Self-Injurious Behavior in a Community Sample of Young Women: Relationship With Childhood Abuse and Other Types of Self-Damaging Behaviors

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Objective: The prevalence of self-injurious behavior (SIB) in the general population is unknown. The present study aims to assess the prevalence and dimensionality of a large spectrum of SIBs in a community sample of young women.

Method: A cohort of female subjects aged 18 through 25 years resident in 2 areas of a large city was involved in the study, which was conducted from December 1996 to August 1998. Subjects (N = 934) underwent a clinical interview to assess the presence of SIBs, childhood sexual and physical abuse, suicidality, use of illicit drugs, alcohol abuse, and DSM-IV lifetime eating disorder diagnosis.

Results: About 24% of the sample reported some type of SIB. The factor analysis revealed that the different types of SIBs tend to group into 4 dimensions: 2 characterized by impulsive features and the other 2 by compulsive features. Body image disturbance ($p < .01$), emotional distress ($p < .001$), alcohol/substance misuse ($p < .05$), and suicide attempts ($p < .01$) were significantly associated with both compulsive and impulsive SIBs. In addition, the presence of impulsive SIBs was significantly predicted by a lower level of education ($p < .05$), lifetime eating disorders ($p < .01$), and childhood abuse ($p < .05$), whereas skin picking/self-biting was predicted by childhood sexual molestation ($p < .04$) and childhood rape ($p < .005$).

Conclusion: Self-injurious behaviors are common among young women. There is a significant association between SIBs and other forms of direct and indirect self-damaging behaviors, including alcohol abuse, use of illicit substances, suicidality, and eating disorders. Further research is needed to better understand the nosology of this spectrum of behaviors.

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Although in the literature there is increasing interest in the whole spectrum of self-injurious behaviors (SIBs), the epidemiology of this phenomenon in the general population is unknown.[1,2] Self-injurious behaviors are defined as "all behaviors involving the deliberate infliction of direct physical harm to one's own body without any intent to die as a consequence of the behavior."[2] The most widely used classification distinguishes between major and stereotypical SIB on the one hand and moderate SIB or self-mutilation on the other.[2] The first are characteristic of psychotic and mentally retarded institutionalized patients, whereas the second includes a wide range of behaviors usually further subtyped into compulsive and impulsive acts.

Compulsive SIBs are usually habitual, repetitive, and "automatic." They are not associated with conscious intent or an affective experience[1] and have the typical characteristics of compulsions (i.e., a mounting tension when the individual attempts to resist the behavior and a relief of anxiety when the behavior is performed). They usually have ego-dystonic overtones and the goal is not to provide gratification, but only to prevent or reduce anxiety and distress. Impulsive SIBs, on the contrary, are usually episodic, involve little resistance, and provide some form of gratification that is beyond the relief of tension or anxiety. Individuals who perform these types of SIBs report that the behavior helps in the control of negative emotions, such as depression, loneliness, or deper-

TAKE-HOME POINTS

- Self-injurious behaviors were reported by one fourth of the population of young women, with compulsive behaviors being more common than impulsive ones.
- All types of self-injurious behaviors were associated with other types of self-damaging acts, such as alcohol/substance abuse, eating disorders, and suicide attempts.
- Childhood sexual and/or physical abuse increased the risk of suicide attempts and all types of self-injurious behaviors except hair pulling and nail biting.

sonalization, and also satisfies other needs, such as self-punishment and the manipulation of others.[1] A Deliberate Self-Harm Syndrome was described by Favazza[1,3] and Simeon and Favazza[2] when a preoccupation with harming oneself physically is associated with the recurrent failure to resist impulses to harm oneself, an increasing sense of tension immediately prior to the act, and gratification or relief when committing the act of self-injury. All types of SIBs should be distinguished from indirect self-harming behavior, such as alcohol abuse and cigarette smoking.[2]

Indirect estimations have led to the opinion that the incidence of impulsive SIB might be at least 1 case per 1000 annually.[2] Using self-reported measures, 2 studies[4,5] performed on nonclinical samples found a rate of impulsive SIB of 4%, although higher rates have been reported by college students.[6] In clinical samples, impulsive SIB has been found to be associated with borderline personality disorder,[7,8] eating disorders,[9–13] posttraumatic stress disorder,[14] and dissociative disorders.[15] Compulsive SIB seems to be more common than impulsive SIB. Hair pulling is reported to be present in about 10% of college students, but the more severe cases involve probably 1% to 2%.[16,17] Trichotillomania is more prevalent in females than in males and typically presents in early adolescence.[2] Self-injurious skin picking, or psychogenic excoriation, seems to occur in about 4% to 5% of college students,[18] whereas no data are available for compulsive nail biting. Skin picking is estimated to occur in 2% of dermatology clinic patients[2] and, like pathological nail biting,[19] seems to be more common in women than in men.[20,21] Hair pulling, severe nail biting, and pathological skin picking have been described as often associated with anxiety and mood disorders, especially obsessive-compulsive disorder and body dysmorphic disorder, and substance abuse.[22–24] Previous studies found that eating-disordered patients report a high frequency of compulsive SIB.[10,11]

