

Comparison of the demographic and wound characteristics of non-suicidal and suicidal self-wrist cutting injuries

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Abstract

Patients who commit self-wrist cutting injuries (SWCIs) are a heterogeneous group composed of patients with non-suicidal self-injury (NSSI) and suicide attempt (SA). The purpose of this study was to compare the demographic features and wound characteristics of patients with NSSI and SA.

A retrospective review of 300 patients who visited the emergency department (ED) for treatment of SWCIs between January 2011 and December 2015 was performed. Data collected from the electronic medical records included age, sex, the reason for SWCIs, presence of suicidal ideation, concomitant intoxication with alcohol or drugs, past psychiatric history, whether or not the patient received psychiatric counseling at the ED, the principal psychiatric diagnosis, the number and severity of external wounds, and subsequent follow-up at the psychiatric or hand surgery outpatient department (OPD). The patients were divided into the NSSI and SA groups according to the presence of suicidal ideation and other variables were compared between the two groups.

There were 138 NSSI patients and 162 SA patients. The NSSI group was younger (33.9 years vs 40.9 years, $P < .01$), more female-dominant, and more non-compliant with psychiatric treatment than the SA group. Compared with the SA group, fewer NSSI patients had past psychiatric histories (26.1% vs 45.7%, $P < .01$) and more patients refused psychiatric counseling (30.4% vs 9.9%, $P < .01$) and follow-up at the psychiatric OPD (8.0% vs 17.3%, $P < .01$). In contrast, the number ($P = .31$) and severity ($P = .051$) of wounds and the rate of follow-up at the hand surgery OPD ($P = .43$) were not statistically different between the two groups.

Although the NSSI and SA groups showed different demographic features and degrees of compliance with psychiatric treatment, wound characteristics were not different between the two groups. Therefore, hand surgeons cannot estimate patients' suicidal intent based on wound characteristics and all patients should be advised to receive psychiatric treatment.

Abbreviations: DAMA = discharge against medical advice, ED = emergency department, NSSI = non-suicidal self-injury, OPD = outpatient department, RTO = return to outpatient department, SA = suicide attempt, SIB = self-injurious behavior, SWCI = self-wrist cutting injury.

Keywords: non-suicidal self-injury, self-injurious behavior, suicide attempt, wrist cutting syndrome, wrist laceration

1. Introduction

Self-injurious behavior (SIB) refers to a broad class of behaviors in which an individual directly and deliberately causes harm to her or himself. Such behaviors include non-suicidal self-injury

(NSSI), which refers to any socially unsanctioned behavior involving destruction of one's own body tissue in the absence of intent to die, or a suicide attempt (SA), which refers to a direct effort to intentionally end one's life.^[1] NSSI and SA represent distinct behavioral phenomena. Remarkable differences have been identified between persons reporting NSSI and SA in regard to depressed mood, hopelessness, psychological distress, reasons for living, aggressive symptoms, and functions served by the behavior.^[2] Historically, NSSI had been included in the Diagnostic and Statistical Manual (DSM) only as a criterion of the borderline personality disorder. However, NSSI does not occur exclusively in the context of borderline personality, and the behavior has been reported across other psychiatric disorders. In 2013, NSSI disorder was accepted into Section 3 of the DSM-5, Disorders Requiring Further Research.^[3]

Self-wrist cutting injury (SWCI) is part of the spectrum of SIB. Patients who commit SWCI are a heterogeneous group composed of patients with NSSI and SA. SWCI has special clinical significance for hand surgeons. Although most SWCIs are treated with emergency surgery, the final clinical results are not always satisfactory. When multiple structures, especially peripheral nerves such as the median or ulnar nerve, are involved they have a potential to cause devastating disability. Furthermore, many patients who inflict SWCI have a tendency to reattempt

Editor: Massimo Tusconi.

The authors report no conflicts of interest.

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How to cite this article: Park HY, Kim YC, Park SC, Cho YJ, Sur YJ. Comparison of the demographic and wound characteristics of non-suicidal and suicidal self-wrist cutting injuries. *Medicine* 2020;99:8(e19298).

