.2%)
6–15	147 (27.9%)	21 (26.9%)	21 (40.4%)	105 (26.5%)
> 15	295 (56.1%)	52 (66.7%)	28 (53.8%)	215 (54.3%)
Average	14.5 ± 4.2	16.2 ± 4.5	15 ± 4.6	14.1 ± 4.9
Average daily working hours	11.9 ± 0.4	12.1 ± 0.5	12.2 ± 0.6	11.8 ± 0.3
Average weekly working hours	71.4 ± 1.2	72.6 ± 1.3	73.2 ± 1.1	70.8 ± 0.9
Type of job:				
Seasonal	231 (43.9%)	0 (0%)	3 (5.8%)	228 (57.6%)
Permanent	295 (56.1%)	78 (100%)	49 (94.2%)	168 (42.4%)
History of incidents and occupational injuries	136 (25.9%)	36 (46.2%)	23 (44.2%)	77 (19.4%)
Work stressors:				
High psychological demand	431 (81.9%)	69 (88.4%)	44 (84.6%)	318 (80.3%)
Low decision latitude	299 (56.8%)	30 (38.5%)	24 (46.2%)	245 (61.9%)
Low social support	259 (49.2%)	40 (51.3%)	25 (48.1%)	194 (49%)
Job strain	222 (42.2%)	27 (34.6%)	22 (42.3%)	173 (43.7%)
Isostrain	149 (28.3%)	26 (33.3%)	18 (34.6%)	105 (26.5%)

tistical level of significance was established at 5%. In order to assess the association between BOS and several other factors, we calculated odds ratio (OR) and 95% confidence intervals (CI). Multivariable logistic regression analysis including the factors that were statistically significant in bivariate analysis were calculated. The OR adjusted (ORa) of each of the factors that we found in the final model, independently of the other factors, were computed.

RESULTS

Five hundred and twenty-six fishermen agreed to answer the questionnaire; the participation rate was 69.1%.

Average age was 41.6 ± 9.1 years. Two-thirds (66.2%) lived with a partner and 59.9% had dependents. Average length of service was 14.5 ± 4.2 years. The average daily working time was 11.9 ± 0.4 hours, and the average weekly working time was 71.4 ± 1.2 hours. More than half were permanent workers, while 43.9% were seasonal. The prevalence of work stress risk factors was 81.9% for high PD, 56.8% for low LD and 49.2% for low SS. The prevalence of job strain was 42.2% and isostrain 28.3% (Table 1).

For doping behaviours, the prevalence was 97.9% for excessive tea-coffee consumption, 37.8% for tobacco, 31.7%

for cannabis, 29.3% for alcohol, 4.6% for psychotropic drugs (antidepressants, tranquilizers and sedatives) and 18.6% for analgesics. Almost a third (31.9%) regularly took part in sport or physical activity outside work. The prevalence of psychosomatic manifestations of stress reported was 67.9%: neurovegetative disorders (55.9%), nervous tension (57.4%), mood disorders (50%), cognitive disorders (21.7%) and sleep disorders (37.5%). Chronic diseases or comorbidities were reported by 36.3%: musculoskeletal disorders (32.5%), respiratory diseases (18.1% with 16.8% for rhinitis, 7.6% for asthma, 4.3% for chronic obstructive pulmonary disease and 6.1% for chronic bronchitis), cardiovascular diseases (16.9% with 14.9% for arterial hypertension and 12.3% for phlebitis), neuropsychiatric disorders (16.5%: headache, depression), digestive disorders (13.9%: gastritis, heartburn, gastric ulcer) and metabolic diseases (13.3%: 7.2% for diabetes and 8.1% for hypercholesterolemia) (Table 2).

The prevalence of BOS in the total population was 8%. It was significantly higher ($p < 0.01$) among pilots/copilots (12.8%) and mechanics (17.3%) than among sailors (5.8%). In the total population, mean scores for EE, DP and PA were 16.2 ± 5.2, 8.2 ± 3.3, and 30.6 ± 7.2, respectively. Abnormally high scores for EE and DP were noted in 16.1% and 13.9%,

Table 2. Health parameters according to the occupational categories

Parameters	Total N = 526	Pilots/copilots N = 78 (14.8%)	Mechanics N = 52 (9.9%)	Sailors N = 396 (75.3%)
Toxic habits:				
Tea–coffee	515 (97.9%)	72 (92.3%)	51 (98.1%)	391 (98.7%)
Tobacco	199 (37.8%)	21 (26.9%)	21 (40.3%)	157 (39.6%)
Cannabis	167 (31.7%)	14 (17.9%)	18 (34.6%)	135 (34.1%)
Alcohol	154 (29.3%)	22 (28.2%)	24 (46.2%)	108 (27.3%)
Other psychotropic	24 (4.6%)	6 (7.6%)	5 (9.6%)	13 (3.2%)
Antalgic drugs	98 (18.6%)	17 (21.8%)	14 (26.9%)	67 (16.9%)
Regular physical activities and/or sports	168 (31.9%)	15 (19.2%)	14(27%)	142 (35.9%)
Self-reported psychosomatic symptoms:				
Neuro-vegetative disorders	294 (55.9%)	54 (69.2%)	39 (75%)	201 (50.6%)
Muscle pains, cramps, or sensations of muscle stiffness	184 (35%)	45 (57.7%)	31 (59,6%)	108 (27.3%)
Nervous tension	302 (57.4%)	55 (70.5%)	34 (65.4%)	213 (53.8%)
Mood disorders	263 (50%)	52 (66.7%)	21 (40.4%)	190 (48%)
Cognitive disorders	114 (21.7%)	32 (41%)	28 (53.8%)	54 (13.6%)
Sleep disorders	197 (37.5%)	39 (50%)	21 (40.4%)	137 (34.6%)
Self-reported chronic diseases				
Musculoskeletal	191 (36.3%)	28 (35.9%)	29 (55.8%)	134 (33.8%)
Respiratory	171 (32.5%)	24 (30.8%)	27 (51.9%)	120 (30.3%)
Cardiovascular	95 (18.1%)	22 (28.2%)	21 (40.4%)	52 (13.1%)
Neuropsychiatric	89 (16.9%)	8 (10.3%)	25 (48.1%)	56 (14.1%)
Digestive	87 (16.5%)	25 (32.1%)	20 (38.5%)	42 (10.6%)
Metabolic	73 (13.9%)	17 (21.8%)	22 (42.3%)	34 (8.6%)
	70 (13.3%)	14 (17.9%)	19 (36.5%)	37 (9.3%)

