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Burnout symptoms, work motivation and their relationships among Italian ICU's nurses after COVID-19 emergency. A multicenter study

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Key word: Burnout, Work Motivation, COVID-19, Intensive Care, Nurse
Parole chiave: Burnout, motivazione al lavoro, COVID-19, terapia intensiva, infermiere

Abstract

Background. *Despite the end of the health emergency, healthcare professionals are at risk of developing long-term mental health problems. The aim of this study was to observe Burnout symptoms and work motivation among Intensive Care Nurses, one year after admission to the Intensive Care Unit of the last positive SARS-CoV-2 swab patients.*
Study design. *A multicenter cross-sectional study design was carried out and a national web-based survey was conducted between April, 2023 and May, 2023 among 21 Italian Intensive Care Units.*
Methods. *The survey consisted of single- and multiple-choice questions structured into 3 sections: demographic sample data, Maslach Burnout Inventory Scale for the assessment of Burnout-symptoms and Multidimensional Work Motivation Scale for the assessment of work motivation.*
Results. *Four hundred-nine surveyed and questionnaires were included in the study. Of these 272 were male (66.5%). Burnout-related symptoms were identified in at least 79% of ICU nurses. Symptoms of severe Burnout was observed in 169 nurses analysed (41.3%) and they are significantly among nurses who had COVID-19 or positive SARS-COV-2 swab during the pandemic (RR= 1.55; CI= 1.24-1.95, p= .0004) and among nurses with at least one child (RR= 1.37; CI= 1.07-1.76; p= .011). Motivated nurses for the intrinsic motivation's level have been 281 (68.7%). The risk of being intrinsically demotivated is significantly greater among nurses with 5-10 years of work experience (RR= 2.44; CI= 1.48-4.02; p= .0002). Emotional exhaustion was associated in increase in demotivation and introjected estrinsic motivation. Depersonalization was associated with demotivation. Personal accomplishment was associated with increase in external estrinsic motivation and amotivation.*
Conclusions. *High level of Burnout has been observed among Italian ICU nurses associated with low work motivation after COVID-19 emergency. Interventions and strategies should be adopted to prevent burnout and improve work motivation.*

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Introduction

The World Health Organization (WHO) defines Burnout as "a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed'' (1). It is characterized by three dimensions: feelings of energy depletion or exhaustion, increased mental distance from one's job or feelings of negativism or cynicism related to one's job and reduced professional efficacy (www.who.int). Burnout can lead to a deterioration in the quality of care or service that is provided by the healthcare staff (1). Burnout seems to be correlated with various self-reported indices of personal distress, including physical exhaustion, insomnia, increased use of alcohol and drugs, and marital and family problems (1).

Nurse burnout can have a vast array of negative consequences for the patient, the health care organization, the nursing profession, and the mental and physical health of the nurse as an individual (2). Nurse burnout has been a challenge for nurses even before the recent pandemic, but we are now seeing reports of higher levels of Burnout (3).

Burnout is a major global issue that afflicts Healthcare professionals of various specialties and disciplines (3).

A recent systematic review that assessed the burden of burnout among Healthcare professionals, including physicians and nurses, found that prevalence estimates of burnout were in the range of 40–60% before the current pandemic (3). However, Burnout has not received much attention in the despite the existence of well-identified stressors in healthcare settings.

The unexpected outbreak and the drastic measures required to cope with the COVID-19 pandemic have rapidly changed intensive care unit (ICU) activity. All over the world, ICUs were confronted with a sudden demand for extra ICU beds for COVID-19 patients (4). This sudden demand required health care systems to realise additional ICU capacity, often with help from non-ICU nurses (5).

Studies of healthcare professionals who care for COVID-19 patients, primarily nurses, have reported symptoms of anxiety, depression, insomnia, and discomfort (6). The nurses caring for COVID-19 patients felt extreme physical fatigue and discomfort caused by the outbreak, intense work, large number of patients, and lack of protective materials (7).

Recently, a Trepanier and collegue study (8) showed that for employees with poor-quality work motivation, job resources resulted in greater burnout over time. Work motivation may be defined as an energy or a force that arises from within an individual, or from the environment, to take on workrelated behaviour, and to shape this behaviour's form, intensity, and duration (9). Most theorists and researchers consider work motivation as a phenomenon that varies only in its amount, level of motivation, and have focused mainly on intrinsic work motivation and its enhancing factors (10).

Therefore the most contemporary theory of self-determination consider both intrinsic and extrinsic motivation.

Intrinsic motivation is defined as accomplishing one's work for the inherent pleasure and satisfaction it provides. It is the most self-determined type of motivation (11).

Extrinsic motivation is definited as the fully recognizes and accepts the underlying importance of one's work as objectives aligned with personal goals and values (11).

The extrinsic motivation introjected regulation, refers to behaving out of internal pressure and external regulation, which refers to engaging in one's work for specific instrumental reasons: to attain desired outcomes or to avoid undesired ones. Lastly, demotivation is defined as a lack of motivation or voluntary intention towards accomplishing one's work (11).

