The interplay between acute post-traumatic stress, depressive and anxiety symptoms among healthcare workers functioning during the COVID-19 emergency: a multicenter study comparing regions with increasing pandemic incidence

1. Introduction

Increasing evidence suggests healthcare workers (HCWs) working in emergency situations are frequently exposed to potentially traumatic events, which can influence general well being and lead to Posttraumatic stress disorder (PTSD), anxiety and depression (Berger et al., 2012; Garbern et al., 2016; Hruska and Barduhn, 2020). Studies on HCWs involved in a health emergency, such as the outbreak of an infectious disease, reported that about one in six might develop significant psychiatric symptoms. In such situations, HCWs may fear contagion and be concerned about the health of their families and colleagues, besides working in strained settings with recurrent surge conditions, experiencing fatigue and being at high risk of burnout (Lu et al., 2006; Shultz, 2017).

The Coronavirus Disease 2019 (COVID-19) outbreak has highlighted the importance of paying attention to the mental health of first-line HCWs, particularly when preparing for the possibility of several waves of the pandemic (Salehi et al., 2021). The COVID-19 pandemic represented a stressful event, beyond everyone's expectation, with important traumatic characteristics for HCWs as: rapidly increased flow of critical patients forcing physicians to make extremely difficult decision tainted with pervasive helplessness; clinical presentation characterized by severe distress, rapidly worsening dyspnea with insidious and unpredictable course, requiring constant medical updating with worldwide emerging multiple clinical manifestations and treatment of the COVID-19 infection increasing distress at the time of patient's death; constant need for complete isolation during patient care, both for the patient and the providers, given the extremely high contamination risk, and the shortage of protective personal equipment that lead to fear, anger, and resentment against the authorities (Carmassi et al., 2020a; Chen et al., 2020; Kang et al., 2020). In this framework, increasing evidence showed a relevant impact of

the COVID-19 pandemic on HCWs' mental health (Salazar de Pablo et al., 2020). HCWs deployed to the front line during the first wave of the current pandemic have been found at higher risk for developing psychological distress and mental health disorders including full blown PTSD, and post-traumatic stress symptoms (PTSS), with higher rates among females and nurses (Buselli et al., 2020; Huang et al., 2020; Kang et al., 2020; Lai et al., 2020; Xiong et al., 2020; Carmassi et al., 2021a). On a sample of 1,257 hospital physicians and nurses caring for COVID-19 patients, 71.5% reported mild to severe PTSS (Lai et al., 2020). Moreover, Lai et al. (2020) reported more severe anxiety, depressive symptoms and PTSS in frontline HCWs reported with respect to second line HCWs in Wuhan, Hubei (China). Conversely, higher levels of PTSS have been reported in non-front-line nurses compared to front-line nurses. The higher psychological resilience of frontline nurses was suggested to be related to the voluntary selection, the sufficient psychological preparation provided and the greater working experience (Li et al., 2020).

Clinically significant anxiety symptoms were also reported in 12.5% of 512 medical staff members in China; furthermore, the medical staff who reported a direct contact with infected patients and, particularly, the medical staff from the Hubei province, the first affected in China, experienced higher anxiety scores with respect to those from other parts of China, yet suggesting the role of working in the "epicenter" of the outbreak as a proximity risk factor for developing distress symptoms (Liu et al., 2020). Consistently, COVID-19 studies showed the frontline medical staff were more likely to suffer from psychiatric symptoms than the general population (Zhou et al., 2020; Sun et al., 2021), with high levels of depression, anxiety, stress and inadequate sleeping (Arafa et al., 2020).

The COVID-19 pandemic is a rapidly and continuously evolving situation that is challenging the world's sanitary systems. Italy was recognized to be the first European country to face the COVID-19 outbreak, and to put into practice measures of social distancing, home quarantine and lockdown. Italy faced an unprecedented need to reconvert many elective clinical activities into Emergency Departments (EDs) and Intensive Care Units (ICUs) medical practice (Italian Ministry of Health, 2020). The first Italian clinical case of COVID19 was identified in Codogno (Lodi, Lombardy, Northern Italy), on February 18th 2020. In the following days, the number of cases started to rise, not only in the Lombardy region but also in other Italian regions, although in the first "wave" of the Italian pandemic Lombardy was the most affected region, while Central and Southern Italian regions were affected to a lesser extent, mainly following a decreasing gradient, moving away from the original Italian "epicenter" (Carmassi et al 2020a; 2021a). By June 24th2020—the time of recruitment of our study sample—, Italy had registered 239,410 total confirmed cases of COVID-19 and 34,644 deceased with a high level of exposure region (Lombardy) accounting for 39% of confirmed cases a medium level of exposure region (Emilia-Romagna) for 11.8%, and a low level of exposure region for 4.3% (Tuscany) (Italian Ministry of Health, 2020).

