

# Investigation On Psychological Status of Patients With Cervical Precancerous Lesions And Cancer Among Han And Ethnic Minority In Yunnan Province of China

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## Research Article

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4 Investigation on psychological status of patients with cervical  
5 precancerous lesions and cancer among Han and Ethnic minority in Yunnan  
6 Province of China  
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59 Abstract: objective The aim of this study was to explore the correlation  
60 and difference of influencing factors by analyzing the psychological  
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4 status of patients with cervical precancerous lesions and cancer in Han  
5 and Ethnic minorities. So as to provide evidence for more targeted  
6 psychological intervention for categories types of patients. Methods 200  
7 Han patients with cervical lesions and 100 Ethnic minority patients in  
8 Yunnan cancer center were investigated with the Chinese version of  
9 Kessler 10 Scale. Statistical analysis was performed using t-test,  
10 analysis of variance, and multivariable linear regression. Results There  
11 was no significant difference in the distribution of demographic  
12 characteristics between the two groups ( $P>0.05$ ).The results of univariate  
13 analysis showed that the impression of K10 score was statistically  
14 significant among the following factors: educational level, awareness of  
15 HPV vaccine, disease screening status, employee medical insurance,  
16 economic burden of disease, cancerous or not, pathological type,  
17 treatment modalities, marital status, and family genetic history of tumor  
18 ( $P<0.05$ ).Among them, the marital status had opposite effects on the two  
19 groups of patients. The mean score of married Han patients were higher  
20 than those of Han patients with other marital status, but the score of  
21 Ethnic minority patients the opposite. Multivariate analysis indicates  
22 that the economic burden of the disease, occupation, and family genetic  
23 history of tumor had a greater impact on the total score of Han patients  
24 among many factors, accounting for a total of 8.1% $\beta$ Adj=0.081 $\beta$ .Treatment  
25 modalities had the greatest effect on the scores of ethnic minority  
26 patients, accounting for 8.4% $\beta$ Adj=0.084 $\beta$ . Conclusion The factors  
27 affecting the psychological status of patients between the two groups  
28 have similarities and differences. Multifactorial analysis showed that  
29 the main factors affecting the psychology of Han patients were: economic  
30 burden caused by the disease, occupation, and family genetic history of  
31 tumor; while the main factors affecting the psychology of minority  
32 patients were: treatment modalities. Therefore, targeted recommendations  
33 and policy measures can be proposed respectively. We should not only  
34 increase the publicity of disease-related knowledge, but also call on all  
35 women to receive vaccines and regular screening of women in the high  
36 incidence age group. It is also necessary to positively guide patients  
37 with higher education level and give more encouragement and spiritual  
38 support to patients with family genetic history of tumor and heavy  
39 economic burden of the disease. The effect of marital relationship on  
40 patients cannot be neglected at the same time. More targeted  
41 psychological intervention and more favorable treatment modalities should  
42 be provided for patients.  
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46 Keywords: Cancer; Oncology; Cervical lesions; Psychological status;  
47 Influencing factors; Kessler 10  
48 Introduction

49 Cervical cancer is a malignant tumor that occurs in the cervical canal  
50 and mainly affects people between 40 and 50 years old. The incidence and  
51 fatality rate are both increasing year by year, and are showing a younger  
52 trend [1-3]. Cervical intraepithelial neoplasia (CIN) is a precancerous  
53 lesion of invasive cervical cancer [4]. Cervical cancer is one of the  
54 most common female malignant tumors, and the global incidence ranks  
55 second among female malignant tumors [5]. According to statistics, 85% of  
56 patients are from developing countries [6]. In 2018, cervical cancer  
57 incidence in China accounted for 18.59% of global incidence and 15.43% of  
58 mortality [7-8].Due to the large population base, cultural background and  
59 lifestyle differences in China, cervical cancer has seriously threatened  
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4 the health of women in this country. Therefore, more attention must be  
5 paid to the prevention and treatment of cervical cancer and the  
6 psychological status of patients.