It is evident that nurses who worked in the ICU during the pandemic displayed high emotional exhaustion, having reported feelings of reduced professional efficacy and depersonalisation concerning their professional work (12).

After 3 years of pandemic, on 5 May 2023, the WHO Director-General trasmitted the Report of the fifteenth meeting of the International Health Regulations Emergency Committee regarding the coronavirus 2019 disease (COVID-19) pandemic. Despite the end of the health emergency, healthcare professionals are at risk of developing long-term mental health problems.

The increase in pressure combined with clinical demands during the COVID-19 pandemic may have increased the risk and Burnout in these professionals (12). Ongoing assessment and intervention are needed to support ICU nurses' mental and physical well-being (13).

The evidence available in terms of prevalence of Burnout syndrome and work motivation and in terms of relationship between these two different construct both in the pre and in the post pandemic era is lack and not ever available, especially in the post pandemic era.

Based on the assumption that the recent pandemic has played a key role on psychological aspects of the nursing professional and on their motivation, the aim of this study is to observe Burnout symptoms and work motivation among Italian Intensive Care Nurses, one year after admission to the Intensive Care Unit of the last positive SARS-COV-2 swab patients. Secondary objective is to establish a relationship between severe Burnout symptoms and work motivation.

Methods

Study design

A multicenter cross-sectional study design was conducted. This study is reported following the Strengthening of Reporting in Observational studies in Epidemiology (STROBE) guidance (14, 15). The EQUATOR Network website has been accessed. The EQUATOR Network website maintains a comprehensive up-to-date list of guidelines (eg. STROBE) and a series of toolkits designed for authors, editors, developers, librarians, and teachers (15).

Sample and setting

This national web-based survey was conducted between April, 2023 and May, 2023 among the ICUs registered with the GiViTi (Italian Group to assess the intervention in Intensive care unit) group. GiViTi is an Italian Intensive Care network. GiViTi, is promoted by the Mario Negri IRCCS Institute for Pharmacological Research. For many years, the society has been collecting epidemiological data on patients admitted to Italian intensive care, including many ICUs of Central-Northern Italy and for some years also in Southern Italy. The GiViTi group is made up of 3 fundamental units: the ICUs, the Technical Scientifc Committee (CTS) and Coordination Center. To date, 300 ICUs are enrolled in the GiViTi group. Membership in the group is free and noform of grant is foreseen for the participating Centers or their representatives.

Before starting the study (March 2023), a request for collaboration in the project was disseminated to all ICUs registered with the GiViTi to look for only ICUs with the following characteristics: i) ICUs that admitted no SARS-COV-2 molecular swab positive patients for at least 12 months (COVID free ICU); but ii) who admitted and managed SARS-COV-2 molecular swab positive patients in the years 2020, 2021 and/or 2022. The study was conducted in the ICUs located in different geographical areas in Italy. GiViTi reported the possibility of carrying out the study on a randomized cluster sample of

21 ICUs (7 ICUs for Northern Italy, 7 ICUs for Central Italy and 7 ICUs for Southern Italy). The characteristics of the individual Intensive Care Units (eg. type of ICU, geographic area, number of ICU beds, number of patients admitted in the last year, number of patients per nurse etc.) were collected with another ad hoc questionnaire, sent to the individual Coordinators/Charge Nurse of the Intensive Care Units and collected in a special table (Table 1). The sample of nurses consisted of the ICU nurses who were active in nursing practice during the study period from April to May 2023, including Nurses with temporary contracts and staff nurses not participating in direct patient care (e.g., team leaders, charge nurses). Nursing students in the ICU were excluded.

Questionnaires

An email has been sent to all ICUs included in the study. A short letter attached to the email, explaining the project and a link to click to access the compilation of the questionnaire was sent. The email was sent by the GiViTi secretary. The questionnaire was submitted online through Google Forms platform. Google Forms is a tool that allows collecting information from users via a personalized survey or quiz. The information is then collected and automatically connected to a spreadsheet. The spreadsheet is populated with the survey and quiz responses. The questionnaires collection took place between 1st April 2023 and 15 May 2023. The editors were VM and VD. Participants responded to the

Table 1 - Characteristics of the partecipating intensive care units.

Characteristic	Results
Type of ICU	
Medical, n %	1 (4.8)
Surgical, n %	0
Medical-Surgical, n %	20 (95.2)
Pediatric, n %	0
Geographic area	
Northern Italy, n %	7 (33.3)
Center of Italy, n %	7(33.3)
Southern Italy, n %	7(33.3)
Lenght of ICU stay (day) in the last year, mean (ds)	14 (± 9.8)
APACHE II score at ICU admission in the last year, mean (ds)	12.8 (± 7.8)
Patient deceased in the last year in the 21 ICUs partecipated	1098
Number of ICU beds, n total	188
Number of patients admitted in the last year, n total	7626
Number of patients admitted in the last year for each ICU, median (25th-75th)	360 (322-398)
Number of nurse in ICU at the moment of the study, n total	574
Number of patients per nurse, median (25th-75th)	2 (2-3)
Number of nurses in ICU every 24 hours, median (25th-75th)	4 (3-6)
Number of nursing assistants during the study period, median (25th-75th)	6 (2-10)
Number of attending physicians for each ICU, median (25th-75th)	4 (2-5)
Full-time psycologist, median (25th-75th)	1 (0-3)

Definition of abbreviation: ICU= intensive care unit; APACHE II= Acute Physiologic Assessment and Chronic Health Evaluation.

survey on a voluntary basis. The response to the survey was considered a written consent to participate.