Table 3. Prevalence of burnout syndrome (BOS), and the levels of its dimensions

Dimensions	Total N = 526	Pilots/copilots N = 78 (14.8%)	Mechanics N = 52 (9.9%)	Sailors N = 396 (75.3%)
Emotional exhaustion:				
Low	441 (83.9%)	47 (60.3%)	36 (69.2%)	359 (90.4%)
High	85 (16.1%)	31 (39.7%)	16 (30.8%)	38 (9.6%)
Average score	16.2 ± 5.2	28.4 ± 8.3	27.8 ± 8.8	12.9 ± 8.2
Depersonalisation:				
Low	453 (86.1%)	56 (71.8%)	30 (57.7%)	368 (92.9%)
High	73 (13.9%)	22 (28.2%)	22 (42.3%)	29 (7.3%)
Average score	8.2 ± 3.3	10.9 ± 5.6	12.8 ± 9	7.2 ± 2,1
Personal accomplishment:				
Low	185 (35.2%)	41 (52.6%)	21 (40.4%)	123 (31.1%)
High	341 (64.8%)	37 (47.4%)	31 (59.6%)	273 (68.9%)
Average score	30.6 ± 7.2	26.4 ± 6.3	29.3 ± 7.4	31.5 ± 7.3
Abnormal dimensions:				
1 abnormal dimension	89 (16.9%)	24 (30.8%)	18 (34.6%)	47 (11.8%)
2 abnormal dimensions	64 (12.2%)	19 (24.4%)	8 (15.4%)	37 (9.3%)
3 abnormal dimensions (BOS)	42 (8%)	10 (12.8%)	9 (17.3%)	23 (5.8%)
Total	195 (37.1%)	53 (67.9%)	35 (67.3%)	107 (26.9%)

respectively, and low scores for PA in 35.2%. The prevalence of abnormal scores was significantly higher in pilots/copilots and mechanics than among sailors ($p < 0.01$) (Table 3).

The age group most affected by at least one abnormal dimension of BOS was between 41 and 50 (56.6%). The prevalence of people with at least one abnormal BOS dimension was higher among those living alone (44.4% vs. 33.3%, $p < 0.01$). The proportion of fishermen with at

least one abnormal BOS dimension was significantly higher among pilots/copilots (67.9%) and mechanics (63.5%) than among sailors (27.8%). 56.3% of seasonal and 22% of permanent PMs had at least one abnormal BOS dimension. Among fishermen with at least one abnormal dimension, 53.3% had had an incident or accident in the last 12 months, 42.1% suffered from job strain and 57.9% from isostrain (Table 4).

Table 4. Relationships between sociodemographic and occupational parameters and burnout syndrome (BOS)

Parameters	Total N = 526	NAD BOS N = 331 (62.9%)	AD BOS N = 195 (37.1%)	P
Age [years]:				
≤ 30	112 (21.3%)	78 (69.7%)	34 (30.3%)	0.0001
31–40	108 (20.5%)	65 (60.1%)	43 (39.9%)	0.004
41–50	152 (28.9%)	66 (43.4%)	86 (56.6%)	0.029
> 50	154 (29.3%)	120 (77.9%)	34 (22.1%)	0.0001
Average age	41.6 ± 9.1	40.5 ± 8.9	41.5 ± 9	0.216
Family status:				
Living in a couple	348 (66.2%)	232 (66.7%)	116 (33.3%)	0.0001
Living alone	178 (33.8%)	99 (55.6%)	79 (44.4%)	0.044
Living with dependents	315 (59.9%)	146 (46.3%)	169 (53.7%)	0.08
Professional category:				
Pilots/copilots	78 (14.8%)	25 (32.1%)	53 (67.9%)	0.0001
Mechanics	52 (9.9%)	19 (36.5%)	33 (63.5%)	0.011
Sailors	396 (75.3%)	286 (72.2%)	110 (27.8%)	0.0001
Work seniority [years]:				
≤ 5	84 (16%)	49 (58.3%)	35 (41.7%)	0.045
6–15	147 (27.9%)	70 (47.6%)	77 (52.4%)	0.484
> 15	295 (56.1%)	212 (71.9%)	83 (28.1%)	0.0001
Average seniority	14.5 ± 4.2	15.2 ± 4.5	12.8 ± 3.6	0.0001
Average daily working hours	11.9 ± 0.4	10.1 ± 0.2	14.9 ± 0.7	0.0001
Average weekly working hours	71.4 ± 1.2	60.6 ± 1.1	89.4 ± 1.4	0.0001
Type of work:				
Seasonal	231 (43.9%)	101 (43.7%)	130 (56.3%)	0.017
Permanent	295 (56.1%)	230 (78%)	65 (22%)	0.0001
History of incidents and occupational injuries	136 (25.9%)	32 (9.7%)	104 (53.3%)	0.0001
Work stressors:				
High psychological demands	431 (81.9%)	250 (75.5%)	181 (92.8%)	0.0001
Low decision latitude	299 (56.8%)	169 (51.1%)	130 (66.7%)	0.0001
Low social support	259 (49.2%)	87 (26.3%)	172 (88.2%)	0.0001
Job strain	222 (42.2%)	140 (42.3%)	82 (42.1%)	0.0001
Isostrain	149 (28.3%)	36 (10.9%)	113 (57.9%)	0.0001

