Status of Two-week Prevalence Rate in Tibet: Data Base on the Sixth Health Service Survey of Tibet, China

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Abstract

Background Tibet is located in the high altitude area of southwest China, which health level is influenced by specific factors. However, there was little research on Tibetan health condition. And the two-week prevalence rate is an important indicator to health status of residents. The purpose of this study was to understand the two-week prevalence rate and its influencing factors in Tibet.

Methods Two-week prevalence rate was calculated using data from a population of 10493 aged 15 and above obtained from the sixth Health Service Survey of Tibet in 2018. Multivariate logistic regression analysis was used to further screen factors for gender, age, marital status, employment status and so on.

Results The two-week illness prevalence rate was 20.1% in Tibet. According to the Multivariate logistic regression analysis the two-week prevalence rate was associated with gender, age, residence, marital status, employment status, respectively. Digestive system diseases are given priority, hypertension is the most common disease. Besides, the severity of two-week illness has differences in different groups.

Conclusion This study identified a number of factors that appear to have a significant relationship with the two-week illness prevalence. Moreover, the two-week prevalence rates of women and older people were significantly higher, which should be paid attention to 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 kilometers and has a population of about 3.3 million. As the average altitude is over 4,000 meters[1].The natural environment and living habits are significantly different from those in other parts of China. Therefore, the health status of
local residents has seldom reported before. Besides, two-week prevalence rate is also an important index for evaluating medical and health services, which can reflect the health status and social health status of the population. Many countries in the world attach importance to health services in order to establish effective health service systems, such as the United States, Ethiopia and Kenya, et al [2–4]. In China, there are huge differences of the two-week prevalence among different regions[5][6]. 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%[7]. Here this study reported the two-week prevalent rate and the factors based on the data from the Sixth Healthy Service Survey of Tibet, China which completed in 2018.

Methods

Data source

Data were collected or obtained from the Sixth Health Service Survey of Tibet, China in 2018. Therefore, according to the level of economic development, geographical location, population distribution and other factors, a total of 24 counties were selected for this survey according to multi-stage stratified cluster random sampling method. Face-to-face survey using a tablet (PAD), the investigator inquired all members of the household one by one, filled in the electronic questionnaire offline, then reported the survey data online after the survey instructors examined each person. A total of 10493 valid cases were finally included. Subjects were eligible to participate in the current study if they: (1) were≥15 years; (2) were the permanent residents of the sample households. In principle, all the contents of the survey should be answered by themselves. People are not at home or unable to respond during the survey period may be replaced by those who are
familiar with their situation.

This study was part of the Sixth National Health Service Survey of China, which has been approved by National Health and Family Planning Commission of the People’s Republic of China and Health and Family Planning Commission of Tibet autonomous region. Oral consent was obtained before the survey from the eligible residents.

The definition of outcome variables

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

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 measure 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.

Among them, “the duration of disease”, “being bedridden” were applied to the residents aged 15 years and above.

Statistical analysis

Data was double typed in by Epidata 3.0. The Chi-square test was performed to examine the significance of differences in two-week prevalence rates from demographic variables. Whether 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 there are a number of subjects suffered from
chronic diseases, multivariate regression analysis was performed to adjust the confounding factors, including gender, age, residence, economic level, education level, marital status, employment status, smoking status and drinking status. Besides, one way analyze of variance was used to analyze the severity of two-week prevalence rate in different groups. Data analysis was completed using SPSS20.0 statistical software. 0.05 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 men. The age of the objects in this study was (44.1 + 15.7) years old. The two-week prevalence rate was 20.1% in Tibet in 2018(Table1). The Tibetan ethic accounted for the highest proportion (97.0%).

Addressing the systems where diseases occurred, digestive diseases, cardiovascular diseases, musculoskeletal diseases, respiratory diseases, and urogenital diseases accounted for the top five diseases, which was 27.8%, 20.5%, 16.5%, 11.6% and 4.4% respectively. Moreover, according to 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 female was higher than that of male with significant difference. The two-week prevalence rate was positively associated with age, and inversely associated with educational level. Urban residents had a higher two-week prevalence rate than rural residents (27.7 % vs. 18.0 %). The two-week prevalence of widows was the highest, reaching 35.8%. Among the people with different employment status, the two-week prevalence rate of the unemployed was the highest, reaching 41.7%, followed by the retired population, which was 37.2%. Characteristics of survey participants were present in table 1.
Table 1: Characteristics of two-week prevalence rate and influencing factors among residents over 15 years old of 2018, Tibet