Received: 2 September 2019 / Received in final form: 5 January 2020 / Accepted: 26 January 2020

<http://dx.doi.org/10.1097/MD.00000000000019298>

this SIB and they are also much less motivated to follow postoperative care instructions and rehabilitation programs than the general population. To improve treatment outcomes and prevent reattempts, coordinated treatment provided by hand surgeons and psychiatrists is mandatory. Hand surgeons who deal with SWCI need to be knowledgeable about the characteristics of underlying psychiatric illnesses. Although several investigations on SWCI have been performed by hand surgeons, they focused on wound features and classified injurers according to the injury severity of anatomical structures.^[4–10] However, external wounds with damaged anatomical structures is only one of the drastic expressions of underlying psychiatric illnesses and is not a pathognomonic sign in itself. Rather, the opposite direction, comparisons of demographic data, patterns of postoperative behaviors, and wound characteristics between different underlying psychiatric illnesses would be more informative. Therefore, we performed retrospective analyses of patients who were treated for SWCI in our institution.

The purpose of this study was to compare the demographic features, patterns of postoperative behaviors, and wound characteristics of patients with NSSI and SA who inflicted SWCI. We hypothesized that there are significant differences in wound severity, patterns of postoperative behavior, and demographic features between patients with NSSI and SA.

2. Materials and methods

2.1. Patients and data processing

After approval by the institutional review board, we performed a retrospective review of all patients who visited the emergency department (ED) of our institution for treatment of SIBs between January 2011 and December 2015. The inclusion criteria were patients with SWCI. SWCI was defined as a self-cutting injury (SCI) below the elbow. Patients with SCIs involving other body areas or those with SIBs other than SCIs were excluded. Data collected from the electronic medical record included age, sex, the reason for SWCI, presence of suicidal ideation, concomitant intoxication with alcohol or drugs, past history of psychiatric treatment, whether or not the patient received psychiatric counseling at the ED, the principal psychiatric diagnosis, the number and severity of external wounds, and the final result of the ED visit. Subsequent follow-up at the psychiatric or hand surgery outpatient department (OPD) was also checked. Psychiatric data were based on the psychiatrists' counseling notes. Wound characteristics were based on the hand surgeon's description note, operation record, and clinical photographs.

Patients were divided into NSSI and SA groups according to the presence of suicidal ideation, and other variables were compared between the NSSI and SA groups. The presence of suicidal ideation was first checked by an emergency medicine practitioner during a triage process and was later re-evaluated by a psychiatrist. The reasons for SWCIs were classified into 11 categories. These were couple conflict, family conflict, psychiatric illness, academic stress, financial stress, job loss, medical condition, military service, work stress, miscellaneous, and no answer. The principal psychiatric diagnosis, which was given by the psychiatrist who interviewed the patient, was based on 20 major diagnostic criteria of the DSM-5. There were six categories for the final result of the ED visit: discharge after complete treatment (RTO, return to OPD), hospitalization for further treatment, transfer to another hospital, discharge against medical

advice (DAMA, incomplete treatment), walk out, and death. We classified wound severity into three categories:

- (1) superficial injury involving only the skin and subcutaneous tissue layer or the palmaris longus,
- (2) moderate injury involving the flexor carpi radialis or ulnaris, and
- (3) deep injury involving neurovascular structures or finger flexors.

Subsequent follow-up at the hand surgery OPD was regarded as positive when a patient visited the OPD at least once for wound care and postoperative education. However, follow-up at the psychiatric OPD was only regarded as positive when a patient visited the OPD at least twice, to exclude only one-time visit to obtain medical documents needed for insurance claims.

2.2. Statistical analysis

Continuous variables were expressed as the mean and range, and categorical variables were summarized by the number of patients and percentages. Comparison of the NSSI and SA groups was made using the paired *t* test for continuous variables and the chi-square test for categorical variables, respectively. A *P* value less than .05 was considered to be statistically significant. SPSS version 18.0 for Windows (SPSS Inc., Chicago, IL) was used for statistical analyses.

