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The Relationship Between Difficulties in Daily Living and Suicidal Ideation Among Older Adults

Results From a Population-Based Survey in Shandong

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Abstract: To date, few studies have examined the association between difficulties in activities of daily living (ADL) and suicidal ideation (SI) among the seniors in China. This study aims to explore this association among older adults in China. A total of 3313 older people (60+) were included in this study, and questionnaires were administered by face-to-face interview. In total, 4.2% of the participants reported SI. The mean score of ADL among older adults with SI (21.06 ± 10.92) was much higher than that in those without SI (16.13 ± 5.60). Multivariate analyses showed that some specific domains of ADL including using transport, medical care, and household activities were associated with SI even after we controlled the psychological conditions. An association was observed between difficulties in daily living and SI among older adults in China. Psychological interventions should be taken to prevent potential risk of suicide targeting the seniors with certain disabilities.

Key Words: Suicidal ideation, difficulties in daily living, older adults, China

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Suicide is a serious public health issue globally. In 2012, an estimated 804,000 suicide deaths occurred worldwide, representing an annual global age-standardized suicide rate of 11.4 per 100,000 people (15.0 for males and 8.0 for females) (WHO, 2014). The prevalence of suicide in China is 5.01 per 100,000 people in urban residents (5.71 in males and 4.29 in females), and 8.61 per 100,000 people in rural areas (9.65 in males and 7.51 in females) in 2014, which ranks second globally in the number of suicides (National Health and Family Planning Commission of the People's Republic of China, 2016).

Although the suicide rate is different across countries, older adults have the highest risk of suicide in all age groups in almost all regions of the world (Erlangsen et al., 2015). In China, according to the 2015 China Health Statistics Yearbook, the prevalence of suicide among older adults was much higher than that among the younger groups (National Health and Family Planning Commission of the People's Republic of China, 2016). The aging problem poses a huge threat to the whole society in China. Older adults aged 65 years and more accounted for 8.9% of the whole population in 2010 (National

Bureau of Statistics of the People's Republic of China, 2011), and it has reached 10.1% in 2014 (National Bureau of Statistics of the People's Republic of China, 2014). In Shandong Province, nearly 11 million people were older adults, which accounted for 11.6% of the whole population in 2014 (Shandong Provincial Bureau of Statistics, 2015).

Suicidal ideation (SI) is an important part for attempted and completed suicide, and it is manifested as a clear will of suicide primarily, not as a suicide plan or action (Ge et al., 2017). Previous studies have noted that the risk factors associated with SI among older adults include female sex, low level of education, age more than 85 years, no income, disability, nonmarried status, subjective depressive mood, high anger, abnormal sleep duration, a family history of psychiatric illness, etc (Chan et al., 2011; Kessler et al., 1999). Comparing with adolescents and young adults, suicide among older adults is typically associated with functional impairment, which has been verified to be one of the most common risk factors (Kim, 2016; Tao et al., 2011).

Difficulties in daily living is a common phenomenon in older people, which lead to loss of a normal life and social contact (Erlangsen et al., 2015). Previous studies have found that difficulties in daily living were associated with SI. Dennis et al. (2009) have reported that disability is an important independent correlate of SI, particularly in older people. Zhang et al. (2016) found that specific instrumental ADL, such as preparing meals or medical care, may have a significant effect on suicide attempt among older adults. However, few studies have examined the association between difficulties in daily living and SI among the seniors in China. Our overall goal is to evaluate the association between the difficulties in daily living and SI among older adults in China. To do so, we have several specific objectives. First, we will draw profiles of difficulties in daily living and SI among older adults. Second, we will explore the association between difficulties in daily living and SI.

METHODS

Study Population

This is a population-based cross-sectional study, which was conducted in Shandong Province, China. In this study, we used a three-stage cluster sampling method to select participants. First, on the basis of gross of domestic products (GDP) per capita (2011), we categorized all districts and counties of Shandong into three groups respectively. One district and one county were then selected from each group randomly, and three urban districts and three rural counties were selected as the study sites. Likewise, second, three subdistricts and three townships were selected from each sampling sites according to the GDP per capita. Third, we selected three communities and three villages from each selected subdistrict or township randomly. Totally, there were 27 communities and 27 villages for this study. In each community and village, all of the elders (aged 60 years and more) who can communicate with others were included in this study. In total, 3313 participants were included in this study.

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Data Collection

We collected the data by using house-to-house interviews. A structured questionnaire was used to interview older adults face to face, and the interview was conducted by trained master's students from Shandong University School of Public Health. To ensure the quality, the completed questionnaires were checked carefully by quality supervisors after the interview. The information collected in this study included demographic characteristics, such as sex, age, marital status, education, occupation, and living arrangements. In addition, we also collected data about family relationship, self-rated health, noncommunicable chronic diseases (NCDs), psychological condition, SI, difficulties in daily living, etc.

