



Prevalence of Suicidal Ideation and Associated Risk Factors among Adults with Disabilities

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Abstract

Aim:

To explore the prevalence of suicidal ideation, psychological symptoms, and associated risk factors among this population.

Background:

Community-based health screening plays an important role in the early detection of psychological symptom and suicidal ideation. People with disabilities are especially at risk for suicide. There is a paucity of research about the prevalence of suicidal ideation and associated risk factors among adults with disabilities.

Design:

A community-based, cross-sectional study is used.

Methods:

This study was part of a health promotion program combined with a multidisciplinary approach for community adults with disabilities in Chiayi County, Taiwan. Eight hundred and thirty community adults with disabilities participated in this study. Assessed parameters included Brief Symptom Rating Scale (BSRS-5), suicidal ideation, and health-related behaviours. Statistical analyses included descriptive statistics and a multivariate logistic regression model.

Results:

Over one-third of the participants ($n=397$, 47.8%) had a physical disability, and the remainder had an intellectual and/or combination of disabilities. Approximately 12.8% of participants (106/830) reported having suicidal ideation and 27.8% displayed psychological symptoms. The associated risk factors of suicidal ideation were unsatisfied health status (OR=3.44, 95% CI=1.40-8.47, $p=0.007$), and psychological symptoms (OR=6.92, 95% CI=4.19-11.43, $p<0.001$), after adjusting for potential confounding variables (*i.e.* age, gender, and education).

Conclusion:

This study identified a high prevalence of suicidal ideation, psychological symptoms, and unhealthy behaviours among adults with disabilities. The enhancement of suicide prevention and the launch health promotion programmes, through regular mental health assessment,

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are necessary for this population.

Relevance to clinical practice:

The results can be used to highlight the value of a multidisciplinary approach for the early detection of suicidal ideation and its associated risk factors for this population.

Keywords:

Suicidal ideation, Risk factors, Adults, Disabilities

Background

Disability included impairments, activity limitations, and participation restrictions. Impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations [1]. Approximately 15% of the world's population lives with some form of disability, with 2-4% experiencing significant difficulties in everyday functioning [1]; a figure which may increase with the aging population. People with disabilities have poorer health outcomes, poor quality of health care received, less education, less social and economic participation, and higher rates of poverty than people without disabilities [1,2]. In Taiwan, more than one million people were designated disabled by the government in 2013 [3]. Individuals with disabilities have the same health needs as non-disabled people. However, few were found to receive adequate physical check-ups and treatment [4,5].

Suicide is a global phenomenon in all regions of the world. Globally, it is estimated that over 800,000 people die due to suicide every year. A prior suicidal ideation is the single most important risk factor for suicide in the general population [6]. The standardized mortality rate of suicide was 12/100000 in 2013 [7]. Suicide was ranked number 6 in all-cause mortality in 2015, and ranked number 2 among those aged 15-44 in Taiwan [7]. Although, suicide is a serious public health problem, suicides are preventable with timely, evidence-based, and often low-cost interventions [6]. Current suicide prevention strategies involve screening of both protective and risk factors for those at high risk of suicide. Previous literature indicates that the risk factors for suicide include demographic, psychiatric, and familial data of suicide attempters. Protective factors include social support and future orientation, e.g. lower social interaction patterns and lower perceived social support were significantly related to suicidal ideation

[8,9]. In South Korea, Lee, *et al.* [10] described the elevated risk of suicide in individuals with disability. The most frequently noted risk factors were a concurrent mental health difficulty; in particular, depression and alcohol use disorders.

Although suicide and psychiatric disorders have a strong association, suicide can also occur in the absence of psychiatric disorders; such as in the United States, where 16.3% of the general population and 25% of general medical patients outside of psychiatric departments have had suicidal ideation or attempted suicide [11]. In Taiwan, Lung, *et al.* [12] found a suicidal ideation rate of 4.9% in community residents, and 16.7% in the general medical groups. Furthermore, literatures indicated that different types of disability, such as physical limitation, limited activity daily living, perceived and actual disability and depressive symptoms had direct association with suicide ideation. There is, however, limited data in the community of adults with disability [13,14].

