

## Preplanned Studies

## Variation in and Factors Associated with Youth Self-Harm in College Students — Jiangsu Province, China, 2019–2023

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### Summary

#### What is already known about this topic?

Self-harm represents a significant public health challenge that disproportionately affects young adults. Understanding individual- and institutional-level risk factors is crucial for developing and implementing effective mental wellness intervention programs for college students.

#### What is added by this report?

The prevalence of youth self-harm fluctuated between 2.21% and 3.83% from 2019 to 2023. Risk factors associated with self-harm included unhealthy lifestyle behaviors, particularly internet addiction, while the implementation of regular family psychological forums was associated with reduced self-harm risk.

#### What are the implications for public health practice?

Effective campus-based psychosocial support systems must incorporate person-centered approaches and context-specific needs, optimize resource allocation through targeted interventions, and prioritize high-risk groups exhibiting unhealthy lifestyle behaviors.

2.21% and 3.83% during the study period. Self-harm was strongly associated with unhealthy lifestyles, particularly internet addiction (*OR*: 2.50, 95% *CI*: 1.91, 3.24), while regular family psychological forums were associated with decreased risk (*OR*: 0.72, 95% *CI*: 0.55, 0.95).

**Conclusion:** Our findings emphasize the necessity of on-campus psychosocial support and highlight the importance of leveraging family-college collective resources with targeted interventions, especially for high-risk groups exhibiting unhealthy lifestyles, particularly internet addiction.

Self-harm, defined as any act of self-injury or self-poisoning regardless of suicidal intent (1), represents a significant public health concern, particularly among young adults and adolescents. As the third leading cause of disability-adjusted life-years in youth globally (2), self-harm demands comprehensive clinical and community care. Educational settings have been identified as crucial intervention points, with targeted support recommended during mental health crises to prevent youth self-harm (3). Regular surveillance is essential for establishing prevention and control priorities (4). Analysis of data from the “Surveillance for common disease and health risk factors among students in Jiangsu Province” program during 2019–2023 revealed self-harm rates fluctuating between 2.21% and 3.83% among 15,641 college students. Among identified risk factors, internet addiction demonstrated the strongest association, with 2.5-fold increased odds of youth self-harm. Notably, institutions implementing regular family psychological forums showed approximately 30% lower risk. These findings underscore the global imperative for prompt and effective responses to address youth mental health challenges and stress management.

Comprehensive public health surveillance of self-

## ABSTRACT

**Introduction:** Self-harm represents a significant public health challenge, particularly affecting young adults. This study evaluated prevalence rates and identified individual- and college-level risk factors for self-harm among college students in Jiangsu Province.

**Methods:** Using data from the ‘Surveillance for common disease and health risk factors among students in Jiangsu Province’ program during 2019–2023, we employed multilevel logistic regression models to account for potential clustering within sampled colleges and to estimate odds ratios (*OR*) and 95% confidence intervals (*CI*) for person- and college-level factors. Dynamic analyses were conducted with repeated modeling by year.

**Results:** Youth self-harm rates fluctuated between

harm behaviors among young people, coupled with the identification of associated individual and contextual factors, is fundamental for developing targeted mental health interventions (4). Before implementing mental health service improvements, policymakers require evidence-based insights to identify core challenges and optimize resource allocation between individual- and environment-oriented programs. This study therefore aimed to evaluate self-harm prevalence rates and identify both individual- and college-level risk factors among college students in Jiangsu Province, China.

Data for this study were obtained from the 'Surveillance for Common Disease and Health Risk Factors Among Students in Jiangsu Province' Project spanning 2019–2023. The surveillance program employed a stratified multi-stage cluster sampling design encompassing 13 prefecture-level administrative regions in Jiangsu Province. Within each administrative region, 1 college was randomly selected, followed by random selection of 6 classes from each of the first 3 college years. All students in selected classes were invited to voluntarily complete an anonymous self-reported questionnaire after providing informed consent. Rigorous quality control measures were implemented throughout data collection, including follow-up calls to clarify ambiguous responses. Detailed methodology of the surveillance program has been previously described (5).