| Characteristics       | Number (Total) | Proportion (%) | Two-week of illness |
|-----------------------|----------------|----------------|---------------------|
|                       | Number         | Proportion (%) | Number of illness   |
|                       |                |                | Pr                 |
| Gender                |                |                |                    |
| Male                  | 4921           | 46.9           | 795                |
| Female                | 5572           | 53.1           | 1309               |
| Age                   |                |                |                    |
| 15-29                 | 2086           | 19.9           | 176                |
| 30-44                 | 3412           | 32.5           | 511                |
| 45-59                 | 3245           | 30.9           | 865                |
| 60-                   | 1750           | 16.7           | 553                |
| Residence             |                |                |                    |
| Urban                 | 2186           | 20.8           | 606                |
| Rural                 | 8307           | 79.1           | 1498               |
| Education level       |                |                |                    |
| Illiteracy            | 5037           | 48.0           | 1181               |
| Primary school        | 3496           | 33.3           | 668                |
| Junior middle school  | 1217           | 11.6           | 156                |
| High school           | 603            | 5.7            | 90                 |
| University and above  | 140            | 1.3            | 10                 |
| Marital status        |                |                |                    |
| Married               | 7950           | 75.7           | 1624               |
| Unmarried             | 1567           | 15.0           | 148                |
| Widow                 | 719            | 6.9            | 258                |
| Divorce               | 186            | 1.8            | 59                 |
| Others                | 71             | 0.7            | 16                 |
| Employment status     |                |                |                    |
| Employed              | 8232           | 78.4           | 1483               |
| Retirement            | 207            | 2.0            | 77                 |
| Laid-off worker       | 168            | 1.6            | 70                 |
| Unemployment          | 1601           | 15.3           | 467                |
| Student               | 285            | 2.7            | 8                  |
| Smoke                 |                |                |                    |
| No                    | 8810           | 84.0           | 1810               |
| Yes                   | 1683           | 16.0           | 294                |
| Drink                 |                |                |                    |
| No                    | 7699           | 73.4           | 1548               |
| Yes                   | 2794           | 26.6           | 556                |

To further study influence factors in 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 analyses, participants who were women, older, urban residents, bad marital and employment status had a higher OR for morbidity as compared with the other groups. The effect size was remained significant after adjusting other factors. (Table2)
Table 2 The influence factors of the two-week prevalence rate by univariate and multivariate analysis of Tibet, in 2018

| Influence factor | Crude OR  | 95%CI       | Adjusted OR | 95%CI       |
|------------------|-----------|-------------|-------------|-------------|
| Gender           |           |             |             |             |
| Female           | Ref       | Ref         |             |             |
| Male             | 0.627     | (0.569,0.692) | 0.642      | (0.572,0.721) |
| Age              |           |             |             |             |
| 15-29            | Ref       | Ref         |             |             |
| 30-44            | 1.912     | (1.595,2.290) | 1.510      | (1.247,1.829) |
| 45-59            | 3.944     | (3.318,4.689) | 2.940      | (2.440,3.543) |
| 60-               | 5.000     | (4.158,6.013) | 3.162      | (2.550,3.920) |
| Residence        |           |             |             |             |
| Urban            | Ref       | Ref         |             |             |
| Rural            | 0.574     | (0.514,0.64)  | 0.616      | (0.548,0.692) |
| Education level  |           |             |             |             |
| Illiteracy       | Ref       |             |             |             |
| Primary school   | 0.772     | (0.694,0.859) | /          | /           |
| Junior middle school | 0.481 | (0.401,0.576) | /          | /           |
| High school      | 0.573     | (0.454,0.724) | /          | /           |
| University and above | 0.251 | (0.132,0.48)   | /          | /           |
| Marital status   |           |             |             |             |
| Married          | Ref       | Ref         |             |             |
| Unmarried        | 0.407     | (0.34,0.486)  | 0.678      | (0.558,0.824) |
| Widow            | 2.182     | (1.856,2.565) | 1.277      | (1.069,1.526) |
| Divorce          | 1.781     | (1.324,2.478) | 1.637      | (1.182,2.266) |
| Others           | 1.134     | (0.648,1.984) | 1.007      | (0.566,1.791) |
| Employment status|           |             |             |             |
| Employed         | Ref       |             |             |             |
| Retirement       | 2.696     | (2.022,3.593) | 1.287      | (0.946,1.751) |
| Student          | 0.131     | (0.065,0.266) | 0.328      | (0.158,0.683) |
| Laid-off worker  | 3.251     | (2.380,4.440) | 2.340      | (1.681,3.256) |
| Unemployment     | 1.868     | (1.655,2.110) | 1.234      | (1.073,1.420) |
| Smoke            |           |             |             |             |
| No               | Ref       |             |             |             |
| Yes              | 0.819     | (0.714,0.938) | 1.180      | (1.006,1.385) |
| Drink            |           |             |             |             |
| No               | Ref       |             |             |             |
| Yes              | 0.987     | (0.886,1.100) | /          | /           |

