

Factors Influencing on Utilization of Primary Health Care for Internal Elderly Migrants in China: The Role of Social Contacts

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Abstract

Objective: To explore the influencing factors of the utilization of primary health care from the perspective of social contact among internal elderly migrants in China to provide further insights that might promote their utilization of primary health care.

Methods: 1544 internal elderly migrants in eight cities participated in the survey. Whether to participate in the free health checkup organized by community health service institutions in the past year was adopted as an indicator of the utilization of primary health care, number of local friends and exercise time per day were measured for social contact. Multivariate binary logistic regression was used to understand the association of the variables with the likelihood of using community health services.

Results: Internal elderly migrants who had more social contact were more inclined to use primary health care.

Conclusion: The role of the community should be expanded, such as creating community-based promotions targeting internal elderly migrants or designing social or sports activities tailored to increase the opportunity for contact between local elders and internal elderly migrants.

Introduction

The rapid development of the economy and increasing urbanization has brought about a drastic flow of population in China. The number of internal migrants who moved between regions within the country reached 245 million in 2016, of which 18 million were more than 60 years of age. Furthermore, The Elderly Migrants population is growing faster than the working migrant population and one out of every ten migrants will be age 60 and older nearly under the background of the decline of 3 consecutive years since 2015 in the total number of internal migrants in China, but the number of elderly migrants continues to grow according to the Internal Migrants Dynamic Monitoring Survey according to the Internal Migrants Dynamic Monitoring Survey.

Like international migrants, internal migrants are a potentially vulnerable population health-wise due to the long-standing household registration (“Hukou”) policy and its dual (rural and urban) governance system in china, Internal migrants do not have the same rights and benefits as the local registered population in a variety of areas, for example, social services and health care because they have not “Hukou” not registered in receiving city[1]. They not only are exposed to a number of health risks before, during and after migration, but the barriers to getting health services in the receiving cities may hamper their access to necessary health care, especially for the elderly who are more in need of health services [2]. Promoting the health of those who need more proactive support, such as elderly migrants, is therefore an essential component of public health, while the theme of internal working migrants (<60 years old) on health is common in the literature, there have also been some studies of health of internal migrant women and children, the internal elderly migrants are rarely noticed [3-5].

Studies on international migrants suggested that compared to non-migrants, utilization of healthcare for migrant populations may be unequal because a series of factors in regard to the process of migration, such as health status, self-perceived needs, health-seeking behavior, language barriers, and cultural differences and so on, affected migrants' needs and access [6]. In Europe, the findings found that migrants inclined to have lower attendance and referral rates to mammography and cervical cancer screening, and less use of consultation by

Telephone compared to non-migrants [7]. As the nation's most vulnerable minority groups, elderly immigrants face more serious health disparities than other groups due to their limited health literacy, with many experiencing bad health outcomes significantly [8]. However, a limited number of studies have examined the Utilization of primary health care in China for internal migrants, especially for elderly migrant that is relatively lower than other groups.

Utilization of primary health care is an important aspect of migrants' access to healthcare in the form of screening, preventive services, general practitioners, specialists, emergency rooms and hospitals [9]. Studies in developed countries show immigrants have lower rates of health insurance and use less health care than local populations [10]. Institutional barriers to access include lack of cultural understanding, lack of open access or community clinics, and failure to integrate care with support organizations [11]. In China, primary health care is mainly provided by community health service centers (stations) in the community, With a large number of medical needs caused by huge ageing populations, One of the proposed solutions was to setting up the elderly support systems in the community health service centers (stations) through primary health care [12], For example, The National Policy proposes to provide free medical examinations for the elderly aged 65 and over each year, and is not subject to household registration restrictions as one of the basic public health services.