The impact of the pandemic on HCWs may produce enduring effects on their mental health, and some authors also hypothesized as a possible consequence the increase in 2020 suicide rates (Goyal et al., 2020), however, studies on the mental health burden of HCWs who faced and are still facing the COVID-19 outbreak are still scant. There is a critical need to better understand mental health problems in HCWs in order to plan effective strategies and enhance psychological resilience in this at-risk population.

The primary aim of the present study was to investigate PTSS, anxiety and depressive

symptoms in a sample of HCWs facing the ongoing COVID-19 pandemic in five major University hospitals from three of the most affected Italian regions exposed at increasing gradient of pandemic impact (namely, Lombardy>Emilia Romagna>Tuscany). Particular attention was devoted to possible gender, age, working environment and occupational differences, focusing on traumatic exposure related to the management of the current COVID-19 emergency. The second aim of the study was to explore the possible effects of PTSS, anxiety and depressive symptoms on the impairment of work and social functioning in such population, with particular attention to acknowledged risk factors for work related stress in HCWs, such as socio-demographic, occupational, working environment characteristics and gradient of pandemic impact, in order to identify variables most closely associated with a higher impairment.

2. Methods

2.1 Sample recruitment and assessment

The study sample included 514 HCWs consecutively recruited from April 2020 to June 2020 in EDs (329, 64.2%), ICUs (129, 25.1%) and Medical/Surgical Units (55, 10.7%), during the acute phase of the Italian COVID-19 outbreak. HCWs were recruited in the framework of a multicenter national study including five major University hospital from three of the most affected regions in Italy. Subjects were recruited in the major hospitals of five different towns located in three regions at different severity of the outbreak: Pisa (the national coordinating center; 265, 51.6%) and Siena (34, 6.6%), in a low level of exposure region (Tuscany, 299, 58.2%); Bologna (31, 6%) and Ferrara (89, 17.3%), in medium level of exposure region (Emilia-Romagna, 120, 23.3%); and Codogno (Lodi) (95, 18.5%) in a high level of exposure region (Lombardy, 95, 18.5%). The personnel

had been informed of the study by their department head and subjects who voluntarily agreed to participate were included. The psychiatric evaluation was performed by psychiatrist or trained residents, by using some psychometric questionnaires, as reported below in details. The evaluation time took about one hour for each participant. All subjects enrolled agreed to participate to the present study in a free form, having the possibility to complete evaluations in their own time.

The total study sample involved 222 males (43.2%) and 292 females (56.8%). The sample showed the following age groups: 46 (8.9%) in the 18-25 years group, 165 (32.1%) in the 26-35 years group, 118 (23.0) in the 36-45 years group, 128 (24.9) in the 46-55 years group and 57 (11.1%) in the 56-65 years group; 211 (41%) HCWs were aged equal or less than 35 years old (the median age), while 303 (59%) were aged more than 35 years old. We divided the HCWs by professional role into physicians (183, 35.6%), nurses (251, 48.8%), and other HCWs (80, 15.6%), including administrative personnel, health and social care workers and all other hospital staff members.

All participants were clearly informed about the study and had the opportunity to ask questions before providing a written informed consent. The study was conducted in accordance with the Declaration of Helsinki and the Ethics Committee of the Azienda Ospedaliero-Universitaria of Pisa (CEAVNO) approved all recruitment and assessment procedures (ID: 17151/2020).