Measures

Dependent Variables

SI was assessed by using a question of "Have you ever seriously thought about committing suicide?" from the baseline National Comorbidity Survey (NCS) (Kessler et al., 1994, 1999). This question was also used to estimate SI in the US NCS (Bernert et al., 2014). The question was asked whether they had experienced this idea during their lifetime. For the purpose of analysis, the positive response was considered to indicate the presence of SI.

Independent Variables

The variables included sex, age, marital status, education, occupation, living arrangement, family relationship, self-rated health and NCDs in the past 6 months, psychological condition, and difficulties in daily living. Age was coded into three categories: 60–, 65–, and 70–. Marital status was coded as single and couple. Single included the unmarried, divorced, separated, and widowed. Education was coded into three categories: illiterate or semiliterate, primary school, and junior high school and above. Occupation was coded as farmers and others. Living arrangement was coded as living single and others (living with children, spouse, or other people). Family relationship was coded as people who had a bad (general or bad) or a good relationship with family members. Self-related health was coded as bad (very bad, bad, and general) and good (good and very good). NCDs in the past 6 months were coded as yes or no.

Psychological health was measured by the Kessler Psychological Distress Scale (K10), which is a nonspecific scale based on 10 questions about the level of anxiety and depressive symptoms a person may have experienced in the past 4 weeks (Andrews and Slade, 2001). The questions included the following: a) tired out for no good reasons, b) nervous, c) so nervous that nothing could calm down, d) hopeless, e) restless or fidgety, f) restless/could not sit still, g) depressed, h) everything was an effort, i) so sad nothing can cheer up, and j) feel worthless. This scale had also been used in previous suicide studies (O'Connor et al., 2012). The Chinese version of K10 was demonstrated to be of high reliability and validity (Zhou et al., 2008).

Difficulties in daily living was evaluated by the scale of activities of daily living (ADL). It is a scale with 14 terms that refers to peoples' daily self-care activities, and it is defined as "the things we normally do, such as feeding ourselves, bathing, dressing, grooming, work, homemaking, and leisure" (MedicineNet.com Medical Dictionary, 2016). ADL is usually used as a measurement of people's functional status, especially in people with injuries or disabilities or older adults (Katz et al., 1963). In our study, participants were asked a series of questions to measure whether they had any difficulty in several domains of ADL. In addition, they were separated into five dimensionalities: personal care, using transport, medical care, household activities, and managing money. These are explained as follows (Dennis et al., 2009):

1. Personal care: six items including dressing, bathing, dining, washing and dressing, and going to the toilet.

2. Using transport: two items including functional mobility and using transport.
3. Medical care: one item refers to taking medicine.
4. Household activities: four items including preparing meals, shopping, calling up laundry, and housework.
5. Managing money: one item refers to budget for food or paying bills.

Data Analysis

The data were double entered and checked using EPI data 6.04 and were analyzed using SPSS 20.0. *T*-test was used to analyze the SI with different ADL scores and psychological conditions. We performed a univariate analysis to check the factors associated with SI. Then, multivariate logistic regression was used to assess the association between ADL and SI.

Ethics Approval and Consent to Participate

The study protocol was approved by the Ethical Committee of Shandong University School of Public Health. The investigation was performed after the acquisition of informed consents of all participants.

RESULTS

A total of 3313 seniors (60+) were included in the analysis. Of the respondents, 139 people had experienced SI. Table 1 presented the characteristics of the sample and also the prevalence of the SI across different subgroups of the sample. The output of the univariate analysis showed those elderly who were female ($p < 0.05$), who were single ($p < 0.001$), who had a lower level of education ($p < 0.001$), who were farmers ($p < 0.01$), who lived single ($p < 0.001$), whose family relationship was bad ($p < 0.001$), whose self-rated health status was bad ($p < 0.001$), who had NCDs in the past 6 months ($p < 0.01$), and who were in poor psychological condition ($p < 0.001$) tended to experience lifetime SI. Figure 1 showed that the level of the ADL disability increased with the age of the older people. ADL disability and its specific domains by age groups were also presented as Supplementary Table 1 (Supplemental Digital Content, <http://links.lww.com/JNMD/A38>), and interested readers are encouraged to refer to the table for more details.

In Table 2, the association between SI and specific areas of ADL is described in detail. The mean scores of ADL in those with SI and those without SI were 21.06 ± 10.92 and 16.13 ± 5.60 , respectively. Both ADL and its five specific domains had a significant association with SI, even after adjusting for sex, marital status, self-rated health, and living arrangement.