The primary outcome measure was self-harm experience, assessed through the question *"Have you ever deliberately hurt yourself in some way in the past year, such as cut or hit yourself?"* with binary (yes/no) responses (6). Independent variables included: college grade (freshman, sophomore, or junior); sex (male or female); ethnicity (Han or non-Han); family size (0–2 or >2 people including the student); boarding status at college (yes/no); unhealthy diet (yes/no); ever-smoking status (yes/no); ever-alcohol consumption (yes/no); internet addiction (yes/no) (7); daily outdoor physical exercise of at least 1 hour in the past week (yes/no); college type (key universities, regular universities, or vocational colleges); and study major category (comprehensive university, polytechnic college, or medical college). On-campus crisis intervention services were categorized as binary variables based on the presence or absence of: regular psychological counselor training; regular psychological training for in-service teachers; established psychological intervention research centers; and family psychological education forums (8).

Categorical variables were summarized using

frequencies and proportions. To account for college-level clustering, multilevel logistic regression models were employed to quantify outcome variation and estimate odds ratios (ORs) and 95% confidence intervals (CIs) for factors of interest. Dynamic analysis was conducted by repeating the modeling procedure annually. All statistical analyses were performed using R software (version 4.4.0; R Core Team, Vienna, Austria), with statistical significance set at  $P < 0.05$ .

Among the 15,641 college students included in this study, 7,601 (48.6%) were male and 8,040 (51.4%) were female, with a relatively even distribution across academic years: 33.7% freshmen, 33.5% sophomores, and 32.8% juniors (Table 1). The prevalence of self-harm fluctuated between 2.21% and 3.83% during the study period (2019–2023) (Table 1), with significant variations observed across individual and institutional factors, including unhealthy diet, smoking status, alcohol consumption, internet addiction, presence of family psychological education forums, and college type (Table 2).

While year-by-year multilevel analyses revealed no consistently significant risk factors across all time points (Table 3), the comprehensive 5-year model identified several notable associations. Internet addiction emerged as the strongest risk factor ( $OR=2.50$ , 95% CI: 1.91, 3.24). Students at institutions with established psychological intervention research centers reported higher rates of self-harm ( $OR=1.62$ , 95% CI: 1.12, 2.21) compared to those without such facilities. Conversely, both sophomores ( $OR=0.64$ , 95% CI: 0.51, 0.80) and juniors ( $OR=0.52$ , 95% CI: 0.41, 0.66) demonstrated significantly lower risk compared to freshmen. Additionally, the implementation of regular family psychological forums was associated with reduced odds of self-harm ( $OR=0.72$ , 95% CI: 0.55, 0.95) (Table 3).

## DISCUSSION

Enhancing youth mental wellness in educational settings is crucial to address the growing demand for mental health services. Aligned with global initiatives advocating for investment in youth mental health (9), our findings emphasize the necessity of implementing person-centered interventions and optimizing environmental contexts to improve mental health service delivery for youth self-harm prevention. The observation of higher self-harm reporting rates in institutions with established psychological intervention research centers underscores the importance of

TABLE 1. Sociodemographic characteristics and prevalence of self-harm among college students in Jiangsu Province, China, 2019–2023.

