

High strain and low social support at work as risk factors for being the target of third-party workplace violence among healthcare sector workers

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PAROLE CHIAVE: Violenza al lavoro; strain da lavoro; scarso supporto sociale; modello domanda-controllo; lavoratori del settore sanitario

ABSTRACT

Introduction: *Healthcare workers are particularly vulnerable to third-party workplace violence. The experience of work-related stress, by threatening the psychological balance of healthcare workers, making them less effective in managing the relationship with patients and their family members, may significantly contribute to third-party violence.*

Objective: *To investigate whether stress-related psychosocial situations at work as defined by the widely known Demand-Control model, and the level of work-related social support, act as risk factors for third-party violence among healthcare workers. Specifically, we explored whether the risk of violence is higher in situations associated with higher levels of work-related stress (i.e., active or passive situations, and especially the high strain situation) when compared to a work situation related to lower levels of stress (i.e., low strain situation). We also explored whether the risk of violence is lower at higher levels of social support.* **Method:** *Cross-sectional study on 633 healthcare workers. Psychosocial work situations and third-party workplace violence have been operationalized by using well validated scales.* **Results:** *Logistic regressions including a number of relevant covariates (e.g., gender, job role, night shift work) revealed that, compared to a low strain situation, an active or passive situation had an increased risk for workplace violence. However, the highest risk was observed for a high strain situation (i.e., the situation associated with the highest level of work-related stress). High social support acted as a protective factor.* **Conclusion:** *Healthcare workers' experience of stress at work may make them more vulnerable to third-party violence. Ensuring better psychosocial working conditions may contribute to the prevention of workplace violence and its consequences.*

RIASSUNTO

«*Alto strain e basso supporto sociale come fattori di rischio per la violenza da parte di pazienti e familiari tra i lavoratori del settore sanitario*». **Introduzione:** *I lavoratori del settore sanitario sono particolarmente a rischio di subire violenza da parte di soggetti esterni all'organizzazione, in particolare pazienti e loro familiari. Lo stress da lavoro, minacciando l'equilibrio psicologico dei lavoratori sanitari e rendendoli meno efficaci nel gestire la relazione*

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con i pazienti e i loro famigliari, può agire da fattore di rischio. **Obiettivi:** Indagare se le situazioni psicosociali definite dal modello Domanda-Controllo e dal grado di supporto sociale ricevuto al lavoro – situazioni che alimentano lo stress da lavoro – agiscono da fattori di rischio per la violenza subita dai lavoratori sanitari da parte di pazienti e loro famigliari. Più nello specifico abbiamo esplorato se situazioni 'attive' o 'passive' e in particolare ad 'alto strain' fungono da fattori di rischio rispetto a situazioni a 'basso strain'. Abbiamo anche esplorato il rischio associato a minori risorse di supporto sociale al lavoro. **Metodi:** Studio trasversale su 633 lavoratori del settore socio-sanitario appartenenti a diverse strutture del centro e nord-Italia. **Risultati:** Le regressioni logistiche, che includevano covariate rilevanti, hanno evidenziato che, rispetto a situazioni a basso strain, una situazione attiva o passiva era associata ad un rischio più elevato di violenza. Il rischio maggiore di violenza era tuttavia associato, così come ipotizzato, alle situazioni ad alto strain. Il supporto sociale agiva da fattore protettivo. **Conclusioni:** Lo stress da lavoro può rendere i lavoratori del settore sanitario più vulnerabili alla violenza dai pazienti e dai loro famigliari. Assicurare buone condizioni psicosociali di lavoro può contribuire alla prevenzione della violenza e delle sue conseguenze.

INTRODUCTION

Workplace violence, which may be defined as the incidents where staff are abused, threatened, or assaulted in the circumstances related to their work is a significant and persistent problem with dramatic consequences on the targets and their organization (5, 11, 24, 28, 39). A particular form of workplace violence is third party violence, which is violence perpetrated by people (e.g., patients, clients, students) who are not employed by the same employer as the person who has experienced the acts of violence (15). Third-party violence has become of increased concern among policymakers and social partners as a peculiar phenomenon (13).