Evidence suggests the five-item Brief Symptom Rating Scale (BSRS-5) is an efficient tool for the first-stage screening of suicidal ideation and psychological symptoms in psychiatric inpatients, general medical patients, and community residents [12,15-17]. Previous studies indicate that a nurse's role in caring for individuals with a disability should include advocacy, health promotion, risk management, and leadership within a multidisciplinary team [16,17]. If the health needs of adults with disabilities in the community remain unknown, information and appropriate care cannot be provided in a timely manner, resulting in this population becoming neglected in the healthcare delivery system [2]. Early detection can reduce the risk and consequences of suicide, which may allow for a reduction in premature deaths and overall healthcare burden. In addition, some studies showed the risk factors of suicide ideation associated with gender differences [18]. For instance, compared with those who were married, suicide ideation were significantly higher among those who were widowed, divorced, or separated for males, but lower

for females; whereas education level, family contact, leisure activity, and drinking frequency were significantly associated in females [18]. However, few studies in community healthcare have focused on suicidal ideation in adults with disabilities and considering the gender issues. Therefore, the purpose of this study was to explore the prevalence of suicidal ideation, psychological symptoms, and associated risk factors among this population.

Methods

■ Design, setting, and participants

This study was part of a health promotion programme for community adults with disabilities, in collaboration with a private local hospital and the Bureau of Health Promotion in Chiayi County, Taiwan. A **community-based health screening survey** was conducted between July 2012 and December 2013. Participants were selected by convenience samples from the registry of the government social welfare centre. The inclusion criteria were (1) a certified disability and age >20 years; (2) ability to complete the questionnaire in Mandarin or Taiwanese with or without assistance; (3) ability to walk to the study setting with or without assistance; and (4) ability to sign an informed consent form before study enrolment. Exclusion criteria were inability to answer questions or provide informed consent.

Of the 847 participants enrolled, 17 failed to complete the interview. The majority of the participants were male ($n=462$, 55.7%), and the mean age was 54 years ($SD=18$). The mean years of education received was 7.5 ($SD=4.8$), and the majority of participants were living with families ($n=657$, 79.2%). Over one-third of the participants ($n=397$, 47.8%) had a physical disability, and the remainder had an intellectual and/or combination of disabilities. Nearly half were single, more than two third did not have a job, and more than half had chronic diseases (**Table 1**).

■ Instruments

(1) *Psychological symptoms* were measured by the five-item Brief Symptom Rating Scale (BSRS-5), which has demonstrated good reliability and validity [15-16]. For instance, the reliability of internal consistency (Cronbach alpha) coefficients of the BSRS-5 ranged from 0.77 to 0.90. The test-retest reliability coefficient was 0.82. Concurrent validity coefficients ranged from 0.87 to 0.95 [15,16]. Furthermore, choosing 6 as cut-off score, the 78.9% of sensitivity, and

74.3% specificity were found [16]. The BSRS-5 is derived from the 50-item Brief Symptom Rating Scale [12,15] which contains five items pertaining to psychological symptoms of anxiety, depression, hostility, inferiority, and insomnia. The full scale contained the following five items to assess mental health status: (1) feeling tense or keyed up (anxiety); (2) feeling low in mood (depression); (3) feeling easily annoyed or irritated (hostility); (4) feeling inferior to others (interpersonal hypersensitivity: inferiority); and (5) having trouble falling asleep (insomnia) in the past week. These responses are rated on a five-point Likert-type scale of 0 to 4, with 0 being *not at all* and 4 being *extremely*. Individuals displaying a cut-off score ≥ 6 were determined to have psychological symptoms present, while individuals with scores ≤ 5 were considered normal [16]. For suicide prevention, the Taiwan BSRS-5, which adds a sixth item that directly asks the subject about the urge of suicide attempts, is commonly used in the medical settings.

(2) *Suicidal ideation* was an additional item added in the end of BSRS-5 questionnaire, which asked the participant directly 'Do you have any suicidal ideation?' The response is rated with a five-point Likert-type scale from 0 to 4, with 0 meaning *not at all* and 4 being *extremely*. A score >1 was deemed as possible suicidal ideation [16,17].

