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Factors that Influence Healthcare Utilization Among Tibetan Residents in Tibet Based on the Andersen Model

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Abstract

Background

This study aims to investigate the impact of predisposing characteristics, enabling resources, and needs on the outpatient utilization of healthcare services among Tibetan ethnic residents in Tibet.

Methods

Using data from the sixth National Health Service Survey in Tibet in 2018, this study focuses on Tibetan ethnic residents aged 15 and above. The Andersen model is employed to explore the factors influencing their utilization of healthcare services.

Results

The rate of two-week outpatient visits (11.6%) and two-week illness visits (57.8%) among surveyed Tibetan ethnic residents was lower than the national average, suggesting a relatively low usage of healthcare services. Predisposing characteristics, enabling factors, and needs exerted different levels of influence on the utilization of healthcare services among Tibetan ethnic residents. Importantly, needs indicated by factors such as "presence of chronic diseases" and "self-rated poor health" emerged as the most significant drivers ($p < 0.001$) for healthcare utilization in Tibetan ethnic residents in Tibet.

Conclusions

It is recommended to strengthen healthcare insurance coverage and promote self-health education among Tibetan ethnic residents, as well as improve the allocation of resources in regional medical institutions and healthcare service delivery methods.

Introduction

Healthcare research is critical for the optimal allocation of health resources, better fulfillment of health service demand, the identification of strategic priorities in healthcare, and the development of health sector planning. The utilization of healthcare is a crucial aspect of such research.[1] Extensive studies have identified key determinants of healthcare utilization, including income stratification, educational attainment, and access to health insurance..[2–3] In China, considerable empirical research has examined these patterns across various populations—such as the general population, income-stratified groups, and those with varying insurance coverage—particularly before and after the implementation of new healthcare reforms.[3–6] However, there remains a notable gap in the literature regarding healthcare utilization among Tibetan residents, specifically within the theoretical framework of the Andersen model.

The Andersen model (also known as the Behavioral Model of Health Services Use) is a globally recognized theoretical framework in medical sociology and health services research.[7] It was developed to analyze the factors influencing medical service use by categorizing them into three main components: predisposing characteristics (e.g., demographics and social structures), enabling resources (e.g., medical insurance and economic support), and need factors (primarily related to health status, perceived need, and demand for care).[8–10] Drawing on this framework, this study utilizes data from the Sixth National Health Service Survey of Tibet to empirically analyze the levels and determinants of healthcare utilization among Tibetan residents. The findings aim to provide an evidential basis for policy-making and for enhancing healthcare utilization strategies in the region.

Methods

Study population

The data for this study was sourced from the Sixth National Health Service Survey of Tibet in 2018. This survey employed a multi-stage stratified random cluster sampling method, with size-proportional probability and systematic sampling. Considering the region's economic development level, geographic location, and population distribution, the seven districts (cities) were categorized into three groups: good, medium, and poor. Among the 74 counties, 34% were randomly selected, with 2–3 townships (towns) sampled per county, 2 villages per township, and 20 households per village for a total of 4,234 households(Fig. 1). The survey included 10,550 permanent residents, of whom 3,321 were aged 15 years and older. After data filtering, the analytical sample comprised 10,164 individuals.

Data collection

The survey instrument used was the "Family Inquiry Questionnaire" from the Sixth National Health Service Survey. Survey administrators, uniformly trained to adhere to standard questioning protocols, administered household surveys to all family members of the sampled households using tablet computers. For those households with communication barriers, survey administrators interviewed informed family members and recorded responses in real-time. The questionnaire covered -the various topics, including general family circumstances, basic individual information, self-assessed health statuses, and utilization of outpatient health services (including two-week visits, two-week patient visits, and healthcare institutions visited, and two-week patient non-visits and reasons for non-visit).