Psychiatric assessments included the following questionnaires: the Impact of Event Scale-Revised (IES-R), to investigate the acute post-traumatic stress symptoms (Weiss & Marmar, 1997), the Generalized Anxiety Disorder 7-item (GAD-7, Spitzer et al., 2006), to investigate the presence of anxiety symptoms , the Patient Health Questionnaire 9-item (PHQ-9, Spitzer et al., 1999; Kroenke et al., 2001), to detect the

presence of depressive symptoms and the Work and Social Adjustment Scale (WSAS, Mundt et al., 2002), to examine the global impairment of functioning related to mental health burden.

The 22-item Impact of Event Scale-Revised (IES-R, Weiss & Marmar, 1997; Weiss, 2004) was developed to assess probable PTSD by covering three symptoms clusters (intrusion, avoidance, and hyperarousal) and showed high internal consistency (Creamer et al., 2003). This questionnaire is one of the most commonly used scales to screen rescue workers for mental health problems (Cetin et al., 2005; Matsuoka et al., 2012; Chung et al., 2015). The IES-R items are rated on a 5-point rating scale and individuals with a score equal or above 33 have a severe PTSS. Particularly, subjects were asked to refer to their worst traumatic experience related to the work as first line emergency personnel during the COVID-19 pandemic.

The Generalised Anxiety Disorder Assessment, 7-item version (GAD-7, Spitzer et al., 2006) is part of the Patient Health Questionnaire (PHQ), a widely established screening instrument for common mental disorders (Mazzotti et al., 2003). GAD-7 was shown to be a reliable and valid instrument with good test-retest reliability and high internal consistency. GAD-7 consists of seven items and is commonly used to screen for general anxiety disorders based on criteria from the DSM-IV-TR. The patient is asked to self-report how often he/she had been bothered by seven common anxiety disorder symptoms during the last two weeks. For each item, scores of 0, 1, 2 and 3 must be given. Scores of 0–4, 5–9, 10–14, and 15–21 indicate minimal, mild, moderate and severe anxiety symptoms, respectively (Kroenke et al., 2010; Beard & Björgvinsson, 2014).

Patient Health Questionnaire, 9-item version (PHQ-9, Spitzer et al., 1999; Kroenke et al., 2001) is used to assess the main criteria of major depression according to the DSM-IV and has nine items that are self-rated on a scale from 0 (not at all) to 3 (nearly every day), so that the available range is 0–27, and scores of 0–4, 5–9, 10–14, 15–19 and 20–27 indicate minimal, mild, moderate, moderately severe and severe depressive symptoms, respectively (Kroenke et al., 2010). The questionnaire has shown high consistency with a diagnosis of major depression based on structured interviews (Beard et al., 2016).

The Work and Social Adjustment Scale (WSAS, Mundt et al., 2002) is a test used to evaluate and measure the work and social adjustment. It includes five items that assess the individual's ability to perform the activities of everyday life and how these are affected in the week prior to the assessment. Each of the five items is rated on a nine-point scale ranging from 0 (not at all) to 8 (severe interference), so that the total scores are between 0 and 40. A mean score equal or higher than 21 was considered to be predictive of a clinically significant impairment of functioning. The internal consistency of the instrument and the reliability of the test-retest were good (Mundt et al., 2002).

2.3 Statistical analyses

We performed Student's t-test to compare IES-R, GAD-7, PHQ-9 and WSAS total mean scores between males and females, or between HCWs aged equal or less than 35 years old or aged more than 35 years old (the median age). To compare IES-R, GAD-7, PHQ-9, WSAS total mean scores between different regions (high, medium and low degree of exposure), work settings (EDs, ICUs and Medical/Surgical Units) and professional roles (physicians, nurses and *other HCWs*) we performed three-way

ANOVA models, followed by the Games-Howell post-hoc test. A multiple linear regression analysis was performed in order to identify the strongest predictors of WSAS score (dependent variable) among gender, age, professional role, work setting, regional degree of exposure, IES-R, GAD-7 and PHQ-9 scores (independent variables). Dummy variables were created for not dichotomic variables. All analyses were performed using SPSS version 26 (IBM Corp 2019). A p-value <.005 was considered statistically significant.

