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# Mental Health Status and Coping Behaviors of the Guangxi Baiku Yao Population in Response to Life Events

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**Background:** Ethnic minorities present specific mental health characteristics that are based on their unique cultural background. We aimed to investigate the mental health status and coping behaviors in the Guangxi Baiku Yao population, an ethnic minority in China.

**Material/Methods:** A total of 121 Baiku Yao, 149 Zhuang, and 141 Han from Nandan Guangxi were enrolled in a survey using stratified random cluster sampling. The questionnaires included general information, a simplified mental symptom checklist, life events, coping behaviors, and social support.

**Results:** The number of stimulating life events in Baiku Yao, particularly in males, was higher than that in the other two groups. Anxiety, depression, and mental symptom scores in Baiku Yao were higher than those in the other two groups. After adjusting for demographic variables, variation in mental health that could be explained by negative coping and life events increased by 40.5% and 7.6%, respectively. All path coefficients were significant ( $P < 0.01$ ); the ratio of the fitting value and the degree of freedom was 1.496, and the root mean square error of approximation was 0.035.

**Conclusions:** Mental symptoms of the Baiku Yao population in Nandan (Guangxi) were more severe than those in other Chinese ethnic groups. Life events affected mental symptoms through negative coping.

**MeSH Keywords:** **Anxiety • Depression • Mental Health**

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## Background

Due to the special cultural and social backgrounds of ethnic minorities, their mental symptoms and coping behaviors are usually different from those of the corresponding general population. Indeed, cultural differences, discrimination (ethnic), social support, economic status, and marital status may affect mental health in different ways among minorities. However, studies about the social problems of minorities often reach contradictory results.

While there is no major difference between countries [1], multiple pressures, especially those resulting from cultural adaptation, might be harmful to the mental health of ethnic minorities [2]. Mangalore and Knapp [3] have observed that inequalities in income, employment, education, and other factors are correlated to the incidence of mental health problems in Britain, and that improving their disadvantages and discrimination would be helpful to solve the mental health challenges in ethnic minorities. Palgi et al. [4] studied the correlation between the demographic characteristics, war-related factors, and use of mental health services in Israel, and showed that war injuries increased the use of mental health services. Carter et al. [5] have studied the role of racial identity attitude in regulating male gender role conflicts and mental symptoms among blacks, Asians, and Latin American people in America, and showed that the way each person identified himself/herself with respect to their racial minority defined how he/she will cope with situations. Some authors believe that part of the pressure on minorities is related to ethnic identity [6], while Richard et al. [7] suggested the concept of ethnic-related pressure source, namely, ethnic discrimination.

There are 56 ethnic groups in China, of which Han is the largest [8]. In the Jinuo ethnic group in Xishuangbanna, Zhua et al. have shown that in the late 1980s, the average annual crime rate, the average annual suicide rate, and the average annual divorce rate were 7/10,000, 9.61/10,000, and 14/10,000, respectively, which were lower than the rates in other areas [9]. Qian et al. conducted a mental symptom survey in She farmers in Fengshun, and showed that the average SCL-90 score was 0.98–0.157, which was comparable to that in the general Chinese population [10]. Xu et al. conducted a survey of mental symptoms in the elderly in rural Yunnan, Hunan, Hubei, Xinjiang, Anhui, and Guangxi, and showed that the education level of the elderly was significantly correlated to mental health ( $r=-0.441$ ,  $P<0.01$ ), that age was significantly correlated to psychic factors ( $r=0.306$ ,  $P<0.05$ ), and that support from family was closely related to mental health [11].

Baiku Yao is an ethnic group in China that retained many of its traditional ethnic characteristics [8]. Up to now, there was no report about the mental health status and coping behaviors of

Baiku Yao. Therefore, the present study aimed to compare the mental symptoms of Baiku Yao, Zhuang, and Han populations, and to investigate how life events affected mental symptoms and coping behaviors from the social, behavioral, and psychological points of view in these three populations. Results could provide a basis for understanding the mental symptom characteristics and for conducting targeted mental health intervention in this minority population, as well as in others.

