Survival Analysis of the Years of Residence of Ethnic Minority Migrants in Tibet and Ningxia

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Abstract. The long-term and stable residence of the city's floating population of ethnic minorities in the residential area is beneficial to ethnic group integration and the city's long-term development. Local public health service policies, on the other hand, have a greater or lesser impact on the long-term residence of the minority floating population. The floating population's years of residence are valuable for ethnic minority regional management planning. There has been no report of a survival analysis on the length of residence of the mobile population. We gathered information from the 2017 China Mobile Population Dynamics Monitoring Data Survey. For the study, ethnic minority migrant populations with current residences in Tibet and Ningxia were chosen. A log-rank test was used to compare the length of residence. To identify significant influencing factors, we used multivariate Cox regression analysis. The data were processed by SPSS. Multi-factor Cox regression analysis found that older age, residence in Ningxia, and deteriorating health status were protective factors, and having hypertension and diabetes were risk factors. Through government intervention, preferential policies, moderate publicity, and other programs, the participation rate of new rural cooperative medical insurance or commercial medical insurance for the floating population of ethnic minorities can be improved, allowing the floating population of ethnic minorities to have a long-term residence.

Keywords: long-term development · survival analysis · SPSS

1 Introduction

In 2017, China's mobile population reached 245 million people, accounting for about 18% of the total population. Despite the provision of free national basic public health services, the health of the mobile population, which accounts for 1/6 of the total population, remains a weak link in the existing public service system [1]. Both internationally and in China, attention has been paid to the disease transmission and health of the floating population [2–5]. It is also critical to identify and eliminate the risk factors for mobile population health problems. The public security reform program clearly proposes to

"establish a sound mechanism for the provision of basic public services linked to conditions such as length of residence". The length of residence is an objective and realistic hard indicator reflecting the living condition of the mobile population in the city. The study of the length of residence of the mobile population in the city and its influencing factors is of great significance to improve the quality of life of the mobile population. Many countries and regions have focused on research on the public health policy of ethnic minorities who are on the move [6–8]. However, the literature on the length of residence of migrant population in cities is scarce, and only the length of residence is analyzed as one of the influencing factors (independent variable) [9, 10]. In this paper, we propose to study the length of residence and the influencing factors of minority migrant populations in Tibet and Ningxia. Given our previous research, this paper will evaluate the residence duration of the floating ethnic population in Tibet and Ningxia through survival analysis.

2 Method

The selected variables (influencing factors) were age, gender, place of residence, health status etc. (see details in Table 2).

Then Cox proportional hazards model is used as follows:

$$h(t, X) = h_0(t) \exp(\beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_p X_p \tag{1}$$

where $X_1, X_2, \ldots, X_P$ are the influencing factors of years of residence, $h(t, X)$ is the risk function of the floating population living to time point t, $h_0(t)$ is the baseline risk function (i.e., when $X_1 = X_2 = \ldots = X_p = 0$, the risk function of time point t), $\beta_1, \beta_2, \cdots, \beta_p$ are regression coefficients corresponding to each influencing factor and undetermined parameters.

The endpoint event in this paper was whether they were in the same place of residence as their spouse at the time of the survey, because being in the same place of residence as their spouse has a greater tendency to move their family to live permanently. The time interval between the current movement's year and month and the time of the survey was used as the survival time variable (month). A multivariate Cox regression analysis was performed using the forward-Wald method to filter the independent variables.

The ratio of any two individual risk functions—the relative risk (RR)—is as follows [11]:

$$RR = \frac{h(t, X)}{h(t, X^*)} = \frac{h_0(t) \exp(\beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_p X_p)}{h_0(t) \exp(\beta_1 X_1^* + \beta_2 X_2^* + \cdots + \beta_p X_p^*)} \tag{2}$$

The relative hazard induced by each unit increase in the variable X_j, with other influencing factors held constant:

$RR = \exp(\beta_j) > 1$, X_j is a risk factor,
$RR = \exp(\beta_j) < 1$, X_j is a protective factor.

3 Results

The data were obtained from the National Health Planning Commission's National Mobile Population Dynamic Monitoring Survey in 2017, with a total of 169,989 cases. In this paper, the minority mobile population living in Tibet and Ningxia at the time of the survey was selected as the sample, and a sample of 2500 cases with complete data was obtained, including 1513 cases in Tibet and 987 cases in Ningxia. The general situation is shown in Table 1.