3. Results

In the sample, mean IES-R score was 19.38±20.09, and 24,5% subjects (N=121) reported severe PTSS. Mean GAD-7 score was 6.02±5.44, and 23.5% (N=115) subjects rated more or equal to 10 at the GAD-7 scale, suggesting the presence of moderate-severe anxiety symptoms. Mean PHQ-9 score was 5.57±5.16, and 20.2% (N=99) subjects presented a PHQ-9 score equal or higher than 10, suggesting the presence of moderate-severe depressive symptoms. Neither gender or age were associated with the IES-R, GAD-7, PHQ-9 scores (see Table 1). The IES-R scores were higher in the regions at high and medium level of exposure to the outbreak compared to the region at low level of exposure (23.81±21.27 vs 16.19±19.88, *p<.001;* 23.55±18.25 vs 16.19±19.88, *p<.001,* respectively). The GAD-7 score was higher in the region at high than in those at medium and at low level of exposure to the outbreak (9.39±5.76 vs 6.93±5.16, *p<.001*; 9.39±5.76 vs 4.77±5.02, *p<.001*, respectively). The GAD-7 score was also higher in the region at medium level of exposure with respect to the region at low level (6.93±5.16 vs 4.77±5.02, *p<.001*). The PHQ-score was lower in the region at low level of exposure to the outbreak than in those at high and at medium level

(7.38±5.29 vs 4.63±4.90, *p<.001*; 6.78±5.20 vs 4.63±4.90, *p<.001*, respectively). Further, the IES-R scores were higher in the EDs than in ICUs (28.36±18.31 vs 18.79±21.02, *p<.05*) and in Medical/Surgical Units (28.36±18.31 vs 18.07±19.70, *p<.05*), while there were no differences on the GAD-7 and PHQ-9 scores. Finally, the IES-R scores were higher in nurses than those of "other HCWs" (20.84±22.38 vs 14.42±18.28, *p<.05*), as were the PHQ-9 scores (6.05±5.49 vs 4.37±5.03, *p<.05*). (see Table 1).

Mean WSAS score was 12.04±10.33 with 22.9% (N=117) presenting a WSAS score suggesting the presence of a clinically significant impairment of functioning. WSAS scores were not associated with gender or age (see Table 2). The WSAS score was higher in the region at high level of exposure to the outbreaks than those at medium and low level (16.38±11.11 vs 12.66±10.79, *p<.001*; 16.38±11.11 vs 10.41±9.45, *p<.001*, respectively); further, the WSAS score was higher in the region at medium level of exposure with respect to the region at low level (12.66±10.79 vs 10.41±9.45, *p<.001*). The WSAS score was higher in EDs than in ICUs and in other Medical/Surgical Units (16.56±10.43 vs 9.77±9.52, *p<.001*; 16.56±10.43 vs 12.22±10.38, *p<.001*, respectively), beside in Medical/Surgical Units than in ICUs (12.22±10.38 vs 9.77±9.52, *p<.001*). No statistically significant professional role differences emerged in WSAS total mean scores.

Further, we conducted a linear regression model (r^2=.505, r^2 corrected=.493) with the age, gender, regional level of exposure to the outbreaks, work setting, professional role and IES-R, GAD-7, PHQ-9 total scores as independent variables and the WSAS scores as the dependent variable, to examine the strongest predictors of work and social functioning impairment. The IES-R [b=.111 (SE=.026), CI95%=.060-.161, p<.001], GAD-7 [b=.283 (SE=.126), CI95%=.035-.530, p= .025], and PHQ-9 [b=.790(SE=.131),

CI95%=.524-1.039, p<.001] scores showed a significant relationship with the WSAS scores (see table 3). In particular, taking into account the semi-partial correlations, the PHQ-9 and IES-R total scores appear to have the strongest pure relationship with the WSAS total score (0.200 and 0.139 respectively).

4. Discussion

To the best of our knowledge, this is the first study aimed at exploring the acute impact of the COVID-19 pandemic on HCWs facing the first wave emergency in five major hospitals of three Italian regions with progressive levels of exposure, focusing on PTSD, anxiety, depressive symptoms and impairment of functioning.