7 More and more researchers have begun to focus on the quality of life and  
8 psychological status of patients with cervical cancer[9-13]. They  
9 explored more the current situation of psychological distress and related  
10 influencing factors [14-15], as well as the effect of social support,  
11 humanistic care, psychological intervention on the quality of life of  
12 patients [16-20]. These studies are a discussion of the integrity of the  
13 psychological status of patients, less classification and evaluation  
14 analysis of specific psychological problems, and also lack of attention  
15 to the differences in psychological status between Han and Ethnic  
16 minority patients. In this study, we used the Kessler psychological  
17 distress scale (Kessler 10) to divide the psychological status of  
18 patients into ten dimensions, and collected information from a total of  
19 200 Han patients and 100 Ethnic minority patients from Yunnan Province as  
20 a multi-ethnic province. The economic status, lifestyle and working  
21 living environment of many ethnic minorities are quite different from  
22 those of Han nationality, which makes the psychological and mental status  
23 after suffering from cervical cancer quite different from those of Han  
24 nationality. So we focused on exploring the related factors affecting the  
25 psychological status of patients with cervical lesions and the  
26 differences in the psychological status of Han and ethnic minority  
27 patients under the influence of the same factors.  
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## 30 Method

### 31 Participants

32 Participants were 200 Han patients and 100 Ethnic minority patients with  
33 cervical lesions who were admitted and definitely diagnosed in the Third  
34 Affiliated Hospital of Kunming Medical University (Yunnan Cancer Center)  
35 from January 2019 to December 2020 were selected as respondents.  
36 Inclusion criteria: 1.aged 18 years or above, had been histologically  
37 confirmed of cervical cancer or precancerous lesions (CIN), 2. Patients  
38 with a certain educational level who can read and know the questionnaire  
39 by themselves; 3. Patients with informed consent and cooperate with the  
40 investigators; 4. Patients without mental illness and disturbance of  
41 consciousness in the past and at present. The exclusion criteria were as  
42 follows: having severe co-morbidities, mental illness, or cognitive  
43 impairment, or having other malignant tumors or serious illness at the  
44 same time, and be contraindications before radiotherapy, chemotherapy and  
45 surgery.  
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### 48 Material

49 The Kessler psychological distress scale (K10) is a brief 10-item screen  
50 for the detection of nonspecific psychological distress widely used in  
51 international epidemiological studies of mental health dysfunction [21].  
52 Foreign scholars have shown that K10 is a concise, rapid, effective and  
53 reliable mental health evaluation tool [22]. Domestic scholars have also  
54 demonstrated through research that the Chinese version of the K10 has  
55 high stability and good reliability and is suitable for the survey of the  
56 Chinese population [23]. K10 includes 10 small items to evaluate people's  
57 psychological status. The content is the frequency of mental health  
58 related conditions such as psychological anxiety and psychological stress  
59 experienced in the past four weeks, which can easily detect people's  
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4 psychological conditions and their risk factors. The Kessler 10 scale is  
5 scored from 10 to 50, with each item corresponding scores: always (5  
6 points), usually (4 points), sometimes (3 points), seldom (2 points), and  
7 rarely never (1 point). The higher the score was, the worse the  
8 psychological condition was, and the greater the risk of mental health  
9 problems would be.  
10

#### 11 12 13 Procedure

14 This cross-sectional questionnaire survey was carried out in the years  
15 2019.01-2020.12. All participants who consented to participate signed  
16 informed consent forms were individually interviewed, face-to-face, by  
17 trained questionnaire interviewers. First, investigate the basic  
18 demographic data of patients, including age, ethnicity (Han majority and  
19 ethnic minorities), occupation (farmer and others), level of education  
20 (primary school or below, junior high school, senior high school, college  
21 or above), marital status (unmarried, married, widowed, divorced or  
22 separated), monthly household income, Number of children, health  
23 insurance, etc, and then use the Kessler 10 scale interview respondents.  
24 The completeness of scale filling was checked after completing the  
25 survey.  
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#### 28 Statistical

29 Effective questionnaire information was entered using EpiData3.1 and  
30 statistical analysis was performed with SPSS 22.0. The total score of K10  
31 was normally distributed. Each scale score was used as a dependent  
32 variable in single factor analysis. The t-test was used to compare the  
33 sample means of two groups, and the analysis of variance was used to  
34 compare the sample means of multiple groups. We also used the  
35 multivariable linear regression analyses. The dependent variables were  
36 the scores of all items of K10 and the total score. Independent variables  
37 were the influencing factors in univariate analysis. Inclusion criteria  
38  $\alpha \leq 0.05$ , exclusion criteria  $\alpha \geq 0.10$ , and test level  $\alpha = 0.05$  for the  
39 model.  
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#### 42 Results