Evaluation indicators and definitions

Analyzing healthcare utilization is a commonly used, practical method to examine the efficiency and potential of health services. This study assessed the utilization of outpatient health services among Tibetan residents by analyzing the two-week office visit rate, the two-week patient visit rate, and the two-week patient non-visit rate. [11] The two-week consultation rate refers to the number of persons per 100 (or 1,000) respondents who sought medical care at all healthcare institution levels within two weeks due to illness or physical discomfort. The two-week consultation rate is thus the number of respondents who visited a medical facility in the two weeks before the survey divided by the total number of respondents surveyed. The two-week patient visit rate refers to the number of visits for all reasons by respondents self-assessed as patients (or sick person) in the two weeks before the survey over the total number of two-week patients (sick persons), expressed as a percentage.

Quality control

Before implementation, the survey plan and procedures had established, personnel had been trained, and the pre-survey had administered. Considering ethical concerns, investigators went into the field to explain to respondents the background, nature, and significance of the research, emphasizing on this study being solely for scientific purposes. Informed consent was obtained from the subjects before officially launching the household electronic questionnaire survey. During the survey, efforts were made to avoid and minimize missing data. After the survey, 5% of the completed households were randomly selected and contacted by phone to verify the accuracy and consistency of their survey data. When extracting data, logical error checking was conducted to ensure data accuracy.

Statistical analysis

The data were organized and analyzed using Stata 15.0 statistical software. Descriptive statistical analysis was used to determine the status of residents' use of outpatient healthcare. Uni-variate analysis using Pearson χ^2 compared the differences in two-week visit rates among different populations categorized by characteristics. Relevant variables were extracted following the analytical framework of the Anderson model's defined dimensions of predisposing factors, enabling resources, and need factors.[7] Predisposing factors refer to the characteristics of populations predisposed to using health services before disease onset. Predisposing factors are not directly related to medical and health service use. Such factors primarily included demographic characteristics, family structures, and health belief characteristics, from which this study selected five indicators: age, gender, marital status, educational level, and employment status.[12] Enabling resources include the personal, family, and community resources available, which are necessary conditions for accessing medical and health services..[13] Need factors primarily measure perceived health service needs, comprising the prerequisite, direct factors leading to healthcare use. This study included two such indicators: self-assessed health status and the presence of chronic illness.[14]

Results

General characteristics of Tibet residents

This study included a total of 10,164 participants. Among them, there were 4,748 men (46.7%) and 5,416 women (53.3%), with a sex ratio of 1:1.14. The proportions of participants aged 15–24, 25–34, 35–44, 45–54, 55–64, and ≥ 65 years old were 10.3%, 21.1%, 21.0%, 22.3%, 14.0%, and 11.2%, respectively. The majority were married, accounting for 75.9% of those surveyed. The highest proportion of the sample included those who had never attended school (48.5%), while those with a college degree or higher were the lowest proportion (3.0%). Those employed accounted for 78.6% of the sample. The *hukou* residency status was predominantly "rural" from agricultural and pastoral areas, representing 79.5%. The highest proportion of families had an annual income of 12000 ~ RMB, accounting for 42.7% (Table 1).

Resident healthcare utilization

Of the 10,164 individuals included in this study, 1,176 sought medical care within a two-week period, resulting in a two-week visit rate of 11.6%. The two-week consultation rate increases with age. After the age of 25, female residents in different age groups have a higher two-week consultation rate than male (Fig. 2). There were 2,035 reported cases of illness within two weeks, and the two-week patient visit rate was 57.8%. The top three initial points of contact for medical services were county-level hospitals (17.2%), township health centers (15.4%), and clinics/health posts (10.3%). Proximity/convenience (57.0%) was the main reason for choosing these medical facilities. The two-week patient non-visit rate was 42.2%; of which 30.1% felt their illness was minor, 14.5% cited financial difficulties, 9.8% had no time, and 9.2% faced transportation challenges or lacked effective treatment options.

Univariate analysis of resident healthcare utilization

Healthcare utilization rates among Tibetan residents varied significantly based on various predisposing factors, including gender, age, marital status, educational level, and employment status. Enabling resources, such as different annual family incomes and *hukou* residency types, as well as need factors, such as the presence of chronic illness and self-assessed health status, also led to significant differences in healthcare utilization ($P < 0.001$). However, there was no statistically significant difference in healthcare utilization rates among Tibetan residents with different insurance statuses ($p > 0.05$) (Table 1).