We found that in the region at high level of exposure to the outbreak (Lombardy) PTSD mean scores were significantly higher than in the region at medium (Emilia-Romagna) and low (Tuscany) level of pandemic incidence, and a similar trend emerged in the region at medium level with respect to the region at low level of incidence. This finding is in line with other studies on samples of HCWs facing outbreaks and reflects an "*Epicenter Effect*", which accounts for a greater traumatic exposure level and, consequently, a greater PTSS burden in HCWs employed in proximity to the most affected regions (Carmassi et al., 2020b; Lai et al., 2020). Similarly, high rates of PTSD were reported in Lombardy frontline HCWs during the first acute phase of COVID-19 pandemic in Italy (Bassi et al., 2020). The epicenter proximity effect was also investigated in previous studies on victims of other natural disasters, such as the L'Aquila 2009 earthquake (Dell'Osso et al., 2013), and even current nosographic systems acknowledge the importance of severity of trauma and the perception of a life threat as important peritraumatic risk factors for PTSD onset (Ozer et al., 2003; Vance et al., 2018).

Furthermore, we found that EDs HCWs presented statistically significant higher PTSD scores than those HCWs working in ICUs and in Medical/Surgical Units, implying a greater post-traumatic stress impact. The finding that EDs HCWs were most affected by PTSD symptoms than HCWs in all other hospital wards is in line with previous

researches that highlighted the role of exposure level. Indeed, working in high-risk wards or in frontline settings during recent and past Coronavirus outbreaks, was found to be a major risk factor for developing PTSD symptoms (Chong et al., 2004; Maunder et al., 2004; Lin et al., 2007; Su et al., 2007; Styra et al., 2008; Wu et al., 2009; Lee et al., 2018; Jung et al, 2020; Kang et al., 2020; Lai et al, 2020). Particularly, these studies pointed out the relevance of perceived threat for health and life and experiencing feelings of vulnerability as mediating factors. The finding that HCWs in ICUs showed post-traumatic stress reactions in a lesser degree with respect to EDs HCWs is quite interesting, and we could presume that working in more structured units and the perceived safety of the working environment are factors that could have enhanced the resilience of ICUs HCWs, as highlighted in some studies (Maunder et al., 2006; Su et al., 2007). Moreover, we could argue that HCWs in EDs were exposed to a greater unpredictability of clinical cases than HCWs in ICUs, who worked in more controlled situations.

We found that nurses showed statistically significantly higher PTSS than *other HCWs*, although not statistically significant differences emerged with respect to physicians. This finding is in line with previous studies that highlighted higher PTSD symptoms scores in nurses with respect to other working categories (Maunder et al., 2004; Phua et al., 2005; Cai et al., 2020; Garcia-Fernandez et al., 2020; Huang et al., 2020; Lai et al., 2020; Zerbini et al., 2020; Carmassi et al., 2021b). The main explanation reported by studies was that nurses had higher workload and longer time in direct contact with infected patients, accounting for a greater traumatic exposure.

Moreover, in our study HCWs employed in Medical/Surgical Units presented a more severe impairment in functioning than HCWs employed in ICUs. In a previous study on the 2003 SARS outbreak, some authors found that first-line exposure had a protective

effect. Indeed, HCWs working in SARS high risk units, as expected, experienced greater distress than HCWs displaced in other departments such as the psychiatric one, but contrary to expectations, HCWs caring for many SARS patients, while working in high-risk units, resulted less distressed. This finding may suggest that experience in treating SARS patients may have helped to manage the traumatic exposure to infected cases (Styra et al., 2008). In our sample, ICUs treated the most severe cases of COVID-19 infection, a fact that could have enhanced their experience in treating such patients; moreover, the Medical/Surgical Units were partly reorganized in order to face the pandemic, with the creation of specific wards dedicated to COVID-19 patients. This could have meant, in the HCWs displaced, a greater distress in adapting to a new context and could have contributed to a greater impairment of functioning related to the psychiatric symptoms reported.

In the linear regression model, PTSS, anxiety and depressive symptoms were the major predictors of impairment of functioning. Particularly, in the total sample depressive symptoms resulted to be the most important factors associated to functional impairment, and this is in line with previous finding showing depression as common symptom in nurses working in Emergency Departments during the COVID-19 pandemic and causing a negative impact on their quality of life and patient care (An et al., 2020). However, our evidence showed that also PTSS significantly affected functioning impairment. PTSD and depressive symptoms showed a high tendency to co-occur after a traumatic event, so that in epidemiological studies about 50% of subjects with PTSD also reported a depressive disorder (Kessler et al., 1995; Bleich et al., 1997; Breslau et al., 1997; Elhai et al., 2008; Rytwinski et al., 2013; Bonde et al., 2016). In the last years, the new approach to PTSD with the DSM-5 inclusion of the *"Negative alterations in cognition and mood symptoms"*, has highlighted the relationship between these two

