



Criminological and Medico-legal Aspects in Homicidal and Suicidal Sharp Force Fatalities

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ABSTRACT

The interpretation of sharp force fatality dynamics may be difficult in some cases, but a contribution to analysis of the phenomenon may be provided by case studies. **Therefore, the purpose of our study is focused on identifying, in observed sharp force fatalities, reliable parameters that can differentiate a homicidal and suicidal manner of death, with particular reference to criminological parameters.**

~~The present study aims at analyzing the characteristics of homicides and suicides by sharp force injuries in Padua and Venice from 1997 to 2019, with a view to differential diagnoses.~~ Data derived from **sharp force fatality cases in Padua and Venice from 1997 to 2019**, anonymized and collected in Excel, included personal, circumstantial, clinical, and psychopathological–criminological data, as well as crime scene investigation, necroscopic, and toxicological data.

Statistical analyses were performed using chi-square and Wilcoxon rank-sum tests. Possible predictors of homicide were analyzed by logistic regression. Six parameters (blood stains distant from the body, clothing lacerations, hesitation/defense wounds, number of injuries, and potential motives) were significantly different in the two groups ($p < 0.05$). An independent statistical association between potential motives explaining the crime ($p < 0.001$; OR 27.533) and homicide on multiple logistic regression analysis was highlighted. The absence of clothing lacerations was inversely related to homicide ($p = 0.002$, OR 0.092). To the best of our knowledge, this is one of very few Italian studies concerning the differential diagnosis between homicidal and suicidal sharp force fatalities. The dynamics of the event is established in most cases by the integrated evaluation of data from crime scene investigation and the autopsy. Nevertheless, in an atypical scenario, a psychopathological–criminological analysis may provide essential elements, and particular attention should be given to the identification of potential explanatory motives.

KEYWORDS: homicide, suicide, sharp force injuries, forensic pathology, criminological analysis, complex suicide

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3 In 2015, an estimated 470,000 people worldwide were victims of homicide, with a global rate of 6.4
4 per 100,000 and the highest rates observed in males aged 15–29 (1). Globally, males commit almost
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7 95% of homicides (2).

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10 Italy's homicide rate is quite low compared to the European Union (0.59 per 100,000 in 2017); the
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12 highest rate, after direct standardization, was observed for male subjects aged 25–34 and female
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14 subjects over 64, followed by middle-aged women, with a total of 357 homicides in 2017 (3,4). In
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16 particular, since the 1990s, a descending trend in the number of homicides was observed, mostly in
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18 relation to male victims (the ratio of male homicides vs. female homicides dropped from 5:1 to 2:1).
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21 Foreigners were the victims of homicide in 19.6% of cases (3).

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24 Deaths due to homicide are largely exceeded by the number of suicides worldwide. According to the
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26 World Health Organization, about 800,000 people commit suicide every year (5), with a global rate
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28 of 10.6 per 100,000 (6).

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31 In Italy, the number of suicides is 10 times greater than the number of homicides, with about 4000
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33 people committing suicide every year, and almost 80% of them are males. The highest rate observed
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35 after direct standardization was for male subjects aged 45–54 (7).

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38 Sharp force fatalities represent the main cause of homicide in countries with strict firearm legislation
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40 (8,9). An analysis of 417 verdicts in female homicide cases in Italy demonstrated that 40.2%, 18%,
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42 15.5%, 12.8%, 9%, and 4.5% of these crimes were committed by means of, respectively, sharp
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44 objects, strangulation, blunt trauma, firearms, blunt forces by fist and kick, and other causes (10).

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47 The majority of homicides are committed by males, and the motive is frequently an interpersonal
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49 conflict between the murderer and the victim, particularly when the victims are female (3,11–14).

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52 “Hard” methods of suicide, such as sharp force self-destruction, are mainly used by men who
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54 frequently have a psychiatric history (15,16), although the lethality of sharp forces is quite low in
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56 comparison to other methods (17).

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59 Sharp force violence is, nowadays, an uncommon method of suicide, constituting only 2–3% of all
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self-inflicted deaths with a frequency almost equal to stabbing and cutting injuries (respectively, 40%

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3 and 37%, with both present in around 25% of cases) (8,16,18–23). In Italy, in the period 2000–2014,
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5 the use of a cutting weapon represented 2.1% (SD 0.32%) of self-inflicted deaths in males and 1.8%
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7 (SD 0.47%) of self-inflicted deaths in females (7). Sharp force fatalities are, hence, a mainly
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9 homicidal event, with a homicide to suicide ratio estimated to be around 6:1 to 5:2 (16).

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12 In forensic practice, the differentiation between suicidal and homicidal sharp force violence is often
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14 achieved by the integrated evaluation of data derived from a crime scene investigation as well as from
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16 well-established necroscopic signs described in the literature (11). Nevertheless, some cases may
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18 present unusual findings (23–25) with a difficult interpretation of the dynamics.

