Chinese General Practice Journal 2 (2025) 100051

Contents lists available at ScienceDirect

Chinese General Practice Journal

journal homepage: https://www.keaipublishing.com/en/journals/chinese-general-practice-journal/

The health state utility and influencing factors of six directly-entering-socialism ethnic groups in Yunnan Province

Yafang Zhang [a], Xuan Wen [a,b], Chunyan Deng [a,c], Xingmei Du [a,d], Xiu Xia [a], Rui Huang [a], Rui Deng [a], Yuan Huang [a,*]

[a] Yunnan Provincial Key Laboratory of Public Health and Biosafety & School of Public Health, Kunming Medical University, China
[b] Changping District Center for Disease Control and Prevention, Beijing, China
[c] Department of Prevention and Health Care, China University of Petroleum (Beijing) Hospital, China
[d] Lijiang Culture and Tourism College, China

ARTICLE INFO

Keywords:
Directly-entering-socialism ethnic groups
Health utility values
EQ-5D-5L
Health-related quality of life
Influencing factors

ABSTRACT

Background: “lDirectly-entering-socialism ethnic groups” refer to certain ethnic minorities in Yunnan Province whose social structures shifted directly from primitive to socialist society after the founding of the People’s Republic of China. This abrupt transition may lead to psychological maladaptation, such as anxiety and depression, affecting overall well-being. Additionally, their remote, mountainous residence limits access to healthcare services, potentially lowering health outcomes. While some studies have explored health utility among ethnic minorities, research specifically on these groups remains scarce.
Objective: To assess the health state utility and their influencing factors among six directly-entering-socialism ethnic groups in Yunnan Province, providing evidence for the development of health promotion and equity measures.
Methods: This study recruited individuals aged 15 and older from six ethnic groups: Va, Lisu, Nu, Jinuo, Lahu, and Blang in three counties of Yunnan Province from July to December 2022 by a multi-stage random cluster sampling method. Health state utility was measured using the EQ-5D-5-L scale and the EQ-5D-5-L Value Set for China. The Andersen model and Tobit regression analysis were used to identify the factors influencing health state utility among these groups.
Results: A total of 1921 participants were included: 293 Va (15.25 %), 378 Lisu (19.68 %), 300 Nu (15.62 %), 398 Jinuo (20.72 %), 280 Lahu (14.58 %), and 272 Blang (14.16 %). The overall health state utility was 0.958±0.092. Va had the highest health state utility (0.966± 0.059), while Lisu had the lowest (0.950±0.093). A higher proportion of participants reported difficulties in the "Pain/discomfort" and "Anxiety/depression". The Tobit regression model showed that depression was a significant barrier to health state utility across all six ethnic groups. For some groups, age over 60-(Va, Nu, Jinuo, Blang), two-week morbidity (Va, Nu, Jinuo), chronic diseases (Lisu, Nu, Lahu), and sleep disorders (Va, Lisu, Jinuo) were associated with lower health state utility. Physical exercise (Lisu, Nu), education level-(primary school or higher for Jinuo and Lahu), and alcohol consumption-(Lahu) promoted higher health state utility in certain groups.
Conclusion: This study enriches the relevant research objects of health state utility, and provides a basis for the measurement of burden of disease of ethnic minorities. The health state utility of these six ethnic groups is close to those of urban Chinese populations and higher than the general population in Yunnan. Addressing depression and improving health state utility in older adults, chronic disease patients, and those with sleep disorders should be prioritized in future health interventions for these groups.

The term "directly-entering-socialism ethnic groups" refers to a set of minority ethnic groups in China that underwent a direct transition of social form from a primitive societal structure to socialism after the founding of the People’s Republic of China. These groups are primarily located in Yunnan Province and include the Jino, Dulong, Deang, Nu, Achang, Blang, Jingpo, Pumi, Lahu, Wa, and Lisu ethnicities. This sudden leap presents various challenges, including potential feelings of anxiety, depression, and other negative emotional responses, which can affect their physical and mental well-being.[1] Additionally, most of these groups live in mountainous regions with poor transportation infrastructure and dis-

* Corresponding author.
E-mail address: huangyuan@kmmu.edu.cn (Y. Huang).

https://doi.org/10.1016/j.cgpj.2025.100051

2950-5593/© 2025 Chinese General Practice Publishing House Co., Ltd. Publishing services by Elsevier B.V. on behalf of KeAi Communications Co. Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/)

persed settlements, complicating access to healthcare services.[2] Health state utility refers to an individual's preference for a specific health state or outcome. It serves as an essential metric for assessing disease burden, as it provides a comprehensive reflection of the health status of a population.[3]

Previous studies in China investigated health state utility among ethnic groups such as the Han, Zhuang, Maonan, and Uyghur.[4,5] However, the unique historical context of the "directly-entering-socialism ethnic groups" may result in distinct health state utility compared to other minority groups. Research on the health state utility of these ethnic groups remains limited.

This study utilizes the EQ-5D-5-L alongside the EQ-5D-5-L Value Set for China to measure health state utility for six "directly-entering-socialism ethnic groups" in Yunnan Province. Additionally, the study employs the Andersen model to systematically analyze the factors influencing these values. The findings aim to provide a reference foundation for estimating the disease burden and promoting health equity for minority populations in China.