##### 43 Basic information of participants

44 The distribution of Socio-demographic characteristics among Han and  
45 Ethnic minority is summarized in Table 1. A total of 300 patients with  
46 cervical lesions were investigated in this study, including 110 patients  
47 had CIN and 190 patients had Cervical cancer. The two types of patients  
48 had the same composition of the following demographic characteristics, or  
49 no statistically significant difference in distribution ( $P > 0.05$ ).  
50

##### 51 The Total score

52 As shown in Tab.2, the differences in the total scores of Han patients  
53 under the influence of disease economic status, menopause, family smoking  
54 status and family genetic history of tumor were statistically  
55 significant. Ethnic minority patients had statistically significant  
56 differences in the total score under the influence of treatment  
57 modalities, pathological types, types of health insurance, as well as  
58 cancer types.  
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4 The score of each item

5 Analysis of influencing factors of K10-score

6 The academic community generally believes that the main factors affecting  
7 the psychological status of patients are education level, economic  
8 status, disease, and social family. Therefore, this study used methods  
9 such as t-test, analysis of variance, and multivariable linear regression  
10 to perform a single factor analysis of each score in the K10 scale. The  
11 following results are the analysis of the influencing factors with  
12 statistical significance ( $P \leq 0.5$ ) and summarized into four dimensions:  
13 education level and disease-related knowledge, economic status, disease  
14 types and treatment modalities, marital and family situation.  
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17 Education Level and Awareness of Disease Prevention

18 As shown in Tab.3, the effect of education level on the boredom-score of  
19 Han patients was statistically significant, within a certain range,  
20 patients with higher educational level had higher score on this item and  
21 spent more time feeling bored. The calm-score of Ethnic minority patients  
22 was statistically significant and negatively correlated with the score,  
23 in contrast to that of Han patients. The knowledge of the vaccine had a  
24 statistically significant effect on the sitting-score and calm-score of  
25 Han and Ethnic minority patients. Whether or not to participate in the  
26 screening had a statistical significance on the calm score of all  
27 patients, as well as the difficulty-score of the Han patients, and the  
28 boredom-score of the Ethnic minority patients. The average score of the  
29 Ethnic minority patients participating in the screening were lower than  
30 those of the patients not participating in the screening.  
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33 Economic status

34 As shown in Tab.4, whether there was employee health insurance had a  
35 statistically significant effect on the difficulty-score and interest-  
36 score of the all patients, and also had a statistically significant  
37 effect on the-calm score of Ethnic minority patients. The impact of  
38 disease economic burden on the scores of helplessness, depression and  
39 difficulty in Han patients was statistically significant, and the higher  
40 the patient's score, the heavier the economic burden.  
41

42 Disease types and Treatment modalities

43 As shown in Tab.5, Whether cancerous had a statistically significant  
44 effect on the difficulty-score of all patients, and also had a  
45 statistically significant effect on the sitting-score, rest-score,  
46 helplessness-score, interest-score of Ethnic minority patients, and the  
47 average score of cervical cancer patients were higher Han those of CIN  
48 patients. The effect of pathological type on the calm-score, rest-score,  
49 helplessness-score, difficulty-score, interest-score of Ethnic minority  
50 patients was statistically significant. The mean score of Squamous cell  
51 carcinoma patients were higher than patients with other pathological  
52 types, but there was no significant effect on the score of Han patients.  
53 The impact of treatment modalities on the calm-score, rest-score,  
54 helplessness-score, difficulty-score of Ethnic minority patients was  
55 statistically significant. The mean score of patients treated with  
56 Concurrent chemoradiation and postoperative adjuvant therapy were higher  
57 than those of patients treated with other methods, but the effect on the  
58 score of Han patients was also not statistically significant.  
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#### Marital and family situation

As shown in Tab.6, the effect of marital status on the sitting score and calm score of Han patients was statistically significant. The mean score of married Han patients was higher than those of Han patients with other marital status. The effect on the exertion-score and interest-score of Ethnic minority patients was statistically significant, and the mean score of Ethnic minority patients with other marital status was higher than those of married Ethnic minority patients. Family genetic history of tumor had a statistically significant effect on the tension-score and interest-score of Han patients, and a statistically significant effect on the helplessness-score of Ethnic minority patients. The mean score of patients with family genetic history of tumor were higher than those of patients without family genetic history of tumor.

