Illness prevalence rate in Tibet, China: Data from the 2018 National Health Service Survey

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Abstract

Abstract Background Tibet is located in the high-altitude area of Southwest China, where the health level is influenced by specific factors such as the natural environment and living habits. However, there has been little research that has focused on Tibetan health conditions. The two-week prevalence rate is an important indicator of the health level of residents. The purpose of this study was to understand the health status of the residents and the health service needs in Tibet. Methods The two-week prevalence rate was calculated using data from a population of 10,493 individuals aged 15 and above that was obtained from the 2018 Sixth National Health Service Survey of Tibet. We initially analysed the types and associated factors of two-week illnesses in Tibetan. The influencing factors for the two-week prevalence rate in Tibet were determined by multivariate logistic regression analysis. Subsequently, we assessed the severity of two-week illnesses by calculating the average days of the duration of the disease, the days of being bedridden and the days of being off work. Results The two-week illness prevalence rate was 20.1% in Tibet. Digestive system diseases were frequent, and hypertension was the most common disease. According to the multivariate logistic regression analysis, the two-week prevalence rate was associated with gender, age, residence, marital status, and employment status. In addition, the severity of two-week illnesses differed among the residents. Conclusion This study identified that health service needs have increased in Tibet and that the health status of the local residents needs to be improved. Moreover, hypertension has become a major health hazard for the residents and should be considered in the utilization of health services.

Background

The Tibet Autonomous Region is located in the southwestern part of China. It covers an area of 1.23 million square kilometres and has a population of approximately 3.3 million. The natural environment and living habits of residents are significantly different from those in other parts of China, as the altitude is over 4000 metres[1]. The local residents mainly obtain nutrients and energy from traditional foods such as Zanba, Tibetan salt cream tea, and Tibetan milk tea[2,3]. Many countries, such as the United States, Ethiopia and Kenya, attach importance to local health services to establish effective health service systems[4-6]. China has been developing a primary health-care system[7].

Previous studies have shown that morbidity was the dominant predictor of health service utilization. In addition, the two-week prevalence rate is an important index for evaluating health service needs, which can reflect the health level and social health status of the population[8]. In China, there were huge differences in the two-week prevalence among different regions[9,10]. The Fourth National Health Service Survey of China showed that Chengguan District in Lahsa, Tibet has a minimal two-week prevalence rate of 5.2%, while the Dongcheng District in Beijing has a maximal two-week prevalence rate of 53.2%[11]. The Fifth National Health Service Survey of China showed that the two-week prevalence rate was 32.1% in western China, lower than the 26.2% in eastern China[12]. The health status of local residents in Tibet has seldom been reported. In this study, the two-week prevalence rate and factors based on data from the Sixth Healthy Service Survey of Tibet, China, which was completed in 2018, are reported.

Methods

Data source

Data were collected or obtained from the Sixth Health Service Survey of Tibet, China, in 2018. The Tibet Autonomous Region has jurisdiction over seven prefecture-level cities, consisting of 74 counties. Therefore, according to the level of economic development, geographical location, population distribution and other factors, 13102 residents from 3,060 households were finally included in this survey, according to the multistage stratified cluster random sampling method.

By performing face-to-faces survey using a tablet, the investigator inquired about all members of the household one by one, filled in the electronic questionnaire offline, and then uploaded the survey data online after the survey instructors examined each person. Because this study was a national survey project and organized by the relevant departments of the government, the selected residents were actively cooperating with the survey. So there was no refusal to answer. Besides, there were 525 cases with missing data. Subjects were eligible to participate in the current study if they (1) were ≥15 years old and (2) were permanent residents of the sample households. A total of 10493 valid cases were finally included. In principle, all the contents of the survey should be answered by the respondents. However, people who were not at home or unable to respond during the survey period were replaced by those who are familiar with their situation.

This study was part of the Sixth National Health Service Survey of China, which was approved by National Health and Family Planning Commission of the People's Republic of China and by the Health and Family Planning Commission of the Tibet Autonomous Region. Oral consent was obtained before eligible residents took the survey.

The definition of outcome variables

Illness types were listed in supplementary 1. Two-week illness was defined as the respondents having had any of the following three circumstances less than two weeks before being interviewed: 1) visited a doctor; 2) received medical treatment for the illness or injury; or 3) were bedridden or off work due to illness (including obvious abnormal depression and loss of appetite in elderly people) for at least one day.

