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Prevalence, Forms, Motivations, and Associated Factors of Non-Suicidal Self-Injury Among High School Students in Hue: A Cross-Sectional Study

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Abstract

This cross-sectional study examined the prevalence, forms, motivations, and associated factors of non-suicidal self-injury (NSSI) among 747 high school students (grades 10–12) in Hue City, Vietnam, using an anonymous online survey. NSSI was assessed via the Functional Assessment of Self-Mutilation (FASM), alongside standardized measures for academic stress, self-esteem, social media addiction, and sleep quality. Overall, 46.7% of students reported past-12-month self-harm; pure NSSI accounted for 26.1% (95% CI: 23.1%–29.4%), while 8.4% reported suicidal intent. Most students with pure NSSI utilized multiple methods, dominantly wound picking, self-biting, and intentional hitting; skin cutting was uncommon (8.7%). Median age of onset was 14 years, with high impulsivity. Automatic negative reinforcement (emotion regulation) drove behaviors, while attention-seeking motives were minimal. Pure NSSI was significantly associated with female gender, poor sleep quality, high academic stress, social media addiction, bedtime procrastination, and low self-esteem. School-based interventions should prioritize emotional regulation, digital hygiene, and sleep optimization.

Keywords: non-suicidal self-injury; high school students; academic stress; social media addiction; sleep quality; Vietnam.

Introduction

Non-suicidal self-injury (NSSI) is defined as the deliberate, direct destruction of body tissue without suicidal intent, which is not socially or culturally sanctioned [1, 2]. Proposed as an independent condition requiring further study in the DSM-5 [3], identifying this behavior remains challenging. Global estimates indicate that the pooled adolescent NSSI prevalence ranges from 17.2% to 23.2% [4, 5], with a community pooled prevalence of 17.7% across 17 countries [6]. The average age of onset is consistently observed between 12 and 14 years [6, 7]. NSSI strongly predicts future suicidal behaviors, increasing baseline risk up to 30-fold [5, 8]. Therefore, accurately measuring and distinguishing pure self-injury from self-injury with suicidal intent is a vital requirement in adolescent psychiatric research.

To explain the core causes of NSSI, Nock and Prinstein's Four-Function Model classifies behavioral motivations along two axes: automatic/intrapersonal versus social/interpersonal, and positive versus negative reinforcement [9]. Large-scale empirical data,

notably a comprehensive meta-analysis by Taylor et al. [10], demonstrated that intrapersonal emotion-regulation functions are overwhelmingly predominant, being reported by 63% to 78% of individuals who engage in NSSI. This evidence effectively refutes the stereotype that adolescent self-injury is driven merely by interpersonal attention-seeking motives [1, 10].

NSSI results from complex interactions among psychological and environmental risk factors [3]. Individually, low self-esteem links to anxiety and hypersensitivity to negative evaluations [11]. In East Asian contexts, academic pressure acts as a massive exogenous source of stress that compromises emotional regulation, driving vulnerable students toward maladaptive behaviors [12]. In the digital era, "problematic social media use" (PSMU) - rather than simple usage duration - is closely tied to psychiatric distress [13–15] due to developmental difficulties in adolescent self-regulation [16]. Excessive digital preoccupation directly links to anxiety, depression [17], and suicidal ideation [18]. Notably, nighttime social media use combined with high emotional investment fuels central nervous system arousal, delaying sleep onset, causing

bedtime procrastination, and degrading sleep quality [19–23]. Standardized tools identify poor sleep quality as an independent risk factor for adolescent self-harm [5], though gender moderation patterns in Asian countries remain highly debated compared to Western contexts [6].

In Vietnam, student psychological burdens are alarming, yet clinical diagnosis faces barriers because the ICD-10 system does not recognize NSSI as an independent disorder [24]. Community surveys in Ho Chi Minh City using behavioral checklists reveal adolescent self-harm proportions as high as 43.9% to 46.9% [25, 26]. In Central Vietnam, a recent study in Hue City noted that up to 46.6% of high school students exhibited stress symptoms influenced by academic pressure and internet frequency [27]. Nevertheless, no in-depth study in Central Vietnam has strictly stratified the pure NSSI group based on suicidal intent while comprehensively evaluating this epidemiological profile through an integrated lens of academic stress, self-image, and digital-sleep disturbances.