Variables	2019			2020			2021			2022			2023			Total			
	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	
Grade																			
Freshman	1,093 (34.1)	51 (41.5)	4.67 (3.49, 6.09) <sup>†</sup>	1,046 (33.3)	41 (43.2)	3.92 (2.89, 5.32) <sup>†</sup>	1,085 (33.3)	33 (45.2)	3.77 (2.40, 5.95)	961 (33.9)	31 (43.7)	3.23 (2.27, 4.59)	1,091 (34.1)	41 (48.2)	3.76 (2.77, 5.10) <sup>*</sup>	5,276 (33.7)	197 (44.1)	3.73 (3.25, 4.29) <sup>*</sup>	
Sophomore	1,069 (33.3)	41 (33.3)	3.84 (2.77, 5.17)	1,054 (33.5)	29 (30.5)	3.57 (2.10, 6.09)	1,086 (33.4)	15 (20.5)	2.20 (1.06, 4.56)	950 (33.5)	21 (29.6)	2.21 (1.44, 3.39)	1,080 (33.8)	28 (32.9)	2.59 (1.79, 3.75)	5,239 (33.5)	134 (30.0)	2.56 (2.16, 3.03)	
Junior	1,047 (32.6)	31 (25.2)	2.96 (2.02, 4.18)	1,045 (33.2)	25 (26.3)	2.42 (1.47, 4.00)	1,085 (33.3)	25 (34.2)	2.99 (1.67, 5.35)	924 (32.6)	19 (26.8)	2.06 (1.31, 3.22)	1,025 (32.1)	16 (18.8)	1.56 (0.96, 2.55)	5,126 (32.8)	116 (26.0)	2.26 (1.89, 2.71)	
Sex																			
Male	1,570 (48.9)	60 (48.8)	4.01 (3.10, 5.11)	1,590 (50.6)	45 (47.4)	3.21 (2.29, 4.49)	1,393 (42.8)	38 (52.1)	2.73 (1.98, 3.75)	1,146 (40.4)	31 (43.7)	2.71 (1.90, 3.85)	1,902 (59.5)	45 (52.9)	2.37 (1.77, 3.17)	7,601 (48.6)	227 (50.8)	2.74 (2.40, 3.12) <sup>*</sup>	
Female	1,639 (51.1)	63 (51.2)	3.66 (2.80, 4.69)	1,555 (49.4)	50 (52.6)	3.30 (2.19, 4.97)	1,863 (57.2)	35 (47.9)	2.91 (1.75, 4.84)	1,689 (59.6)	40 (56.3)	2.37 (1.74, 3.23)	1,294 (40.5)	40 (47.1)	3.09 (2.27, 4.21)	8,040 (51.4)	220 (49.2)	2.99 (2.62, 3.40)	
Ethnic group																			
Non, Han	99 (3.1)	8 (6.5)	8.08 (3.55, 15.3) <sup>†</sup>	70 (2.2)	-	2.86 (0.71, 11.42)	135 (4.1)	-	2.24 (0.72, 6.94)	112 (4.0)	-	1.79 (0.45, 7.14)	132 (4.1)	-	3.79 (1.58, 9.10)	548 (3.5)	20 (4.5)	3.65 (2.35, 5.66)	