We used two multivariate logistic regression models to examine the associations between ADL and its specific domains and SI (see Table 3). In model 1, we analyzed the risk factors of SI, including total score of ADL. Psychological condition, living arrangement, and family relationship were found to be risks for the occurrence of SI, and the result also showed that ADL was still significantly associated with SI. In model 2 to model 6, we included the five domains of ADL into the logistic regression analysis model separately, and four domains of ADL were found to have a significant independent association with SI, with the odds ratios (ORs) as follows: using transport, 1.20 (1.06–1.35); medical care, 1.58 (1.14–2.19); household activities, 1.06 (1.01–1.11); and managing money, 1.32 (1.05–1.65).

DISCUSSION

Being underreported, underdiagnosed, and undertreated, SI is a serious issue that may lead to suicide attempt and completed suicide (Bernal et al., 2007). According to Dennis et al. (2009), limitation in ADL is a proxy of disability. The association between disability and SI had been verified previously. A study in Great Britain found that the disability was an important correlate of SI. Pirkis et al. (2000) also found that limitation of ADL was associated with SI among Australian

TABLE 1. Univariate Analysis of SI Among Older Adults in Shandong, China (2012)

Characteristics	n (%)	SI		χ^2/t	p
		Yes (%)	No (%)		
Observations	3313	139 (4.2)	3174 (95.8)		
Sex				4.668	0.031
Male	1463 (44.2)	49 (3.3)	1414 (96.7)		
Female	1850 (55.8)	90 (4.9)	1760 (95.1)		
Age				3.905	0.142
60–	1348 (40.7)	53 (3.9)	1295 (96.1)		
65–	804 (24.3)	27 (3.4)	777 (96.6)		
70–	1161 (35.0)	59 (5.1)	1102 (94.9)		
Marital status				17.955	0.000
Single ^a	810 (24.4)	55 (6.8)	755 (93.2)		
Couple	2503 (75.6)	84 (3.4)	2419 (96.6)		
Education				17.378	0.000
Illiterate or semiliterate	1530 (46.2)	85 (5.6)	1445 (94.4)		
Primary	966 (29.1)	38 (3.9)	928 (96.1)		
Junior or above	817 (24.7)	16 (2.0)	801 (98.0)		
Occupation				10.093	0.001
Farmers	2210 (66.7)	110 (5.0)	2100 (95.0)		
Others	1103 (33.3)	29 (2.6)	1074 (97.4)		
Living arrangement				28.018	0.000
Single	343 (10.4)	33 (9.6)	310 (90.4)		
Others	2970 (89.6)	106 (3.6)	2864 (96.4)		
Family relationship				72.832	0.000
Good	3023 (91.2)	99 (3.3)	2924 (96.7)		
Bad	290 (8.8)	40 (13.8)	250 (86.2)		
Self-rated health				30.760	0.000
Good	1739 (52.5)	41 (2.4)	1698 (97.6)		
Bad	1574 (47.5)	98 (6.2)	1476 (93.8)		
NCDs				11.063	0.001
Yes	2215 (66.9)	111 (5.0)	2104 (95.0)		
No	1098 (33.1)	28 (2.6)	1070 (97.4)		
Psychological condition	15.75 ± 6.46	24.69 ± 8.38	15.36 ± 6.07	12.978	0.000

^aMerged with the divorced, separated, and widowed.

adults. However, such studies mainly evaluated the association among the general population. To date, few studies have explored this association among seniors, a subpopulation with high prevalence of SI and limitation in ADL. This study will provide evidence of the association between ADL and SI among the Chinese elderly.

The lifetime prevalence of suicide ideation among older adults was 4.2% (139 of 3313). It was lower than that in Canada (8.4%) (Vasiliadis et al., 2013) and in Europe (7.8%) (Bernal et al., 2007). It was also lower than the reported rates in Hong Kong (5.5%) (Yip et al., 2003), Taiwan (6.1%) (Chan et al., 2011), and the older US Chinese population (9.4%) (Dong et al., 2014). However, the rate of the current study is higher than the reported rate of 2.3% among older people (65+) in Beijing, China (Ma et al., 2009). Because of different cultural backgrounds, settings, and applied measures, the prevalence of SI varied widely. Similar with previous studies, we found that the older the seniors were, the more likely they would experience ADL disability, and this is still true for all domains of ADL.