NAD – no abnormal dimensions of BOS; AD – abnormal dimensions of BOS

Among seafarers with at least one abnormal dimension of the BOS, sporting practices were less frequent (7.7% vs. 25.4%, $p < 0.01$) and doping behaviours more important. The prevalence of psychosomatic manifestations of stress and reported chronic illnesses was respectively and significantly higher among seafarers with at least one abnormal dimension of the BOS (77.4% and 62.6%) than among those with none (62.2% and 20.8%) (Table 5).

Multivariate logistic regression showed that iso-strain, job strain, fatigue, seasonal work, sleep disorders and daily working hours greater than 14 hours were independent risk factors associated with the presence of abnormal BOS dimensions (Table 6).

DISCUSSION

CONCEPTS

For designers, BOS can result from overwork in emotionally demanding occupations such as fishermen, caregivers, teachers and so on. Occupational exhaustion, which partic-

ularly affects fishermen, is a psychological and physiological state in which individuals become exhausted due to the daily accumulation of chronic stress factors. It has its roots in response to a number of stressors over a long period of time [4–6]. BOS combines three symptoms (emotional exhaustion, depersonalisation and loss of sense of personal fulfilment) and is likely to occur in anyone working with other human beings in any way [2]. Emotional exhaustion is the major dimension of BOS, and corresponds to a loss of motivation and a feeling of annihilation of emotional resources. It translates into an impression of affective and emotional saturation with regard to the suffering of others. Depersonalisation includes the development of impersonal and negative attitudes towards colleagues, as well as a loss of empathy and cynicism. This disinvestment in relationships manifests itself in negative attitudes and feelings towards those around us. The reduced sense of personal fulfilment at work implies a loss of confidence in one's skills and in the idea of being able to fulfil oneself

Table 5. Relationships between health data and burnout syndrome (BOS)

Parameters	Total N = 526	NAD BOS N = 331 (62.9%)	AD BOS N = 195 (37.1%)	P
Toxic habits:				
Tea–coffee consumption	515 (97.9%)	320 (96.7%)	195 (100%)	0.024
Tobacco smoking or snuff	199 (37.8%)	102 (30.8%)	97 (49.7%)	0.0001
Cannabis smoking	167 (31.7%)	83 (25.1%)	84 (43.1%)	0.0001
Alcohol consumption	154 (29.3%)	73 (22.1%)	81 (41.5%)	0.0001
Other psychotropic substances	24 (4.6%)	13 (3.9%)	11 (5.6%)	0.488
Antalgic drugs	98 (18.6%)	39 (11.8%)	59 (30.3%)	0.0001
Regular physical activities and/or sports	99 (18.8%)	84 (25.4%)	15 (7.7%)	0.0001
Psychosomatic symptoms:				
Neuro-vegetative disorders	294 (55.9%)	153 (46.2%)	141 (72.3%)	0.0001
Muscle pains, cramps, or sensations of muscle stiffness	184 (35%)	51 (15.4%)	133 (68.2%)	0.0001
Nervous tension	302 (57.4%)	154 (46.5%)	148 (75.9%)	0.0001
Mood disorders	263 (50%)	128 (38.7%)	135 (69.2%)	0.0001
Cognitive disorders	114 (21.7%)	46 (13.9%)	68 (34.9%)	0.0001
Sleep disorders	197 (37.5%)	89 (26.9%)	108 (55.4%)	0.0001
Self-reported chronic diseases:				
Musculoskeletal	171 (32.5%)	68 (20.5%)	103 (52.8%)	0.0001
Respiratory	95 (18.1%)	22 (6.6%)	73 (37.4%)	0.0001
Cardiovascular	89 (16.9%)	34 (10.3%)	55 (28.2%)	0.0001
Neuropsychiatric	87 (16.5%)	25 (7.6%)	62 (31.8%)	0.0001
Digestive	73 (13.9%)	14 (4.2%)	59 (30.3%)	0.0001
Metabolic	70 (13.3%)	31 (9.4%)	39 (20%)	0.0001

NAD – no abnormal dimensions of BOS; AD – abnormal dimensions of BOS

Table 6. Risk factors of abnormal dimensions of burnout syndrome (BOS): multivariate logistic regression

Risk factors	ORa	95% CI	P
Isostrain	4.6	3.48; 5.5	< 0.001
Job strain	3.8	1.89; 5.1	< 0.001
Fatigue	3.7	2.2; 4.17	< 0.002
Seasonal job	3.6	2.44; 5.4	< 0.002
Sleep disorders	3.4	2.9; 4.2	< 0.001
Daily working > 14 h	3.3	2.7; 5.1	< 0.007

CI – confidence interval; ORa – odds ratio adjusted

through work, with a tendency towards negative professional self-assessment [18]. The links between BOS and anxiety disorders are often cited, with some scientists believing that burnout is a form of depression [19–21].