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21 In such circumstances, a psychopathological–criminological analysis may provide essential elements.
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23 In particular, from the psychopathological point of view, we hypothesized that a diagnosable
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25 psychopathological disorder assessed by means of clinical data may indicate the identification of a
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27 suicide and the possible exclusion of a homicide; this is based on the fact that the majority of the
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29 subjects committing suicide had a psychiatric disorder (16). From the criminological point of view,
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31 we hypothesized that the characteristics of the deceased are different in suicide and homicide events,
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33 and in addition, there is the presence of indicators of potential motives. A general victimological role
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35 may be suggested by the presence of features of the victim that may interfere with an appropriate
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37 response to an assault; potential motives may be related to a specific context of the murder (e.g.,
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39 homicide committed by a family member) (3). In particular, the knowledge one can glean of the most
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41 frequent circumstances of murder linked to a specific form of homicide (e.g., domestic or criminal
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43 homicide), and of the most common motives, may represent a useful additional tool in terms of
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45 differential diagnosis.

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48 The aims of this study were to (1) investigate the general characteristics of homicidal and suicidal
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50 sharp force violence in Padua and Venice in the period 1997–2019, (2) find reliable necroscopic and
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52 criminological features useful for a differential diagnosis between murder and suicide, and
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54 (3) compare the results with national and international studies.
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Materials and Methods

In this case-control study, we reviewed autopsy reports and alleged documentation from closed judicial proceedings involving sharp force fatalities observed at the Institute of Legal Medicine of the University of Padua and at the Department of Legal Medicine in the Health Unit of Venice in the period 1997–2019. The inclusion criteria were as follows:

- A homicidal or suicidal manner of death as established by the forensic pathologist.
- The availability of circumstantial data.
- The availability of iconographic material.
- The availability of data from the crime scene investigation, external examinations, and autopsy.
- The identification and characterization by the forensic pathologist of sharp force injuries that included either stab wounds (depth exceeds length) or incised wounds (cuts whose length exceeds depth).

Autopsy reports and iconographic material were reviewed by two forensic pathologists after an anonymization process was performed. The following parameters were recorded and are reported in Table 1: 1) personal data; 2) circumstantial data and event planning; 3) data from the crime scene investigation; 4) necroscopic and toxicological data; 5) clinical data; and 6) criminological data, where available. Criminological data included potential motives explaining the crime derived from circumstantial and investigative data as well as the presence of victimological aspects regarding the deceased. Potential motives explaining a crime and victimological aspects, even if suggestive of a specific dynamic, may be found for other reasons in atypical scenarios or cases. Potential motives were classified as being related to the presence of a **defined** psychiatric disorder in someone with a close relationship with the deceased (**immediate family, partner, ex-partner, close friend**), money (**inheritance matters, evidence of robbery**), drugs (**history of drug dealing**), jealousy/betrayal, conflictual/chaotic family background (**previous domestic violence, frequent quarrels with law enforcement alerted**), recent separation/divorce, trivial reasons, and unknown. A victimological role

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3 was suggested by the presence of one of the following features: age (subjects younger than 10 or
4 older than 65), gender (female), state of intoxication, inability to defend oneself due to weakness/frail
5 constitution, or social marginality.
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10 For a topographical assessment of injuries, we implemented the human model presented by Vassalini
11 et al. (8) (Fig. 1). If the review of the cases revealed conflicting interpretations of the available data,
12 a third evaluation was carried out by the senior author. Descriptive analyses were conducted in Excel,
13 separately for homicides and suicides. Homicide cases were then compared to suicide cases (controls)
14 according to variables related to the crime scene investigation and to necroscopic and criminological
15 data, where significance was determined by chi-square (Fisher's exact test) and Wilcoxon rank-sum
16 tests. Finally, to prevent confounding effects, multiple logistic regression analysis was performed.
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27 **Results**

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29 Fifty-one cases were included in this study, which covered the period 1997–2019. Gender, nationality,
30 and mean age of the deceased are provided in Table 2. The parameters of marital status, parenthood,
31 education, occupation, and toxicological analysis were not considered any further due to
32 unavailability of the data in most cases.
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38 *Homicide*

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40 Thirty-one (60.8% of the sample) homicide cases were analyzed, where a higher proportion of the
41 victims (18 out of 31 cases, or 58.1%) were male subjects aged 25–45. Homicides most frequently
42 occurred between 6.00 PM and 6.00 AM (19 cases, 61.2%). More than half of the cases occurred on a
43 weekend day (seven cases occurred on a Friday and nine cases on a Sunday), and the murders took
44 place at the victim's house in 51.6% of the cases. The weapon was found in 25 cases (83.3%) and
45 was recovered near the body of the victim in 16 cases (53.3%); in only one case was the weapon
46 found still inside the body (3.3%). The kitchen knife was the most frequently used sharp weapon (24
47 out of 30, or 80%). In 14 cases (47%), blood traces were found far from the body, and the victim
48 presented with blood on the palms of the hands in 19 cases (63.3%).
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3 Clothing lacerations were present in 22 cases (70.96%). The median and interquartile range (in
4 parentheses) of the total number of injuries and defensive wounds were, respectively, 7 (2.5-15) and
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7 1 (0-3). The distribution of injuries is shown in Fig. 2. No hesitation marks were described in any of
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9
10 the cases. The victims suffered from physical diseases in three cases and from psychiatric disease in
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12 two cases (depression and borderline personality disorder).