The main aim of the present study was to assess the prevalence and phenomenology of SIB in a community sample of young women. The study also aimed to evaluate (1) the connection of SIB with some variables that could be implicated in the pathogenesis of SIBs, such as temperament, body image disturbances, sociodemographic factors, and childhood abuse; and (2) the relationship of SIB with other types of direct and indirect self-damaging behaviors, such as alcohol abuse, use of illicit drugs, eating disorders, and suicidality.

SUBJECTS AND METHOD

Sample

The study involved all female subjects aged 18 through 25 years who resided in 2 areas of the city of Padua, in northeast Italy. One area represents about a tenth of the whole urban area of Padua (total urban population: 200,000) and the other about an eighth of all the suburban areas surrounding the city. The recruitment procedure for the sample has been described in previous studies.[25,26] All women aged 18 through 25 years listed on the electoral registers were sent a letter containing the aims and method of the research study and an invitation to participate. The letter presented the study as a survey about the general and psychological health of young women, with a particular focus on eating disorders and related features. In the space of a few weeks, every subject was then contacted by phone to arrange for their clinical interview.

Subjects were interviewed in a face-to-face fashion by the second author (S.F.). The answers of all the subjects were independently scored by the first and the second author (A.F. and S.F.) to characterize the diagnostic status. Sources of disagreement (less than 2% of cases) were discussed with the third author (P.S.). All participating subjects gave written informed consent for the use of data in an anonymous form after being given a complete description of the study. The total sample of subjects aged 18 through 25 years resident in the 2 geographic areas was 1198. We were unable to trace 34 (2.8%) of the subjects and another 230 (19.2%) refused to be interviewed. A final response rate of 78.0% was achieved, resulting in 934 interviewed subjects. No differences were found between subjects who accepted the invitation to participate and those who did not as regards age and urbanization. The protocol was in accord with the Helsinki Declaration of 1975 as revised in 1983.

Assessment of Self-Injurious Behavior, Suicidality, and Alcohol/Substance Use

All subjects were asked about sociodemographic characteristics, history of suicide attempts, suicidal ideation,

history of impulsive and compulsive SIB, and substance and alcohol use. In the absence of defined diagnostic criteria for most of the behaviors considered, we used a broad definition of SIBs, based on the presence of such behavior and of physical damage, but without any reference to the other symptoms required for inclusion among impulse-control disorders or obsessive-compulsive symptoms (i.e., the experience of an increased sense of tension before the behavior and the presence/absence of a sense of relief or gratification after the behavior).

Subjects were asked about the occurrence of SIBs, according to the following questions:

- Have you ever bitten your nails repeatedly? If so, did you bite your nails in a way to cause pain, recurrent bleeding, or inflammation?
- Have you ever pulled your hair repeatedly?
- Have you ever picked or excoriated the skin of your face repeatedly? If so, did you ever cause any tissue damage, scar, or pain? Have you ever picked or excoriated the skin of other parts of your body? If so, did you ever cause any tissue damage, scar, or pain?
- Have you ever cut your skin on purpose? Have you ever burnt your skin on purpose? Did it happen more than once?
- Have you engaged in any other SIB (such as self-hitting, head- or hand-banging, self-scratching, or others) on purpose? Did it happen more than once?
- Have you ever wished to be dead? Have you ever thought about killing yourself?
- Have you ever attempted suicide?

Every affirmative answer was followed by a request for a detailed description of the behavior. All types of SIB were defined as present when they were severe enough to cause visible tissue damage (bleeding or inflammation), significant distress or pain, and/or functional impairment. In the present study, if any behavior was present only in childhood (before age of 12 years), SIB was not considered. Subjects who did not report any type of SIBs and/or suicide attempts were defined as control subjects. Substance abuse was defined as either episodic or recurrent use of illicit drugs (benzodiazepines were excluded) and alcohol abuse was defined as the presence or the history of recurrent alcohol abuse (more than 7 units per episode).

Assessment of Childhood Abuse

During the interview, subjects were asked about the occurrence of any lifetime experience of victimization or violence. The questions were "Have you ever been in a situation in which you were the victim of violence, in some way?" and "Have you ever been in a situation in which you were forced to have some form of sexual contact?" Every affirmative answer was followed by a request for a detailed description of the experience, including information about age at time of abuse, perpetrator, and number of episodes.