## Material and Methods

### Study design

This was a cross-sectional study conducted in Nandan County, Guangxi, China, in July and August of 2013. Nandan County belongs to Hechi City, Guangxi Zhuang Autonomous Region, and is located in the northwest of Guangxi, with a total area of 3916 square kilometers, including 7 towns and 4 villages where live 23 ethnic groups such as Zhuang, Han, Baiku Yao, Miao, Maonan, and Shui Mulao, among others. The total population of Nandan County is 291,421, among which there are 25,166 in the Ba Yu Village and 22,140 in the Lihu Village, where live the Baiku Yao [8]. According to the State Ethnic Affairs Commission, the Baiku Yao ethnic identity is defined as having Baiku Yao parents and three generations of ancestors that were Baiku Yao [8].

### Subjects

A stratified random cluster sampling method was used: two Baiku Yao-inhabited hamlets, two Zhuang-inhabited hamlets, and two Han-inhabited hamlets were randomly selected from the Lihu and Bayu villages in Nandan County in order to obtain 75 villagers older than 18 years of age from each hamlet. Villagers who had mental illnesses (according to DSM-IV) or who failed to complete the survey were excluded.

This study was approved by the Ethics Committee of the Guangxi Medical University Medical. Informed consent was obtained from each participant.

### Survey tools

Participants filled out a questionnaire about general sociodemographic information including gender, age, ethnic, education level, economic status, marital status, and the number of family members.

The Life Event Scale (LES) [12] was from the Social Readjustment Rating Scale, which was translated into Chinese and revised according to some social and cultural characteristics of China by Yang and Zhang and widely used for qualitative and quantitative

measurement of mental pressure (stress and mental discomfort). This questionnaire contains 48 significant aspects of life that are common in China including family life (n=28), work and learning (n=13), and social and other aspects (n=7), with two additional blank items for contents not included in the above three categories. Events within a one-year time period were recorded. Individuals clarified, according to their own experience, the effects that those events had on themselves, the degree of influence and influence duration. The degree of influence was divided into five grades, from no influence to very severe influence, and recorded as 0, 1, 2, 3, and 4 points, respectively. Influence duration was divided into four grades: no more than 3 months, no more than half a year, no more than one year, and more than one year, and were recorded as 1, 2, 3, and 4 points, respectively. The higher the total LES score, the greater the mental pressure in individuals.

The simplified mental symptom checklist was from Symptom Checklist 90 (SCL-90, L. R. Derogatis, 1975), which was translated into Chinese by Tang and Wei [13]. It assesses four factors: somatization, anxiety, depression, and hostility. A total of 29 items were identified, including 8 items for somatization, 7 items for anxiety, 8 items for depression, and 6 items for hostility. Based on the scoring method in SCL-90, the average of the four factors and positive rates were calculated.

The Simplified Coping Styles Questionnaire (SCSQ) was translated and adapted from the Ways of Coping Questionnaire (WCQ, Folkman and Lazarus) by Xie [14]. The questionnaire contains 20 items and consists of two dimensions (subscales): positive and negative coping, involving different attitudes and measures that are commonly adopted in daily life. For the self-rating scale, a multilevel evaluation was adopted, with four choices: never use, occasionally use, sometimes use, and often use (corresponding scores of 0, 1, 2, and 3). Subjects selected one answer according to their own situation.

The Social Support Rating Scale (SSRS) compiled by Xiao [15] was based on the Interview Schedule for Social Interaction (ISSI, Henderson, 1981) and the Social Support Questionnaire (SSQ, Sarason, 1981). The scale was developed according to social conditions specific to China and included three dimensions: objective support (3 items), subjective support (1 item), and accessibility to social support (3 items).

