

**Public Health Services Utilization and Its Determinants among Internal
Migrants in China: Evidence from a Nationally Representative Survey**

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Abstract: *Background:* Internal migrants had obstacles in accessing local public health services in China. This study aimed to estimate the utilization of local public health services and its determinants among internal migrants. *Methods:* Data were from the 2014 and 2015 nationally representative cross-sectional survey of internal migrants in China. Multivariate logistic regressions were used to estimate the relationship between socioeconomic, migration, demographic characteristics and public health services utilization. *Results:* Internal migrants in more developed eastern regions used less public health services. Those with higher socioeconomic status were more likely to use public health services. The broader and shorter they migrated, the less they used public health services. Compared to migration within the city, migration across provinces is negatively associated with health records (OR=0.88, 95% CI: 0.86-0.90), health education (OR=0.97, 95% CI: 0.94-1.00), and health education on NCDs (OR=0.92, 95% CI: 0.89-0.95) or through Internet channel (OR=0.96, 95% CI: 0.94-0.99). *Conclusion:* Public health services coverage for internal migrants has seen great improvement due to government subsidies. Internal migrants with lower socioeconomic status and across provinces need to be targeted. More attention should be given to the local government in the developed eastern regions in order to narrow the regional gaps.

Keywords: migrant, public health, health education, health records, China

1. Introduction

During the last three decades, the number of internal migrants has been increasing dramatically in China, reaching 245 million and accounting for 18% of the total population in 2016.¹ In China, internal migrants (i.e., the floating population) are defined as those who live outside their cities of Hukou registration. Hukou, a permanent household registration system, ties citizens' access to services according to their Hukou location and Hukou classification (rural vs. urban).² Many public policies and social welfare programs are implemented based on the long-established Hukou system.^{3,4} The Hukou status is also difficult for citizens to be transferred from rural into urban or from one place to another place when people migrate.⁵ Thus, the social welfare and healthcare benefits in urban areas are only available to local residents with registered Hukou, but not to the internal migrants.⁶ The health of internal migrants has not been a focus of the urban healthcare system for a long time. The city government in urban areas mainly addressed three health problems for internal migrants: infectious diseases, reproductive health, and occupational disease, because these problems had external effect on local residents.⁷ However, the prevention and control of non-communicable diseases (NCD) among internal migrants has not become the top priority.

The national program of Equalization of Essential Public Health Services is one of the very few programs that cover the NCD prevention and control for internal migrants.⁸ In 2009, the Chinese government issued this national program, aiming to provide the essential public health services for all residents free of charge.⁹ The essential public health services included the establishment of health records, health education, immunization, children and maternal health management, and NCD management.^{9,10} The government subsidies were given to primary care providers for delivering these services. The government raised the subsidy from 15 Renminbi (RMB) per capita in 2009 to 40 RMB in 2015 for financing essential public health services.¹⁰

Unfortunately, migrants might have obstacles in accessing local public health services

because these capitation-based subsidies were generally allocated based on the number of residents with local Hukou. Although establishing health records was necessary for disease prevention and treatment, only 23.8% of migrants had established health records in 2013.¹¹ While 64.12% of migrants received some health education, more than half of them did not receive any health education on occupational safety and health protection at the cities in 2013.¹¹ Recently some cities issued policies to promote the equalization of essential public health services between migrants and local residents. However, previous studies showed that migrants were still less likely to receive public health services than local residents.¹² A survey in Guangdong province showed that in 2014, the rate of utilizing essential public health services was only 30.37% among the migrants, far below that in the urban residents (43.23%).¹³

In fact, little has been known about national status, regional variations, and the determinants of public health services utilization among internal migrants in China. The existing literature mainly focused on utilization of medical services for internal migrants.^{14,15} The few studies that did investigate the utilization of public health services were limited in generalizability because they only focused on several megacities such as Beijing, Shanghai and Guangzhou,^{16,17} or focused on patients with certain diseases.¹⁸ Moreover, they emphasized on the demographic and socioeconomic factors that affected the utilization of public health services but did not examine the influence of migration characteristics.^{17,19} To provide evidence to achieve the equalization of public health services between residents and migrants, this study aims to investigate the national status, regional variation, and influencing factors of the public health services utilization among Chinese internal migrants, using a nationally representative survey for migrants.