The seniors with SI during their lifetime had a significantly higher risk of ADL disability and also its specific domains than their counterparts, which was consistent with previous studies. This was true when we adjusted for the factors of sex, marital status, self-rated health, and living arrangements, although the ORs were a little reduced. This

finding indicated a potential association between SI and ADL among older adults. Further, we used a multivariate logistic regression model to assess this association. When we controlled for the family relationship, NCDs, and psychological condition, the association between SI and

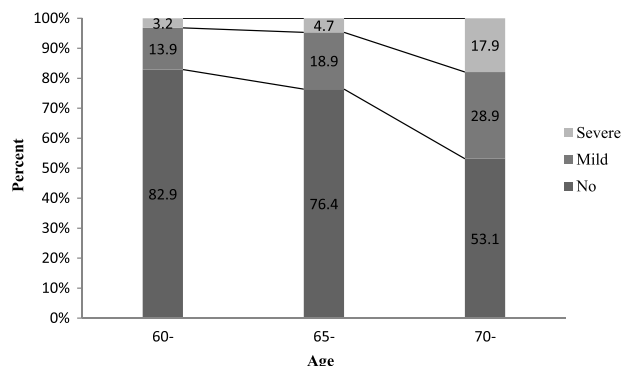


FIGURE 1. ADL among older adults of different age groups in Shandong, China (2012).

TABLE 2. Comparisons of ADL and Its Specific Domains Between Older Adults With and Without SI in Shandong, China (2012)

Areas of ADL	SI		Unadjusted OR (95% CI)	Adjusted OR ^a (95% CI)
	Yes	No		
ADL	21.06 ± 10.92	16.13 ± 5.60	1.07 (1.06–1.09)*	1.06 (1.04–1.08)*
Personal care	6.72 ± 3.35	5.46 ± 1.64	1.22 (1.15–1.28)*	1.19 (1.22–1.26)*
Using transport	3.42 ± 1.83	2.46 ± 1.09	1.55 (1.40–1.70)*	1.45 (1.31–1.61)*
Medical care	1.31 ± 0.74	1.06 ± 0.29	2.76 (2.12–3.60)*	2.46 (1.86–3.24)*
Household activities	8.19 ± 4.74	6.09 ± 2.67	1.16 (1.12–1.20)*	1.14 (1.10–1.19)*
Managing money	1.46 ± 0.97	1.13 ± 0.50	1.86 (1.55–2.24)*	1.74 (1.42–2.12)*

95% CI indicates 95% confidence interval.

^aAdjusted for sex, marital status, self-rated health, and living arrangement.**p* < 0.001.**TABLE 3.** Multivariate Analysis Models of SI With ADL and its Specific Domains Among Older Adults in Shandong, China (2012)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex						
Male	1.0	1.0	1.0	1.0	1.0	1.0
Female	1.30 (0.86–1.97)	1.28 (0.85–1.93)	1.28 (0.85–1.93)	1.31 (0.87–1.98)	1.30 (0.86–1.96)	1.27 (0.84–1.91)
Marital status						
Single ^a	1.0	1.0	1.0	1.0	1.0	1.0
Couple	1.12 (0.67–1.86)	1.07 (0.65–1.77)	1.13 (0.68–1.88)	1.05 (0.64–1.74)	1.13 (0.68–1.88)	1.12 (0.67–1.85)
Education						
Illiterate or semiliterate	1.0	1.0	1.0	1.0	1.0	1.0
Primary	1.11 (0.70–1.75)	1.08 (0.68–1.70)	1.12 (0.71–1.77)	1.09 (0.69–1.71)	1.10 (0.70–1.74)	1.08 (0.69–1.70)
Junior or above	0.67 (0.35–1.29)	0.66 (0.34–1.25)	0.68 (0.35–1.29)	0.66 (0.35–1.26)	0.67 (0.35–1.27)	0.65 (0.34–1.23)
Occupation						
Farmers	1.0	1.0	1.0	1.0	1.0	1.0
Others	0.75 (0.46–1.21)	0.73 (0.45–1.19)	0.76 (0.47–1.24)	0.75 (0.46–1.22)	0.75 (0.46–1.21)	0.75 (0.46–1.21)
Living arrangement						
Single	1.0	1.0	1.0	1.0	1.0	1.0
Others	0.54 (0.30–0.99)*	0.57 (0.31–1.03)	0.55 (0.30–1.00)*	0.57 (0.31–1.03)	0.54 (0.29–0.98)*	0.54 (0.29–0.98)*
Family relationship						
Good	1.0	1.0	1.0	1.0	1.0	1.0
Bad	2.24 (1.40–3.56)***	2.24 (1.41–3.56)***	2.13 (1.33–3.41)**	2.26 (1.42–3.61)***	2.24 (1.41–3.57)***	2.30 (1.44–3.66)***
Self-rated health						
Good	1.0	1.0	1.0	1.0	1.0	1.0
Bad	1.18 (0.76–1.83)	1.21 (0.78–1.88)	1.17 (0.76–1.83)	1.20 (0.77–1.86)	1.18 (0.76–1.83)	1.21 (0.78–1.88)
NCDs						
Yes	1.0	1.0	1.0	1.0	1.0	1.0
No	0.89 (0.55–1.44)	0.87 (0.54–1.41)	0.90 (0.56–1.47)	0.88 (0.54–1.43)	0.88 (0.54–1.43)	0.87 (0.54–1.40)
Psychological health	1.13 (1.11–1.16)***	1.14 (1.11–1.16)***	1.13 (1.11–1.16)***	1.14 (1.11–1.16)***	1.14 (1.11–1.16)***	1.14 (1.11–1.16)***
ADL	1.03 (1.01–1.05)*					
Personal care		1.06 (0.99–1.13)				
Using transport			1.20 (1.06–1.35)**			
Medical care				1.58 (1.14–2.19)**		
Household activities					1.06 (1.01–1.11)*	
Managing money						1.32 (1.05–1.65)*
Constant	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***