Among the vulnerable workers for third party violence there are health care workers (11, 13, 14, 25, 33). A recent study estimated that one in five health care professionals experienced such kind of violence worldwide annually (41). It is believed that such vulnerability is mostly related to the complex relationships that healthcare workers have to manage with patients and their family members (12), who at times may be frustrated in relation to aspects of the healthcare facility organization and other factors (e.g., long waiting times, having their requests denied, poor prognosis, etc.), thus becoming aggressive (30). To effectively manage such complex and demanding relationships, health care workers should maintain calmness and emotional balance, that is, psychological fit

with their role. However, such a fit may be threatened by a stressful work environment conducive to work-related stress – a ubiquitous, yet often overlooked, and superficially tackled phenomenon in today's work organizations (3). Employees under chronic work stress may develop a persistent cynical attitude and withdrawal symptoms as part of a burnout syndrome (32), which may in turn directly contribute to further activate already frustrated patients or their family members while interacting with them. Thus, work-related stress and its psychological correlates may constitute a powerful contributing factor for violent incidents and not only one of its outcomes (4, 7).

Previous research identified different risk factors for third-party violence in the healthcare sector, such as patient characteristics (e.g. working with people who have a history of violence), workplace features (e.g. working alone) and organizational factors (e.g. staff shortage) (18, 28, 33). Surprisingly, psychosocial factors – that is, factors that adversely affect healthcare personnel through fueling work-related stress – have received less systematic attention (10). For example, their role as potential risk factors is not even mentioned in recent guidelines on preventing third party workplace violence among health care workers (27). Thus, the main aim of the present study is to explore whether exposure to common stress-inducing psychosocial factors is related to the experience of third-party workplace violence among healthcare personnel.

Psychosocial factors have been often conceptualized and measured through the widely known job demand-control (JDC) model (20,21). Such a model distinguishes four different psychosocial working situations that are related with different levels of work-related stress. High strain situations, which are characterized by high levels of job demand (i.e., high pressure and work intensity) and low levels of job control (i.e., mainly autonomy over decisions), carry the highest potential for work-related stress. According to Karasek & Theorell (21, p. 33), the psychological stress experienced in such a situation may be expressed in the form of aggressive behavior, which may be highly dysfunctional in an interaction of a healthcare worker with a (angry) patient, leading to a concrete risk of violence escalation. Active and passive situations, defined by the combination of, respectively, high job demand and high control and low job demand and low job control, are characterized by an average level of work-related stress (21). Finally, low strain situations, which are those with low job demand and high job control, are related with the lowest levels of work-related stress. Such differences in the level of stress between the

four JDC situations may be understood according to their respective position along the *stress (or strain) diagonal* postulated by the model (figure 1).

Thus, a first specific aim of our study is to apply the JDC framework to investigate workplace violence, examining the role of the different psychosocial situations as identified by the combination of levels of demand and control, on the risk of third-party violence. The JDC model has been rarely applied to explain the occurrence of workplace violence among healthcare sector employees (29). A previous study using the model (23) found that job strain was indeed related to workplace violence. However, the study didn't offer a clear rationale for why this may happen and, most importantly, confounded internal and external (i.e., third-party) violence. Thus, in the present study, by focusing exclusively on third-party violence, we adopt a more conceptually clear and specific definition of violence. We expect that healthcare workers in high strain, active and passive situations would experience a higher risk of exposure to violence compared to employees in a low strain situation, with the risk being the highest for employees in a high strain situation.