ANALYSIS OF OUR RESULTS

Compared with the majority of land-based occupations, the risk of PE among seafarers appears moderate, despite maritime fishing being recognised as a particularly demanding and dangerous occupation [22]. Several studies have shown that the prevalence of BOS among caregivers and teachers is higher, ranging from 20% to 30% [23–27]. In a study among Moroccan healthcare workers, 59.7% had at least one abnormal dimension of the BOS: 33.8%

had a single abnormal dimension, 19.6% two abnormal dimensions and 6.3% three abnormal dimensions [28]. Many authors have reported that occupations with a lot of interpersonal contact are at risk. However, they seem to be more likely to involve showing or repressing emotions, or showing empathy [6, 29]. Some authors argue that the fisherman's job operates a kind of selection of subjects with particular characteristics. Indeed, sailors are motivated above all by adventure, passion and freedom [30, 31]. What's more, weakness is generally frowned upon in this male environment, where endurance, robustness and courage are considered attributes of masculinity and constitute the representative sample and benchmark. Unhappiness and mental disorders remain taboo [32]. Only 15% of sail-

ors worldwide are affected, which means that these pathologies remain under estimated in this population [33]. Among German sailors, high EE and DP scores were noted in 10.8% and 14%, respectively [17]. In our total population, the prevalence of BOS was 8%. It was significantly higher ($p < 0.01$) among pilots/copilots (12.8%) and mechanics (17.3%) than among sailors (5.8%). The formers were under greater stress due to their responsibility for personnel, equipment and the importance of the catch [34]. A Chinese survey showed that the prevalence of BOS was 63.3% among fishermen with greater professional responsibility [35]. In our study, the prevalence of abnormal BOS dimensions was higher in people aged between 41 and 50 (56.6%) and in those with between 6- and 15-years professional seniority (52.4%). This prevalence did not exceed 22.1% for people over 50 and 28.1% for those with more than 15 years' seniority. These results may be explained by the healthy worker effect, or by the adaptation of seafarers to their lifestyle through the development of protective methods against the various risk factors. Age may be a protective factor for certain ageing and resilient workers in the face of burnout. But it can also be a risk factor, with the gradual increase in exposure load correlated with advancement in the professional career [6, 36].

Our fishermen living in couples were less likely to have at least one abnormal dimension of BOS, at 33.3% ($p = 0.0001$), than those living alone, at 44.4% ($p = 0.04$). Living with a partner inhibits anxiety, whereas being single or separated increases the risk of BOS [37].

More than half of our fishermen (56.1%) worked on a seasonal basis during the fishing season for certain varieties of lucrative catch. As a fisherman's income is linked to the size of the catch, seasonal peaks in fish availability represent their best income opportunity of the year. This necessitates long work periods with minimal and irregular rest opportunities responsible for fatigue, sleep and alertness disorders, and chronic stress exposing them to BOS and occupational injuries [10, 11, 38]. In addition, 56.2% of seasonal workers had at least one abnormal BOS dimension, compared with 25.2% of permanent workers ($p < 0.001$). In addition, our fishermen's income is mainly based on a shared remuneration system conditioned by the size of the catches. Their activity is marked by several periods of interruption during the year due to unfavourable weather conditions, seasonality (biological rest) and religious events (Eid celebrations). Insufficient income to meet the necessities of life, job insecurity, unfavourable socio-economic conditions, precariousness and an unpleasant working environment (dilapidated boats, faulty equipment) often lead to suffering at work, stress and burnout [9].

Sea fishing is universally recognised as one of the most dangerous and accident-prone professions. Around a quar-

ter (25.9%) of our seafarers have suffered an incident or accident in the last 12 months. This proportion rose to 53.3% among those with at least one abnormal dimension of BOS. The BOS of fishermen is responsible for many incidents and accidents at sea [8]. A seafarer is three times more likely to suffer a work-related accident than a shore worker, and 44 times more likely to die on the job [39–41]. In Morocco, the number of incident cases in 2021 was 164 occupational injuries for 118,541 active seafarers, i.e. a cumulative incidence of 1.4 accidents per 1,000 seafarers. 37 accidents were fatal, representing a fatality rate of 22.6% (37/164) and a cumulative incidence of 31/100,000 seafarers. It should be pointed out that the frequency of accidents was underestimated due to under-reporting, and only those involving fatal accidents were reliable. The frequency of occupational accidents in 2021 was lower than in 2019 and 2020 (46/100,000), but higher than in 2018 (32/100,000). Nevertheless, cumulative incidences worldwide were higher, at between 90/100,000 and 150/100,000. The human factor, in particular failure to observe on-board safety rules, accounts for 80% of the causes of work-related accidents. The large number of fatalities following events at sea is most often explained by the loss of almost the entire crew in the event of shipwreck.

Among our fishermen, 16.1% had a high EE score, 13.9% a high DP score, 40.4% a low PA score, 16.9% had one abnormal dimension, 12.2% two and 8% three. In a study of merchant navy sailors in Germany, the prevalence of high EE score was 10.8%, high DP 14% and low PA 62.2% [17]. Among our fishermen sailors with at least one abnormal dimension of BOS, 57.9% had job strain and 42.1% had isostrain. Indeed, this syndrome is a psychological and physiological condition resulting from the accumulation of occupational stress factors. It has its roots in response to a number of long-term stress factors, and is a consequence of daily stress reactions that have worn the individual down [5, 6].

