Original Article

The Association between Internet Addiction and Suicide Ideation: Comparison between Soldiers and College Students in Taiwan

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Abstract

Objectives: To explore the association between Internet addiction and suicide ideation, we introduced the Interpersonal Theory of Suicide as a potential model to understand Internet addiction and suicidality. In addition, we intended to identify differences between genders and between subgroups of soldier and student in this association. **Methods:** We conducted a cross-sectional survey study of 661 participants, comprising military personnel (n = 399, 60.36%) and college students (n = 262, 39.64%). Several copies of anonymous questionnaire were used to assess variables, including Internet addiction, anxiety, depression, perceived burdensomeness, thwarted belongingness, acquired capability for suicide, and suicide ideation. **Results:** We found that 18% of participants (119 out of 661) met the criteria for Internet addiction. Internet addiction was significantly associated with higher anxiety ($p < 0.001$), significantly more severe depression ($p < 0.001$), significantly more perceived burdensomeness ($p < 0.001$), and significantly more perceived suicidal ideation ($p < 0.001$). Significant differences in study participants existed in genders ($p < 0.001$) and between the soldier and student groups ($p < 0.001$). In regression analyses, we found general associations between specific facets of Internet addiction, for example, compulsive use, and components of the interpersonal theory and thwarted belongingness of suicide. **Conclusion:** Internet addiction is linked to worse mental health and suicidality. Understanding the connections between Internet addiction and models such as the Interpersonal Theory of Suicide can inform prevention and treatment approaches for vulnerable groups.

Key words: Beck Anxiety Inventory-II, Beck Depression Inventory-Second Edition, Chen Internet Addiction Scale, Interpersonal Theory of Suicide

Taiwanese Journal of Psychiatry **(Taipei) 2024; 38: 38-45**

Introduction

The Internet has become an essential tool for modern society and a source of addiction, especially when people use it as a coping style for their unpleasant life situations. Kim et al. reported that loneliness is one of the causes and the resources for problematic Internet use [1]. In addition, this kind of loneliness in Internet users is also linked to suicide ideas and behavior [2]. Internet addiction, or Internet addiction disorder, can be linked to impulse control disorder [3] and is associated with maladaptive use of digital networks and new social and virtual technologies [4].

Clinically, depressive disorder is one of the common comorbid disorders of Internet addiction [5]. As proposed by investigators, four possible mechanisms exist in Internet addiction [6]:

- The escape model (the depression onsets before Internet addiction)
- The negative consequences model (the Internet addiction onsets before depression)
- The bidirectional model (the Internet addiction and depression fluctuate together)
- The shared mechanism model (some characteristics predispose both Internet addiction and depression).

Received: Dec. 12, 2013 revised: Jan. 11, 2024 accepted: Jan. 18, 2024
date published: Mar. 29, 2024

Access this article online

Quick Response Code:

Website: https://journals.lww.com/TPSY

DOI: 10.4103/TPSY.TPSY_8_24

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How to cite this article: Lin HY, Tai YM: The association between internet addiction and suicide ideation: Comparison between soldiers and college students in Taiwan. Taiwan J Psychiatry 2024;38:38-45.

Another study showed that individuals who had overcome Internet addiction (remitted subjects) have lower levels of depression, anxiety, and hostility than those currently struggling with the disorder [7]. In many studies [8], suicide ideation has been suggested as a consequence of Internet addiction.