The total score results of multivariable linear regression analysis of influencing factors

As shown in Supplementary Table 1, the total score was associated with economic burden of disease ( $\beta = 0.288$ ,  $P < 0.001$ ), occupation ( $\beta = 0.192$ ,  $P = 0.012$ ), and family genetic history of tumor ( $\beta = 1.44$ ,  $P = 0.036$ ) in Han patients. The total score in minority patients was associated with treatment modalities ( $\beta = 0.305$ ,  $P = 0.002$ ).

#### Discussion

##### Education Level and Awareness of Disease Prevention

There were significant differences in the effects of education level and Disease screening status of Han patients and ethnic minority patients. Higher education level and certain knowledge of disease prevention help alleviate the psychological problems of Ethnic minority patients, especially can help patients recover calm in stressful emotions. And all psychological status indicators of ethnic minority patients who participated in the screening were better than those of patients who did not participate in the screening. This is the same with the research conclusion of Chinese scholar Wu Ying [24]. Some studies [25-26] have also found that the quality of life of cervical cancer survivors is related to their education level. The higher the education level, the higher the quality of life of patients. This is related to the occurrence and development of cervical cancer. Cervical lesions are a continuous process, which takes several years to more ten years from precancerous lesions to invasive cancer. Some early lesions can be reversed [27]. Timely vaccination and regular participation in screening are helpful for the treatment and outcome of the disease. However, the education level is low, the ability to accept knowledge is limited, and the knowledge of diagnosis and treatment related to cervical cancer is less. So it is difficult to make a correct and objective understanding of the disease and treatment, and the awareness of disease prevention is also insufficient. However, the results showed that illiterate patients had the lowest scores in both Han and ethnic minority patients. And the psychological status of Han patients did not become better completely with increasing education level. Among them, the scores of patients with high school degree showed a significant increase ( $M=1.750$ ,  $SD=0.794$ ), and the scores of college and above decreased to the lowest scores of patients except illiterate ( $M=1.350$ ,  $SD=0.587$ ). This may be due to the fact that illiterate patients do not pay enough attention to the disease,



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4 lack awareness of prevention, and the disease does not burden their  
5 psychology. Patients with moderate education levels, on the other hand,  
6 are more aware of the disease, but it is not comprehensive and scientific  
7 enough. Eventually, some patients produce negative emotions, lose  
8 enthusiasm for things and life, and aggravate their psychological  
9 problems. With the further improvement of cultural level, the  
10 understanding of disease and health is more perfect and scientific, and  
11 mental health has also been improved.

12 Therefore, we should strengthen the publicity of cervical cancer-related  
13 knowledge and call for regular screening of women in the vaccinated and  
14 high incidence age groups. At the same time, it is also necessary to  
15 provide simpler and more detailed guidance for patients with low  
16 education level, especially real Ethnic minority patients. It is also  
17 necessary to explain the clinical symptoms of the disease and the adverse  
18 reactions of postoperative chemotherapy to patients with a moderate  
19 education level of education, and provide positive guidance to enhance  
20 patients' confidence in treatment, thereby improving their psychological  
21 state [28-29].  
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#### 23 24 Economic status

