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Physical health, life satisfaction, social support and their effects on the willingness to receive eldercare among the elderly in urban and rural areas

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-020225
Article Type:	Research
Date Submitted by the Author:	24-Oct-2017
Complete List of Authors:	Xing, Yanan; Harbin Medical University School of Public Health, Department of Health Management Pei, Ruijuan; Harbin Medical University School of Public Health, Department of Health Management Qu, Jing; Harbin Medical University School of Public Health, Department of Health Management Yan, Guanyun; Harbin Medical University School of Public Health, Marketing Management Zhou, Hao; Center for Disease Control and Prevention, Harbin , China, Department of Quality Control Liu, Xinyan; Harbin Medical University School of Public Health, Department of Health Management Zhang, Zhong; Harbin Medical University School of Public Health, Department of Health Management Sun, Tao; Harbin Medical University School of Public Health, Wang, Zhaoqing; Harbin Medical University School of Public Health, Department of Health Management Li, Li; Harbin Medical University School of Public Health, Department of Health Management
Primary Subject Heading:	Public health
Secondary Subject Heading:	Health services research, Public health
Keywords:	Physical health, Life satisfaction, Social support, Family eldercare, Institutional eldercare

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Physical health, life satisfaction, social support and their effects on the willingness to receive eldercare among the elderly in urban and rural areas

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Abstract:

Purpose

The purpose of this article is to study the physical health, life satisfaction and social support of the elderly, along with the effects of these aspects on the willingness of eldercare, in urban and rural areas. The information will aid in our understanding of the genuine needs of the elderly, so that we can provide services that will ensure comfortable and happy lives for them.

Methods

Sample data from Heilongjiang Province, China was used. A total of 1003 the elderly were selected through multistage sampling. Data were processed with Epidata and analyzed by SPSS 19.0. Descriptive statistics, chi-square, t-test, and logistic regression analysis were used to measure the level of physical health, life satisfaction and social support, as well as their effects on the willingness of eldercare among the elderly in urban and rural areas.

Results

The results revealed that lots of the elderly would prefer family eldercare. The percentage of the elderly who would prefer to have institutional eldercare is greater in urban areas than in rural areas. Factors that influenced the willingness of eldercare for the urban elderly were age, house property, and objective support. For the rural elderly, having children, living alone, and having house property were associated with the willingness of eldercare.

Conclusion

The elderly should be provided with more eldercare support and a platform for efficient communication. For the elderly who are willing to choose institutional eldercare, the government should provide some type of economic insurance and the disposition of resources should be optimized according to the demand for institutional eldercare.

Keywords: physical health; life satisfaction; social support; family eldercare; institutional eldercare;

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Strengths and limitations of this study

Made a comprehensive study that selected physical health, life satisfaction and social support as the potential factors which may affect the willingness of eldercare.

Analysed the different factors influenced in the willingness of eldercare among the elderly in urban and rural areas.

Used cross-sectional design, data were collected at only one point in time.

Our participants were from a single province, and therefore, we cannot generalize the results to assume that they apply to all of the elderly in China.

Introduction

The aging population has become one of the major social problems in the world. In China, which is the largest developing country in the world, the trend of population aging has become a serious issue [1]. By the end of 2015, 222 million are aged 60 years or older, which comprises 16.1 percent of the total population [2]. And there were 40.63 million disabled elderly in China, which made up 18.3% of the aged population.The problems associated with eldercare have become challenges for both our government and society, since the aging population typically experiences an increase in health problems.

Nowadays, the main way of eldercare was family eldercare and institutional eldercare in China. Family eldercare refers the elderly live in home and receive care from their families; institutional eldercare is when the elderly choose to live in an institution that provides all of their care.

In recent years, increased geographic mobility and reduced family size due to one-child policy have made more adult children unavailable for elder care [3]. In the meanwhile, the traditional institutional eldercare service can not meet the high level demands of the elderly for the quality of life. Therefore, the rational allocation of eldercare resources and appropriate development of eldercare services has become urgent problems. We should combine resources and explore various methods of eldercare in order to meet the growing needs of this population. What's more, we

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should also know the willingness of eldercare which is defined as the attitude to and selection preference of some kind ways for eldercare [4].

Based on the current literatures, the willingness of eldercare will be affected by many factors, including demographical and economical factors, physical health, life satisfaction, and social support.

Firstly, in the studies of the effect of the demographical and economical factors on the willingness of eldercare. A study found that gender, perceived family harmony, perceived filial piety, socio-cultural beliefs and self-assessed economic status were associated with willingness to live in eldercare institutions for both urban and rural older adults[5]. Age, living arrangements, and socioeconomic status are major determinants of institutional residence[6,7]. Another study also pointed that low income level was negatively associated with a willingness to stay in an elder home [8]. Secondly, in the studies of effects of physical health on the willingness of eldercare, Ewa Borowiak pointed out that the living arrangements are related to the physical health of the elderly [9]. The study conducted by Wang reveals that the health condition of the elderly is related to their need of institutional eldercare [10]. Further study is supported by John, who found that with the decline of physical health, the demand for institutional eldercare increases [11].

Thirdly, in the studies of life satisfaction and its effects on the willingness of eldercare. Research analyzed the life satisfaction of the rural elderly, and the results revealed that 50% of the rural elderly are not satisfied with their current living conditions [12]. Another study pointed out that 88.3% of the urban elderly are satisfied with their lives [13]. Other studies have shown that elderly with lower life satisfaction tend to choose institutional eldercare [14]. In agreement with this study, Yuan shows that the more satisfied with life the elderly are, the less willing they will be to choose institutional eldercare [15].

Besides, there are many studies on social support. In rural areas, the social is less sufficient than in urban areas [16]. The influential factors of social support mainly include the education level, annual income, living condition, and chronic disease prevalence [17]. Bryła reported that social support has a positive effect on

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health, because it can meet people's psychological needs and plays an essential role in reducing stress [18]. Social support will also have a clear impact on the willingness of eldercare. Liu found that the more social support the elderly receive, the less likely they are to accept institutional eldercare [19].

The effects of these factors on the willingness of eldercare are not isolated. Currently, there are few comprehensive studies on the influential factors of the willingness of eldercare. Therefore, this study selected physical health, life satisfaction and social support as the potential factors which may affect the willingness of eldercare.

In China, there is a certain gap between urban and rural area [20]. And the gap caused the serious inequality between urban and rural areas, such as the inequality of political right, income, agriculture and industry [21]. Some of the studies were aimed at the difference between the willingness of eldercare in urban and rural areas. In recent years, however, some elders are willing to live alone [22]. Another study shows that the elderly in urban areas are willing to live in the home and they hope that the community can provide them with the necessary services [23]. Rural elders want to spend their old age at home, receiving care from their children [24]. But, there's not an analysis of the different factors influenced in the willingness of eldercare among the elderly in urban and rural areas.

This study includes the following aspects: the level of physical health, life satisfaction, social support and willingness of eldercare both in urban and rural elderly; the differences in physical health, life satisfaction and social support for each eldercare option; comparing and analyzing the influential factors of the willingness of eldercare among the elderly in urban and rural areas.

Methods

Data and Sample

In this study, we used multistage sampling to select participants. First, three cities (Harbin, Qiqihaer, and Jiamusi) were selected based on gross domestic product. Second, three communities in urban areas and three villages from rural areas were randomly selected in each city. Individuals were included in the study if they met the

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following conditions: aged 60 years or older, clear consciousness, and effective verbal communication. Additionally, the participants consented to our investigation.

Data collection

We conducted the six-month-long survey from March 1-August 31, 2016. The data were collected through face-to-face interviews by trained undergraduate and graduate students from Harbin Medical University using a questionnaire. In total, 1,200 questionnaires were distributed. Among them, participants with not responding to the survey, or not answering the willingness to receive eldercare survey question were excluded. Finally, a valid questionnaire was returned by 1,003 subjects, giving an overall response rate of 83.6%.