The two-week prevalence rate was calculated by the following formula: Two-week prevalence rate = (Number of respondents with two-week illness) * 100%/(The total number of respondents).

Besides, we measured the severity of two-week illness by calculated the average days of duration of the disease, the days of being bedridden and the days of being off work. Gender, age, residence, education, economic level, marital status, and employment status were selected as covariates to examine their impacts on the two-week prevalence rate. We divided age into 4 groups: 15-29 years, 30-44 years, 45-59 years, and 60- years. Residence was divided into 2 groups: rural and urban. Education was divided into 4 groups: illiterate, primary school, junior middle school, high school, and university and above. Economic level was grouped according to the quartile of annual income per capita: low, medium and high, with the

grouping cut-offs being 3,333 Yuan, 6,000 Yuan, and 12,000 Yuan, respectively. Marital status was divided into married, unmarried, widowed, divorced and other. Employment status was divided into employed, retired, laid-off, unemployed, and student. In addition, we measured the severity of the two-week illness by calculating the average duration of the disease in days, the number of days of being bedridden and the number of days of being off of work.

Statistical analysis

Data were input into Epidata 3.0. The chi-square test was performed to examine the significance of differences in the two-week prevalence rates according to demographic variables. Whether an individual was sick within two weeks was used as a dichotomous variable. Multivariate logistic regression analysis was further conducted, and variables with statistical significance were included in the analysis. With respect to the number of subjects suffering from chronic diseases, multivariate regression analysis was performed to adjust for confounding factors, including gender, age, residence, economic level, education level, economic level, marital status, and employment status. In addition, one-way analysis of variance was used to the severity of the two-week prevalence rate in different groups. Data analysis was completed using SPSS20.0 statistical software. $P < 0.05$ was set as the test level.

Results

Overall, 10,493 residents aged 15 and above were included in this study. The proportion of women (53.1%) was higher than that of men. The age of the subjects in this study was (44.1 ± 15.7) years old. The Tibetan accounted for the highest proportion (97.0%) among ethnic groups in Tibet. The two-week prevalence rate was 20.1% in Tibet in 2018 (Table 1).

Digestive diseases, cardiovascular diseases, musculoskeletal diseases, respiratory diseases, and urogenital diseases accounted for the top five diseases by body system with prevalences of 27.8%, 20.5%, 16.5%, 11.6% and 4.4%, respectively. Moreover, in terms of the composition of diseases, the top five chronic diseases were hypertension (14.4%), rheumatoid arthritis (8.0%), cholelithiasis (6.3%), chronic gastritis (5.5%), and diabetes mellitus (0.9%) (data not shown).

Among the patients, the two-week prevalence rate of females was significantly higher than that of males. The two-week prevalence rate was positively associated with age and economic level; and inversely associated with education. Urban residents had a higher two-week prevalence rate than rural residents (27.7% vs. 18.0%). The two-week prevalence rate of widows was the highest, reaching 35.8%. Among people with different employment statuses, the two-week prevalence rate of the unemployed population was the highest, reaching 41.7%, followed by the retired population, with a rate of 37.2%. The characteristics of the survey participants are presented in Table 1.

To further study influencing factors in of the two-week prevalence rate, a regression analysis was performed. The chi-square test found that the two-week prevalence rate was associated with gender, age, residence, economic level, marital status and employment status. In an unadjusted regression analysis,

participants who were women, older, and urban residents, and who had a higher economic level, and poor marital and employment statuses had a higher OR for morbidity than the other groups. Other than for economic level , the effect size remained significant after adjusting for other factors. (Table 2)

In addition, the duration of the two-week illness was positively associated with age. There were differences according to urban-rural residence, education, annual income per capita, marital status, and employment status. The duration of being bedridden for the two-week illness also differed by age, residence, education, and employment status Rural residents were off work longer than urban residents. (Table 3).

Discussion

Based on the Sixth Health Service Survey in the Tibet Autonomous Region in 2018, the two-week prevalence rate and its influencing factors were analysed. This study showed that the two-week prevalence rate of residents aged 15 years and above in Tibet was 20.1%, which was higher than the rate from the Fifth Health Service Survey in Tibet (10.6%)[12], indicating that health service needs in Tibet were significantly increased. In this study, the two-week prevalence rate and its influencing factors in the Tibet Autonomous Region were studied using the Sixth Health Service Survey from 2018. Our results showed that the two-week prevalence rate in Tibet was influenced by multiple factors. The two-week prevalence rate is an important index for evaluating the utilization of health services. On the one hand, health insurance coverage has increased from 29.7% in 2003 to 97.0% in 2015 in China. Health insurance coverage has reached approximately 95% in Tibet[13,14]. Additionally, the education level and health awareness of Tibetans have improved. Therefore, more residents choose to actively seek medical treatment.