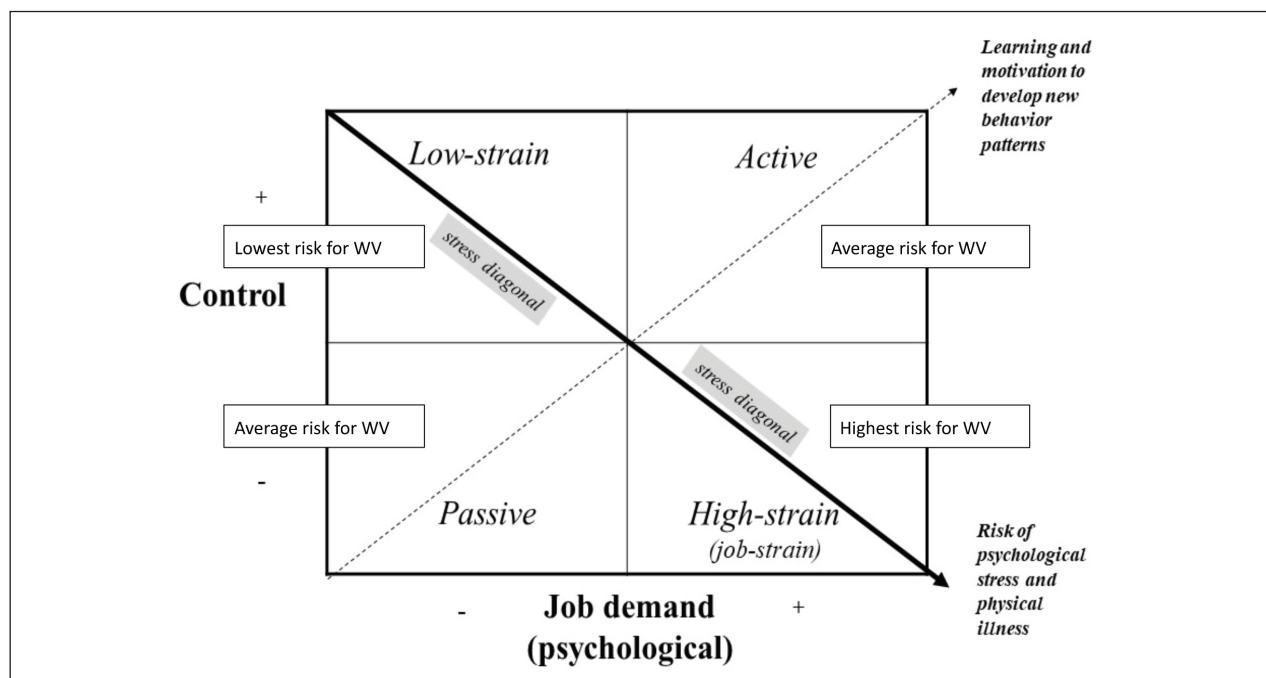


Figure 1 - Representation of the Job Demand Control model (stress diagonal emphasised). Note. WV: workplace violence

Additionally, according to Karasek & Theorell (21), a further psychosocial dimension to consider in relation to work-related stress is social support. Social support refers to the level of the instrumental and socio-emotional help received at work by colleagues and the supervisor (19). Thus, the social support received by healthcare employees may act as an important resource, helping them to remain calm and balanced even under emotionally charged interactions with patients and their family members, thus reducing the risk of conflict and violence escalation. In line with this, a second specific aim of our study is to explore whether the level of social support received by healthcare workers may represent a protective factor for third party workplace violence.

METHOD

Sample and procedure

Data have been collected as part of a national project aimed at developing updated guidelines and context specific measuring instruments for the management of work-related stress. The project was funded by the Italian Ministry of Health and coordinated by the Italian Workers Compensation Authority (INAIL). Among the work sectors that were targeted, there was the healthcare sector. The main reason for focusing on such a sector is the notorious high prevalence in it of work-related stress (12). The data were collected in three large healthcare facilities in the central and northern parts of Italy between October 2015 and May 2016. As part of the project, the facilities conducted a work-related stress risk assessment by using tools (i.e., an observational checklist and a self-reported questionnaire) that included a variety of items and scales thought to capture both general (e.g., workload) and context-specific (e.g., workplace violence) stressors. No ethical approval was sought since the data were subsequently used for the mandatory work-related stress risk assessment routinely carried out by the focused organizations under the Italian health and safety law (D. Lgs. 81/2008). However, the study was conducted in line with the Helsinki Declaration as well as the Italian data protection regulation (Legislative Decree n. 196/2003).

The data for the present study were derived from the responses to the self-report questionnaire, which was filled in anonymously by a total of 807 workers. The average response rate was 79% (range 22-100%) in the included departments/wards. The data of a small number of participants (No. = 26) were subsequently discarded because they provided only sporadic responses to the questionnaire (i.e., less than 30% of the items included). The analyses reported here were based on the 633 participants with complete data on all the study variables. Participants were females in 79.1% of the cases and had an age distributed as follows: 8.5% up to 30 years, 66.7% between 31 and 50 years, and 24.8% more than 50 years. Regarding the job role, 50.9% were nurses, 24.6% were doctors - with this group including few biologists, chemists, and physicists - 13.7% were assistance operators, and the remaining 10.8% included obstetricians, technicians, and administrative staff. Almost all participants (99%) were of Italian nationality and had a permanent job contract (96.7%). Organizational tenure was, on average, 14 years (SD=9.9 years). Participants worked in a number of different units/wards within their organization. The choice on which department/ward including in the study was left to the health and safety departments of the recruited healthcare facilities. Emergency departments were represented in the sample, while psychiatric services were not.

Measures

Workplace violence, the outcome variable, was measured by adapting three items from the Negative Acts Questionnaire-Revised (NAQ-R; 9), which has been validated in Italy (17). We focused on the 'physically intimidating behaviour' dimension of the NAQ-R. The three adapted items were the following: "During work, I'm the subject of intimidating behaviour from patients or their family members"; "During work I'm the subject of verbal violence and mistreatment from patients or their family members (such as being shouted at or being the target of spontaneous anger)" and "At work I am subject to violence from patients or their family members". Responses were given on a 5-point scale ranging from 1 (Never) to 5 (Always). The scale had

an excellent internal consistency as indicated by Cronbach's alpha ($\alpha=.87$). Responses to items were averaged to derive a workplace violence score. Subsequently, to identify participants exposed to workplace violence, the obtained score was dichotomized as explained below (see Statistical analyses section).