Assessment tools

The instrument used in the study consisted of a questionnaire composed of four sections. Section 1 focused on the respondents' socioeconomic and demographic status. Section 2 assessed the willingness of eldercare, based on a single-item measure. Respondents were asked, "Which are you willing to choose between: family eldercare or institutional eldercare?" Respondents marked 0 for family eldercare and 1 for institutional eldercare.

Section 3 assessed self-rated physical health. Respondents were asked, "how do you rate your health?" Respondents were asked to indicate the rate of feeling with their own health on a 5-point scale, ranging from 1 (worst) to 5 (best).

Section 4 assessed life satisfaction. The 5-item version of the Life Satisfaction Scale compiled by Diener was used for measurement. Respondents were asked to indicate the strength of their agreement with statements on a 7-point scale, ranging from 1 (highly disagree) to 7 (highly agree) [25]. Then, scores were averaged across items to form a scale score. The scale achieved reasonable reliability in our sample, with Cronbach's alpha value measured at 0.96.

Section 5 assessed social support, which refers to the opportunities available for the individual to receive assistance from other groups in the social environment. Social support was measured with a 10-item scale, which was developed by Xiaoshuiyuan in 1986. The scale classifies social support into subjective support (4

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items), objective support (3 items) and support utilization (3 items) [26]. Each item was scored on a scale of 1 to 4. Within each subscale, score of each item were added to form a subscale score. The sum of three subscale scores is total social support. In addition, the Cronbach's alpha value for the individual scales ranged from 0.89 to 0.94. In the present study, the scale demonstrated appropriate reliability.

Data analysis

Data were processed with Epidata and double-entered to ensure data quality. The sample characteristics were analyzed using descriptive statistics through SPSS 19.0. Descriptive analyses included frequencies and percentages for categorical variables and means and SDs for continuous variables. Mean differences were examined using t-tests and categorical variables differences were examined using chi-square with significance set at $p<0.05$. The influential factors for willingness of eldercare were analyzed by logistic regression, with $p<0.05$.

Ethics approval

Ethics approval for this study was granted by the Institutional Research Board of Harbin Medical University.

Results

Sample Characteristics

Table 1 displays the demographic characteristics of the participants. The questionnaire was completed by 581 respondents from urban areas and 422 respondents from rural areas. In urban areas, female and male were 59% and 41% of the respondents, respectively, and the average age was 74.23. In rural areas, the average age of the participants was 72.39, with more male (55.9%) than female (44.1%). The income of urban elderly is higher than that of rural elderly. Most participants (92.5%) do not work. In the survey, the majority of the elderly have children (97.6% in urban areas and 90.8% in rural areas), with 19.4% of the urban elderly living alone compared to 18% of the rural elderly. The survey revealed that the proportion of the elderly who have house property in urban and in rural areas was quite similar, at 62.1% and 60.2%, respectively. Unfortunately, 74.7% of the respondents were suffering from chronic diseases. Sex ($P = 0.000$), monthly income

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(P = 0.000), have children (P = 0.000) were significantly different between urban and rural areas.

Table 1.Descriptive Analysis of the Sample Characteristics In Urban and Rural areas

variable		Urban area (n=581)		Rural area (n=422)		Total (n=1003)		χ^2/t	P
		N	%	N	%	N	%		
Sex	male	238	41.0	236	55.9	474	47.3	21.905	0.000
	female	343	59.0	186	44.1	529	52.7		
Age （range≥ 60）	<70	238	41.0	270	64.0	508	50.6	0.804	0.422
	70-79	171	29.4	109	25.8	280	27.9		
	≥80	172	29.6	43	10.2	215	21.4		
	mean±SD	74.23±25.71		72.39±46.24		73.45±35.80			
Monthly income （RMB）	<500	11	1.9	209	49.5	220	21.9	32.320	0.000
	500-999	23	4.0	111	26.3	134	13.4		
	1000-1999	126	21.7	73	17.3	199	19.8		
	2000-2999	258	44.4	20	4.7	278	27.7		
	≥3000	163	28.1	9	2.1	172	17.1		
Work	Yes	49	8.4	26	6.2	75	7.5	1.825	0.177
	No	532	91.6	396	93.8	928	92.5		
Have children	Yes	567	97.6	383	90.8	950	94.7	22.798	0.000
	No	14	2.4	39	9.2	53	5.3		
Living alone	Yes	113	19.4	76	18.0	189	18.8	0.331	0.565
	No	468	80.6	346	81.2	814	81.2		
House property	Yes	361	62.1	254	60.2	615	61.3	0.390	0.532
	No	220	37.9	168	39.8	388	38.7		
Chronic diseases	Yes	445	76.6	304	72.0	749	74.7	2.681	0.102
	No	136	23.4	118	28.0	254	25.3		

Physical health, Life satisfaction and Social support of the elderly in urban and

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rural areas

Table 2 shows that there was a statistically significant difference in life satisfaction, support utilization, and overall social support in relation to one's place of residence, with scores being higher for urban rather than rural respondents. The overall social support of the elderly in urban and rural areas (32.29±7.14 and 30.66±7.41, respectively) is lower than the norm of social support (34.56±3.73). This indicates that there is insufficient social support for the elderly in both urban and rural areas.

Table 2.Physical health, Life satisfaction and Social support of the elderly in urban and rural areas

	Urban			Rural			P
	Mean	Range	SD	Mean	Range	SD	
Physical health	3.26	1-5	1.017	3.36	1-5	0.906	0.088
Life satisfaction	26.53	5-35	5.73	23.80	5-35	6.78	0.000
objective support	6.85	1-20	2.28	6.33	1-20	2.17	0.693
subjective support	19.34	8-32	4.65	19.38	8-32	5.09	0.885
support utilization	6.67	3-12	2.64	4.94	3-12	2.42	0.000
Overall social support	32.29	12-64	7.14	30.66	12-64	7.41	0.000

Physical health, Life satisfaction, social support and the willingness of eldercare

The results show that the differences in objective support, subjective support, and overall social support were statistically significant in the choice of institutional eldercare and family eldercare (Table 3). Among the elderly who chose family eldercare, the mean objective support, subjective support, and overall social support scores were 6.85±2.10, 20.13±4.59 and 32.88±7.07, respectively. Among the elderly who chose institutional eldercare, the mean objective support, subjective support, and overall social support scores were 5.64±2.22, 18.43±4.97 and 30.06±7.27, respectively.

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Table 3.Physical health, Life Satisfaction and Social support of the elderly who choose family eldercare and institutional eldercare

	Family eldercare			Institutional eldercare			P
	Mean	Range	SD	Mean	Range	SD	
Physical health	3.38	1-5	1.002	3.33	1-5	0.938	0.212
Life satisfaction	25.16	5-35	6.41	25.65	5-35	6.25	0.226
objective support	6.85	1-20	2.10	5.64	1-20	2.22	0.000
subjective support	20.13	8-32	4.59	18.43	8-32	4.97	0.000
support utilization	5.91	3-12	2.66	5.98	3-12	2.73	0.660
Overall social support	32.88	12-64	7.07	30.06	12-64	7.27	0.000

The willingness of eldercare in urban and rural areas

Table 4 shows that there was a statistically significant difference in the willingness of eldercare in relation to place of residence ($p<0.05$). Out of the respondents, 51.6% of the urban elderly and 54.7% of the rural elderly would prefer family eldercare when they are old. The elderly who would prefer institutional eldercare in urban areas (48.4%) is greater than in rural areas (45.3%).

Table 4.Comparison of the willingness of eldercare in urban and rural areas.