### Survey methods

The investigators were graduates in medical psychology, and personnel in local health centers were hired to assist the investigation. All personnel accepted uniform training conducted by the research team prior to the survey. A unified guidance language was used in the questionnaire. Prior to testing, the purpose and significance of the survey were explained to the

subjects, and one-on-one interviews were performed to complete questionnaire items. For subjects with a language barrier, translation was provided by local investigators. Finally, investigators checked the answers and excluded invalid questionnaires. A no-response rate of >5% was considered as invalid, and such questionnaires were excluded. In this survey, a total of 450 questionnaires were used, with 414 valid questionnaires (recovery rate of 92%).

### Statistical analysis

According to the cross-sectional survey sample size calculation formula and a mental symptom positive rate of 0.20, the sample size was estimated as 400 [16]. Data were collected using double entry. SPSS 19.0 (IBM, Armonk, New York, USA) was used to establish the database and to conduct statistical analysis. Continuous data are expressed as means  $\pm$  standard deviation. Categorical data are expressed as frequencies and percentage. Analysis of variance (ANOVA) and rank sum tests were used to compare continuous variables. Relevant factor analysis was performed using nested regression analysis, and further analysis of relevant factors for intermediation analysis was performed using the mixed path analysis in Amos 5.0 (IBM, Armonk, NY, USA). A two-sided probability level of  $\leq 0.05$  was considered significant.

## Results

### Participants

There were 121 Baiku Yao, 48 men and 73 women, with a mean age of  $48 \pm 5$  years (<35: 38.8%; 36–59: 35.5%; >60: 25.7%). There were 141 Zhuang, 48 men and 93 women, with a mean age of  $45 \pm 4$  years (<35: 52.8%; 36–59: 29.8%; >60: 18.4%). There were 137 Han, 52 men and 85 women, with a mean age of  $49 \pm 5$  years (<35: 38.0%; 36–59: 35.8%; >60: 26.2%). There was no significant differences in sex ( $P=0.645$ ) and age ( $P=0.137$ ) (Table 1).

### Comparison of life events

The top-10 life events in Baiku Yao were, in order: long-distance marriage (25.3%), significant improvement in economic conditions (23.2%), family financial difficulties (19.6%), start of employment (16.7%), sexual dissatisfaction or celibacy (12.3%), significant changes in pattern of life (diet, sleep) (11.5%), dissatisfaction with current job (9.8%), debt, being misunderstood, blamed unjustly, accused falsely, gossip (7.4%, respectively), and waiting for employment, unemployment (6.3%). The occurrences of all life events ranged from 2.7% to 25.3%.

**Table 1.** Characteristics of the subjects.

Variable	Category	Baiku Yao (n=124)	Zhuang (n=149)	Han (n=141)	$\chi^2$ /Hc/F*	P-value
Gender	Male (149)	49	52	48	0.978	0.613
	Female (265)	75	97	93		
Age		48.35±15.45	49.10±16.03	49.23±16.31	1.325	0.061
Education	Illiteracy or semiliterate	63	35	38	15.793	<0.01
	Primary school	32	50	56		
	Junior scholle or above	29	64	47		
Income (yuan/month)	0-499	106	94	103	4.364	0.113
	500-999	14	36	29		
	Above 1000	4	19	9		
Family population		4.92±1.86	4.94±1.74	4.99±1.85	0.047	0.954

\* Chi-square for gender. Rank sum test for education and income. ANOVA for age and family population.