2. Materials and Methods

2.1. Data and Study Design

The data were from the 2014 and 2015 waves of the National Internal Migrants

Dynamic Monitoring Survey (NIMDMS), conducted by the National Health and Family Planning Commission of China. The NIMDMS is a cross-sectional and nationally representative survey of internal migrants aged 15-59 years who did not have the local “Hukou” and had been living in local cities for more than one month.

The sample was drawn using the stratified multi-stage random sampling method with the Probability Proportional to Size (PPS) approach. The survey covered 348 cities from all 32 provincial units in China. Within each city, neighborhoods in urban or suburban areas were randomly selected using the PPS, resulting in a total of 10,300 communities nationwide. In each selected neighborhood, 20 migrants were randomly selected to participate in the survey, and the survey was conducted through the face-to-face interviews. Finally, there were 200,937 and 206,000 migrants who participated in the survey in 2014 and 2015 respectively. All subjects gave their informed consent for inclusion before they participated in the study. Our study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of the School of Public health, Fudan University, China.

The questionnaires included five sections: (I) basic demographic characteristics including gender, age, marital status and etc.; (II) socioeconomic status including education, income and occupational status; (III) migration characteristics; (IV) public health and medical services including establishment of health records, health education, health insurance coverage and hospitalization services; (V) family planning services.

2.2. Dependent Variables

The outcome of the analysis is the utilization of public health services, which is measured by two binary variables indicating the establishment of health records and the attendance of health education sessions in the living city respectively.

We are also interested in the content and methods of health education among internal migrants who received health education. As discussed in the introduction section, the

prevention and control of NCD among internal migrants were often neglected. Thus, we are especially interested in whether migrants received any health education on NCD. We constructed a binary variable based on the question “whether migrants received health education content on NCD prevention, including nutrition health knowledge, chronic disease prevention and mental health prevention.” In addition, the method of health education is measured by a binary variable indicating whether health education is done by face-to-face or online. This variable is constructed based on the question “whether migrants received health education by the Internet channel, including phone message, WeChat and online consultation.”

2.3. Independent variables

The independent variables were socioeconomic, migration, and demographic characteristics.

- Socioeconomic status: Variables included monthly income, educational attainment, employment status, and Hukou status. Income was measured as a continuous variable. Respondents' education levels were categorized into four groups: primary school or below, middle school, high school and college degree or above. Employment status contained three categories: unemployment, employed, self-employed. Hukou status was categorized into two types: rural and urban Hukou.
- Migration characteristics: Migration characteristics were measured by the years of living in the local city, migration scope, causes of migration, and where they lived currently. Migrants may move across counties within the city, across cities within the province, or across provinces, which measured migration scope. The causes of migration included seeking jobs, and their family members following them to migrate or other reasons. The place where they lived was divided as the urban and suburban areas.
- Demographic characteristics: gender, marital status (currently married vs. single), and age were included.

2.4. Statistical analysis

We first described the characteristics of the respondents and their public health services utilization. The provincial variation of public health services utilization rates were then displayed by maps which were created by the geographic information system (GIS). In addition, multivariate regressions were used to estimate the relationship between socioeconomic, migration, demographic characteristics and public health services utilization. In order to control the homogeneity within each city, generalized multilevel models were used in multivariate regressions. All statistical analyses were conducted using SAS 9.4 except for the maps.

3. Results

3.1. Characteristics of the respondents

The characteristics of study participants are presented in Table 1. Overall, the average age was around 35 years in both panels, and there were more males than females, with the majority married. Average monthly income increased from 3721 RMB in 2014 to 4077 RMB in 2015. About 85% of the respondents had completed the education of middle school or above and were registered as rural Hukou. In 2014, about 90% of internal migrants were either employed or self-employed, and this proportion dropped to 82% in 2015. These migrants had lived in the local city around five years, about half migrated across provinces, and 70% lived in urban areas. According to the causes of migration, the percentage of seeking jobs decreased slightly from 88.13% in 2014 to 84.39% in 2015.

