Observational study

Occupational health and psychological wellbeing in first line nurses during health crisis periods: reliability study of the SOIC tool

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Abstract

Background. In 2020, the emergence of the new Coronavirus has put health professionals under enormous pressure, as they had to work in difficult and often disadvantaged situations. Prevention of symptoms such as stress, anxiety and burnout therefore become important health management goals.

Aim. The aim of this pilot cross-sectional study was to assess the reliability and feasibility of a tool on Occupational Health Nurses after a Pandemic Period such as the COVID-19 pandemic (Salute Occupazionale negli Infermieri in Periodo Pandemico Covid19 - SOIC) that aims to assess the occupational health and psychological wellbeing of nurses during periods of health crisis.

Methods. This study was conducted from September to November 2022. The SOIC tool is composed by two preliminary sections and a third part including five validated questionnaires (measuring burnout, work engagement, psychological symptoms, resilience, and mindful awareness). An opportunistic sample of 202 nurses working in a Teaching Hospital of Rome and members of NurSind union were invited to participate: of these, 24 nurses completed the SOIC in two subsequent occasions (T1 and T2).

Results. The test-retest assessment showed no differences between the two waves (T1 and T2) in terms of median scores for all questionnaires included in the SOIC tool. The Cronbach alphas, considering all items of each questionnaire included in the SOIC tool, showed good or excellent internal consistencies.

Conclusion. The test-retest assessments and the reliability analyses encouraged the usability of the SOIC tool. Furthermore, consistent associations between the five questionnaires were obtained. *Clin Ter 2024; 175 (1):34-41 doi: 10.7417/CT.2024.5031*

Keywords: *burnout, health crisis, nurses, occupational health, psychological wellbeing*

Introduction

Occupational health is defined by the Cambridge English Dictionary as the study or activity of trying to prevent people becoming ill because of their job. In Italy, since the issuing of Law 81/08, the term 'occupational health' refers to the specific branch of medicine that deals with the prevention, diagnosis and treatment of diseases caused by work activities. Through preventive and periodic health surveillance, the Competent Doctor (or the Occupational Physician) carries out specific visits at the end of which he issues a judgement of job suitability. Considering the regulatory compliance, over the years, an increasing attention has been paid not only to workers' health, with all the risks related to the specific function, but also and especially to mental health and psychological well-being.

In 2020, the emergence of the new Coronavirus, the severe acute respiratory syndrome also known as Sarscov-2, that caused coronavirus disease 2019 (Covid-19), wreak havoc on international medical systems. Worldwide, more than 685,740,983 confirmed cases and 6,842,948 deaths have been reported, with the count increasing day by day (1). This has put health professionals under enormous pressure as they had to work in difficult and often disadvantaged situations and had to face multiple problems, such as long working hours, lack of adequate personal protective equipment (PPE), lack of medicines and specific protocols, separation from family. According to previous studies, during outbreaks of Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), first-line medical personnel reported high levels of stress that resulted in posttraumatic stress disorder (PTSD) (2–5). In fact, it has been found that many health professionals considered resigning, because they were often faced with the social stigma of assisting patients infected with SARSCOV-2 and thus being considered potential vectors of disease transmission (6); they also feared the spread of the virus to family and friends, in their places of socialization, resulting in high levels of stress, depression and anxiety symptoms (7).

In March 2020, Italy faced the most critical phase of the pandemic, with the transmission of the virus spreading throughout the country. Healthcare professionals experienced during this period a fight like never before. Due to direct exposure, healthcare personnel were found to be particularly vulnerable to negative psychological consequences, with

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increased levels of depression, anxiety, psychological distress and sleep problems (8,9). General concerns about the impact of the pandemic on first-line nurses have therefore gradually emerged, leading to the establishment of specific aid and support interventions, such as the creation of psychological assistance services through telephone sessions, via the Internet and through applications. Prevention of symptoms such as stress or anxiety and protection from PTSD and burnout syndrome have become important health management goals, for improving both the quality of the services offered to patients and the organizational well-being of employees (10).