	Urban area		Rural area		p
	N	%	N	%	
Willingness of institutional eldercare	281	48.4	173	45.3	
Willingness of family eldercare	300	51.6	249	54.7	0.021
total	581	100	422	100	

Influencing factors of the willingness to reserve eldercare

For urban elderly, the age, house property and objective support are predictors of willingness of institutional eldercare (table 5). Compared with less than 70 years old, the elderly who are older than 80 years old (OR=2.226, P<0.01) are more likely to choose institutional eldercare. The participants who have house property (OR=0.517, P<0.01) reported less willingness of institutional eldercare. When objective support

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increased by one grade, the willingness of institutional eldercare decreased by 0.197 (OR=0.803, P<0.01).

The rural elderly who have children (OR=0.370, p<0.05) and have house property (OR=0.392, p<0.01) are less willing to choose institutional eldercare. The elderly who are living alone (OR=2.459 p<0.05) are more willing to choose institutional eldercare (Table 5).

Table 5.Logistic regression analysis for the willingness of eldercare among the elderly in urban and rural areas

variable		Urban area OR,95%CI	Rural area OR,95%CI
Sex(ref=male)	female	1.225, 0.840-1.786	0.977, 0.623-1.534
Age(ref=<70)	70-79	1.200, 0.775-1.859	0.718, 0.422-1.220
	≥80	2.226**, 1.373-3.608	1.506, 0.699-3.245
	500-999	0.159*, 0.029-0.880	1.603, 0.930-2.764
Monthly income	1000-1999	0.411, 0.093-1.822	1.630, 0.870-3.055
(ref=<500)	2000-2999	0.400, 0.091-1.747	2.005, 0.711-5.657
	≥3000	0.384, 0.086-1.709	1.091, 0.225-5.294
Work(ref=no)	yes	1.119, 0.579-2.164	2.077, 0.836-5.157
Have children(ref=no)	yes	0.672, 0.182-2.489	0.370*, 0.147-0.930
Living alone(ref=no)	yes	0.919, 0.544-1.553	2.459*, 1.182-5.114
House property(ref=no)	yes	0.517**, 0.348-0.768	0.392**, 0.249-0.618
Chronic disease(ref=no)	yes	1.240, 0.786-1.967	1.420, 0.845-2.385
Self-rated physical health		1.123, 0.914-1.380	0.978, 0.743-1.288
Life satisfaction		1.009, 0.971-1.048	1.017, 0.978-1.059
Objective support		0.803**, 0.725-0.890	0.968, 0.846-1.107
Subjective support		0.973, 0.927-1.020	0.972, 0.920-1.028
Support utilization		1.023, 0.949-1.102	1.045, 0.948-1.151

Ref=Reference categories; *p<0.05; **p<0.01；OR: odds radio；CI：confidence interval code; family eldercare=0; institutional eldercare=1

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DISCUSSION

It is very important to understand the willingness of eldercare to better cope with the aging population. This study is one of the first to examine the level of physical health, life satisfaction and social support and their combined effects on the willingness of institutional eldercare. And we also compared the willingness of institutional eldercare between urban and rural areas. In this study, we found that life satisfaction, support utilization, the overall social support and the willingness of eldercare are different in urban and rural areas. And the influential factors of the willingness of eldercare are also different in urban and rural areas.

Results indicated that life satisfaction in urban areas is higher than that in rural areas (Table 2), which is consistent with previous studies [27]. Several factors may have contributed to these findings. The first reason is the influence of income. In this study, the income of urban elderly is higher than that of rural elderly. A study pointed that the difference in life satisfaction between urban and rural elders is the influence of their income, a higher economic level provides more life protection, so as to maintain and improve life satisfaction [28]. Another reason is the impact of the physical health of the elderly. Being ill not only affects the normal life of the elderly, but also brings pain, which as a result reduces the satisfaction of life [29]. In this study, the prevalence rate of illness for the elderly in rural areas is higher than for the urban elderly. Suffering from diseases leads to their higher dissatisfaction with life. The formation of the two-dimensional structure of urban and rural areas in China resulted in a great difference in living standards and convenience, and this certainly influenced the differences in life satisfaction as well [30,31,32].

With regard to social support, results showed the subscale of support utilization and the overall social support for the urban elderly are higher than that of the rural elderly (Table 2) . Our results are consistent with the findings of another research [33,34]. And the social support score of this study was lower than other studies, and was lower than the norm[35].That is to say, the social support for the elderly is insufficient for these respondents. Social support is the main source of relationships and social networks, and members retain a sense of happiness through the existence of

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social support [36]. In Taiwan, higher cognitive function in community-living elderly was associated with increased social support[37]. Another study pointed that social relations play an important role in the health of the elderly[38].Therefore, it is important for us to take measures to ensure the social support for the elderly. Firstly, the community should build an activity center according to the actual situation of the elderly. And participatory programs should be improved [39]. Many participatory programs for older people, such as village services in England and social activity formal support networks in the Philippines [40], have demonstrated that the elderly who participate in social activities have a corresponding increase in the level of their support utilization.

And then, we included physical health, life satisfaction and social support of the elderly who chose family eldercare versus institutional eldercare. Table 3 shows that the score of objective support, subjective support, and overall social support of the elderly who chose family eldercare are higher than that of those who chose institutional eldercare. Liu noted that the elderly tend to live in their existing living environment in order to maintain the established social support [41]. This indicates that when the objective and subjective support of the elderly meets their needs within the family and community, the elders are more inclined to choose family eldercare.

Last, the study compared the willingness of eldercare among the elderly in urban and rural areas. The proportion of the urban elderly who chose institutional eldercare is higher than that of the rural. In both urban and rural areas, the willingness of family eldercare is higher than the willingness of institutional eldercare (Table 4). This phenomenon indicates that family eldercare is still the primary choice for old-age support for the elderly in China. But in this study, more than 40 % of the elderly chose institutional eldercare, this proportion is still high. At present, there are about 40 million people in Heilongjiang Province[42], with 7.302 million beds available beds[43], which can meet the needs of less than 5% of the elderly. Clearly, the gap between beds and demand is still great. But there is a contradiction exists in the reality, although there are many old people want to choose the institutional eldercare, due to the facilities, fees, and nursing of the eldercare institution does not meet the needs of

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the elderly, many old people did not go to the institutional eldercare in fact. Local government should enrich the institutional eldercare, strengthen the publicity of institutional eldercare, and increase the community services to supplement the lack of family eldercare [44]. Meanwhile the government should give subsidies to the elderly who live in eldercare institutions, and provide some economic security for the elderly who will need institutional eldercare [45]. But the government cannot afford to take on huge eldercare pressures. Welfare pluralism has also pointed that eldercare problems cannot be undertaken by the government alone[46]. The main responsibility of the government is to establish an effective and secure eldercare system to meet the basic needs of the elderly. We should build up a new form of eldercare and learn the advanced foreign experience, such as American eldercare form of house-for-pension and Japanese Day-care [47].

In this study, we also found the influential factors of the willingness of eldercare in urban and rural areas are different. The influential factors of the eldercare of urban elders are age and objective support (Table 5). In rural areas the factors are have children and living alone. Many studies are consistent with our findings[48,49]. The elderly in urban areas who are over 80 years old prefer institutional eldercare. This may be caused by the decline in self-care ability of the elderly, and if the family cannot meet the needs of the elderly, they need professional care [50]. When we make a single factor analysis, objective support and subjective support influence the willingness of eldercare (Table 4). However, when we put physical health and the psychological condition of the sample in logistic regression analysis, only objective support affects the willingness of eldercare (Table 5). Objective support includes individual social networks, as well as financial and emotional support from others in the past. The elderly have a fundamental need to have emotive and informational communication with their families and society, which gives them spiritual consolation. Therefore, when objective support meets the needs of the elderly, they prefer to live in their home [51]. In rural areas, the elderly who have children and live with family were willing to choose family eldercare (Table 5). Similar results have also been found in other studies [52,53]. The elderly who have children will choose family

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eldercare regardless of whether they have social support. There is a traditional concept that raising children ensures a warm old age, which is not only part of the culture, but also a kind of eldercare strategy for rural residents[54].In the opinion of some elders, if they live in an eldercare institution, their children may be considered unfilial and they may be ridiculed[55].