Table 1. Characteristics of the respondents in NIMDMS, 2014 & 2015

Characteristics	2014, N (%)	2015, N (%)
<i>Demographic characteristics</i>		
Gender		
Male	117624 (58.55)	109300 (53.06)
Female	83273 (41.45)	96689 (46.94)
Age (year)*	34.66 (9.40)	36.29 (10.64)
Marital status		
Single	47997 (23.89)	43521 (21.13)
Married	152899 (76.11)	162468 (78.87)

Socioeconomic status

Monthly income (RMB)*	3721.86 (5439.44)	4077.82 (4873.15)
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Education

Primary school or below	27911 (13.89)	31336 (15.21)
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Middle school	105874 (52.70)	104005 (50.49)
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High school	41280 (20.55)	44774 (21.74)
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College degree or above	25832 (12.86)	25874 (12.56)
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Employment status

Unemployed	24537 (12.21)	36443 (17.69)
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Employed	82099 (40.87)	78902 (38.30)
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Self-employed	94257 (46.92)	90641 (44.00)
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Hukou status

Rural Hukou	170870 (85.05)	174691 (84.81)
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Urban Hukou	30027 (14.95)	31298 (15.19)
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Migration characteristics

Years of living in the local city*	5.06 (4.78)	5.17 (4.95)
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Causes of migration

Seeking jobs	177045 (88.13)	173829 (84.39)
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Family members following migrants or other reasons	23852 (11.87)	32160 (15.61)
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Migration scope

Across provinces	102371 (50.96)	102781 (49.90)
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Across cities within the province	60933 (30.33)	62503 (30.34)
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Across counties within the city	37593 (18.71)	40705 (19.76)
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Currently living area

Urban	140460 (69.92)	146691 (71.21)
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Suburban	60437 (30.08)	59298 (28.79)
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N	200,937	206,000
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Note: *Mean, SD.

3.2. Utilization of local public health services among internal migrants

Table 2 demonstrates the utilization percentages of local public health services among internal migrants in China. In 2015, 29.10% of the migrants in the survey reported that they have established health records, which increased from 22.98% in 2014. The proportion of migrants who have accessed health education rose from 70.14% in 2014 to 90.70% in 2015. In terms of the content of health education, 95% of the migrants have accessed health education on infection diseases in both panels. Meanwhile, 80.86% of the migrants have accessed health education on NCDs prevention in 2015,

which increased from 66.54% in 2014. Almost all internal migrants accessed health education face-to-face in both panels, whereas the proportion of using the Internet increased from 43.04% in 2014 to 64.97% in 2015.

Table 2. Utilization of local public health services among internal migrants in NIMDMS, 2014 & 2015 (%)

Public health services	2014	2015
Establishment of health records	22.98	29.10
Accessing health education	70.14	90.70
Content of health education accessed		
Prevention of infectious diseases	95.98	94.38
Prevention of non-communicable diseases	66.54	80.86
Methods for accessing health education		
Face-to-face channel	99.26	99.12
Internet channel	43.04	64.97

Figure 1 and 2 show the provincial variation on the percentages of internal migrants who had established health records and accessed health education in 2015. The percentages of using both public health services were higher in central China, and lower in eastern and western China.