Table 1
Different characteristics of Tibet residents; survey on the utilization of health services

Variables	N	Number of two-week visits	the two-week office visit rate(%)	$\chi 2$	*p*
Gender					
Male	4748	427	9.0	57.834	< 0.001
Female	5416	749	13.8		
Age					
15~	1048	43	4.1	208.738	< 0.001
25~	2148	163	7.6		
35~	2134	196	9.2		
45~	2263	336	14.8		
55~	1428	221	15.5		
≥ 65	1143	217	19.0		
Marital Status					
Unmarried	1504	67	4.5	128.687	< 0.001
Married	7713	928	12.0		
Widowed/divorced/Other	947	181	19.1		
Education Level					
Illiteracy	4927	653	13.3	44.865	< 0.001
Primary school	3395	392	11.5		
Middle school	1148	81	7.1		
High school	388	33	8.5		
College or above	306	17	5.6		
Employment status					
Employed	7985	848	10.6	32.877	< 0.001
Unemployed	2179	328	15.1		
Household Income Level(yuan/year)					
< 12000	1594	245	15.4	25.811	< 0.001
12000~	4342	504	11.6		
36000~	2467	263	10.7		
72000~	935	88	9.4		
≥ 120000	826	76	9.2		
Insurance situation					
no	89	9	10.1	0.187	0.666
yes	10075	1167	11.6		
Household registration					
rural	8080	884	10.9	15.270	< 0.001
urban	2084	292	14.0		
chronic illness					
no	5963	289	4.8	637.458	< 0.001
yes	4201	887	21.1		
Self-assessed Health Status					
0~	650	177	27.2	467.245	< 0.001
40~	1601	335	20.9		

Variables	N	Number of two-week visits	the two-week office visit rate(%)	$\chi 2$	p
Gender					
60~	3329	418	12.6		
80 ~ 100	4584	246	5.4		

Multivariate Logistic Regression Analysis

Taking whether there was a two-week office visit as the dependent variable and the statistically significant predisposing factors, enabling factors, and need factors from Table 1 as independent variables (multicollinearity tests among the variables showed that the variance inflation factor [VIF] in the model was < 10, indicating no multicollinearity), a multivariate logistic regression model was established to analyze factors affecting healthcare utilization among Tibetan residents. Model 1 only included predisposing factors; Model 2 added enabling resources to the predisposing factors; and Model 3 incorporated all three dimensions (predisposing factors, enabling resources, and need factors) with a significance level of $\alpha = 0.05$. The analysis showed that the independent variables influencing outpatient healthcare utilization among Tibetan residents were gender, marital status, annual household income, *hukou* residency status, the presence of a chronic illness, and self-assessed health status. The Goodness-of-fit measures for the constructed models indicated that the explanatory power for outpatient service use among Tibetan residents progressively increased across the three models. The explanatory power of the independent variables was strongest in Model 3, as analyzed by the Cox–Snell R^2 and Nagelkerke R^2, which suggests that the introduction of enabling resources and need factors progressively improved the model's explanatory power and fit. By analyzing the growth magnitude of the Cox-Snell R^2 and Nagelkerke R^2, it appeared that the addition of need factors to Model 2 (creating Model 3) resulted in the greatest increase in explanatory power, and while the inclusion of enabling resources in Model 1 (creating Model 2) resulted in an explanatory power increase, the increase was not as pronounced. Overall, it is evident that predisposing factors, enabling factors, and need factors all affect the healthcare utilization of Tibetan residents to varying degrees, with need factors having a more significant effect.