Considering this background, the aim of the present project was to assess the reliability and feasibility of a tool focused on the evaluation of occupational health and psychological wellbeing in nursing personnel post periods of health crisis, such as the case of SARS–COV2 pandemic (Project: Salute occupazionale Infermieri e Covid – SOIC). A subsidiary aim was to evaluate the associations between resilience, mindful awareness, burnout, psychological symptoms, and work engagement in a late phase of the COVID-19 pandemic. Previous studies showed that dispositional mindfulness and resilience might provide protective buffering against psychological distress in healthcare professionals (11,12). We thereby expected to replicate these findings.

Materials and methods

This is a cross-sectional study of measurement reliability. The Bland Altman approach was considered (13).

Participants

An opportunistic sample of nurses working in the medicine and surgery units of a Teaching hospitals of Rome (Italy), were contacted for this reliability study in the period between September and November 2022. The elegibility criteria chosen: age (20-70 years); nursing degree or equivalent degree; having a part-time or full-time employment contract; members in the labor union NurSind at the time of the study.

The sample size was defined using pilot study sample size formula (14). The confidence (fill in how certain you want to be that you will detect any existing problem) was set at 0.95. The prevalence of bournout was used as outcome probability (a problem should be in order to be important enough for you to want to detect it) and it was set at 0.10 according to the world recent literature (15–18). The sample size was set at N=29.

Instruments

The SOIC tool was composed by four sections. The first section considered the following sociodemographic characteristics: gender, age, marital status, highest level of education completed, and number of children. The second section assessed several work characteristics, including the type of employment contract, the assigned ward/unit, the continuity of the employment into a specific ward, time

spent per day to travel to work, seniority (the number of years of work as nurse), the amounts of extra hours worked per month.

Concering the exposures to the working health crisis period it was asked the total number of months of work at direct contact with COVID19 patients from March 2020 to June 2022[1] and if the work period was continuous or intermittent.

Finally, the fourth part of the SOIC included five validated questionnaires on actually health status:

– the Italian version of the Maslach Burnout Invetory (MBI) ((19,20): this is a psychological instrument comprising 22 symptom items, aimed at assessing occupational burnout. All MBI items are scored using a 7-point Likert scale from never to everyday. The MBI has three component scales: emotional exhaustion score (EE) included nine items with a score range of 0–54 (9 items), depersonalization (DP) with a score range of 0–30 points (5 items) and personal achievement evaluation (PA) with a score range of 0–48 points (8 items).

– The Italian version of the Utrecht Work Engagement Scale (UWES), which measures work engagement, defined as the enthusiasm and vigour people feel about their work. It includes 17 items with 7-point Likert scales (0=never, 1=very rarely, 2=rarely, 3=sometimes, 4=frequently, 5=very frequently, 6=everyday) (21,22). It investigates three aspects of the work engagement construct: Vigour (VI), Dedication (DED), and Absorption (AB).

– The Italian version of the Depression Anxiety Stress Scale (DASS-21) (23,24). This is a self-report tool containing 21 items that assess three constructs: depression (DEP), anxiety (AX), and stress (ST). Each item is scored on a 4-point Likert scale (never, sometimes, often, almost always) (23).

– The Italian version of the 14-item Resilience Scale (RS-14). This questionnaire includes 14 items measuring five dimensions of resilience: namely, purpose (PU), perseverance (PE), self-reliance (SR), equanimity (EQ), and authenticity (AU) (25). Each item uses a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Total scores range from 14–98, with ≤64 considered low levels of resilience.

– the Italian version of the Mindful Awareness Attention Scale (MAAS) (26). This is a 15-item scale designed to assess a core characteristic of mindfulness, namely, a receptive state of mind in which attention, informed by a sensitive awareness of what is occurring in the present, simply observes what is taking place. To score the scale it computed a mean of the 15 items.

A last open item was added at the end of the SOIC tool to allow participants to report critical issues.

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[1]The period of the COVID-19 emergency in Italy came from March 2020 to March 2022: two additional months were added in order to consider the fact that some Units still worked in the post-pandemic period.