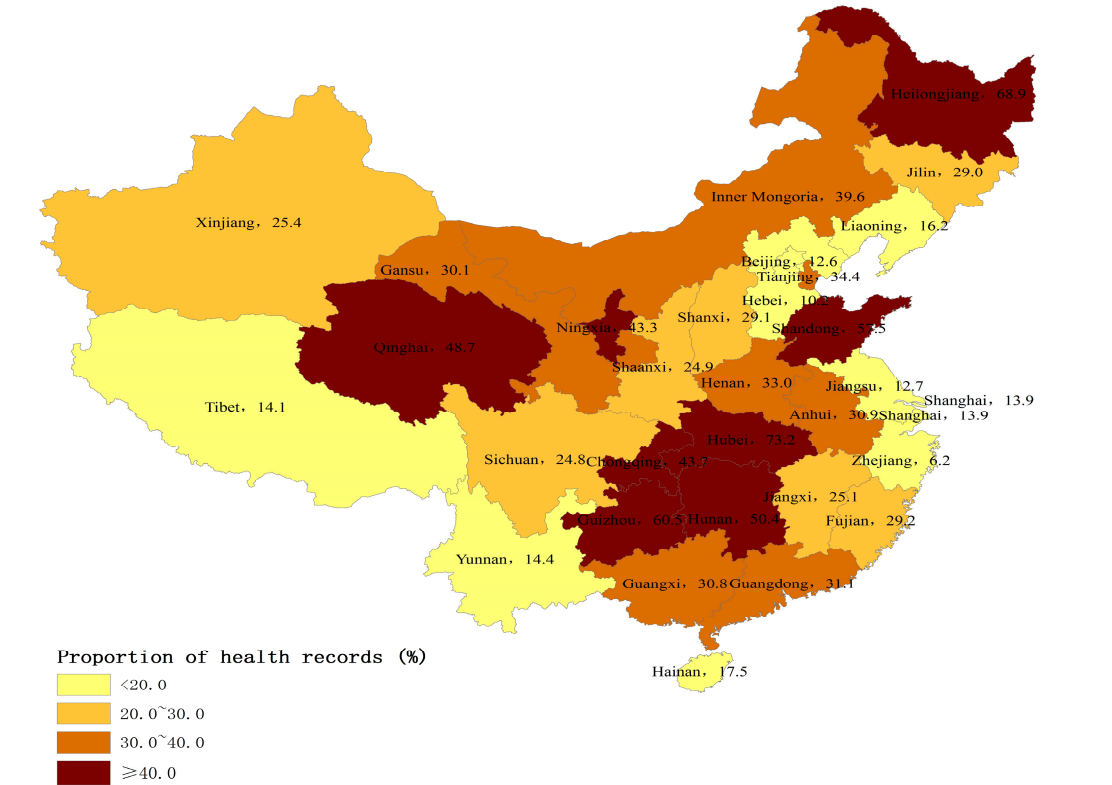


Figure 1: Percentage of internal migrants establishing health records by province, 2015 (%)

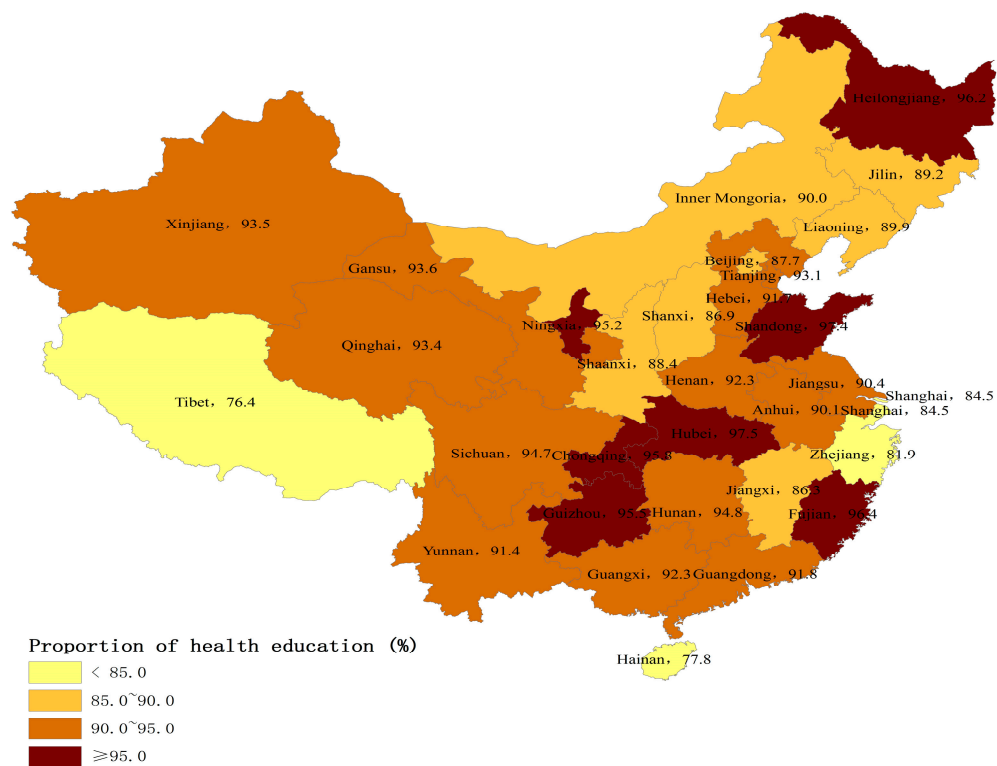


Figure 2: Percentage of internal migrants accessing health education by province, 2015 (%)

Figure 3 and 4 present the provincial variation on the percentages of internal migrants who received health education on NCDs prevention and through Internet channel in 2015. Internal migrants in western China were less likely to receive health education on NCDs prevention and through Internet channel than eastern and central China.