Core functions of primary health care in China that include prevention, case detection and management, gate keeping, referral, and care coordination and so on are provided by community health service centers in urban communities [13], the main determinants impacting the utilization involve gender, age, education, work time every day and the like. It is evident that social contacts, such as community engagement, social mobilization and ability to communicate were related to health service delivery [14,15]. But little has been done to explore the relationship between social contacts and Utilization of primary health care or the possible mechanisms mediating the relationship, especially for internal elderly people [16,17]. Therefore, our study attempts to explore the influencing factors from the perspective of social contact.

Social contact is a key dimension of poverty and of well-being [18], and play an important role in determining individual health behaviors [19,20], and should be considered alongside these other factors, but the challenge of measuring social contact is daunting, the vast and diverse conceptual literature on it didn't give a unified definition and measurement, Empirical studies explored different aspects of them, including physical isolation and access to social resources, for example, 'people feel that their communities' as a proxy for physical isolation [21], 'ties with other people' as a proxy for access to social

resources through drawing attention away from simply counting numbers of social contacts[22]. For internal elderly people in China, due to retirement and migration, interaction with friends is the main social ties, and exercise in the community is the main way to feel their communities. Referring to the literature and considering the actual situations of the population in question, number of local friends and exercise time per day in the community were chosen as indicators of measuring two aspects of social contacts.

Providing affordable, equitable access to quality basic health care for all its citizens by 2020 has been pledged in China. Strengthening of the utilization of primary health-care facilities is considered as an effective approach. As the number of internal elderly migrant increases, it is necessary to understand the utilization of their health services. Improving their use of primary health services can contribute to health equity. In this study, we are trying to show the situation of the utilization of primary health care for internal elderly migrants, and explore influencing factors from the role of social contact. Our objective was to complement the existing literature by providing further insights into the social contact that might influence primary health care utilization by these migrants. Our results may help policy makers design the proper social policies to improve utilization of primary health care for this disadvantaged population.

Methods

Data and Sampling

Data was derived from the Internal Migrants Dynamic Monitoring Survey of the National Health Commission of the People's Republic of China that was led and organized by the National Health Commission in 2015(Former National Health and Family Planning Commission). The survey belongs to the government's regular data collection, and the unified training investigators helped to fill out the questionnaires by face-to-face home-based interviews, Response rates for the survey was not announced. Our local IRB exempted the analysis of the public-access data because it involved analyzing existing data that had been de-identified; ethical approval was not required.

Stratified, multi-stage sampling based on a probability proportionate to size (PPS) sampling method was adopted, and multilevel random selection was applied. The basic sampling frameworks were all migrants' households reported by each village or neighborhood who did not have "Hukou" (registered resident certificate) in local area and had been living there for more than a month. Multilevel random selection was applied. Township were randomly selected and followed by village or neighborhoods. In each village or neighborhood, migrants' households were selected.

Sampling cities included eight pilot cities (Beijing, Shanghai, Dalian, Wuxi, Hangzhou, Hefei, Guangzhou, and Guiyang). From the perspective of location, Beijing, Shanghai, Hangzhou, Guangzhou and Wuxi are located in the east, which is more economically developed; Guiyang belongs to the western region, Hefei, the central region, and Dalian, the northeast region. Distribution of sample sizes by eight cities were on the basis of maintaining representation to the whole country and provinces, 8,000 households in Beijing and Shanghai, and 2,000 in other cities. 27960 migrants' households participated in the survey finally, in which included 1544 internal elderly migrants aged over 60. In short, 1544 internal elderly migrants as our

targeted population can represent the situation of this population in the country; in addition, data was standardized to adjust bias caused by different regions.

Measures

Variables

Considering that our study targets were internal elderly migrants who had reached the statutory retirement age, we mainly selected indicators of informal networks to weigh the social contacts of our study subjects,, number of local friends and exercise time per day as indicators of measuring social contacts, meanwhile, age, gender, education, marital status, medical insurance, average monthly household income and physical condition as demographic characteristics were measured. See Table 1 for details.