Procedure

The online questionnaire was self-administered in an anonymous way through a google-form link. The nurses who accepted to participate were introduced to the general procedure and informed that the survey was anonymous, voluntary, and performed for the purpose of a larger research project. They were free to withdraw from the study at any time. After signing an informed consent, the nurses were invited to fill the questionnaire twice; completing the questionnaires took an average of 20 minutes.

The analysis of reliability was made possible by the repeated administration of the SOIC at a mean distance of 13 days (SD=2.1 days). A personalised code was sent by email to each participant. At the beginning of the questionnaire the code was asked as input to complete the survey. A brief introduction that explained the aim of the project was reported at the beginning of the survey. As stated above, for each participant two identical administrations were planned: the first administration was called T1 and the second one T2. The number of absences was registered in both waves.

Ethical considerations

This study was approved by Ethical Committee of Sapienza University of Rome 23/09/2022 protocol 0635/2022, and Ethical Commitee of INMI Spallanzani Hospital n. 87/2022.

The study was conducted in conformity with the Declaration of Helsinki World Medical Association (28). The Italian legislation currently regulates only observational studies on medicinal products, leaving the conduction of other observational studies without a normative reference (29). The data collected have been processed in accordance with GDPR 2016/679.

Statistical analysis

The IBM SPSS 27 software (SPSS Inc., Chicago, IL, USA) was used to analyse the data. Descriptive characteristics were summarized in terms of means, standard deviations (SD) and percentages. The analysis of reliability was performed using different approaches:
a) by computing repeated-measures tests (non-parametric tests for two-paired samples), which assess the difference or stability of the mean values of scales/dimensions over time (T1 versus T2);
b) by quantifying test-retest reliability using Spearman's correlations between the scores on the first and the second testing;
c) by computing Cronbach's Alpha coefficients (α): according to Nunnaly et al. (1967), scores between 0.6 and 0.7 indicate questionable consistency, between 0.7 and 0.8 indicate acceptable consistency, between 0.8 and 0.9 indicate good consistency, and higher than 0.9 indicate excellent consistency.

The level of significance was set at $p < 0.05$ for all analyses.

Results

Nurses NurSind members in the Teaching Hospital were invited to participate in the pilot study; a total of 202 e-mails were sent. A subset of 24 nurses completed both administrations (T1 and T2). Therefore, the present study considered this sample for the reliability analysis (Figure1). The non-responders at T1 (N=151) and the non-responders at T2 (N=27) did not differ in terms of gender, when compared with the sample that completed the follow-up (p > 0.05).

Table 1 illustrates the main demographic and work characteristics of the sample. About 71% of the participants were females and the mean age was 44.5 years old (SD=10.7). 83% had at least one child. All participants had a permanent work contract. About 75% (N=18) of our nurses worked with hospitalized COVID-19 patients from March 2020 until June 2022: of those, 39% worked continuously at contact with COVID-19 patients and the mean time spent within this context was about 10 months (SD=11).

Concerning reliability, the test-retest assessment showed no differences between the two waves (T1 and T2) in terms of median scores for all questionnaires included in the SOIC tool (p>0.20), except for the Depersonalization subscale of the MBI, which showed a slight increase at T2 ($p = 0.01$).

Spearman's correlation coefficients between the T1 and T2 scores are shown in Table 2. The dimensions of UWES and DASS reported significant proportional correlations, with a good level of linearity: all *r* coefficients were ≥0.8. The MAAS scores reported a good linear correlation between T1 and T2: $r = 0.79$. The correlations for the RS dimensions were significant and the coefficients ranged from 0.57 to 0.81 ($p<0.005$). Lastly, the three MBI subscales were correlated at significant levels between the two waives, with Spearman's coefficients ranging from 0.58 to 0.83.