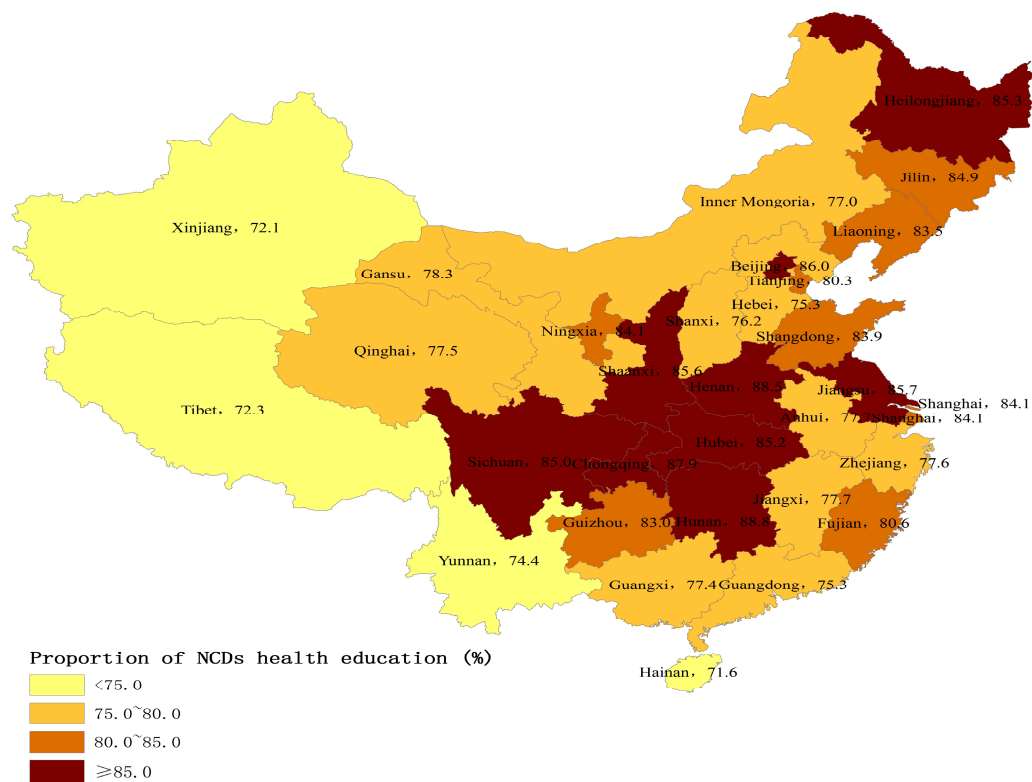


Figure 3: Percentage of internal migrants receiving health education on NCDs prevention by province, 2015 (%)