Han	3,110 (96.9)	115 (93.5)	3.70 (3.06, 4.42)	3,075 (97.8)	-	3.02 (2.47, 3.71)	3,121 (95.9)	-	2.21 (1.75, 2.80)	2,723 (96.0)	-	2.53 (2.00, 3.21)	3,064 (95.9)	-	2.61 (2.10, 3.25)	15,334 (98.0)	427 (95.5)	2.83 (2.57, 3.11)	
Family size																			
>2	2,817 (87.8)	98 (79.7)	3.48 (2.83, 4.22) <sup>*</sup>	2,868 (91.2)	83 (87.4)	2.89 (2.33, 3.59)	2,989 (91.8)	65 (89.0)	2.14 (1.68, 2.74)	2,449 (86.4)	55 (77.5)	2.25 (1.72, 2.93) <sup>†</sup>	2,897 (90.6)	68 (80.0)	2.35 (1.85, 2.98) <sup>*</sup>	15,334 (98.0)	296 (66.2)	2.56 (2.28, 2.86) <sup>*</sup>	
0–2	392 (12.2)	25 (20.3)	6.38 (4.17, 9.27)	277 (8.8)	12 (12.6)	4.33 (2.46, 7.63)	267 (8.2)	8 (11.0)	3.00 (1.50, 5.99) <sup>*</sup>	386 (13.6)	16 (22.5)	4.15 (2.54, 6.77)	299 (9.4)	17 (20.0)	5.69 (3.53, 9.15)	548 (3.5)	151 (33.8)	3.73 (3.18, 4.38)	
Boarding at college																			
Yes	3,087 (96.2)	114 (92.7)	3.69 (3.06, 4.42) <sup>†</sup>	3,110 (98.9)	-	2.96 (2.41, 3.63)	3,206 (98.5)	-	2.18 (1.73, 2.76)	2,787 (98.3)	-	2.44 (1.92, 3.09)	3,144 (98.4)	-	2.67 (2.16, 3.31)	15,334 (98.0)	429 (96.0)	2.80 (2.55, 3.08) <sup>*</sup>	
No	122 (3.8)	9 (7.3)	7.38 (3.43, 13.54)	35 (1.1)	-	8.57 (2.76, 26.58)	48 (1.5)	-	4.17 (1.04, 16.6)	48 (1.7)	-	6.25 (2.02, 19.38)	52 (1.6)	-	1.92 (0.27, 13.65)	305 (2.0)	18 (4.0)	5.90 (3.72, 9.37)	
Total	3,209 (100.0)	123 (100.0)	3.83 (3.21, 4.57)	3,145 (100.0)	95 (100.0)	2.99 (2.44, 3.66)	3,256 (100.0)	73 (100.0)	2.21 (1.76, 2.79)	2,835 (100.0)	71 (100.0)	2.50 (1.98, 3.16)	3,196 (100.0)	85 (100.0)	3.30 (2.60, 4.19)	15,641 (100.0)	477 (100.0)	2.86 (2.60, 3.14)	