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14 With regard to the relationship between the perpetrator and the victim, it was found that the
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16 perpetrator of the crime was a member of the same family in the majority of the cases (17 cases,
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18 54.8%). Potential motives explaining the fatal event that involved responsibilities of a third party
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20 were present in 28 cases (90.3%); the most frequent motive was a psychopathological one (10 cases,
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22 38.5%), followed by jealousy (six cases, 23.1%). Characteristics of the deceased that suggested a
23
24 victimological role were present in 18 cases (58.06%).
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27 28 *Suicide*

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30 Twenty cases of suicide (39.2% of the sample) were analyzed, and male subjects (17) aged 25–44
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32 were most frequently affected (10 out of 20 cases, 50%). Suicides occurred most often between
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34 midnight and 6 AM (eight cases, 40%) or between noon and 6 PM (eight cases, 40%). Sixty percent of
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36 the suicides occurred during a weekend, and 10% occurred on a Monday morning. Twelve suicides
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38 (60%) occurred in the victim's house. A written note explaining the reasons for suicide was found in
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40 10 cases (50%). The weapon was found in all cases, including near or inside the body in 17 cases
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42 (85% of the total). A kitchen knife was the most frequently used weapon (14 out of 20 cases, 70%).
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44 In two cases (10%), blood traces were found far from the body. In 14 cases, there was blood on the
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46 palms of the victim's hands (70%); clothing damage was present in four cases (20%).
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51 The presence and localization of hesitation marks (10 of 20 cases, 50%) are reported in Fig. 3. Defense
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53 wounds were present in one case. The average total lesions, excluding hesitation wounds, was 5.15;
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55 median values (and interquartile range) of the total number of injuries was 3 (1-5.25). In seven cases,
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57 a single lesion was described. The distribution of the lesions is described in Fig. 4. The death was
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59 caused by sharp force injuries in 18 of the 20 cases (90%); in two cases, the causes of death were
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3 complications from burns and drowning. A history of psychiatric disease was present in 14 cases
4 (70%), with psychopharmacological therapy in just seven cases (50%). Potential motives explaining
5 the fatal event that involved responsibilities of third parties were present in three cases; features of
6 the deceased suggesting a victimological role were present in six cases.
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10 11 *Homicide vs. Suicide*

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13 Six parameters were significantly different in the two groups, as shown in Table 2. Our results
14 revealed an independent statistical association between potential motives explaining the crime
15 (p -value < 0.001; OR = 27.533; 95% CI 5.210–145.511) and homicide, based on multiple logistic
16 regression analyses (Table 3). The absence of clothing lacerations was inversely associated with
17 homicide (p -value of 0.002; OR = 0.092; 95% CI 0.020–0.423).
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26 27 **Discussion**

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29 In some cases, sharp force fatalities represent a challenge for the medical examiner appointed to
30 distinguish between homicide and suicide events, and unusual suicide cases have been reported
31 (16,20,26). Our study confirms the results of previous studies on necroscopic and circumstantial data,
32 and it is an innovative contribution to the analysis of psychopathological–criminological aspects of
33 sharp force fatalities.
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40 41 *Personal Data*

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43 In our cases, among the homicide victims, there was a predominance of male subjects (18 out of 31,
44 58.1%) who were aged 25–44, which is in accordance with recent Italian studies (3); however,
45 divergent results have been reported in the international literature regarding the sex ratio in sharp
46 force homicide cases (8,9,11,16,27–29). Our results support the evidence that violent methods of self-
47 destruction are more frequently used by men, with 85% of male subjects in the suicide group (15). It
48 has been suggested that women use less lethal methods, resulting in a higher number of failed suicides
49 (15).
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3 The age of the victim was not significantly different between the homicide and suicide groups. This
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5 is in contrast to previous studies that showed a predominance of younger victims in homicide cases,
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7 presumably because of the inclusion in such studies of infants and children, who are potential victims
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9 of murder but do not commit suicide (8,9,16,27,30,31).
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12 *Circumstantial Data*

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14 Our results confirmed that with respect to both manners of death, the location of the death was
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16 frequently the victim's home, suggesting the presence of a closer relationship between victim and
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18 perpetrator in homicides. In particular, a higher degree of interrelationship has been reported for
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20 women, as they tend to be killed in their own homes more frequently than men (11,13,14,19,32).
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23 *Scene of Death*

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25 The presence of blood stains far from the corpse was associated with a homicide event, suggesting
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27 movement of the murderer and/or the victim (19). A kitchen knife was the most frequently used
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29 weapon, and its position, while more often present next to the corpse in a suicide, did not show
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31 statistical significance in differentiating between the two dynamics. Moreover, a position nearer to
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33 the corpse did not necessarily indicate suicide, as a murderer may leave the weapon to simulate
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35 suicide. The finding of a note, a will, or a previous declaration of suicidal intent has been found to be
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37 related to suicide, which was demonstrated by Karlsson et al. (12) in a model based on multivariate
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39 analysis.
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44 *Necroscopic Data*