Table 2
Analysis of influencing factors of outpatient health service utilization among surveyed Tibetan residents in Tibet based on a multivariate logistic regression model

Variable	Model1				Model2				Model3			
	Wald value	*P*	OR	95% CI	Wald value	*P*	OR	95% CI	Wald value	*P*	OR	95% CI
Predisposing factors												
Gender(ref=Male)												
Female	40.104	<0.001	1.531	1.342 ~ 1.747	36.743	<0.001	1.506	1.319 ~ 1.719	15.581	<0.001	1.319	1.150 ~ 1.513
Age(ref = 15~)												
25~	3.054	0.081	1.389	0.961 ~ 2.009	2.696	0.101	1.363	0.942 ~ 1.971	0.171	0.679	1.083	0.742 ~ 1.582
35~	6.353	0.012	1.617	1.113 ~ 2.349	5.590	0.018	1.571	1.080 ~ 2.285	0.025	0.873	1.032	0.702 ~ 1.516
45~	27.995	<0.001	2.680	1.860 ~ 3.862	26.641	<0.001	2.624	1.819 ~ 3.785	2.209	0.137	1.333	0.913 ~ 1.947
55~	25.31	<0.001	2.641	1.809 ~ 3.855	24.997	<0.001	2.632	1.801 ~ 3.847	0.103	0.748	1.067	0.719 ~ 1.582
≥ 65	29.728	<0.001	3.003	2.023 ~ 4.459	29.856	<0.001	3.012	2.028 ~ 4.473	0.236	0.627	1.107	0.734 ~ 1.671
Marital status(ref=Unmarried)												
Married	25.855	<0.001	2.066	1.562 ~ 2.732	28.990	<0.001	2.164	1.634 ~ 2.866	29.685	<0.001	2.217	1.665 ~ 2.953
Widowed/divorced/Other	30.628	<0.001	2.517	1.815 ~ 3.49	29.881	<0.001	2.493	1.797 ~ 3.458	26.663	<0.001	2.418	1.729 ~ 3.380
Education Level(ref= Illiteracy)												
Primary school	0.084	0.772	1.021	0.888 ~ 1.174	0.328	0.567	1.042	0.905 ~ 1.199	4.985	0.026	1.181	1.021 ~ 1.367
Middle school	0.421	0.516	0.918	0.709 ~ 1.188	0.299	0.585	0.930	0.717 ~ 1.206	1.486	0.223	1.182	0.903 ~ 1.548
High school	0.670	0.413	1.175	0.799 ~ 1.728	0.670	0.413	1.178	0.795 ~ 1.746	4.787	0.029	1.578	1.049 ~ 2.374
College or above	0.648	0.421	0.809	0.483 ~ 1.356	0.376	0.540	0.847	0.499 ~ 1.439	0.579	0.447	1.235	0.717 ~ 2.129
Employment status (ref=Employed)												
Unemployed	4.62	0.032	1.193	1.016 ~ 1.402	2.339	0.126	1.136	0.965 ~ 1.337	0.041	0.840	1.018	0.856 ~ 1.210
Variables	**Model1**				**Model2**				**Model3**			
	Wald Value	*P*	OR	95% CI	Wald Value	*P*	OR	95% CI	Wald Value	*P*	OR	95% CI
Enabling resources												
Household Income Level(yuan/year)(ref= <12000)												
12000~					8.974	0.003	0.772	0.652 ~	9.721	0.002	0.755	0.633 ~

Variable	Model1				Model2				Model3			
	Wald value	*P*	OR	95% CI	Wald value	*P*	OR	95% CI	Wald value	*P*	OR	95% CI
								0.914				0.901
36000~					13.471	<0.001	0.697	0.575 ~ 0.845	17.164	<0.001	0.655	0.537 ~ 0.800
72000~					16.200	<0.001	0.581	0.446 ~ 0.757	15.614	<0.001	0.577	0.440 ~ 0.758
≥ 120000					18.282	<0.001	0.539	0.406 ~ 0.716	15.504	<0.001	0.553	0.412 ~ 0.743
Household registration(ref=Rural)												
Urban					9.064	0.003	1.263	1.085 ~ 1.469	25.655	<0.001	1.509	1.287 ~ 1.770
Need factors												
chronic illness(ref = no)												
Yes									283.997	<0.001	3.769	3.230 ~ 4.398
Self-assessed Health Status(ref = 80 ~ 100)												
0~									87.054	<0.001	3.171	2.488 ~ 4.040
40~									88.491	<0.001	2.531	2.086 ~ 3.072
60~									32.852	<0.001	1.667	1.400 ~ 1.986
										<0.001	0.012	
Cox & Snell R^2	0.030				0.034				0.087			
NagelkerkeR^2	0.059				0.066				0.171			

Discussion

Improving transportation may increase healthcare utilization in Tibet.