In our previous study, we have shown the strong association between Internet addiction and suicide ideation [9]. A study of Taiwanese outpatients with Internet addiction showed that Internet addiction is correlated with lower behavior inhibition [10]. But to the best of our knowledge, the mechanism between Internet addiction and suicidality has not been well explored. Khatcherian et al. have proposed a feeling-of-loneliness model to answer their systemic literature review but without results [11]. Another study based on 497 Chinese adolescents who completed the assessment of cyber-victimization has revealed the mediation effects of thwarted belongingness and perceived burdensomeness between cyber-victimization and suicidal ideation/attempts [12]. This suggestion has compelled us to consider the Interpersonal Theory of Suicide proposed by Thomas Junior [13]. This theory is intended to understand why people engage in suicidal behavior and determine those most at risk. For causing a desire for suicide, three key components of the Interpersonal Theory of Suicide [13] are as follows:

- Thwarted belongingness: A sense of social alienation and lack of reciprocally caring relationships (this produces a desire for suicide)
- Perceived burdensomeness: The view that one's existence is a burden on friends, family, and/or society (this also produces the desire for suicide)
- Acquired capability: A diminished fear of death and increased tolerance for physical pain, which enables one to actually attempt suicide.

The simultaneous presence of all three components can lead to a lethal suicide attempt [13]. We propose that these three components might be an essential key to understanding the association between Internet addiction and suicidality among youths. Therefore, we intended to do a cross-sectional survey study to explore the relationship between Internet addiction, Interpersonal Theory of Suicide, and suicide among youths, namely, soldier and students. To the best of the authors' knowledge, no study has been conducted in military samples to apply Joiner's theory to Internet addiction and suicide. We hypothesized that this theory could also be applied to military population as students but with different weights.

Methods

Study participants and study procedures

This was a cross-sectional survey study. The experimental protocol was approved by the Institutional Review Board at the Tri-Service General Hospital, National Defense Medical Center in Taipei, Taiwan (TSGHIRB No: A202305119 and date of approval = August 2, 2023) with the need to obtain informed consent forms from the study participants. The study was conducted from August to October 2023.

Participants in the study included military personnel from three military camps and students from one college in Northern Taiwan. First, we gave education classes and then provided a brief introduction about this study. After that, eligible participants were asked to voluntarily participate in the study, and provided their informed consent. We collected 661 anonymous responses from eligible participants for their current demographics and a series of copies of the Chinese version questionnaire, namely Beck Depression Inventory-Second Edition (BDI-II) as subjects' depression level, Beck Anxiety Inventory, second edition, Chen Internet Addiction Scale (CIAS), Interpersonal Needs Questionnaire (INQ), and Acquired Capability for Suicide Scale (ACSS). The subject's suicidal ideation was derived from the six items of BSRS-5. In this item, participants' responses to their current 1-week suicide ideation ranged from none to extreme severity. There was no dropout or withdrawal in this study.

Measures

Brief Symptom Rating Scale-5

Five-item Brief Symptom Rating Scale (BSRS-5) is originally designed as a screening tool for psychiatric illness screening in nonpsychiatric health settings [14]. Besides five symptom items of anxiety, depression, hostility, interpersonal sensitivity/inferiority, and insomnia, the modified BSRS-5 by adding sixth item of current suicide ideation has been used for an effective screening instrument for suicide ideation [15]. In this study, we summarized responders' rating scores. The severity level (ranging from 0 to 4) of the sixth item as suicide ideation is scaled from 0 to 4.

Beck Anxiety Inventory

The BAI is a nonspecific, self-report inventory that is used to measure the severity of anxiety in children and adults. The questions used in this inventory detect the common symptoms of anxiety that the subject has experienced during the past week (including the day of the assessment). It served as the primary outcome for measuring the severity of anxiety in participants with different primary anxiety disorders. BAI is to assess emotional, physiological, and cognitive aspects of state anxiety. It consists of 22 items, to rate the study participants on a four-point Likert scale ranging from 0 = not at all to 3 = severely. Categorical anxiety levels consist of minimal (0–7 points), mild (8−15), moderate (16–25), and severe (26–63) anxiety [16].