Methods

Field survey

Three autonomous prefectures in Yunnan Province were identified as survey sites of the cross-sectional study based on the population and geographic distribution of the "directly-entering-socialism ethnic groups" . Using a multi-stage, randomized cluster sampling method, one county was randomly selected from each identified prefecture. Within each county, one township predominantly inhabited by these ethnic groups was chosen, and one or two natural villages from each township were selected. The survey covered six ethnic groups: Jino, Blang, Lahu, Wa, Lisu, and Nu. Data collection was conducted from July to December 2022, involving a total of 2002 residents.

The inclusion criteria were as follows: (1) age≥15 years old; (2) live in the community for more than six months; (3)-voluntary participation in the survey. Individuals who withdrew from the survey were excluded. After cleaning and verifying the data, 1921 participants were included in the final analysis.

Measurement tools

The EQ-5D-5-L scale (Chinese version) has been validated by researchers, showing good reliability and validity in populations from southwestern China and ethnic minority groups.[6-8] This study used the EQ-5D-5-L scale to assess health state utility. The scale includes five dimensions: mobility, self-care, daily activities, pain/discomfort, and anxiety/depression. Each dimension has five severity levels: no difficulty, mild difficulty, moderate difficulty, severe difficulty, and extreme difficulty. These levels are numbered from 1 to 5, with higher numbers indicating greater severity, to define 3125 distinct health states.

Participants were required to select the severity level that best reflected their current health status for each dimension. This resulted in various combinations, such as "11111" which indicates no difficulty in all five dimensions, representing a state of perfect health. To convert these health states into health state utility, we used the EQ-5D-5-L Value Set for China developed by Luo et al.[9] Health state utility range from [-1, 1], with higher values indicating better health status.

The reliability of the EQ-5D-5-L scale was assessed in this study. The Cronbach's alpha coefficients ranged from 0.68 to 0.79 across different age groups, sexes, and populations with or without chronic diseases, demonstrating acceptable reliability.

Additionally, this study collected data on demographics (age, gender, marital status, education level, occupation, income), health behaviors (smoking, alcohol consumption, physical activity), and health service needs and utilization (two-week morbidity, number of chronic conditions, depression, sleep disorders, BMI, and travel time to the nearest healthcare facility).

Statistical methods

The Andersen model is a widely used framework in health services research[10] and applied to explore the determinants of health state utility.[11-13] It categorizes the factors influencing individual health status into four domains: predisposing factors, enabling factors, need-based factors, and health behaviors. Predisposing factors refer to an individual's social and cultural attributes. Enabling factors include conditions that facilitate access to healthcare resources. Need-based factors encompass both objective health conditions, which healthcare providers deem require medical attention, and subjective health perceptions. Health behaviors involve habits or activities that influence physical health.

In this study, predisposing characteristics include age, gender, marital status, education level, and occupation. Enabling factors include monthly household income, travel time to the nearest healthcare facility, participation in health insurance, and social support.

Need-based factors include recent morbidity, the number of chronic conditions, depression, sleep disorders, and body mass index. Finally, health behaviors were represented by smoking, alcohol consumption, and physical activity.

The data were processed and analyzed using Stata 15.1 software. Counting data were presented as frequencies and percentages (n [%]). Health utility values, being non-normally distributed measurement data, were initially considered for representation as medians. However, due to low discriminatory power, means with standard deviations were used instead. Group comparisons were conducted using *t*-tests or *F*-tests.

Each dimension of the EQ-5D-5-L scale was categorized into two levels of severity: "no difficulty" (no problems) and "difficulty" (including slight, moderate, severe, and extreme problems). Bar charts were generated using Stata 15.1 to show the proportions of individuals reporting difficulty across the five EQ-5D-5-L dimensions for different "directly-entering-socialism ethnic groups".

To mitigate the "ceiling effect" in the measurement of health utility values,[14,15] Tobit regression analysis was used to examine the factors influencing health utility values across different directly-entering-socialism ethnic groups. The results were visualized as a forest plot using GraphPad Prism 10.1.2.

Results

Comparison of health state utility among six directly-entering-socialism ethnic groups

Among the 1921 study participants, the ethnic distribution was as follows: Wa (293 individuals, 15.25-%), Lisu (378 individuals, 19.68-%), Nu (300 individuals, 15.62-%), Jino (398 individuals, 20.72-%), Lahu (280 individuals, 14.58-%), and Blang (272 individuals, 14.16-%). The sample included 919 males (47.84-%) and 1002 females (52.16-%), with a mean age of 46.9±17.0 years. Most participants had at least a primary school education (1342 individuals, 69.86-%), were married (1309 individuals, 68.14-%), and worked as farmers (1283 individuals, 66.79-%). A significant portion (1101 individuals, 57.31-%) had a monthly household income below 2999 Chinese Yuan(CNY). The mean health utility value for the overall population was (0.958±0.092). Among the ethnic groups, the Wa group exhibited the highest health utility value (0.966±0.059), while the Lisu group had the lowest value (0.950±0.093); however, the differences were not statistically significant (F=1.260, P>0.05).

For individuals aged 60 years and older, as well as those with no formal education, the health state utility were significantly lower in the Lisu (F=13.18, P<0.05), Nu (F=6.66, P<0.05), Jino (F=23.48, P<0.05), Lahu (F=4.27, P<0.05), and Blang (F=8.31, P<0.05) groups.