Grounded in these critical gaps, this study was conducted to:

- examine the prevalence and diverse physical methods of self-injurious behavior among high school students;
- analyze self-injury motivations based on the Four-Function Model by comparing the pure NSSI group with the suicidal intent group; and
- explore the associations between pure NSSI behavior and demographics, academic stress, self-esteem, social media addiction, and sleep quality.

Materials and Methods

Study Design and Participants

This cross-sectional descriptive study was conducted from March to May 2026 among students in grades 10–12 at Hai Ba Trung High School, Hue City. This investigation was part of a broader school-based mental health surveillance project during the 2025–2026 academic year. A companion paper examined sequential mediation pathways linking social media addiction, sleep disturbances, and generalized self-esteem [28], whereas the present study focuses strictly on the epidemiological characteristics, forms, motivations, and associated factors of NSSI. Inclusion required voluntary student assent and parental/legal guardian informed consent. The protocol was formally approved by the Ethics Committee in Biomedical Research of the University of Medicine and Pharmacy, Hue University (Approval No. H2026/736). The unidentifiable online survey collected no personally identifiable information, ensuring complete anonymity.

Measurement Tools and Variable Definitions

Data were collected via a self-administered Google Forms questionnaire.

Demographic Variables

Demographic variables included gender, grade level, self-reported academic performance, current living arrangement, and family economic status.

Self-Harming Behavior

Self-harming behavior during the previous 12 months was assessed using the Functional Assessment of Self-Mutilation (FASM) [29]. This inventory tracks the frequency of 11 standardized physical tissue-damaging methods and medical treatment requirements. Contextual items described impulsivity, age of onset, substance use, and pain perception. Based on the FASM suicidal intent item, participants were classified into four mutually exclusive groups: non-self-harm, pure NSSI (primary analytical outcome), suicidal self-harm, and unknown intent [25, 26].

Motivations for Self-Harm

Motivations for self-harm were assessed using Section H of the FASM (22 items scored on a 4-point Likert scale: 0 = never to 3 = often). Items were interpreted according to the Four-Function Model across four subscales: Automatic Negative Reinforcement (A-NR), Automatic Positive Reinforcement (A-PR), Social Negative Reinforcement (S-NR), and Social Positive Reinforcement (S-PR) [9, 29]. Subscale endorsement was operationally defined at the item level, representing the percentage of students scoring ≥ 2 (“sometimes” or “often”) on at least one individual item within that functional domain.

Social Media Addiction

Social media addiction was measured using the 6-item Bergen Social Media Addiction Scale (BSMAS; score range 6–30), evaluating core behavioral addiction components across multiple platforms to avoid platform-specific measurement bias [15, 30, 31].

Educational Stress

Educational stress was assessed using the 16-item Educational Stress Scale for Adolescents (ESSA; score range 16–80), covering five dimensions: study pressure, workload, grade worry, self-expectation, and despondency, utilizing a validated Vietnamese version [12, 32].

Global Self-Esteem

Global self-esteem was measured using the 10-item Rosenberg Self-Esteem Scale (RSES; score range 10–40), where the five positively worded items were reverse-scored so that higher scores indicated higher global self-esteem [11, 33].

Sleep Quality and Nighttime Social Media Use

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI; score range 0–21) across seven components; a global score > 5 denoted poor sleep quality [34]. Nighttime social media use was tracked using a 4-item pilot measure covering use after 22:00, nighttime waking, bedtime procrastination, and device charging in the bedroom, analyzed as separate observed variables.

Translation and Cultural Adaptation

Translation and cultural adaptation involved forward- and back-translation by a committee of two psychiatrists and two language experts assisted by generative AI tools (Gemini and ChatGPT) to ensure semantic equivalence.