Beck Depression Inventory-Second Edition

The BDI-II, is a 21-item instrument to evaluate the existence and severity of depressive symptoms listed in *the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*. Each item is scored from 0 for "not at all" to 3 for "almost always" [17]. The Chinese version of the BDI-II has been demonstrated to have substantial internal consistency, reliability, and stability in a study of the military population in Taiwan [18]. BDI-II is a self-report, 21-item instrument to assess the existence and severity of depressive symptoms

listed in DSM-IV during the past 2 weeks. The Chinese version of the BDI-II has shown to have substantial internal consistency, reliability, and stability in a study of Hong Kong adolescents [19].

Chen Internet Addiction Scale

The CIAS is a four-point, 26-item self-reported scale to assess five dimensions of Internet-related symptoms and problems, including symptoms of compulsive use, withdrawal, tolerance, and problems in interpersonal relationships and health/time management [20]. The total score of the CIAS ranges from 0 to 78. Higher CIAS scores indicate increased severity of addiction to Internet activity. The internal reliability of the scale and the subscales in the original study ranged from 0.79 to 0.93 [21]. Correlation analyses have yielded a positive correlation between total scale and subscale scores of CIAS and weekly hours spent on Internet activity. A suggested cutoff point of the total score of 58 yields a sensitivity level as 92.6% and a specificity level as 85.6% [21].

Interpersonal Theory of Suicide – Interpersonal Needs Questionnaire and Acquired Capability for Suicide Scale

The Interpersonal Theory of Suicide consists of the following three components that result in suicidality: perceived burdensomeness, thwarted belongingness, and capacity for suicide. In this study, the measurements of perceived burdensomeness and thwarted belongingness were performed using the Chinese version of the Interpersonal Needs Questionnaire consisting of 15 seven-point Likert scales, ranging from 1 as disagree to 7 as totally agree [22]. We also used the Chinese version of ACSS to evaluate the third component, CS. The validity and reliability of these 20 five-point Likert scales, from 0 for not agree to 4 for totally agree, have been proven to be feasible for the adolescent and adult population [23].

The INQ is a 15-item self-report assessment of "recent" TB (nine items; e.g., "These days I feel disconnected from people") and PB (six items; e.g., "These days I feel like a burden to the people in my life") from the Interpersonal Theory of Suicide. Respondents endorse items using a seven-point scale ranging from 1 (not at all true for me) to 7 (very true for me). Higher scores on the INQ reflect greater TB or PB. The INQ has demonstrated good psychometric properties among college samples [22]. Cronbach's alphas for the current sample were 0.83 for the TB subscale and 0.94 for the PB subscale.

The Interpersonal Theory of Suicide proposes that suicidal behavior requires both a desire for suicide and the capability to act on that desire. This capability involves reduced fear of death and increased pain tolerance. In this study, we revised the ACSS to better reflect the current theoretical conceptualization. Expert review led to the retention of seven ACSS items assessing fearlessness about death (FAD), termed the ACSS-FAD. Confirmatory factor analyses across three student samples have shown a one-factor model with these seven items [24].

Statistical analysis

Descriptive analyses were used to present the demographic characteristics of the total sample and psychological conditions, namely, Internet addiction and Interpersonal Theory of Suicide. We then compared demographic variables between genders and student/soldier groups using Chi-square models for categorical variables and the independent *t*-test for continuous variables. We also used linear regression models to compare the effects (beta) of psychological factors. The outcome variable is the three components of Joiner's theory of suicide and the 6th item of BSRS. The main predictors are five components of CIAS for Internet addiction. The models also designed to adjust the effects of sex, age, and status of soldier/student.

All statistical analyses were done using the Statistical Package for the Social Sciences version 25 (SPSS Inc., Chicago, Illinois, USA). Differences between subgroups and association coefficients were considered statistically significant if *p*-values were smaller than 0.05.

Results

We collected study variables from 661 participants; Table 1 depicts the demographics, Internet addiction states, and psychology states of samples in general, genders, and soldier/student status. According to the criteria of CIAS, about 18% (119 out of 661) of participants met the states of Internet addiction.