25 Family economic status is an important factor affecting the quality of  
26 life of patients [30]. The Han patients with heavier disease economic  
27 burden had higher scores and more time to feel helpless, depressed and  
28 difficult to do things. This result is the same as the results of  
29 multiple studies [31-32]. This is because the treatment of cervical  
30 cancer is a long-term process, with complex treatment modalities and high  
31 treatment cost. Besides, chemotherapeutic drugs also have toxic and side  
32 effects, which can impair the body function and must be relieved by  
33 drugs, leading to an increase in the economic burden. In a poor economic  
34 situation, patients may take less drugs, resulting in the aggravation of  
35 toxic and side effects [33], which has caused severe physical and  
36 psychological suffering. At the same time, the disease may also affect  
37 the patients' daily work and life, or even lose their jobs, further  
38 aggravating the economic burden of the disease. Medical insurance can  
39 also reflect the economic burden of disease. From the impact of employee  
40 medical insurance on Ethnic minority patients, it is found that the total  
41 score of K10 of the patients with employees' insurance reimbursement is  
42 14.8, which is lower than the patients with non-employee medical  
43 insurance 16.6. Li Weiling's study [32] also found that patients whose  
44 costs were mainly derived from health insurance had better mental health  
45 status than those from other patients. Although the effect of having  
46 employee medical insurance on Han patients is not uniform, the  
47 psychological effect of economic burden on all patients cannot be  
48 ignored. Therefore, we also need the support of the national medical  
49 insurance system and the joint efforts of all sectors of society to try  
50 our best to reduce treatment costs, increase the coverage and proportion  
51 of medical insurance reimbursement, and reduce the economic pressure of  
52 patients' diseases to alleviate their psychological problems.  
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#### 55 Disease types and Treatment modalities

56 It is found that the total score of K10 of the Ethnic minority patients  
57 with carcinogenesis, especially squamous cell carcinoma is 18.7, which is  
58 higher than the patients with Adenocarcinoma 12.5. And patients with  
59 cancer find it difficult to do anything more time. This is because, not  
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4 only cervical cancer patients will produce symptoms of severe anxiety and  
5 depression during chemoradiotherapy, but also patients' psychological  
6 adverse emotions cannot be avoided during neoadjuvant chemotherapy for  
7 cervical cancer. Chemoradiotherapy brings pain to the body and also  
8 affects their psychological status. During chemoradiotherapy, adverse  
9 reactions such as gastrointestinal reactions and alopecia will make  
10 patients suffer from physical and psychological torture, resulting in  
11 reduced treatment enthusiasm and compliance. In addition, high  
12 chemotherapy cost will aggravate its psychological pressure [34].The  
13 patients with Cervical conization and radical hysterectomy had lower  
14 scores. Zheng Yingying's study [35]pointed out that surgery is the best  
15 early treatment for patients with cervical cancer, which can effectively  
16 improve the life cycle of patients, but at the same time will have an  
17 impact on patients, such as physiological defects caused by hysterectomy.  
18 So formulating the treatment plan for patients, these two methods could  
19 be given priority in a scientific and reasonable case to reduce the  
20 psychological problems of patients after treatment. The pathological type  
21 and treatment modalities had a greater impact on Ethnic minorities, so  
22 more attention and psychological counseling could be given to Ethnic  
23 minority patients with squamous cell carcinoma.  
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#### 26 Marital and family situation

27 In China, the family is a very important social system and a strong  
28 spiritual pillar, and the role of women in the family is very special.  
29 Compared with married patients, patients with other marital conditions  
30 lack the care and support from the other half or children, as well as the  
31 sense of belonging and identity from the family, will bear more  
32 loneliness and helplessness. Some scholars have shown [36] that sexual  
33 life has a certain impact on the quality of life of patients with  
34 gynecological malignancies. And the earlier sexual life is started after  
35 surgery, the faster the negative impact caused by surgery and  
36 chemoradiotherapy can be relieved, helping patients eliminate their  
37 doubts about their female identity. However, some scholars also point out  
38 that compared with other types of tumors, gynecological tumors have the  
39 greatest negative impact on female sexual behavior and will last for a  
40 period of time [37]. Approximately 70% of cervical cancer survivors  
41 suffer from sexual dysfunction, such as decreased vaginal sensitivity,  
42 reduced sexual desire and sexual excitement in patients due to vaginal  
43 dryness, pain bleeding, dyspareunia, and vaginal atrophy after treatment  
44 [38].  
45