In the definition of sexual abuse, we included both sexual molestation (such as exposing or unwanted sexual kissing, fondling, and touching) and unwanted sexual intercourse or attempts at intercourse. Childhood sexual abuse was defined as the history of any type of sexual assault before the age of 18 years. Childhood physical abuse was defined as any of the following occurring before the age of 18 years: getting hit with something; having something thrown at them; being kicked, burned, pushed, or shoved; or being physically attacked in some other way. Slapping or spanking were considered only when they were very frequent and led to some physical injury. Table 1 shows the findings about childhood abuse in the sample.

Table 1. Childhood Abuse Experiences in the Female General Population Sample (N = 934)

Factor	Sexual Molestation	Rape	Physical Maltreatment
Prevalence[a]	40 (4.3%)	9 (1.0%)	35 (3.7%)
Perpetrator[b]			
Family members	7 (18%)	2 (22%)	19 (54%)
Known individuals	17 (43%)	3 (33%)	9 (26%)
Unknown individuals	16 (40%)	4 (44%)	7 (20%)
Episodes[b]			
Once	29 (73%)	6 (67%)	11 (31%)
More	11 (28%)	3 (33%)	24 (69%)
Age at abuse, y[b,c]			
3–10	15 (38%)	4 (44%)	13 (37%)
11–14	13 (32%)	1 (11%)	12 (34%)
15–17	11 (28%)	4 (44%)	10 (29%)

[a]Prevalence based on N of 934 (total sample) as the denominator.
[b]Prevalence based on the subset N as the denominator.
[c]In 1 case, age at abuse for sexual molestation was not specified.

Assessment of Eating Disorders, General Health, Temperament, and Body Image Disturbance

The interview included the eating disorders section of the Structured Clinical Interview for DSM-IV (SCID).[27] For the assessment of the lifetime presence of eating disorders, subjects answered all the key questions in the SCID as well as the screening questions.[25] The presence of a lifetime eating disorder included either anorexia nervosa, bulimia nervosa, or an atypical eating disorder as defined in our previous study.[25] All subjects were asked to complete the 28-item version of the General Health Questionnaire (GHQ),[28] which is a measure of emotional distress, and the Body Attitudes Test (BAT).[29] The BAT consists of 20 items scored on a 6-point scale. It is designed for female subjects and measures 3 dimensions of body experience: "negative appreciation of body size," "lack of familiarity with one's own body," and "general body dissatisfaction." The Tridimensional Personality Questionnaire (TPQ)[30] was administered only to subjects recruited in the urban area.

Table 2. Lifetime Prevalence and Principal Components Analysis of the Different Types of Self-Injurious Behavior in the Female General Population Sample (N = 934)[a]

Type of Self-Injurious Behavior	N	Prevalence (95% CI)	Factor 1	Factor 2	Factor 3	Factor 4
Compulsive 1						
Hair pulling	50	5.4 (4.6 to 6.1)	.651	…	...	...
Severe nail biting	113	12.1 (11.0 to 13.2)	.556	...	...	...
Impulsive 1						
Skin cutting	22	2.4 (1.9 to 2.9)	...	.736	...	...
Self-hitting	12	1.3 (0.9 to 1.7)	...	.651	.319	...
Skin burning	5	0.5 (0.3 to 0.8)	.485	.348	...	–.495
Impulsive 2						
Head/hand banging	9	1.0 (0.6 to 1.3)	...	...	.740	...
Skin scratching	8	0.9 (0.6 to 1.2)	.414	...	.607	...
Compulsive 2						
Skin picking	75	8.0 (7.1 to 8.9)	...	...	...	.663
Self-biting	6	0.6 (0.4 to 0.9)	...	...	...	.571
Any impulsive behavior (Impulsive 1 + Impulsive 2)	49	5.2 (4.5 to 6.0)				
Any compulsive behavior (Compulsive 1 + Compulsive 2)	199	21.3 (20.0 to 22.6)				

[a]Only loadings greater than .3 were reported.
Symbol: ... = loading < .3.

The GHQ was completed by 924 (Cronbach α = .91), the BAT by 926 (Cronbach α = .85), and the TPQ by 441 subjects (Cronbach α = .73). Social class was determined using an Italian adaptation of Havighurst's formula.[25,26] This formula calculates social class using paternal and maternal professional status and degree of education.

Statistics

A principal component analysis with both oblique and varimax rotations was performed to examine the dimensions of different kinds of SIB. Since the dimensions were poorly correlated ($r < 0.08$), the final model was achieved by performing a varimax rotation. The relationships between social and clinical factors and case status were assessed by χ^2 likelihood ratio statistic. In addition, odds ratios with 95% confidence intervals were reported. The significance of odds ratios was assessed by the Mantel-Haenszel test. Student t test was used to compare subjects with SIB and those without as regards the questionnaire scores. Logistic regression analysis was used to derive multivariate models while taking into account potential confounder variables such as socioeconomic status and urbanization and to control for possible correlations among predictors. These procedures were implemented with the Statistical Product and Service Solutions software (SPSS Inc., Chicago, Ill.).