**Table 2.** Comparison of life events among Baiku Yao, Han and Zhuang ethnics.

Category/Item	LES score	Family event	Work event	Social and other events
Baiku Yao (n=121)	22.8±11.3	2.9±2.8*	2.9±2.843	1.039±2.509
Male	23.7±10.6	3.2±3.4#	0.2±0.9	1.1±2.3
Female	21.2±8.4	2.8±2.4	0.3±0.8	1.0±2.6
Zhuang (n=141)	18.1±8.3	2.2±2.5	0.3±1.2	1.2±2.9
Male	17.2±7.7	2.0±2.0	0.3±1.0	1.5±2.9
Female	18.6±9.1	2.3±2.8	0.3±1.3	1.1±3.0
Han (n=137)	17.9±7.1	2.2±2.2	0.7±0.9	1.1±2.5
Male	18.2±6.2	1.8±1.9	0.3±1.3	0.9±2.6
Female	17.7±7.3	2.4±2.3	0.1±0.5	1.2±2.4
P	0.062	<0.001	0.986	0.453

\* Compared with Zhuang and Han; # Compared with males in Zhuang and Han.

Statistical comparison of the life events among the three ethnic groups was conducted by classification of family, work, social, and other events. Results showed that there were significant differences in family events (P=0.001). Further multiple comparisons showed that there were significant differences between Baiku Yao, Han, and Zhuang (P=0.001), while the difference between Han and Zhuang was not statistically significant (P=0.678). There were significant differences between Baiku Yao men and men in the other two ethnic groups (Table 2).

### Comparison of mental symptoms, coping style, and social support

As seen in Table 3, somatization, anxiety, and depression factors in Baiku Yao were higher than the Chinese norms, and the somatization factor in Zhuang and Han ethnicities was higher than that in Baiku Yao. Anxiety and depression in Baiku Yao were higher than anxiety and depression in Zhuang and Han, while there was no difference between Zhuang and Han. The degree of positive coping of the three ethnicities was higher than the Chinese norm, while negative coping was lower than the Chinese norm, and the differences were statistically significant (all P<0.05).

**Table 3.** Comparison of mental symptom, coping mechanisms and social support among Baiku Yao, Zhuang and Han ethnics.

Ethnics	Somatization	Anxiety	Depression	Hostility	Positive coping	Negative coping	Social support
Baiku Yao (n=124)	1.79±0.66 <sup>###</sup>	1.70±0.69 <sup>###</sup>	1.75±0.71 <sup>###</sup>	1.51±0.56	26.32±7.56 <sup>###</sup>	15.86±4.23 <sup>###</sup>	36.46±7.33
Zhuang (n=149)	1.74±0.56 <sup>###</sup>	1.47±0.55 <sup>**</sup>	1.56±0.54 <sup>**</sup>	1.42±0.58	26.20±6.91 <sup>###</sup>	16.29±4.50 <sup>###</sup>	36.47±8.18
Han (n=141)	1.83±0.70 <sup>###</sup>	1.47±0.54 <sup>##</sup>	1.56±0.54 <sup>##</sup>	1.39±0.48	25.95±7.96 <sup>###</sup>	15.89±4.93 <sup>###</sup>	36.04±7.38
Chinese normal (23)	1.37±0.48	1.39±0.43	1.50±0.59	1.46±0.55	21.25±7.14	30.26±8.74	34.56±3.73

\* P<0.05 Baiku Yao vs. Zhuang; \*\* P<0.01 Baiku Yao vs. Zhuang; ## P<0.01 Baiku Yao vs. Han; ### P<0.001 between the three ethnics and the Chinese normal.

**Table 4.** Relationships between mental symptoms and coping mechanisms, life events as well as social support by hierarchical regression analysis.

