

An epidemiological cross-sectional study of prevalence of mental disorders in Dulong nationality of Southwest China

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Abstract

The Dulong nationality is one of the 5 smallest ethnic minorities in China. The suicide rate among people of the Dulong nationality is very serious. To address this issue, we conducted cross-sectional epidemiological studies on the prevalence of mental disorders in ethnic groups. Studying the unique situation of ethnic minorities can help us better understand their mental state and improve their quality of life.

We conducted a cross-sectional epidemiological survey on a minority group in Southwest China. We used the cluster sampling method, and 2129 people were included in the study.

The highest 1-month disorder prevalence was for alcohol dependence/abuse (4.16%), and the prevalence of lifelong mood disorders was 9.82%. The results of multivariate analysis showed that women faced a higher risk of mood disorders and anxiety disorders.

This epidemiological survey of the prevalence of mental disorders in ethnic minorities in Southwest China provides a significant reference for mental health interventions for other ethnic minorities around the world.

Abbreviations: AUD = alcohol use disorder, CIDI = Composite International Diagnostic Interview, GHQ-12 = The 12-item general health questionnaire, MDD = major depressive disorder, OD = odds ratio, PTSD = posttraumatic stress disorder, SCID-I = The structured clinical interview for DSM-IV axis I disorders.

Keywords: Dulong nationality, mental disorder, epidemiological study

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1. Introduction

The Dulong nationality is one of the 5 smallest ethnic minority groups in China.^[1] Recently, reports have shown that suicide is a prominent issue in this ethnic group. A large number of studies have noted that mental disorders and suicide are highly correlated, and people with a history of psychiatric disorder are more likely to commit suicide.^[2] The prevalence of mental disorders varies considerably across regions, times, and races.^[3] The evolution of society and economic changes in Chinese society have had a profound influence on the 56 ethnic groups in China.^[4,5] Studies have shown that in many countries around the world, minority groups face a higher likelihood of mental disorders.^[3] In this context, the mental status of Chinese ethnic minorities deserves attention, but there is little research on this topic. Previous research on the mental status of ethnic minorities in China has investigated ethnic minorities such as the Jino^[4] and Mosuo^[6] nationalities. These studies have revealed that the recognition rate and treatment rate of mental disorders in ethnic minority groups are low. Yang et al^[4] showed that the prevalence of alcohol abuse/dependence and major depressive disorder in the Jino nationality has been growing in the past few years and that the prevalence of schizophrenia has been maintained. However, these studies have limitations. For example, the study on the Mosuo nationality^[6] had a small sample, and the study on the Jino nationality^[4] mainly investigated citizens who had high academic qualifications and spoke Mandarin. However, most Jino people have a lower education level and do not speak Mandarin. Therefore, the samples of these studies do not reflect the actual mental status of the local people.

To fill the gaps in the ethnic epidemiological data, provide better mental health services, and support suicide research in China, more information on minority suicides is needed. Information on the prevalence of mental disorders and the influence of psychiatric disorders can improve knowledge of the spiritual condition of Chinese minority group members and help reduce suicide by recognizing their unique situation. Dulong River Township is the only region where the Dulong people gather. There are 4239 people in this village, and >98.87% of the total population comprises Dulong people.^[17] Dulong River Township has long been one of the most remote, primitive, and closed towns in Yunnan Province.

Although local hospitals can provide some medical services, only a small number of people with mental illness receive psychiatric treatment. The main reason is that the villagers and the medical staff of the rural health center have limited knowledge of mental illness. Other reasons are that transportation is not convenient, villagers do not know about welfare policies for local mental disorders, mental health professionals are mostly concentrated in the county, and the staff is limited. However, there is currently no study of the mental health status of the Dulong nationality. Therefore, to improve the quality of life of Dulong people, we conducted a large-scale epidemiological survey of mental diseases among the Dulong people and provided psychological consultation and drug intervention for patients with mental disorders. This research examines the prevalence of mental disorders in this group.

2. Methods

2.1. Study site and sample

Dulong River township is the main habitation area of the Dulong people in China and is one of the national minority poverty areas. According to statistics released by the local government in 2015, 97.87% of farmers are under the new rural cooperative medical care system, which is considered representative of the population. In 2016, there were 4020 people on the system list.