RESULTS

Description and Associated Features of Self-Injurious Behaviors

The subjects of the study reported some type of clinically significant SIB in 228 cases (24%). The prevalence of the various types of behavior is reported in Table 2. Nail biting and skin picking were reported by 278 (30%) and 185 subjects (20%), but only, respectively, in 113 (12%) and 75 cases (8%) was the behavior severe enough to cause pain and recurrent bleeding or inflammation. The sites of excoriation due to skin picking were as follows: face (69%), legs (23%), arms and hands (12%), scalp (5%), back (4%), and chest (4%). Twenty-five percent of subjects excoriated multiple sites, and 7 subjects refused to reveal the site of skin picking. Self-biting was usually performed on hands (67%) and arms (33%), whereas impulsive skin scratching was performed on legs (25%), arms and hands (25%), back (13%), or on the whole body (37%). Skin cutting was performed mainly on arms (55%), hands (45%), and, more rarely, legs (10%). Finally, skin burning involved only hands and arms. Head banging was reported by 3 subjects, while 6 others reported hitting their hands against something, such as a window or a wall.

The number of episodes of SIBs reported by the subjects varied considerably. In contrast to skin picking, hair pulling, and nail biting that always occurred with a recurrent pattern, the episodes of skin cutting, burning, self-biting, skin scratching, self-hitting, and head banging were few (1 or 2 episodes) in 39% of cases (N = 19) or more frequent in 61% of cases (N = 30). Subjects with more than 2 episodes of impulsive SIB differed significantly from subjects with 1 or 2 episodes of SIB as regards the mean ± SD scores of the GHQ (34.0 ± 13.9 vs. 24.1 ± 13.7; $t = 2.45$; $p < .02$) and BAT (42.4 ± 14.7 vs. 32.2 ± 10.5; $t = 2.61$; $p < .02$). In addition, among subjects with impulsive SIB, the group with a high frequency of episodes included all those who reported childhood abuse, all those with a lifetime anorexia nervosa or bulimia nervosa, all those with more than 1 type of impulsive SIB, and 75% of those with a history of attempted suicide.

Table 3. Associations of the 2 Types of Compulsive Self-Injurious Behavior With Clinical Data

Variable	Compulsive 1: Hair Pulling/Nail Biting (N = 143)		Compulsive 2: Skin Picking/Self-Biting (N = 78)		Controls, % (N = 698)
	% (χ^2)[a]	OR[b] (95% CI)	% (χ^2)[a]	OR[b] (95% CI)	
Childhood abuse					
Sexual abuse	6 (1.16)	1.6 (0.7 to 3.4)	14 (10.39)***	3.8 (1.8 to 7.9)***	4
Molestation	4 (0.07)	1.1 (0.5 to 2.8)	9 (3.77)	2.6 (1.1 to 6.1)*	4
Rape	2 (3.46)	5.0 (0.9 to 24.9)	5 (9.61)**	12.5 (2.8 to 57.0)***	0.4
Physical abuse	6 (3.46)	2.4 (1.0 to 5.6)*	8 (4.97)*	3.3 (1.3 to 8.7)*	2
Lifetime eating disorders					
Anorexia nervosa	3 (0.67)	1.7 (0.5 to 5.2)	5 (3.01)	3.1 (0.9 to 9.8)	2
Bulimia nervosa	6 (0.98)	1.5 (0.7 to 3.5)	8 (2.31)	2.2 (0.9 to 5.4)	4
Any eating disorder	15 (4.82)*	1.9 (1.1 to 3.2)*	21 (9.44)**	2.8 (1.5 to 5.2)***	9
Alcohol abuse	18 (19.29)***	3.5 (2.0 to 5.9)***	17 (9.36)**	3.1 (1.6 to 6.1)**	6
Illicit drug use	16 (10.65)***	2.5 (1.5 to 4.3)**	21 (12.80)***	3.4 (1.8 to 6.4)***	7
High or medium-high social class	41 (2.08)	1.3 (0.9 to 1.9)	40 (0.82)	1.2 (0.8 to 2.0)	35
Education, < 9 years	27 (0.91)	1.2 (0.8 to 1.8)	26 (0.18)	1.1 (0.7 to 1.9)	23

[a]χ^2 = likelihood ratio statistic.
[b]Odds ratios were calculated using subjects without any type of self-injurious behavior and/or suicide attempt as a control group.
*p < .05.
**p < .01.
***p < .001.

