

Workplace Violence and Patient Management Time in the Emergency Department: An Observational Study

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ABSTRACT

Background: Workplace violence is steadily rising, and the healthcare sector is one of the most impacted areas. Several studies have shown that patients' long management times are a key factor in workplace violence in this setting.

Objective: This study aims to analyze the prevalence and characteristics of aggressions against healthcare workers (HCWs) that occurred in 2023 in the Emergency Rooms (ER) of a large university hospital and to evaluate the potential relationship between the management time of a patient in the ER and the risk of violence incidents.

Methods: To evaluate the prevalence and characteristics of aggressive events against HCWs that occurred in 2023, data from the "incident reporting" form were analyzed. Then, using the 2023 report on daily ER accesses, the management time of a patient at the ER was calculated. Finally, the average management times of patients on days when there were no aggressions were compared with those on days when there was one or more assaults against HCWs to evaluate the potential relationship between the average length of stay of a patient at the ER and the risk of aggression.

Results: In 2023, 271 violent incidents were reported. Verbal aggressiveness was the most common (82.7%), and working the night shift was riskier (42.8%). In 36.2% of cases, patient management time was identified as a potential predictor of aggression. Other identified potential predictors included the patient and/or caregiver relationship with HCW (30.6%), the refusal to accept diagnostic-therapeutic protocols (27.3%), and the cultural background and temperamental traits of the patient or caregiver (18.8% and 11.8%, respectively). According to the logistic regression analysis, the likelihood of a violent incident during a 150-minute stay was less than 10%; it increased to 53% after 650 minutes. **Conclusion:** Workplace violence in healthcare settings results from a complex interaction of internal and external factors. Understanding how these elements interact and contribute to the development of incidents is essential for identifying key actions to reduce and mitigate violence.

1. INTRODUCTION

The phenomenon of workplace violence is constantly rising, and the healthcare sector is one of the most affected areas [1, 2]. Violence against healthcare workers (HCWs) is a global issue, requiring targeted

legislative actions. NIOSH (National Institute for Occupational Safety and Health) defines workplace violence as "any physical assault, threatening behavior, or verbal abuse occurring in the workplace" [3]. Several factors contribute to the development of aggression against HCWs and can be grouped into three main

categories: characteristics of the patient and their caregivers, characteristics of HCWs, and organizational or environmental factors [4]. Organizational factors include lack of resources, staff shortages, long waiting times, compliance with hospital restrictions (such as only one caregiver per patient and inflexible visiting hours), inadequate security measures, and insufficient support and commitment from top management and staff to protect themselves [5, 6, 7]. There is a widespread lack of communication among healthcare workers, often driven by excessive workloads and worsened by job dissatisfaction caused by daily acts of aggression [8, 9, 10]. Additionally, rising healthcare costs, the commercialization of services, media attention, the availability of online health information, conflicting medical opinions, and reports of medical errors have altered doctor-patient relationships. The most common patient-related factors include psychomotor agitation (due to intoxication from alcohol or drugs, or cognitive disorders) and patients' expectations regarding access, speed, and effectiveness of care [11]. Several studies [12, 13, 14] indicate that long waiting times can be a primary factor contributing to workplace violence in healthcare settings.

The Italian Minister of Health's 2007 recommendations [15] emphasize the importance of comfortable and appropriate waiting areas to minimize stress-inducing factors. They also suggest ensuring that patients receive adequate information about waiting times.

This study aims to analyze the prevalence and characteristics of aggressive incidents against healthcare workers (HCWs) that occurred in 2023 in the emergency rooms (ER) of a large university hospital in Milan. The study will also evaluate the potential relationship between the average management time of a patient at the ER and the risk of violent incidents. The goal is to identify the most effective preventive interventions to protect the physical and mental well-being of HCWs, thereby maintaining the quality of healthcare services and care.