Note: “-” indicates calculations were not performed for cells with small numbers (<5). P were calculated using the Cochran-Armitage test.

Abbreviation: CI=confidence interval.

\* P<0.01.

† P<0.05.

TABLE 2. Individual and college-level characteristics associated with self-harm prevalence among college students in Jiangsu Province, China, 2019–2023.

Variables	2019			2020			2021			2022			2023			Total		
	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)	N (%)	n (%)	Rate % (95% CI)
Individual-level factors																		
Unhealthy diet																		
Yes	2,458	108	4.39 (3.62, 5.28)*	720	41	5.69 (4.19, 7.73)*	822	32	3.90 (2.76, 5.52)*	711	34	4.78 (3.42, 6.69)*	878	32	3.64 (2.58, 5.15)†	5,589	247	4.42 (35.7) (55.3) (3.90, 5.00)*
No	751	15	2.00 (1.12, 3.27)	2,425	54	2.23 (1.71, 2.91)	2,434	41	1.64 (1.21, 2.24)	2,124	37	1.74 (1.26, 2.40)	2,318	53	2.29 (1.75, 2.99)	10,052	200	1.99 (64.3) (44.7) (1.73, 2.29)
Ever-smoking status																		
Yes	453	27	5.96 (3.96, 8.55)†	342	17	4.97 (3.09, 8.00)†	311	15	4.82 (2.91, 8.00)*	250	16	6.40 (3.92, 10.45)*	356	18	5.06 (3.19, 8.03)*	1,712	93	5.43 (10.9) (20.8) (4.43, 6.66)*
No	2,756	96	3.48 (2.83, 4.24)	2,803	78	2.78 (2.23, 3.47)	2,943	57	1.94 (1.49, 2.51)	2,585	55	2.13 (1.63, 2.77)	2,840	67	2.36 (1.86, 3.00)	13,927	353	2.53 (89.1) (79.0) (2.28, 2.81)
Ever-alcohol consumption status																		
Yes	2,756	67	4.55 (3.54, 5.74)	1,265	40	3.16 (2.32, 4.31)	1,117	33	2.96 (2.10, 4.16)†	1,016	32	3.15 (2.23, 4.45)	1,342	39	2.91 (2.12, 3.98)*	6,212	211	2.50 (39.7) (47.2) (2.20, 2.84)*
No	1,737	56	3.22 (2.44, 4.17)	1,880	55	2.93 (2.25, 3.81)	2,139	40	1.83 (1.33, 2.50)	1,819	39	2.14 (1.57, 2.93)	1,854	46	2.48 (1.86, 3.31)	9,429	236	3.40 (60.3) (52.8) (2.97, 3.89)
Internet addiction																		
Yes	228	21	9.21 (5.79, 13.73)*	182	11	6.04 (3.35, 10.91)†	197	13	6.63 (3.85, 11.42)*	234	16	6.84 (4.19, 11.16)*	234	14	5.98 (7.3) (16.5) (3.54, 10.10)*	1,075	75	6.98 (6.9) (16.8) (5.56, 8.75)*
No	2,981	102	3.42 (2.80, 4.14)	2,961	83	2.96 (2.27, 3.86)	3,059	60	1.93 (1.50, 2.49)	2,601	55	2.11 (1.62, 2.75)	2,962	71	2.40 (1.90, 3.02)	14,564	371	2.55 (93.1) (83.0) (2.30, 2.82)
Physical exercise, weekly																		
Yes	2,048	39	4.10 (3.28, 5.05)	2,205	33	2.83 (2.11, 3.78)	2,163	56	2.55 (1.96, 3.32)	1,972	47	2.38 (1.79, 3.17)	2,421	66	2.73 (2.14, 3.47)	9,922	270	2.72 (63.4) (60.4) (2.42, 3.07)
No	1,161	95	3.36 (2.40, 4.56)	940	62	4.26 (2.99, 6.81)	1,093	17	1.56 (0.97, 2.50)	863	24	2.78 (1.86, 4.15)	775	19	2.45 (24.2) (22.4) (1.56, 3.84)	5,719	177	3.09 (36.6) (39.6) (2.67, 3.59)
College-level factors																		
Regular training with psychological counselors																		
Yes	2,965	–	3.98 (3.32, 4.77)	2,905	81	2.76 (2.21, 3.43)*	2,993	–	2.45 (1.88, 3.19)	2,569	63	2.45 (1.92, 3.14)	2,941	77	2.62 (2.09, 3.27)	14,373	410	2.85 (91.9) (91.7) (2.59, 3.14)
No	244	–	2.05 (0.85, 4.92)	240	14	6.07 (7.6) (14.7) (3.35, 11.0)	263	–	1.21 (0.19, 7.75)	266	8	3.01 (9.4) (11.3) (1.50, 6.01)	255	8	3.14 (8.0) (9.4) (1.57, 6.27)	1,268	37	2.92 (8.1) (8.3) (2.11, 4.03)
Regular psychological training with in-service teachers																		
Yes	2,725	110	4.04 (3.35, 4.87)	2,668	71	2.66 (2.11, 3.36)*	2,756	–	2.54 (1.94, 3.33)	2,569	63	2.45 (1.92, 3.14)	2,785	71	2.55 (2.02, 3.22)	13,503	383	2.84 (86.3) (85.7) (2.57, 3.14)
No	484	13	2.69 (1.56, 4.63)	477	24	5.30 (15.2) (25.3) (3.24, 8.69)	500	–	1.27 (0.42, 3.86)	266	8	3.01 (9.4) (11.3) (1.50, 6.01)	411	14	3.41 (12.9) (16.5) (2.02, 5.75)	2,138	64	2.99 (13.7) (14.3) (2.34, 3.82)