The survey results showed that the two-week visit rate of Tibetan residents (11.6%) was lower than the two-week visit rate of Sichuan residents (37.7%), as reported in the Sixth Health Service Survey.[15] It was also lower than the national average visit rate (24.0%) reported in the same survey.[16] This indicates that Tibetan residents seek medical attention at a relatively low rate, which indirectly suggests that the overall healthcare utilization rate among Tibetan residents is also low.[17–18] The proximity of medical institutions is a major reason for patients' choice of their initial consultation facility, which indicates that, due to the vast territory and sparse population of Tibet, where the distances between villages and townships are great and the transportation infrastructure is poor, Tibetan residents' willingness to seek medical attention in counties and towns is low. To address this, the government could improve transportation conditions in Tibet and increase the density of the road network, thus increasing the accessibility of county and township clinics. Policies could also be adopted in which medical staff at the county and township levels regularly visit rural areas to ensure full medical service utilization. [19–20]

Demand characteristics: The primary driving factor

Based on the uni-variate analysis of ANOVA, the only variables for which the two-week visit rate exceeded 20% and the difference in the two-week visit rates between variable groups exceeded 10% were the presence of chronic illness and self-assessed health status, both of which are demand-side characteristics. It is evident that demand characteristics are the primary driving factor for two-week visit rates among Tibetan residents, which is consistent with the conclusions of Wang Wen Long et al. [14] This also indirectly shows that promoting accurate and objective health self-awareness among Tibetan residents may be an effective means for driving utilization of health services. The main reason of not seeking medical attention within two weeks of illness is the perception that their illness is minor. The fundamental issues lie in the low levels of education among Tibetan residents, the weak care-seeking initiative and health awareness, and even the perception of illness being influenced by local religious beliefs.[21] It is thus critical to provide health education initiatives for

Tibetan residents, especially those in rural areas[22], to improve the accuracy of their health self-assessments as well as the timeliness of their intent to seek medical attention.

Validating the Anderson Model

The results of the multi-factorial logistic regression model indicated that the key factors influencing Tibetan residents' medical care seeking behavior within the two-week period were the predisposing factors of gender, marital status, and educational level; the enabling resources of family income and *hukou* residency status; and the need factors of chronic illness and self-assessed health status. This suggests that, from an individual perspective, the decision to seek medical care is the result of a combination of factors. However, looking at the odds ratio (OR) values, only marital status, *hukou* residency status, and need factors yielded values greater than 1.5, which indicates that, besides health needs, family factors are important drivers in whether Tibetan residents seek medical care. Being married and having an urban residency status can positively drive Tibetan residents to seek medical services. Mutual supervision among family members and redistributing medical resources from counties and towns to rural areas may thus not only increase the willingness of residents to proactively seek medical care but may also ensure that Tibet's already scarce medical resources are fully utilized, improving the efficiency of healthcare use.[23] Additionally, whether participants had health insurance did not significantly affect the two-week visit rate in chi-squared analysis, which indicates that although 95% of Tibetan residents participate in health insurance (according to survey data), insurance has not been able to fundamentally overcome the barriers to residents' healthcare utilization.

Conclusions

In summary, the two-week office visit rate among Tibetan residents of the Tibet Autonomous Region is low, and the two-week rate of patients not seeking medical attention is high, which leads to an overall low rate of healthcare utilization. Not seeking medical care is influenced by predisposing factors, enabling resources, and need factors, with the latter being the primary driver of visit rates among Tibetan residents. Additionally, family and marital status, as well as *hukou* residency status, also affected the willingness to seek medical care. Once the factors that affect healthcare utilization among Tibetan residents are understood, further improvements must be made to the resource allocation of regional medical institutions and the modality of health services to increase the healthcare utilization rates, with consideration for the unique geography of Tibet, its local customs, culture, and health concepts, and the residents' disease distribution and prevalence rates.