2. METHODS

2.1. Subjects and Methods

The present study analyzed data from the HCWs population working in the ERs of a large University

Hospital in Milan. The Hospital under study is part of the Italian public healthcare system, comprising four Hospital Centers and several Territorial Outpatient Units. An ER unit is present in every hospital center. To evaluate the prevalence and the characteristics of aggressive events against HCWs that occurred in 2023, data from the "incident reporting" form [15] were analyzed. This instrument was a reporting system that originated in complex and high-risk organizations, such as aviation or nuclear settings, which allows for the detection of risk situations for the safety of operators and users. Subsequently, it was adapted to the healthcare context also to identify factors potentially related to episodes of violence against HCWs. The HCW who experiences verbal or physical violence at the workplace fills out the incident reporting form, making sure to fill out all the mandatory fields. The required information includes:

1. HCW's details (professional profile and contact information of the assaulted individual), however, anonymous reporting is permitted;
2. date and time of the event;
3. the event location;
4. type of event;
5. description of the event (this is a free text field where the dynamics of the episode should be detailed);
6. patient data (gender, year of birth, identification code of the healthcare service)
7. contributing factors to aggression. HCW could select more than one option from:
 - Staff-related factors (communication, behavior, performance, cognitive factors, psychophysical factors)
 - Patient-related factors (communication, behavior, performance, cognitive factors, psychophysical factors)
 - Environmental factors (structure, physical environment, and infrastructure, equipment)
 - Organizational factors (protocols and procedures, safety culture, organization of the work group, resources/workload)
8. attachments, if the assaulted individual wishes to report a record or other supplementary documentation.

The 2023 report on daily ER accesses was also analyzed. This report included, for every patient admitted to the ER in 2023, the subsequent data: the patient's personal data, the way of the patient's access to the ER, the diagnosis at entry and discharge, the entry and discharge times, the color code assigned at admission and discharge, and the mode of discharge. Using this report, the average management time of a patient at the ER was calculated according to the Agenas (National Agency for Regional Health Services) report, from the patient's entry into the emergency department to their discharge [16]. Then, to evaluate the potential relationship between the average length of stay of a patient at the ER and the risk of aggression, the average management times of patients on days when there were no violent events were compared with those on days when there was one or more violent accidents against HCWs.

All data were anonymously extracted from both the incident reporting form and the 2023 report on daily ER accesses, and then analyzed in compliance with the most recent privacy protection laws.

2.2. Statistical Analysis

All data presented in our study were expressed as absolute numbers, percentages, and/or means $\pm$ SD.

Further analysis was conducted using logistic regression and Student's T-test. Logistic regression compared, for each day, the occurrence of at least one event with the average length of stay in the emergency room, with each average calculated as the ratio of the total time spent in the emergency room (from entry to discharge) across all episodes on that day to the number of distinct patient episodes managed that day. Confidence intervals were determined using the lower and upper 95% Wald confidence limits.

For the ROC curve, ideal cutoffs were identified using Youden's index and the closest top-left methods. Additionally, 95% confidence intervals were estimated with 2000 stratified bootstrap replicates. All analyses were performed using the R software version 4.2.3.

3. RESULTS

The demographic and occupational information of the population under study was shown in Table 1.

As shown in Table 2, in 2023, 271 violent acts against HCWs working at ERs were reported.

Verbal aggressiveness was the most common kind of assault (82.7%), and working the night shift was riskier (42.8%). The majority of aggressive events

Table 1. Characteristics of the study population.

	Total		Males		Females	
	n	%	n	%	n	%
<i>HCWs (tot)</i>	294	100,0%	91	31,0%	203	69,0%
<i>Age (mean $\pm$ ds)</i>	40,5 $\pm$ 11,3		42,1 $\pm$ 10,9		39,8 $\pm$ 11,4	
<i>Age group (years)</i>	n	%	n	%	n	%
20-30	72	24,5%	17	18,7%	55	27,1%
31-40	81	27,6%	24	26,4%	57	28,1%
41-50	71	24,1%	24	26,4%	47	23,2%
51-60	63	21,4%	25	27,5%	38	18,7%
>60	7	2,4%	1	1,1%	6	3,0%
<i>Job category</i>	n	%	n	%	n	%
Physicians	74	25,2%	18	19,8%	56	27,6%
Nurses	160	54,4%	48	52,7%	112	55,2%
Nursing assistants	59	20,1%	25	27,5%	34	16,7%
Administrative staff	1	0,3%	0	0,0%	1	0,5%