Table 1. The general situation of ethnic minority mobile population in Tibet and Ningxia

Variables		Municipality of residence	
		Tibet	Ningxia
Age (years)		35.75 (16–77)	35.59 (16–84)
Months already lived		184.98 (4–794)	281.51 (4–393)
Sex	male	778	481
	female	735	506
Ethnicity	Zang	1266	0
	Hui	195	954
	Mongol	9	11
	Man	3	7
	Zhuang	3	3
	Uyghur	1	0
	Miao	1	2
	Yi	6	0
	Tujia	4	2
	Tong	1	0
	Korean	1	0
	Bai	5	0
	Hani	1	0
	Hazak	3	1
	Dai	1	1
	Others	13	6
	Han	0	0
Health	healthy	1104	720
	Basic health	366	156
	Unhealthy, but can take care of itself	42	108
	Can not take care of itself	1	3

<div align="right">(continued)</div>

Table 1. (*continued*)

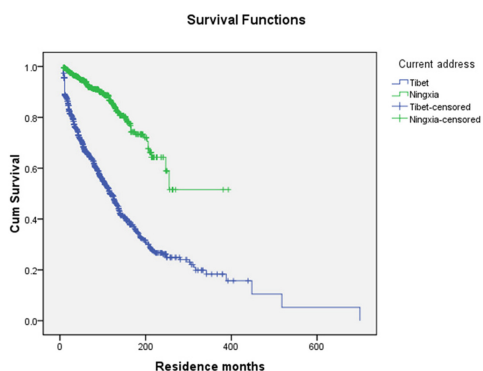| Variables		Municipality of residence	
		Tibet	Ningxia
Participate in the new rural cooperative medical insurance	Yes	1241	704
	No	218	272
	Unknown	54	11
Percentage of Participate in the new rural cooperative medical insurance		82.02%	71.33%

Fig. 1. Years of residence of minority migrants in Tibet and Ningxia (photo credit: Original)

Figure 1 shows that both Log-rank test and Breslow test compare the years of residence of minority migrant population in Tibet and Ningxia are statistically different (p < 0.01).

Have you ever had symptoms of jaundice (yellowing of the skin, mucous membranes and sclera due to increased bilirubin in the serum), conjunctival erythema (redness and swelling of the conjunctiva when the eye is congested), cold or flu in the last year, or any illness (injury) or physical discomfort in the last year? (P < 0.05 for all 12 items). Multifactorial analysis revealed: age [RR = 0.384 (0.326–0.453), P < 0.001], place of residence [RR = 0.230 (0.189–0.280), P < 0.001], health status [RR = 0.821 (0.715–0.944), P = 0.006], presence of physician-diagnosed hypertension and type II diabetes [RR = 1.057(1.018–1.099), P = 0.004] were independent influencing factors. See Table 2.

Table 2. Results of Univariate and Multivariate analyses of years of residents of the floating populations.

Factors	n	Univariate analyses		Multivariate analyses	
		P	RR (95%CI)	P	RR (95%CI)
Age(years)		<0.001		<0.001	0.384(0.326–0.453)
16–40	1745				
41–60	657	<0.001*	0.280(0.228–0.343)		
≥61	98	<0.001*	0.345(0.232–0.514)		
Municipality of residence				<0.001	0.230(0.189–0.280)
Tibet	1513				
Ningxia	987	<0.001	0.225(0.185–0.273)		
Sex					
male	1259				
female	1241	0.003	1.239(1.078–1.424)		
Health		<0.001		0.006	0.821 (0.715–0.944)
Healthy	1824				
Basic health	522	0.034	0.828(0.696–0.986)		
Unhealthy, but can take care of itself	150	<0.001	0.252(0.162–0.390)		
Can not take care of itself	4	0.455	1.698(0.424–6.809)		
High blood pressure or type II diabetes		<0.001		0.004	1.057 (1.018–1.099)
None of them	2060				
High blood pressure	139	<0.001	0.475(0.323–0.699)		
High diabetes	26	0.040	0.234(0.058–0.937)		
High blood pressure and high diabetes	13	0.893	1.062(0.441–2.562)		
Non visit	262	<0.001	1.742(1.441–2.106)		
Incidence of diarrhea (≥3 times daily) in the recent year		<0.001			
N	2070				
Y	295	0.002	0.682 (0.536–0.868)		
unclear	135	0.001	1.574 (1.217–2.035)		