^aMerged with divorced, separated, and widowed.**p* < 0.05, ***p* < 0.01, ****p* < 0.001.

ADL remained significant. Our result confirmed that ADL was a significant correlate of SI among the seniors in China. Some studies have also similarly highlighted this association between disability and SI. Dennis et al. (2007) found that there was a significant independent association between limitation in ADL and SI among adults with a range from 16 to 74 years in Great Britain. Pirkis et al. (2000) found that SI was strongly associated with disability in Australia. All of the findings were consistent with our result that difficulties in daily living was associated with SI. Therefore, it is essential for community health providers to identify the potential risk of suicide among older adults with ADL disability.

The associations between limitation in specific domains of ADL and SI were analyzed in detail. Disability in household activities was found to be associated with SI. In China, many older people undertake the responsibility of taking care of their children or grandchildren. Older adults with disability in ADL would consider themselves as a burden to other family members, which may provoke feelings of hopelessness and despair and eventually evolve into SI (Zhang et al., 2016). It was also consistent with the interpersonal theory of suicide, wherein feeling burdensome was one of the key predictors of suicidality (Orden et al., 2010).

Besides, our study found that the well-being of personal care was not related to SI among older adults. One possible explanation could be that the elderly with a good ability in personal care might have huge spiritual needs, whereas the realistic condition (such as being empty, unemployed, and having worse family relationship) would exaggerate the feeling of loneliness and magnify the fall to ideal condition, leading to SI finally. We also found that disability in using transport was associated with SI. Older adults who are unable to get out and use transport would feel helpless and may view suicide as a means of escape from the suffering (Kim, 2016). The association between ADL and SI was particularly stronger in the domains of medical care (OR, 1.58) and managing money (OR, 1.32). These two domains of ADL highlighted loss of control in important areas rather than purely limitations in physical activities, which may have an important role in triggering feelings of despair (Dennis et al., 2009).

Similar with previous studies, psychological condition was found to be associated with SI (Dennis et al., 2007). Psychological disorders, depression in particular, were the most important correlates for SI (Casey et al., 2006; Forsell et al., 1997). This association was significantly stronger in older people than in young people (Vasiliadis et al., 2013). In addition, the factors of living single and having a bad family relationship were associated with SI. Li (2015) found that older adults with good support from children and neighbors were less likely to have SI. Machell et al. (2016) found that adolescent perceptions of family conflict demonstrated an independent association with SI. In agreement with these studies, the current study also indicated the important role of family support in SI.

There are some limitations in this study. First, it was a cross-sectional design, and the relationship between difficulties in daily living and also other identified factors and SI cannot be interpreted as cause and effect. Second, information, including SI and health status were self-reported, thus leading to the possibility of subjective bias. Third, life-time SI is the independent variable in this study. However, psychological well-being was measured for an interval of 1 month before the interview. We do not know the participants' psychological condition when the SI happened, and it may cause some bias for the results.

CONCLUSIONS

The present study demonstrated a strong association between difficulties in daily living, some of its specific domains (e.g., using transport, medical care, household activities, and managing money), and SI among older adults in China. As a result, some interventions should be taken to prevent suicide, targeting seniors with certain

disabilities, such as helping the disabled elderly with difficulties in daily living as much as possible, taking psychological intention to the elders who have difficulties in daily living.

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Availability of data and material: No additional data are available. Interested readers are encouraged to contact the corresponding author.

DISCLOSURE

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