Table 2. Data from “incident reporting” form: violent events reported in 2023.

	n	%
Total violent events	271	100.0%
Type of assault		
<i>Verbal assault</i>	224	82.7%
<i>Physical assault</i>	42	15.5%
<i>Damage to objects</i>	2	0.7%
<i>Not declared</i>	3	1.1%
Time of the event		
<i>Morning</i>	52	19.2%
<i>Afternoon</i>	103	38.0%
<i>Night</i>	116	42.8%
Location of the event		
<i>Triage Room</i>	132	48.7%
<i>Internal common areas</i>	39	14.4%
<i>Waiting room</i>	36	13.3%
<i>Clinic/medical room</i>	33	12.2%
<i>Observation room</i>	19	7.0%
<i>Emergency Room</i>	5	1.9%
<i>Other</i>	7	2.6%
Aggressor		
<i>Relative/caregiver</i>	143	52.8%
<i>User/Patient</i>	123	45.4%
<i>Not declared</i>	5	1.9%
Job category of the assaulted HCW		
<i>Nurse/pediatric nurse</i>	178	65.7%
<i>Physician</i>	25	9.2%
<i>Nursing assistant</i>	5	1.9%
<i>Security guard</i>	3	1.1%
<i>Not defined (multiple figures involved)</i>	29	10.7%
<i>Other</i>	27	9.9%
Gender of the assaulted HCWs		
<i>Female</i>	189	69.7%
<i>Male</i>	53	19.6%
<i>Data not available (multiple figures involved)</i>	29	10.7%

(48.7%) took place in the triage area, and the aggressor was a patient's family member or caregiver in 52.8% of the incidents. Nurses/pediatric nurses were the most commonly targeted professional group

(65.7%), and women were the victims in 69.7% of cases. (Table 2). The analysis of the ratio between the number of aggressive events that were recorded and the size of the population under consideration supports this data. Specifically, women recorded a ratio of 0.93 (95% CI, 0.80-1.07) versus 0.58 (95% CI, 0.44-0.76) in men, and nurses recorded a ratio of 1.11 (95% CI, 0.96-1.29) versus a physician's ratio of 0.34 (95% CI, 0.22-0.50).

As shown in Table 3, the analysis of the “incident reporting” form indicated that in 36.2% of cases, patient management times could potentially predict aggressive incidents. Other factors identified by healthcare workers as possible triggers for violence include the patient and/or caregiver relationship (30.6% of cases), the patient's refusal to follow diagnostic-therapeutic protocols (27.3% of cases), and the cultural influences and temperamental traits of the patient or caregiver (18.8% and 11.8% of violent cases, respectively). Additionally, work environmental factors such as the physical surroundings, equipment, staff shortages, and workloads were reported by approximately 26.5% of healthcare workers as potential contributors to violent events, while organizational factors were cited in 20% of cases.

The analysis of the 2023 report on daily ER visits showed that the average patient management time was 223.7 minutes, with notable differences depending on the severity of the illness and the triage code (white code: 173.7 minutes, green code: 203.9 minutes, yellow code: 346.8 minutes, red code: 492.3 minutes).

The analysis showed a significantly longer average patient management time on days when one or more violent events occurred compared to days when no events occurred (278.6 minutes vs. 249 minutes, $p < 0.001$) (Figure 1).

The predicted probability of a violent incident within a 150-minute stay was less than 10%, according to the logistic regression analysis, which calculated the risk of an aggressive occurrence in connection with the prolonged patient management time at the ER. At 300 minutes (5 hours), the likelihood of one or more violent incidents was about 20%; after 420 minutes (7 hours), it rose to roughly 30%; and after 650 minutes (10/11 hours), it reached 53%, as shown in Figure 2.

Table 3. Data from “incident reporting” form: factors reported by HCWs as possible causes of the aggressive event (more than one answer was possible).