Based on this study's results, this article proposes several suggestions for improving healthcare utilization in the Tibet region. First, the development of transportation infrastructure in Tibet's county-level units should be accelerated. This would allow residents to reach medical institutions at the county (district) and township levels more conveniently and quickly, thus preventing the exacerbation of illnesses from delayed treatment. Second, health education, publicity, and self-awareness should be enhanced among Tibetan residents. Medical personnel from counties and townships could regularly go to rural areas to promote health knowledge, check for indicators of chronic illness, increase the rate of illness consultations, and prevent illness from progressing from minor to major. Third, the utilization and public awareness of health insurance should be increased to fully leverage its benefits. Doing so may allow poorer Tibetan families to realize that medical treatment costs can be reimbursed, which would lighten the burden of medical expenses and enhance confidence in the healthcare system.

Declarations

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Author contributions

DZ and DZ participated in the concept and study design. DZ and DZ contributed to data acquisition and analysis. DZ and SC performed results interpretation and manuscript drafting. All authors read and approved the final manuscript.

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Data Availability

The data used in this study are not publicly available due to the confidentiality policy but are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This study was approved by the National Health and Family Planning Commission (NHFPC) of the People's Republic of China and by the Health and Family Planning Commission (HFPC) of the Tibet Autonomous Region.

Respondents provided oral informed consent before participating in the interview because of their low educational level, which was also approved by the NHFPC and HFPC of Tibet.

Consent for publication

Not applicable.

Competing interests

The author(s) declared no potential competing interests with respect to the research, authorship, and/or publication of this article.