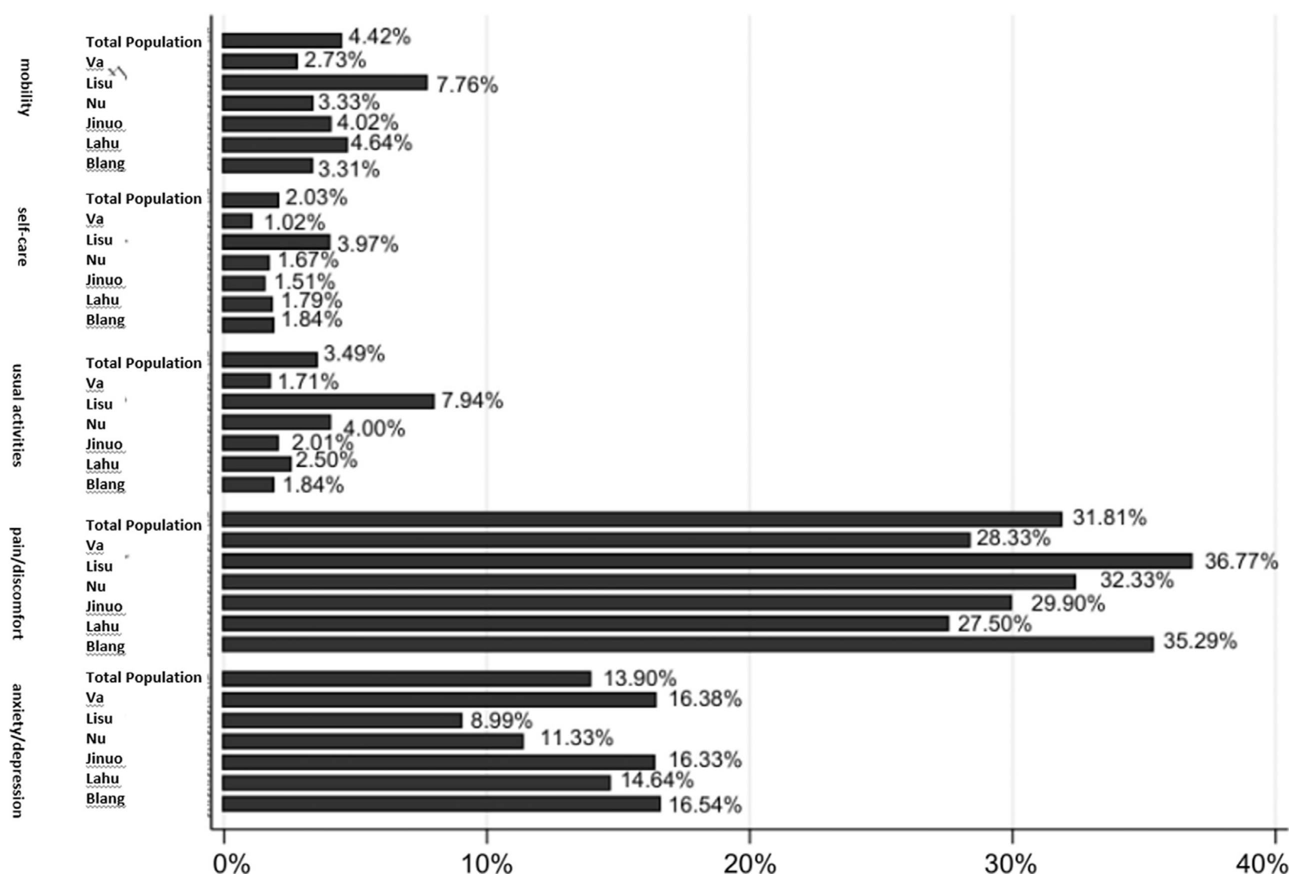

Fig. 1. Proportion of difficulties across dimensions of the EQ-5D-5 L for the general population and the six directly-entering-socialism ethnic groups.

Among the Nu group, males had higher health utility values than females (t=1.88, P<0.05). Married individuals in the Nu (t=1.66, P< 0.05) and Jino (t=1.88, P<0.05) groups had higher health utility values compared to unmarried individuals. In the Jino group, individuals with lower monthly household incomes had lower health state utility (F=1.64, P<0.05). See Table 1 for details.

EQ-5D-5-L dimension profiles among residents of the six directly-entering-socialism ethnic groups

This study found that the highest proportions of difficulties in both the overall population and the six directly-entering-socialism ethnic groups were reported in the "pain/discomfort" and "anxiety/depression" dimensions. Among these groups, the Wa population reported the lowest proportions of difficulties in the "mobility" "self-care" and "usual activities" dimensions. See Fig. 1 for details.

Tobit Regression Analysis of Factors Influencing Health Utility Values Across Different "Directly Transitioned Ethnic Groups"

The Tobit regression analysis identified several factors influencing health utility values across the six "Directly Transitioned Ethnic Groups" as follows (Fig. 2).

(1)Predisposing factors

Age: Among the Jino group, older age was associated with lower health state utility(β=-0.020, P<0.05).

Gender: Males in the Jino group had higher health state utility than females (β=0.026, P<0.05).