Conclusions:

This article focuses on the physical health, life satisfaction, and social support of the elderly in urban and rural areas and the effects on the willingness of eldercare.

There are differences in life satisfaction and social support between the elderly in urban and rural areas. Therefore, the government should change the two-dimensional structure of urban and rural areas, and focus on the poor people and vulnerable groups in rural areas.

The results also indicate that nearly half of the elderly in Heilongjiang will choose institutional eldercare. Although the demand for institutional eldercare is large, the occupancy rate of the eldercare institution is still very low[56,57]. This indicates that institutional eldercare cannot meet the needs of the elderly in service levels and equipment condition. Alternatively, it could be that due to the current insurance system, the elderly cannot afford the cost of institutional eldercare. If this is the case, the government should pay more attention to improving medical and endowment insurance. The government should also optimize the disposition of resources for the elderly according to the demand for institutional eldercare.

Acknowledgment

The authors thank all participants in this study helping us complete this study.

Funding

Funding this study was funded by the National Science Foundation of China (NSFC), Contract No.71573066/G0308 and Contract No.71203050/G0308.

Availability of data and materials

Data will not be shared because, when we sought informed consent from the participants, we promised them that we would not disclose their information.

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Author Contributions

LL conceived and designed the experiments; NX JP JQ HZ performed the experiments; NX JP JQ YL WQ analyzed the data; LL YG ZZ TS contributed reagents/materials/analysis tools; NX wrote the paper. LL critically revised the paper. All authors checked and proofread the final version of manuscript.

Conflicts of Interest

The authors have no conflicts of interest.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

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Urban-rural differentials in the factors associated with the willingness to receive eldercare among the elderly : a cross-sectional survey in China

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-020225.R1
Article Type:	Research
Date Submitted by the Author:	04-Jan-2018
Complete List of Authors:	Xing, Yanan; Harbin Medical University School of Public Health, Department of Health Management Pei, Ruijuan; Harbin Medical University School of Public Health, Department of Health Management Qu, Jing; Harbin Medical University School of Public Health, Department of Health Management Yan, Guanyun; Harbin Medical University School of Public Health, Marketing Management Zhou, Hao; Center for Disease Control and Prevention, Harbin , China, Department of Quality Control Wang, Zhaoqing; Harbin Medical University School of Public Health, Department of Health Management Yan, Wenxin; Harbin Medical University School of Public Health, Department of Health Management Sun, Xinran; Harbin Medical University School of Public Health, Department of Health Management Sun, Tao; Harbin Medical University School of Public Health, Li, Li; Harbin Medical University School of Public Health, Department of Health Management
Primary Subject Heading:	Public health
Secondary Subject Heading:	Health services research, Public health
Keywords:	the willingness of eldercare, the elderly, urban, rural

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Urban-rural differentials in the factors associated with the willingness to receive eldercare among the elderly : a cross-sectional survey in China

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Abstract

Objective: The willingness of eldercare was an important factor affecting the rational allocation of resources and appropriate development of eldercare services. The objective of this article was to study the difference of the willingness of eldercare and the affecting factors in urban and rural areas.

Design: Cross-sectional survey

Setting: Heilongjiang Province, China

Participants: A total of 1003 the elderly were selected through multistage sampling in Heilongjiang Province.

Primary and secondary outcome measures: Descriptive statistics were reported for socioeconomic status and demographic characteristics, level of physical health, life satisfaction and social support. Mean differences were examined using t-tests and categorical variables differences were examined using chi-square. The influential factors for willingness of eldercare were analyzed by logistic regression.

Results: The results revealed that 51.6% of the urban elderly and 54.7% of the rural elderly would prefer family eldercare. Factors that influenced the willingness of eldercare for the urban elderly were age, house property, and objective support，which were having children, having house property, and living alone for rural elderly.

Conclusion: The elderly should be provided with more eldercare support and a platform for efficient communication. The government should optimize the disposition of resources according to the demand for institutional eldercare. In the meanwhile, it was also important to offer more support for family eldercare.

Keywords: the willingness of eldercare; the elderly; urban; rural

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Strengths and limitations of this study

This study was one of the first studies to analyze the combined effects of socioeconomic status, demographic characteristics, physical health, life satisfaction and social support on the willingness of eldercare for elderly in urban and rural areas.

The approach to self-reports of the elderly in the survey may led to response bias.

The small sample may limit the generalisability of the research findings.

Introduction

The aging population has become one of the major social problems in the world. In China, which is the largest developing country in the world, the trend of population aging has become a serious issue [1]. By the end of 2016, 230 million were aged 60 years or older, which comprised 16.7 percent of the total population [2]. There were 40.63 million disabled elderly in China, which made up 18.3% of the aged population. The problems associated with eldercare have become challenges for both government and society, since the aging population typically experiences increasing health problems.

In China, the main ways of eldercare were family eldercare and institutional eldercare. Family eldercare referred that the elderly live in home and receive care from their families; institutional eldercare was when the elderly choose to live in an institution that provides all of their care.

Recently, increased geographic mobility and reduced family size due to one-child policy have made more adult children unavailable for elder care [3]. In the meanwhile, the traditional institutional eldercare services can not met the high level demands of the elderly. Based on this situation, a set of policies officially was introduced by China's central government, called for the development of eldercare services. The government invested a lot in the construction of infrastructure, which focused on improving the convenience of life and enriching the spiritual and cultural life for the elderly of family eldercare. In the mean while, the government promoted common development for both public and private eldercare institutions through providing preferential policies for private institutions.

As known, it is very important take the elders' willingness of eldercare into

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consideration first in allocating sources [4]. Therefore, we should also focus on the willingness of eldercare which is defined as the attitude to and selection preference of some kind ways for eldercare [5].

There were extensive literatures concerning current situation and factors affecting the willingness of eldercare for the elderly. A study of the willingness to use a nursing home in Korean American elders showed that 45% of the elderly reported their willingness to use a nursing home [6]. It was lower than 16.7% found in a study of the elderly in Taiwan, China [7]. A study showed that in urban and rural areas, only 20 and 17 percent of older adults, respectively, were willing to live in eldercare institutions in 2009 [8].

Regarding the influencing factors of the willingness of eldercare, lots of studies found that some socioeconomic and demographic status, including age, sex, socio-cultural beliefs and self-assessed economic status were associated with willingness to live in eldercare institutions [3,9,10]. Engelhardt findings suggested that reductions in social security benefits would significantly alter the living arrangements of the elderly, and that a 10% cut in social security benefits would lead more than 600,000 independent elderly households to move into shared living arrangements [11]. Research focusing on functional levels and health found that with the decline of physical health and self-care ability, the demand for institutional eldercare increased [12]. Besides, social support, perceived family harmony and perceived filial piety could affect the eldercare willingness. Liu found that the more social support the elderly receive, the less likely they were to accept institutional eldercare [13]. Chou pointed that a feeling of loneliness and life satisfaction were about the willingness of eldercare [8]. The elderly prefer institutional eldercare with low life satisfaction [14,15].

However, the effects of these factors on the willingness of eldercare are not isolated. Previous studies on the willingness of eldercare used different framework. Based on the physical status, psychological condition and social relations of the elderly, we set up a conceptual framework for this study stems from four resources: socioeconomic and demographic status, physical health, life satisfaction and social support.