Possible determinants of violent act	n	%
Work environment elements		
<i>Timing</i>	98	36.2%
<i>Staff</i>	36	13.3%
<i>Structure and design</i>	19	7.0%
<i>Workload/working hours</i>	7	2.6%
<i>Environment</i>	6	2.2%
<i>Equipment/supplies</i>	4	1.5%
Factors related to tasks and work processes		
<i>Availability and use of protocols</i>	74	27.3%
<i>Availability and accuracy of test results</i>	1	0.4%
Individual factors		
<i>Skills and knowledge</i>	1	0.4%
Organizational factors		
<i>Organizational structure</i>	30	11.1%
<i>Safety culture</i>	27	9.9%
<i>Imported/exported risks</i>	1	0.4%
Patient-related factors		
<i>Relationship between staff and patient</i>	83	30.6%
<i>Personal characteristics</i>	51	18.8%
<i>Treatment</i>	47	17.3%
<i>Conditions</i>	32	11.8%
<i>Medical history</i>	1	0.4%
Factors related to the relative/caregiver		
<i>Patient – Characteristics of relatives/caregivers/acquaintances</i>	32	11.8%
Factors related to the workgroup		
<i>Verbal communication</i>	9	3.3%
<i>Written communication</i>	4	1.5%
<i>Leadership and responsibility</i>	3	1.1%
<i>Colleagues' reaction to incidents</i>	1	0.4%

Furthermore, a statistical analysis was conducted on the collected data to identify both a “safety” value below which the risk of assault can be considered acceptable and an “action” value from which to consider mandatory improvement interventions. The statistical analysis showed that the temporal cut-off with the highest sensitivity was 144 minutes of average management time, while the best compromise between sensitivity and specificity

was 246 minutes of average management time (Figure 3).

4. DISCUSSION

As evidenced by the rise in scientific publications on the topic [17] and legislative actions [18] during the previous 20 years, violence by patients and their relatives against HCWs are becoming

more commonplace worldwide, and Italy is no exception.

In this context, starting from the incident reporting form, we preliminarily outlined the characteristics of violent acts perpetrated against healthcare

workers in 2023 in the ER. Subsequently, we conducted a specific analysis to investigate the relationship between average patients' management times in the ER and the risk of violent acts against HCWs.

Literature shows that over 80% of HCWs experienced physical or verbal assault during their careers, and verbal assaults/threats are more frequent than physical assaults [17]. Similarly, our study found that 82.7% of reported aggressive episodes in 2023 were referred to verbal assault, followed by physical assault (about 15%), while property damage was minimal (<1% of violent acts). The underreporting of verbal aggression incidents warrants consideration; healthcare professionals often perceive such episodes as inherent and unavoidable aspects of clinical practice, and otherwise elevated workload demands may contribute to the reluctance to formally report verbal assaults, in an effort to preserve time for direct patient care activities.

It is noted that in 42.8% of cases, the violence occurred at night, compared to 57.2% of events recorded during the daytime shift (19.2% of cases in

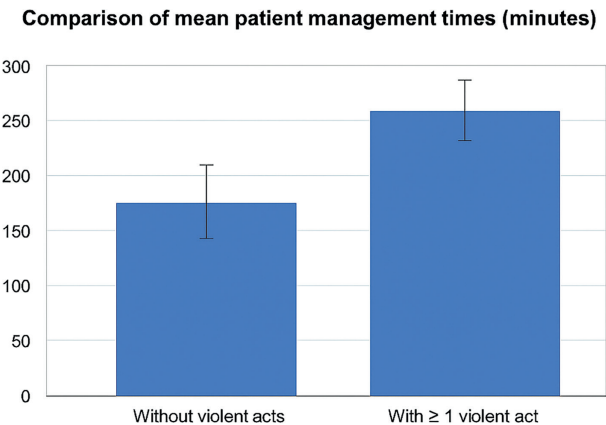


Figure 1: Comparison of average management times (minutes) of a patient in the ER on days without violent acts and on days with one or more violent acts.