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Figures

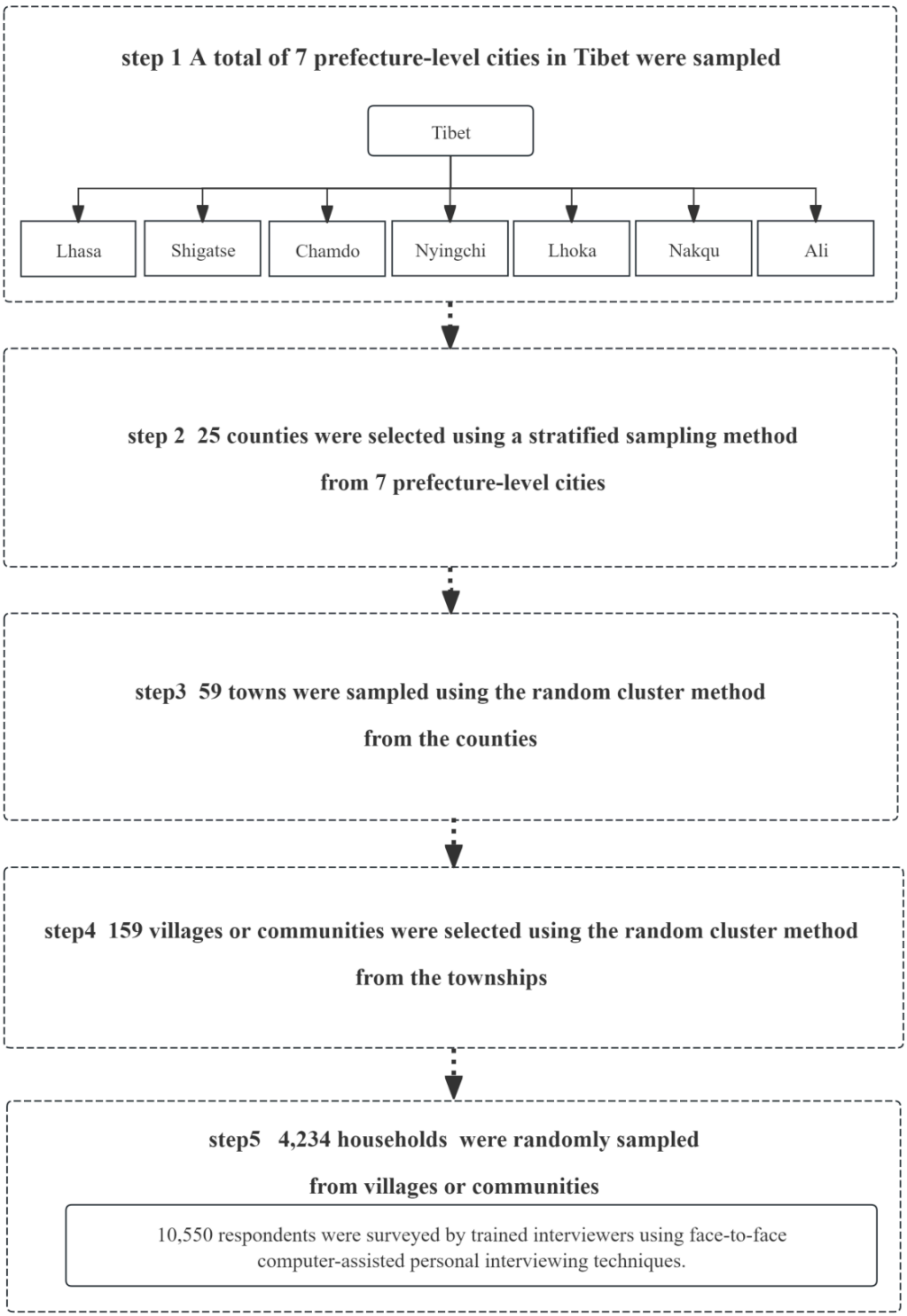


Figure 1

Sampling process diagram

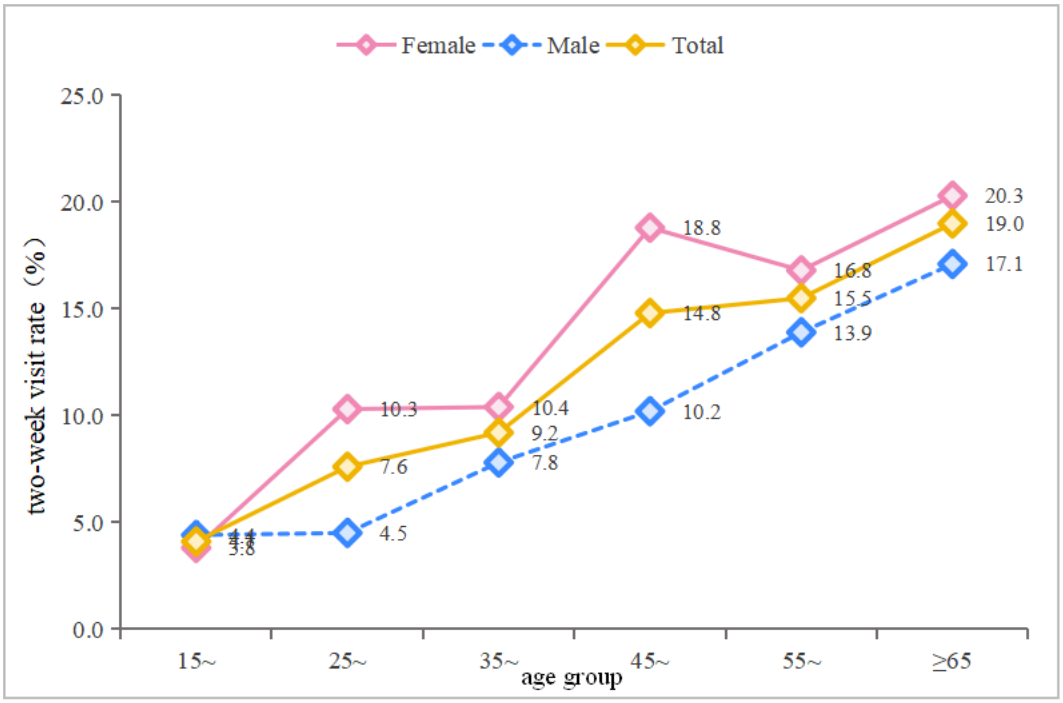


Figure 2

The two-week visit rate of residents in different age groups in Tibet