Variables	2019		2020		2021		2022		2023		Total	
	N (%)	Rate % (95% CI)	N (%)	Rate % (95% CI)	N (%)	Rate % (95% CI)	N (%)	Rate % (95% CI)	N (%)	Rate % (95% CI)	n (%)	Rate % (95% CI)
Established psychological intervention research centers												
Yes	463 (14.4)	3.46 (2.12, 5.64)	475 (15.1)	3.79 (2.39, 6.01)	493 (15.1)	3.04 (2.05, 5.05)	506 (17.8)	2.37 (1.35, 4.18)	514 (16.1)	2.53 (1.47, 4.36)	2,451 (15.7)	3.02 (2.40, 3.79)
No	2,746 (85.6)	3.90 (3.22, 4.71)	2,670 (84.9)	2.95 (2.30, 3.78)	2,763 (84.9)	2.22 (1.64, 2.99)	2,329 (82.2)	2.53 (1.96, 3.27)	2,682 (83.9)	2.68 (2.13, 3.38)	13,190 (84.3)	2.83 (2.55, 3.13)
Regular family psychological education forums												
Yes	1,496 (46.6)	3.28 (2.48, 4.33)	1,476 (46.9)	2.78 (1.93, 3.99)	493 (15.1)	2.75 (1.82, 4.15)	1,566 (55.2)	2.17 (1.55, 3.04)	1,517 (47.5)	2.44 (1.77, 3.37) <sup>†</sup>	7,586 (48.5)	2.57 (2.23, 2.96) <sup>†</sup>
No	1,713 (53.4)	4.32 (3.44, 5.43)	1,669 (53.1)	3.27 (2.48, 4.32)	2,763 (84.9)	2.15 (1.56, 2.97)	1,269 (44.8)	2.92 (2.11, 4.02)	1,679 (52.5)	2.86 (2.15, 3.79)	8,055 (51.5)	3.13 (2.77, 3.54)
Types of study majors												
Comprehensive university	1,970 (61.4)	4.11 (3.31, 5.11)	1,905 (60.6)	2.94 (2.26, 3.82)	1,722 (52.9)	2.12 (1.44, 3.13)	1,516 (53.5)	2.77 (2.05, 3.75)	1,662 (52.0)	2.41 (1.77, 3.28)	8,775 (56.1)	2.61 (2.35, 2.90)
Polytechnic college	992 (30.9)	3.53 (2.53, 4.91)	999 (31.8)	3.49 (2.26, 5.38)	1,289 (39.6)	2.33 (1.63, 3.33)	1,061 (37.4)	2.26 (1.52, 3.37)	1,267 (39.6)	2.92 (2.12, 4.03)	5,608 (35.9)	4.23 (2.79, 6.43)
Medical college	247 (7.7)	2.83 (1.35, 5.94)	241 (7.7)	2.90 (1.38, 6.09)	245 (7.5)	3.27 (1.10, 11.0)	258 (9.1)	1.94 (0.81, 4.66)	267 (8.4)	3.00 (1.50, 5.99)	1,258 (8.0)	4.12 (3.32, 5.11)
Types of colleges												
Regular universities	2,696 (84.0)	3.52 (2.88, 4.31) <sup>†</sup>	2,655 (84.4)	3.10 (2.42, 3.98)	2,724 (83.7)	1.99 (1.52, 2.59)	2,318 (81.8)	2.16 (1.63, 2.85)	2,713 (84.9)	2.29 (1.78, 2.93)	13,106 (83.8)	2.89 (2.56, 3.27) <sup>*</sup>
Key universities	269 (8.4)	4.83 (2.81, 8.32)	251 (8.0)	3.59 (1.87, 6.89)	-	-	-	-	-	-	520 (3.3)	2.82 (2.41, 3.29)
Vocational colleges	244 (7.6)	6.15 (3.71, 10.2)	239 (7.6)	2.51 (1.13, 5.59)	532 (16.3)	3.38 (2.13, 5.37)	517 (18.2)	4.06 (2.65, 6.23)	483 (15.1)	4.76 (3.16, 7.17)	2,015 (12.9)	2.78 (2.00, 3.87)

Note: "-" indicates calculations were not performed for cells with small numbers (<5). P-values were calculated using the Cochran-Armitage test.

Abbreviation: CI=confidence interval.

\* P<0.01.

<sup>†</sup> P<0.05.

TABLE 3. Adjusted odds ratios and 95% confidence intervals for individual and college characteristics associated with self-harm among college students in Jiangsu Province, China, 2019–2023.