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46 The absence of clothing damage was negatively associated with a homicidal dynamic according to
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48 multivariate analysis. Accordingly, clothing damage was the strongest predictor of death being caused
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50 by homicide in a model based on multivariate analysis by Karlsson et al. (12). In a typical suicide,
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52 injuries are sustained at sites not covered by clothing or after clothing has been pulled aside to expose
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54 skin. Though commonly seen in homicide, clothing damage is not infrequently encountered as an
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56 atypical feature in suicidal events: in our sample, four cases out of 20 (20%) had clothing lacerations,
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58 in keeping with findings from De Giorgio et al. (23%) (19) and Start et al. (28%) (31); Fukube et al.
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3 (20) and Karger et al. (16) reported higher rates (respectively, 39% and more than 50%). It has been
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5 proposed that the absence of hesitation marks or the presence of damage to the clothing may indicate
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7 a strong motivation to commit suicide in a victim with a psychiatric history (33). This evidence
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9 highlights that clothing damage should not be considered an absolute indicator of homicide, and it
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11 instead needs to be integrated with other findings.
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15 With regard to the number of injuries, we observed a significant difference between murder and
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17 suicide, even after the exclusion of case 13, with 120 lesions. There was a greater number of injuries
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19 inflicted in homicide cases (a median of seven in homicides, with an interquartile range of 2.5–15,
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21 versus a median of three in suicides, with a range of 1–5.25, tentative wounds excluded); however,
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23 variability was present in both groups. It has to be noted, however, that single stab homicides are not
24
25 a rare event, with reports of rates varying from 22% to 67% (11,16,34). There are also atypical
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27 suicides reported with more than 60 sharp force wounds (16,20,26,33,35). The self-infliction of
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29 multiple injuries may derive from the failure to inflict a single lethal injury or from a desire for self-
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31 punishment (26). The total number of injuries is therefore consistently considered a less reliable
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33 parameter for differentiating between dynamics (19).
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38 An analysis of the locations of lesions pointed to differences between the manners of death. In the
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40 typical suicide case, the choice of site for self-infliction of a wound depends on the existence of a
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42 readily accessible region of the body; the avoidance of sensitive areas such as genitalia, lips, and eyes;
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44 the avoidance of solid anatomic structures such as bones; and the victim's belief about the anatomic
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46 position of vital structures such as the heart or arteries in the neck (20,26). Our results are consistent
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48 with the literature in showing the region of the neck, the left anterior chest, the abdomen, and the
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50 anterior surface of the forearms were the most frequently injured sites (16,19,22,33,36).
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54 Homicide victims usually do not have control over the site of injury, and indeed, we observed injuries
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56 to bony regions such as the face (23% of the cases) or head (19% of the cases). Sharp wounds in the
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58 back were also a frequent occurrence (42%) in homicides but were not present at all in the suicide
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60 cases. These locations are considered strong indicators of homicide (9,12,29). The left chest was more

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3 frequently injured in both manners of death, probably because of beliefs about the heart's anatomic
4 position and/or the composition of the population in relation to a predominance of right-handed
5 subjects.
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10 The presence of defensive and tentative wounds were strongly associated with, respectively, homicide
11 and suicide. Injuries to the posterior surface of the forearms and to the hands were seen exclusively
12 in homicide cases and corresponded to defensive wounds (with the exception of one suicide victim
13 in a homicide–suicide case). These injuries occur when the victim raises the upper limbs to protect
14 themselves against the assault (passive defense injury) or tries to ward off the weapon by grasping it
15 (active defense injury). We observed a higher incidence of such injuries compared to what has been
16 reported in the literature (64.5% vs. 37.1%–49.5%) (11,19,36). Tentative injuries are superficial stabs
17 or cuts often seen in close proximity to the fatal wound and parallel to each other, with a lower
18 dispersion than defensive wounds. Our results are comparable to those described in previous studies,
19 as tentative injuries were present in 50% of the cases and confirm that injuries to the upper limbs,
20 except for the anterior surface of the forearm, are rarely seen in a suicidal event (8,19,21,27).
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35 Both tentative and defensive wounds may be missing in atypical scenarios; defensive-type injuries
36 can occur in suicide cases, and conversely, hesitation marks have been described in homicide cases
37 (16,19,21,27,33). In an atypical scenario, such as the aforementioned ones, a psychopathological and
38 criminological analysis may be useful for determining the manner of death.
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44 *Psychopathology*