Education: Non-illiterate individuals had higher health state utility in both the Jino (β=0.067, P<0.05) and Lahu (β=0.027, P<0.05) groups.

Marital status: Married individuals in the Blang group had higher health state utility than unmarried individuals (β=0.032, P<0.05).

(2)Enabling factors

Household Income: In the Wa group, a household monthly income of 3000 CNY or more was associated with higher health state utility (β=0.029, P<0.05).

(3)Need-based factors

Depression: Depression was a barrier to higher health state utility in all six ethnic groups.

Recent morbidity: Two-week morbidity negatively affected health state utility in the Wa (β=-0.032, P<0.05), Nu (β=-0.032, P<0.05), and Jino (β=-0.031, P 0.05) groups.

Chronic conditions: Compared to those without chronic conditions, individuals with at least one chronic disease had lower health state utility in the Lisu (β=-0.049, P<0.05), Nu (β=-0.068, P<0.05), and Lahu (β=-0.032, P<0.05) groups.

Body mass index: Among the Nu group, individuals classified as obese had higher health state utility compared to those who were underweight or of normal weight (β=0.041, P<0.05).

(4)Health behaviors

Sleep disorders: Sleep disorders were associated with lower health state utility in the Wa (β=-0.023, P<0.05), Lisu (β=-0.019, P<0.05), and Jino (β=-0.019, P<0.05) groups.

Physical activity: Physical activity was associated with higher health state utility in the Lisu (β=0.025, P<0.05) and Nu (β=0.044, P<0.05) groups.

Alcohol consumption: Among the Lahu group, alcohol consumption was associated with higher health state utility (β=0.024, P<0.05).

Discussion

The overall health state utility for residents of the six directly-entering-socialism ethnic groups in Yunnan was (0.958±0.092). This value is comparable to the health state utility of urban residents in China in 2018 (0.957; 95 %CI:0.952–0.962) as calculated using the EQ-5D-5-L scale and EQ-5D-5-L Value Set for China.[16] It is, however, higher than the 2019 health state utility of Yunnan's general population (0.89±0.09) reported by Liu et al. .[17] This discrepancy may be partly due to the im-

Table 1
Basic characteristics and health state utility of the six directly-entering-socialism ethnic groups.

Variable	Total Population		Wa		Lisu		Nu		Jino		Lahu		Blang	
	n	Health state utility	n	Health state utility	n	Health state utility	n	Health state utility	n	Health state utility	n	Health state utility	n	Health state utility
Overall	1921	0.958±0.092	293	0.966±0.059	378	0.950±0.093	300	0.958±0.114	398	0.958±0.088	280	0.963±0.089	272	0.953±0.102
F(*P*)			1.26(0.280)											
Age														
15–29	322	0.984±0.043	50	0.974±0.074	53	0.990±0.028	53	0.994±0.020	57	0.990±0.024	54	0.973±0.047	55	0.985±0.040
30–44	566	0.975±0.047	98	0.972±0.044	107	0.980±0.050	101	0.970±0.048	103	0.981±0.037	74	0.980±0.046	83	0.966±0.053
45–59	513	0.960±0.076	83	0.960±0.064	64	0.935±0.143	98	0.954±0.073	127	0.973±0.047	72	0.969±0.055	69	0.961±0.063
≥60	520	0.920±0.142	62	0.958±0.061	154	0.922±0.094	48	0.900±0.248	111	0.904±0.140	80	0.934±0.144	65	0.902±0.177
F(*P*)			1.29(0.279)		13.18(<0.001)		6.66(<0.001)		23.48(<0.001)		4.27(0.006)		8.31(<0.001)	
Gender														
Male	919	0.927±0.075	119	0.962±0.047	191	0.950±0.100	166	0.968±0.082	181	0.978±0.043	119	0.976±0.057	143	0.961±0.085
Female	1002	0.950±0.106	174	0.962±0.066	187	0.945±0.086	143	0.946±0.144	217	0.942±0.110	161	0.953±0.106	129	0.945±0.118
t (*P*)			0.88(0.605)		1.33(0.104)		1.88(0.036)		1.41(0.100)		1.19(0.264)		1.63(0.067)	
Education level														
Illiterate	579	0.931±0.123	46	0.949±0.069	193	0.934±0.095	57	0.929±0.143	47	0.863±0.166	101	0.937±0.134	135	0.940±0.131
Primary school	640	0.962±0.084	159	0.968±0.053	102	0.972±0.051	89	0.942±0.160	102	0.946±0.094	101	0.979±0.359	87	0.960±0.067
Middle school	456	0.975±0.066	55	0.974±0.043	62	0.952±0.135	100	0.977±0.054	160	0.984±0.035	47	0.975±0.054	32	0.974±0.051
High school and above	246	0.976±0.051	33	0.965±0.089	21	0.982±0.035	54	0.978±0.042	89	0.978±0.041	31	0.972±0.052	18	0.982±0.044
F(*P*)			1.63(0.052)		2.17(<0.001)		1.96(0.009)		4.76(<0.001)		2.65(<0.001)		2.07(0.012)	
Marital status														
Married	1309	0.962±0.069	192	0.966±0.053	227	0.957±0.072	210	0.959±0.078	303	0.962±0.077	197	0.966±0.062	180	0.959±0.061
Unmarried	612	0.949±0.129	101	0.965±0.071	151	0.939±0.117	90	0.954±0.172	95	0.947±0.117	83	0.954±0.134	92	0.942±0.154
t (*P*)			1.19(0.268)		1.41(0.062)		1.66(0.040)		1.88(0.009)		1.55(0.064)		1.25(0.232)	
Occupation														
Farmer	1283	0.951±0.100	226	0.963±0.056	176	0.927±0.114	179	0.946±0.140	263	0.953±0.096	212	0.964±0.068	227	0.950±0.109
Non-farmer	638	0.970±0.074	67	0.975±0.071	202	0.970±0.063	121	0.974±0.053	135	0.970±0.069	68	0.959±0.136	45	0.971±0.060
t (*P*)			1.61(0.058)		1.61(0.058)		1.03(0.428)		0.84(0.620)		1.27(0.196)		1.65(0.062)	
Household monthly income														
≤2999	1101	0.951±0.104	151	0.955±0.069	246	0.947±0.100	173	0.954±0.130	118	0.930±0.126	202	0.964±0.093	211	0.952±0.102
3000–4999	458	0.964±0.082	74	0.979±0.040	90	0.959±0.078	78	0.962±0.104	123	0.968±0.068	52	0.954±0.088	41	0.950±0.122
≥5000	362	0.969±0.057	68	0.975±0.051	42	0.953±0.075	49	0.964±0.053	157	0.972±0.057	26	0.968±0.058	20	0.972±0.045
F(*P*)			1.47(0.101)		1.15(0.258)		0.80(0.716)		1.64(0.033)		1.12(0.326)		1.17(0.296)	