The questionnaire consists of single- and multiple-choice questions and is structured into three sections.

The first section concerned the collection of the demographic sample data (eg. age, gender, level of education, training, ICU work experience, number of children, marital status...).

The second section concerned the collection of the Maslach Burnout Inventory data. The Maslach Burnout Inventory (MBI) is a psychological assessment instrument comprising 22 symptom items pertaining to occupational Burnout (1). The original form of the MBI was developed by Christina Maslach and Susan Jackson with the goal of assessing an individual's experience of Burnout. The MBI measures three dimensions of Burnout: emotional exhaustion (9 items), depersonalization (5 items), and personal accomplishment (8 items) (16, 17). All MBI items are scored using a 7 level frequency ratings from "never" to "daily." Each scale measures its own unique dimension of Burnout. The following cut-offs are identified on the basis of the three domains of the MBI; emotional exhaustion: low risk (score lower than 17) moderate risk (score 18-29), high risk (score higher than 30); depersonalization: low risk (score lower than 5), moderate risk (score 6-11), high risk (score higher than 12); personal accomplishment: low risk (score higher than 40), moderate risk (score 39-34), high risk (score lower than of 33) (16-18). All three subscales show high internal consistency with Cronbach's α coefficient values of 0.837, 0.869, and 0.881 and test-retest reliability was high ($p<0.001$) (17).

The third section concerned the Multidimensional Work Motivation Scale (MWMS) that can be used by managers as a means of assessing employees' work motives (19). As explained in the validation study carried out in three Mediterranean countries - Italy, Greece and Spain - the scale is based on the Theory of Self-determination – SDT (20), a theoretical framework that helps to understand the motivation of an individual within the work environment. The MWMS is characterized by 18 items with 7-point Likert scale (1= Absolutely not for this reason; 2= Very little; 3 =Little; 4 = Moderately; 5 = A lot; 6 = Strongly; 7= Exactly for this reason). The instrument is divided into 4 dimensions that investigate: intrinsic motivation (Dimension 1, 5 items), that involves the implementation of a behavior for the sole pleasure that derives from it or because a sense of satisfaction is derived from it; demotivation (Dimension 2, 3 items) which refers to the total absence of motivation; introjected estrinsic motivation (Dimension 3, 4 items), in which the individual, who has full control of his actions, internalizes all the factors coming from the outside that influence his behavior forcing him not to act and external estrinsic motivation (Dimension 4, 6 items) that implies the fact that the individual is motivated by external elements such as material rewards or punishments and therefore control comes from the outside and no longer from individuals, as in the case of introjected motivation. For the intrinsic motivation (Dimension 1), introjected estrinsic motivation (Dimension 3) and for external estrinsic motivation (Dimension 4) subjects are demotivated with a score range lower than 3.5, neutral with score range from 3.5 to 4.49 and motivated with score range greater than 4.49; on the contrary, for the demotivation subjects are demotivated with a score range greater than 4.49, neutral with score range from 3.5 to 4.49 and motivated with score range lower than 3.

The internal reliability of the scales was estimated via Cronbach's alpha coefficient (19). For Reliability of the MWMS the Cronbach's alphas were calculated for each subscale. The values were .89 (intrinsic motivation), .74 (integrated motivation), .80

(introjected regulation), .81 (social external regulation), .71 (material external regulation), and .75 (amotivation), respectively (19). Overall, the items of the version of MWMS make up a robust measure of employee motivation exhibiting a Cronbach's alpha exceeding the .70 threshold for all the subscales, thus revealing a good internal consistency and reliability of the scale (19).

Statistical Analysis

One-way ANOVA or Student's t test on ranks was used to compare Burnout and Motivation with different demographic and work-related characteristics in an univariate analysis. Between-group comparisons were performed with the chi^2 test (nominal variables) and Student's t test (ratio level variables). Data analysis was performed as a blind test by a colleague not involved in the study and not informed about its aim or about the group of subjects the data belonged to, using the Statistical Package for Social Sciences (SPSS) version 22 (SPSS Inc., Chicago, Illinois, USA). In addition, multivariable linear regression was used to assess the relationship between MBI subscales' scores and the MWMS subscale's scores. A confdence interval (CI) of 95% and a signifcance of $p < .05$ were used.