Job demand, job control and *social support* were measured by using the corresponding scales of the Stress Indicator Tool (SIT; 8). This tool has been validated in Italy by the Italian Workers Compensation Authority (31) and used in a number of studies on psychosocial factors at work (36). Specifically, job demand was assessed by eight items (e.g. "I am pressured to work long hours"), with responses collected on a frequency scale ranging from 1 (Never) to 5 (Always). The internal consistency of the scale was good ($\alpha=.81$). Job Control was investigated by six items, such as "I have a choice in deciding how I do my work", with the response options ranging from 1 (Never) to 5 (Always). The internal consistency of the scale was adequate ($\alpha=.75$). Social support was assessed by nine items, with five items investigating managerial support (e.g., "My line manager encourages me at work") and four items investigating peer support (e.g., "I get the help and support I need from my colleagues"). As in the original version of the scales, some of the responses were collected on a frequency scale varying from 1 (Never) to 5 (Always), while others on an agreement scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Alpha (α) of the social support scale was excellent ($\alpha=.85$). Responses to items of the three scales were first averaged to derive a single score for each construct. Subsequently, we carried out further transformations of the obtained variables to identify participants exposed to the different psychosocial situations focused in the analyses (see Statistical analyses section below).

Statistical analyses

Before running the main analyses, we first defined and identified participants exposed to workplace violence. To this end we dichotomized the workplace violence measure by differentiating participants who reported an average scale score of three or higher at the adopted violence measure from all the others. In

this way, we considered exposed to workplace violence participants who were, on average, the target of violent behaviour at least 'sometimes' – i.e., the modality associated to the score of '3'. Subsequently, we identified participants exposed to the different psychosocial situations postulated by the demand-control model. We first dichotomized the job demand and job control measures at the median of their distribution, differentiating participants with high vs. low levels of each of the two constructs. We then computed four new dichotomous variables, one for each combination of demand and control: high demand and low control (job strain situation), high demand and high control (active situation), low demand and low control (passive situation), and low demand and high control (low strain situation). Each of these variables differentiated participants in the situation considered from all the others. Since the active and passive situations are thought to have the same potential of evoking work-related stress in the demand-control model (21), we created a further variable identifying participants with either an active or passive situation *versus* others. We also dichotomized at the median the social support variable, separating participants with high vs. low social support.

To test for whether the risk for workplace violence was higher in a passive or active situation and especially in a high strain situation, when compared to a low strain situation (i.e., the referent situation), we fitted a series of logistic regression models. In the first model (Model 1) we entered the two variables identifying participants with either an active or passive situation (vs. others) and participants with a high strain situation (vs. others). In the second model (Model 2) we entered the social support variable. Finally, in the third model (Model 3) we entered a number of sociodemographic and occupational variables to control for further participant's potentially relevant characteristics: gender, age, job role, organizational tenure, night shift work, and whether the participant worked in the emergency department. These variables were operationalized as reported in table 1. All the analyses were conducted by using SPSS 25.

RESULTS

Table 1 reports descriptive statistics of the study variables. As for the dependent variable focused in the analyses, namely workplace violence, it can be seen that as many as more than one fifth of participants (i.e., 21.5%) reported being the target of violent behaviour at least sometimes during their working time. An analysis at the item level of the violence scale further revealed that the violent aspect that was reported most frequently referred to being the target of 'verbal violence and mistreatment' (from patients or their family members), with 39.7% of participants reporting that this happened at least sometimes. This was followed by being the target of 'intimidating behaviour' and of 'violence', with 34.4% and 23.9% of the participants, respectively, reporting a frequency of exposure to these aspects of at least 'sometimes'. Overall, it is clear that violent behaviour against healthcare workers from patients or their family members is not a sporadic phenomenon.

As a further preliminary analysis, we checked for whether the main constructs of interest (i.e., job demand, job control, social support, and workplace violence) could be discriminated empirically in the data. To this end we ran confirmatory factor analysis on the items defining the constructs in their original 1-5 response scores. Specifically, we fit a one-factor solution where all the items of the risk factors and outcome loaded on the same (common method) factor, and compared the fit of this solution to the fit of a four-factor solution where the items of the risk factors and outcome loaded on their respective factors. Results showed that the one-factor solution didn't fit the data ($\chi^2(292) = 2483.87, p < .01, CFI = .64, TLI = 60, RMSEA = .109, SRMR = .096$). To the contrary, the four-factor solution fitted sufficiently well the data ($\chi^2(286) = 850.98, p < .01, CFI = .91, TLI = 90, RMSEA = .056, SRMR = .053$) and better than the one factor solution ($\Delta\chi^2(6) = 1632.89, p < .01$). This indicated that the items of the four hypothesised constructs could not be viewed as manifestations of a unique common method factor, which is usually considered an important potential bias in cross-sectional self-reported studies (34).