Variable	Mental symptoms (β)				
	1 <sup>st</sup> step	2 <sup>nd</sup> step	3 <sup>rd</sup> step	4 <sup>th</sup> step	5 <sup>th</sup> step
Control variable					
Gender	0.156 <sup>**</sup>	0.110 <sup>**</sup>	0.103 <sup>**</sup>	0.107 <sup>**</sup>	0.111 <sup>**</sup>
Age	0.019	0.013	0.009	0.006	0.012
Ethnic	0.103 <sup>*</sup>	0.095 <sup>*</sup>	0.096 <sup>*</sup>	0.090 <sup>*</sup>	0.064
Education	-0.070	-0.033	-0.016	-0.020	-0.023
Negative coping		0.640 <sup>***</sup>	0.682 <sup>***</sup>	0.689 <sup>***</sup>	0.554 <sup>***</sup>
Positive coping			-0.081	-0.058	-0.032
Social support					
Objective				-0.080	-0.063
Subjective				-0.036	-0.042
Support accessibility				0.030	0.008
Life event					
Family event					0.141 <sup>***</sup>
Work event					0.206 <sup>***</sup>
Social event					0.070
R2	0.044	0.449	0.453	0.463	0.539
ΔR2		0.405 <sup>***</sup>	0.004	0.010	0.076 <sup>***</sup>
F	4.646 <sup>**</sup>	66.152 <sup>***</sup>	55.997 <sup>***</sup>	38.545 <sup>***</sup>	38.937 <sup>***</sup>

\* P<0.05; \*\* P<0.01; \*\*\* P<0.001.

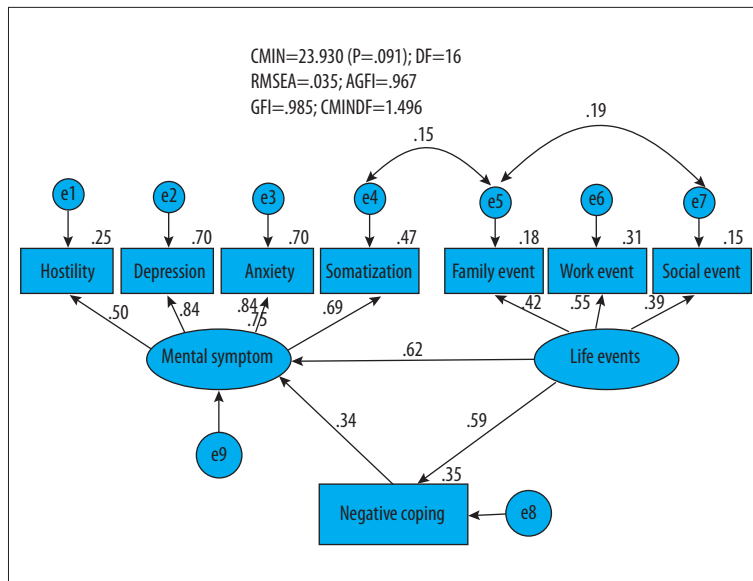


Figure 1. Path analysis of the mental symptoms by mixed model.

Table 5. Fitting indices of mixed models.

$\chi^2$	df	$\chi^2/df$	Goodness of fit index (GFI)	Root mean square error of approximation (RMSEA)	Adjusted goodness of fit index (AGFI)
23.930	16	1.496	0.985	0.035	0.967

### Relationship between mental symptoms and coping styles, life events, and social support in Baiku Yao

Hierarchical regression analysis was used to analyze the relationship between mental symptoms and coping behaviors, life events, and social support. In the first step, the demographic variables (gender, age, race, education) were set as controlled variables. In the second, third, and fourth steps, coping and social support were set as controlled variables. In the fifth step, coping and social support were set as controlled variables. Results showed that negative coping and life events were contributing to mental health status after controlling for demographic variables, explaining variations of 40.5% and 7.6%, respectively (Table 4).

### Relationship between mental symptoms and coping styles and life events in Baiku Yao by mixed model

On the basis of nested regression analysis, mental symptoms were considered as independent variables, negative coping as a mediator, and life events as dependent variables to construct a relationship model of different variables, using Amos 5.0. A method of portfolio of projects was adopted [17] to integrate the observed indicators. The results of path analysis are shown in Figure 1. All path coefficients were significant ( $P < 0.01$ ), and the fitting indices are listed in Table 5. The results suggested that life events have direct effects on mental

symptoms and may also have indirect effects through negative coping. Path analysis model for the evaluation results had the following parameters:  $\chi^2 = 23.930$ , ( $P = 0.091$ ); goodness of fit index (GFI) = 0.985; and adjusted goodness of fit index (AGFI) = 0.976, all  $> 0.90$ ; root mean square error of approximation (RMSEA) = 0.035. These results show that the model fitting is good.