Ethical considerations

The recruitment of participants started with the researchers obtaining the approval of the study from technical-scientific committee (CTS) and the president of the GiViTi Association. Nurses who showed interest for the study were recruited and asked to sign the informed consent prior to participating in the study and completing the questionnaires. The study questionnaire was introduced to each participant, and for each participant was asked to answer the questions. The study protocol was in line with the Declaration of Helsinki, as revised in 2013, and the Oviedo Convention for the protection of human rights and dignity of the human being with regard to the application of biology and medicine (1996). The nurses belonging to the three different geographical area and ICU settings completed the survey and were offered the possibility to remain anonymous. Data were collected in completely anonymous form. Therefore, the approval of an Ethics Committee was not necessary and the GDPR EU 2016/678 in force in Italy since 2018 does not apply for our study design. However, the study was approved by the Institutional Review Board of each participating center.

Results

We sent the questionnaires to a sample of 574 ICU nurses. A total of 466 (81.2%) responded. Fourteen nurses (2.4%) were excluded because they had managed COVID-patients in the last 12 months (nurses who have worked in other departments in the past 12 months). Fifty-seven nurses (9.9%) excluded for failing to manage COVID-patients during the pandemic (year: 2020-2022). One nurse (0.2%) has not provided consent.

A total of 409 nurses were enrolled and included in our analyses (409/574; 71.2%).

Socio-demographic characteristics of nurses included in the study

Four hundred-nine patients and questionnaires were included in the study. Of these 272 were male (66.5%) (Table 2). The mean age of the participants was 39, married in 50.1% of cases (n= 205), with at least one child in 58.9% of cases (n= 241). The work experience was approximately 13 years, with a specific ICU experience of approximately 11 years. The prevalence of nurses who declared a positive SARS-COV-2 swab during the pandemic was 24.2% (n=99/409). Analyzing the questionnaires, there is a higher response rate among the Intensive

Table 2 - Socio-demographic characteristics of nurses included in the study and Univariate analysis of Burnout and Motivation with different demographic and work-related characteristics (N= 409).

Variable	Results	MBI (Mean, SD)	t/F	p	MWMS (Mean, SD)	t/F	p
Gender, n (%)			0.706	.240[a]		-1.929	.054[a]
Male	272 (66.5)	49.1 + 9.8			66.1 + 14.4		
Female	137 (33.5)	56.3 + 9.8			68.6 + 12.7		
Age, Mean (SD)	39.05 (8.5)						
Age (y), n (%)			2.155	.092[b]		6.216	.0003[b]
< 30	21 (5.1)	44.5 + 7.7			64.8 + 16.3		
30 - 40	265 (64.8)	49.5 + 9.9			65.2 + 14.8		
41-50	71 (17.3)	47.6 + 9.6			68.8 + 11.8		
> 50	52 (12.8)	48.9 + 9.7			73.8 + 8.4		
Marital status, n (%)			0.368	.692[b]		2.504	.082[b]
Unmarried	190 (46.5)	48.7 + 8.6			65.4 + 13.7		
Married	205 (50.1)	49.1 + 10.8			68.6 + 13.5		
Divorced	14 (3.4)	46.9 + 11.4			66.7 + 19.9		
Number of children, n (%)			-0.922	.356[a]		-2.092	.037[a]
> 1	241 (58.9)	49.2 + 10.9			68.2 + 13.8		
None	168 (41.1)	48.3 + 8.1			65.3 + 14.01		
Nurse Experience in Y (range), n (%)			1.134	.339[b]		4.255	.002[b]
<5	26 (6.5)	46.9 + 7.2			65.6 + 14.8		
5-10	154 (37.6)	49.6 + 9.7			64.9 + 14.6		
11-20	158 (38.6)	48.9 + 10.6			66.8 + 14.3		
21-30	50 (12.2)	47.2 + 8.6			73.6 + 9.5		
> 30	21 (5.1)	47.9 + 9.5			70.9 + 8.3		
SARS-COV-2 swab positive during pandemic, n (%)			0.950	.342[a]		-1.691	.106[a]
Yes	99 (24.2)	49.7 + 11.1			65.1 + 15.01		
Not	310 (75.8)	48.6 + 9.4			67.7 + 13.1		

Definition of abbreviation: N= number; SD=standard deviation; y=years; ICU= intensive care unit; MBI= Maslach Burnout Inventory; MWMS= Multidimensional Work Motivation Scale; M= mean; SD= standard deviation.
[a]p-value of indipendent samples t test.
[b]p-value of one way analysis of variance (ANOVA).

Care Units of Northern Italy (42.1%), and a similar rate of responses between the Intensive Care Units of Southern (32%) and Center Italy (25.9%) (Table 2).

Prevalence of Burnout symptoms among ICU nurses

Regarding the total score of the MBI scale, no statistical correlation emerged between the means of the subgroups studied (Table 2). Burnout-related symptoms (medium or high score) for individual domains of the Maslach Burnout Inventory were identified in at least 79% of ICU nurses. Fifty-six (13.7%) were at risk of emotional exhaustion, 135 (33%) of depersonalization, and 252 (61.6%) of reduced personal accomplishment (Table 3). Regarding the medium-high symptoms

Table 3 - Domain's scores in the Maslach Burnout Inventory (N= 409).