The dimension of emotional exhaustion and fatigue would be the one with the greatest pejorative predictivity. Chronic fatigue could evolve into anxiety-depressive disorders, with a drop in self-esteem. Subjects with BOS often adopt doping or compensatory behaviours and consume psychoactive substances (PAS) to confront an obstacle, real or perceived, and/or improve their professional performance (physical, cognitive, etc.) [6]. The main PAS used by fishermen are tobacco (smoked, snuffed, chewed), cannabis, alcohol, tea, coffee and certain medicines (tranquilizers, anxiolytics, amphetamines, analgesics, etc.).

In all the studies we conducted among fishermen, the prevalence of PAS consumption among fishermen was significantly higher than that of the Moroccan male in general population aged over 20, which was 34.5% for tobacco

smoking, 14% for alcohol consumption and 9% for cannabis [42]. Prevalence ranged from 52.3% to 79% for tobacco smoking, from 10.6% to 64.4% for alcohol consumption and from 23.9% to 41% for cannabis [10, 43–46]. In our study of PAS use by fishermen, among users, misuse was 49% for smoked tobacco, 61.2% for cannabis and 86% for alcohol. Only 9.4% had no toxic habit, 56.4% had one toxic habit, 20.4% two toxic habits, 11.9% three toxic habits and 1.9% four toxic habits. The most frequent associations were tobacco-cannabis (10.5%) and tobacco-alcohol (6.1%) [40]. In our study of stress among fishermen, the prevalence of PAS consumption was significantly higher for those under stress than for those not under stress [10]. The presence of addictive behaviours or psychosomatic or somatic manifestations is sometimes considered a constitutive element of BOS, sometimes a complication [6]. In our study, the prevalence of substance use was higher in those with at least one abnormal dimension of BOS. Fishermen were classified as heavy users of PAS [47].

Fishing is a demanding profession, with heavy workloads, high stamina and energy levels, reducing the ability of fishermen to engage in physical and sporting activities beneficial for stress prevention. Only 18.8% of our fishermen took part in regular sport or physical activity. In a Greek study, 66% of fishermen did not engage in any type of exercise outside work [48]. In our survey, the prevalence of having at least one abnormal BOS dimension was lower in people who regularly took part in sport or leisure activities. In our survey, only 7.7% of fishermen with at least one abnormal BOS dimension regularly took part in sports or leisure activities. These two practices play an important role in creating a state of equilibrium by boosting self-esteem, absorbing excess stress and reinforcing emotional impermeability. Numerous publications have highlighted their importance in the prevention of BOS [6]. In our study, just over two-thirds of people (67.9%) had reported psychosomatic manifestations of stress (77.4% in the group with at least one abnormal dimension vs. 62.2% in the group with no abnormal dimension, $p = 0.001$). Mood disorders were reported by 50% of our fishermen: 69.2% in the group with at least one abnormal BOS dimension vs. 38.7% in the group with no abnormal BOS dimension, $p = 0.001$). These mood disorders can have disastrous consequences, particularly suicidal, especially in susceptible individuals [49]. Besikci et al. [50] found that distress is not detected by seafarers' self-reports. Although sailing is a demanding and dangerous profession, the high risk of depression is controversial [51]. Depression and suicide have been reported in numerous studies, with 13.1% of recorded deaths from diseases resulting from suicide [52]. More than a third of our fishermen (32.5%) reported chronic diseases (62.6% in the group with at least one abnormal dimension of BOS vs. 14.8%

in the group with no abnormal dimension; $p < 0.0001$). The literature confirms that fishing is an exhausting occupation, which includes musculoskeletal disorders linked to significant physical and psychological constraints [17, 53].

INTERESTS AND LIMITS

Our study has certain limitations. Its cross-sectional nature is responsible for a selection bias in relation to the healthy worker effect because those with impaired health are assumed to be absent. Moreover, we can't infer causality; longitudinal research is needed. Weaknesses in self-reporting must be emphasized, particularly with regard to the use of psychoactive substances, especially alcohol. Furthermore, the KJCQ and MBI are tools for the perception of working conditions, not their objective measurement. Thus, a fisherman responding to the questionnaire may give a negative description of his working environment, and it is difficult to distinguish between real suffering at work and mere professional grievances. There is no way of avoiding or limiting individual variation in self-declaration. Furthermore, it should be pointed out that the 1982 version of the MBI does not provide a cut-off for diagnosing BOS, and distinguishes between low, medium and high levels for each of its three dimensions [54]. Nevertheless, the aim of our study was a global quantification and approach, and not a precise assessment of the prevalence of BOS of fishermen.

CONCLUSIONS

The location of psychosocial risks at the intersection of the professional and private spheres increases the difficulties of their conceptual delimitations and accentuates the complexity of their apprehension [55]. While it is impossible to totally eliminate situations that put fishermen at risk of stress and BOS, it is imperative to identify priority actions to improve the working and living conditions of fishermen. Psychosocial and organizational constraints in the inshore maritime fishing sector constitute a highly topical occupational risk, justifying the development of a genuine prevention policy. The planning of tasks within the fishing crew and the coordination of their activities are part of the preventive actions for BOS. In the boats, several professionals work in a reduced space with more or less specific tasks. The transition from coaction to collaboration can only be achieved through the construction of a common work organization frame of reference [56]. While some initiatives fall within the remit of occupational health services (awareness-raising campaigns, analysis of working conditions, screening, etc.) and shipowners (work organization), the majority fall within the remit of the executive (national policy on occupational health among fishermen).