### Discussion

The objective of the present study was to compare the mental symptoms of Baiku Yao, Zhuang, and Han populations, and to investigate how life events affected mental symptoms and coping behaviors in this population from the social, behavioral, and psychological points of view. Results showed that the number of stimulating life events in Baiku Yao, particularly in males, was higher than the number in the other two groups. Anxiety, depression, and mental symptom scores in the Baiku Yao were higher than those in the other two groups. After adjusting for demographic variables, variation in mental health could be explained by negative coping and life events, which increased by 40.5% and 7.6%, respectively.

Long, stressful life events may cause adverse effects on an individual's body and mind, and are closely associated with mental health [18]. These events are an important basis for



analyzing the differences between influencing factors on mental health in different populations. In this study, the top three family events were long-distance marriage, significant improvement in the economic conditions, and familial financial difficulties. These results were consistent with results obtained by Zhi et al. [19]. The influence of the finances on mental stress was the most prominent in Southwest minorities, and family events were among the top three negative life events in rural dwellers [20].

Among the three ethnicities, the pressure produced by life events was the most significant in the Baiku Yao population. Furthermore, there were differences in family events in Baiku Yao men compared with Zhuang and Han men, while this feature was not observed in women. This may be explained by the traditional division of roles between Baiku Yao men and women, where men are expected to take care of the earning/finances, while women are more devoted to home life. With the development of society, more and more Baiku Yao people join the workforce outside of the home. Such lifestyle changes improve the financial conditions to a certain degree while applying long-distance pressure to traditional marriages.

Minorities present different degrees of mental health due to differences in their specific cultural background, habits and customs, and financial conditions. The present study found that somatization, anxiety, and depression factors of Baiku Yao were higher than those observed in other Chinese populations. The positive coping of the three ethnic groups was higher than the Chinese norm, and the negative coping was lower than the Chinese norm.

The structural equation model is a very broad mathematical model and is a powerful tool in psychology, behavior, education, social sciences, and even medicine. Multiple observable variables are used to reflect latent variables, which are difficult to measure directly and accurately; the potential structural relationship between the latent variables can be estimated [21]. This study attempted to use a structural equation model to analyze the mental symptoms in the Baiku Yao population and to investigate its application in mental health studies in minorities. Nested regression analysis of demographic factors showed that negative coping and life events could significantly predict mental symptoms after managing demographic variables, indicating that more life events and more negative coping behaviors will result in a higher score on mental

symptoms, which is consistent with the relevant results obtained by Huang et al. [22]. The impact of life events on mental symptoms is largely due to increased pressure resulting from life events, while negative coping will also affect the solution to stressful events, thus affecting mental health [23]. The results obtained by the mixed path model showed that negative coping plays a partially intermediary role between life events and mental symptoms. The ratio of the direct effect to the mediating effect is three, indicating that the direct effect was significantly larger than the mediating effect. Therefore, mental symptoms are mainly affected by life events, which is supported by results from Mourad et al. [24].

The present study is not without limitations. First, the sample size was relatively small, and larger-scale studies should provide better estimates of the effects of different factors on mental health status. In addition, albeit interesting for the study of mental health of minority ethnic groups, the results of the present study can only be directly applied to a very small population.

## Conclusions

The present study constructed a structural equation model to analyze the mental health symptoms of minorities and their influencing factors in Guangxi Baiku Yao. Mental symptoms of Baiku Yao in Nandan (Guangxi) were more severe than those in other Chinese ethnic groups. They were mainly affected by life events, including long-distance marriage, which might result in inadaptability to the change of living space, and family economic difficulties, which led to psychological problems probably through influencing the quality of life. Negative coping played a partially intermediary role between life events and mental symptoms.

## Conflict of interest declaration

The authors declare that they have no competing interests.

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