In China, there were a huge difference between urban and rural areas in income

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and living environment [16]. Some studies showed that the willingness of eldercare between urban and rural areas were differently [17,18]. But, there was not an analysis of the different factors influenced in the willingness of eldercare among the elderly in urban and rural areas.

The purpose of this study were (1) to study on the willingness of eldercare from socioeconomic and demographic status, physical health, life satisfaction and social support and (2) to compare and analyze urban-rural differentials in the factors associated with the willingness of the elderly.

Methods

Data and Sample

A multistage sampling was used to select participants. First, three cities (Harbin, Qiqihaer, and Jiamusi) were selected based on per capita gross domestic product. The total of the elderly in Harbin, Qiqihaer, and Jiamusi was 1.848, 0.845, 0.427 million respectively. Second, three communities in urban areas and three villages from rural areas were randomly selected in each city. Individuals were included in the study if they met the following conditions: aged 60 years or older, clear consciousness, and effective verbal communication. Additionally, participants were assured that participation in the survey was voluntary, and the return of questionnaires represented informed consent.

Data collection

A cross-sectional survey was conducted from March 1, 2016 to August 31, 2016. The data were collected through face-to-face interviews by trained 9 undergraduate and 9 graduate students from Harbin Medical University using a structured questionnaire. A operation manual was made to offer a suggestion on how to ask each question. And a pre-investigation was conducted to find out the problems and to give a further training for interviewers.

In total, 1,200 questionnaires were distributed (included 600 in urban and 600 in rural). Among them, participants with not responding to the survey, or not answering the willingness to receive eldercare survey question were excluded. Finally, a valid questionnaire was returned by 1,003 subjects (included 581 in urban and 482 in rural), giving an overall response rate of 83.6%. The response rate of urban and rural areas was

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96.8% and 80.3% respectively.

Assessment tools

The instrument used in the study consisted of a questionnaire composed of five sections. Section 1 focused on the respondents' socioeconomic and demographic status, including sex, age, mothly income, work, education, have children or not, marriage status, living arrangement, house property and chronic disease. WHO made a definition for chronic diseases which were not passed from person to person. They were of long duration and generally slow progression. The four main types of chronic diseases were cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes. In this study, we listed these diseases and set up a multiple choice questions. Respondents were asked, "Are you suffering from the following chronic diseases?" They were thought have chronic disease if any of diseases was selected. The answer of Yes was coded as 0 and No was coded as 1.

Section 2 assessed the willingness of eldercare, based on a single-item measure. Respondents were asked, "Which are you willing to choose between: family eldercare or institutional eldercare?" Respondents marked 0 for family eldercare and 1 for institutional eldercare.

Section 3 assessed self-rated physical health. Respondents were asked, "How do you rate your health?" Respondents were asked to indicate the rate of feeling with their own health on a 5-point scale, ranging from 1 (worst) to 5 (best).

Section 4 assessed life satisfaction. The 5-item version of the Life Satisfaction Scale compiled by Diener was used for measurement. Respondents were asked to indicate the strength of their agreement with statements on a 7-point scale, ranging from 1 (highly disagree) to 7 (highly agree) [19]. Then, scores were averaged across items to form a scale score. The scale achieved reasonable reliability in our sample, with Cronbach's alpha value measured at 0.96.

Section 5 assessed social support, which referred to the opportunities available for the individual to receive assistance from other groups in the social environment. Social support was created by Xiaoshuiyuan in 1986 and publicly introduced in 1994. The

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scale was measured with a 10-item scale and classified social support into subjective support, objective support and support utilization. Subjective support was measured by 4 items: (1)How many friends you can get support; (3)The relationship between you and your neighbors; (4)The relationship between you and your colleagues; (5)support and care from family members. Objective support was measured by 3 items: (2)living conditions in recent year; (6)financial support in case of emergency; (7)comfort and care in the case of an emergency. Support utilization was measured by 3 items: (8)the way you pour out feeling when you are in trouble; (9)the way you seek help when you are in trouble; (10) the frequency with which you participate in group activities [20]. Each item was scored on a scale of 1 to 4. Within each subscale, score of each item were added to form a subscale score. The sum of three subscale scores was total social support. In addition, the Cronbach's alpha value for the individual scales ranged from 0.89 to 0.94. In the present study, the scale demonstrated appropriate reliability.

Data analysis

Data were processed with Epidata and double-entered to ensure quality. The sample characteristics were analyzed using through SPSS 19.0. Descriptive analyses included frequencies and percentages for categorical variables and means and SDs for continuous variables. Mean differences were examined using t-tests and categorical variables differences were examined using chi-square with significance set at $p<0.05$. The influential factors for willingness of eldercare were analyzed by logistic regression, with $p<0.05$. In this study, the outcome variable was the willingness of the eldercare (0 for family eldercare and 1 for institutional eldercare). Based on the literature review and the purpose of this study, fifteen independent variables were identified as potential factors, including socioeconomic and demographic status, physical health, life satisfaction and social support.

Results

Sample Characteristics

Table 1 displayed the demographic characteristics of the participants. The questionnaire was completed by 581 respondents from urban areas and 422 respondents from rural areas. In urban areas, female and male were 59% and 41% of the respondents,

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respectively, and the average age was 74.23. In rural areas, the average age of the participants was 72.39, with more male (55.9%) than female (44.1%). The income of urban elderly was higher than that of rural elderly. Most participants (92.5%) did not work. In the survey, the majority of the elderly had children (97.6% in urban areas and 90.8% in rural areas), with 19.4% of the urban elderly living alone compared to 18% of the rural elderly. The survey revealed that the proportion of the elderly who had house property in urban and in rural areas was quite similar, at 62.1% and 60.2%, respectively. Unfortunately, 74.7% of the respondents were suffering from chronic diseases. Sex (P = 0.000), monthly income (P = 0.000), education (P=0.000), have children (P = 0.000) and marriage status (P=0.000) were significantly different between urban and rural areas.

Table 1 Descriptive Analysis of the Sample Characteristics in Urban and Rural areas

variable		Urban area (n=581)		Rural area (n=422)		Total (n=1003)		P
		N	%	N	%	N	%	
Sex	male	238	41.0	236	55.9	474	47.3	0.000
	female	343	59.0	186	44.1	529	52.7	
Age（range≥60）	<70	238	41.0	270	64.0	508	50.6	0.422
	70-79	171	29.4	109	25.8	280	27.9	
	≥80	172	29.6	43	10.2	215	21.4	
	mean ± SD	74.23 ± 25.71		72.39 ± 46.24		73.45 ± 35.80		
Monthly income（RMB）	<500	11	1.9	209	49.5	220	21.9	0.000
	500-999	23	4.0	111	26.3	134	13.4	
	1000-1999	126	21.7	73	17.3	199	19.8	
	2000-2999	258	44.4	20	4.7	278	27.7	
	≥3000	163	28.1	9	2.1	172	17.1	
Work	Yes	49	8.4	26	6.2	75	7.5	0.177
	No	532	91.6	396	93.8	928	92.5	
Education	Primary school	192	33	330	78.2	522	52	0.000

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	or below							
	Middle and high school	318	54.7	88	20.9	406	40.5	
	Junior college or above	71	12.2	4	0.9	75	7.5	
Have children	Yes	567	97.6	383	90.8	950	94.7	0.000
	No	14	2.4	39	9.2	53	5.3	
Marriage status	Single/Widowed/Divorced	273	47	137	32.5	410	40.9	0.000
	Married	308	53	285	67.5	593	59.1	
Living arrangements	Alone	113	19.4	76	18.0	189	18.8	0.565
	With children or others	468	80.6	346	81.2	814	81.2	
House property	Yes	361	62.1	254	60.2	615	61.3	0.532
	No	220	37.9	168	39.8	388	38.7	
Chronic diseases	Yes	445	76.6	304	72.0	749	74.7	0.102
	No	136	23.4	118	28.0	254	25.3	

Physical health, Life satisfaction and Social support of the elderly in urban and rural areas

Table 2 showed that there was a statistically significant difference in life satisfaction, support utilization, and overall social support in relation to one's place of residence, with scores being higher for urban respondents than rural respondents.