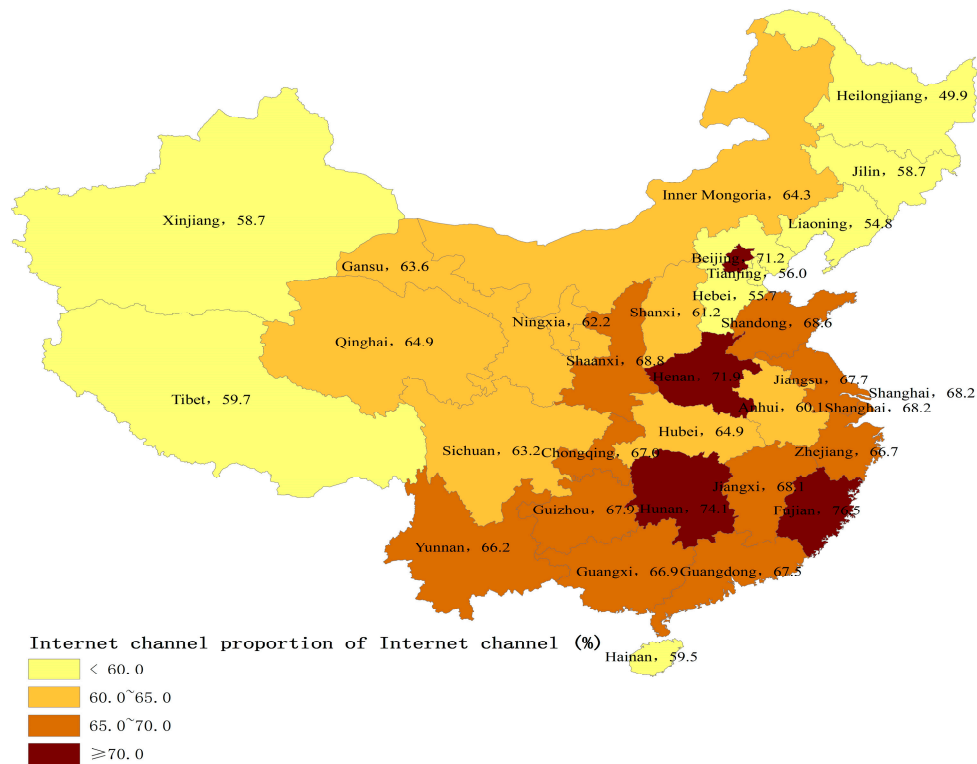


Figure 4: Percentage of internal migrants receiving health education through Internet channel by province, 2015 (%)

3.3. Determinants of local public health services utilization among internal migrants

Table 3 presents the multivariate regression results for the factors associated with utilization of local public health services among all internal migrants (the second and third columns). In terms of the socioeconomic status, internal migrants with higher income and education level were more likely to establish health records and access health education in their living cities. The internal migrants who had a college degree or above were more likely to establish health records (OR=1.37, 95% CI: 1.32-1.42) and access health education (OR=1.86, 95% CI: 1.78-1.94) than those with primary school or below. The employed or self-employed internal migrants had the significantly higher probability to use local public health services than those unemployed. It was also found that the internal migrants with urban Hukou were more likely to establish health records (OR=1.09, 95% CI: 1.70-1.12) and access health education (OR=1.06; 95%CI: 1.03-1.10).

With respect to the migration characteristics, the years of living in the local city was positively associated with the utilization of local public health services. Compared with internal migrants seeking jobs, those who followed others as family members or other reasons for migration were more likely to establish health records (OR=1.09, 95% CI: 1.05-1.13), but were less likely to access health education (OR=0.96, 95% CI: 0.92-1.00). Compared to migration within the city, migration across provinces is negatively associated with the establishment of health records (OR=0.88, 95% CI: 0.86-0.90) and utilization of health education (OR=0.97, 95% CI: 0.94-1.00). Living in urban areas was more positively associated with the establishment of health records (OR=1.26, 95% CI: 1.23-1.29) and utilization of health education (OR=1.34, 95% CI: 1.31-1.37).

In terms of the demographic characteristics, female and currently married internal migrants were more likely to establish health records and utilize health education. Increased age would be related to a higher proportion of health records establishment

257 but lower percentage of health education utilization. The coverage of local public
258 health services was much higher in 2015 than in 2014.

Table 3. Determinants of local public health services utilization, the contents and channels of health education