Table 2 reports the results of the logistic regressions in which workplace violence acted as the out-

Table 1. Distribution of the main study variables

	n.	%
Workplace violence		
Yes	136	21.5
No	497	78.5
High strain job situation		
Yes	193	30.5
No	440	69.5
Active or passive job situation		
Yes	251	39.7
No	382	60.3
Social support		
High	319	50.4
Low	314	49.6
Gender		
Male	178	28.1
Female	455	71.9
Age (dummy 1)		
> 50 years	157	24.8
Others	476	75.2
Age (dummy 2)		
31-50 years	422	66.7
Others	211	33.3
Night shiftwork		
Yes	402	63.5
No	231	36.5
Job role (dummy 1)		
Nurse	322	50.9
Others	111	43.4
Job role (dummy 2)		
Doctors	156	24.6
Others	477	75.4
Working at emergency department		
Yes	85	13.4
No	548	86.6

come variable. The crude risk of workplace violence related to the psychosocial job situations investigated, that is, active or passive and high strain, was significant in both cases (see Model 1). This in-

Table 2 - Exposure to distressing psychosocial job situations and risk of third-party workplace violence: results of hierarchical multiple logistic regression analysis (N=633)

	Model 1 OR (CI 95%)	Model 2 OR (CI 95%)	Model 3 OR (CI 95%)
Passive or active job situation (no=0; 1=yes)	2.21 (1.27-3.85), P=0.005	2.00 (1.14-3.52), P=0.016	1.79 (0.97-3.31), P=0.060
High strain job situation (0=no; 1=yes)	4.19 (2.41-7.28), P<0.001	3.55 (2.00-6.30), P<0.001	4.18 (2.22-7.84), P<.001
Social support (0=low; 1=high)		0.65 (0.43-0.98), P=0.040	0.57 (0.36-0.90), P=0.017
Gender (0=female; 1=male)			0.62 (0.38-1.01), P=0.056
Age-dummy 1 (0=others; 1= 50+ years)			0.48 (0.16-1.38), P=0.172
Age-dummy 2 (0=others; 1=31-50 years)			1.07 (0.44-2.62), P=0.883
Job role-dummy 1 (0=others; 1=nurse)			1.24 (0.69-2.25), P=0.472
Job role-dummy 2 (0=others; 1=doctors)			1.03 (0.52-2.03), P=0.932
Organizational tenure (0=less than 5 years; 1=5+ years)			1.06 (0.55-2.07), P=0.859
Working at emergency department (0=no; 1=yes)			6.22 (3.55-10.89), P<0.001
Night shiftwork			1.35 (0.80-2.28), P=0.259

Note. The outcome variable is workplace violence (0=No; 1=Yes). For all risk factors, the modality with a value of 0 is the reference category. OR: Odds ratio. CI: confidence interval. P: probability value.

indicated that being exposed to an active or passive situation increased the risk of workplace violence by 2.21 times (CI: 1.27-3.85; $p < .01$) in comparison to having a low strain job. The same risk increased to 4.19 times (CI: 2.41-7.28; $p < .001$) in the case of a high strain job situation. Thus, the risk of violence doubled when 'moving' from a low strain situation to a passive or active situation and became four times higher when 'moving' from low strain to high strain. These results supported one of our hypothe-

ses. The addition of social support in Model 2 (table 2) indicated that social support resources acted as a significant protective factor for workplace violence (OR: 0.65, CI: 0.43-0.98; $p < .05$), which was also in line with our hypothesis. In such a model (Model 2), the risk associated to both active or passive and high strain job situations was only slightly reduced. Finally, in Model 3, we entered a number of covariates to see whether they could weaken the risk or the protective role of the investigated psychosocial

situations. Among the covariates, working in the emergency department was the strongest risk factor for workplace violence, increasing the risk of more than 6 times (OR: 6.22, CI: 3.55-10.89). Finally, being male was related to an almost significant reduced risk for violence ($P=0.056$), suggesting that there was a trend for a significantly higher risk for females. Importantly, the risk of violence associated with psychosocial job situations was only modestly affected by the covariates, with the risk of active or passive job situations 'dropping' just above the significance level (OR: 1.79, CI: 0.97-3.31).