Table 2 Physical health, Life satisfaction and Social support of the elderly in urban and rural areas

	Urban			Rural			P
	Mean	Range	SD	Mean	Range	SD	
Physical health	3.26	1-5	1.017	3.36	1-5	0.906	0.088
Life satisfaction	26.53	5-35	5.73	23.80	5-35	6.78	0.000

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objective support	6.85	1-20	2.28	6.33	1-20	2.17	0.693
subjective support	19.34	8-32	4.65	19.38	8-32	5.09	0.885
support utilization	6.67	3-12	2.64	4.94	3-12	2.42	0.000
Overall social support	32.29	12-64	7.14	30.66	12-64	7.41	0.000

The willingness of eldercare in urban and rural areas

Table 3 showed that there was a statistically significant difference in the willingness of eldercare between urban and rural areas ($p<0.05$). Out of the respondents, 51.6% of the urban elderly and 54.7% of the rural elderly would prefer family eldercare when they are old.

Table 3 Comparison of the willingness of eldercare in urban and rural areas.

	Urban area		Rural area		p
	N	%	N	%	
Willingness of institutional eldercare	281	48.4	173	45.3	
Willingness of family eldercare	300	51.6	249	54.7	0.021
total	581	100	422	100	

Physical health, Life satisfaction and Social support of the elderly between family eldercare and institutional eldercare in urban and rural areas

The results of variance analysis were showed in Table 4. There were significant differences in scores for objective support, subjective support, and overall social support according to family eldercare and institutional eldercare for urban and rural respondents. Both in urban and rural areas, the elderly who prefer family eldercare reported significantly higher scores on objective support, subjective support, and overall social support.

Table 4 Physical health, Life satisfaction and Social support of the elderly between family eldercare and institutional eldercare in urban and rural areas

	Urban			Rural		
	Family eldercare	Institutional eldercare	P	Family eldercare	Institutional eldercare	P

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	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Physical health (range 1-5)	3.21 ± 1.038	3.31 ± 0.994	0.211	3.37 ± 0.950	3.36 ± 0.841	0.902
Life satisfaction (range 5-35)	26.53 ± 5.76	26.53 ± 5.70	0.994	23.52 ± 6.77	24.20 ± 6.81	0.307
subjective support (range 8-32)	20.21 ± 4.55	18.40 ± 4.57	0.000	20.01 ± 4.64	18.48 ± 5.55	0.002
objective support (range 1-20)	6.97 ± 2.10	5.54 ± 2.24	0.000	6.70 ± 2.09	5.81 ± 2.20	0.000
support utilization (range 3-12)	6.67 ± 2.59	6.65 ± 2.71	0.913	4.97 ± 2.44	4.89 ± 2.39	0.717
Overall social support (range 12-64)	33.87 ± 7.02	30.59 ± 6.89	0.000	31.69 ± 6.97	29.19 ± 7.77	0.001

Influencing factors of the willingness to reserve eldercare

For urban elderly, the age, house property and objective support were predictors of willingness of institutional eldercare (table 5). Compared with less than 70 years old, the elderly who older than 80 years old (OR=2.791, P=0.000) were more likely to choose institutional eldercare. The participants who had house property (OR=0.494, P=0.001) reported less willingness of institutional eldercare. When objective support increased by one grade, the willingness of institutional eldercare decreased by 0.236 (OR=0.764, P=0.000).

The rural elderly who had children (OR=0.368, P=0.035) and had house property (OR=0.371, P=0.000) were less willing to choose institutional eldercare. The elderly who were living alone (OR=3.361 P=0.005) are more willing to choose institutional eldercare (Table 5).

Table 5 Logistic regression analysis for the willingness of eldercare among the elderly in urban and rural areas

variable	Urban area	P	Rural area	P

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		OR,95%CI		OR,95%CI	
Sex(ref=male)	female	1.086, 0.732-1.612	0.682	0.857, 0.536-1.372	0.521
Age(ref=<70)	70-79	1.309, 0.836-2.050	0.239	0.750, 0.438-1.286	0.296
	≥80	2.791, 1.644-4.737	0.000	1.831, 0.826-4.060	0.137
	500-999	0.161, 0.029-0.891	0.036	1.625, 0.939-2.811	0.083
Monthly income	1000-1999	0.394, 0.088-1.760	0.222	1.611, 0.847-3.067	0.146
(ref=<500)	2000-2999	0.349, 0.079-1.548	0.166	1.717, 0.580-5.077	0.329
	≥3000	0.316, 0.069-1.443	0.137	1.002, 0.178-5.645	0.998
Work(ref=no)	yes	1.077, 0.553-2.099	0.827	2.163, 0.854-5.477	0.104
Education(ref=Primary school and below)	junior college and above	1.506, 0.775-3.003	0.245	0.484, 0.040-5.848	0.568
	Middle and high school	1.484, 0.930-2.367	0.098	1.609, 0.913-2.834	0.100
Have children(ref=no)	yes	0.611, 0.161-2.314	0.468	0.368, 0.146-0.930	0.035
marriage status(ref=Married)	Single/Widowed/Divorced	0.697, 0.401-1.213	0.202	0.622, 0.307-1.259	0.187
Living arrangement(ref=with children and others)	Alone	0.982, 0.563-1.713	0.949	3.361, 1.436-7.866	0.005
House property(ref=no)	yes	0.494, 0.329-0.740	0.001	0.371, 0.231-0.596	0.000
Chronic disease(ref=no)	yes	1.254, 0.794-1.982	0.332	1.451, 0.861-2.448	0.162
Physical health		1.140, 0.927-1.403	0.216	0.979, 0.742-1.292	0.882
Life satisfaction		1.009, 0.972-1.049	0.630	1.020, 0.980-1.061	0.340
Subjective support		0.962, 0.916-1.011	0.126	0.963, 0.908-1.020	0.200
Objective support		0.764, 0.681-0.858	0.000	0.959, 0.835-1.102	0.557
Support utilization		1.017, 0.943-1.097	0.666	1.039, 0.942-1.147	0.446

Ref=Reference categories; OR: odds radio；CI：confidence interval code; family eldercare=0;

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institutional eldercare=1

DISCUSSION

It was very important to understand the willingness of eldercare to better cope with the aging population. In this study, we compared and analyzed the willingness of eldercare and its influencing factors among the elderly in urban and rural areas.

First, we researched the difference of physical health, life satisfaction and social support of the elderly in urban and rural areas. Improving life satisfaction of the elderly was a topic that has been studied extensively by researchers and managers. This study indicated that life satisfaction in urban areas was higher than that in rural areas (Table 2), which was consistent with previous studies [21]. Several factors may have contributed to these findings. The first reason was the influence of income. A study pointed that a higher economic level provided more life protection, so as to maintain and improve life satisfaction [22]. In this study, the income of urban elderly was higher than that of rural elderly. Another reason was the impact of the physical health of the elderly. Being ill not only affected the normal life of the elderly, but also brought pain, which as a result reduced the satisfaction of life [23]. In this study, the prevalence rate of illness for the elderly in rural areas was higher than for the urban elderly. The formation of the two-dimensional structure of urban and rural areas in China resulted in a great difference in living standards and convenience, which certainly influenced the differences in life satisfaction as well [24-26].