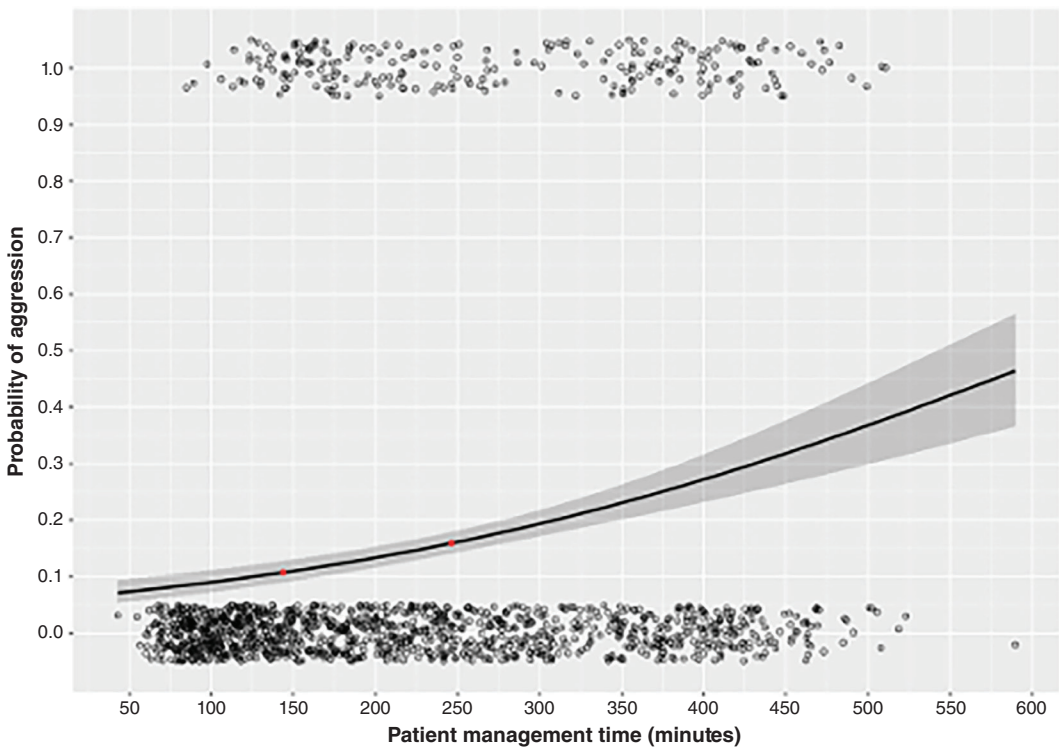


Figure 2. Scatter plot: probability of an aggressive event related to the patient's management time in the ER.