Table 2 displays the demographics and psychological states of the sample with Internet addiction (according to CIAS) and controls. We found that Internet addiction was significantly associated with higher anxiety ($p < 0.01$), significantly more severe depression ($p < 0.001$), significantly more perceived burdensomeness ($p < 0.001$), and significantly more perceived suicide ideation ($p < 0.01$).

Table 3 lists the correlations between Internet addiction and suicide ideation among either soldiers or students. We found that, in both the groups, there were certain degrees of correlations between three components of Junior's theory of suicide (items D to F in Table 3) and five dimensions of Internet addiction (items G to L in Table 3) and suicide ideation (M in Table 3) but with different patterns. The different correlation patterns were also found in genders (Table 4).

Table 5 demonstrates the associations (betas) of linear regressions of Internet addiction subitems on outcome variables, namely, three components of Junior's theory of suicide and suicide ideation detected by the sixth item of BSRS-5, with adjustment of effect of age, sex, and soldier/student status. We found that both perceived burdensomeness and thwarted belongingness were associated with compulsive use of Internet. And the withdrawal problem of Internet addiction was associated with the acquired capability of suicide (Table 5). In addition, the acquired capacity component was positively associated with student status (beta = 3.09, $p < 0.01$) and female (beta = −0.20, $p < 0.001$, Table 5). The suicide ideation detected by sixth item of BSRS-5 was associated

Table 1. Demographics, internet addiction, and psychology states of samples genders and soldier/student status (n = 661)

	Mean ± SD			
	Female	Male	Soldiers	Students
n	237	424	399	262
Status***				
Soldiers, *n* (%)	33 (13.92)	366 (86.32)		
Students, *n* (%)	204 (86.08)	58 (13.68)		
Sex***, *n* (%)				
Female			33 (8.27)	204 (77.86)
Male			366 (91.73)	58 (22.14)
Age (years)				
Range	18.83–37.58	17.65–45.25	18.83–45.25	17.65–37.58
Mean ± standard deviance	20.26 ± 2.55	23.94 ± 5.53***	24.35 ± 3.67	19.74 ± 1.52***
Psychological states				
Anxiety	26.04 ± 8.17	24.43 ± 5.99**	24.41 ± 6.14	26.03 ± 7.93**
Depression	7.39 ± 8.63	5.57 ± 7.68**	5.09 ± 7.62	8.01 ± 8.54***
Interpersonal Theory of Suicide				
Perceived burdensomeness	8.89 ± 5.69	9.69 ± 6.36	10.11 ± 7.85	8.68 ± 5.60*
Thwarted belongingness	32.01 ± 10.2	31.83 ± 10.22	31.81 ± 10.21	32.01 ± 10.21
Acquired capability	37.54 ± 11.16	42.34 ± 11.47***	42.32 ± 11.47	37.92 ± 11.17***
Internet addiction (CIAS total score)	23.68 ± 15.53	24.12 ± 16.78	23.81 ± 16.56	24.64 ± 16.16
Compulsive use	4.18 ± 4.13	4.00 ± 3.32	3.96 ± 3.28	4.31 ± 4.16
Withdrawal	5.16 ± 3.35	5.43 ± 3.80	5.34 ± 3.76	5.38 ± 3.48
Tolerance	4.28 ± 2.62	4.16 ± 2.87	4.13 ± 2.82	4.41 ± 2.73
Interpersonal problems	5.35 ± 4.35	5.52 ± 4.64	5.48 ± 4.60	5.56 ± 4.50
Health-related problems	4.71 ± 3.20	5.01 ± 3.77	4.92 ± 3.77	4.98 ± 3.30
Suicide ideation (BSRS_6)†	0.16 ± 0.40	0.15 ± 0.52	0.14 ± 0.52	0.18 ± 0.42

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ significantly different tested using Chi-square or t-test when appropriate
†The suicide ideation is measured by the sixth item of BSRS.
CIAS, Chen Internet Addiction Scale; SD, standard deviation; BSRS, Brief Symptom Rating Scale

with only health-related problems dimension of CIAS score (beta = 0.02, $p < 0.01$).