Table 4. Associations of the 2 Types of Impulsive Self-Injurious Behavior With Clinical Data

Variable	Impulsive 1: Cutting/Burning/Self-Hitting (N = 35)		Impulsive 2: Banging/Scratching (N = 16)		Controls, % (N = 698)
	% (χ^2)[a]	OR[b] (95% CI)	% (χ^2)[a]	OR[b] (95% CI)	
Childhood abuse					
Sexual abuse	9 (1.25)	2.2 (0.6 to 7.5)	0 (0.04)	...	4
Molestation	3 (0.08)	0.8 (0.1 to 5.8)	0 (0.01)	...	4
Rape	6 (5.83)*	14.0 (2.3 to 86.9)**	0 (0.14)	...	0.4
Physical abuse	3 (0.02)	1.2 (0.2 to 9.1)	19 (7.11)**	9.2 (2.4 to 35.5)**	2
Lifetime eating disorders					
Anorexia nervosa	9 (4.58)*	5.4 (1.4 to 19.9)*	0 (0.01)	...	2
Bulimia nervosa	11 (3.53)	3.3 (1.1 to 10.1)*	12 (1.29)	3.7 (0.8 to 17.1)	4
Any eating disorder	31 (13.92)***	5.0 (2.3 to 10.6)***	38 (9.86)**	6.5 (2.3 to 18.5)***	9
Alcohol abuse	29 (16.01)***	6.2 (2.8 to 13.9)***	25 (5.76)*	5.2 (1.6 to 16.8)**	6
Illicit drug use	37 (23.90)***	7.8 (3.7 to 16.5)***	19 (2.31)	3.1 (0.8 to 11.1)	7
High or medium-high social class	38 (0.19)	1.2 (0.6 to 2.4)	50 (1.57)	1.9 (0.7 to 5.1)	35
Education, < 9 years	40 (4.44)*	2.2 (1.1 to 4.4)*	50 (5.14)*	3.3 (1.2 to 8.8)*	24

[a]χ^2 = likelihood ratio statistic.
[b]Odds ratios were calculated using subjects without any type of self-injurious behavior and/or suicide attempt as a control group.
*p < .05.
**p < .01.
***p < .001.

Table 2 shows the loadings computed by the principal components analysis. The analysis revealed the presence of 4 different and independent groups of behavior, which accounted for 53.5% of the total variance. It resulted in the subdivision of the compulsive SIB into 2 main dimensions: the first (Compulsive 1) included severe nail biting and hair pulling (15% of the total sample), and the second (Compulsive 2) included skin picking and self-biting (8% of the sample). Impulsive SIBs were mainly represented in 1 (Impulsive 1) of the other 2 emerging dimensions, which included skin cutting, skin burning, and self-hitting (4% of the sample). The other small dimension (Impulsive 2) that emerged in the analysis accounted for only 2% of the total sample and included 2 impulsive behaviors: head/hand banging and skin scratching.

The association between the different types of SIB and the presence of lifetime eating disorders, childhood sexual and physical abuse, misuse of alcohol and illicit drugs, and sociodemographic factors are described in Tables 3 and 4. No relationship was found between the

Table 5. Predictors of the 4 Dimensions of Self-Injurious Behaviors

Variable	Odds Ratio[a] (95% CI)	Wald χ^2	p Value
Compulsive 1[b]			
Lack of familiarity with body (BAT)	1.1 (1.0 to 1.1)	7.13	.008
General Health Questionnaire	1.0 (1.0 to 1.1)	5.70	.017
Compulsive 2[c]			
General Health Questionnaire	1.0 (1.0 to 1.1)	21.29	.000
Childhood sexual molestation	2.7 (1.1 to 6.6)	4.36	.037
Childhood rape	10.3 (2.1 to 51.5)	8.05	.005
Impulsive 1[d]			
Lifetime eating disorders	3.7 (1.6 to 8.9)	8.69	.003
Childhood rape	13.8 (1.6 to 119.4)	5.67	.017
Low educational level	2.2 (1.0 to 4.8)	4.22	.040
Lack of familiarity with body (BAT)	1.1 (1.0 to 1.1)	6.05	.014
Impulsive 2[e]			
General Health Questionnaire	1.0 (1.0 to 1.1)	4.86	.027
Childhood physical abuse	4.6 (1.0 to 20.4)	4.04	.045
Lifetime eating disorders	4.0 (1.3 to 12.7)	5.44	.020
Low educational level	4.3 (1.4 to 13.0)	6.53	.011

[a]Odds ratios were adjusted for socioeconomic status and degree of urbanization.
[b]Likelihood ratio statistic for model: 32.88; df = 4; p < .001.
[c]Likelihood ratio statistic for model: 35.20; df = 5; p < .001.
[d]Likelihood ratio statistic for model: 31.11; df = 6; p < .001.
[e]Likelihood ratio statistic for model: 27.07; df = 6; p < .001.
Abbreviation: BAT = Body Attitudes Test.

different types of SIBs and degree of urbanization (data not shown).