The Cronbach alphas, considering all items of each questionnaire included in the SOIC tool, showed good or excellent internal consistencies. In fact, the alpha scores ranged from 0.77 to 0.96 at T1, and from 0.80 to 0.97 at T2 (Table 3). Further analyses considering the subscales of the five questionnaires confirmed this conclusion, except for the Depersonalization (T1 and T2) and Personal Accomplishment (T1) subscales of the MBI and the Perseverance subscale (T1) of the RS-14, for which alpha scores were questionable (i.e., α<0.70).

Lastly, Table 4 shows the correlations between the different scales involved in the SOIC tool at T1 ($N = 51$). Several interesting findings emerged. First, high positive correlations were found between the subscales of the two questionnaires (MBI and DASS) measuring stress conditions. Specifically, the Emotional Exhaustion and Depersonalization subscales of the MBI were positively correlated with all subscales of the DASS (all $p < 0.05$); in contrast, the Personal Accomplishment subscale of the MBI was negatively associated with the depression, anxiety, and stress subscales of the DASS.

Thus, participants reporting high levels of burnout and low levels of personal accomplishment were also more likely to be psychologically distressed. Second, most of the UWES dimensions were negatively associated with the Emotional Exhaustion and Depersonalization subscales of the MBI, as well as with the DASS subscales, suggesting that participants being more positively engaged with their work were less li-
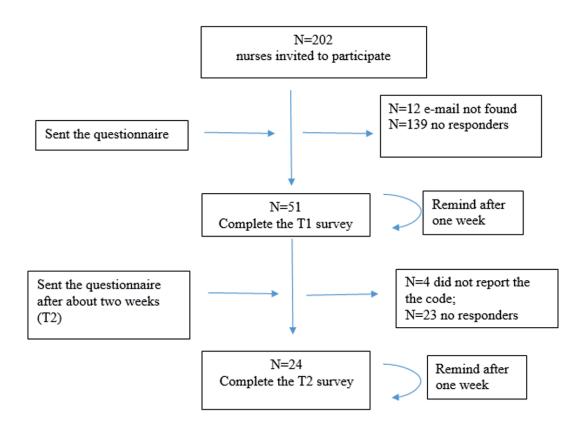
Fig.1. Flow-chart of the participation to the study

Table 1. Sociodemographic variables and work characteristics of the sample (N=24)

Qualitative variables		N	%
Gender	Male	7	29
	Female	17	71
2. Do you have children?	no	4	17
	yes	20	83
3.What is the highest degree of education you have completed?	degree	10	42
	more	14	58
4. Do you use any drugs? (antidepressant; anxiolytic; etc.)	no	18	75
	yes	6	25
5.Were you a nurse who worked with hospitalised patients with COVID-19 patients from March 2020 until June 2022?	no	6	25
	yes	18	75
6.*During this period you have been dedicated to the care of COVID-19 patients…	alternately	11	61
	continuously	7	39
7. Did you work in the same Unit in the period between March 2020 and June 2022?	no	6	33
	yes	12	67
8. Did you get COVID-19?	no	7	29
	yes	17	71
Quantitative variables		M (SD)	Mn (IQR)
9.*Total working time spent with COVID-19 patients (n. months)		11(10)	8(10)
10. Time spent going from home to job (n. minutes)		43(24)	40(30)
11. Mean number of hours worked per month		9.8(7)	10(13)

*Items who were answered only by nurses who worked with hospitalised patients with COVID-19. Mn: median; M: mean; SD: Standard Deviation; IQR: interquartile range.

Table 2. Spearman's correlations between T1 and T2 scores for the five questionnaires included in the SOIC tool.

Questionnaires	Spearman coefficients (T1 versus T2)	p
MAAS	0.797	<0.001
MBI DP	0.664	<0.001
MBI PA	0.589	0.002
MBI EE	0.828	<0.001
RS EQ	0.720	<0.001
RS PE	0.572	0.003
RS AU	0.759	<0.001
RS PU	0.679	<0.001
RS SR	0.807	<0.001
UWES VI	0.842	<0.001
UWES DED	0.860	<0.001
UWES AB	0.837	<0.001
DASS AX	0.806	<0.001
DASS ST	0.878	<0.001
DASS DEP	0.862	<0.001

bold: $p < 0.005$; DP: depersonalization; PA: personal achievement; EE: emotional exhaustion; EQ: equanimity; PE: perseverance; AU: authenticity; PU: purpose; SR: self-reliance; VI: vigor; AB: absorption; DED: dedication; AX: anxiety; ST: stress; DEP: depression.