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46 Several studies have shown that, as opposed to homicide, more than 90% of people who commit
47 suicide have a diagnosable psychopathological disorder (16,31,37–39). Our results are in keeping
48 with these findings. Interestingly, we found that among patients with a mental disorder, only 50%
49 were on treatment with pharmacological therapy. This observation may derive from low compliance
50 by these patients and/or an underestimation of the clinical situation by doctors. Any causal inference
51 to the death occurrence must take into account the toxicological evidence, which was not available in
52 many cases. As reported in our study, the diseases most frequently associated with suicide are mood
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3 disorders. Depressive syndromes were present in 80% of the cases, and psychoactive substance abuse
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5 (drugs and alcohol) is the second most common risk factor. Other diagnoses include schizophrenia,
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7 borderline personality disorder, and dementia (21,40).
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9 10 *Criminology*

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12 In Italy, domestic and criminal homicides are the most frequent homicidal incidents (41). In recent
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14 years, an important drop has been observed in homicides related to organized crime, especially in the
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16 central-south area, explaining the relative increase in the proportion of female homicide victims (3).
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18 Around 80.5% of female victims are killed by an acquaintance, whereas this is true for only 24.8%
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20 of male victims. A frequent scenario is, indeed, that of a family member, generally a man, who
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22 assaults other relatives, often the spouse (3,41).
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26 Sharp force violence is, in particular, an offense of a domestic nature: compared to men, a higher
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28 degree of interrelationship between perpetrator and female victim is suggested by the fact that they
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30 are more frequently killed in their own homes and tend to suffer a larger number of injuries, including
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32 to the upper extremities and superficial thoracic injuries (“scratches”) (3,11,13,14,30,32,42). The
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34 escalation of a chronic conflict within a family is the most common motive for domestic homicide
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36 (11,41).
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40 Our findings are in keeping with the foregoing considerations, as the majority of homicides (54.8%)
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42 in our case study occurred in a family context. In particular, a potential motive explaining the fatal
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44 event that involved responsibilities of third parties was present in 90.3% of the cases, and the
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46 existence of an interpersonal conflict against a psychopathological background of the perpetrator was
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48 the most frequent (38.5%) scenario, suggesting that the management of the psychiatric patient is
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50 sometimes very delicate in relation to not only his or her health but also with respect to people in
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52 close relationships with the individual, such as immediate family or a partner. Jealousy is also a
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54 frequent motive, and in our study, it was the second most prevalent motive (41). The presence of
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56 potential motives explaining the crime was an independent factor associated with homicide in our
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3 study, prompting the need for a careful criminological evaluation in cases where classic necroscopic
4 data are missing.
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7 A general victimological role is suggested by the presence of features of the victim that may interfere
8 with an appropriate response to the assault (e.g., alcohol/drug intoxication and other vulnerabilities
9 such as being socially marginalized) (41). Characteristics of the deceased suggesting a victimological
10 role were predominant in homicide victims (58.06%), although statistical significance was not
11 reached ($p = 0.05$).
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20 **Conclusions and Limitations of the Study**

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22 The number of subjects in our study was relatively small, and the documentation was not consistently
23 available, thereby preventing further analysis with stratification. Also, considering the low frequency
24 of sharp force suicidal methods in Italy, the design of a multicentric study may be the best perspective
25 to overcome these criticalities. Differentiation between suicidal and homicidal sharp force violence
26 can be successfully achieved through an integrated evaluation of data derived from the crime scene
27 investigation and external examination, in most cases. In accordance with previous studies, the
28 evaluation of clothing damage is of paramount importance.
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38 Nevertheless, classic necroscopic features may be missing in atypical cases, requiring that particular
39 attention should be given to the identification of **criminological aspects like** potential motives
40 explaining the crime. In our study, approximately one out of every three cases involved the perpetrator
41 being in a close relationship with the deceased and where the perpetrator suffered from psychiatric
42 disorders. Additionally, the majority of the homicides occurred in a family context.
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For Peer Review

Table 1. Data included in the collection form.

Personal data
✓ nationality and gender
✓ age
✓ marital status and parenthood
✓ education
✓ occupation
<hr/>
Circumstantial data and premeditation
✓ year, month, day of the week
✓ time of occurrence
✓ place of occurrence
✓ presence of third party
✓ presence of explanatory notes, wills or previous threats of suicide
<hr/>
Scene of the event
✓ presence of the weapon
✓ localization of the weapon
✓ type of weapon
✓ presence of blood stains distant from the corpse
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Necroscopic and toxicological data
✓ clothing lacerations
✓ characteristics of injuries (number, location, stab/incised)
✓ hesitation wounds (number, location)
✓ defence wounds (number)
✓ location of lesions and dominant hand
✓ alcohol
✓ drugs
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Clinical data
✓ diagnosis of physical diseases
✓ diagnosis of mental disorders
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Criminological and victimological data
✓ potential motives explaining the crime
✓ features of the deceased suggesting a victimological role.

Table 2. Demographic, crime scene investigation, necroscopic and criminological data among cases (homicides) and controls (suicides).