3. Results

Of the 2366 patients who visited the ED for treatment of SIBs, 323 patients were treated for SWCIs (13.7%). After excluding 23 patients who refused wound management, 300 patients were enrolled in this study. There were 138 patients in the NSSI group and 162 patients in the SA group.

The demographic features, patterns of postoperative behaviors, and wound characteristics of the NSSI and SA groups are presented in Table 1. In the NSSI group, there were 93 female patients with a mean age of 33.4 years (range, 18–65 years) and 45 male patients with a mean age of 34.8 years (range, 19–60 years). The mean ages of the female and male patients were not significantly different ($P = .64$). The mean age of the total 138 patients was 33.9 years (range, 18–65 years). There were four patients who inflicted SWCI twice. In the SA group, there were 91 female patients with a mean age of 37.5 years (range, 17–74 years) and 71 male patients with a mean age of 45.3 years (range, 20–80 years). The female patients were significantly younger than male patients ($P < .01$). The mean age of the total 162 patients was 40.9 years (range, 17–80 years). There were 5 patients who inflicted SWCI twice and one patient who did so 3 times. The NSSI group was significantly younger than the SA group ($P < .01$). The sex ratios were also significantly different between the NSSI and SA groups ($P = .047$).

In the NSSI group, compared with the SA group, fewer patients had a past history of psychiatric treatment (26.1% vs 45.7%, $P < .01$) and more patients refused psychiatric counseling (30.4% vs 9.9%, $P < .01$). In addition, fewer patients continued psychiatric treatment at the OPD (8.0% vs 17.3%, $P < .01$).

In contrast, wound characteristics of the 2 groups were not statistically different. In the NSSI group, the wound severity was superficial in 79%, moderate in 10.9%, and deep in 10.1%. The wound numbers were single in 66.7% and multiple in 33.3%. In the SA group, the wound severity was superficial in 69.1%,

Table 1
Demographic features, patterns of postoperative behaviors, and wound characteristics of the NSSI and SA Patients.

Variable	All patients (n=300)	NSSI patients (n=138)	SA patients (n=162)	P-value
Age (range)(years)	37.7 (17–80)	33.9 (18–65)	40.9 (17–80)	< .01
Sex (F:M)	1.6: 1	2.1: 1	1.3: 1	.047
Female (%)	184 (61.3%)	93 (67.4%)	91 (56.2%)	
Male (%)	116 (38.7%)	45 (32.6%)	71 (43.8%)	
Past psychiatric history (%)				< .01
+	110 (36.7%)	36 (26.1%)	74 (45.7%)	
-	131 (43.7%)	58 (42.0%)	73 (45.1%)	
No answer	59 (19.7%)	44 (31.9%)	15 (9.3%)	
Psychiatric counselling (%)				< .01
+	221 (73.7%)	82 (59.4%)	139 (85.8%)	
Refuse	58 (19.9%)	42 (30.4%)	16 (9.9%)	
-	21 (7.0%)	14 (10.1%)	7 (4.3%)	
Psychiatrics OPD F/U (%)				< .01
+	39 (13.0%)	11 (8.0%)	28 (17.3%)	
-	261 (87.0%)	127 (92.0%)	134 (82.7%)	
Wound severity (%)				.051
Superficial	221 (73.7%)	109 (79.0%)	112 (69.1%)	
Moderate	32 (10.7%)	15 (10.9%)	17 (10.5%)	
Deep	47 (15.7%)	14 (10.1%)	33 (20.4%)	
Wound number (%)				.31
Single	191 (63.7%)	92 (66.7%)	99 (61.1%)	
Multiple	109 (36.3%)	46 (33.3%)	63 (38.9%)	
Hand surgery OPD F/U (%)				.43
+	42 (14%)	17 (12.3%)	25 (15.4%)	
-	258 (86.0%)	121 (87.7%)	137 (84.6%)	

F/U=follow-up, NSSI=non-suicidal self-injury, OPD=outpatient department, SA=suicide attempt.

moderate in 10.5%, and deep in 20.4% ($P=.051$). The wound numbers were single in 61.1% and multiple in 38.9% ($P=.31$). The majority of the patients did not visit the hand surgery OPD for postoperative care. Only 12.3% of the NSSI patients and

15.4% of the SA patients continued postoperative wound care and rehabilitation at the OPD ($P=.43$).