Survey Structure and Missing Data Handling

To minimize negative priming, items were ordered by increasing sensitivity: demographics, digital habits, sleep, academics, psychology, and self-harm, concluding with counseling hotline information. Missing data for the PSQI utilized complete-case analysis, with blank item Q5j frequency fields coded as 0 (denoting absence of other sleep-disrupting factors) [34]. For BSMAS, ESSA, and RSES, primary analyses used complete-case calculation, supplemented by sensitivity analysis applying prorated scoring to records with $\geq 80\%$ item completion.

Statistical Analysis

Prevalence estimates were calculated over the total valid analytical sample ($N = 747$) using the Wilson score interval method. Sensitivity analyses modified diagnostic thresholds (≥ 1 , ≥ 2 , or ≥ 3 standard methods). FASM motivation structural validity was evaluated using Principal Component Analysis. Internal consistency was assessed via Cronbach's alpha. Univariable analyses compared the pure NSSI group with the non-self-harm group (excluding suicidal and unknown groups), using Chi-square or Fisher's exact tests for categorical variables (reporting odds ratios) and Mann-Whitney U or Welch's t-tests for continuous indices. Due to non-normal continuous data distributions, effect sizes were evaluated using the rank-biserial correlation.

Results

Sample Screening, Data Processing, and Scale Reliability

A total of 747 students from grades 10–12 at Hai Ba Trung High School participated. Valid analytical sample sizes varied due to complete-case analysis (RSES: $n = 508$; PSQI: $n = 467$). Measurement instruments showed acceptable-to-excellent internal consistency: ESSA ($\alpha = 0.95$), RSES ($\alpha = 0.71$), and

FASM motivational subscales (A-NR = 0.76; A-PR = 0.58; S-NR = 0.71; S-PR = 0.90). Principal Component Analysis (PCA) of the 22 motivation items extracted four components with eigenvalues > 1 , explaining 62.46% of the total variance.

Demographic Characteristics and Prevalence

The baseline sample was predominantly female (58.9%), distributed across grades 10 (42.6%) and 11 (43.8%), with a high proportion of excellent academic performers (66.5%), students living with both parents (86.7%), and families of average economic status (73.1%) (Table 1).

Overall, 46.7% of students reported past-12-month self-harm, with 26.1% categorized as pure NSSI, 8.4% as suicidal self-harm, and 12.2% as unknown intent. Sensitivity analysis indicated that tightening diagnostic boundaries shifted estimated NSSI prevalence from 26.1% (≥ 1 standard method) to 18.5% (≥ 2 methods) and 11.6% (≥ 3 methods).

Methods, Severity, and Behavioral Characteristics

Within the pure NSSI group, 70.8% of students reported using two or more methods, with wound picking, self-biting, and intentional hitting emerging as the most prevalent expressions, while skin cutting was relatively rare (Table 2). Behavioral context screening revealed high impulsivity, with 46.2% engaging in the act with no prior thought and 20.0% contemplating for only a few minutes. Additionally, 16.4% of adolescents experienced no physical pain during self-injury, whereas mild-to-moderate pain characterized the majority of remaining cases.

Self-Harm Motivations According to the Four-Function Model

Automatic Negative Reinforcement (A-NR) functioned as the primary motivation for pure NSSI, although the suicidal self-harm group exhibited significantly higher mean scores across all four functional domains (Table 3). Item-level endorsement tracking revealed that despite low aggregated continuous domain averages for social subscales, 40.5% of students in the pure NSSI group reported frequent engagement in at least one social positive motive (S-PR), signaling highly focused communicative and help-seeking behaviors.

Factors Associated with Pure NSSI Behavior

Univariable analyses indicated that female gender (OR = 2.06) and poor sleep quality (PSQI > 5 ; OR = 2.90) were significantly associated with increased odds of pure NSSI (Table 4).

Continuous scale evaluations confirmed that adolescents in the pure NSSI group displayed significantly lowered global self-esteem alongside heightened levels of educational stress, social media addiction, nighttime digital platform usage distribution, and sleep-related bedtime procrastination (Table 5).

Table 1: Distribution of demographic characteristics by self-harm status.