Among the disease systems, the digestive system had the largest proportion of diseases; however, cardiovascular system diseases were prioritized according to national survey results[12], and may be related to food habits (such as special Tibetan dietary habits). The traditional Tibetan diet is almost approximately 60% protein and high in fat[2]. In the traditional Tibetan dietary model, protein and fat provide approximately 60% of the daily energy intake, making food difficult to digest and be absorbed by the human body. Moreover, hypertension was the most common chronic diseases in Tibet, which may be related to the diet and awareness of Tibetans[15,16]. A high salt in diet and insufficient awareness of hypertension, which leads to an increase in medical treatment[17,18]. Nevertheless, in this study, the self-reported prevalence of hypertension was 14.4% among the patients, which was lower than the national level (23.2%)[19]. This indicates inadequate utilization of health services to a certain extent in Tibet.

In this study, we found that the two-week prevalence among females was higher than that among males. The reason may be that women have special physiological periods, namely menstruation, pregnancy, childbirth, puerperium and breastfeeding, which resulted in special needs[20,21]. Compared with men, women had lower immunity and more delicate emotions, making them more likely to pay attention to their own health needs. According to the findings of Anna Ruggieri[22], it appears that differences in hormonal, genetic and environmental factors between males and females may affect the immune response. In

addition, females may actively utilize health services because they pay more attention to health than males.

With increasing age, the two-week prevalence rate showed a linearly increasing trend, which was supported by studies[23] that have shown that various kinds of physical diseases gradually increase with increasing age. For most older people, physical and social activities show a downward trend, which weakens the immunity of the body. In addition, most women over 60 are menopausal, and their health might be affected by hormone levels[24]. Older people being more sensitive to illness may promote their use of medical services.

In addition, we found that the two-week prevalence rate may be related to residence, marital status, and employment status. We identified factors that differed between rural and urban residences of two-week prevalence rates. The two-week disease risk of urban residents was higher than that of rural residents, which may be because the education level and health awareness of urban residents were higher than those of farmers and herdsmen[25, 26]. Moreover, the distance between residential areas and clinical areas in agricultural and pastoral areas was relatively farther than in urban areas, which might affect the accessibility of medical treatment to farmers and herdsmen to a certain extent. Therefore, the reported prevalence rate was low, which was similar to the results from Tian, D[27].Compared with married people, the two-week prevalence of widowed and divorced people was higher. The reason may be that the past way of life or environment of people who experience widowhood or divorce, to a certain extent, would be changed. On the other hand, widowed patients were also more likely to be older, and the results were consistent with age. Therefore, the widowed patients may have a certain negative psychological impact on health. A happy marriage and good family care are conducive to reducing the occurrence of illness and accelerating recovery from illness. In different employment situations, unemployment and being laid off were risk factors for two-week illness which is similar to the results from the Fifth National Health Service Survey[12]. To a certain extent, An irregular daily life and realistic pressure are negative factors of illness[28]. As a special social group, school students were at an early life stage, and have relatively low life pressure and regular living habits, and most of them are energetic because of their youth with good physical immunity, so the possibility of two-week illness was low.

There were several limitations in this study. Firstly, it was insufficient to make causal inferences in this cross-sectional study, so we could only provide the possible influencing factors for the two-week illness. Secondly, because the status of illness was self-reported, the actual two-week illness may be underestimated due to recall bias and low diagnosis rate. Thirdly, due to the lack of longitudinal data, we were unable to examine changes in the two-week prevalence rate.

Conclusions

In conclusion, the two-week prevalence rate was significantly higher than that from the fifth health survey in Tibet, indicating that the needs for health care have increased greatly and the health level needs improvement. The two-week prevalence rate of Tibetans were generally associated with gender, age, residence, marital status, and employment status. In addition, the severity of the two-week prevalence rate

was different among groups based on age, residence, education, marital status, and employment status. Therefore, many efforts should be made by the central and local governments of China to improve the health of Tibetans because of the severity of the disparity. This study may provide a basis for formulating health service policies about residents with different characteristics for the government.