A cluster sampling method was used to sample all rural cooperative medical care members who met the following criteria: aged 18 to 65 years; local Dulong (had stayed in the area at least a year and a half in the last 2 years); both parents were Dulong, and able to complete face-to-face interviews. A total of 2129 people met the criteria. The sample size was 1485 with a response rate of 69.75%.

2.2. Instrument

2.2.1. The 12-item general health questionnaire and 8 additional items. The screening instrument was an expanded Chinese version of the 12-item general health questionnaire (GHQ-12)^[18] and 8 additional items that were validated in China by Qin et al.^[19] The 8 additional items measured 8 other risk factors of mental disorders. According to Qin et al,^[19] subjects can be classified as high-, moderate-, and low-risk patients. High-risk patients are those with any of the 8 risk factors present or a GHQ-12 score of ≥ 5 ; moderate-risk patients have none of the 8 risk factors and a GHQ-12 score of 2 to 4; low-risk patients have none of the 8 risk factors and a GHQ-12 score of 0 or 1.

2.2.2. The suicide questionnaire. The suicide questionnaire by Li and Phillips^[10] consists of 2 parts: suicidal behavior and suicidal ideation. Suicidal behavior refers to a history of

attempted suicide. Suicidal ideation refers to thoughts of suicide or intentional injury. The questionnaire studies suicidal behavior and suicidal ideation in detail in terms of frequency, practice, and methods with 29 items. This scale was adopted in several studies investigating suicide in China.^[11–13] See Li and Phillips^[10] for details.

2.2.3. The structured clinical interview for DSM-IV axis I disorders (SCID-I). The SCID-I is a diagnostic interview used to determine DSM-IV Axis I disorders.^[14] A Chinese version of the SCID has been shown to be reliable and valid in China.^[5,9,15] The semistructured interview considered all important DSM-IV Axis I diagnoses, allows for the inclusion of “not otherwise specified” categories of illness for subjects who have clinically significant symptoms combined with social dysfunction but do not meet the full criteria of a specific disorder (which is fairly common in China), and allows for the recording of multiple diagnoses ranked according to clinical importance. DSM-IV criteria were used in this study. The Chinese SCID has been shown to be reliable and valid.^[16]

2.3. Procedures

The survey was conducted from October 2015 to August 2016. The interviewers were 3 senior psychiatrists, 4 psychiatric graduates, and 9 Dulong medical workers. They visited 6 villages in Dulong River Township. The study was divided into 2 phases. The first phase was a mental difficulty screening of 2129 people, and the second phase was a SCID interview of 228 people. In the first stage, the participants provided demographic data and completed the GHQ-12, the 8 extra items and a suicide scale. A total of 1485 people (69.75%) completed the first stage. The sociodemographic variables are shown in Table 1. Based on the screening outcomes, the subjects were separated into high- (160), moderate- (87), and low-risk (1238) patients. High-risk patients and low- and moderate-risk patients with a history of suicide attempts or active suicidal thoughts participated in the SCID Axis I Disorders interview. A total of 228 participants entered the second phase, and 144 participants (63.44%) completed this phase. The clinical interview typically took approximately 50 minutes. One psychiatrist who participated in the research attended a 2-week training class on use of the SCID. Both lifetime and 1-month diagnoses were assessed. Before respondents were interviewed, written informed consent was obtained, and declarations of anonymity and confidentiality were made. The flow chart of this epidemiological investigation is shown in Figure 1.

2.4. Ethics

All experimental protocols involved in this study were approved by the ethics committee of the Sixth Affiliated Hospital Kunming Medical University. Written informed consent was obtained from all participants included in this study.

2.5. Statistical analysis

Epi data 3.1 software was used as a double data entry and check method. The SPSS 24 statistical software package was used to analyze the data. Descriptive statistics were applied to measure the prevalence of suicidal behavior and ideation. The adjusted rates of disorders were weighted by the proportion of SCID examinations completed by the high-risk subjects (ie, the inverse of the sampling

Table 1
Demographic variables (n = 1485).