Table 3. Cronbach's alpha coefficients considering all items and the subscales of the five questionnaires included in the SOIC tool

Questionnaire	sub-scales (N. items)	Alpha T1	Alpha T2
MAAS	(15)	0.886	0.948
MBI	(22)	0.766	0.802
MBI subscales	EE (8)	0.935	0.959
	DP (5)	0.695	0.661
	PA (7)	0.666	0.850
RS	(14)	0.963	0.968
RS subscales	PU (3)	0.913	0.911
	PE (2)	0.690	0.915
	SR (5)	0.870	0.894
	EQ (2)	0.837	0.666
	AU (2)	0.895	0.869
UWES	(17)	0.946	0.955
UWES subscales	VI (6)	0.883	0.856
	DED (5)	0.917	0.963
	AB (6)	0.787	0.874
DASS	(21)	0.957	0.959
DASS subscales	DEP (7)	0.903	0.926
	AX (7)	0.836	0.908
	ST (7)	0.924	0.915

EE: emotional exhaustion; DE: depersonalization; PA: personal achievement; PU: purpose; PE: perseverance; SR: self-reliance; EQ: equanimity; AU: authenticity; VI: vigor; DED: dedication; AB: absorption; DEP: depression; AX: anxiety; ST: stress.

kely to report burnout and negative psychological symptoms. Third, scores in the MAAS and RS-14 questionnaires were negatively associated with the Emotional Exhaustion and Depersonalization subscales of the MBI and the depression, anxiety, and stress subscales of the DASS, but positively associated with the Personal Accomplishment subscale of the MBI and the UWES subscales. Thus, mindfulness and resilience emerged as protective factors against psychological distress. Fourth, the MAAS scores were positively correlated with all five dimensions of the RS-14 questionnaire, suggesting that these positive characteristics were closely connected to each other.

Discussion

In summary, the present study suggests that the SOIC tool is useful for assessing psychological wellbeing in healthcare professionals in critical period such as the COVID-19 health emergency period, because it covers five important domains identified from the literature and by experts in the area - namely, occupational burnout, anxiety, stress, mindful awareness, work engagement and resilience (15,30,31).

The results confirm that, with few exceptions, the SOIC tool is composed by questionnaires that are reliable and have good internal consistencies, as indicated by acceptable-to-excellent Cronbach's alphas and significant Spearman's correlations. Furthermore, scores in the five questionnaires were reasonably stable between T1 and T2: in fact, only one subscale, the RT-equanimity, showed a slight temporal increase at the second assessment.

Interestingly, despite the relatively low sample size, the associations between the five questionnaires were significant and in the expected directions. Specifically, measures of burnout and psychological distress were positively correlated with each other, but negatively correlated with work engagement, resilience, and mindful awareness scores. Besides replicating the results already available in literature, these findings highlight the importance of assessing these constructs in healthcare professionals and suggest that early interventions aimed at increasing their resilience and mindfulness abilities might prevent the occurrence of negative health outcomes.

Table 4. Spearman's correlations (r) between the five questionnaires at T1 (N=51).