(3) *Health-related behaviours* were modified from the health promotion scale [19-22] and evidenced by the presence of specific healthy behaviours positively associated with general life satisfaction and health status [23,24]. This modified questionnaire contained 6 domains; including substance use, exercise, and nutrition, sleeps quality, social participation, and life satisfaction in the past year. The information was collected during the standardized personal interview using a structured questionnaire. Substance use was measured by the question 'Do you consume alcohol, betel nuts, and/or tobacco?' Which was classified as '*never*' if they had never engaged in the behaviour, and as '*current or former user*' if they currently engaged, or had previously ceased. Exercise behaviour was measured by the question 'How often do you exercise for 30 minutes per day, three times a week?' Responses were classified as '*irregular*' if answer was never or seldom, and '*regular*' if they usually exercised for a total or cumulative time >30 min per day, three times per week. Nutrition behaviours were measured by the questions 'How often do you consume at least 1500 mL of water each day?'

Table 1: Demographic characteristics and health-related behaviors according to gender (N=830).

Variable	Total (N=830)	Male (n=462)	Female (n=368)	P value
Age (years) Mean ± SD	53.9 ± 18.3	54.9 ± 17.6	52.7 ± 19.2	0.085
Education (years)	7.5 ± 4.8	8.2 ± 4.3	6.7 ± 5.1	<0.001
Living arrangement				0.959
Other (with assistant/alone)	173 (20.8)	96 (20.8)	77 (20.9)	
With families	657 (79.2)	366 (79.2)	291 (79.1)	
Disability classification				0.112
Physical	397 (47.8)	209 (45.2)	188 (51.1)	
Intellectual	225 (27.1)	125 (27.1)	100 (27.2)	
Multiple disabilities/others	208 (25.1)	128 (27.7)	80 (21.7)	
Marital status				0.534
Single	423 (51.0)	231 (50.0)	192 (52.2)	
Married/others	407 (49.0)	231 (50.0)	176 (47.8)	
Occupation				0.001
No	598 (72.0)	312 (67.5)	286 (77.7)	
Yes	232 (28.0)	150 (32.5)	82 (22.3)	
Chronic diseases/Comorbidity*				0.018
No/don't know	368 (44.3)	188 (40.7)	180 (48.9)	
Yes	462 (55.7)	274 (59.3)	188 (51.1)	
Regular exercise				0.349
Irregular/seldom	561 (67.6)	306 (66.2)	255 (69.3)	
Regular/usually	269 (32.4)	156 (33.8)	113 (30.7)	
Water intake (1500mL/day)				0.033
Insufficient	554 (66.7)	294 (63.6)	260 (70.7)	
Sufficient	276 (33.3)	168 (36.4)	108 (29.3)	
Vegetable intake (3 portion/day)				0.034
Insufficient	562 (67.7)	327 (70.8)	235 (63.9)	
Sufficient	268 (32.3)	135 (29.2)	133 (36.1)	
Fruit (2 portion/day)				0.254
Insufficient	673 (81.1)	381 (82.5)	292 (79.3)	
Sufficient	157 (18.9)	81 (17.5)	76 (20.7)	
Cigarette smoke				<0.001
Never	620 (74.7)	265 (57.4)	355 (96.5)	
Current or former user	210 (25.3)	197 (42.6)	13 (3.5)	
Betel nut chewing				<0.001
Never	710 (85.5)	342 (74.0)	368 (100.0)	
Current or former user	120 (14.5)	120 (26.0)	0 (0.0)	
Alcohol drinking				<0.001
Never	697 (84.0)	335 (72.5)	362 (98.4)	
Current or former user	133 (16.0)	127 (27.5)	6 (1.6)	
Sleep (hours)				0.336
<8	283 (34.1)	151 (32.7)	132 (35.9)	
≥ 8	547 (65.9)	311 (67.3)	236 (64.1)	
Satisfied sleep quality				0.122
Unsatisfied	158 (19.0)	82 (17.7)	76 (20.7)	
Average	233 (28.1)	121 (26.2)	112 (30.4)	
Satisfied	439 (52.9)	259 (56.1)	180 (48.9)	
Community participation				0.862
Seldom	507 (61.1)	281 (60.8)	226 (61.4)	
Usually	323 (38.9)	181 (39.2)	142 (38.6)	
Close friends				0.153
≤ 2	411 (49.5)	239 (51.7)	172 (46.7)	
≤ 3	419 (50.5)	223 (48.3)	196 (53.3)	
Satisfied health status				0.684
Unsatisfied	187 (22.5)	109 (23.6)	78 (21.2)	