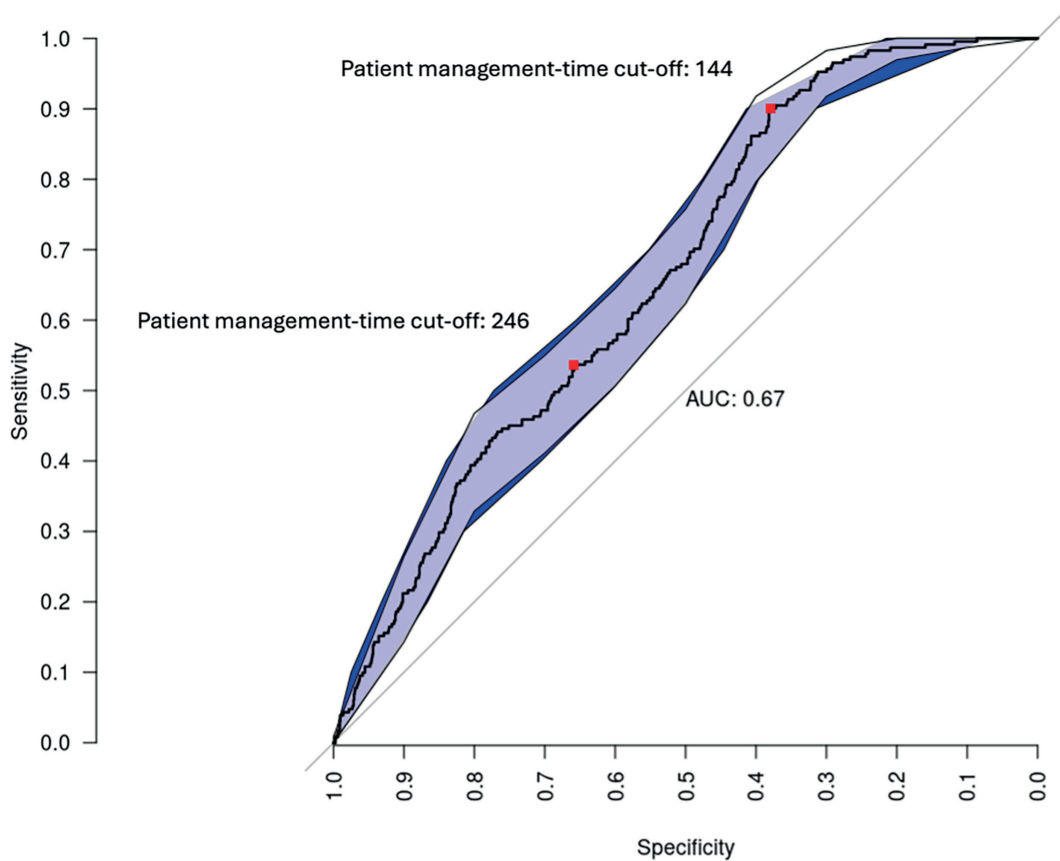


Figure 3. ROC curve: aggressive event related to the patient's management time in the ER.

the morning and 38.0% of events in the afternoon). These findings are supported by other research in the literature [19, 20]. Although the slightly longer night shift duration cannot be ruled out, several different factors, in our experience, may have contributed to the higher frequency of violent events at night. During nighttime hours, there is a noticeable increase in Emergency Department admissions involving patients experiencing acute intoxication from alcohol or illicit drugs. The resulting psychomotor agitation represents a risk factor for the onset of aggressive behavior, which is often unprovoked. Another contributing factor is the accumulation of patients whose care was not completed during the day, leading to a heavier workload for the night shift. This situation is exacerbated by reduced healthcare staffing levels, particularly in the radiology unit, resulting in delays in conducting diagnostic tests. Additionally, hospital volunteer support services,

which are often involved in discharge planning and patient transfers during daytime hours, are typically unavailable at night, thereby removing a valuable resource for patient flow management. Together, these conditions contribute to increased tension and discomfort among patients, which, in our experience, may explain the higher risk of verbal and physical aggression during night shifts.

The violent episode occurred most frequently in the triage room (48.7%), and 65.7% of the assaults were perpetrated against nurses; this data is in accordance with the literature and plausible since nurses are the most represented professional figures and especially face high-tension situations in triage (demand for immediate assistance, caregiver's emotional vulnerability, patient's health concern) [21].

As expected and confirmed by literature [22], female staff were more frequently victims of violence (69.7%) compared to male colleagues; this

data should be examined considering that in ERs of the hospital under study 69% of HCWs are women (203 women out of 294 workers).

Regarding the aggressor, our study highlighted that the relative/caregiver was the actor of the violence in 52.8% of cases and the patient themselves in 45.4% of events. The data is in line with the study conducted by Ferri et al. [23], in which verbal assault by relatives/ friends of patients was more frequent in emergency departments. In contrast, patients are the main culprits of physical attacks.

Starting from the evidence that the literature lists long management times as a risk factor for assaults on healthcare staff [12-14], we conducted an internal analysis to evaluate the possible relationship between average patients' management times in the ER and the risk of aggression. Indeed, although the literature agrees that the time factor is a target for improvement interventions [24], no study establishes a reference temporal cut-off for managing this risk.

Specifically, analysis of the 2023 report on daily ER accesses showed an average patient management time of 223.7 minutes, with wide variability depending on disease severity and subsequent triage code (white code: 173.7 minutes, green code: 203.9 minutes, yellow code: 346.8 minutes, red code: 492.3 minutes). These findings are consistent with nationwide data released by Agenas [16] in 2023, which indicated that the average patient management time in the emergency department was approximately 165 minutes for white codes, 230 minutes for green codes, and 416 minutes for yellow codes.