Demographic characteristic	Classification	Non-self-harm group (n = 398)	Pure NSSI group (n = 195)	Total valid sample (N = 747) ^a
Gender	Female	51.0% (n = 203)	68.2% (n = 133)	58.9% (n = 440)
	Male	46.7% (n = 186)	29.2% (n = 57)	38.4% (n = 287)
	Other/unanswered	2.3% (n = 9)	2.6% (n = 5)	2.7% (n = 20)
Grade level	Grade 10	41.7% (n = 166)	46.2% (n = 90)	42.6% (n = 318)
	Grade 11	46.2% (n = 184)	39.0% (n = 76)	43.8% (n = 327)
	Grade 12	12.1% (n = 48)	14.9% (n = 29)	13.7% (n = 102)
Academic performance	Excellent	67.1% (n = 267)	67.7% (n = 132)	66.5% (n = 497)
	Good	32.4% (n = 129)	31.8% (n = 62)	32.3% (n = 241)
Living arrangements	Both parents	86.9% (n = 346)	86.7% (n = 169)	86.7% (n = 648)
	Single parent/other	13.1% (n = 52)	13.3% (n = 26)	13.3% (n = 99)
Family economic status	Wealthy/very wealthy	20.6% (n = 82)	19.0% (n = 37)	19.9% (n = 149)
	Average	73.6% (n = 293)	74.9% (n = 146)	73.1% (n = 546)
	Low-income/difficult	5.8% (n = 23)	4.6% (n = 9)	7.0% (n = 52)

^aThe total valid sample also includes students in the suicidal self-harm group (n = 63) and the self-harm group with unknown intent (n = 91).

Table 2: Frequency, prevalence, and medical needs of self-harm methods in the pure NSSI group.

Method	Prevalence (%)	Frequency per year, median (Q1–Q3)	Medical treatment requirement rate ^a
Picking or scraping a wound	53.8	3.0 (2.0–5.0)	15.5% (13/84)
Self-biting	52.3	5.0 (2.0–10.0)	8.3% (7/84)
Intentionally hitting oneself	44.6	3.0 (1.6–6.5)	7.9% (6/76)
Hair pulling	34.4	3.0 (1.7–5.0)	13.6% (8/59)
Picking skin to the point of bleeding	20.5	5.0 (2.0–18.2)	24.2% (8/33)
Scraping or scratching skin	20.5	3.0 (2.0–3.5)	16.1% (5/31)
Rubbing skin hard to cause damage	17.4	1.7 (1.0–2.6)	2.9% (1/34)
Cutting or carving skin	8.7	2.0 (1.0–4.5)	0.0% (0/14)

^aDenominators reflect valid responses for each respective item.

Table 3: Comparison of self-harm function scores according to the Four-Function Model.

Functional subscale	Pure NSSI group (n = 195), mean (SD)	Suicidal group (n = 63), mean (SD)	Any-item endorsement rate ^a in NSSI group (%)
Automatic Negative Reinforcement (A-NR)	0.86 (0.89)	1.74 (0.85)	40.0
Automatic Positive Reinforcement (A-PR)	0.56 (0.63)	1.11 (0.80)	35.4
Social Negative Reinforcement (S-NR)	0.31 (0.48)	0.75 (0.81)	23.6
Social Positive Reinforcement (S-PR)	0.30 (0.45)	0.70 (0.75)	40.5

^aScore ≥ 2 on at least one item. Mean (SD) represents continuous subscale averages.

Discussion

This study delivers a comprehensive epidemiological profile of pure non-suicidal self-injury among high school students in Central Vietnam, strictly stratifying suicidal intent while integrating digital and psychological lifestyle habits.

Prevalence and the Role of Measurement Methods

The observed pure NSSI prevalence (26.1%) and broad self-harm history (46.7%) sit higher than Western global baselines but robustly converge with domestic data utilizing identical behavioral checklists in Ho Chi Minh City [4–6, 25, 26]. This pattern underscores a critical methodological artifact: multi-item inventories like the FASM bypass the “stereotype bias” inherent in single-item screens, successfully capturing concealed, non-prototypical distress that typically eludes

Table 4: Univariable analysis of categorical factors associated with pure NSSI.