Discussion

From 661 participants, about 60% were soldiers and 40% were students. The sample was male dominated (male:female = 64.15%:35.85%). The majority of male respondents were soldiers, while the most females were students. Both age and sex exhibited significant differences between the soldier and student groups (Table 1).

In anxiety, soldiers had a lower mean score than students, indicating less anxiety. They are also found to be less depressed. In the Interpersonal Theory of Suicide parameters, soldiers scored higher on "Perceived Burdensomeness" and lower on "Thwarted Belongingness." They have a higher "Acquired Capability" score, indicating a higher tolerance to painful and fearful experiences (Table 1).

This study confirms that Internet addiction appears to be significantly associated with worse mental health outcomes, including suicidality. About 18% (119/661) of participants met the criteria for Internet addiction based on the CIAS. An online survey among students of UK universities has shown a prevalence of 3.2% of Internet addiction [25]. In this study, 7.7% were in these Chinese college students [26]. The prevalence of IA in male and female Chinese college students is 7.21% (259/3592) and 8.17% (368/4506), respectively [27].

In our previous study, about 7.53% (92 out of 1,212) of soldiers met the criteria of pathological Internet use of Young's Diagnostic Questionnaire for Internet addiction (YDQ) [9]. But in that male-sample study, further evaluation of suicidality is not shown.

The psychoemotional scores such as anxiety and depression as well as suicide parameters appear to indicate significantly higher anxiety and depression among students but higher perceived burdensomeness and acquired accessibility among soldiers (Table 1). But regarding Internet addiction (measured by CIAS total score), no significant difference was seen between soldiers and students. In its subscales, no significant differences were found either (Table 1). The level of suicide ideation, measured by BSRS_6, also did not differ significantly between the groups (Table 1). This finding seems to contradict the result of a national sample of 207 with the US military identities, indicating that religious and spiritual struggles have predicted higher Internet gaming severity [28].

In this study, most females were students (204 out of 237), while most males were soldiers (366 out of 424). The age range for females was 18.83 to 37.58 years, with a mean of 20.26. For males, the age range was broader, from 17.65 to 45.25 years, with a mean of 23.94. As shown in Table 1, female samples were significantly younger than male samples ($p < 0.001$). Females exhibited higher anxiety levels (26.04 vs. 24.43), depression (7.39 vs. 5.57), and slightly higher

Table 2. Demographics and psychology states of sample with Internet addiction (according to Chen Internet Addiction Scale) and controls

	Mean ± SD	
	Internet addiction†	Control
n	119	543
Sex, *n* (%)		
Female	38 (31.93)	198 (36.46)
Male	77 (64.71)	342 (62.98)
Status, *n* (%)		
Soldiers	70 (58.82)	332 (61.14)
Students	49 (41.18)	211 (38.86)
Age		
Range	17.65–37.58	18.83–45.25
Mean ± standard deviance.	22.66 ± 3.49	22.5 ± 3.82
Psychological states		
Anxiety**	26.77 ± 7.92	24.62 ± 6.59
Depression***	8.76 ± 9.23	5.66 ± 7.73
Interpersonal Theory of Suicide		
Perceived burdensomeness***	12.03 ± 11.25	8.97 ± 5.60
Thwarted belongingness	32.87 ± 9.12	31.75 ± 10.39
Acquired capability	39.09 ± 12.13	40.92 ± 11.43
Suicide ideation (BSRS_6)**§	0.27 ± 0.70	0.13 ± 0.41

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, significantly different tested using *t*-test or Chi-square test when appropriate
†The samples met the CIAS criteria for Internet addiction;
§The suicide ideation is measured by the sixth item of BSRS. BSRS, Brief Symptom Rating Scale; SD, standard deviation; CIAS, Chen Internet Addiction Scale

perceived burdensomeness, but these differences were not significant. On the other hand, males scored higher on the "acquired capability" metric (42.34 vs. 37.54), which was a significant difference ($p < 0.001$). Regarding Internet addiction, no significant differences were found in the subcategories of the CIAS or in the total CIAS score, between males and females. Both sexes had similar levels of suicide ideation, as measured using the sixth item of the BSRS_6, with no significant difference (Table 1).