Utilization of PHC

A free medical check-up service organized by the community health service institutions is provided for elderly people over 60 years old in China. Therefore, whether elderly migrants had chosen to participate in this checkup within the past year was adopted as an indicator of their utilization of primary health care (Table 1).

Table 1 Variable assignment

Variables	Assignment
Gender	Male =0, Female =1
Age	60~64=1, 65~69=2, 70~74=3, 75~79=4, 80 and above =4
Education	Primary school or below =1 Middle and high schools =2 College and above =3
Marital status	Married =0, Single =1
Physical condition	Healthy =1, Basically healthy =2, Unhealthy, but can take care of themselves=3, Unhealthy, and cannot take care of themselves =4
Medical insurance	None =1, New Rural Cooperative Medical Scheme (NCMS)=2, Urban and Rural Resident Cooperative Medical Insurance =3, Urban Resident Basic Medical Insurance (URBMI)=4, Urban Employee Basic Medical Insurance (UEBMI)=5, Free Medical Service =6
Number of local friends	0=1, 1~2=2, 3~4=3, 5~6=4, 7~8=5, 9 ~10=6, 10 and above=7
Exercise time per day	0=1, Within 30 minutes =2, 31-60 minutes =3, 61-90 minutes =4, 91-120 minutes =5, Over 120 minutes =6
participate in free checkup within the past year	No=0, Yes=1

Statistical analyses

For descriptive analyses, we aimed to show overall demographics, self-reported health characteristics and social contacts. We calculated average and standard deviations in age, average monthly household income and number of local friends. Meanwhile, we conducted a classification process and calculated the frequency in each categorical variable. For testing the relevance of each categorical variable to the utilization of primary health care, Chi-square analysis was used to examine significance of difference.

To explore the association between social contacts and utilization of primary health care, multivariate binary logistic regression was developed to understand the association of the variables with the likelihood of using primary health care through modeling odds ratios. In the models, we adjusted for age, gender, marital status, education, average monthly household income and physical conditions. In view of the regional differences in significant use of primary health care, regional classification came into the model as fixed-effects to disaggregate the influence of different areas.

Results

Demographic and social contacts

The analytical sample included 1544 internal elderly migrants across four districts. Our sample was 55.6% male, and the mean age was 66.34 years (SD, 5.94), 50.2% of which were in the 60 to 64 age range. On average, we observed a low level of education: 88.6% of the individuals had received an education of high school or below. 78.2% were married, and 94.7% rated their health as healthy or basically healthy. Most of the respondents (74.7%) were in the eastern region. The 25% to 75% interquartile range of the migrants' average monthly household income was 5,000-12,000 RMB (or US\$784 to US\$1881). Gender ($p < 0.05$), age ($p < 0.01$) and regional classification ($p < 0.001$) were related to participation (or lack of participation) in free medical check-ups at community health service organizations in the prior year.

In terms of medical insurance, more than half of them (52.5%) had New Rural Cooperative Medical Care Insurance, which means that the majority of internal elderly migrants came from rural areas. This was followed by Urban Employee Medical Insurance (22.8%), Urban Residents Medical Insurance (9.7%), Urban and Rural Residents Cooperative Medical Insurance (4.0%), Free Medical Service (2.1%), and, for 8.9%, no medical insurance. As regards local friends, the average number of local friends was 8.29 (SD, 11.90), but 12.9% had no local friends. The distribution of the number of friends was relatively balanced, with local friends numbering from 1 to more than 10. With respect to exercise time, 5.2% did not exercise, and most (62.2%) of the exercise time was within 60 minutes per day. Further statistical analysis shows that gender, age, number of local friends ($p < 0.001$) and exercise time per day ($p < 0.01$) were associated with the utilization of primary health care among internal elderly migrants. It was interesting to note that the elders' physical condition was irrelevant to their participation in free medical check-ups.(Table 2).