&: It represented the P value which were adjusted by multivariate logistic regression analysis
/: In multivariate regression analysis, Forward: LR method (the forward stepwise
regression method based on maximum likelihood) was used to adjust confounding factors. In addition, duration of the two-week illness was positively associated with age. There were differences among urban-rural residents, education levels, marital status, employment status, smoking and drinking. For the time of being bedridden of the two-week illness, age, residence, education level, and employment status were also different.

Rural versus urban residents had longer time of being off work. (Table 3).

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

| Characteristics | Duration | Being bedridden | Being off work |
|-----------------|----------|-----------------|----------------|
|                 | Mean     | 95% CI          | Mean           | 95% CI         | Mean           |
| Gender          |          |                 |                |                |                |
| Male            | 8.47     | (8.13,8.82)     | 4.53           | (3.51,5.54)    | 1.64           |
| Female          | 8.54     | (8.27,8.81)     | 4.43           | (3.78,5.07)    | 2.29           |
| Age             |          |                 |                |                |                |
| 15-29           | 7.41     | (6.72,8.10)     | 3.04           | (1.54,4.55)    | 1.67           |
| 30-44           | 7.77     | (7.36,8.19)     | 3.40           | (2.56,4.25)    | 2.20           |
| 45-59           | 8.52     | (8.19,8.86)     | 4.05           | (3.19,4.91)    | 1.94           |
| 60+             | 9.54     | (9.14,9.95)     | 6.32           | (5.14,7.50)    | 2.17           |
| Residence       |          |                 |                |                |                |
| Urban           | 8.18     | (7.77,8.59)     | 4.20           | (3.24,5.16)    | 1.40           |
| Rural           | 8.65     | (8.41,8.89)     | 4.59           | (3.93,5.25)    | 2.29           |
| Education level |          |                 |                |                |                |
| Illiteracy      | 9.05     | (8.78,9.33)     | 5.35           | (4.55,6.15)    | 2.58           |
| Primary school  | 7.89     | (7.51,8.26)     | 3.55           | (2.74,4.36)    | 1.53           |
| Junior middle school | 7.54 | (6.76,8.32) | 2.36           | (0.76,3.96)    | 2.00           |
| High school     | 8.00     | (6.89,9.11)     | 4.31           | (1.95,6.67)    | /              |
| University and above | 7.00 | (2.93,11.07) | /              | /              | /              |
| Marital status  |          |                 |                |                |                |
| Married         | 8.33     | (8.09,8.56)     | 3.98           | (3.39,4.56)    | 1.84           |
| Unmarried       | 9.10     | (8.29,9.91)     | 4.77           | (2.61,6.94)    | 1.00           |
| Widow           | 9.31     | (8.69,9.93)     | 6.54           | (4.70,8.38)    | 6.50           |
| 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           |
Retirement 9.74 (8.56,10.92) 3.33 (0.13,6.79) /
Laid-off worker 10.00 (8.87,11.13) 6.53 (3.25,9.81) /
Unemployment 9.40 (8.95,9.85) 6.17 (5.03,7.32) /
Student 7.63 (3.29,11.96) / / /

*Smoke No 8.65 (8.42,8.87) 4.67 (4.08,5.27) 2.04
Yes 7.69 (7.11,8.27) 3.22 (1.92,4.52) 1.83

*Drink No 8.64 (8.39,8.88) 4.82 (4.19,5.44) 2.40
Yes 8.18 (7.77,8.58) 3.21 (2.16,4.26) 1.27

*: they are all measured in days
*: there were differences of duration in different groups, P<0.05
‡: there were differences of being bedridden in different groups, P<0.05
#: there were differences of being off work duration in different groups, P<0.05
/: there were no subjects satisfy the grouping condition

Discussion

Based on the Sixth Health Service Survey in Tibet Autonomous Region in 2018, the two-week prevalence rate and its influencing factors were analyzed. 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 that of the Fifth Health Service Survey in Tibet (10.6%), indicating that health services in Tibet was significantly declined in a way. However, it was lower than the Fifth National Health Service Survey (24.1%).