Variables	2019	2020	2021	2022	2023	Total
Social demographic characteristics						
Grade						
Freshman (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Sophomore	0.79 (0.51, 1.21)	0.69 (0.41, 1.14)	0.44 (0.23, 0.82)	0.60 (0.34, 1.07)	0.60 (0.36, 0.99)	0.64 (0.51, 0.80)
Junior	0.51 (0.32, 0.83)	0.53 (0.31, 0.91)	0.70 (0.40, 1.21)	0.53 (0.29, 0.97)	0.37 (0.20, 0.67)	0.52 (0.41, 0.66)
Sex						
Male (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Female	1.20 (0.79, 1.83)	0.93 (0.58, 1.50)	0.91 (0.54, 1.53)	1.22 (0.73, 2.05)	1.68 (1.04, 2.71)	0.85 (0.70, 1.05)
Ethnic group						
Non-Han (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Han	0.55 (0.25, 1.19)	1.05 (0.24, 4.54)	1.10 (0.33, 3.63)	1.88 (0.43, 8.17)	0.63 (0.24, 1.62)	0.79 (0.51, 1.30)
Family size						
>2 (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
0–2	1.93 (1.20, 3.11)	1.30 (0.67, 2.55)	1.37 (0.63, 2.97)	1.74 (0.97, 3.12)	2.61 (1.48, 4.60)	1.08 (0.86, 1.34)
Boarding at college						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.46 (0.21, 1.01)	0.31 (0.08, 1.23)	0.41 (0.09, 1.83)	0.34 (0.10, 1.19)	1.41 (0.18, 10.95)	0.48 (0.30, 0.83)
Individual-level factors						
Unhealthy diet						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.08 (1.19, 3.65)	2.43 (1.57, 3.78)	2.13 (1.29, 3.49)	2.40 (1.46, 3.95)	1.55 (0.97, 2.48)	2.03 (1.65, 2.50)
Ever-smoking status						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.35 (0.81, 2.33)	2.12 (1.12, 4.01)	1.76 (0.92, 3.40)	2.63 (1.34, 5.16)	2.09 (1.14, 3.84)	1.85 (1.42, 2.41)
Ever-alcohol consumption status						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.19 (0.79, 1.79)	0.93 (0.57, 1.51)	1.29 (0.77, 2.16)	1.04 (0.61, 1.78)	1.12 (0.68, 1.83)	1.09 (0.89, 1.35)
Internet addiction						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.89 (1.72, 4.86)	1.90 (0.93, 3.88)	3.53 (1.85, 6.74)	2.73 (1.48, 5.05)	2.39 (1.29, 4.42)	2.50 (1.91, 3.24)
Physical exercise, weekly						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.74 (0.50, 1.11)	0.84 (0.53, 1.33)	1.88 (1.06, 3.35)	0.87 (0.51, 1.48)	1.11 (0.65, 1.89)	0.99 (0.81, 1.21)
College-level factors						
Regular training for psychological counselors						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.44 (0.89, 6.71)	0.67 (0.15, 2.93)	2.71 (0.58, 12.77)	0.55 (0.15, 1.97)	1.05 (0.30, 3.65)	1.10 (0.61, 1.93)
Regular psychological training for in-service teachers						
No (ref.)	1.00	1.00	1.00	–	1.00	1.00
Yes	0.98 (0.40, 2.42)	0.24 (0.06, 0.97)	1.45 (0.41, 5.08)	–	0.59 (0.23, 1.55)	0.87 (0.57, 1.38)