Table 2 Demographic and social contacts of internal elderly migrants (n = 1544)

	N(%) (n = 1544)	Number of people attending community free medical examinations (%) (n = 511)
Gender* ($\chi^2 = 4.757, p = 0.029$)		
Male	858(55.6)	304(59.5)
Female	686(44.4)	207(40.5)
Age** ($\chi^2 = 13.28, p = 0.01$)		
60-64	775(50.2)	229(44.8)
65-69	387(25.1)	132(25.8)
70-74	208(13.5)	75(14.7)
75-79	125(8.1)	54(10.6)
80-	49(3.2)	21(4.1)
Education		
Primary school or below	683(44.2)	218(42.7)
Middle and high schools	685(44.4)	232(45.4)
College and above	176(11.4)	61(11.9)
Marital status		
Married	1208(78.2)	397(77.7)
Single	336(21.8)	114(22.3)
Physical condition		
Healthy	837(54.2)	284(55.6)
Basically healthy	626(40.5)	201(39.3)
Unhealthy, but can take care of themselves	69(4.5)	25(4.9)
Unhealthy, and cannot take care of themselves	12(0.8)	1(0.2)
Regional classification*** ($\chi^2 = 81.224, p = 0.000$)		
Eastern Region	1153(74.7)	325(63.6)
Central Region	46(3.0)	14(2.7)
Western Region	169(10.9)	106(20.7)

	N(%) (n = 1544)	Number of people attending community free medical examinations (%) (n = 511)
Northeast Region	176(11.4)	66(12.9)
Medical insurance		
None	138(8.9)	39(7.6)
New Rural Cooperative Medical Scheme (NCMS)	811(52.5)	272(53.2)
Urban and Rural Resident Cooperative Medical Insurance	62(4.0)	26(5.1)
Urban Resident Basic Medical Insurance (URBMI)	149(9.7)	43(8.4)
Urban Employee Basic Medical Insurance (UEBMI)	352(22.8)	121(23.7)
Free Medical Service	32(2.1)	10(2.0)
Number of local friends*** ($\chi^2 = 59.398, p = 0.000$)		
0	199(12.9)	23(4.5)
1-2	248(16.1)	74(14.5)
3-4	233(15.1)	76(14.9)
5-6	262(17.0)	95(18.6)
7-8	91(5.9)	37(7.2)
9-10	236(15.3)	90(17.6)
Above 10	275(17.8)	116(22.7)
Exercise time per day** ($\chi^2 = 15.536, p = 0.008$)		
0	81(5.2)	14(2.7)
Within 30 minutes	352(22.8)	116(22.7)
31-60 minutes	608(39.4)	206(40.3)
61-90 minutes	61(4.0)	29(5.7)
91-120 minutes	335(21.7)	108(21.1)
Over 120 minutes	106(6.9)	38(7.4)

*p < 0.05; ** p < 0.01;***p < 0.001

Utilization of PHC

As a national basic public health service project, elderly people over the age of 60 can receive free medical check-up services in community health service institutions where primary health care is delivered mainly. Elders are not restricted by their household registration, as long as they have lived in their community for more than six months. In our study, on average, 33.1% of internal elderly migrants had participated in a free medical check-up offered by a community organization within the previous year.

Association between variables and Utilization of PHC

An associative model was constructed sequentially, first by entering the demographic and region variables (model I), then adding the income and health status variables (model II), and finally the other variables (model III). The models are displayed in Table 3 along with odds ratios (OR) and 95% confidence intervals for OR. The collinearity analysis shows that the tolerances of all independent variables are much greater than 0.1, and the variance inflation factors are less than 10, hence multicollinearity does not exist.