DISCUSSION

Our analysis revealed that work environmental conditions conducive to work-related stress may have a role in being the target of workplace violence. We specifically focused on the job content factors defined by the JDC model (20, 21) and additionally included social support as a contextual factor. In line with our hypothesis, we found that healthcare sector employees exposed to a higher job demand and lower job control (i.e., a high strain situation) were at particularly increased risk of workplace violence. Moreover, employees that, according to the JDC model, should experience average levels of stress (those in passive and active situations) were at increased risk for workplace violence in comparison to employees in low strain situations, although in this case the risk became non-significant with the inclusion of control variables. Additional analyses (not reported in the manuscript) in which the active and passive situations were separated rather than considered as a single group, revealed that it was mainly the active situation that contributed significantly to increase the risk of violence. To the contrary, the risk associated with the passive situation was still higher when compared with the low-strain situation, but not significantly so. Even in these additional analyses, however, the highest risk for violence from patients and their family members was associated with the high-strain situation.

Furthermore, higher levels of social support from colleagues and the supervisor acted as a protective factor for the experience of workplace violence. This latter result further strengthens the idea that psycho-

social risk factors may be implicated in workplace violence, since social support is a powerful 'shield' against the experience and/or the consequences of work-related stress (40).

The obtained results are consistent with the idea that the levels of stress reported by healthcare workers due to poor working conditions, by undermining their psychological balance and fitness to the job, may contribute to becoming the target of violent behavior. Such idea has been repeatedly considered (7) but more rarely investigated in light of solid models of work-related stress. Thus, when under stress, healthcare workers may be less effective in managing the complex and demanding relationships with patients and their family members, thus becoming easy scapegoats of third parties' frustration and tension. For example, in stressful conditions health care workers may likely become less able to regulate their emotions when interacting with patients and families, thus behaving in a more impulsive and less tactful manner. Given that violent behaviour is often the outcome of a conflicting interpersonal exchange that quickly escalates, such decreased flexibility may play the role of a catalyst, especially in work contexts where the risk of workplace violence is already high (e.g., emergency departments).

Our results are in line with those of studies investigating exposure to 'internal' violence and mistreatment (2), that have already shown the implications of working in poor environmental conditions, such as workload and unclear roles, for becoming the target of harassment at work. In terms of implications, this study suggests that effective assessment and prevention of work stress should be taken seriously by healthcare organizations, not only for the health-related consequences of stress, but also for reducing the risk of workplace violence episodes. Monitoring the objective and subjective experience of workload and ensuring that it is perceived as manageable by employees within the available working time is of key importance for keeping their level of arousal and tension acceptable. To reach this end, human and instrumental resources must be proportionate to the number of patients accommodated in the ward and the tasks to be accomplished. Additionally, local (e.g., ward level) strategies and procedures should be in place to respond quickly to problematic

and unexpected issues raised by employees (e.g., bad functioning equipment should be quickly substituted, sick employees replaced). In parallel, employees should perceive a high level of autonomy in dealing with their job demand. This means that they should be able to determine as much as possible their pace of work, the switch to less demanding tasks and when to take a break, all aspects that decrease the perceived job pressure by allowing 'internal' recovery - i.e., recovery during work (16). Additionally, they should be able to influence the organization of their shifts and have occasions for improving their work-related competencies and skills. All this contributes positively to job control, which is particularly important for reducing anxiety and stress especially under conditions of naturally high workload such as in emergency departments or when the ward operates at its maximum capacity in terms of hosted patients. Finally, an inclusive and socially supportive climate aimed at violence prevention (38), should be nurtured by those having responsibility positions. Research has shown that these better working conditions are more easily achievable if those in responsibility positions have strong stress-preventive management competencies, which may be developed with focused interventions (see 35).

The results of the present study should be interpreted with caution due to a number of limitations. First of all, the study was cross-sectional and entirely based on self-reported data. This means that common method bias could be an issue (34). However, by using confirmatory factor analysis we found that the investigated constructs could be clearly discriminated empirically, suggesting that the common method bias - although potentially present - was not the only determinant of the observed associations between the risk factors and the outcome variable. Thus, the emerged associations reflected also true relationships between the investigated variables. These results converge with findings showing that employees' descriptions of their psychosocial work environment tend to be valid and reliable (22).

Regarding the cross-sectional nature of the study, this cannot exclude reverse causality. It is highly likely that exposure to workplace violence is a risk factor for the development of a job strain situation, since workers exposed to violence due to their poor

health may perceive a higher demand. Similarly, violence may threaten the perception of being in control of the work environment and lead to feelings of isolation (i.e., reduced social support). Indeed, previous research has documented a reciprocal relationship between violence and job strain (23). The point relevant for third-party violence prevention, however, is not that violence deteriorate the psychosocial work environment - which is almost obvious -, but that by ensuring good working conditions the risk of violence from patients and family members may be tackled. To be more confident on this, however, future research should adopt more robust research designs including prospective data.