Domain	Risk	N (%)	Scores (Mean, SD)
Emotional exhaustion			8.004 + 8.55
	Low	353 (86.3)	
	Medium	47 (11.5)	
	High	9 (2.2)	
Depersonalization			4.67 + 5.003
	Low	274 (67)	
	Medium	56 (13.7)	
	High	79 (19.3)	
Personal accomplishment			36.15 + 8.68
	Low	157 (38.4)	
	Medium	113 (27.6)	
	High	139 (34)	
Severe Burnout	Total	169 (41.3)	

Definition of abbreviation: N= number; SD= standard deviation.

of Burnout for emotional exhaustion (related to the individual domains of the MBI scale) results are significantly observed among nurses who had COVID-19 or positive SARS-COV-2 swab during the pandemic (RR= 1.51; CI= 1.14-2.00, p= .005). Regarding the medium-high symptoms of Burnout for depersonalization results are significantly observed among nurses who had COVID-19 or positive SARS-COV-2 swab during the pandemic (RR= 1.52; CI= 1.16-2.01, p= .005). Regarding the medium-high symptoms of Burnout for personal accomplishment results are significantly observed among nurses who had COVID-19 or positive SARS-COV-2 swab during the pandemic (RR= 1.37; CI= 1.19-1.57, p= .0002).

Severe Burnout

The probability that a nurse has severe Burnout, defined as the presence of at least one high score in the three MBI dimensions or ≥ 2 moderate risk scores, was observed in 169 nurses analysed (41.3%) (Table 3). Symptoms of severe Burnout are significantly observed among nurses who had COVID-19 or positive SARS-COV-2 swab during the pandemic (RR= 1.55; CI= 1.24-1.95, p= .0004) and among nurses with at least one children (RR= 1.37; CI= 1.07-1.76; p= .011). No significant differences emerged correlating Burnout-severe symptoms and gender (p= .442), age range (p= .737), marital status (p= .206), geographic area (p= .688) and work experience (p= .533).

Work motivation among ICU nurses

A significant difference emerged in univariate analysis between scores on the Multidimensional Work Motivation Scale (MWMS) across age ranges, among nurses with at least one child, and in nurse experience (Table 2). The results of the MWMS questionnaire are summarized in Table 4. Motivated nurses for the intrinsic motivation's level have been 281 (68.7%). Intrinsic motivation is significantly present among nurses with at least one children (RR= 1.77; CI= 1.14-2.75; p= .0100). In relation to work experience, the most representative experience range were

Table 4 - Domain's scores in the Multidimensional Work Motivation Scale (MWMS) (N= 409).

Dimension	Risk	N (%)	Scores (Mean, SD)
Intrinsic motivation's level - Dimension 1			5.23 (0.76)
	Demotivated	67 (16.4)	
	Neutral	61 (14.9)	
	Motivated	281 (68.7)	
Demotivation - Dimension 2			1.89 (0.76)
	Demotivated	28 (6.8)	
	Neutral	34 (8.3)	
	Motivated	347 (84.9)	
Introjected estrinsic motivation's level - Dimension 3			3.85 (0.8)
	Demotivated	160 (39.1)	
	Neutral	106 (25.9)	
	Motivated	143 (35)	
External estrinsic motivation's level - Dimension 4			3.3 (0.67)
	Demotivated	204 (49.9)	
	Neutral	143 (35)	
	Motivated	62 (15.1)	

Definition of abbreviation: N= number; SD=standard deviation.

compared (5-10 years vs 11-20 years). The risk of being intrinsically demotivated is significantly greater among younger nurses with 5-10 years of work experience (RR= 2.44; CI= 1.48-4.02; p= .0002). Motivated nurses for the demotivation's level have been 347 (84.9%). Demotivation, second dimension of the MWMS, did not reveal statistical significance for the risk factors studied. Motivated nurses for the introjected estrinsic motivation's level have been 143 (35%). Introjected estrinsic motivation, third dimension of the MWMS, did not reveal statistical significance for the risk factors studied. Motivated nurses for the external estrinsic motivation's level have been 62 (15.1%). External estrinsic motivation, fourth dimension of the MWMS, did not reveal statistical significance for the risk factors studied.

The relationship between Burnout and Work motivation

Mashlack Burnout Inventory-emotional exhaustion was significantly and independently associated with demotivation and introjected estrinsic motivation subscales of Multidimensional Work motivations scale. Increase in MBI-EE was associated with increase in demotivation and introjected estrinsic motivation by 0.72 (0.38, 1.09) and 0.79 (0.41, 1.13), respectively. However, no statistically significant associations were found between MBI-EE and the Work motivations for the intrinsic or external estrinsic motivation subscale (Table 5). Mashlack Burnout Inventory-depersonalization was associated only with demotivation. Increase in MBI-D was associated with increase in demotivation score by 0.35 (0.02, 0.74). Finally, MBI- personal

Table 5 - Adjusted relationship between Burnout domains and work motivation domains.