The most common reason for SWCIs was interpersonal relationships (Fig. 1). It accounted for 50% of the injuries in

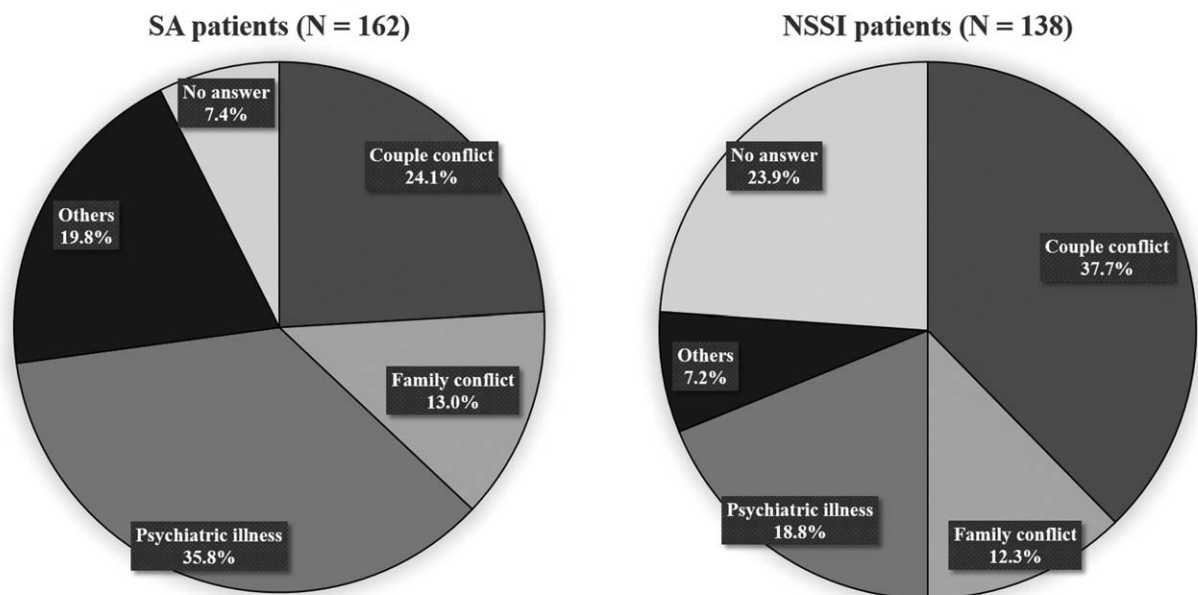


Figure 1. The reason for SWCIs in the NSSI and SA patients. The reasons were classified into 11 categories. Others included academic stress, financial stress, job loss, medical condition, military service, wrist stress, and miscellaneous categories.