As regards the self-reported questionnaires, all 4 groups of subjects with different types of SIB compared with subjects without any type of SIB scored significantly higher on the GHQ ($p < .001$ for all 4 analyses) and on the "lack of familiarity with one's own body" BAT subscale ($p < .001$ for the first 3 groups and $p < .01$ for the Impulsive 2 group). The "body dissatisfaction" BAT subscale score was significantly higher for the Compulsive 2 and Impulsive 1 groups in comparison with the control group ($p < .01$). As regards the TPQ, univariate analyses revealed that the Impulsive 1 group scored significantly higher than the control group both on the harm avoidance ($p < .01$) and on the novelty seeking ($p < .01$) subscales, whereas the Compulsive 1 group reported significantly higher mean scores on the harm avoidance subscale ($p < .001$). No other significant differences between the groups with SIB and controls emerged.

Suicide Attempts

Suicide attempts were reported by 20 subjects (2.1% of the whole sample): 7 subjects reported having attempted suicide by wrist cutting, 11 by overdosing, 2 by defenestration, and 1 by gas poisoning. Four subjects reported more than 1 suicide attempt. Suicide attempts were significantly associated with both childhood sexual molestation (OR = 6.5; 95% CI = 2.0 to 20.7; $p < .01$) and rape (OR = 25.7; 95% CI = 4.1 to 163.6; $p < .001$), and with childhood physical abuse (OR = 10.0; 95% CI = 3.0 to 33.1; $p < .001$). Among suicide attempters, the frequency of anorexia nervosa was 5% (OR = 3.0; 95% CI = 0.4 to 24.3; not significant [NS]), that of bulimia nervosa was 30% (OR = 11.1; 95% CI = 3.9 to 31.1; $p < .001$), and that of any eating disorder was 40% (OR = 7.2; 95% CI = 2.8 to 18.4; $p < .001$). Alcohol abuse and use of illicit drugs were also significantly associated with suicide attempts (respectively, OR = 15.6; 95% CI = 6.2 to 39.6; $p < .001$ and OR = 7.1; 95% CI = 2.7 to 18.7; $p < .001$). No significant association was found between suicide attempts and sociodemographic factors, such as social class and education.

Eight suicide attempters (40%) did not report any form of SIB. Suicide attempts were reported by 7% of Compulsive 1 subjects (OR = 5.2; 95% CI = 2.1 to 12.9; $p < .001$), 8% of Compulsive 2 subjects (OR = 4.2; 95% CI = 1.5 to 11.1; $p < .01$), 11% of Impulsive 1 subjects (OR = 5.6; 95% CI = 1.8 to 17.8; $p < .005$), and none of the Impulsive 2 subjects.

Multivariate Analyses

Conditional logistic regression models were used to explore which variables were independently associated with the presence of a specific type of SIB. The factors entered as dependent variables were childhood sexual molestation, childhood rape, childhood physical abuse, any lifetime eating disorder, level of education, GHQ total score, and BAT subscales scores. Table 5 shows the models that best fit the data. In all models, odds ratios were adjusted for socioeconomic status and degree of urbanization.

DISCUSSION

Epidemiologic Findings

The present study shows that SIBs are common among young women and that they are associated with a wide

spectrum of other types of direct and indirect self-harming behaviors, such as alcohol and drug abuse, eating disorders, and suicide attempts. The distinction between impulsive and compulsive behaviors appears to be substantially confirmed by our analyses, although a more complex subdivision emerged. As regards the prevalence of SIBs, not enough data on nonclinical populations are available in the literature to allow a comparison of our prevalence figures with those of previous studies. Our findings about impulsive SIBs are consistent with those of 2 previous studies based on self-reported data.[4,5] For compulsive SIBs, comparisons are more problematic, since, to our knowledge, no studies performed on community samples of women are available. The surveys conducted on samples of college students,[16–18] based on self-reported measures, found frequencies of skin picking and hair pulling that are highly variable, depending on the definition used for the investigated behavior. Indeed, with the exception of trichotillomania, no agreement exists as to the definition, diagnostic criteria, and clinical significance of compulsive SIBs, and the debate about their nosology is still open.[22,23,31]