disorders (APA, 2013). This relationship is bidirectional as PTSD has been reported as a risk factor for the onset of depressive disorders (Breslau et al., 1997; Oquendo et al., 2005; Ginzburg et al., 2010) while other authors suggested that pre-existing depression could predispose to PTSD after a traumatic event, mainly through an impairment in positive coping styles and a greater distress perception (Bui and Fava, 2017; Carmassi et al., 2020c). As emerged in semi-partial correlations, both PTSD and depression were independently related to the functioning levels suggesting the need to detect both disorders in frontline HCWs after a traumatic event.

However, when interpreting these data some limitations should be acknowledged. First, the study relies on voluntary responses given by the subjects. Second, the lack of records on the number of HCWs that refused to fulfill the questionnaires and the related reasons. We may argue that most severe cases, with high levels of avoidance, may have refused to revisit a traumatic experience by participating to the assessment, this leading to underreport the incidence of traumatic sequelae. On the contrary, we may also hypothesize that HCWs not complaining for mental health distress may have not felt the need to fulfill the scales. However, in the present study should be highlighted the prompt direct recruitment of subjects facing the acute phase of a worldwide exceptional event in which Italy was one of the first western Countries involved. Third, assessment of psychiatric symptoms relied on self-report questionnaires however, data suggest that there is usually a good correlation between self-reports and clinician administered measures (Cody et al., 2017; Uher et al., 2012). A fourth limit is the absence of information about medical comorbidities, which may lead to an increased risk of severe COVID-19 clinical pictures, or about the presence of family members or close friends affected by COVID-19, that may increase the risk for post-traumatic stress reactions.

Fifth, the recruitment of subjects actively employed during the pandemic, may limit generalizability to those who were too distressed to work.

In conclusion, our study showed a relevant association between depressive symptoms as well as work-related PTSD symptoms and the impairment of functioning in frontline HCWs facing COVID-19. Thus, HCWs should be considered a high-risk group for developing psychiatric disorders in the aftermath of a pandemic and they should have ready access to psychiatric care, as promoting the psychic well-being of HCWs is equally important to the fight against the pandemic (Chung & Yeung, 2020). Comprehensive surveys about the psychological effect of the COVID-19 pandemic on HCWs of different ranks and positions are needed to provide timely and appropriate interventions.

5. References

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Table 1. Comparison of IES-R, GAD-7 and PHQ-9 total mean scores in HCWs divided by gender, age, region, working environment and occupational role.

	N (%)	IES-R (mean±SD)	Test statistic	p	Post-hoc* <.05	GAD-7 (mean±SD)	Test statistic	p	Post-hoc* <.05	PHQ-9 (mean±SD)	Test statistic	p	Post-hoc* <.05
Total sample	514 (100.0)	19.38±20.09	-	-	-	6.02±5.44	-	-	-	5.57±5.16	-	-	-
Males	222 (43.2)	20.46±20.40	-	.294	1.05 (510) $^{+}$	6.38±5.58	1.25 (487)$^{+}$	.210	-	5.85±5.46	1.05 (489)+	.296	-
Females	292 (56.8)	18.55±19.85				5.75±5.33				5.36±4.92			
Age ≤35	211 (41.0)	17.79±18.82	-	.130	-1.52 (466.9)$^{+}$	5.91±5.22	-0.40 (487)$^{+}$	.686	-	5.68±5.15	-0.39 (489)$^{+}$	.697	-
Age >35	303 (59.0)	20.52±20.92				6.11±5.60				5.50±5.18			
Region at low level of exposure to the outbreak [a]	95 (18.5)	23.81±21.27	8.65** (2,493)	<.001	a,b>c	9.39±5.76	26.70** (2,489)	<.001	a>b,c b>c	7.38±5.29	13.50** (2,490)	<.001	a,b>c
Region at medium level of exposure to the outbreak [b]	120 (23.3)	23.55±18.25				6.93±5.16				6.78±5.20			
Region at low level of exposure to the outbreak [c]	299 (58.2)	16.19±19.88				4.77±5.02				4.63±4.90			
EDs [a]	55 (10.7)	28.36±18.31	6.34** (2,492)	<.050	a>b,c	7.08±4.63	1.16** (2,487)	.315	-	7.03±4.50	1.73** (2,489)	.178	-
ICUs [b]	129 (25.1)	18.79±21.02				5.58±5.44				5.31±5.73			
Medical/Surgical Units [c]	329 (64.0)	18.07±19.70				6.08±5.53				5.51±5.00			
Physicians [a]	183 (35.6)	19.60±17.02	3.081** (2,493)	<.050	b>c	5.87±4.71	1.013** (2,488)	.364	-	5.45±4.66	3.201** (2,490)	<.050	b>c
Nurses [b]	251 (48.8)	20.84±22.38				6.34±5.81				6.05±5.49			
Other HCWs [c]	80 (15.6)	14.42±18.28				5.38±5.75				4.37±5.03			