In terms of psychological states, while demographic variables appear equivalent between those with Internet addiction and those without, there are significant differences in psychological state, notably with higher levels of anxiety, depression, perceived burdensomeness, and suicide ideation seen in Internet-addicted individuals (Table 2). Our findings support a previous prospective study that showed that an Internet addiction group exhibits increased depression and hostility more than a nonaddiction group, that the effect on depression is stronger in adolescent girls, and that the remission group decreases depression, hostility, and social anxiety more than the persistent addiction group [7]. These elements could serve as critical points for intervention and therapy in addiction management.

Positive or negative correlation coefficients represent the strength and direction of the relationship between variables (Table 3) in both student and soldier groups and both genders

Table 3. Correlations between age, psychology states, suicidality, and internet addiction of soldiers (up-right and gray background)

Soldiers/students	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Age (A)	1	0.0003	−0.048	−0.008	−0.020	−0.070	−0.034	−0.032	−0.046	−0.057	<0.001***	−0.031	0.044
Anxiety (B)	0.093	1	0.528**	0.401**	0.093	0.038	0.217**	0.205**	0.142**	0.210**	0.205**	0.228**	0.380**
Depression (C)	0.051	0.650**	1	0.435**	0.165**	0.066	0.238**	0.234**	0.202**	0.217**	0.182**	0.253**	0.369**
Interpersonal Theory of Suicide													
Perceived burdensomeness (D)	−0.027	0.231**	0.564**	1	0.156*	0.091	0.260**	0.263**	0.174**	0.224**	0.264**	0.250**	0.273**
Thwarted belongingness (E)	−0.037	0.076	0.084	0.220**	1	−0.029	0.125*	0.177**	0.096	0.051	0.147**	0.081	0.044
Acquired capability (F)	0.024	−0.026	0.052	0.054	−0.157**	1	−0.051	−0.074	−0.108*	0.007	−0.063	0.019	−0.091
CIAS total score (G)	0.041	0.136*	0.177**	0.113	−0.127*	−0.126*	1	0.927**	0.890**	0.901**	0.916**	0.907**	0.196**
Compulsive use (H)	0.039	0.185**	0.220**	0.198**	−0.058	−0.104	0.851**	1	0.688**	0.657**	0.729**	0.647**	0.189**
Withdrawal (I)	0.033	0.072	0.108	0.093	−0.194**	−0.144*	0.896**	0.806**	1	0.792**	0.793**	0.733**	0.170**
Tolerance (J)	0.043	0.100	0.169**	0.110	−0.123*	−0.132*	0.899**	0.772**	0.798**	1	0.805**	0.816**	0.192**
Interpersonal problems (K)	0.031	0.114	0.123*	0.033	−0.118	−0.069	0.926**	0.847**	0.718**	0.763**	1	0.751**	0.117
Health-related problems (L)	0.039	0.118	0.171**	0.071	−0.080	−0.128*	0.875**	0.789**	0.739**	0.812**	0.781**	1	0.222**
Suicide ideation (M)	0.062	0.442**	0.395**	0.323**	0.130**	0.136**	0.184**	0.160**	0.127*	0.147**	0.204**	0.183**	1

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. CIAS, Chen Internet Addiction Scale

Table 4. Correlations between age, psychology states, suicidality, and Internet addiction in female (low-left) and male (up-right and gray background) samples