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REFERENCES

- Chamoux A, Paris C, Desheulles J. Stress et travail: rôle de la pénibilité psychique du travail. *Arch Mal Prof.* 1999; 60(6): 570–573.
- Maslach C, Jackson SE. *The Maslach Burnout Inventory*. 2nd ed. Consulting Psychologist Press, Palo Alto, CA 1986.
- Karasek R. Job demands, job decision latitude, and mental strain: implications for job redesign. *Adm Sci Q.* 1979; 24(2): 285, doi: [10.2307/2392498](https://doi.org/10.2307/2392498).
- Maslach C. Understanding burnout: Definitional issues in analyzing a complex phenomenon. In: Paine WS (ed.) *Job Stress and Burnout*. Sage Publications, Beverly Hills, California, US 1982: 28–40.
- Maslach C, Leiter MP. *Burn-out: le syndrome d'épuisement professionnel*. Les Arènes, Paris 2011: 270.
- Olié JP, Légeron P. Le burn-out. *Bulletin de l'Académie Nationale de Médecine*. 2016; 200(2): 349–365, doi: [10.1016/s0001-4079\(19\)30765-4](https://doi.org/10.1016/s0001-4079(19)30765-4).
- Galanakis M, Stalikas A, Kallia H, et al. Gender differences in experiencing occupational stress: the role of age, education and marital status. *Stress and Health*. 2009; 25(5): 397–404, doi: [10.1002/smi.1248](https://doi.org/10.1002/smi.1248).
- Chung YS, Lee PW, Lee JK. Burnout in seafarers: its antecedents and effects on incidents at sea. *Maritime Policy & Management*. 2017; 44(7): 916–931, doi: [10.1080/03088839.2017.1366672](https://doi.org/10.1080/03088839.2017.1366672).
- Landsbergis P, Dobson M, LaMontagne A, et al. Occupational stress. *Oxford Scholarship Online*. 2017, doi: [10.1093/oso/9780190662677.003.0017](https://doi.org/10.1093/oso/9780190662677.003.0017).
- Laraqui O, Manar N, Laraqui S, et al. Occupational risk perception, stressors and stress of fishermen. *Int Marit Health*. 2018; 69(4): 233–242, doi: [10.5603/IMH.2018.0038](https://doi.org/10.5603/IMH.2018.0038), indexed in Pubmed: [30589062](https://pubmed.ncbi.nlm.nih.gov/30589062/).
- Laraqui O, Roland-Levy C, Manar N, et al. Health status, sleeping habits and dyssomnia of coastal fishermen. *Int Marit Health*. 2022; 73(4): 163–171, doi: [10.5603/imh.2022.0029](https://doi.org/10.5603/imh.2022.0029).
- Bakker A, Schaufeli W, Demerouti E, et al. Using equity theory to examine the difference between burnout and depression. *Anxiety, Stress & Coping*. 2000; 13(3): 247–268, doi: [10.1080/10615800008549265](https://doi.org/10.1080/10615800008549265).
- Leiter MP, Day A, Harvie P, et al. Personal, and organizational knowledge transfer: Implications for work-life engagement. *Human Relations*. 2007; 60: 259–283.
- Pichené A. Screening for chronic psychological stress using a questionnaire. *Notes techniques et scientifiques de l'INRS*. Institut national de recherches et sécurité. N° ISSN 0397-4529, Paris 1995: 64.
- Lourel M, Gueguen N, Mouda F. L'évaluation du burnout de Pines: adaptation et validation en version française de l'instrument Burnout Measure Short version (BMS-10). *Pratiques Psychologiques*. 2007; 13(3): 353–364, doi: [10.1016/j.prps.2007.06.001](https://doi.org/10.1016/j.prps.2007.06.001).
- Maslach C, Jackson S. The measurement of experienced burnout. *J Organizational Behavior*. 1981; 2(2): 99–113, doi: [10.1002/job.4030020205](https://doi.org/10.1002/job.4030020205).
- Oldenburg M, Jensen HJ, Wegner R. Burnout syndrome in seafarers in the merchant marine service. *Int Arch Occup Environ Health*. 2013; 86(4): 407–416, doi: [10.1007/s00420-012-0771-7](https://doi.org/10.1007/s00420-012-0771-7), indexed in Pubmed: [22526089](https://pubmed.ncbi.nlm.nih.gov/22526089/).
- Brotheridge C, Grandey A. Emotional labor and burnout: comparing two perspectives of “people work”. *J Vocational Behavior*. 2002; 60(1): 17–39, doi: [10.1006/jvbe.2001.1815](https://doi.org/10.1006/jvbe.2001.1815).
- Bianchi R, Schonfeld IS, Laurent E. Burnout-depression overlap: a review. *Clin Psychol Rev*. 2015; 36: 28–41, doi: [10.1016/j.cpr.2015.01.004](https://doi.org/10.1016/j.cpr.2015.01.004), indexed in Pubmed: [25638755](https://pubmed.ncbi.nlm.nih.gov/25638755/).
- Lily YL, Stewart K, Woo C, et al. The relationship between burnout and depressive symptoms in patients with depressive disorders. *J Affect Disord*. 2015; 172: 361–366, doi: [10.1016/j.jad.2014.10.029](https://doi.org/10.1016/j.jad.2014.10.029), indexed in Pubmed: [25451438](https://pubmed.ncbi.nlm.nih.gov/25451438/).