Continued

Variables	2019	2020	2021	2022	2023	Total
Established psychological intervention research centers						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.39 (0.70, 2.78)	2.15 (0.85, 5.44)	2.20 (1.04, 4.66)	1.49 (0.70, 3.16)	1.50 (0.71, 3.18)	1.62 (1.18, 2.21)
Regular family psychological forums						
No (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.62 (0.34, 1.12)	1.76 (0.54, 5.74)	0.70 (0.36, 1.36)	0.92 (0.44, 1.95)	0.75 (0.40, 4.39)	0.72 (0.55, 0.95)
Types of colleges						
Regular universities (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Key universities	1.91 (0.89, 4.10)	2.01 (0.65, 6.25)	-	-	-	1.95 (1.16, 3.17)
Vocational colleges	1.54 (0.78, 3.06)	2.40 (0.56, 10.26)	0.70 (0.36, 1.36)	2.30 (1.17, 4.51)	2.44 (1.36, 4.39)	1.72 (1.30, 2.25)
Types of study majors						
Comprehensive University (ref.)	1.00	1.00	1.00	1.00	1.00	1.00
Polytechnic College	1.38 (0.83, 2.30)	0.96 (0.41, 2.25)	1.18 (0.66, 2.13)	0.71 (0.33, 1.53)	1.17 (0.66, 2.08)	1.08 (0.84, 1.38)
Medical College	0.83 (0.35, 1.98)	3.08 (0.74, 12.79)	1.74 (0.72, 4.17)	0.88 (0.31, 2.53)	1.62 (0.69, 3.82)	1.11 (0.74, 1.63)

Note: “-” indicates calculations were not performed due to collinearity or cells with small numbers (<5); “ref.” means the reference.

strengthening public health surveillance and intervention programs for college students' mental wellness. Effective prevention of youth self-harm requires enhancement of existing on-campus crisis intervention services, including regular psychological counselor training, systematic psychological training for in-service teachers, establishment of psychological intervention research centers, and regular family psychological education forums. These components collectively facilitate early identification of at-risk youths and enable development of comprehensive countermeasures for self-harm prevention and control.

Future campus crisis intervention services require evidence-based prioritization, particularly focusing on different institutional types (key universities, vocational colleges) and students with unhealthy lifestyles. Global best practices in campus mental health services emphasize integrated multidisciplinary care aimed at providing stigma-free, meaningful consultations and interventions. Current evidence supports a comprehensive approach combining clinical-, community-, web- and school-based interventions for managing youth self-harm (8), complementing the established paradigm of gatekeeper access to campus mental health services (10). Future investments should strengthen collaborative workforce coordination among stakeholders (students, families, college administrators, clinicians, and authorities), adapt services to person-centered and context-specific needs, optimize resource allocation through targeted

interventions, and specifically address high-risk groups exhibiting unhealthy lifestyles, particularly internet addiction.

This study has several important limitations. First, the cross-sectional design precluded investigation of causal relationships between individual and institutional characteristics and self-harm behaviors among college students. Nevertheless, the observed variations in youth self-harm underscore the importance of delivering integrated physical, behavioral, and psychosocial support services on campus. Second, the reliance on self-reported data may have led to underestimation of self-harm prevalence. While clinical confirmation using DSM-V diagnostic criteria would provide greater diagnostic accuracy, such extensive clinical evaluation was not feasible in this large-scale surveillance study. The survey instruments used are, however, widely validated screening tools in the literature. Future clinical investigations targeting high-risk groups identified through initial screening would enhance prevalence estimate reliability and provide additional validation. Third, although this study employed a stratified multi-stage cluster sampling scheme to ensure representative sampling across Jiangsu Province, the framework did not achieve comprehensive coverage of all college types and academic majors. Without census data for the entire college student population across different academic backgrounds, our results should be interpreted with appropriate caution. Future research should focus on

identifying modifiable service components and evaluating their contribution to reducing self-harm in youth, advancing evidence-based resource allocation for campus mental health services.

This investigation demonstrates that individual-level variation in youth self-harm can be effectively addressed through strategic implementation of campus mental health services during this critical period of psychological development. The findings emphasize the urgent need for sustained commitment and systematic efforts to identify, assess, modify, and monitor both personal behaviors and contextual factors associated with youth self-harm reduction in collegiate settings, particularly as demand for youth mental health services continues to grow.

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