MBI domains	WM Intrinsic motivation's			WM Demotivation			WM Introjected estrinsic motivation			WM External estrinsic motivation		
	B (95% CI)	SE	p	B (95% CI)	SE	p	B (95% CI)	SE	p	B (95% CI)	SE	p
MBI-EE	-0.25 (-0.66, 0.32)	0.19	0.192	0.72 (0.38, 1.09)	0.19	<.001	0.79 (0.41, 1.13)	0.18	<.001	-0.22 (-0.63, 029)	0.22	0.312
MBI-D	0.003 (-0.35, 0.41)	0.19	0.899	0.35 (0.02, 0.74)	0.18	0.036	-0.22 (-0.59, 0.19)	0.19	0.247	0.002 (-0.42, 0.37)	0.19	0.983
MBI-PA	-0.21 (-0.59, 0.18)	0.19	0.263	0.84 (0.38, 1.14)	0.21	<.001	-0.21 (-0.57, 026)	0.21	0.312	1.12 (0.79, 1.54)	0.21	<.001

Definition of abbreviation: MBI= Mashlack Burnout Inventory; B= regression coefficient; WM= Work Motivation; SE= standard error; CI= confidence interval; EE= emotional exhaustion; D= depersonalization; PA= personal accomplishment.

accomplishment was associated with external estrinsic motivation and demotivation of the Multidimensional Work motivation subscale. Increase in MBI-PA was associated with increase in external estrinsic motivation and demotivation scores by 1.12 (0.79, 1.54) and 0.84 (0.38, 1.14), respectively (Table 5). In addition Severe Burnout symptoms significantly reduces motivation in relation to MWMS dimension-2 (demotivation) (RR= 1.72; CI= 1.30-2.29; p= .0031), and in relation to MWMS dimension-4 (external estrinsimotivation) (RR= 1.44; CI= 1.14-1.83; p= .0021).

Discussion

The present research was aimed to analyze the prevalence of Burnout symptoms, work motivation and their relationships among ICU's nurses after COVID-19 outbreak. Health-care workers are known to be at risk for anxiety, depression, burnout, insomnia, moral distress, and post-traumatic stress disorder (21, 22). The levels of PTSD symptoms and anxiety among nurses were high during the pandemic. A recent study conducted in Italy on a sample of 400 nurses showed a total of 56.8% of all participants had clinical predictors of PTSD, and a total of 50% of respondents reported moderate-to-severe symptoms consistent with anxiety (23). Multivariable analysis showed that moderate-to-severe anxiety being employed in the critical care area and being female were significantly associated with the presence of clinical predictors of PTSD (23).

PTSD and anxiety represent a public health problem that should be addressed in the post-pandemic period.

Under usual working conditions, severe Burnout syndrome affects as many as 33% of critical care nurses and up to 45% of critical care physicians (21, 22). Extrinsic organisational risk factors including increased work demands and

little control over the work environment and the trauma of caring for patients who are critically ill, have been heightened by the COVID-19 pandemic and represent important exacerbating factors and poor mental health among health-care workers (24). Importantly, our findings revealed that Burnout-related symptoms (medium or high score) are present in at least 79% of critical care nurses and severe Burnout was observed in at least 41% nurses analysed, 1 year after the management of COVID-19 patients. A recent study observed a 68% Burnout prevalence among Italian nurses during the pandemic (18). This prevalence was also found in a similar way (69%) among Italian ICU healthcare professionals engaged in the front line of the COVID-19 emergency and 50% about had a moderate-high risk of emotional exhaustion, 55% of depersonalization, and 52% of reduced professional accomplishment (25). A high risk of emotional exhaustion, a moderate risk of depersonalization and a moderate risk for reduced professional accomplishment, were observed mainly among nurses in relation to other professional categories (25). Having tested positive for the SARS-COV-2 swab during the pandemic increases the risk of Burnout relating to all three dimensions of the MBI observed. This results seem to hypothesize how the fear of coronavirus as a mechanism through which personality affects Burnout. This extends our understanding of how people may differ in their responses to an extreme situation such as a pandemic. We argue that the COVID-19 pandemic will have not only activated varying levels of fear among people based on their demographic or social characteristics, but also lead to varying levels of burnout, job satisfaction, and perceived performance. The fear experienced by extraverted individuals may be rooted in the restricted freedom and perceived loss of friends or social environments in which they thrive (26). A recent meta-analysis on nurses' burnout and associated risk factors during the COVID-19 pandemic, revealed that the overall prevalence of emotional exhaustion was 34.1%, the depersonalization was 12.6% and the lack of personal accomplishment was 15.2% (27). It is worrying that the prevalence of emotional exhaustion is 13.7%, the prevalence of depersonalization is 33% and the prevalence of lack of personal accomplishment is 61.6% among Italian ICU nurses, 1 year after the COVID-19 emergency. Recent studies show that the main risk factors that increased nurses' burnout are: younger age, decreased social support, low family and colleagues readiness to cope with COVID-19 outbreak, increased perceived threat of COVID-19, longer working time in quarantine areas, working in a high-risk environment, working in hospitals with inadequate and insufficient material and human resources, increased workload and lower level of specialized training regarding COVID-19 (27, 28). These risk factors are not in line with our results. Symptoms of severe Burnout are significantly observed only among nurses who had COVID-19 or positive SARS-COV-2 swab during the pandemic and among nurses with at least one children. No significant differences emerged correlating Burnout-severe symptoms and gender, age, marital status and work experience. Male/female gender does not appear to be a risk factor for severe Burnout symptoms, in line with a recent study exploring within and between gender differences in Burnout levels in Italian nurses engaged in the COVID-19 health emergency (29). Nurse Burnout is an occupational hazard affecting nurses, patients, society at large and organizations. Traditionally, burnout is viewed as an individual issue but in reality the impact of Burnout is an issue for the whole health system and for care. Nurse Burnout is associated with worsening safety and quality of care, decreased patient satisfaction, and nurses' organizational commitment and productivity (30). Different studies evaluated