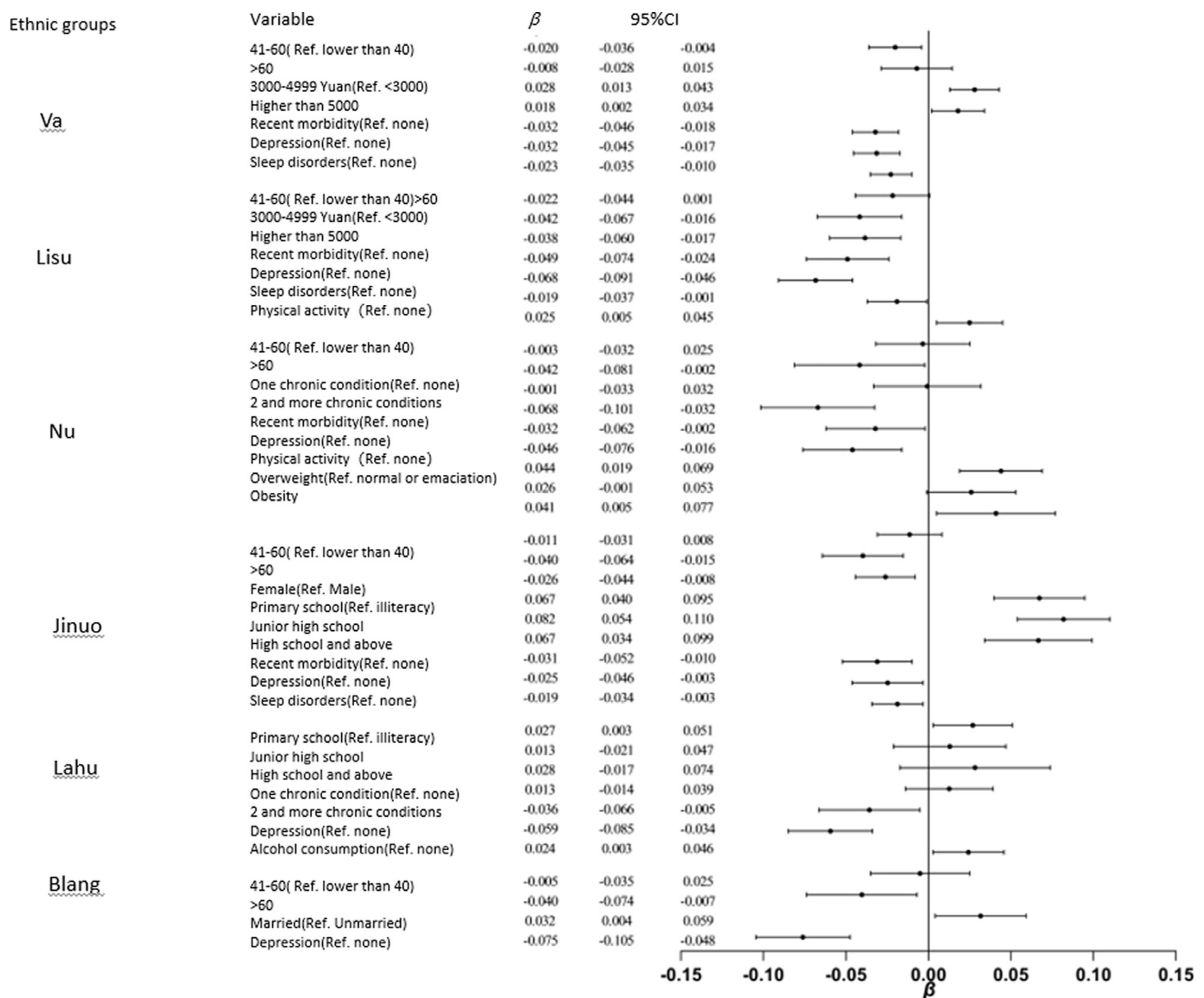

Fig. 2. Forest plot of multivariate Tobit regression analysis of health state utility across different directly-entering-socialism ethnic groups.