- Nyklíček I, Pop VJ. Past and familial depression predict current symptoms of professional burnout. *J Affect Disord*. 2005; 88(1): 63–68, doi: [10.1016/j.jad.2005.06.007](https://doi.org/10.1016/j.jad.2005.06.007), indexed in Pubmed: [16054229](https://pubmed.ncbi.nlm.nih.gov/16054229/).
- Agterberg G, Passchier J. Stress among seamen. *Psychol Rep*. 1998; 83(2): 708–710, doi: [10.2466/pr0.1998.83.2.708](https://doi.org/10.2466/pr0.1998.83.2.708), indexed in Pubmed: [9819944](https://pubmed.ncbi.nlm.nih.gov/9819944/).
- Nyssen AS, Hansez I, Baele P, et al. Occupational stress and burnout in anaesthesia. *Br J Anaesth*. 2003; 90(3): 333–337, doi: [10.1093/bja/aeg058](https://doi.org/10.1093/bja/aeg058), indexed in Pubmed: [12594147](https://pubmed.ncbi.nlm.nih.gov/12594147/).
- Cubrilo-Turek M, Urek R, Turek S. Burnout syndrome: assessment of a stressful job among intensive care staff. *Coll Antropol*. 2006; 30(1): 131–135, indexed in Pubmed: [16617587](https://pubmed.ncbi.nlm.nih.gov/16617587/).
- Gingras J, de Jonge LA, Purdy N. Prevalence of dietitian burnout. *J Hum Nutr Diet*. 2010; 23(3): 238–243, doi: [10.1111/j.1365-277X.2010.01062.x](https://doi.org/10.1111/j.1365-277X.2010.01062.x), indexed in Pubmed: [20642639](https://pubmed.ncbi.nlm.nih.gov/20642639/).
- Quattrin R, Ciano R. Burnout in teachers: an Italian survey. *Ann Ig*. 2010; 22(4): 311–318.
- Fernández JD, Clavero FH, Gutiérrez MV, et al. Síndrome de desgaste profesional en trabajadores de atención a la salud en el área sanitaria de Ceuta. *Atención Primaria*. 2012; 44(1): 30–35, doi: [10.1016/j.aprim.2011.01.004](https://doi.org/10.1016/j.aprim.2011.01.004).
- Laraqui O, Manar N, Laraqui S, et al. Risques psychosociaux et syndrome d'épuisement professionnel des professionnels de soins hospitaliers. *Archives des Maladies Professionnelles et de l'Environnement*. 2019; 80(5): 386–397, doi: [10.1016/j.admp.2019.05.001](https://doi.org/10.1016/j.admp.2019.05.001).
- Lloyd C, King R, Chenoweth L. Social work, stress and burnout: A review. *J Mental Health*. 2009; 11(3): 255–265, doi: [10.1080/09638230020023642](https://doi.org/10.1080/09638230020023642).
- Jegaden D, Lemoine C, Paris P, et al. Do fishermen have a particular psychological profile leading to risky behavior? *ErgoMare International Symposium*. 2006; October 5-6-7(Lorient, France).
- Mellbye A, Carter T. Seafarers' depression and suicide. *Int Marit Health*. 2017; 68(2): 108–114, doi: [10.5603/IMH.2017.0020](https://doi.org/10.5603/IMH.2017.0020), indexed in Pubmed: [28660614](https://pubmed.ncbi.nlm.nih.gov/28660614/).
- Clouette F. *Marins-pêcheurs : des masculinités à coudre bord à bord*. Sociologie du Travail. 2021; 63(3), doi: [10.4000/sdt.39770](https://doi.org/10.4000/sdt.39770).
- Lefkowitz RY, Slade MD, Redlich CA. Rates and occupational characteristics of international seafarers with mental illness. *Occup Med (Lond)*. 2019; 69(4): 279–282, doi: [10.1093/occmed/kqz069](https://doi.org/10.1093/occmed/kqz069), indexed in Pubmed: [31094424](https://pubmed.ncbi.nlm.nih.gov/31094424/).
- Oldenburg M, Jensen HJ, Latza U, et al. Seafaring stressors aboard merchant and passenger ships. *Int J Public Health*. 2009; 54(2): 96–105, doi: [10.1007/s00038-009-7067-z](https://doi.org/10.1007/s00038-009-7067-z), indexed in Pubmed: [19288290](https://pubmed.ncbi.nlm.nih.gov/19288290/).
- Shi LC, Dai JJ, Wang HR, et al. [Current status of job burnout in in-service sailors from 13 provinces and cities in China]. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi*. 2017; 35(12): 893–897, doi: [10.3760/cma.j.issn.1001-9391.2017.12.003](https://doi.org/10.3760/cma.j.issn.1001-9391.2017.12.003), indexed in Pubmed: [29495149](https://pubmed.ncbi.nlm.nih.gov/29495149/).
- Van Daele A. Stress, work and age: what relationships? Paper at the colloquium of the Association des Licenciés en Sciences de la Santé Publique de l'Université de Liège on: Le Stress au Travail: les groupes à risque du troisième millénaire, 2018. <https://staff.umons.ac.be/agnes.vandaele/pubsfr.html>.
- Ahola K, Honkonen T, Isometsä E, et al. Burnout in the general population. *Soc Psychiatry Psychiatr Epidemiol*. 2006; 41(1): 11–17, doi: [10.1007/s00127-005-0011-5](https://doi.org/10.1007/s00127-005-0011-5).