Average	330 (39.8)	183 (39.6)	147 (39.9)	
Satisfied	313 (37.7)	170 (36.8)	143 (38.9)	
Life satisfaction				0.076
Unsatisfied	118 (14.2)	73 (15.8)	45 (12.2)	
Average	378 (45.5)	218 (47.2)	160 (43.5)	
Satisfied	334 (40.2)	171 (37.0)	163 (44.3)	
Brief-Symptom Rating Scale				0.135
≤ 5	599 (72.2)	343 (74.2)	256 (69.6)	
≥ 6	231 (27.8)	119 (25.8)	112 (30.4)	
Suicidal ideation				0.834
No (≤ 1)	724 (87.2)	404 (87.4)	320 (87.0)	
Yes (≥ 2)	106 (12.8)	58 (12.6)	48 (13.0)	
*Chronic diseases: hypertension 32%; diabetes 16%				

'Do you eat 3 servings of vegetables every day?', and 'Do you eat 2 servings of fruit every day?' Answers was classified as '*insufficient*' if the participant answered never or sometimes and as '*sufficient*' if the participant answered usually or always. Sleeping hours and quality was measured by the questions 'In general, how many hours do you sleep per day?', and 'How do you rate your sleep quality' which was classified as '*satisfied*', '*average*', and '*unsatisfied*'. Social participation was measured by the questions 'How many close friends do you have?', and 'How often do you participate in community activities?', which was classified as '*seldom*' if the participant answered never or sometimes and as '*usually*' if the participant answered usually or always. Life satisfaction was measured by the questions 'In general, how do you rate your health status?', and 'How do you rate your life satisfaction?' which were classified as '*satisfied*', '*average*', and '*unsatisfied*'.

(4) *Demographic characteristics* included age, gender, educational attainment (years of education received or level of school completed), disability classification, chronic diseases or comorbidity (e.g. hypertension, stroke, diabetes), and living arrangement (alone, institutional, with others, e.g. parents, children, siblings, friends). Disabilities were determined according to government classifications, e.g. physical disabilities, intellectual disabilities, or combined, such as hearing and vision impaired [25], and was confirmed prior to conducting the interview.

Procedure and Ethical Considerations

This study was approved by the Ethical Committee of the Institutional Review Board (No 102-3331B). Written informed consent was obtained from all participants or their guardian. A cover letter, which invited participation in the study, was sent by the collaborating Bureau

of Health Promotion and emphasized that the responses would be confidential. Participants were also told about the purpose of the study by the research team. The researcher notified each participant that after a free medical examination, the interview process would take approximately 15-20 minutes. All participants were interviewed in a temporary private setting in a school auditorium. To create a caring and friendly environment, each participant was accompanied by a senior nursing student during the process. Confidentiality was maintained by data coding during data analysis.

■ Data analysis

The demographic characteristics and health-related behaviours among groups (i.e. gender, suicidal ideation) were compared using a chi-square test for categorical variables and using an independent sample *t*-test for continuous variables. To investigate the associated factors of suicidal ideation, those significant variables ($p < 0.05$) in the aforementioned bivariate analyses were further incorporated into a multivariable logistic regression model. Data analyses were conducted using SPSS 22 (IBM SPSS, Armonk, NY: IBM Corp).

Results

Regarding health-related behaviours, **Table 1** shows that 67.6% ($n=561$) of the participants reported *never* or *seldom* performing exercise, 66.7% reported insufficient water intake, 67.7% reported insufficient 3 portion vegetable intake, and 81.1% reported insufficient 2 portion fruit intake. Concerning substance use, 25.3% reported being current or former smokers, 14.5% reported betel nut chewing, and 16% reported alcohol intake. Further, more than half of participants reported have 7 hours of sleep, and nearly half were satisfied their sleep quality. Regarding the community participation, 61%

reported *never* or *seldom* engaging in community activities, and nearly half reported a number of close friends < 2. Furthermore, 22.5% ($n=187$) reported being *unsatisfied* with their health status, and 14.2% ($n=118$) being *unsatisfied* with their life. Regarding psychological symptoms, 27.8% ($n=231$) displayed a score on the BSRS-5 ≥ 6 , and 12.8% ($n=106$) reported having suicidal ideation.

Examining gender differences, **Table 1** shows that female adults with disabilities tended to receive lower education ($p<0.001$), were more likely to be without a job ($p<0.001$), and had insufficient water intake ($p=0.034$). Conversely, male participants tended to have more chronic diseases ($p=0.018$) and insufficient vegetable intake ($p=0.034$), as well as increased numbers of current cigarette smoking ($p<0.001$), betel nut chewing ($p<0.001$), and alcohol use ($p<0.001$). There were no significant differences in gender in psychological symptoms or suicidal ideation.