46 Even some patients had to remove the uterus during the treatment, which  
47 leads to physiological problems such as sexual dysfunction and loss of  
48 reproductive function [39], other treatment modalities such as concurrent  
49 chemoradiotherapy will also cause physiological damage to a certain  
50 extent. The treatment of cervical cancer requires a long recovery period,  
51 which will lead to decreased sexual desire and even sexual dysfunction of  
52 patients, affecting the life of husband and wife and destroying family  
53 relations. It instead causes the patient to fall into a dilemma of  
54 anxiety and helplessness. The analysis results showed that there were  
55 large differences in the scores of Han and Ethnic minority patients in  
56 different marital states. Married Ethnic minority patients had less time  
57 to feel exhausted and considered life boring than Han patients with other  
58 marital status. Married Han patients scored higher, more time feel  
59 restless, difficult to calm. Therefore, we should pay attention not only  
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4 to the patient's psychological status but also to the patient's other  
5 half of the mood as well as the husband-wife relationship. Medical staff  
6 should help patients correctly face sex-related problems and provide  
7 necessary sexual life guidance to help them improve their sexual life  
8 status [40]. Having a loving sexual life and a harmonious family  
9 relationship is conducive to the rehabilitation of patients.  
10

## 11 CONCLUSIONS

12 Our study identified the factors affecting the psychological status of  
13 patients between the Han and Ethnic minorities were different.  
14 Multifactorial analysis showed that the main factors affecting the  
15 psychology of Han patients were: economic burden caused by the disease,  
16 occupation, and family genetic history of tumor; while the main factors  
17 affecting the psychology of Ethnic minority patients were: treatment  
18 modalities. Therefore, targeted recommendations and policy intervention  
19 measures can be proposed respectively. We should increase awareness about  
20 cervical cancer and call for women to be vaccinated, in particular, for  
21 women in the high-incidence age group to receive regular screening.  
22 Easier and more detailed instructions need to be provided for patients  
23 with low education levels, especially for Ethnic minority patients. It is  
24 necessary to give more spiritual support to patients with family genetic  
25 history of tumor and heavy economic burden of the disease. Treatment  
26 modalities have a greater impact on Ethnic minorities, and more attention  
27 and psychological counseling should be given to them.  
28

### 29 1. Study limitations

30 This study has some limitations. Firstly, the sample size is small, and a  
31 single center study. Secondly, the cross-sectional study design employed  
32 means causal conclusions could be made with caution. Thirdly, other  
33 factors such as the prevalence of the living environment, behavior habits  
34 and the quality of life were not considered. Finally, blank control is  
35 absent in this study.  
36

### 37 2. Clinical implications

38 The current study suggested that it should not only increase the  
39 publicity of disease-related knowledge, but also call on all women to  
40 receive vaccines and regular screening of women in the high incidence age  
41 group. It is also necessary to positively guide patients with higher  
42 education level and give more encouragement and spiritual support to  
43 patients with family genetic history of tumor and heavy economic burden  
44 of the disease. More targeted psychological intervention and more  
45 favorable treatment modalities should be provided for patients.  
46

### 47 Conflicts of interest

48 The authors declare that there are no conflicts of interest.  
49

### 50 Availability of data and material

51 The data used for the current study are available from the corresponding  
52 author on reasonable request.  
53

### 54 Code availability

55 Not applicable.  
56

### 57 Authors' contributions

58 Min Zhao\*: Designed the study, and guided writing.

59 Dan Liu\*: Conceptualization, and wrote the main manuscript.  
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4 \*Min Zhao and Dan Liu are co-first authors, and they contributed equally  
5 to this Paper.

6 Rong-yan Gu: Result interpretation, and participated in manuscript  
7 development.

8 Hong-tao Lei: Statistical analysis

9 Shao Zhang: .Coordinated the study, supervised data collection

10 Song-rui Ding: Methodology.

11 Lei Luo: Participated in data collection.

12 Meng-jiao Zhang: Formal analysis, and writing - review.

13 Guo-yu Ma: Data curation and editing.

14 Zheng Li : Commented and revised manuscripts.

15 All authors read and approved the final manuscript for submissions for  
16 publication.  
17

#### 18 Ethics approval

19 The study has been approved by the ethics committee of The Third  
20 Affiliated Hospital of Kunming Medical University.  
21

#### 22 Consent to participate

23 Participants expressed their agreement to participate in the study by  
24 signing the informed consent after they were informed about the  
25 significance of this study, study objectives, and their rights to  
26 withdraw from the study at any time, and measures to maintain the  
27 confidentiality of the data they provided.  
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#### 30 Consent for publication

31 Informed consent for publication was obtained from the authors.  
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