Declarations

Ethics approval and consent to participate

National Health and Family Planning Commission of the People's Republic of China and Health and Family Planning Commission of Tibet autonomous region approved the study. Local health research projects which meet ethical requirements can be implemented with the approval of these two departments. The Medical Ethics Expert Committee of the National Health and Family Planning Commission of the People's Republic of China is a legitimate ethical review institution in China. It conducts research on major ethical issues in biomedical research involving human beings, directs and supervises the work of provincial medical ethics expert committees, and jointly inspects and evaluates the work of institutional ethics committees.

Because the subjects of this study were Tibetan residents with a low educational level and a large sample size, the investigators use oral informed consent to inform the respondents of the purpose of the survey in accordance with the prepared electronic version of the informed consent. Oral consent was obtained before the survey from the eligible residents. And all the participants are Chinese, and they resided in China.

Consent for publication

Not applicable

Availability of data and materials

The data that support the findings of this study are available from Medical College of Tibet University but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of Medical College of Tibet University.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

RD led the analysis and wrote the first draft of the paper. L acquired and interpreted the data. Z, GW and PH assisted with data analysis and interpretation. YW, JL and QL provided critical modification suggestions on the manuscript. YW and HX was responsible for the supervision of the project. All authors read and approved the final manuscript.

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Abbreviations

CI: Confidence interval

OR: Odds ratio

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Tables

e 1 Sociodemographic characteristics and illness prevalence rates among residents 15 years old from Tibet, 2018

Characteristics		Number	Proportion (%)	Two-week Illness		*P*
				Number of illnesses	Prevalence rate (%)	
	Total	10493	100.0	2104	20.1	
Gender	Male	4921	46.9	795	16.2	<0.001
	Female	5572	53.1	1309	23.5	
Age	15-29	2086	19.9	176	8.4	<0.001
	30-44	3412	32.5	511	15.0	
	45-59	3245	30.9	865	26.6	
	60-	1750	16.7	553	31.6	
esidence	Urban	2186	20.8	606	27.7	<0.001
	Rural	8307	79.1	1498	18.0	
ducation	Illiterate	5037	48.0	1181	23.4	<0.001
	Primary school	3496	33.3	668	19.1	
	Junior middle school	1217	11.6	156	12.8	
	High school	603	5.7	90	14.9	
	University and above	140	1.3	10	7.1	
nomic level	Low	2524	24.1	457	18.1	0.008
	Medium	5311	50.6	1075	20.2	
	High	2658	25.3	572	21.5	
rital status	Married	7950	75.7	1624	20.4	<0.001
	Unmarried	1567	15.0	148	9.4	
	Widowed	719	6.9	258	35.8	
	Divorced	186	1.8	59	31.6	
	Others	71	0.7	16	22.5	
nployment status	Employed	8232	78.4	1483	18.0	<0.001
	Retired	207	2.0	77	37.2	
	Laid-off	168	1.6	70	41.7	

Unemployed	1601	15.3	467	29.1
Student	285	2.7	8	2.8

Table 2 The influencing factors of the two-week prevalence rate according to the univariate and multivariate analysis of individuals from Tibet, in 2018

Influence factor		Crude OR	95% CI	Adjusted OR	95% CI	&p value
Gender	Female	Ref		Ref		
	Male	0.627	(0.569,0.692)	0.691	(0.622,0.767)	<0.001
Age	15-29	Ref		Ref		
	30-44	1.912	(1.595,2.290)	1.464	(1.201,1.784)	<0.001
	45-59	3.944	(3.318,4.689)	2.804	(2.304,3.413)	<0.001
	60-	5.000	(4.158,6.013)	2.968	(2.367,3.722)	<0.001
Residence	Urban	Ref		Ref		
	Rural	0.574	(0.514,0.640)	0.610	(0.541,0.689)	<0.001
Education	Illiterate	Ref		Ref		
	Primary school	0.772	(0.694,0.859)	0.921	(0.822,1.032)	0.155
	Junior middle school	0.481	(0.401,0.576)	0.876	(0.717,1.072)	0.199
	High school	0.573	(0.454,0.724)	0.974	(0.741,1.279)	0.849
	University and above	0.251	(0.132,0.480)	0.568	(0.288,1.120)	0.102
Economic level	Low	Ref		Ref		
	Medium	1.148	(1.017,1.296)	1.134	(1.000,1.287)	0.051
	High	1.240	(1.081,1.423)	1.106	(0.953,1.283)	0.185
Marital status	Married	Ref		Ref		
	Unmarried	0.407	(0.340,0.486)	0.684	(0.562,0.832)	<0.001
	Widow	2.182	(1.856,2.565)	1.279	(1.070,1.529)	0.007
	Divorce	1.781	(1.324,2.478)	1.644	(1.187,2.277)	0.003
	Others	1.134	(0.648,1.984)	1.023	(0.575,1.819)	0.940
Employment status	Employed	Ref		Ref		
	Retired	2.696	(2.022,3.593)	1.295	(0.945,1.776)	0.108
	Laid-off	3.251	(2.380,4.440)	2.360	(1.695,3.287)	<0.001
	Unemployed	1.868	(1.655,2.110)	1.238	(1.075,1.424)	0.003
	Student	0.131	(0.065,0.266)	0.334	(0.159,0.701)	0.004