In the model with demographic and regional variables (Model I), age and region were significant predictors of primary health care use. When socioeconomic and health variables were added, both of them remained significant. Of the other variables, an unexpected finding was that average monthly household income was a risk factor for primary health care use (Model II, OR=0.846). The social contact variables, when added, all showed positive association with the utilization of primary health care (Model III, Figure 1). The forest map of the OR values in Model III shows the significance of social contact more intuitively (Figure 1). Other variables that remained significantly associated were age and region. Comparing the results of Model II and Model III, we believe that for internal elderly migrants, economic income had an influence in their utilization of primary health care by virtue of the social opportunities it provided for them (table 3).

Evidence from correlation analysis suggested a significant variation across regions in utilization of primary health care. Therefore, regional classification and demographic characteristics were controlled in logistic regression Model III with regions as fixed effects. The Hosmer and Lemeshow test indicated that the P value ($P = 0.908$) was greater than the inspection level (0.05), which meant that the information in the current data had been completely extracted. The percentage accuracy in classification was 70.4%, suggesting that the means regression model could correctly classify 70.4% of the observations. The odd ratios of the association between social contact and utilization of primary health care are showed in Model III.

Results in Model III also show that age impacts the utilization of primary health care significantly. The probability that respondents more than 75 years old used PHC was more than twice as high as for 60-64-year-olds (OR = 2.099, 95% CI: 1.349-3.265; OR = 2.171, 95% CI: 1.111-4.243). Gender, education, marital status, family average monthly income, and physical condition had no association with the utilization of primary health care. Respondents in different regions had a different probability of using primary health

care; internal elderly migrants in the western region even had fourfold higher odds than those in eastern region (OR = 4.191, 95% CI: 2.902-6.053), where the relatively developed cities are located, such as Beijing, Shanghai, Guangzhou, Hangzhou, etc.; those in the northeast region (Dalian) had 55% (OR = 1.555, 95% CI: 1.093-2.211) higher odds than those who lived in the eastern region.

No matter the region, Associations tended to be stronger for the number of local friends than for the other factors ($p < 0.001$). Respondents who reported having local friends had an almost triple (OR = 2.859, 95% CI: 1.677-4.875) or more than fourfold (OR = 4.607, 95% CI: 2.709-7.837) higher odds of utilizing primary health care than those without local friends. In short, the more local friends, the more likely respondents were to use primary health care. Similarly, respondents who had social medical insurance care had higher odds of utilizing primary health care compared to those who did not have medical insurance, especially for the people who had Urban and Rural Residents Cooperative Medical Insurance (OR = 2.370, 95% CI: 1.213-4.632). Respondents who exercised for 61-90 minutes per day had more than triple (OR = 3.515, 95% CI: 1.538-8.032) the odds of utilizing primary health care than those who did not exercise as much. In a word, internal elderly migrants who had Urban and Rural Resident Cooperative Medical Insurance, many local friends, and engaged in 61-90 minutes of exercise time were more inclined to use primary health care (table 3, Figure 1).

Table 3 Results of Binary Logistic Regression of the Relationship between variables and Utilization of Primary Health Care among Internal Elderly Migrants in China

	Model I		Model II		Model III	
	Demographic + region		Model I+ socioeconomic and Physical conditions		Model II + social integration	
	OR	95% C. I.	OR	95% C. I.	OR	95% C. I.
Gender	0.819	0.648-1.034	0.836	0.661-1.058	0.889	0.698-1.134
Age (years)						
60-64	-	-	-	-	-	-
65-69	1.259	0.962-1.648	1.257	0.959-1.649	1.403*	1.058-1.861
70-74	1.295	0.924-1.815	1.315	0.935-1.851	1.420	0.999-2.018
75-79	1.665*	1.105-2.510	1.804**	1.182-2.754	2.099***	1.349-3.265
80-	1.617	0.862-3.036	1.782	0.940-3.380	2.171*	1.111-4.243
Education						
Primary school or below	-	-	-	-	-	-
Middle and high schools	1.240	0.970-1.585	1.258	0.982-1.611	1.214	0.925-1.594
College and above	1.334	0.917-1.941	1.363	0.935-1.851	1.245	0.814-1.905
Marital status						
Married	1.0	-	1.0	-	1.0	-
Single	0.949	0.707-1.257	0.987	0.734-1.329	1.008	0.740-1.374
Region classification						
Eastern region	1.0	-	1.0	-	1.0	-
Central region	1.331	0.693-2.556	1.328	0.690-2.557	1.312	0.662-2.597
Western region	4.525***	3.195-6.409	4.650***	3.268-6.617	4.191***	2.902-6.053
Northeast region	1.500*	1.073-2.097	1.544**	1.101-2.165	1.555*	1.093-2.211