Another potential limitation is that we ran a logistic regression analysis by using a 'common' outcome (i.e., with a prevalence higher than 10%). The use of odds ratio in such circumstances has been discouraged by some (26) because odds ratio can overestimate the relative risk, although there are also different opinions on this (6). In any case, in additional analyses (available upon request from the first author), we dichotomised the workplace violence measure differently, obtaining a more conservative estimate of exposure to violence that was lower than 10%. The main results remained substantially unchanged.

Finally, we considered only a few potential psychosocial issues leading to work stress among health care sector workers. Additional psychosocial risk factors (1) are prevalent in healthcare organizations and research showed the importance to consider context-specific psychosocial risk factors in order to better understand work-stress processes in organisations (37). This implies that we may have underestimated the role of the psychosocial work environment in leading to third party workplace violence.

Despite the mentioned limitations, we believe that the present study contributes with interesting results to a better understanding of third-party workplace violence in the healthcare sector. By adopting a solid theoretical framework and deriving specific hypotheses based on this, the present study suggests the need to consider, in addition to other factors (27), psychosocial working conditions to the end of preventing workplace violence towards healthcare workers.

REFERENCES

1. Balducci C, Avanzi L, Fraccaroli F: Emotional demands as a risk factor for mental distress among nurses. *Med Lav* 2014; 105: 100-108
2. Balducci C, Baillen E, Van den Broeck A, Fraccaroli F: Job Demand, job control, and impaired mental health in the experience of workplace bullying behavior: A two-wave study. *Int J Environ Res Public Health* 2020; 17: 1358
3. Balducci C, Fraccaroli F: Stress lavoro-correlato: questioni aperte e direzioni future. *G Ital di Psicol* 2019; 1-2: 39-65
4. Cannavò M, La Torre F, Sestili C, et al.: Work related violence as a predictor of stress and correlated disorders in emergency department healthcare professionals. *Clin Ter* 2019; 170: e110-e123
5. Choi K, Maas ET, Koehoorn M, McLeod CB: Time to return to work following workplace violence among direct healthcare and social workers. *Occup Environ Med* 2020; 77: 160-167
6. Cook TD: Advanced statistics: up with odds ratios! A case for odds ratios when outcomes are common. *Acad Emerg Med* 2002; 9: 1430-1434
7. di Martino V (2003). Relationship between work stress and workplace violence in the health sector. Available online at: https://www.who.int/violence_injury_prevention/violence/interpersonal/WVstresspaper.pdf
8. Edwards JA, Webster S, Van Laar D, Easton S: Psychometric analysis of the UK Health and Safety Executive's Management Standards work-related stress Indicator Tool. *Work Stress* 2008; 22: 96-107
9. Einarsen S, Hoel H, Notelaers G: Measuring exposure to bullying and harassment at work: Validity, factor structure and psychometric properties of the Negative Acts Questionnaire-Revised. *Work Stress* 2009; 23: 24-44
10. Estryn-Behar M, van der Heijden B, Camerino D, et al: Violence risks in nursing—results from the European 'NEXT' Study. *Occup Med* 2008; 58: 107-114
11. EU-OSHA, European Agency for Safety and Health at Work (2010). Workplace Violence and Harassment: a European Picture. Available online at: <https://osha.europa.eu/en/publications/workplace-violence-and-harassment-european-picture/view>
12. Eurofound (2017). Sixth European Working Conditions Survey – Overview report. Available online at: <https://www.eurofound.europa.eu/publications/report/2016/working-conditions/sixth-european-working-conditions-survey-overview-report>
13. Eurofound (2015): Violence and harassment in European workplaces: Extent, impacts and policies. Available online at: <https://www.eurofound.europa.eu/publications/report/2015/violence-and-harassment-in-european-workplaces-extent-impacts-and-policies>
14. Ferri P, Silvestri M, Artoni C, Di Lorenzo R: Workplace violence in different settings and among various health professionals in an Italian general hospital: a cross-sectional study. *Psychol Res Behav Manag* 2016; 9: 263-275
15. Firenze A, Santangelo OE, Gianfredi V, et al: Violence on doctors. An observational study in Northern Italy. *Med Lav* 2020; 111: 46-53
16. Geurts SAE, Sonnentag S: Recovery as an explanatory mechanism in the relation between acute stress reactions and chronic health impairment. *Scan J Work Environ Health* 2006; 32: 482-492
17. Giorgi G: Il Negative Acts Questionnaire Revised (NAQ-R) in Italia. *Prevenzione Oggi* 2008; Ottobre-Dicembre: 71-84
18. Hills DJ: Differences in risk and protective factors for workplace aggression between male and female clinical medical practitioners in Australia. *Aust Health Rev* 2017; 41: 313-320
19. Johnson JV, Hall EM: Job strain, work place social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. *Am J Public Health* 1988; 78: 1336-1342
20. Karasek R, Brisson C, Kawakami N, et al: The job content questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol* 1998; 3: 322-355
21. Karasek R, Theorell T: *Healthy work*. New York: Basic Books, 1990
22. Kivimäki M, Leino-Arjas P, Luukkonen R, et al: Work stress and risk of cardiovascular mortality: prospective cohort study of industrial employees. *BMJ* 2002; 325: 857-860
23. Magnavita N: The exploding spark: Workplace violence in an infectious disease hospital—A longitudinal study. *BioMed Res Int* 2013; 316358
24. Magnavita N, Di Stasio E, Capitanelli I, et al: Sleep problems and workplace violence: A systematic review and meta-analysis. *Front Neurosci* 2019; 13: 997
25. Marte M, Cappellano E, Sestili C, et al: Workplace violence towards healthcare workers: an observational study in the College of Physicians and Surgeons of Rome. *Med Lav* 2019; 110: 130-141
26. McNutt LA, Wu C, Xue X, Hafner JP: Estimating the relative risk in cohort studies and clinical trials of common outcomes. *Am J Epidemiol* 2003; 157: 940-943
27. OSHA—Occupational Health and Safety Administration (2016): Guidelines for preventing workplace violence for healthcare and social service workers. Available online at: <https://www.osha.gov/Publications/osh3148.pdf>
28. Phillips JP: Workplace violence against health care workers in the United States. *New Eng J Med* 2016; 374: 1661-1669
29. Ramacciati N, Ceccagnoli A, Addey B, et al: Violence