Categorical variable	Non-self-harm group (<i>n</i> = 398), <i>n</i> (%)	Pure NSSI group (<i>n</i> = 195), <i>n</i> (%)	Odds ratio	95% CI	<i>p</i> -value
Gender: female	203 (51.0%)	133 (68.2%)	2.06	1.44–2.95	< 0.001
Gender: male	186 (46.7%)	57 (29.2%)	0.47	0.33–0.68	< 0.001
Poor sleep (PSQI > 5)	94 (23.6%)	84 (43.1%)	2.90	1.95–4.34	< 0.001
Good sleep (PSQI ≤ 5)	221 (55.5%)	68 (34.9%)	Reference	–	–

The analytical sample deliberately excludes suicidal and unknown-intent self-harm groups.

Table 5: Comparison of clinical scale medians and effect sizes between the non-self-harm and pure NSSI groups.

Scale (non-normally distributed data)	Non-self-harm group median (Q1–Q3)	NSSI group median (Q1–Q3)	Effect size (r_{rb}) ^a	<i>p</i> -value
Self-esteem (RSES; score 10–40)	27.0 (25.0–29.0)	25.0 (23.0–27.0)	0.32	< 0.001
Sleep quality (PSQI; score 0–21)	4.0 (2.0–6.0)	6.0 (4.0–8.0)	–0.34	< 0.001
Academic stress (ESSA; score 16–80)	49.0 (45.0–57.0)	54.0 (47.0–62.0)	–0.21	< 0.001
Social media addiction (BSMAS; score 6–30)	17.0 (14.0–18.0)	18.0 (15.0–20.0)	–0.20	< 0.001
Nighttime SMU after 22:00 (minutes)	60.0 (30.0–120.0)	60.0 (30.0–120.0)	–0.16	0.002
Bedtime procrastination (score 0–4)	2.0 (1.0–2.0)	2.0 (1.0–3.0)	–0.18	< 0.001

^a r_{rb} represents the rank-biserial correlation coefficient. Negative values indicate that the NSSI group scored higher, except for RSES, where the positive value indicates that the non-self-harm group scored higher.

authorities [3, 7, 8]. Furthermore, tightening diagnostic boundaries to exclude transient experimentation shifts the prevalence to 18.5% (for ≥ 2 methods) and 11.6% (for ≥ 3 methods), isolating a highly vulnerable sub-population characterized by high behavioral versatility [7].

Behavioral Characteristics and Recalibrating the Perception of Self-Harm

The physical phenomenology patterns within this cohort sharply refute the public stereotype equating adolescent self-injury solely with wrist-cutting [1]. Minor expressions including wound picking (53.8%), self-biting (52.3%), and intentional self-hitting (44.6%) overwhelmingly dominated, while skin cutting registered at a mere 8.7%, matching localized community profiles [9, 29, 35]. The high behavioral impulsivity (46.2% acting with zero forethought) combined with a prominent absence of somatic pain (16.4%) deeply resonates with the Experiential Avoidance Model (EAM) [2]. When intense scholastic distress overloads cognitive capacities during early adolescence (median age of onset = 14 years), vulnerable students rapidly execute these concealed physical behaviors as a primitive “pain offset relief” strategy to terminate intolerable affective states, circumventing resource-heavy adaptive emotion regulation options [2, 8].

Motivations for Self-Harm and the Boundary with Suicidal Behavior

Grounded in Nock and Prinstein’s Four-Function Model, continuous subscale scores confirm that Automatic Negative Reinforcement (A-NR) - the intra-

psychic deployment of pain to extinguish intolerable emotional states - functions as the primary driver of pure NSSI, led by “stopping bad feelings” and “escaping numbness” [9]. Conversely, social positive reinforcement (“attention-seeking”) ranked at the bottom (5.1%), refuting stigmatizing socio-cultural misconceptions [25]. However, interpersonal communication elements remain active for 40.5% of the pure NSSI sample, operating as a high-intensity non-verbal signaling language when formal communication mechanisms break down [1, 10]. Crucially, the dramatic doubling of A-NR scores (1.74 ± 0.85 vs. 0.86 ± 0.89) within the suicidal subgroup provides powerful empirical validation for Joiner’s Acquired Capability framework [8]. When automated affect-regulation thresholds fail to contain compounding distress, psychological pain triggers a lethal trajectory, transforming a baseline emotional-relief mechanism into an acute life-threatening crisis [8]. This indicates that while average scores for social functions appear floor-bounded due to scale aggregation, item-level endorsement captures a widespread “spotlight effect” where nearly half of the youth rely on specific interpersonal features to signal distress or regain situational control.