	Model I		Model II		Model III	
	Demographic + region		Model I+ socioeconomic and Physical conditions		Model II + social integration	
	OR	95% C. I.	OR	95% C. I.	OR	95% C. I.
Average monthly household income			0.846*	0.722-0.991	0.885	0.758-1.033
Physical conditions						
Healthy			-	-	-	-
Basically healthy			0.862	0.683-1.089	0.866	0.680-1.103
Unhealthy, but can take care of themselves			0.890	0.512-1.574	1.011	0.567-1.805
Cannot take care of themselves			0.104*	0.013-0.861	0.211	0.024-1.865
Medical insurance						
None					-	-
New rural cooperative medical care insurance					1.560*	1.016-2.394
Urban and Rural Resident Cooperative Medical Insurance					2.370*	1.213-4.632
Urban Residents Medical Insurance					1.062	0.609-1.852
Urban Employee Medical Insurance					1.260	0.779-2.037
Free Medical care					0.842	0.344-2.060
Number of local friends						
0					-	-
1-2					2.859***	1.677-4.875
3-4					3.318***	1.943-5.665
5-6					3.945***	2.341-6.648

	Model I		Model II		Model III	
	Demographic + region		Model I+ socioeconomic and Physical conditions		Model II + social integration	
	OR	95% C. I.	OR	95% C. I.	OR	95% C. I.
7-8					4.391***	2.320-8.309
9-10					4.377***	2.580-7.426
Above 10					4.607***	2.709-7.834
Exercise time per day						
0					1.0	-
Within 30 minutes					1.661	0.852-3.238
31-60 minutes					1.804	0.943-3.451
61-90 minutes					3.515**	1.538-8.032
91-120 minutes					1.526	0.777-2.997
Over 120 minutes					1.320	0.613-2.840

*p < 0.05; **p < 0.01;***p < 0.001," -" was reference, C.I. = confidence interval

Figure 1 Association between Social contacts and Utilization of Primary Health Care

Discussion

The descriptive statistics reveal that most of the internal elderly migrants are aged 60 to 64. There are more men than women, and all tend to have a lower level of education, which is consistent with the characteristics of internal migrants in general. Physical health advantages are also observed, which is similar to previous research [23], but we did not find a correlation between physical condition and

utilization of primary health care, which is contradictory to other studies about migrants in general [24]. Two factors may account for this result: First, the elderly who are able to move away from their hometowns are better physically fit generally and not inclined or used to seeking health services in health institutions. Second, for internal elderly migrants as a socially disadvantaged group, the social factors that affect their access to primary health care may be more significant, such as institutional obstacles due to restrictions on household registration, etc. [24]. Another inconsistency with previous studies is that marital status is also irrelevant to the utilization of primary health care. Those studies showed that persons who are 65 years of age or older and living with others are less likely to see a doctor than persons who live alone [25]. We think the respondents in our study migrated with their family at large and the companionship coming from family may have replaced the role of marriage. Meanwhile, we found that region is related to utilization of primary health care. Whether a person lives in a metropolitan area or a smaller community can lead to different results in utilization of health services, as confirmed by earlier findings of other studies [26]. How to influence the utilization of health services, however, needs further study.