Variable		Total	Homicide	Suicide	P-value*	OR	95% CI
		N=51	N=31	N=20			
Gender	Female, n (%)	16 (31.4)	13 (41.9)	3 (15.0)	0.064	4.093	0.990-16.925
	Male, n (%)	35 (68.6)	18 (58.1)	17 (85.0)			
Nationality	Italian, n (%)	38 (74.5)	20 (64.5)	18 (90.0)	0.053	0.202	0.039-1.037
	Non-Italian, n (%)	13 (25.5)	11 (35.5)	2 (10.0)			
Age, years, median (interquartile range)		43.5 (35.25-53)	43.5 (34-53)	45 (37.75-54.5)	0.627	1.010†	0.975-1.016
Weapon far from the body, n (%)		11 (21.56)	8 (25.8)	3 (15)	0.32	2.061	0.474-8.963
Blood stains far from the body, n (%)		16 (31.37)	14 (45.16)	2 (10)	<0.01	8.400	1.642-42.974
Clothing lacerations, n (%)		26 (50.98)	22 (70.96)	4 (20)	<0.01	9.778	2.554-37.430
Hesitation wounds, n (%)		10 (19.60)	0 (0)	10 (50)	<0.01	-	-
Defense wounds, n (%)		21 (41.17)	20 (64.51)	1 (5)	<0.01	34.545	4.059-293.983
Number of injuries, median (interquartile range)		5 (2-11)	7 (2.5-15)	3 (1-5.25)	0.021	1.069†	1.007-1.135
Potential motives explaining the crime, n (%)		31 (60.78)	28 (90.32)	3 (15)	<0.01	52.889	9.566-292.424
Features of the deceased suggesting a victimological role, n (%)		24 (47.05)	18 (58.06)	6 (30)	0.05	3.231	0.980-10.653

* P-value refer to chi-square test (Fisher's exact test) for dichotomous variables and to Wilcoxon rank sum Test for continuous variables.

† OR (95% CI) for age and number of injuries (continuous variables) refer to univariate logistic regression analysis.

1
2
3 Table 3. P-Value, Odds ratio and Confidence interval of the variables associated to homicide cases
4
5 using multiple logistic regression model.
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8 Variable	P-value	OR	95% CI
9 Lack of Clothing lacerations	0.002	0.092	0.02-0.42
10			
11 Blood stains distant from the body	0.22	0.43	(0.096-1.930)
12			
13 Number of injuries	0.27	1.065	(0.962 – 1.180)
14			
15 Potential motives explaining the crime	<0.001	27.533	5.21-145.51
16			

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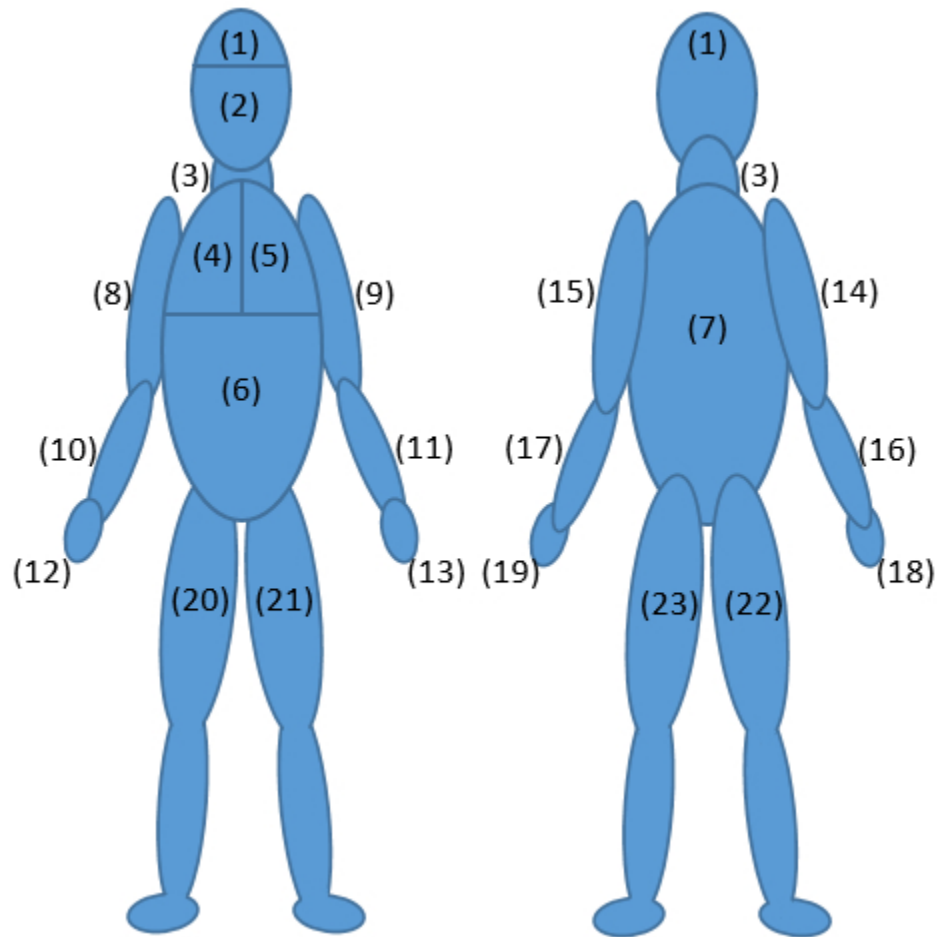
Figures Legends