Variables	Total sample		Subsample using health education	
	Establishment of health records	Using health education	NCDs content	Internet channel
Socioeconomic status				
Monthly income (1000 RMB)	1.00 (1.00-1.01)**	1.01 (1.00-1.01)***	1.01 (1.01-1.01)***	1.02 (1.02-1.02)***
Education (referred to primary school or below)				
Middle school	1.17 (1.13-1.20)***	1.34 (1.30-1.38)***	1.16 (1.12-1.19)***	1.44 (1.40-1.48)***
High school	1.24 (1.20-1.28)***	1.58 (1.52-1.63)***	1.34 (1.30-1.39)***	1.72 (1.67-1.77)***
College degree or above	1.37 (1.32-1.42)***	1.86 (1.78-1.94)***	1.74 (1.67-1.81)***	2.13 (2.06-2.21)***
Employment status (referred to unemployed)				
Employed	1.16 (1.01-1.24)***	1.26 (1.18-1.35)***	1.01 (0.94-1.07)	1.19 (1.12-1.26)***
Self-employed	1.11 (1.04-1.18)**	1.17 (1.09-1.25)***	1.12 (1.05-1.19)***	1.13 (1.07-1.20)***
Urban Hukou	1.09 (1.07-1.12)***	1.06 (1.03-1.10)***	1.12 (1.09-1.15)***	1.13 (1.10-1.16)***
Migration characteristics				
Years of living in the local city	1.02 (1.02-1.02)***	1.01 (1.00-1.01)***	1.01 (1.01-1.01)***	1.00 (1.00-1.00)
Causes of migration (referred to seeking jobs)				
Family members following migrants or other reasons	1.09 (1.05-1.13)***	0.96 (0.92-1.00)*	1.10 (1.05-1.14)***	0.97 (0.94-1.00)
Migration scope (referred to across counties within the city)				
Across provinces	0.88 (0.86-0.90)***	0.97 (0.94-1.00)*	0.92 (0.89-0.95)***	0.96 (0.94-0.99)**
Across cities within the province	0.98 (0.96-0.90)	1.00 (0.97-1.04)	0.96 (0.93-0.98)**	0.92 (0.89-0.94)***
Living in urban areas	1.26 (1.23-1.29)***	1.34 (1.31-1.37)***	1.39 (1.36-1.42)***	1.07 (1.05-1.09)***
Demographic characteristics				
Female	1.14 (1.12-1.16)***	1.30 (1.27-1.32)***	1.08 (1.06-1.10)***	0.90 (0.89-0.92)***
Age (10 years)	1.01 (1.00-1.02)*	0.92 (0.91-0.93)***	1.05 (1.04-1.06)***	0.73 (0.72-0.74)***

Currently married	1.35 (1.32-1.39)***	1.47 (1.44-1.51)***	0.88 (0.86-0.90)***	0.97 (0.95-0.99)*
2015	1.55 (1.53-1.58)***	4.88 (4.78-4.98)***	2.27 (2.23-2.31)***	2.99 (2.94-3.04)***
Observations	352945	352945	284490	284488

260 Notes: Odds ratio and 95% confidence intervals were shown.

261 Significance level: *** p<0.001, ** p<0.01, * p<0.05.

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3.4. Determinants of the content and methods of health education among internal migrants using health education

Table 3 further shows the multivariate regression results for the factors associated with the content and methods of health education among internal migrants using health education (the fourth and fifth columns). In terms of the socioeconomic status, income, education and urban Hukou positively affected the access to health education on NCDs or through Internet channel. The internal migrants with college or above level of education were more likely to access health education on NCDs (OR=1.74, 95% CI: 1.67-1.81) and through Internet channel (OR=2.13, 95% CI: 2.06-2.21) than those with primary or below. Compared to those unemployed, self-employed internal migrants had the higher likelihood of access to health education on NCDs (OR=1.12, 95% CI: 1.05-1.19) and through Internet channel (OR=1.13, 95% CI: 1.07-1.20).

Regarding the migration characteristics, the longer the internal migrants lived in the local city, the higher the possibility of accessing health education on NCDs but no significant difference for usage of Internet channel. The internal migrants who followed others as family members or other reasons for migration were more likely to utilize health education on NCDs than those seeking jobs (OR=1.10, 95% CI: 1.05-1.14), but no significant difference for usage of Internet channel. Compared to migration within the city, migration across provinces and across cities was negatively associated with the access to health education on NCDs or through Internet channel. Living in urban areas was positively associated with the access to health education on NCDs (OR=1.39, 95% CI: 1.36-1.42) and through Internet channel (OR=1.07, 95% CI: 1.05-1.09).

In terms of the demographic characteristics, female and older migrants were more likely to receive health education on NCDs, but were less likely to use Internet channel for health education. Current married participants were less likely to receive health education on NCDs or through Internet channel. The probability of receiving health education on NCDs or through Internet channel in 2015 was twice or three

times of that in 2014.