8.9% of elderly internal migrants do not have medical insurance, which means they are in an inferior position compared to the 95% coverage of the entire population by three public insurance plans (NCMS, URBMI, and UEBMI) [27]. In addition, 12.9% of these elderly have no local friends, just as the Internal Migrants Dynamic Monitoring Survey Report of China points out. Compared with the local elderly, migrants do not have their own circle of friends and relatives, and their living ranges are relatively small because they are far from their hometowns and old friendship circles. In addition, over 60% of internal elderly migrants have not participated in free medical examinations offered in the community, which shows that the obstacles for internal elderly migrants in using primary health care persist, just as other studies have shown [24]. As the free medical check-ups for the elderly in a community are not restricted by household registration requirements, social contact have to be considered.

It is interesting to note that utilization is worse in the regions with higher levels of social and economic development. For example, the eastern region is more economically developed, as a reference region, but internal elderly migrants who live there have a lower probability using primary health care than elderly migrants other regions. Conversely, the western region, which is least developed, has the highest probability of utilization of primary health care. These results support the idea that there is an inverse association between community social capital and the utilization of primary health care, which has been reported in previously published cross-sectional analysis [26, 28]. Because of this potential bias, we stratified by region while at the same time adjusting demographic, socioeconomic, and health variables. In terms of demographic characteristics, the only significant predictor of primary health care use is age, which had a positive association. We did not find that gender, marriage, education, economic income, or physical health have significant impacts on the utilization of primary health care, as other studies have discovered [25, 29, 30, 31]. In this case, we believe the discrepancy may be attributed to our target research groups and the type of health services. First, our objects are internal elderly migrants who tend to live with their families, because most of the elderly migrants moved with their children to take care of

their grandchildren; therefore, the impacts on the children may be greater than on themselves. Second, we focused on free medical check-up services in the community, so it is reasonable to suggest that in this case economic income is not significant.

As one would expect, excluding the influences of the above factors, medical insurance, number of local friends, and exercise time per day are significantly associated with the utilization of primary health care. As a protective factor, medical insurance coverage can contribute to utilization of primary health care among internal elderly migrants, which is consistent with previous research results [32, 33]. Simultaneously, the more local friends, the more likely elderly migrants are to use community health services, which may be due to the information and supports that friends provide. We note, as well, that exercise should be encouraged, as exercise time between 60 and 90 minutes per day is more beneficial for promoting the utilization of primary health care.

Conclusions

In conclusion, it is important to recognize the role of the influence of social contact on the utilization of primary health care among internal elderly migrants. This study provides a more in-depth examination of the relationship between the two and confirms the positive association. Internal elderly migrants without local friends, medical insurance, and exercise habits should be given more attention. The role of the community should be expanded, such as creating community-based promotions targeting internal elderly migrants or designing social or sports activities tailored to increase the opportunity for contact between local elders and internal elderly migrants. In view of the growing number of internal elderly migrants; all these activities can achieve a significant increase in the welfare of this vulnerable elderly group in China.

Declarations

List of abbreviations

OR: odds ratios

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Authors' contributions

Conceived and designed the study: CW. Performed the study: YL, CC, QC, JX.

Analyzed the data: YL. Wrote the paper: YL.

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Availability of data and materials

The data used in this paper were provided by the National Health Commission of the People's Republic of China, which is the top agency governing health issue in China. We have to sign a legally binding agreement with the Commission that we will not share any original data to any third parties. It is third party data and the authors did not produce any of the original data. Although interested researchers can apply for the access to the data at

<http://www.moh.gov.cn/ldrks/s7846r/201410/ee63c32ca4b7443faf2feeb14ce88874.shtml> and E-mail:ldrkzxsj@163.com,the final decision is up to the National Health Commission of the People's Republic of China.