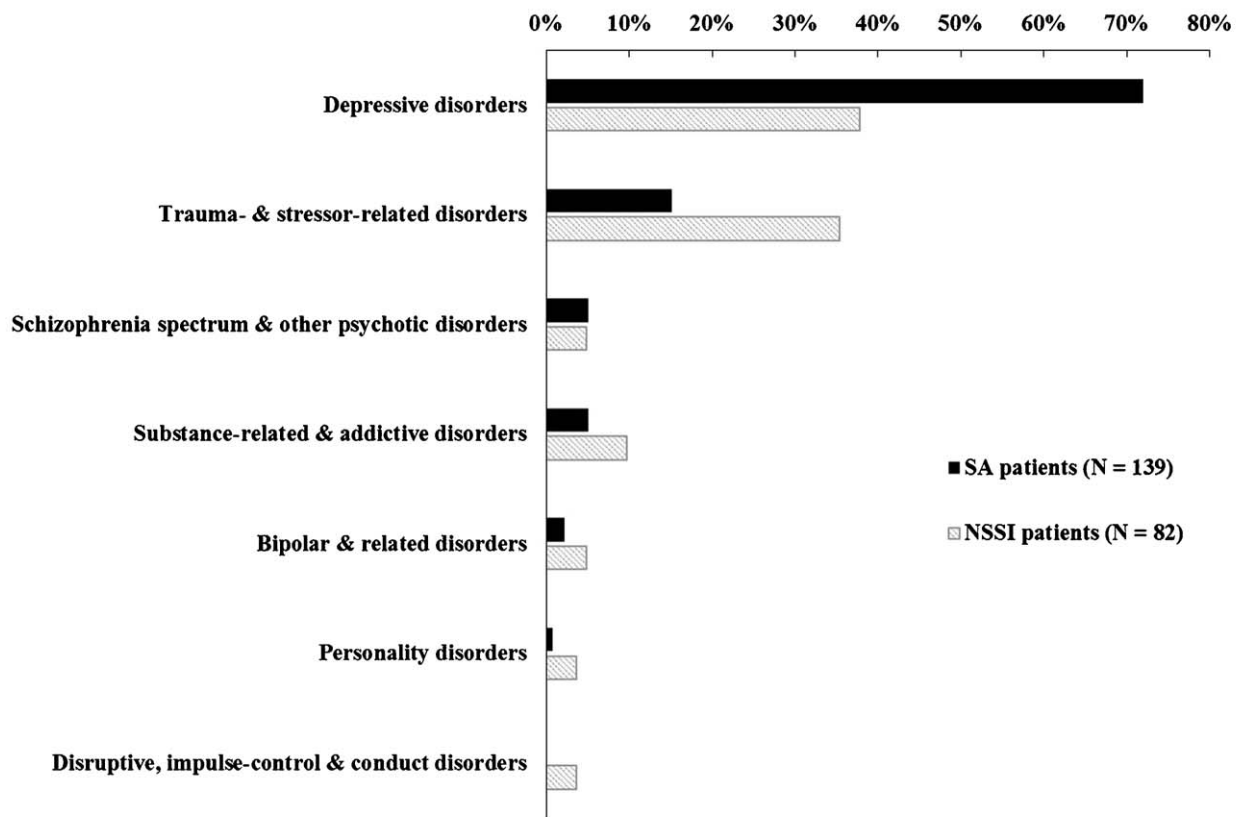


Figure 2. The principal psychiatric diagnosis of the NSSI and SA patients. The diagnosis was based on 20 major diagnostic criteria of the DSM-5.

the NSSI group and 37.1% in the SA group. Psychiatric illness was the second most common reason for SWCIs, accounting for 18.8% in the NSSI group and 35.8% in the SA group. Nevertheless, the distribution of the reasons for SWCIs was different between the NSSI and SA groups ($P < .01$). In the SA group, there were 32 patients (19.8%) with other reasons, including 11 patients with medical condition (6.8%) and six patients with financial stress (3.7%). On the other hand, many NSSI patients (33/138, 23.9%) did not want to confide the reason for their SWCIs and no one in the NSSI group chose medical condition or financial stress as the reason for their SWCIs.

The most common psychiatric principal diagnosis was depressive disorders, followed by trauma- and stressor-related disorders (mostly, adjustment disorders) in both groups (Fig. 2). However, depressive disorders were more predominant in the SA group (37.8% vs 71.9%, $P < .01$) and trauma- and stressor-related disorders were more common in the NSSI group (35.4% vs 15.1%, $P < .01$).

About two-thirds of the patients in both groups ingested alcohol or drugs (Fig. 3). In the NSSI group, 84 patients (60.9%) ingested alcohol and only three patients (2.1%) took drugs with or without alcohol. Patients who ingested alcohol or drugs inflicted severe wounds more frequently than sober patients ($P = .03$). In the SA group, 93 patients (57.4%) ingested alcohol and 21 patients (13%) took drugs with or without alcohol. Alcohol or drug ingestion was not related to the wound severity in this group ($P = .63$).