Variable	No. of cases (n)	Composition ratio (%)
Sex		
Male	763	51.38
Female	722	48.62
Age, y		
18–25	235	15.82
26–35	476	32.05
36–45	354	23.84
46–55	261	17.58
56–65	159	10.71
Education level		
Uneducated	292	19.66
Primary school	605	40.74
Junior middle school	511	34.41
High school	61	4.11
Junior college or above	16	1.08
Marital status*		
Never married	265	17.85
Married	1120	75.42
Remarriage	7	0.47
Cohabitation	1	0.07
Separation/divorce	23	1.55
Widowed spouse	60	4.04
Mode of residence†		
Live alone	67	4.51
Dormitory	18	1.21
Live with relatives	1399	94.27
Current occupation‡		
Farmer	1430	96.36
Worker/service personnel	11	0.74
Professional technical personnel/administrative personnel	18	1.21
Self-employed/temporary worker	6	0.4
Unemployed	10	0.67
Child/student/housewife	9	0.61
Religious belief		
No religion	1002	67.47
Catholicism	3	0.2
Christianity	475	31.99
Buddhism	5	0.34

* The marital status of 9 people is unknown.

† The living mode of one person is unknown.

‡ One person's occupation is unknown.

fraction inflated by the number of scheduled but not completed SCID interviews). Additionally, the 95% CIs were computed by the Gaussian approximation to the log-likelihood of the log (rate).^[17] The sociodemographic characteristics were independent variables, and disease was the dependent variable. Multivariate unconditional logistic analysis was used to analyze the mental disorder data. Additionally, based on the risk factors for suicidal behavior and suicidal ideation, the Pearson correlation coefficient was adopted to compute the correspondence between suicidal ideation, suicidal behavior, and year. Whether the variation was statistically meaningful was determined by $P < .05$.

3. Results

3.1. The prevalence of mental disorders in the Dulong nationality

The 1-month prevalence and lifetime prevalence of mental disorders are presented in Table 2. With regard to the 1-month

mental disorder prevalence, alcohol dependence/abuse is the main substance use disorder, affecting 4.16% of the Dulong population. With regard to lifelong mental disorders, the highest prevalence was for mood disorders (9.82%) and substance use disorders (8.11%). The lifetime prevalence of women with substance use disorders was only approximately 1% lower than that of men. The 3 most common mental disorders were alcohol use disorder (AUD), major depressive disorder (MDD), and posttraumatic stress disorder (PTSD). In terms of comorbidity, 44.3% of patients with MDD (79 people) had AUD, and 30.38% (24 people) had PTSD. Among AUD patients (77 people), 45.45% (35) were comorbid with MDD and 11.69% (9) were comorbid with PTSD. Among PTSD patients (30 people), 30% (9 people) had AUD. Among people with mood disorders caused by physical conditions (9 people), 55.56% (5 people) had AUD and one-third (3 people) had PTSD.

3.2. Sociodemographic correlates

The analysis showed that the odds ratio (OR) of mental disorders was significantly related to 4 sociodemographic variables. The analysis showed a significantly elevated OR of mood/anxiety disorder among females compared to males (1.69/3.19); an elevated OR of alcohol abuse/dependence disorder among divorced/widowed/separated respondents compared to those who were never married (3.81) and among self-employed/temporary workers compared to farmers (12.61); and a decreased OR among Christian respondents compared to nonreligious respondents (0.42) (Table 3).

4. Discussion

4.1. The prevalence of mental disorders in the Dulong nationality

The main finding is that the prevalence rate of all mental disorders is similar to the results found in recent psychiatric epidemiological surveys conducted elsewhere in China.^[18] The prevalence rate of *alcohol dependence* is much higher in the Dulong nationality than the average rate in China, which is 1.5% for 1-month prevalence and 1.4% for lifetime prevalence.^[19] It is also higher than the rates found by surveys in some Western countries, ranging from 1.3% to 7.4%.^[20–22] The prevalence of MDD and mood disorder is higher in Dulong people than that found in other surveys in Yunnan Province (2.4% among the Jino nationality and 1.96% in Kunming)^[4,18,23] and in China. However, the prevalence of MDD and mood disorder is lower than that in the United States.^[24] The prevalence of anxiety disorders in the Dulong population is similar to that in rural China, but the lifetime prevalence of PTSD is higher (3.09%) than that of China (0.21%).^[18]

Comparisons of these results with previous Chinese studies should consider differences in sampling strategies, socioeconomic status, and case ascertainment. The CMHS survey in China and other areas^[18] was confined to urban and rural districts and might not be representative of the minority population. In addition, the levels of industrialization and urbanization of these regions are higher than those among the Dulong. This may be the reason for the different results between the surveys. Another explanation for the difference between the CMHS and Dulong surveys is that in the former, trained interviewers used the