Associated Factors: Gender Disparities, Psychological Profiles, and the Digital Space

Univariable analysis identified a prominent female vulnerability disparity (OR = 2.06), aligning with global meta-analytic estimates but diverging from the strict gender parity models hypothesized in certain Asian community reviews, though potential under-detection in males due to emotional-disclosure barriers

must be considered [5, 6, 15, 36, 37]. Heightened educational stress ($r_{rb} = -0.21$) and diminished self-esteem ($r_{rb} = 0.32$) confirm that internal scholastic components actively impair emotional regulation, while shattered self-esteem exacerbates hypersensitivity to external evaluations, driving students toward maladaptive outlets [11, 12, 32].

In the digital domain, the core psychological intrusion of Problematic Social Media Use acted as a prominent concurrent risk factor ($r_{rb} = -0.20$), carrying far greater clinical predictive utility than absolute daily screen duration [13, 14]. Adolescents with low self-esteem frequently deploy digital networking as an artificial coping mechanism for mood modification and emotional escape [15, 31]. When these channels fail to alleviate accumulating internalizing distress, a cross-domain behavioral spillover occurs, driving students toward physical tissue damage to achieve immediate emotional truncation [13]. This digital preoccupation actively fuels a hazardous digital-sleep cascade; nighttime device usage and social media-induced bedtime procrastination significantly compromise subjective sleep architecture, segmenting participants into poor sleepers (PSQI > 5), which carries a threefold higher odds of engaging in pure NSSI (OR = 2.90) [5, 17, 19, 21, 22]. Rather than operating as abstract markers, these technology-induced sleep disruptions represent concrete, clustered lifestyle co-factors that directly amplify adolescent behavioral dysregulation.

Limitations

Several structural limitations bound the generalizability of these findings. First, the cross-sectional design prevents drawing definitive causal trajectories between technological habits, sleep disruptions, and self-injurious behavior [13, 21]. Second, reliance on online self-report platforms introduces inherent recall and social-desirability biases, and complete-case analysis for sensitive continuous indices resulted in missing data rates [34]. Finally, the sample was restricted to a single prestigious public high school with an overrepresentation of high academic performers (66.5% excellent), requiring extreme caution when extrapolating these profiles to broader geographic regions across Vietnam.

Conclusion

NSSI behavior within this urban Vietnamese community sample is highly prevalent, characterized by high method complexity, marked impulsivity, and primarily maintained by automatic internal affect-regulation functions rather than social manipulation. The dominant community phenotype centers on highly concealed, low-severity micro-behaviors (wound picking and self-biting) rather than prototypical skin cutting, marking a critical “hidden epidemic” for school health surveillance. Pure NSSI risks are tightly bound to

female gender, poor subjective sleep quality, deflated self-esteem, problematic digital immersion, and severe scholastic pressure. School-based universal screening frameworks must utilize multi-behavioral checklists to capture early-stage emotional dysregulation, combining targeted distress-tolerance training and sleep-hygiene optimization with strict suicide-risk screening for adolescents presenting with accelerated automatic negative reinforcement motivations.

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Ethics Approval and Consent to Participate

The research protocol was formally reviewed and approved by the Ethics Committee in Biomedical Research of the University of Medicine and Pharmacy, Hue University (Approval Reference No. H2026/736). Written informed voluntary assent was obtained from all participating students, alongside formal signed informed consent documents from their respective parents or legal guardians prior to survey deployment. Total anonymity and data confidentiality were strictly guaranteed throughout the processing pipeline.

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Competing Interests

The authors declare no competing interests.

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