The final results of the ED visit were also compared between the 2 groups and there were statistically significant differences

($P < .01$) (Fig. 4). In both groups, more than 60% of the patients were discharged against medical advice (DAMA, incomplete treatment). Most of them refused hospitalization for psychiatric treatment. However, compared with the NSSI group, more SA patients accepted hospitalization (14.5% vs 25.9%, $P < .01$) or transfer to another hospital for psychiatric treatment (2.2% vs 9.3%, $P < .01$). In contrast, more NSSI patients were discharged after complete treatment (RTO, return to OPD) (17.4% vs 1.9%, $P < .01$). Most of them refused psychiatric counseling.

4. Discussion

Patients visiting EDs for treatment of SIBs are increasing.^[11] SCI is the second most common SIB next to self-poisoning, accounting for 14.6% to 21% of all SIBs.^[11–14] Although SIBs other than SCI, such as hanging, jumping from heights, or pesticide poisoning are very fatal, the lethality of SCI was reported to be less than 2.1%.^[14–17] Moreover, if SCIs on the body other than below the elbow are excluded, the lethality is much lower. The reason for such a low lethality can be attributed to the heterogeneity of the patients inflicting SCIs. Although some patients who harm themselves with sharp objects have a real intent to die, quite a number of patients harm themselves without an intent to end their lives. This heterogeneity is a unique characteristic of SWCIs. In our study, 46% of the SWCIs were NSSIs. Meanwhile, the proportion of NSSIs was 7.7% in hanging, 11.3% in jumping from heights, 0% in drowning, and 10.2% in poisoning. The purpose of NSSI is to relieve intense distressing affect by the use of sharp physical pain which can