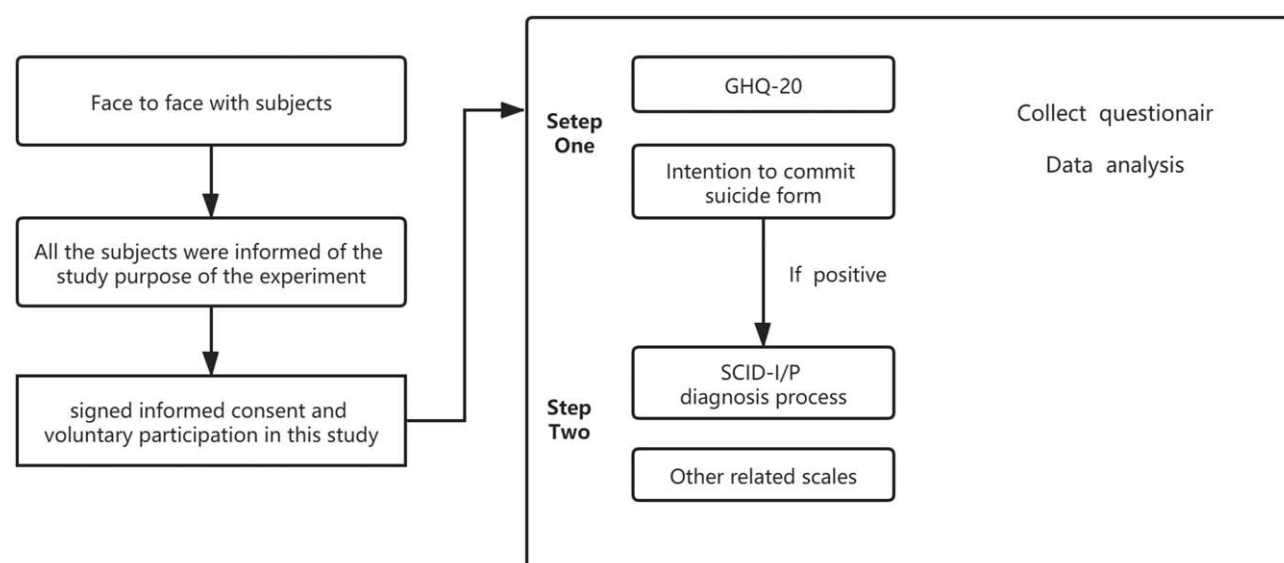


Figure 1. Design of investigative process for the epidemiological cross-section study.

Composite International Diagnostic Interview as an instrument, which may be one of the reasons for the different results.

There are also some local ethnic minority habits, the unique geographical location, and climate that may be related to

excessive alcohol use. Recently, the poverty alleviation policy in China has greatly enriched the material and cultural life of members of the Dulong nationality. It has also promoted an increase in the quality and quantity of alcohol. The local

Table 2

Prevalence rates of mental disorders in Dulong nationality.