a wide range of interventions for Burnout reduction, individual-focused (emotion regulation, self-care workshop, yoga, massage, mindfulness, meditation, stress management skills and communication skills training), structural or organizational (workload or schedule-rotation, stress management training program, group face-to-face delivery, teamwork/transitions, debriefing sessions and a focus group) and combine interventions (stress management and resiliency training, stress management workshop and improving interaction with colleagues through personal training) (31, 32). Interventions aimed at reducing Burnout symptoms can reduce other related negative outcomes such as demotivation which we have seen to increase with the increase in Burnout symptoms (31, 32). Regarding work motivation, our findings reveal that approximately 70% of nurses are motivated to work by intrinsic factors. Regarding the associations between the domains of the Burnout scale and the domains of the Motivation scale, an increase in Burnout with the respective increase in demotivation is statistically significant. Although age did not emerge as a risk factor, demotivation is significantly present among nurses with 5-10 years of work experience compared to nurses with more work experience. High intrinsic motivation to work, understood as the set of positive sensations associated with performing an activity or job well, is observed only among nurses with low scores on the Burnout scale and is therefore associated among nurses with symptoms of Burnout absent or mild. However, the highest Burnout domain scores of both emotional exhaustion and personal accomplishment are associated with an introjected estrinsic motivation or external estrinsic motivation. Therefore it is possible to observe a motivation to work influenced by factors external to the profession, such as for example the reward, or nurses who introject certain objectives while not fully accepting them, thus continuing to perceive an external control (behaviors implemented in order not to feel guilty, to avoid anxiety or to achieve self-esteem enhancement), among nurses with higher Burnout symptoms. Employee retention strategies should be adopted to improve and maintain nurses' motivation. Employee retention is "the ability of an organization to retain its employees within the company" (www.randstad.it). In the health sector, an employee retention strategy is the organizational redesign that must aim to improve nursing motivation through the rotation of tasks, a mechanism that allows the health professional to abandon pedantic procedures to be stimulated to intervene on another series of patients or to perform other procedures that favor a motivational boost; the extension of tasks, which allows the health professional to carry out, in addition to his duties, a wider cycle of operations acquiring greater skills and autonomy; the enrichment of tasks, thanks to the addition of managerial activities (33). It would be interesting to investigate this association with larger samples and to define whether this association and these external factors can compensate for physical and emotional exhaustion. This is important because in a recent meta-analysis on the relationship between professional Burnout and quality and safety in healthcare, Burnout shows consistent negative relationships with perceived quality (including patient satisfaction), quality indicators, and perceptions of safety (34). Though the effects are small to medium, the findings highlight the importance of effective interventions for healthcare providers.

Limitations

Our study has the following severe limitations.

First, the present study was a cross-sectional study and the studied variables were collected as a self-report. Also, due to the focus of this study on COVID-19

frontline healthcare workers, 1 year after COVID-19 outbreak, there is a possibility for bias in the results because there is potential for these risk factors to occur in other healthcare settings that directly and indirectly deal with COVID-19 patients.

Second, we did not measure previous mental health history. This was a conscious decision made to respect Nurses privacy.

Third, we did not have pre-COVID-19 data to compare prior rates of Burnout, stress, anxiety, and work motivation, thus our interpretation of the data is only within the study time frame.

Fourth, it was not possible to correlate Burnout symptoms and nursing motivation with ICU characteristics. For example, it was not possible to determine whether high or moderate symptoms of Burnout are more or less prevalent among ICU nurses who had more ICU stay, deaths or more severe patients in the last year.

Fifth, the criterion "not having managed patients in the last 12 months" could make it quite difficult for nurses to report exactly whether or not they have managed patients accurately, and this exposes the study to recall bias.

Finally, our results concern only to a small sample of italian nurses who work in ICU; we don't know if our study results can be generalized to all italian nurses who work in other units and/or to ICU nurses from other countries.

Conclusion

High level of Burnout symptoms has been observed among Italian ICU nurses after COVID-19 emergency and Burnout is associated with low work motivation.

Although we noted good intrinsic motivation among the nurses surveyed, work motivation is lower among less experienced nurses.