(*continued*)

Table 2. (*continued*)

Factors	n	Univariate analyses		Multivariate analyses	
		P	*RR* (95%CI)	*P*	*RR* (95%CI)
fever (axillary temperature ≥ 38°C) in the recent year		<0.001			
N	2116				
Y	254	<0.001	0.504 (0.379–0.670)		
unclear	130	0.007	1.446 (1.109–1.887)		
Rash (abnormal color, swelling or blister on the skin surface, etc.) in the recent year		<0.001			
N	2341				
Y	69	0.104	0.663 (0.404–1.089)		
unclear	90	<0.001	1.931 (1.424–2.570)		
Jaundice (yellow skin, mucous membrane and sclera caused by increased serum bilirubin level) in the recent year		<0.001			
N	2372				
Y	42	0.682	0.895(0.527–1.520)		
unclear	86	<0.001	1.999(1.483–2.694)		
Conjunctival redness (redness and swelling when conjunctival congestion occurs) in the recent year		0.013			
N	2323				
Y	88	0.027	0.607(0.389–0.946)		
unclear	89	0.061	1.367(0.986– 1.894)		
Cold symptoms in the recent year		<0.001			
N	857				
Y	1533	<0.001	0.716(0.618–0.830)		
unclear	110	0.029	1.381(1.033–1.846)		

(*continued*)

Table 2. (*continued*)

Factors	n	Univariate analyses		Multivariate analyses	
		P	*RR* (95%CI)	*P*	*RR* (95%CI)
Diseases (injury) or physical discomforts in the recent year		<0.001			
N	1714				
Yes, within the recent 2 weeks	176	<0.001	2.540(2.074–3.111)		
Yes, before the recent 2 weeks	610	0.230	0.769(0.502–1.181)		
Incidence of diarrhea (≥3 times daily) in the recent year		<0.001			
N	2070				
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Note * compared with the age 16–40 years subgroup in the first row, (the following cases are similar, all compared with the subgroup in the first row).

4   Conclusions

The Breslow test and the Log-rank test (the former is sensitive to the recent difference and the latter is sensitive to the long-range difference) indicate that there is a statistical difference between the recent and long-range years of residence of the minority mobile population in Tibet and Ningxia, and that the minority mobile population has longer years of residence in Ningxia than in Tibet for reasons that remain unknown.

A multi-factor Cox regression analysis revealed that having hypertension and diabetes was a risk factor (RR > 1, implying a risk factor, i.e., an unfavorable factor), and it was recommended to strengthen hypertension and diabetes prevention, detection, and treatment among the minority mobile population living in Tibet and Ningxia. Because the prevalence of chronic diseases such as hypertension and diabetes is relatively high in China's elderly floating population [12], we should pay more attention to the chronic diseases of minority floating population.

Increasing age and worsening health status were both protective factors (because they both had RR < 1, the two independent influencing factors were both protective, i.e., favorable factors). From 35 years in 1949 to 77 years in 2018, China's per capita life expectancy has more than doubled. With increasing years of residence, the mobile population ages, and as they get older, their health is not as good as when they were younger, and they may develop certain diseases, whereas the provision of free national basic public health services, new rural cooperative medical insurance, and other protection mechanisms make it possible that the appearance of certain diseases does not affect the long-term residence of ethnic minority mobile populations.

The use of basic public health services by ethnic minorities on the move is generally low. It is critical to pay special attention to people who travel alone, within the province, or with limited mobility stability, and to promote the equal and balanced development of basic public health services across regions, as well as between urban and rural areas. Improve social integration to increase access to basic public health services [13]. It is recommended that effective measures be taken to increase the number of minority migrant population participants in the new rural cooperative medical insurance in order to increase the length of residence.

The general comparison of the floating population of ethnic minorities by province is the study's limitation. In future studies, we will concentrate on more precise geographical comparisons (municipal administrative units).

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