With regard to social support, results showed the subscale of support utilization and the overall social support for the urban elderly were higher than that of the rural elderly (Table 2) . Our results were consistent with the findings of previous research [27,28]. Social support was the main source of relationships and social networks, and retained a sense of happiness for members [29]. In Taiwan, higher cognitive function in community-living elderly was associated with increased social support [30]. Another study pointed that social relations played an important role in health of the elderly[31]. Therefore, it was important for us to take measures to ensure the social support for the elderly. Firstly, the community should build an activity center according to the actual situation of the elderly. And participatory programs should be improved [32]. Many

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participatory programs for older people, such as village services in England and social activity formal support networks in the Philippines [33], have demonstrated that the elderly who participated in social activities have a corresponding increase in the level of their support utilization.

Then, the study compared the willingness of eldercare among the elderly in urban and rural areas. The proportion of the urban elderly who chose institutional eldercare is higher than that of the rural. In both urban and rural areas, the willingness of family eldercare is higher than the willingness of institutional eldercare (Table 3). This phenomenon indicated that family eldercare was still the primary choice for the elderly in China. Unfortunately, the proportion of willingness to institutional eldercare were really high both in urban and rural areas (more than 40%). By the end of 2016, 230 million were aged 60 years or older in China, with 7.302 million beds available beds [2,34], which can meet the needs of 3.2% of the elderly. Based on the need of eldercare and resource planning ratios, there is a shortfall of eldercare bed. Paradoxically, although there were many the elderly prefer institutional eldercare, but they did not go to the eldercare institution in fact. One reason for the low occupancy may be the facilities, fees, and nursing of the eldercare institution does not met the needs of the elderly. Therefore, to better develop eldercare service, much more research on the willingness of the elderly was needed.

Last, the study compared the willingness of eldercare and its influencing factors among the elderly in urban and rural areas. The results showed that both urban and rural elders who had a house property were more inclined to choose family eldercare (Table 5). We also found different influential factors of the willingness of eldercare for urban and rural elders.

The elderly in urban areas who were over 80 years old and received lower objective support prefer institutional eldercare(Table 5). This may be because that self-care ability of the elderly declined with age. When life care and nursing care provided by the family were inadequate, the elderly need more professional care [35].

When we made a single factor analysis, objective support and subjective support influence the willingness of eldercare (Table 4). Liu noted that the elderly tended to live

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in their existing living environment in order to maintain the established social support [13]. This indicated that when the objective and subjective support of the elderly met their needs within the family and community, the elders were more inclined to choose family eldercare. However, when we put demographic and economic factors, physical health and life satisfaction together in logistic regression analysis, only objective support affected the willingness of eldercare (Table 5). Objective support included individual social networks, as well as financial and emotional support from others in the past. The elderly had a fundamental need to receive emotive and informational communication with their families and society, which gave them spiritual consolation. Therefore, when objective support met the needs of the elderly, they preferred to live in home [36].

In rural areas, the elderly who have children and live with family were willing to choose family eldercare (Table 5). Similar results had also been found in other studies [37-40]. The elderly who have children will choose family eldercare regardless of whether they have social support. There was a traditional concept that raising children ensures a warm old age, which was not only part of the culture, but also a kind of eldercare strategy for rural residents [41]. In the opinion of some elders, if they live in an eldercare institution, their children may be considered unfilial and they may be ridiculed [42].

Conclusions:

This article focuses on the difference of the willingness of eldercare and its influencing factors in urban and rural areas.

There were differences in life satisfaction and social support between the elderly in urban and rural areas. Therefore, the government should change the two-dimensional structure of urban and rural areas, and focus on the poor people and vulnerable groups in rural areas.

The results also indicated that nearly half of the elderly in Heilongjiang will choose institutional eldercare. Although the demand for institutional eldercare was large, the occupancy rate of the eldercare institution was still very low [43,44]. This indicated that institutional eldercare cannot met the needs of the elderly in service levels and

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equipment condition. Alternatively, it could be that due to the current insurance system, the elderly cannot afford the cost of institutional eldercare. If this was the case, the government should pay more attention to improving medical and endowment insurance and optimizing the disposition of resources for the elderly according to the demand for eldercare.

Acknowledgment

The authors thank all participants in this study helping us complete this study.

Funding

Funding this study was funded by the National Science Foundation of China (NSFC), Contract No.71573066/G0308 and Contract No.71203050/G0308.

Availability of data and materials

Data will not be shared because, when we sought informed consent from the participants, we promised them that we would not disclose their information.

Author Contributions

LL conceived and designed the experiments; NX JP JQ HZ performed the experiments; NX JP JQ QW analyzed the data; LL YG TS contributed reagents/materials/analysis tools; NX wrote the paper. QW XY RS provide technical support. LL critically revised the paper. All authors checked and proofread the final version of manuscript.

Conflicts of Interest

The authors have no conflicts of interest.

Ethical approval

This study was approved by the Medical Ethics Committee of Harbin Medical University.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Line1-3, P1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Line 34-56, P2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Line71-130, P3-P4
Objectives	3	State specific objectives, including any prespecified hypotheses	Line131-134, P5
Methods			
Study design	4	Present key elements of study design early in the paper	Line 137, P5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Line 146-158, P5-P6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Line 137-145, P5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Line 159-201, P6-P7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Line 202-213, P7
Bias	9	Describe any efforts to address potential sources of bias	Line 150-152,line

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			203
Study size	10	Explain how the study size was arrived at	Line 154-155, P6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Line 160-178, P6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Line 203-209, P7
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Line 204-209, P7
		(*e*) Describe any sensitivity analyses	P7
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Line 153-158, P6
		(b) Give reasons for non-participation at each stage	Line 154-155, P6
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Line 251-231, P8-P9
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	Line 240-246, P10
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Line 256-270, P11-13

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		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	Line 273-349, P13-15
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Line 68-70, P3
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	P13-P15
Generalisability	21	Discuss the generalisability (external validity) of the study results	Line 351-365, P16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Line 369-370, P16

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Urban-rural differentials in the factors associated with the willingness to receive eldercare among the elderly: a cross-sectional survey in China

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-020225.R2
Article Type:	Research
Date Submitted by the Author:	09-Feb-2018
Complete List of Authors:	Xing, Yanan; Harbin Medical University School of Public Health, Department of Health Management Pei, Ruijuan; Harbin Medical University School of Public Health, Department of Health Management Qu, Jing; Harbin Medical University School of Public Health, Department of Health Management Wang, Juan; Harbin Medical University, Propaganda and United Front Work Department Zhou, Hao; Center for Disease Control and Prevention, Harbin , China, Department of Quality Control Wang, Zhaoqing; Harbin Medical University School of Public Health, Department of Health Management Yan, Wenxin; Harbin Medical University School of Public Health, Department of Health Management Sun, Xinran; Harbin Medical University School of Public Health, Department of Health Management Sun, Tao; Harbin Medical University School of Public Health, Li, Li; Harbin Medical University School of Public Health, Department of Health Management
Primary Subject Heading:	Public health
Secondary Subject Heading:	Health services research, Public health
Keywords:	the willingness of eldercare, the elderly, urban, rural

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Urban-rural differentials in the factors associated with the willingness to receive eldercare among the elderly: a cross-sectional survey in China

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Abstract

Objective: The willingness of eldercare was an important factor affecting the reasonable allocation of resources and appropriate development of eldercare services. The objective of this article was to study the differences of the willingness of eldercare and the affecting factors in urban and rural areas.

Design: Cross-sectional survey

Setting: Heilongjiang Province, China

Participants: A total of 1003 the elderly were selected through multistage sampling in Heilongjiang Province.

Primary and secondary outcome measures: Descriptive statistics were reported for socioeconomic status and demographic characteristics, level of physical health, life satisfaction and social support. Mean differences were examined using t-tests and categorical variables differences were examined using chi-square. The influential factors for willingness of eldercare were analyzed by logistic regression.