Univariate analysis of factors associated with suicidal ideation by gender (**Table 2**) found that, consistent for genders, dissatisfaction with sleep quality ($p<0.001$), health status ($p<0.001$), and life ($p<0.001$), as well as a BSRS-5 score ≥ 6 ($p<0.001$) were significantly associated with suicidal ideation. There were no significant differences among demographic characteristics, personal health-related behaviours, or suicidal ideation. Variables found to be significantly associated with suicidal ideation were introduced into the multivariate logistic regression model. The results indicated that the covariates independently associated with suicidal ideation were unsatisfied health status (OR=3.44, 95% CI=1.40–8.47, $p=0.007$), and BSRS-5 scores ≥ 6 (OR=6.92, 95% CI=4.19–11.43, $p<0.001$), after adjusting for potential confounding variables (e.g., age, gender, and education) (**Table 3**).

Discussion

The aim of the present study was to assess the prevalence of suicidal ideation and psychological symptoms among adults with disabilities, and to identify associated risk factors. Three key findings emerged from this study. First, a high prevalence of suicidal ideation and psychological symptoms were found. Second, some specific unhealthy behaviour (e.g. substances use, inadequate nutrition behaviours, and engagement in few community activities) were found. Third, suicidal ideation was significantly associated with unsatisfied health status and psychological symptoms.

Using the BSRS-5 for the purpose of psychological symptom screening, we found that 27.8% of the participants had a mild to severe mood disorder, and that there was a significant relationship with suicidal ideation in both genders. In addition, the present study also found 12.8% of participants displayed suicidal ideation. There were limited comparison studies in this population, using the same scale. However, this result is higher than the 4.9% of suicidal ideation found in community residents in Taiwan [12], the 10% of Medicare home health patients in the USA [26], but similar to a report of 12.4% for individuals with physical disabilities in Germany [27]. The finding also echoed a result from South Korea, in which Lee, *et al.* [10] reported that the hazard ratio of suicide people with disability was 1.9-fold higher, compared to individuals without disability. Lee, *et al.* [10] also indicated that the risk of suicide among different disability types was higher for those with a mental disorder, renal failure, brain injury, or physical disability. Based on a systematic review, Dodd, *et al.* [28] mentioned that people with intellectual disabilities that understood the concept of death or suicide, displayed a higher rate of suicide attempts. The current study, however, found no differences among physical, mental, or multiple disabilities in both genders.

Notably, according to the level of suicidal ideation, our study showed that there were 27 (3.2%) participants with a severe suicide attempt. Considering confidentiality, we suggested timely contact with the suicide prevention system, from the local government sector, to the family and community support system before ending of the study. The final model from the study showed that suicidal ideation was significantly associated with unsatisfied health status and psychological symptoms. More than half (55.7%) of participants had chronic diseases, with most suffering with hypertension and diabetes. In a retrospective analysis from all autopsies of suicide, medical, and police notes, Fegg, *et al.* [27] found many individuals with disabilities suffered with cancer, and/or chronic pain, and had previous suicide attempts. In addition, a systematic review also described that suicidal behaviour is associated with functional disability, and with other specific conditions, including physical illnesses, malignant diseases, pain, and arthritis [29]. Therefore, to efficiently prevent suicide through early detection of the health status, especially for chronic diseases with pain, using the simple BSRS-5 to screen for suicidal

Table 2: Univariate analysis of factors associated with suicidal ideation by gender (N=830).