plementation of targeted policies, which may have contributed to improved well-being and quality of life in these regions.[18] Additionally, the relatively low health literacy among these ethnic groups—where health is often perceived as the absence of major diseases—could also explain this higher value.[19]

The study also found that residents of all six directly-entering-socialism ethnic groups experienced significant difficulties in the "pain/discomfort" and "anxiety/depression" dimensions. This finding is consistent with previous research on quality of life in both urban and rural populations, as well as in ethnic minority areas of Yunnan.[19,20]

This study identified depression as a common barrier to the health state utility across the six directly-entering-socialism ethnic groups, a finding consistent with other studies on the quality of life among rural adults.[21] The negative and pessimistic thought patterns associated with depression often lead individuals to lose interest and motivation in life, diminishing their sense of personal worth and overall well-being,[22] which in turn results in lower health state utility. These findings underscore the importance of addressing the mental health needs of the directly-entering-socialism ethnic groups, as psychological well-being is a critical factor influencing their overall health status.

Additionally, the results revealed that being aged 60 years or older acted as a barrier to health state utility for the Wa, Nu, Jino, and Blang groups, but had no significant impact on the Lisu and Lahu groups. Previous studies have demonstrated that health levels and health state utility typically decline with age.[23,24] However, in this study, age did not significantly influence health state utility for the Lisu and Lahu groups. This may be attributed to the disproportionately high percentage of older adults (over 60 %) in these two groups, which resulted in an uneven age distribution among the participants.

In the Wa, Nu, and Jino groups, two-week morbidity was a significant barrier to their health state utility. This finding aligns with previous studies showing that rural populations often delay seeking medical care due to limited service accessibility and financial burdens.[25] Additionally, a higher level of education among these groups (Wa: 84.3-%, Nu: 81 %, Jino: 88.19-%) compared to the Lisu (48.94-%), Lahu (63.93-%), and Blang (50.37-%) groups may also contribute. Better-educated individuals generally have higher health awareness, more resource of health information, and are more inclined to take proactive measures to treat or prevent illnesses.

To enhance the health state utility of directly-entering-socialism ethnic groups, future efforts should focus on improving healthcare accessibility, optimizing medical care procedures, and refining health insurance policies. Emphasis must be placed on strengthening health education and public health strategies tailored to these populations to improve their health literacy.

Chronic diseases have been identified as significant barriers to the health state utility of the Lisu, Nu, and Lahu groups. The negative impact of chronic diseases on quality of life is well-documented,[26,27] and previous studies have indicated that, in recent years, chronic diseases have overtaken infectious diseases as the leading cause of death among several directly-entering-socialism ethnic groups, including the Lisu, Nu, and Lahu groups.[28] This highlights the urgent need for targeted interventions to prevent and manage chronic diseases in these groups.

Furthermore, the study revealed that sleep disorders are a barrier to health state utility for the Wa, Lisu, and Jino groups. These populations primarily rely on rubber and tea cultivation for their livelihoods,[29,30] which often involves early morning labor.[31] Such irregular work schedules may lead to insufficient or poor-quality sleep, thereby diminishing their health state utility. Future research should explore the relationship between livelihood practices, sleep quality, and health outcomes within these populations to develop tailored health strategies.

In addition to the barriers discussed above, this study identified three factors that positively influenced the health state utility of the directly-entering-socialism ethnic groups. First, physical activity emerged as a promotive factor for health state utility among the Lisu and Nu groups. These groups have retained unique traditional sports, such as top-spinning, "walking on blades and through fire," and "bamboo jumping".[32,33] These traditional physical activities not only enrich cultural life but also promote health. Efforts to raise awareness and actively promote these activities could further enhance their health benefits. Second, the study found that education at the primary school level or above was a positive factor influencing the health state utility of the Jino and Lahu groups. Previous studies suggest that individuals with higher education level typically have better health literacy, which in turn influences health awareness and behaviors.[34] Finally, the study revealed that alcohol consumption positively affected the health state utility of the Lahu group. Although alcohol consumption is not inherently a health-positive behavior, several studies suggest that moderate drinking can foster social interactions,[35] potentially improving psychological well-being and strengthening social support networks.[36-38] In Lahu communities, alcohol is often accompanied by singing and dancing during social gatherings, reflecting its cultural significance.[39]

This study expands the scope of health state utility research by including diverse ethnic minority populations, providing a reference for estimating the disease burden in multiple minority groups. However, there are several limitations. First, some participants were elderly individuals from the directly-entering-socialism ethnic groups who had limited proficiency in Mandarin. Local residents fluent in both Mandarin and the participants' native languages served as translators. Translation biases may influence the participants' understanding of the EQ-5D-5-L, leading to potential inaccuracies in their responses. Second, the applicability of the instrument is influenced by cultural, regional, and demographic factors. Currently, no EQ-5D-5-L or EQ-5D-5-L Value Set for China was specifically designed for ethnic minorities or directly-entering-socialism ethnic groups.