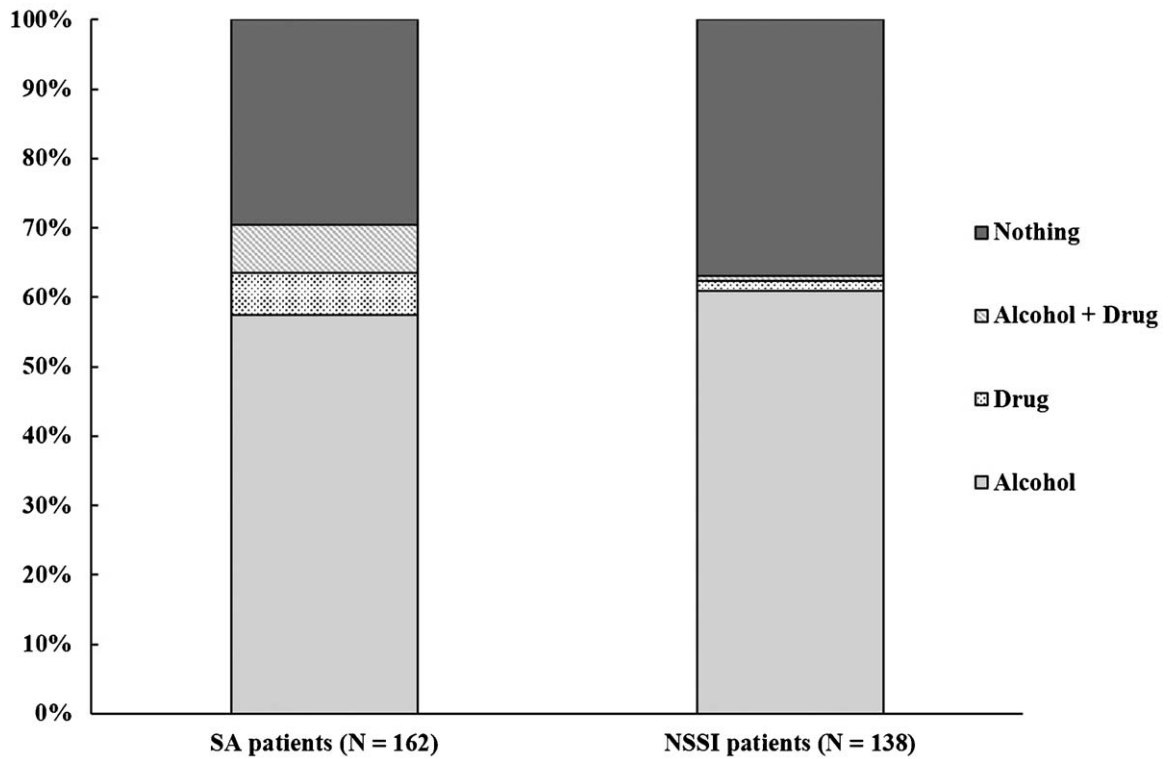


Figure 3. The percentage of concomitant ingestion of alcohol or drugs in the NSSI and SA patients.

distract the sufferer from their unbearable feelings.^[18] Other reasons include self-punishment in which patients see their injury as deserved, to gain attention from other people, and to fit in socially with peers who self-injure.^[18]

Previous studies on SWCIs did not distinguish NSSI from SA.^[4-10,19,20] However, many studies showed that nearly half of SWCIs, especially SWCIs inflicted by female patients, were not

real suicide attempts.^[4,5,7,8,10] For such patients, SWCIs are obsessive activities, not to attempt suicide, but to reduce tension.^[10] So, this behavior is actually an anti-suicide attempt to recover from a depersonalized state and has an addictive nature. Rosenthal et al^[21] studied many female habitual non-suicidal wrist-cutters and classified them as having a wrist-cutting syndrome. The authors reported that those women cut their

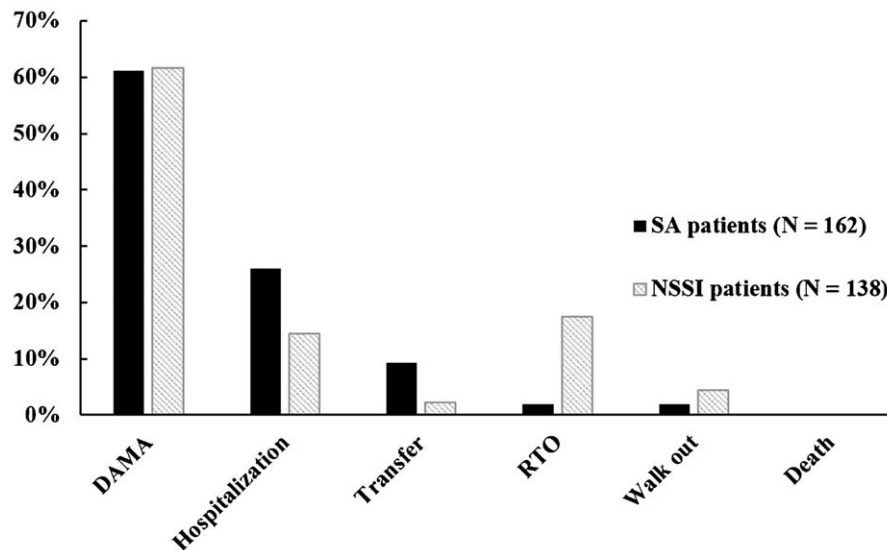


Figure 4. The final results of the ED visits by NSSA and SA patients. DAMA, discharge against medical advice; RTO, return to OPD.

wrists not to attempt suicide, but to alleviate tension. Thus, their wounds were usually superficial, and the wrist-cutting behavior was repeated. Fujioka et al.^[7] investigated 31 patients with SWCIs. They divided the patients into superficial and deep injury groups. They reported that all patients in the superficial injury group were female and all male patients were included in the deep injury group. The superficial injury group had a tendency to repeat SWCIs and to make a single wound. On the other hand, the deep injury group was less likely to repeat SWCIs but frequently made multiple wounds. The authors reported that the superficial injury group closely resembled those with wrist-cutting syndromes. Ersen et al.^[10] analyzed 41 patients with SWCIs and reported that 21 patients (51%) damaged only the skin and subcutaneous tissues. Females had a higher percentage of skin-only injuries (16/22 patients, 72%) than males (5/19 patients, 26%). In agreement with the study by Fujioka et al.,^[7] the authors also thought that the patients with skin-only injuries resembled those with wrist-cutting syndromes.