	1 mo						Lifetime					
	Total (n=1485)		Male (n=763)		Female (n=722)		Total (n=1485)		Male (n=763)		Female (n=722)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
I. Mood disorders												
Bipolar disorder type I	0.11	0.00–0.36	0.00	0.00–0.00	0.22	0.00–0.68	0.11	0.00–0.32	0.00	0.00–0.00	0.22	0.00–0.68
Other biphasic disorders	0.11	0.00–0.32	0.00	0.00–0.00	0.22	0.00–0.76	0.11	0.00–0.43	0.00	0.00–0.00	0.22	0.00–0.74
Major depressive disorder	0.43	0.11–0.86	0.41	0.00–1.11	0.44	0.00–1.09	8.11	6.29–10.07	5.61	3.67–8.38	10.75	7.87–13.79
Unspecified depression	0.00	0.00–0.00	0.00	0.00–0.00	0.00	0.00–0.00	0.54	0.11–1.06	0.21	0.00–0.82	0.87	0.21–1.95
Mood disorders caused by physical condition	0.32	0.00–0.74	0.21	0.00–0.65	0.44	0.00–1.19	0.86	0.32–1.54	0.82	0.21–1.90	0.87	0.00–1.74
Mood disorders caused by substances	0.21	0.00–0.63	0.41	0.00–1.08	0.00	0.00–0.00	0.21	0.00–0.63	0.41	0.00–1.20	0.00	0.00–0.00
Total mood disorders	1.17	0.49–2.03	1.05	0.21–2.19	1.31	0.44–2.44	9.82	7.73–12.16	7.06	4.66–10.20	12.71	9.52–15.93
II. Schizophrenia and other mental disorders												
Schizophrenia	0.21	0.00–0.54	0.41	0.00–1.06	0.00	0.00–0.00	0.21	0.00–0.54	0.41	0.00–1.03	0.00	0.00–0.00
Psychosis caused by physical condition	0.11	0.00–0.32	0.21	0.00–0.63	0.00	0.00–0.00	0.11	0.00–0.43	0.21	0.00–0.71	0.00	0.00–0.00
Psychosis caused by substance	0.21	0.00–0.54	0.41	0.00–1.03	0.00	0.00–0.00	0.21	0.00–0.54	0.41	0.00–1.14	0.00	0.00–0.00
Total psychotic disorders	0.54	0.11–1.06	1.05	0.21–2.00	0.00	0.00–0.00	0.54*	0.11–1.06	1.05	0.21–2.15	0.00	0.00–0.00
III. Substance use disorders												
Alcohol	4.16	2.99–5.49	5.81	3.96–7.96	2.41	1.11–4.12	8.11	6.29–10.07	8.71	5.68–11.70	7.46	4.81–10.17
IV. Anxiety disorder group												
Special phobia	0.11	0.00–0.32	0.21	0.00–0.71	0.00	0.00–0.00	0.11	0.00–0.32	0.21	0.00–0.62	0.00	0.00–0.00
Posttraumatic stress disorder	0.74	0.32–1.33	0.41	0.00–1.14	1.09	0.33–2.07	3.09	2.09–4.16	0.82	0.82–1.82	5.48	3.58–7.98
Generalized anxiety disorder	0.11	0.00–0.32	0.00	0.00–0.00	0.22	0.00–0.70	/	/	/	/	/	/
(only referring to present symptoms)												
Anxiety disorder caused by substance	0.11	0.00–0.32	0.21	0.00–0.82	0.00	0.00–0.00	0.21	0.00–0.54	0.41	0.00–1.06	0.00	0.00–0.00
Unspecified anxiety disorder	0.11	0.00–0.43	0.00	0.00–0.00	0.22	0.00–0.68	0.54	0.11–0.97	0.41	0.00–1.05	0.67	0.00–1.65
Total anxiety disorders	1.17	0.54–1.87	0.82	0.11–1.84	1.54	0.63–2.79	3.83	2.66–5.07	1.87	0.81–3.25	5.92	3.63–8.33
V. Somatoform disorder												
Pain disorder	0.11	0.00–0.32	0.00	0.00–0.00	0.22	0.00–0.70	0.11	0.00–0.43	0.00	0.00–0.00	0.22	0.00–0.68
VI. Other DSM–IV Axis I disorder												
Acute stress disorder	0.00	0.00–0.00	0.00	0.00–0.00	0.00	0.00–0.00	0.43	0.00–0.97	0.82	0.21–1.77	0.00	0.00–0.00

CI = confidence interval.

* In a clue survey, 9 people were found to have mental disorders, and the prevalence rate was 1.14% after adding 9 people.

Table 3
Multiple regression analysis of demographic variables of mood disorders, anxiety disorder and Alcohol abuse/dependence disorders.