Among the disease systems, digestive system diseases account for the largest proportion, which may be related to food habits (such as special Tibetan dietary habits). Traditional Tibetan food such as Tibetan cream tea and Zanba (which consists of Tibetan naked barley, Tibet cream tea, and Tibetan cream) and so on, provided almost approximately 60% protein and high fat[8, 9], which was difficult to digest and absorb in human body.

Moreover, the prevalence of hypertension was 14.4% among the patients which is lower than national average (27.8%)[10]. Nevertheless, hypertension was the most popular
chronic diseases in Tibet, which may be related to the diet and awareness of Tibetan[11, 12]. High salt in diet, insufficient awareness of hypertension might lead to poor control of hypertension, and the greater possibility of adverse reactions to hypertension, which leads to an increase of medical treatment[13, 14]. In addition, this study found that the prevalence of hypertension in females was higher than that in males which was consistent with Yichong Li[10].

In this study, we found that there was a significant difference in the two-week prevalence rate between genders. The risk of female population was higher than that of men. The reason may be that women had special physiological periods, mainly affected by menstruation, pregnancy, childbirth, puerperium and breastfeeding, which resulted in special needs[15, 16]. Compared with men, women had lower immunity and more delicate emotions which were more likely to pay attention to their own health needs. Therefore, the two-week morbidity rate is higher than men. According to the founding of Anna Ruggieri[17], it appears that hormonal, genetic and environmental factors between males and females may affect the immune.

With the increase of age, the two-week prevalence rate showed an linear increasing trend, which supported for an explanation comes from studies[18] that have shown various kinds of physical diseases are gradually increasing with the increase of age. For most older people, physical and social activities are showing a downward trend, which will weaken the immunity the body. Therefore, the possibility of exposure to risk factors is greater, coupled with a relatively weak awareness of health care, which increased the risk of disease. Otherwise, most women over 60 are in menopause, whose health might be affected by hormone levels[19].

Besides, we also identified factors that rural-urban was different to two-week prevalence rate. The two-week disease risk of urban residents is higher than rural residents, which
may be that the education level and health awareness of urban residents are higher than farmers and herdsmen[20, 21]. Moreover, the distance between medical treatment in agricultural and pastoral areas is relatively longer, which might affect the accessibility of farmers and herdsmen in medical treatment to a certain extent. Therefore, the reported prevalence rate is low, which is similar to the results from Tian, D [22]. Compared with married people, the two-week prevalence of widowed and divorced people is higher than others in urban. The reason may be that the people who undergone widowhood or divorce, to a certain extent, the past way of life or environment will be changed. On the other hand, the widowed were also more likely older, the results were consistent with age. Therefore, they may have a certain negative psychological impact, thus affecting health.

In different employment situations, unemployment and loafer are the risk factors leading to two-week illness which came to the same conclusion with Fifth National Health Service Survey[23]. To a certain extent, Irregular daily life and realistic pressure are the negative factors of illness[24]. Happy marriage and good family care are conducive to reducing the occurrence of illness and accelerating the recovery of illness. As a special social group, school students were at a young stage, who have relatively low life pressure and regular living habits, and most of them are energetic in their youth with good physical immunity, so the risk of two-week illness was lower.

There are several limitations in this study. We did not obtain detailed information on the frequency of smoking and drinking. This discrepancy can attribute to the limited the questionnaire design. Secondly, we did not consider the difference in disease severity for two-week illness due to the size of specific diseases and injuries caused by sample limitations. In addition, 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 of Tibetan was generally associated with gender, age, residence, marital status, employment status. In addition, the severity of the two-week prevalence rate is different among the groups of age, residence, education level, marital status, and employment status. Moreover, chronic diseases also have a significant impact on the two-week prevalence rate. Despite the two-week prevalence rate was lower than the national level, the two-week prevalence rate was significantly higher than the fifth time. Moreover, there are many efforts should be made by the central and local government of China to improve the health of Tibetan because of the severity disparity. This study may provide a basis to formulate health service policies about residents with different characteristics for the government.

Abbreviations

CI: Confidence interval

OR: Odds ratio

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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