*** Games-Howell test**

**ANOVA F(dg)

$^{+}$t-student t(fd)

Table 2. Comparison of WSAS total mean scores in HCWs divided by gender, age, region, working environment and occupational role.

	N (%)	WSAS (mean±SD)	Test statistic	p	Post-hoc* <.05
Total sample	514 (100.0)	12.04±10.33	-	-	-
Males	222 (43.2)	12.13±10.62	0.17 (510)$^{+}$	.866	-
Females	292 (56.8)	11.98±10.13			
Age ≤35	211 (41.0)	11.92±10.32	-0.22 (510)$^{+}$	.828	-
Age >35	303 (59.0)	12.13±10.36			
Region at low level of exposure to the outbreak [a]	95 (18.5)	16.38±11.11	12.88** (2,511)	<.001	a>b,c b>c
Region at medium level of exposure to the outbreak [b]	120 (23.3)	12.66±10.79			
Region at low level of exposure to the outbreak [c]	299 (58.2)	10.41±9.45			
EDs [a]	55 (10.7)	16.56±10.43	8.70** (2,510)	<.001	a>b,c c>b
ICUs [b]	129 (25.1)	9.77±9.52			
Medical/Surgical Units [c]	329 (64.0)	12.22±10.38			
Physicians [a]	183 (35.6)	12.04±10.16	3.081** (2,493)	.200	-
Nurses [b]	251 (48.8)	12.62±10.27			
Other HCWs [c]	80 (15.6)	10.24±10.82			

*** Games-Howell test**
****ANOVA F(dg)**
$^{+}$t-student t(fd)

Table 3. Linear regression model: sociodemographic characteristics, IES-R, GAD-7 and PHQ-9 scores as predictive variables associated to WSAS scores in the total sample (N=514).

Predictive factors	b (S.E.)	β	$CI_{95\%}$	Zero-order correlation	Semi-Partial correlation	p
Gender (ref. male)						
Female	.201 (.750)	.010	-1.27 ~ 1.675~	-.028	.009	.789
Age (ref. <35 years)						
Age >35 years	.084 (.716)	.004	-1.323 ~1.490	.018	.004	.907
Work setting (ref. EDs)						
ICUs	-2.259 (1,449)	-.095	-5.107 ~ 0.588	-.115	-.051	.120
Medical/Surgical Units	-.291 (1,321)	-.013	-2.887 ~ 2.305	.049	-.007	.826
Professional role (ref. Nurses)						
Physicians	-.434 (.779)	-.020	-1.964 ~ 1.096	-.026	-.018	.578
Other HCWs	-.880 (1.021)	-.032	-2.885 ~ 1.126	-.072	-.028	.389
Level of exposure (ref. High)						
Region at medium level of exposure	-1.178 (1,226)	-.049	-3.586 ~ 1.231	.072	-.045	.337
Region at low level of exposure	-.983 (1,078)	-.047	-3.102 ~ 1.137	-.189	-.030	.363
IES-R	.111 (.026)	.214	.060 ~ .161	.599	.142	<.001
GAD-7	.283 (.126)	.149	.035 ~ .530	.639	.074	.025
PHQ-9	.790 (.131)	.390	.524 ~ 1.039	.677	.197	<.001
K	5.118 (2.233)	-	.730 ~ 9.506	-	-	.022

r^2: .505 r^2 corrected: .493