	Mood disorders			Anxiety disorder			Alcohol abuse/dependence disorders		
	OR	95% CI	P	OR	95% CI	P	OR	95	P
Sex									
Male	1.00			1.00			1.00		
Female	1.69	1.05–2.72	0.03*	3.19	1.39–7.30	0.01**	0.93	0.56–1.55	0.77
Age									
18–25	0.84	0.32–2.23	0.73	0.56	0.10–3.12	0.51	1.19	0.37–3.90	0.77
26–35	0.84	0.42–1.71	0.64	1.46	0.46–4.68	0.52	1.16	0.44–3.01	0.76
36–45	0.64	0.31–1.34	0.24	0.54	0.14–2.10	0.37	1.09	0.42–2.86	0.85
46–55	0.62	0.29–1.33	0.22	1.22	0.35–4.22	0.79	1.24	0.45–3.41	0.67
56–65	1.00			1.00			1.00		
Education level									
Uneducated	1.00			1.00			1.00		
Primary school	1.22	0.69–2.17	0.49	1.41	0.57–3.49	0.45	1.35	0.66–2.77	0.41
Junior middle school	0.94	0.46–1.89	0.85	1.15	0.38–3.45	0.80	1.17	0.52–2.63	0.70
High school	0.67	0.14–3.25	0.62	1.69	0.18–15.73	0.64	1.18	0.31–4.52	0.81
Junior college or above	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Marriage status									
Never married	1.00			1.00			1.00		
Married	1.6	0.72–3.56	0.25	1.23	0.32–4.65	0.76	1.3	0.63–2.72	0.48
Remarriage	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Cohabitation	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Separation/divorce	3.41	0.78–14.85	0.1	2.57	0.23–28.53	0.44	3.81	1.01–14.33	0.05*
Widowed spouse	1.46	0.38–5.52	0.58	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Living style									
Live alone	0.71	0.21–2.35	0.57	1.53	0.34–6.79	0.58	0.95	0.28–3.23	0.93
Dormitory	0.85	0.09–7.91	0.89	0	0.00–0.00	1.00	2.09	0.38–11.55	0.40
Live with relatives	1.00			1.00			1.00		
Current occupation									
Farmer	1.00			1.00			1.00		
Worker/service personnel	2.97	0.56–15.80	0.20	0	0.00–0.00	1.00	3.17	0.53–18.95	0.21
Professional technical personnel/administrative personnel	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Self-employed/temporary worker	0	0.00–0.00	1.00	0	0.00–0.00	1.00	12.61	1.90–83.57	0.01**
Unemployed	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Child/student/housewife	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Religious belief									
No religion	1.00			1.00			1.00		
Catholicism	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00
Christianity	0.93	0.59–1.48	0.77	1.48	0.74–2.99	0.27	0.42	0.23–0.79	0.01**
Buddhism	0	0.00–0.00	1.00	0	0.00–0.00	1.00	0	0.00–0.00	1.00

* $P < .05$.

** $P < .01$.

environment is damp and cold, and people drink more alcohol to resist the cold weather.

In recent years, the lifestyle of local residents has begun to blend with that of the outside world. For the Dulong people, whose material transformation conflicts with the ideology of their culture, the gap between the wealthy and the poor, the increasing cost of living, and the influence on the conventional family structure will bring new differences and pressures.

4.2. Correlates of mental disorder

Multivariate investigation revealed that women are at risk for mood disorders and anxiety disorders. Numerous studies have confirmed that women are more likely to suffer from mood disorders and anxiety disorders than men. Therefore, the results of this study are consistent with the present research findings.^[18] In this study, we found that separation/divorce is a risk factor for AUD. In the Chinese national census, the most common marital

status among patients with substance use disorder was separation/divorce.^[18] In addition, the study found that Christianity is a protective factor for AUD because local Christianity prohibits believers from smoking and drinking. Unlike other areas, the difference in sex is not apparent. The proportion of males to females for AUD is 1.2, and the average for other places in China is 17.4.^[19] The custom of drinking at parties in local areas is not restricted by sex. Both women and men are encouraged to drink, which differs from the male-dominated culture in most areas of China. The results of previous surveys across the country are quite different because of local drinking practices.^[18]

4.3. Limitations and future suggestions

This study was based on standardized diagnostic tools and the use of one-on-one interviews to collect data on mental disorders in the Dulong nationality. The response rate was only 70%. This is mainly because the elderly are scattered across remote areas,

and their communication with us would have involved linguistic difficulties. The proportion of people who started but did not complete the diagnostic process was relatively high because of the impact of local culture. Close attention needs to be paid to public health approaches to address the relationships among social isolation, urbanization, and restrictions on alcohol use. Local communities can promote the risks of drinking and establish anonymous groups to help individuals stop drinking. They can provide medical support for alcohol cessation, promote healthier drinking and control drinking, and can further improve living conditions, especially the popularity of winter heating measures. It is important to improve the Dulong people's ability to adapt to the outside world and to improve economic assistance and training in related skills.