Female/male	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Age (A)	1	0.082	−0.009	−0.021	0.081	−0.034	−0.023	−0.012	0.001	−0.033	−0.022	−0.041	0.055
Anxiety (B)	−0.070	1	0.632**	0.201**	0.044	0.021	0.132*	0.186**	0.047	0.093	0.122	0.110	0.467**
Depression (C)	−0.127	0.537**	1	0.534**	0.097	0.107	0.159*	0.207**	0.046	0.150*	0.121	0.171**	0.418**
Interpersonal Theory of Suicide													
Perceived burdensomeness (D)	0.056	0.386**	0.410**	1	0.219**	0.077	0.079	0.158*	0.029	0.087	0.028	0.038	0.422**
Thwarted belongingness (E)	−0.063	0.111*	0.143**	0.168**	1	−0.161**	−0.176**	−0.089	−0.230**	−0.174**	−0.166*	−0.128	0.137**
Acquired capability (F)	−0.007	0.007	0.018	0.144*	0.002	1	−0.083	−0.084	−0.141*	−0.083	−0.018	−0.057	0.100*
CIAS total score (G)	−0.053	0.218**	0.252**	0.280**	0.139**	−0.095	1	0.850**	0.865**	0.883**	0.922**	0.875**	0.201**
Compulsive use (H)	−0.046	0.199**	0.250**	0.280**	0.186**	−0.104*	0.925**	1	0.818**	0.775**	0.851**	0.776**	0.183**
Withdrawal (I)	−0.068	0.162**	0.240**	0.214**	0.101*	−0.134**	0.904**	0.653**	1	0.818**	0.743**	0.758**	0.144**
Tolerance (J)	−0.070	0.209**	0.233**	0.223**	0.070	−0.040	0.907**	0.634**	0.743**	1	0.769**	0.821**	0.167**
Interpersonal problems (K)	−0.019	0.196**	0.185**	0.281**	0.158**	−0.103*	0.919**	0.718**	0.746**	0.796**	1	0.774**	0.209**
Health−related problems (L)	−0.051	0.232**	0.255**	0.268**	0.103*	−0.040	0.905**	0.658**	0.686**	0.793**	0.759**	1	0.203**
Suicide ideation (M)	−0.082	0.340**	0.342**	0.203**	0.019	−0.051	0.148*	0.144*	0.123	0.151*	0.078	0.176**	1

*$p < 0.05$, **$p < 0.01$. CIAS, Chen Internet Addiction Scale

(Table 4). The different correlation patterns existed in soldier/student status and genders. It is notably that most variables show significant positive correlations with Internet addiction (as measured by the CIAS total score and its constituents) and suicide ideation. Some variables also showed significant positive correlations with age, indicating that they may increase with age. In addition, anxiety, depression, perceived burdensomeness, and other factors were found to significantly correlate with suicidality in both genders. In that, a linear regression model with adjusting effects of age, soldier/student status, and age is appropriate.

Associations (betas) between suicidality and Internet addiction

With regard to statistical significance, in the whole sample, being a student, compulsive use of the Internet, and withdrawal showed a significant correlation with some aspects of suicidality (Table 5). As females are generally considered to tend to use the Internet predominantly for social interactions [29], our findings showed no significant effect of gender on thwarted belongingness nor perceived burdensomeness. In contrast, females demonstrated higher acquired capability of suicide and this was also associated with soldier status and withdrawal dimension of Internet addiction (Table 5). To the knowledge of the authors, this is the first study reporting findings related to student/soldier comparison.

In summary, Internet addiction is generally associated with both perceived burdensomeness and thwarted belongingness mainly in the dimension of compulsive use of Internet. But the association between the acquired capability of suicide and withdraw dimension of Internet addiction is mediated with the solider status and the gender of female. We agree that further combinations of other theories or a new theory are needed to interpret our findings. Future studies of specific subgroups with different status and gender are warranted.