Scales		DASS DEP	DASS AX	DASS ST	UWES VI	UWES DED	UWES AB	RS SR	RS PU	RS EQ	RS PE	RS AU	MBI EE	MBI DP	MBI PA
DASS AX	r	0.746													
	p	<0.001													
DASS ST	r	0.800	0.717												
	p	<0.001	<0.001												
UWES VI	r	-0.365	-0.215	0.371											
	p	0.009	0.134	0.008											
UWES DE	r	-0.444	-0.287	0.409	0.866										
	p	0.001	0.043	0.003	<0.001										
UWES AB	r	-0.193	-0.073	0.198	0.767	0.776									
	p	0.179	0.616	0.168	<0.001	<0.001									
RS SR	r	-0.568	-0.413	-0.472	0.510	0.507	0.355								
	p	<0.001	0.003	0.001	<0.001	<0.001	0.012								
RS PU	r	-0.649	-0.430	-0.502	0.342	0.394	0.196	0.791							
	p	<0.001	0.002	<0.001	0.015	0.005	0.173	<0.001							
RS EQ	r	-0.604	-0.381	-0.554	0.500	0.495	0.298	0.739	0.807						
	p	<0.001	0.006	<0.001	<0.001	<0.001	0.036	<0.001	<0.001						
RS PE	r	-0.452	-0.343	-0.372	0.515	0.397	0.344	0.758	0.652	0.642					
	p	0.001	0.015	0.008	<0.001	0.004	0.014	<0.001	<0.001	<0.001					
RS AU	r	-0.520	-0.387	-0.397	0.403	0.286	0.153	0.813	0.830	0.776	0.695				
	p	<0.001	0.005	0.004	0.004	0.044	0.288	<0.001	<0.001	<0.001	<0.001				
MBI EE	r	0.722	0.604	0.699	-0.468	-0.481	-0.277	-0.465	-0.505	-0.500	-0.436	-0.475			
	p	<0.001	<0.001	<0.001	0.001	<0.001	0.051	0.001	<0.001	<0.001	0.002	<0.001			
MBI DP	r	0.379	0.313	0.321	-0.576	-0.561	-0.539	-0.430	-0.305	-0.393	-0.400	-0.337	0.475		
	p	0.007	0.027	0.023	<0.001	<0.001	<0.001	0.002	0.031	0.005	0.004	0.017	<0.001		
MBI PA	r	-0.540	-0.418	-0.447	0.535	00.457	0.457	0.657	0.556	0.593	0.674	0.616	-0.409	-0.362	
	p	<0.001	0.003	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.010	
MAAS	r	-0.735	-0.618	-0.682	0.568	0.606	0.457	0.670	0.634	0.597	0.628	0.523	-0.680	-0.539	0.655
	p	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Bold: *p* < 0.005; EE: emotional exhaustion; DE: depersonalization; PA: personal achievement; DEP: depression; AX: anxiety; ST: stress; VI: vigor; AB: absorption; DED: dedication; EQ: equanimity; PE: perseverance; AU: authenticity; PU: purpose; SR: self-reliance.

Finally, the time to fill in the SOIC tool is feasible (about 20 minutes). The responders did not report criticisms and all items resulted clear and simple.

Health emergencies, such as Covid-19 pandemic, have long-term negative effects on well-being of nurses: the SOIC instrument can be used in the post-pandemic period to assess the occupational health of nurses. The generalisability and the applicability of this tool is demonstrated by the results of the study, that show how this can be used in a large sample.

Limits

The present validation study has several limitations. First, the sample was opportunistic, and the reliability analysis could be influenced by the fact that nurses involved are nurses members in the labor union NurSind.

Furthermore, the sample size was not very large: according to Viechtbauer et al. (14) the sample size for pilot study was N=29 with five more units in comparison with the sample size of the present study (N=24) . The use of the code to link the questionnaires at T1 and T2 could be reduce the participation to the study: 4 nurses, for example, not reported the code in the questionnaire at T2 and the pairing was not been possible. However, the primary aim of the present study was to explore the reliability and feasibility of the SOIC tool in the nursing population in order to administer it in a larger sample.

Conclusions

Health emergencies such as the Covid-19 pandemic have long-term negative effects on the occupational health and psychological well-being of nurses; the feasibility emerged in this pilot study of the SOIC tool encourage its usability to measure a combination of information related to the occupational health and psychological wellbeing of nurses during health emergency period. The main aspects are the good reliability of the instruments and the concordance in the repeated administrations, which support the robustness and the stability of the SOIC tool.

The next step is to consider the feasibility and usability of the SOIC tool application in a larger sample in order to have more confident results.

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