38. Olafsdóttir L. The relationship between fishermen's health and sleeping habits. *Work*. 2004; 22(1): 57–61.
39. Kowalski JM. Sailors and death. Actualité d'un mythe. *La Revue Maritime*. 2011; 492: 90–102.
40. Laraqui O, Laarej H, Manar N, et al. Dépistage de la bronchopneumopathie chronique obstructive et qualité de vie dans un échantillon de gens de mer à Kenitra. *Revue des Maladies Respiratoires*. 2017; 34: A170, doi: [10.1016/j.rmr.2016.10.402](https://doi.org/10.1016/j.rmr.2016.10.402).
41. Recanati H. The living, the dead and those who go to sea. *La Rochelle, La Découverte, France* 2015: 169.
42. Jalal T, El Omari F, Sabir M. Rapport annuel de l'Observatoire national des drogues et addictions. Maroc, Rapport officiel 2014:108. www.onda-drogues.com.
43. Laraqui O, Laraqui S, Manar N, et al. Prevalence of consumption of addictive substances amongst Moroccan fishermen. *Int Marit Health*. 2017; 68(1): 19–25, doi: [10.5603/IMH.2017.0004](https://doi.org/10.5603/IMH.2017.0004), indexed in Pubmed: [28357832](https://pubmed.ncbi.nlm.nih.gov/28357832/).
44. Laraqui O, Laraqui S, Manar N, et al. Risk-taking behaviours among fishermen in Morocco by the evaluation of "ordalique" functioning. *Int Marit Health*. 2017; 68(2): 83–89, doi: [10.5603/IMH.2017.0016](https://doi.org/10.5603/IMH.2017.0016), indexed in Pubmed: [28660610](https://pubmed.ncbi.nlm.nih.gov/28660610/).
45. Laraqui O, Hammouda R, Laraqui S, et al. Prevalence of chronic obstructive respiratory diseases amongst fishermen. *Int Marit Health*. 2018; 69(1): 13–21, doi: [10.5603/IMH.2018.0003](https://doi.org/10.5603/IMH.2018.0003), indexed in Pubmed: [29611609](https://pubmed.ncbi.nlm.nih.gov/29611609/).
46. Laraqui OO, Deschamps F, Roland-Lévy C. Apport de la psychologie du travail et des organisations pour la prévention des risques psychosociaux des marins pêcheurs. 33rd International Congress on Occupational Health, ICOH2022, Melbourne, Australia. *Safety and Health at Work*. 2022, doi: [10.1016/S2093-7911\(22\)00108-1](https://doi.org/10.1016/S2093-7911(22)00108-1).
47. Goullé JP, Morel F. Addictions en milieu professionnel. Académie nationale de médecine, Paris. Report, 2017; October 10. <https://www.academie-medecine.fr/wp-content/uploads/2017/10/Addictions-en-milieu-professionnel-ANM-10-10-2017.pdf>.
48. Frantzeskou E, Kastania AN, Riza E, et al. Risk factors for fishermen's health and safety in Greece. *Int Marit Health*. 2012; 63(3): 155–161, indexed in Pubmed: [23129097](https://pubmed.ncbi.nlm.nih.gov/23129097/).
49. Szymańska K, Jaremin B, Rosik E. Suicides among Polish seamen and fishermen during work at sea. *Int Marit Health*. 2006; 57(1-4): 36–45, indexed in Pubmed: [17312692](https://pubmed.ncbi.nlm.nih.gov/17312692/).
50. Beşikçi EB, Tavacıoğlu L, Arslan O. The subjective measurement of seafarers' fatigue levels and mental symptoms. *Maritime Policy & Management*. 2015; 43(3): 329–343, doi: [10.1080/03088839.2015.1047426](https://doi.org/10.1080/03088839.2015.1047426).
51. Carotenuto A, Malino I, et al. A Broader Vision of Seafarer Wellbeing: Survey of ITF Maritime Affiliates on HIV/Aids, Health and Wellbeing. ITF 2012. http://www.itfglobal.org/media/819789/hiv_survey.pdf.
52. Carotenuto A, Molino I, Fasanaro AM, et al. Psychological stress in seafarers: a review. *Int Marit Health*. 2012; 63(4): 188–194, indexed in Pubmed: [24595974](https://pubmed.ncbi.nlm.nih.gov/24595974/).
53. Piniella F, Novalbos JP, Nogueroles PJ. Artisanal fishing in Andalusia (II): Safety and working conditions policy. *Marine Policy*. 2008; 32(4): 551–558, doi: [10.1016/j.marpol.2007.10.005](https://doi.org/10.1016/j.marpol.2007.10.005).
54. Truchot D. Professional exhaustion and burn-out. Concepts, methods, interventions. Dunod, Paris 2015.
55. Chakor T. Les consultants dans la prévention des risques psychosociaux au travail : proposition d'une typologie de pratiques. *GRH*. 2014; 10(1): 37–58, doi: [10.3917/grh.141.0037](https://doi.org/10.3917/grh.141.0037).
56. Caroly S. Différences de gestion collective des situations critiques dans les activités de service selon deux types d'organisation du travail. Perspectives interdisciplinaires sur le travail et la santé. 2002(4-1), doi: [10.4000/pistes.2696](https://doi.org/10.4000/pistes.2696).