This study used the EQ-5D-5-L Value Set for China to calculate EQ-5D-5-L scores, the converted utility values may not fully reflect the true health utility of these populations. Finally, this is a cross-sectional study, limiting the ability to track changes in health state utility over time. Additionally, the EQ-5D-5-L relies on subjective health evaluations, which may differ from objective health assessments, potentially introducing bias.

Authors' contributions

Conceptualization, Y.H. and Y.Z.; Data curation, Y.H., R.D., Y.Z., and X.W.; Formal analysis, Y.Z., X.W., C.D., X.D, X.X., and R.H.; Funding acquisition, Y.H. and R.D.; Investigation: Y.Z., X.W., C.D., X.D, X.X., and R.H.; Methodology, Y.H. and Y.Z.; Project administration, Y.H. and R.D.; Resources, Y.H. and R.D.; Software: Y.Z. and X.W.; Supervision, Y.H.; Validation, Y.H.; Writing—original draft, Y.Z., X.W., C.D., X.D, X.X., and R.H.; Writing—review & editing, Y.H. and R.D. All authors have read and agreed to the published version of the manuscript.

Ethical approval and consent to participate

The study received approval from Kunming Medical University (KMMU2021MEC095).

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Funding

This research was supported by grants from the National Natural Science Foundation of China (71904069), Yunnan Fundamental Research Projects (202401AT070178), Yunnan High-level Talent Support Plan (YNQR-QNRC-2018-140), and Philosophy and Social Science Innovation Team of Yunnan Province (2024CX08).

Declaration of competing interest

All authors declare that there are no competing interests.

Acknowledgements

Not applicable.

References

1. Ling YS, Sun Y. Directly-entering-socialist nationalities": from "Millennium Direct Transition" to "Century Leap. *(Chinese). Forum on Socialism*. 2019(9):22–23.
2. Du TP. Research on "Accurate Poverty Relief" issues of the "directly-entering-socialist ethnic groups" in Menghai County [dissertation]. (Chinese). Kunming: Yunnan University of Finance and Economics; 2017.
3. Wang XW. *Health Economics Evaluation of Interventions For Mother-To-Child Transmission Prevention of HIV Infection [dissertation]. (Chinese)*. Kunming: Kunming Medical University; 2018.
4. Kang M. *Health-related Quality of Life and Its Influencing Factors in the Elderly in Rural Areas of Guangxi Zhuang Minority Regions in China [dissertation]. (Chinese)*. Guilin: Guilin Medical University; 2016.
5. Dong J, Li X, Fan R, et al. Health-related quality of life among ethnic minority residents in remote Western China: a cross-sectional study. *BMC Public Health*. 2023;23(1):638. doi:10.1186/s12889-023-15544-8.
6. Xia J, Wu NW, Ma TP, et al. Evaluation of reliability and validity of EQ-5D-5L based on residents in Southwest China. *(Chinese). J Sichuan Univ Med Sci*. 2020;51(5):691–694.
7. Qin TT, Liu SQ, Su MZ, et al. Health utility value and its influencing factors in patients with gastric cancer in rural areas of Shandong Province based on EQ-5D-5L instrument. (Chinese). *Chin Health Econ*. 2021;40(3):43–45.
8. Li MH, Luo N. Introduction to the Chinese version of the EuroQol-5 Dimensions (EQ-5D) questionnaire. (Chinese). *Chin J Pharm Econ*. 2009(1):49–57.
9. Luo N, Liu G, Li M, et al. Estimating an EQ-5D-5L value set for China. *Value Health*. 2017;20(4):662–669. doi:10.1016/j.jval.2016.11.016.
10. Li YE, Lu S. A review of the development of the Anderson Model's theoretical construction and analysis path. (Chinese). *Chin Health Serv Manag*. 2017;34(5):324–327 334.
11. Lee E, Cha S, Kim GM. Factors affecting health-related quality of life in multimorbidity. *Healthcare*. 2021;9(3):334. doi:10.3390/healthcare9030334.
12. Kim GM, Hong MS. Noh W. Factors affecting the health-related quality of life in community-dwelling elderly people. *Public Health Nurs*. 2018;35(6):482–489. doi:10.1111/phn.12530.
13. Lim E, Davis J, Siriwardhana C, et al. Racial/ethnic differences in health-related quality of life among Hawaii adult population. *Health Qual Life Outcomes*. 2020;18(1):25. doi:10.1186/s12955-020-01625-4.
14. Yang JJ, Zhou Y, Huang WD, et al. Study of health utility value in patients with colorectal cancer and its determinants. (Chinese). *Chin Health Econ*. 2018;37(9):11–13.
15. Luo HY, Liu HF, Wu YQ, et al. Statistical issues and practices in analyzing clinical patient outcomes based on repeated observation data. (Chinese). *Chin J Health Stat*. 2017;34(5):749–752.
16. Zhihao Y, Jan B, Gordon L, et al. EQ-5D-5L norms for the urban Chinese population in China. *Health Qual Life Outcomes*. 2018;16(1):25.