4. Discussion

Using a nationally representative sample, this study to investigate the utilization of essential public health services and its determinants among internal migrants in China. Our study showed the great improvement of public health services coverage among internal migrants. Specifically, the coverage of health education increased 20 percentages, and the coverage of health education specifically on NCD prevention also increased 14 percentages between 2014 and 2015. More interestingly, there were remarkable regional differences in public health services utilization among internal migrants. Internal migrants in more economically-rich municipalities and eastern coastal areas had lower utilization level of public health services than those in central and northeast regions, which was inconsistent with their regional economic levels. Our study also found that migration characteristics and socioeconomic status were closely associated with the utilization of public health services among internal migrants, which was rarely studied previously.^{11,17}

These improvements in health education coverage may be due to the government-subsided national program, Equalization of Essential Public Health Services, and the subsidy increased year by year.¹⁰ The government free-of-charge policy and subsidies could extend the essential public health services to the vulnerable population such as internal migrants. It was notable that the coverage of health records only saw slow increase. Our results indicated that only 29% of internal migrants established health records in 2015, whereas 75% of local residents had health records.²⁰ This finding was consistent with the previous studies showing that internal migrants had less access to public health services.^{3,12} In fact, health education may not depend on their Hukou status and can reach all people, but health records were much more related with their Hukou status. Since the Hukou status was not easily transferred from rural to urban areas, internal migrants may face major obstacles to establish health records and manage their health in cities.⁴

There may be two reasons to explain the regional variations of public health services utilization. First, compared to local residents, the internal migrants may be more vulnerable in the more developed eastern areas than the remaining areas. In the developed eastern areas, there were much more factors that limited internal migrants to interact with local residents, leading to the larger gap between internal migrants and local residents. Some research showed that the social integration of internal migrants in the eastern areas was worse than in the other areas.²¹ Second, the central government mainly provided subsidies to the underdeveloped central and western areas, and the delivery of public health services was considered as the sole responsibility of local government in the developed eastern areas. According to the national policy, central government should provide 80% and 60% of total subsidies to the western and central regions to deliver essential public health services respectively, but only 10-50% to the eastern regions.²² For example, Gansu province, a less-developed region, received the subsidy from the central government, but Zhejiang province, a developed region did not receive any subsidy.^{23, 24} The subsidies from central government may be more likely to target internal migrants than local government.

Migration characteristics might also influence public health services utilization in different ways. First, instability due to migration status would reduce the continuum and compliance with public health services. Because of residential change and job instability, internal migrants had little incentive to establish health records in the city where they lived, and our study proved this point that less than 30% of internal migrants established health records in the city in 2015. Lack of health records brought challenges to overall health management. Instead, cross-regional resource and information sharing would improve the continuum of public health services for internal migrants.¹⁷ Second, internal migrants may face more stress when they hunt jobs, find and purchase housing and child education,¹⁴ and may have less time to participate in health education. Previous research also showed that to encourage

internal migrants to participate in community activities was important to improve the accessibility of public health services.¹¹ Third, we found that years of migration would increase the probability of utilizing public health services, and also the access to health education on NCDs or through Internet channel, whereas the scope of migration would decrease. Therefore, internal migrants who moved to the local city for a shorter time period or migrated across provinces, were more vulnerable and should be given more attention when providing essential public health services.

In addition, public health services utilization for internal migrants saw the large disparity by socioeconomic status. Higher education level, the employed and urban Hukou were the main protective factors for public health services utilization among internal migrants, which are consistent with previous studies.^{11,18} The internal migrants with higher education levels, usually own the better knowledge and awareness about public health services.¹¹ The employed internal migrants with formal jobs were more likely to establish health records and utilize health education about occupation diseases and NCDs in their community. The internal migrants with urban Hukou had the equal access to public health services with local residents,⁴ indicating rural Hukou was a key hinder of accessing public health services for internal migrants. Therefore, internal migrants with low socioeconomic status should be given more attention in urban healthcare system to achieve the equalization of public health services.

This study has several limitations. First, the public health services policies for internal migrants in each city were not available, and we cannot identify the effect of different policies by city. To control for the effects of city-level variables, we considered the city fixed effect in the analysis. Second, internal migrants with poor health may be more likely to use public health services, but we had no data on their health status. Since age is the key predictor of health, so we included age in our analysis.

5. Conclusions

Public health services coverage for internal migrants has seen great improvement due to government subsidies. Internal migrants with lower socioeconomic status and across provinces are less likely to use public health services and need to be targeted. More attention should be given to the local government in the developed eastern regions in order to narrow the regional gaps and to achieve the equalization of public health services.

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