From the point of view of classification, the differentiation of skin picking and self-biting from the other 2 compulsive SIBs, hair pulling and nail biting, deserves further investigation. Our findings seem to indicate that the 2 groups of compulsive SIBs have many characteristics in common, but also some important differences. Few studies are available about the differences between the various types of compulsive SIBs. A study comparing a small group of pathological skin-pickers with a sample of patients with trichotillomania found no substantial differences as regards temperamental dimensions and comorbid Axis I and II psychiatric diagnoses.[24] In addition, both hair pulling and skin picking seem to be associated with other types of SIBs,[21] alcohol/substance use, body dysmorphic disorder, and eating disorders.[22,23] Severe nail biting,[19] hair pulling,[32] and skin picking[33] might all be considered, from a neuroethological point of view, as forms of pathological grooming behavior, similar to those observed in animals.[34] This type of behavior typically involves concerns such as the removal of dirt and elimination of danger and, in animals, seems to be activated by traumatic stress.[32] However, skin picking seems to be different from hair pulling and nail biting because it causes direct damage to the skin. Among the compulsive SIBs, skin picking and self-biting have some characteristics in common with the other types of compulsive SIBs and others in common with impulsive SIBs, i.e., the direct harm of skin integrity and, as shown by our data, the relationship with childhood sexual abuse.

For impulsive SIBs, our findings on the dimensionality of impulsive SIBs should be considered with caution, due to the low prevalence of Impulsive 2 behaviors. The phenomenology and associated characteristics of these 2 groups of behaviors seem to be very similar. Both groups of subjects described their impulsive behavior as occasional, ego-syntonic, and triggered by events. In addition, both appeared to be associated with eating disorders, childhood abuse, and lower levels of education.

The presence of moderately high rates of subjects with more episodes of SIBs in their lifetime seems to confirm the hypothesis of Favazza[1,3] and Simeon and Favazza[2] of the existence of a "Deliberate Self-Harm Syndrome." Since our assessment did not provide information about the emotions that precede and follow the SIB, the present study cannot provide a prevalence rate for this syndrome. However, our findings appear to give support to the validity of this construct and to its association with other types of impulse-control disorders and self-damaging behaviors since subjects with several episodes of impulsive SIB were more distressed, had more problems with their body image, and reported eating disorders and suicide attempts more often compared with subjects with few episodes of SIB.

It is also noteworthy that the sites of skin cutting reported in our sample are different from those reported by clinical samples.[13] For example, in our sample, the rate of subjects who reported cutting their legs is very low, whereas legs are one of the most common sites of cutting in bulimia nervosa.[13] The difference could be due to the different recruitment method, but further studies on larger samples are necessary to draw any conclusion.

Pathogenetic Implications

Our findings seem to suggest that SIBs could have a multifactorial etiopathogenesis. Although our study is limited by the retrospective design, the associations that we have observed with temperamental characteristics on the one hand and with trauma on the other indicate that a genetic vulnerability and environmental factors probably interact to determine the risk of developing SIBs. Temperament is considered a measure of heritable personality traits that regulate the activation, maintenance, and inhibition of the behavior.[30] As reported in previous studies,[11,24] novelty seeking and harm avoidance seem to be the 2 temperamental dimensions involved in the risk of displaying SIBs. The temperamental characteristics of subjects with impulsive SIBs, i.e., high novelty seeking and high harm avoidance, do not completely coincide with the definition of temperamental impulsivity described by Cloninger,[30] which included high novelty seeking, low harm avoidance, and low persistence. Since temperamental traits are assumed to be quite stable, our findings appear to show that genetic factors that influence temperament could have a role in the risk of developing at least some types of SIBs. However, the fact that the TPQ was administered to only half of the sample limits the generalizability of these findings.

As regards the environmental factors, our findings highlight the importance of childhood abuse as a factor significantly associated with an increased risk for both impulsive and compulsive SIBs. According to some authors,[7] the stress of the abuse can produce lasting biological changes in the immature central nervous system of the child, leading to an inability to cope with negative emotions in adolescence and adult life. Dysphoria or a sense of tension can lead to SIB as the only way to recover control over emotions and body sensations. However, while our findings on suicide attempts and impulsive SIBs are consistent with those of the literature,[13,35–37] to our knowledge, our study is the first to investigate—and find—a connection between childhood abuse and compulsive SIB.

Alteration of the relationship with the body is another important pathway to SIB that can explain the relationship with childhood trauma. Indeed, all types of SIBs in our sample were associated with a significantly higher score on the "lack of familiarity with one's own body" BAT subscale. With the exception of the small Impulsive 2 group, the relationship between SIB and this BAT subscale also remained significant when controlling for the presence of eating disorders in a regression analysis (analyses not shown). This means that the observation of SIBs could be a specific sign of the presence of a disturbed experience of the body, which could be considered a risk factor not only for eating disorders, but also for somatoform disorders, such as body dysmorphic disorder.[22–24]

As for other forms of psychopathology, sociodemographic factors could represent important environmental risk factors for SIB. Our findings seem to indicate that socioeconomic status and degree of urbanization do not play a major role in the risk of developing self-injurious behavior.