FIG. 1—Distribution of injuries: (1) head; (2) face; (3) neck; (4) right anterior chest; (5) left anterior chest; (6) abdomen; (7) posterior chest; (8) right anterior arm; (9) left anterior arm; (10) right anterior forearm; (11) left anterior forearm; (12) right anterior hand; (13) left anterior hand; (14) right posterior arm; (15) left posterior arm; (16) right posterior forearm; (17) left posterior forearm; (18) right posterior hand; (19) left posterior hand; (20) right anterior lower limb; (21) left anterior lower limb; (22) right posterior lower limb; and (23) left posterior lower limb. Modified from Vassalini et al. (8).

FIG. 2—Distribution of homicidal injuries by percentage (darker colors correspond to the more frequently injured body areas). Additional locations that were present in less than 10% of the cases included the right posterior arm, left anterior arm, left posterior arm, right posterior hand, and left posterior lower limb.

FIG. 3—Distribution of hesitation marks by percentage (darker colors correspond to the more frequently injured body areas). Injuries to the head, face, anterior surface of the left chest, arms, and right inferior limb were also present in 5% of the cases (not shown).

FIG. 4—Distribution of suicidal wounds, tentative injuries excluded, by percentage (darker colors correspond to more frequently injured body areas). Additional locations were the anterior surface of the right chest and the left inferior limb, seen in 5% of the cases (not shown).



Distribution of injuries: (1) head; (2) face; (3) neck; (4) right anterior chest; (5) left anterior chest; (6) abdomen; (7) posterior chest; (8) right anterior arm; (9) left anterior arm; (10) right anterior forearm; (11) left anterior forearm; (12) right anterior hand; (13) left anterior hand; (14) right posterior arm; (15) left posterior arm; (16) right posterior forearm; (17) left posterior forearm; (18) right posterior hand; (19) left posterior hand; (20) right anterior lower limb; (21) left anterior lower limb; (22) right posterior lower limb; and (23) left posterior lower limb. Modified from Vassalini et al. (8).