Our study was designed to compare the demographic and clinical features of the NSSI and SA groups in SWCI patients. Our study showed that the NSSI and SA groups were quite dissimilar in many aspects. Compared with the SA group, the NSSI group was younger, more female-dominant, and more noncompliant with psychiatric treatment. Many NSSI patients did not want to mention their past psychiatric treatment history and the reason for their SIBs. A number of NSSI patients also refused psychiatric counseling at the ED and follow-up at the psychiatric OPD. In the NSSI group, patients intoxicated with alcohol or drugs inflicted more severe wounds than did sober patients. Such a difference was not found in the SA group. Interestingly, however, there was no statistically significant difference in wound characteristics between the NSSI and SA groups. As mentioned earlier, previous studies reported that most SWCI patients without an intent to die were female and usually made superficial wounds.^[4–10,19,20] In contrast, in our study, a third of the NSSI patients were male and the wound characteristics were not different from the SA group. Furthermore, there was no statistically significant difference in wound severity and number between male and female patients in the NSSI and SA groups, respectively ($P = .46$, $P = .20$). This result was inconsistent with previous studies and our hypothesis. Although the NSSI and SA groups showed different demographic features and degrees of compliance with psychiatric treatment, such differences were not reflected in wound characteristics. Wound severity and number were not related to suicidal intent or gender. Considering our study results, the wrist-cutting syndromes seen in female habitual non-suicidal wrist-cutters do not represent all NSSI patients, rather are only a small subgroup of NSSI patients.

The treatment goal of hand surgeons is to return their patients to pre-injury life. Full recovery requires addressing more than repair of the damaged anatomy, and an increasing body of literature advocates for a more holistic treatment approach.^[22] When treating SWCI patients, hand surgeons should consider two aspects of an underlying psychiatric illness. First, SIB patients discharged without receiving psychiatric counseling are at greater risk for attempting a more lethal SIB and for completing suicide than those who received psychiatric counseling.^[20,23] However, people who visited the ED for treatment of SCIs were 56% less likely to receive psychiatric counseling compared with people who visited the ED for treatment of self-poisoning.^[17] Although NSSI and SA are distinct, both can occur within the same individual and some individuals may move to other high-lethality SIBs.^[24] Our study showed that hand surgeons cannot estimate a

patient's suicidal intent based on wound characteristics. Therefore, all patients, regardless of their wound severity, should be advised to receive psychiatric counseling. Second, the incidence of posttraumatic stress disorder, depression, suicide risk, and psychological distress is known to be high after hand and upper extremity injury.^[25] Psychological problems following hand injuries have a substantial, negative impact on functional outcomes and general health status.^[26] Considering that SWCI patients already have an underlying psychiatric illness, they are vulnerable to posttraumatic emotional distress. To achieve better surgical outcomes, hand surgeons should make an effort to provide their patients with concomitant psychiatric treatment.

The current study has several limitations. First, this was a retrospective study and there was no uniform documentation protocol for psychiatric and surgical assessment. Second, there is a possibility of selection bias in our patient cohort because this study was implemented at a single secondary-care center geographically located in a suburban area with a relatively low-income population. Third, the number of enrolled patients was relatively small. Fourth, some of the data that were based on self-reporting or recall such as the reason for SWCIs, presence of suicidal ideation, and past psychiatric history, are likely to be inaccurate. Fifth, the grading of wound severity was quite arbitrary. Previous studies on SWCIs used their own wound grading systems.^[4–10] So, direct comparison between the current study and previous studies were impossible. Finally, this study did not evaluate functional outcomes and long-term results. Therefore, our study cannot conclude whether there was any difference between short- and long-term functional results between the NSSI and SA groups. Considering above mentioned several limitations, caution is required in interpreting our findings. In the future, well-designed multi-center studies with larger number of patient cohort are required to confirm our findings.

Author contributions

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