Variable	Male		P	Female		P
	Yes (n=58)	No (n=404)		Yes (n=48)	No (n=320)	
Age (years) Mean ± SD	54.6 ± 14.9	55.0 ± 18.0	0.870	54.0 ± 17.3	52.5 ± 19.5	0.626
Education (years)	7.5 ± 4.0	8.3 ± 4.4	0.158	7.2 ± 5.0	6.6 ± 5.2	0.468
Living arrangement			0.743			0.716
With others	13 (22.4)	83 (20.5)		11 (22.9)	66 (20.6)	
With families	45 (77.6)	321 (79.5)		37 (77.1)	254 (79.4)	
Disability classification			0.231			0.827
Physical	21 (36.2)	188 (46.5)		23 (47.9)	165 (51.6)	
Intellectual	16 (27.6)	109 (27.0)		13 (27.1)	87 (27.2)	
Multiple/others	21 (36.2)	107 (26.5)		12 (25.0)	68 (21.3)	
Occupation			0.080			0.316
No	45 (77.6)	267 (66.1)		40 (83.3)	246 (76.9)	
Yes	13 (22.4)	137 (33.9)		8 (16.7)	74 (23.1)	
Marital status			0.779			0.220
Single	30 (51.7)	201 (49.8)		29 (60.4)	163 (50.9)	
Married/others	28 (48.3)	203 (50.2)		19 (39.6)	157 (49.1)	
Chronic diseases/Comorbidity			0.109			0.090
No/ don't know	18 (31.0)	170 (42.1)		18 (37.5)	162 (50.6)	
Yes	40 (69.0)	234 (57.9)		30 (62.5)	158 (49.4)	
Regular exercise			0.674			0.560
Irregular/seldom	37 (63.8)	269 (66.6)		35 (72.9)	220 (68.8)	
Regular/usually	21 (36.2)	135 (33.4)		13 (27.1)	100 (31.3)	
Water (1500ml/day)			0.979			0.756
Insufficient	37 (63.8)	257 (63.6)		33 (68.8)	227 (70.9)	
Sufficient	21 (36.2)	147 (36.4)		15 (31.3)	93 (29.1)	
Vegetable (3portion)			0.066			0.834
Insufficient	47 (81.0)	280 (69.3)		30 (62.5)	205 (64.1)	
Sufficient	11 (19.0)	124 (30.7)		18 (37.5)	115 (35.9)	
Fruit (2 portion/day)			0.423			0.265
Insufficient	50 (86.2)	331 (81.9)		41 (85.4)	251 (78.4)	
Sufficient	8 (13.8)	73 (18.1)		7 (14.6)	69 (21.6)	
Cigarette smoke			0.719			0.799
Never	32 (55.2)	233 (57.7)		46 (95.8)	309 (96.6)	
Current or former	26 (44.8)	171 (42.3)		2 (4.2)	11 (3.4)	
Betel nut chewing			0.114			NA
Never	38 (65.5)	304 (75.2)		48 (100.0)	320 (100.0)	
Current or former	20 (34.5)	100 (24.8)		0 (0.0)	0 (0.0)	
Alcohol drinking			0.986			0.137
Never	42 (72.4)	293 (72.5)		46 (95.8)	316 (98.8)	
Current or former	16 (27.6)	111 (27.5)		2 (4.2)	4 (1.3)	
Sleep hours/per day			0.070			0.369
<7	25 (43.1)	126 (31.2)		20 (41.7)	112 (35.0)	
≥ 7	33 (56.9)	278 (68.8)		28 (58.3)	208 (65.0)	
Satisfied sleep quality			<0.001			<0.001
Unsatisfied	18 (31.0)	64 (15.8)		20 (41.7)	56 (17.5)	
Average	23 (39.7)	98 (24.3)		16 (33.3)	96 (30.0)	
Satisfied	17 (29.3)	242 (59.9)		12 (25.0)	168 (52.5)	
Community participation			0.835			0.263
Seldom	36 (62.1)	245 (60.6)		33 (68.8)	193 (60.3)	
Usually	22 (37.9)	159 (39.4)		15 (31.3)	127 (39.7)	
Close friends			0.262			0.269
≤ 2	34 (58.6)	205 (50.7)		26 (54.2)	146 (45.6)	
≥ 3	24 (41.4)	199 (49.3)		22 (45.8)	174 (54.4)	
Satisfied health status			<0.001			<0.001

Unsatisfied	29 (50.0)	80 (19.8)		22 (45.8)	56 (17.5)	
Average	21 (36.2)	162 (40.1)		19 (39.6)	128 (40.0)	
Satisfied	8 (13.8)	162 (40.1)		7 (14.6)	136 (42.5)	
Life satisfaction			<0.001			<0.001
Unsatisfied	24 (41.4)	49 (12.1)		13 (27.1)	32 (10.0)	
Average	26 (44.8)	192 (47.5)		24 (50.0)	136 (42.5)	
Satisfied	8 (13.8)	163 (40.3)		11 (22.9)	152 (47.5)	
Brief-Symptom Rating Scale			<0.001			<0.001
≤ 5	19 (32.8)	324 (80.2)		10 (20.8)	246 (76.9)	
≥ 6	39 (67.2)	80 (19.8)		38 (79.2)	74 (23.1)	

Table 3: Multivariate logistic regression of factors associated with suicidal ideation.