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References

- [1] Population Censuses Office Under the State Council, Department of Population and Employment Statistics, National Bureau of Statistics. Tabulation on the 2010 population census of the people's republic of China. 2010; <http://www.stats.gov.cn/tjsj/pcsj/rkpc/6rp/indexch.htm>.
- [2] De Vylder JE, Lukens EP, Link BG, et al. Suicidal ideation and suicide attempts among adults with psychotic experiences: data from the collaborative psychiatric epidemiology surveys. *JAMA Psychiatry* 2015; 72:219–25.
- [3] Veling W. Ethnic minority position and risk for psychotic disorders. *Curr Opin Psychiatry* 2013;26:166–71.
- [4] Yang J, Kang C, Li J, et al. A three-decade repeated cross-sectional survey on mental health of the Chinese Jino minority. *Aust N Z J Psychiatry* 2017;51:1134–41.
- [5] Yin H, Xu G, Tian H, et al. The prevalence, age-of-onset and the correlates of DSM-IV psychiatric disorders in the Tianjin mental health survey (TJMHS). *Psychol Med* 2018;48:473–87.
- [6] Xu L, Wang Q, Yang J, et al. The epidemiological investigation of major depressive disorder and dysthymia in mosuo ethnic minority of Ninglang area, Yunnan province. *Chin J Behav Med Brain Sci* 2018; 27:758–62.
- [7] Cao X. The Dulong people. Available at: http://www.gov.cn/guoqing/2015-09/24/content_2937946.htm.
- [8] Goldberg DP, Gater R, Sartorius N, et al. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med* 1997;27:191–7.
- [9] Qin X, Wang W, Jin Q, et al. Prevalence and rates of recognition of depressive disorders in internal medicine outpatient departments of 23 general hospitals in Shenyang, China. *J Affect Disord* 2008;110:46–54.
- [10] Li XY, Phillips MR, Wang S, Lin H. Research methods in suicide and suicide prevention. *Epidemiological Field Research Methods for Injuries*. Beijing, China: Peoples Health Publishing House; 2007;143–218.
- [11] Jiang C, Li X, Phillips MR, et al. Matched case-control study of medically serious attempted suicides in rural China. *Shanghai Arch Psychiatry* 2013;25:22–31.
- [12] Li XY, Xu D, Phillips M, et al. Comparison of the characteristics of suicide attempters treated in general hospitals with and without prior suicide attempts. *Zhonghua Nei Ke Za Zhi* 2003;42:861–4.
- [13] Wang Z, Wang A, Xu Y, et al. Comparison of suicide attempters two years after the attempt with matched normal controls. *Chin Ment Health J* 2003;17: 856–858, 855.
- [14] First M, Spitzer RL, Gibbon ML, et al. Structured clinical interview for DSM-IV-TR Axis I disorders, research version, non-patient edition. New York, NY: Biometrics Research, New York State Psychiatric Institute; 2002.
- [15] Shi QC, Zhang JM, Xu FZ, et al. Epidemiological survey of mental illnesses in the people aged 15 and older in Zhejiang Province, China. *Zhonghua Yu Fang Yi Xue Za Zhi* 2005;39:229–36.
- [16] Phillips MR, Liu XH. Translated and adapted Chinese version of structured clinical interview for DSM-IV-TR axis I disorders, research version, patient edition (SCID-I/P) by Michael B. First, Robert L. Spitzer, Miriam Gibbon, and Janet B.W. Williams. Shanghai, China: Shanghai Jiaotong University Press; 2011.
- [17] Qin X, Phillips MR, Wang W, et al. Prevalence and rates of recognition of anxiety disorders in internal medicine outpatient departments of 23 general hospitals in Shenyang, China. *Gen Hosp Psychiatry* 2010; 32:192–200.
- [18] Huang Y, Wang Y, Wang H, et al. Prevalence of mental disorders in China: a cross-sectional epidemiological study. *Lancet Psychiatry* 2019;6:211–24.
- [19] Cheng HG, Deng F, Xiong W, et al. Prevalence of alcohol use disorders in mainland China: a systematic review. *Addiction* 2015;110:761–74.
- [20] Kessler RC, Berglund P, Demler O, et al. The epidemiology of major depressive disorder: results from the National comorbidity survey replication (NCS-R). *JAMA* 2003;289:3095–105.
- [21] Kessler RC, Chiu WT, Demler O, et al. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National comorbidity survey replication. *Arch Gen Psychiatry* 2005;62:617–27.
- [22] WHO. Global status report on alcohol and health 2018. 2018; <https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf?ua=1>.
- [23] Lu J, Ruan Y, Huang Y, et al. Major depression in Kunming: prevalence, correlates and co-morbidity in a South-Western city of China. *J Affect Disord* 2008;111:221–6.
- [24] Reeves WC, Strine TW, Pratt LA, et al. Mental illness surveillance among adults in the United States. *MMWR Suppl* 2011;60:1–29.