Nurses experiencing Burnout may exhibit a decline in energy, emotional weariness, lack of motivation, and feelings of frustration. As Burnout progresses, it can lead to disengagement, detachment, and decreased work efficacy. Unaddressed, Burnout can lead to more severe symptoms such as self-doubt, despair, and depression.

More research is needed on the impact of Burnout for the quality of assistance and within a team. For example, it is possible that the impact of one team member with Burnout on the total delivery of care would be enough to affect outcomes or it is possible that the Burnout may be subject to a "contagion effect," (35) in which one or a few burned-out team members could negatively impact the whole team.

Despite years of inaction, possible policies to prevent/manage this issue in the future, concern for example new resources to strengthen programs affecting health worker well-being. These resources are supporting increased mental health services, health workforce expansion, more robust public health infrastructure, and well-being education programs for health workers.

Making these changes won't be easy but they are essential and urgent. They require key stakeholders to step up and do their part. The governments can ensure continued focus and accountability to drive coordinated action and by collaborating with local governments and the private sector on a national agenda for health worker well-being. Add worker well-being measures to institutional accreditation standards it is now fundamental and health system leaders must make worker well-being a measurable priority, with accountability at the highest level of the organization, and include health workers in designing and implementing a comprehensive well-being strategy.

Implications for Nursing Practice

This study offers several important practical implications. During a pandemic,

organizations should pay particular attention to individuals high in Burnout and amotivation. Burnout is a complicated problem and should be dealt with by using bundled strategy. Furthermore, while assigning people to work during emergency situations, they should rely on highly conscientious individuals to help better manage and provide help to others. Similarly, organizations should be careful about assigning frontline roles to amotivated individuals without proper support mechanisms in place that may endanger patient safety.

Data availability: The datasets used during the study are avaible upon reasonable request from the corresponding author.
Ethical Approval: Data were collected in completely anonymous form. However, nurses were asked to give informed consent prior to participating in the study and completing the questionnaires. The study protocol was in line with the Declaration of Helsinki, as revised in 2013, and the Oviedo Convention.
Conflict of Interest: The authors declare that they have no conflicts of interest.
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Riassunto

Sintomi di burnout, motivazione al lavoro e loro relazioni tra gli infermieri delle unità di terapia intensiva italiane dopo l'emergenza COVID-19. Uno studio multicentrico

Introduzione. Nonostante la fine dell'emergenza sanitaria, gli operatori sanitari sono a rischio di sviluppare problemi di salute mentale a lungo termine. Lo scopo di questo studio era osservare i sintomi di burnout e la motivazione al lavoro tra gli infermieri di terapia intensiva, un anno dopo il ricovero nell'unità di terapia intensiva degli ultimi pazienti positivi con tampone SARS-CoV-2.

Disegno dello studio. È stato condotto un disegno di studio trasversale multicentrico ed è stata condotta un'indagine nazionale sul web tra aprile 2023 e maggio 2023 tra 21 unità di terapia intensiva italiane.

Metodi. L'indagine consisteva in domande a scelta singola e multipla strutturate in 3 sezioni: dati demografici del campione, Maslach Burnout Inventory Scale per la valutazione dei sintomi di burnout e Multidimensional Work Motivation Scale per la valutazione della motivazione al lavoro.

Risultati. Quattrocentonove intervistati e questionari sono stati inclusi nello studio. Di questi 272 erano maschi (66,5%). I sintomi correlati al burnout sono stati identificati in almeno il 79% degli infermieri di terapia intensiva. I sintomi di grave Burnout sono stati osservati in 169 infermieri analizzati (41,3%) e questi sono statisticamente significativi tra gli infermieri che hanno avuto COVID-19 o tampone SARS-COV-2 positivo durante la pandemia (RR = 1,55; CI= 1.24-1.95, p= .0004) e tra gli infermieri con almeno un figlio (RR= 1.37; CI= 1,07-1,76; p= .011). Gli infermieri motivati per il livello di motivazione intrinseca sono stati 281 (68,7%). Il rischio di essere intrinsecamente demotivati è significativamente maggiore tra gli infermieri con 5-10 anni di esperienza lavorativa (RR= 2,44; CI= 1,48-4,02; p= .0002). L'esaurimento emotivo è stato associato ad un aumento della demotivazione e della motivazione estrinseca introiettata. La depersonalizzazione era associata alla demotivazione. La realizzazione personale è stata associata ad un aumento della motivazione estrinseca esterna e dell'amotivazione.

Conclusioni. Un alto livello di Burnout è stato osservato tra gli infermieri italiani di terapia intensiva associato ad una bassa motivazione al lavoro dopo l'emergenza COVID-19. Dovrebbero essere adottati interventi e strategie per prevenire il burnout e migliorare la motivazione al lavoro.

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Authors' contributions

All authors contributed equally to the manuscript and read and approved the final version of the manuscript. In particular, VM**:** First author, principal investigator and project manager; MM: Direct participation in the writing and revision of the article; CM: Direct participation in the writing and revision of the article; VD: Writing study protocol and writing results section and tables.