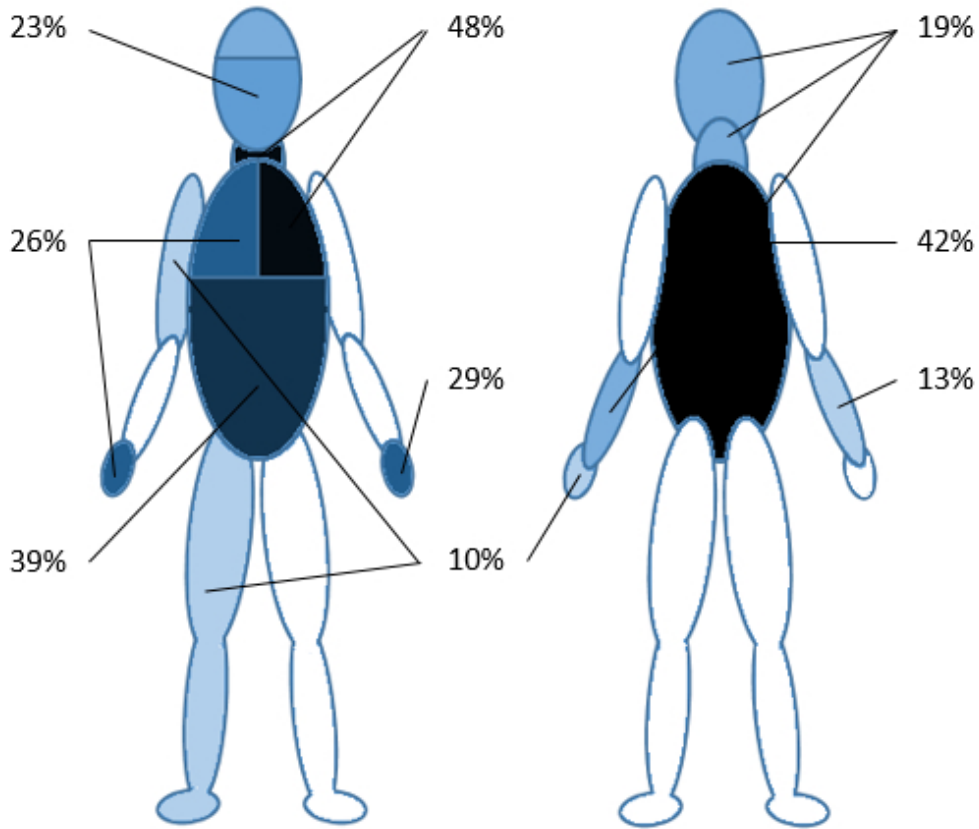


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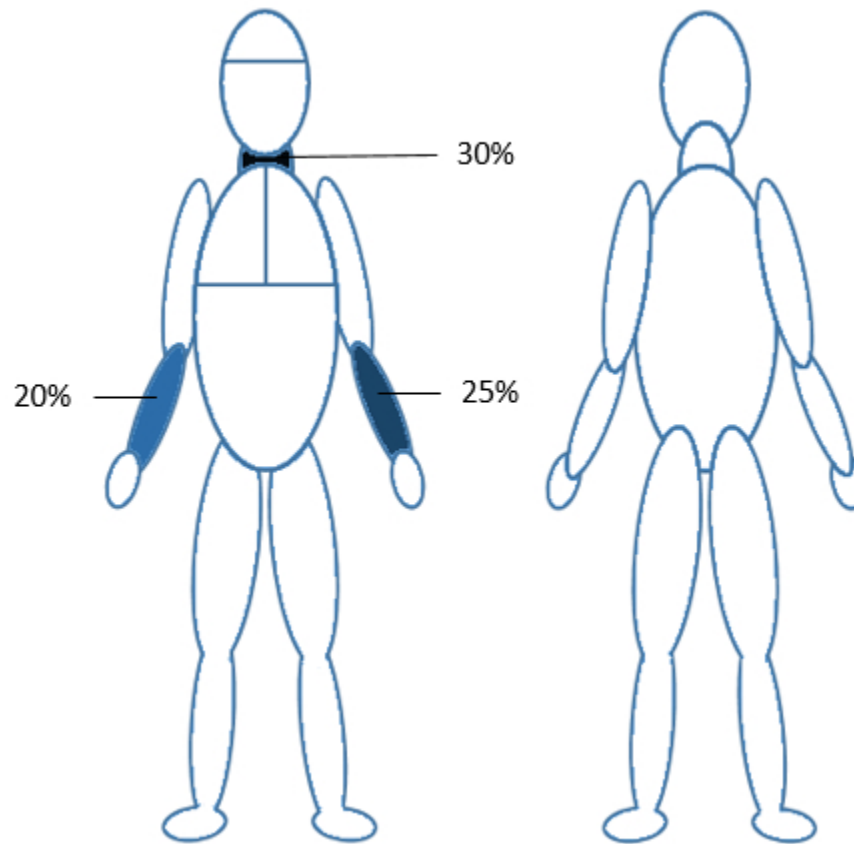


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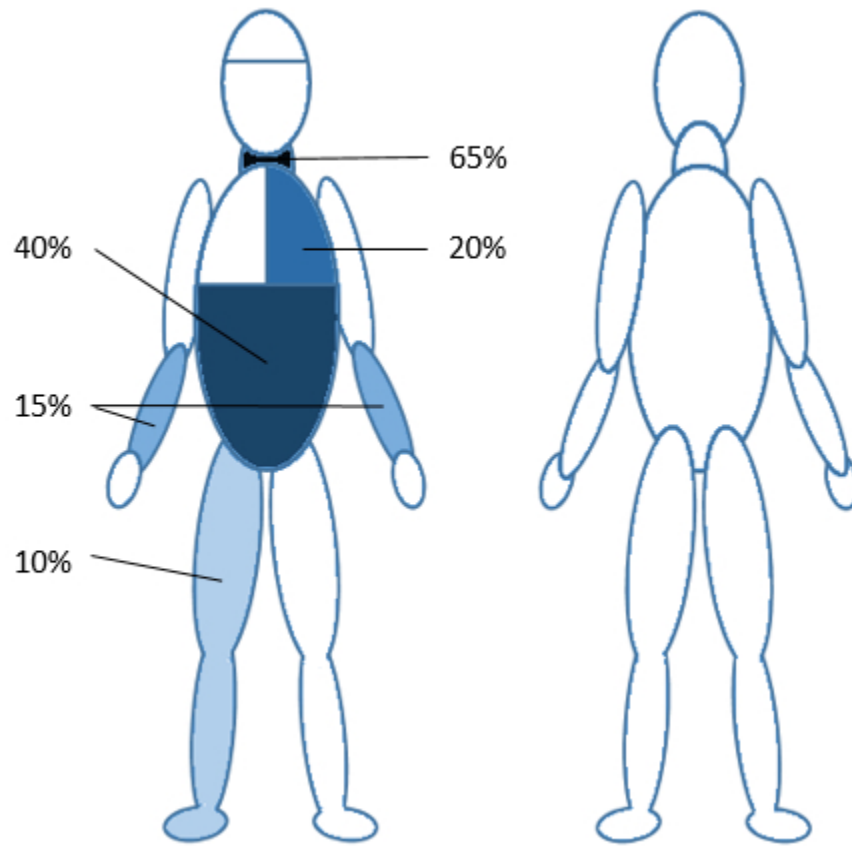


FIG. 4—Distribution of suicidal wounds, tentative injuries excluded, by percentage (darker colors correspond to more frequently injured body areas). Additional locations were the anterior surface of the right chest and the left inferior limb, seen in 5% of the cases (not shown).