- towards emergency nurses: A narrative review of theories and frameworks. *Int Emerg Nurs* 2018; 39: 2-12
30. Ramacciati N, Gili A, Mezzetti A, et al: Violence towards emergency nurses: The 2016 Italian national survey-A cross-sectional study. *J Nurs Manag* 2019; 27:792-805
 31. Rondinone BM, Persechino B, Castaldi T, et al: Work-related stress risk assessment in Italy: the validation study of Health Safety and Executive Indicator Tool. *G Ital MedLav Ergon* 2012; 34: 392-399
 32. Schaufeli WB, Leiter MP, Maslach C: Burnout: 35 years of research and practice. *Career Development International* 2009;14: 204-220
 33. Terzoni S, Ferrara P, Cornelli R, et al: Violence and unsafety in a major Italian hospital: experience and perceptions of health care workers. *Med Lav* 2015; 106: 403-411
 34. Theorell T, Hasselhorn HM: On cross-sectional questionnaire studies of relationships between psychosocial conditions at work and health – Are they reliable? *Int Arch Occup Environ Health* 2005; 78: 517-522
 35. Toderi S, Balducci C: Stress-preventive management competencies, psychosocial work environments, and affective well-being: A multilevel, multisource investigation. *Intl J Environ Res Public Health* 2018; 15: 397
 36. Toderi S, Balducci C, Edwards JA, et al.: Psychometric properties of the UK and Italian versions of the HSE Stress Indicator Tool: A cross-cultural investigation. *Eur J Psychol Assess* 2013; 29: 72-79
 37. Vignoli M, Nielsen K, Guglielmi D, et al: The importance of context in screening in occupational health interventions: A mixed methods study. *Front Psychol* 2017; 8: 1347
 38. Viotti S, Guidetti G, Converso D: Nurses between the hammer and the anvil: Analyzing the role of the workplace prevention climate in reducing internal and external violence. *Violence and Victims* 2019; 34: 363-375
 39. Wisow C (2003). Guidelines on workplace violence in the health sector. Available online at: https://www.who.int/violence_injury_prevention/violence/interpersonal/en/WV_ComparisonGuidelines.pdf
 40. Viswesvaran C, Sanchez JI, Fisher J: The role of social support in the process of work stress: A meta-analysis. *J Vocat Behav* 1999; 54: 314-334
 41. Yi-Lu L, Rui-Qi L, Dan Q, Shui-Yuan X: Prevalence of workplace physical violence against health care professionals by patients and visitors: A systematic review and meta-analysis. *Int J Environ Res Public Health* 2020; 17: 299.

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