Variable	aOR	95% CI of OR	P value
Male gender	1.04	0.66-1.65	0.867
Age (per year)	0.99	0.98-1.01	0.383
Satisfied sleep quality			
Unsatisfied	1.36	0.74-2.52	0.324
Average	1.67	0.94-2.96	0.079
Satisfied*	1		
Satisfied health status			
Unsatisfied	3.44	1.40-8.47	0.007
Average	1.77	0.73-4.31	0.209
Satisfied*	1		
Life satisfaction			
Unsatisfied	1.35	0.54-3.35	0.517
Average	1.05	0.46-2.36	0.914
Satisfied*	1		
Brief-Symptom Rating Scale ≥ 6	6.92	4.19-11.43	<0.001

aOR= adjusted OR; OR=odds ratio; CI=confidence interval;
 Confounding variables: age, gender, education, satisfied sleep quality, and life satisfaction; *reference group

ideation is an important strategy for adults with disabilities in the rural community.

With the exception of depression, other mood disorders, and physical illness, the literature indicates that individuals coping with increasing age, substance use, financial problems, social isolation, and/or relationship cessation are well known high-risk groups of suicide [1,7,30]. Our study showed that nearly half of participants interacted with few close friends. Moreover, 35.6% (n=213) said they had zero friends to contact and 61% *never* or *seldom* participate in community activities. In addition, more than two thirds of participants did not have an occupation, and males significantly tended to be smokers, drinkers, and betel nut chewers. These phenomena could increase if left unchecked. As such, efforts should be made to close the gap through specific community health promotion strategies, especially for males, e.g. encouraging eating together in the community activity centre. Based on the findings of this study, reducing isolation in adults with disabilities is a new insight for the front line community

nurses to address. Further study is necessary to explore new, innovative ways to increase social interaction patterns and perceived social support. For instance, capitalization on the current era of mobile technology and the fact that many disable individuals own a smart or cell phone [31].

Although our study did not find health behaviours to be correlated with suicidal ideation or psychological symptoms, many participants reported inadequate levels of exercise, water, vegetable, and fruit intake. Some literature supports that healthy eating and exercise are associated with health status, e.g. decreasing the chances of being overweight and developing cardiovascular diseases, and increasing general life satisfaction [5,23]. Therefore, even outside of the context of suicide prevention, a healthy lifestyle for people with disabilities is an important health focus for community health nurses. For instance, how to replace the unhealthy behaviours with good habits is a challenging topic for further study.

Despite the valuable findings in this study, some limitations should be noted. First, this study

did not include all of the risk factors associated with suicidal ideation, such as perception of isolation and previous suicide behaviour. Future studies should include the assessment of suicide behaviours and methods. Second, the non-random sampling and geographical scope, limits the generalization of these findings. Third, recall bias should also be taken into consideration, as participants had different durations of disability; controls for other health conditions were not practiced. Fourth, regarding the self-report of thoughts of suicide in a short time of contact, participants may have felt difficulty in telling the truth, since this is a personal matter. Thus, the measures of suicidal ideation reported might be an underestimate.

Conclusions

This study examined, from a nursing perspective, the mental health among adults with disabilities in the community. A high prevalence of psychological symptoms and suicidal ideation among adults with disabilities was found. Few of the participants engaged in community activities, healthy lifestyle, or possessed close friends. Suicidal ideation was significantly associated with unsatisfied health status and psychological symptoms.

Relevance to Clinical Practice

Early detection of chronic diseases with health status, unhealthy behaviours, and emotional changes through regular mental health assessments are important strategies for community health nursing and clinicians. In addition, the initiation of timely suicide

prevention through the local governmental sector and community resources should be re-established by policy makers. For instance, using a multidisciplinary system to link the resources of local government, local hospitals, health-related or nursing schools, and social welfare departments, prevention and treatment for those with suicidal ideation, from a comprehensive perspective, could result in long-term effects.

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Conflict of Interest

The authors declare they have no competing interests.

Author's Contributions

YCL and MYC were involved with the conceptualization of the study, study design, data analysis, development of the discussion section, and editing of the final draft for publication. CYC, MSL and PHC participated in the conceptualization of the study and data collection.

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