Study limitations

This study has the following limitations, which should be considered by the readers before overinterpreting its results:

- The present study used only anonymous self-report measures to assess Internet addiction and variables related to suicidality; these measures are insufficient to provide diagnoses, thereby limiting the clinical implications of the results
- In addition to depression [30], Internet addiction may be associated with other psychiatry disorders, such as delusional disorder [31] and attentional deficit/hyperactivity disorder [32]
- There are some alternative subtypes of Internet addiction, namely, Internet gaming addiction, social media addiction, and smartphone addiction, which have drawn the attention of researchers
- Association effects do not indicate causality. In any case, the causal conclusions extended by this study design should be examined and clarified via longitudinal or experimental research

Table 5. Results (betas) of linear regressions of Internet addiction subitems on suicidality

	Perceived burdensomeness	Thwarted belongingness	Acquired capability	Suicide ideation (BSRS6)
Whole samples (n = 661)				
Status (student = 1)	−1.38 ± 0.75	−0.09 ± 1.28	−3.09 ± 1.42*	0.09 ± 0.06
Sex (female = 1)	−0.27 ± 0.68	0.11 ± 1.17	3.46 ± 1.30**	0.01 ± 0.05
Age	0.02 ± 0.08	−0.09 ± 0.13	−0.20 ± 0.15	0.01 ± 0.01
Internet addiction				
Compulsive use	0.34 ± 0.11**	0.45 ± 0.19*	−0.14 ± 0.22	0.01 ± 0.01
Withdrawal	−0.15 ± 0.12	−0.31 ± 0.20	−0.79 ± 0.22***	−0.01 ± 0.01
Tolerance	0.05 ± 0.17	−0.48 ± 0.29	0.45 ± 0.32	<0.001 ± 0.01
Interpersonal problems	0.03 ± 0.10	0.14 ± 0.17	<0.001 ± 0.19	<0.001 ± 0.01
Health-related problems	0.15 ± 0.12	0.14 ± 0.21	0.28 ± 0.23	0.02 ± 0.01*

*p < 0.05, **p < 0.01, ***p < 0.001. Significant different.
BSRS, Brief Symptom Rating Scale

- According to Young, Internet addiction includes a wide variety of behavior and impulse control disorders, and five subtypes can be described: cybersex addiction, net compulsions, online relationship addiction, compulsive information seeking, and gaming addiction [4].

Summary

This study confirms that Internet addiction appears to be significantly associated with worse mental health outcomes, including suicidality. Approximately 18% (119/661) of participants met the criteria for Internet addiction based on the CIAS. No significant differences in Internet addiction or suicide ideation were found between soldiers and students. However, students had higher anxiety and depression, whereas soldiers had higher perceived burdensomeness and acquired capability. No significant gender differences were found in Internet addiction levels or suicide ideation. Females had higher anxiety, whereas males had higher acquired capability. The Internet addiction group had significantly higher anxiety, depression, perceived burdensomeness, and suicide ideation than the control group. Positive correlations were found between various aspects of Internet addiction and suicide ideation in both soldier/student and gender analyses. Regression analyses found differing associations between specific Internet addiction facets (e.g., compulsive use and withdrawal) and aspects of suicidality (e.g., perceived burdensomeness and thwarted belongingness) generally. Females also displayed a higher acquired capability of suicide, which was correlated with soldier status and a higher withdrawal dimension of Internet addiction. The results of this study may facilitate the understanding of the associations between the Interpersonal Theory of Suicide and Internet addiction.

Acknowledgments

The authors thank all participants for the kindness and contribution. The opinions expressed are the authors' personal opinions. They are unnecessarily reflecting on those of their hospitals or institutions.

Data Availability Statements

The data supporting the findings of this study are available on request from the corresponding author.

Financial Support and Sponsorship

The authors declare that the financial support for this article is from the Military Suicide Prevention Center (MSPC) of Taiwan.

Conflicts of Interest

The authors declare no conflicts of interest in writing this report.

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