Ethics approval and consent to participate

Our local IRB exempted the analysis of the public-access data because it involved analyzing existing data that had been de-identified; ethical approval was not required.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Figures

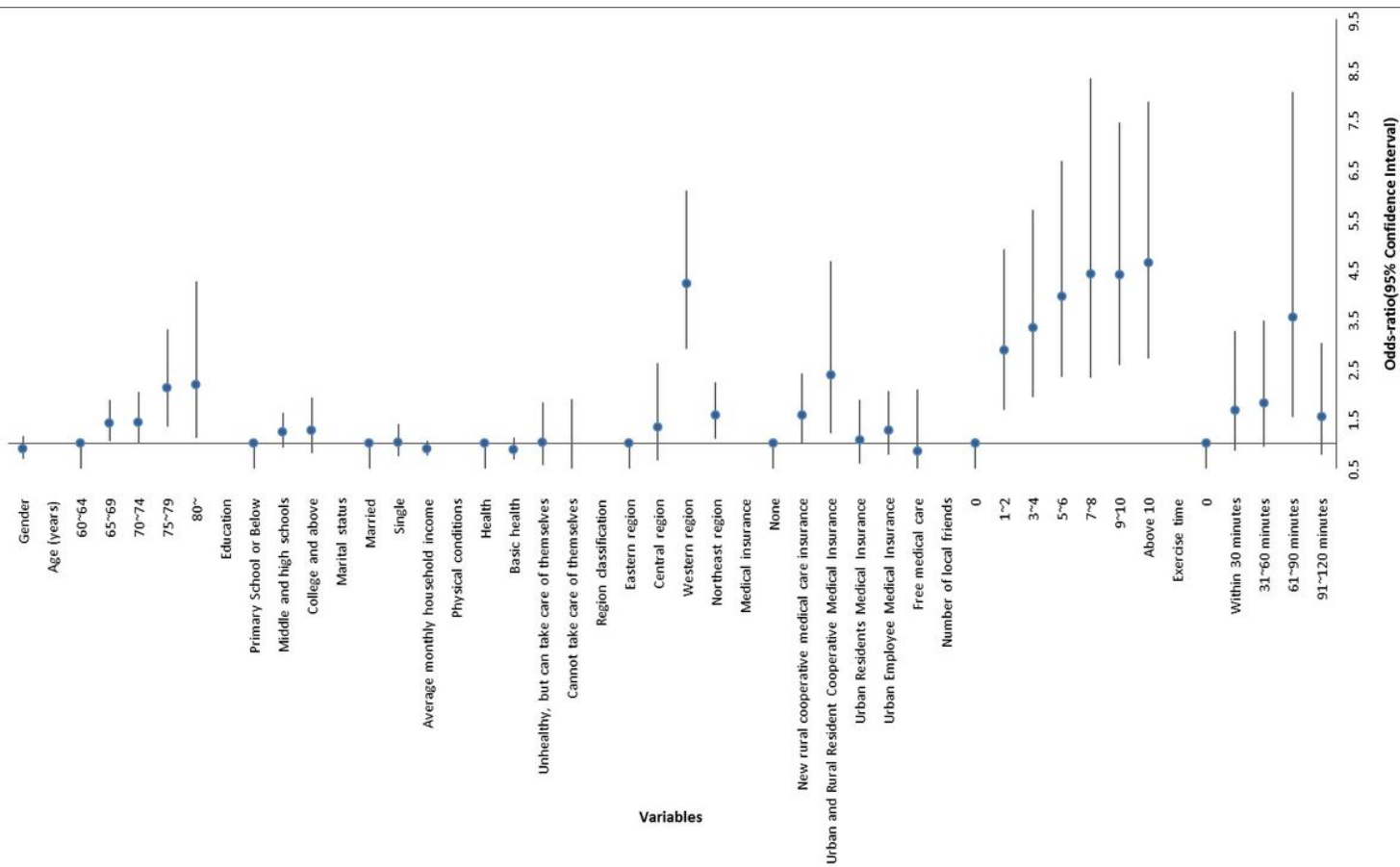


Figure 1

Association between Social contacts and Utilization of Primary Health Care