On the contrary, it is interesting to observe that both groups of impulsive SIBs were characterized by lower levels of education, although their social class was similar to or higher than that of the control group. An impairment of school achievement can be considered a sign of the personal difficulties that characterize people with impulsive SIBs, leading to an earlier withdrawal from studies. However, these findings might also be interpreted as a sign that subjects with impulsive SIBs could be characterized by fewer abilities of coping due to lower or more disharmonic intellectual resources. It is possible that some deficit in specific cognitive functions, such as decision making or flexibility, could explain both the use of impulsive behavior in the presence of interpersonal difficulties and the low school achievement. However, any hypothesis remains speculative since unfortunately, to our knowledge, no data about the cognitive performance of subjects with impulsive SIB are available in the literature.

Association With Eating Disorders, Suicidality, and Alcohol/Substance Misuse

Although many studies have observed a high frequency of SIBs in eating disorders,[6,10–13] this is the first study to demonstrate a specific, significant association between impulsive SIBs and eating disorders in a community sample. Eating disorders are characterized by the presence of several self-damaging behaviors aimed at losing weight (fasting, self-induced vomiting, abuse of laxatives and/or diuretics). These behaviors showed a dimensional link with SIBs,[10] leading to the hypothesis that, in eating disorders, compensatory behaviors and SIBs could share some characteristics and psychological functions. Self-injurious behaviors and eating disorders share many characteristics: they occur more often in females and during adolescence,[3,6] they could both reveal a need to control the body after the uncontrollable changes due to puberty,[6] and they could both be associated to body dissatisfaction, asceticism, and ineffectiveness.[6,11]

Although there is an increased risk of compulsive SIBs among eating disordered subjects, the association with these types of SIBs appears to be less specific and significant. On the contrary, the strong association we have found between eating disorders and suicide attempts highlights the importance of considering eating disorders among the diagnoses to be assessed in young women who attempt suicide.

In our sample, both compulsive and impulsive SIBs showed a significant positive association with suicide attempts. This association confirms the importance of considering SIB as part of a wide spectrum of self-damaging behaviors that includes suicide and attempted suicide at the end of a severity continuum. However, despite the presence of many similarities, SIB and suicide attempts are very different as regards the psychological functions of the behavior. Self-injurious behaviors can be considered as attempts to control or prevent negative emotions and to produce a sense of relief or gratification, while suicide attempts are an act of escape, an attempt to end any type of emotion.[3]

Alcohol and illicit substance misuse are usually considered a sign of impulsivity, and this dimensional link is confirmed by their strong association with the impulsive SIBs of the first group (Impulsive 1). However, in our sample, they also showed a close association with both groups of compulsive SIBs. Though unexpected, this association is reasonable, since, from a phenomenological point of view, addictive behaviors have both impulsive and compulsive features.

Strengths and Weaknesses

Some limitations are present and must be acknowledged. First of all, although the total sample is not small, the low prevalence of some of the investigated behaviors limits the generalizability of the data about their

frequency and the validity of the findings about their dimensionality. Another limitation is linked to our methodological choice of assessing the frequency of the various behaviors without any assumption about their impulsive or compulsive nature. Although this choice gave us the opportunity of studying the full spectrum of SIBs and assessing their dimensionality, we lack some important information about the presence of essential features that would provide more precise knowledge about the nosology of the observed behaviors. The lack of data about Axis I and II psychiatric diagnoses prevents any consideration of the comorbidity of SIBs. Finally, our study did not provide any data about the phenomenon of SIBs in the male gender.

Notwithstanding these limitations, the present study is the first interview-based study to assess the prevalence of a large spectrum of SIBs in young women. Although impulsive and compulsive SIBs are different as regards clinical and phenomenological characteristics, they also share many important features. These observations suggest that a common classification of SIBs would be meaningful and advisable. Genetic and environmental factors are probably implicated in the risk of developing SIBs, and future studies about the genetic, neurobiological, and psychological correlates of SIBs should include both impulsive and compulsive behaviors for a better characterization of this spectrum of behaviors. Although many of the behaviors that we have included in the survey are not generally considered to be of a psychopathological nature, it is interesting to observe that all types of SIBs are significantly associated with emotional distress, low familiarity with the body, and a high frequency of direct and indirect self-damaging behaviors, such as alcohol abuse, use of illicit substances, eating disorders, and suicide attempts. The assessment of the full spectrum of SIBs may give the therapist a deeper knowledge of the patient's difficulties in coping with negative emotions, thus enabling him/her to plan individualized and appropriate treatment techniques. Furthermore, the literature reports that these behaviors are associated with a high frequency of psychiatric comorbidity, a chronic course, and a large amount of distress and dysfunction. These observations make the phenomenon of SIB a topic that deserves greater attention in the future both in research and in the clinical setting.

Disclosure of off-label usage: The authors have determined that, to the best of their knowledge, no investigational information about pharmaceutical agents that is outside U.S. Food and Drug Administration–approved labeling has been presented in this article.

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