Regarding the possible relationship between patient management time in the ER and the risk of violent acts, our study showed a significantly longer average patient management time on days when one or more violent events occurred compared to days when no events occurred ($p < 0.001$). In our study, the predicted probability of one or more violent acts was around 20% at 300 minutes (5 hours) of stay, increased to about 30% after 420 minutes (7 hours), and reached 53% after 650 minutes (10/11 hours), identifying a possible role of the "time" factor only for particularly prolonged management times and far exceeding the average waiting times of ER patient. Since there are currently no comparable works

on this issue in the scientific literature, we are unable to compare this result. Our results indicate a possible co-causal but not an exclusive role of the "waiting time" factor in aggressive behaviour by patient/caregiver against HCWs, as confirmed by the event description on the "incident reporting" form. Among other co-causal factors are clinical and cultural reasons of the patient/caregiver (e.g., altered behavior due to drug use, alcohol abuse, or behavioral disorders, refusal to comply with procedures regarding the number of allowed companions and visiting hours, demand for immediate assistance even if not supported by an emergency-urgent clinical condition).

These results necessitate a reflection on the most appropriate measures to be implemented to reduce the risk of aggressive events in the healthcare setting and improve the safety of HCWs in carrying out their activities. Effective collaboration between the employer and the Occupational Physician is imperative. In the context of primary prevention, the occupational physician contributes to risk assessment by sharing insights with the employer. Health surveillance visits may be an opportunity to raise workers' awareness regarding the importance of incident reporting: workers' testimonies, collected in an anonymous and aggregated form, combined with the outcomes of workplace inspections, allow for a more accurate risk assessment and may contribute to the confirmation or revision of intervention priorities based on the epidemiological analysis of reported incidents and occupational injuries assault-related. Furthermore, during occupational health surveillance visits (periodic, on request, or at return to work), the Occupational Physician may detect early signs of psycho-physical distress related to previously experienced aggression. When appropriate, psychological support can be activated as part of a secondary prevention strategy. As outlined in Article 25 of Legislative Decree 81/2008 [25], the Occupational Physician also plays a key role in workers' education and training, providing information on procedures to follow in the event of aggression, and promoting participation in de-escalation, self-defense, and assertive communication courses. In our experience we think that, about the measures to reduce the risk of aggressive events

in the healthcare setting, structural/environmental interventions (delimitation with airtight doors and safety glass of acceptance/triage area, limited access areas, security service, adequate spaces for de-escalation techniques, comfortable waiting rooms), and organizational interventions (clear policies, adequate number of operators to the workload) are crucial in all contest at risk. Furthermore, the HCWs' training program intervention would be appropriate to enhance their ability to manage these high-risk situations. Finally, the availability of a psychological support service appears to be effective in reducing post-traumatic stress symptoms through individual and group interventions (debriefing and defusing).

4.1. Study Limitations

It is necessary to mention some limitations of this study that could affect the accuracy of the results shown and the validity of the conclusions drawn. Firstly, we did not have data on patient waiting times from entry into the ER to being attended to by healthcare workers. Therefore, the investigation was conducted considering the patient's overall management time, from entry to discharge from the ER, in light of Agenas reports [18]. In addition, the unavailability of specific data on the ER stay of patients from whom the violent event originated meant that the survey was conducted by comparing, more generally, the average time of stay for ER patients managed during days with and without aggression. Furthermore, we do not have access to the actual number of hours worked by each category of HCWs; this data could help examine the increased occurrence of aggressive events in particular subgroups of the study population. Finally, an underestimation of the problem cannot be excluded due to a possible under-reporting by health professionals. Further studies are necessary on larger cases focused on the time of "patients taking charge", aggressors and not, for deepening and confirmation of the results obtained.

5. CONCLUSIONS

In conclusion, healthcare workplace violence is impacted by a complex interplay of external

(political, sociocultural) and internal (individual and organizational) elements. Here, the "waiting time" element may contribute to, but not be the sole cause of, aggressive behavior by patients or caregivers against HCWs. Understanding how these elements interact and contribute to the genesis of events is crucial for maximizing the effectiveness of the interventions undertaken, as well as for defining priority actions to reduce and mitigate violent incidents.

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