17. Liu M, Li LQ. Study on health-related quality of life and its influencing factors among residents in Yunnan Province. (Chinese). *Chin J Health Educ*. 2021;3(3):199–204. doi:10.16168/j.cnki.issn.1002-9982.2021.03.002.
18. Resource for understanding China. The profound enlightenment of the "directly-entering-socialist nationalities" achieving their second historical leap [Internet]. (Chinese). 2021 Mar 2 [cited 2024 Apr 23]. Available from: https://www.theorychina.org.cn/c/2021-03-02/1352748.shtml.
19. Sang SP. *The Study of Health-Related Quality of Life and Its Impact Factors of People in Minority Areas [dissertation]. (Chinese)*. Wuhan: Wuhan University; 2014.
20. Li MH, Liu GE, Ma AX. Study on health-related quality of life among urban and rural residents in China. *(Chinese). Chin J Pharm Econ*. 2010(3):22–34.
21. Sang SX. *Epidemiological Characteristics of Quality of Life in Rural Adult Population and Its Relationship With Hypertension [dissertation]. (Chinese)*. Zhengzhou: Zhengzhou University; 2022.
22. Sun XN, Mei J, Xu J, et al. The mediating effect of depression on the quality of life related to physical and mental health in the elderly with sleep disorders. (Chinese). *Mod Prev Med*. 2024;51(3):500–506. doi:10.20043/j.cnki.MPM.202308070.
23. Yang ZH, Li SP, Zha XDW, et al. Health-related life quality of Tibetan residents: based on utility value integration system of EQ-5D-3L scale in 3 countries. (Chinese). *Chin J Pharm Econ*. 2019;14(6):22 13-17.
24. Wang XH, Hu WP, Lv M, et al. Health-related quality of life and impact factors of Lanzhou residents based on EQ-5D-5L. (Chinese). *Chin Rural Health Serv Adm*. 2021;41(6):435–440. doi:10.19955/j.cnki.1005-5916.2021.06.012.
25. Cao XZ, Tan XT. Integrated medical insurance system and health of the middle-aged and elderly in rural areas: empirical study based on CHARLS data. (Chinese). *J Agrotechn Econ*. 2022(12):56–70. doi:10.13246/j.cnki.jae.20220214.002.
26. Si JX, Yao YS, He JB, et al. Study on the current situation and influencing factors of quality of life of elderly patients with chronic diseases. (Chinese). *Health Econ Res*. 2024;41(4):39–42. doi:10.14055/j.cnki.33-1056/f.2024.04.009.
27. Shi PP, Liu HJ, Ren YP, et al. Quality of life and influencing factors of elderly patients with chronic diseases in China: empirical analysis based on CHARLS data. (Chinese). *Chin J Soc Med*. 2024;41(1):49–53.
28. Wu KW, Tang X, Huang Y, et al. Analysis on the causes of death among "ethnic groups with cross-stage development" in Yunnan province, 2015—2019. (Chinese). *Chin Prev Med*. 2021;22(12):920–925. doi:10.16506/j.1009-6639.2021.12.006.
29. Geng X, Chen N, Hu P. Study on the model and experience of realizing common prosperity for ethnic minorities with smaller populations under the vision of strengthening the Chinese national community consciousness. (Chinese). *Guangxi Ethnic Stud*. 2022(5):63–70.
30. Lai QK. Inheritance and expanding of traditional ecological protection of local minority people in Nujiang Valley. (Chinese). *J Southwest For Univ Soc Sci*. 2017;1(3):17–20.
31. Yunnan cn. From Rubber village to Eco-cultural tourism "check-in" spot: the story of Jino Mountain tropical rainforest restoration [Internet]. *(Chinese)*. 2023 Jul 29. [cited 2024 Apr 23]. Available from:. https://yn.yunnan.cn/system/2023/07/29/032691408.shtml .
32. Sun GY. *Research On the Rural Construction of Sports and Leisure Characteristics in Yunnan Province and the Strategy of a Sports Powerful Country [dissertation]. (Chinese)*. Kunming: Yunnan University; 2021.
33. Gao R, Zhang JH. Research on the combination of minority track and field sports and fitness in the new situation. (Chinese). *Guizhou Ethnic Stud*. 2019;40(6):116–120. doi:10.13965/j.cnki.gzmzyj10026959.2019.06.024.
34. Gao J, Zhou SC, Gao SD, et al. Health-related quality of life and its influencing factors in patients with prevention of disease in Traditional Chinese Medicine based on EQ-5D-5L scale. (Chinese). *Chin Gen Pract*. 2023;26(32):4056 4043-4050.
35. Zhong Y, Sun XL. Drink away sorrow" or "drink for pleasure": life satisfaction and drinking behavior of residents, frequency of drunkenness. (Chinese). *Consum Econ*. 2024;40(2):1–18.
36. Li XX, Wang H, Sun Q, et al. Prevalence and related factors of anxiety among undergraduates in Shandong province. (Chinese). *Mod Prev Med*. 2019;46(12):2212 2205-2208.
37. Wang HX, Zhao M, Wang M, et al. The mediating effect of loneliness on the relationship between health self-assessment and anxiety among the elderly in China. *(Chinese). J Jingdezhen Univ*. 2022;37(3):57–61.
38. Zhou Q, Chen AQ, Wu JY, et al. Research progress on application of mendelian randomization studies in etiological exploration of patients with frailty. (Chinese). *Chin Nurs Res*. 2024;38(20):3659–3662.
39. Wang YT. *Image of Lahu nationality in Lancang County: A study of Cultural Interpretation and Construction [dissertation]. (Chinese)*. Kunming: Yunnan Normal University; 2020.