&: P value adjusted by multivariate logistic regression analysis

/: In multivariate regression analysis, the Enter method was used to adjust for confounding factors.

Table 3 The severity of two-week illnesses in Tibet, 2018

Characteristics		[a] Duration		[a] Being bedridden		[a] Being off work	
		Mean	95%CI	Mean	95%CI	Mean	95%CI
Gender	Male	8.47	(8.13,8.82)	4.53	(3.51,5.54)	1.64	(0.18,3.10)
	Female	8.54	(8.27,8.81)	4.43	(3.78,5.07)	2.29	(0.03,4.56)
*▯ Age	15-29	7.41	(6.72,8.10)	3.04	(1.54,4.55)	1.67	(0.21,5.46)
	30-44	7.77	(7.36,8.19)	3.40	(2.56,4.25)	2.20	(1.77,6.17)
	45-59	8.52	(8.19,8.86)	4.05	(3.19,4.91)	1.94	(0.08,3.80)
	60-	9.54	(9.14,9.95)	6.32	(5.14,7.50)	2.17	(0.34,7.74)
*#▯ Residence	Urban	8.18	(7.77,8.59)	4.20	(3.24,5.16)	1.40	(0.12,2.92)
	Rural	8.65	(8.41,8.89)	4.59	(3.93,5.25)	2.29	(0.38,4.19)
*▯ Education	Illiterate	9.05	(8.78,9.33)	5.35	(4.55,6.15)	2.58	(0.68,5.85)
	Primary school	7.89	(7.51,8.26)	3.55	(2.74,4.36)	1.53	(0.09,2.98)
	Junior middle school	7.54	(6.76,8.32)	2.36	(0.76,3.96)	2.00	(0.70,3.30)
	High school	8.00	(6.89,9.11)	4.31	(1.95,6.67)	/	/
	University and above	7.00	(2.93,11.07)	/	/	/	/
*Economic level	Low	8.45	(8.01,8.89)	3.93	(2.91,4.94)	4.62	(3.36,5.88)
	Medium	8.67	(8.38,8.96)	4.92	(4.09,5.75)	2.83	(2.07,3.60)
	High	8.28	(7.86,8.70)	4.13	(3.12,5.14)	2.38	(1.43,3.33)
*Marital status	Married	8.33	(8.09,8.56)	3.98	(3.39,4.56)	1.84	(0.48,3.20)
	Unmarried	9.10	(8.29,9.91)	4.77	(2.61,6.94)	1.00	(0.12,13.71)
	Widow	9.31	(8.69,9.93)	6.54	(4.70,8.38)	6.50	(0.76,8.90)
	Divorce	8.10	(6.82,9.39)	4.11	(0.54,7.68)	/	/
	Others	10.94	(8.66,13.22)	6.00	(1.93,10.07)	/	/
*▯ Employment status	Employed	8.11	(7.86,8.36)	3.61	(3.02,2.00)	2.00	(0.67,3.33)
	Retired	9.74	(8.56,10.92)	3.33	(0.13,6.79)	/	/
	Laid-off	10.00	(8.87,11.13)	6.53	(3.25,9.81)	/	/
	Unemployed	9.40	(8.95,9.85)	6.17	(5.03,7.32)	/	/
	Student	7.63	(3.29,11.96)	/	/	/	/

[a]: measured in days

*: there were differences in duration among different groups, $P<0.05$

: there were differences in being bedridden among different groups, $P<0.05$

#: there were differences in the duration of being off work among different groups, $P<0.05$

/: there were no subjects satisfying the grouping condition

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- TranslationofAdditionalfile1.docx
- TransfationofAdditionalfile2.docx
- TransfationofAdditionalfile3.docx