Results: The results revealed that 51.6% of the urban elderly and 54.7% of the rural elderly would prefer family eldercare. Factors that influenced the willingness of eldercare for the urban elderly were age, house property, and objective support，which were having children, having house property, and living arrangement for rural elderly.

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Conclusion: We should not only pay more attention to improve the function of family eldercare, but also promote the development of variable eldercare services. The investment and targeted policies should be made for different subgroups of urban and rural elderly.

Keywords: the willingness of eldercare; the elderly; urban; rural

Strengths and limitations of this study

This study was one of the first not only to compare the different willingness of eldercare between urban and rural areas, but to analyze their influencing factors respectively.

The results were significant to divide the elders into different categories, which would help contribute to allocate eldercare resources reasonably and better meet the elders' demands.

However, there may be an inherent bias in self-report measures, and the small sample may limit the generalisability of the research findings.

Introduction

The aging population has become one of the major social problems in the world. In China, which is the largest developing country in the world, the trend of population aging has become a serious issue and has caused concerns around the world [1]. By the end of 2016, 230 million were aged 60 years or older, which comprised 16.7 percent of the total population [2]. There were 40.63 million disabled elderly in China, which made up 18.3% of the aged population. The problems associated with eldercare have become challenges for both government and society, since the aging population typically experiences increasing health problems.

In China, the main ways of eldercare were family eldercare and institutional eldercare. Family eldercare referred that the elderly live in home and receive care from their families; institutional eldercare was when the elderly choose to live in an

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institution that provides all of their care.

One-child policy has created the "4-2-1" families, in which a couple need to care for four older people and their own child [3]. In recent years, more and more younger generations have moved away from home to work. The function of family eldercare was weakened and the availability of eldercare provided by adult children has become questionable [4]. In the meanwhile, the traditional institutional eldercare services can not met the high level and multiple kinds of demands of the elderly.

Based on this situation, a set of policies officially was introduced by China's central government and local governments, called for the development of eldercare services. The government invested a lot in the construction of infrastructure, which focused on improving the convenience of life and enriching the spiritual and cultural life for the elderly of family eldercare. In the mean while, the government promoted common development for both public and private eldercare institutions through providing preferential policies for private institutions.

The willingness of eldercare, which is defined as the attitude to and selection preference of some kind ways for eldercare [5], could influence the final choice of the eldercare way. Previous studies pointed that it was very important for the government to take the elders' willingness of eldercare into consideration in allocating eldercare sources [6-8].

There were extensive literatures concerning current situation and influencing factors of the willingness of eldercare for the elderly.

A study of the willingness to use a nursing home in Korean American elders showed that 45% of the elderly reported their willingness to use a nursing home [9]. It was lower than 16.7% found in a study of the elderly in Taiwan, China [10]. A study showed that in urban and rural areas, only 20 and 17 percent of older adults, respectively, were willing to live in eldercare institutions in 2009 [11]. Another study found that 81 percent of the elderly preferred family eldercare in 2017 [12].

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Regarding the influencing factors of the willingness of eldercare, lots of studies found that some socioeconomic and demographic status, including age, sex, socio-cultural beliefs and self-assessed economic status were associated with willingness of eldercare [3,13,14]. Engelhardt findings suggested that reductions in social security benefits would significantly alter the living arrangements of the elderly, and that a 10% cut in social security benefits would lead more than 600,000 independent elderly households to move into shared living arrangements [15]. Research focusing on functional levels and health found that with the decline of physical health and self-care ability, the demand for institutional eldercare increased [16]. Besides, social support, perceived family harmony and perceived filial piety could affect the eldercare willingness. Liu found that the more social support the elderly receive, the more likely they were to accept family eldercare [17]. Chou pointed that a feeling of loneliness and life satisfaction were about the willingness of eldercare [11]. The elderly prefer institutional eldercare with low life satisfaction [18,19].

However, the effects of these factors on the willingness of eldercare are not isolated. Previous studies on the willingness of eldercare used different theoretical framework. According to the definition of WHO that health was a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [20], we set up a conceptual framework for this study stems from four resources: socioeconomic and demographic status, physical health, life satisfaction and social support.

In China, there were a huge difference between urban and rural areas in income and living environment [21]. A study of the willingness of eldercare between urban and rural areas showed that the elderly in urban areas had less willingness for family eldercare than the elderly in rural areas, and 23.4 and 55.8 percent, respectively [22]. Recently, lots of studies had aimed to compare the difference in the willingness of eldercare between urban and rural areas. But, there was not an analysis of the different factors influenced in the willingness of eldercare among the elderly in urban and rural

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areas.

This study not only compared the differences of the willingness of eldercare between urban and rural areas, but analyzed their influencing factors respectively. The results were very important to divide the elders into different categories, which would help contribute to allocate eldercare resources reasonably and better meet the elders' demands.

The purpose of this study were (1) to study on the willingness of eldercare from socioeconomic and demographic status, physical health, life satisfaction and social support and (2) to compare and analyze urban-rural differentials in the factors associated with the willingness of the eldercare.

Methods

Data and Sample

A multistage sampling was used to select participants. First, a total of 15 cities in Heilongjiang were divided into three grades through per capita GDP, and one city was selected at each level. Three cities (Harbin, Qiqihaer, and Jiamusi) were selected. In the end of 2016, the total population in Harbin, Qiqihaer, and Jiamusi was 1.066, 0.536, 0.255 million respectively. And the rate of elderly over 60 years old was 17.3%, 18.5%, 10.8% respectively. Second, three communities in urban areas and three villages from rural areas were randomly selected in each city. Individuals were included in the study if they met the following conditions: aged 60 years or older, clear consciousness, and effective verbal communication. Additionally, participants were assured that participation in the survey was voluntary, and the return of questionnaires represented informed consent.

Data collection

A cross-sectional survey was conducted from March 1, 2016 to August 31, 2016. The data were collected through face-to-face interviews by trained 9 undergraduate and 9 graduate students from Harbin Medical University using a structured

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questionnaire. A operation manual was made to offer a suggestion on how to ask each question. And a pre-investigation was conducted to find out the problems and to give a further training for interviewers.

In total, 1,200 questionnaires were distributed (included 600 in urban and 600 in rural). Among them, participants with not responding to the survey, or not answering the willingness to receive eldercare survey question were excluded. Finally, a valid questionnaire was returned by 1,003 subjects (included 581 in urban and 422 in rural), giving an overall response rate of 83.6%. The response rate of urban and rural areas was 96.8% and 70.3% respectively.

Assessment tools

The instrument used in the study consisted of a questionnaire composed of five sections. Section 1 focused on the respondents' socioeconomic and demographic status, including sex, age, monthly income, work, education, have children or not, marriage status, living arrangement, house property and chronic disease. WHO made a definition for chronic diseases which were not passed from person to person [23]. They were of long duration and generally slow progression. The four main types of chronic diseases were cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes. In this study, we listed these diseases and set up a multiple choice questions. Respondents were asked, "Are you suffering from the following chronic diseases?" They were thought have chronic disease if any of diseases was selected. The answer of Yes was coded as 0 and No was coded as 1.

Section 2 assessed the willingness of eldercare, based on a single-item measure. Respondents were asked, "Which are you willing to choose between: family eldercare or institutional eldercare?" Respondents marked 0 for family eldercare and 1 for institutional eldercare.

Section 3 assessed self-rated physical health. Respondents were asked, "How do

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you rate your health?" Respondents were asked to indicate the rate of feeling with their own health on a 5-point scale, ranging from 1 (worst) to 5 (best).

Section 4 assessed life satisfaction. The 5-item version of the Life Satisfaction Scale compiled by Diener was used for measurement. Respondents were asked to indicate the strength of their agreement with statements on a 7-point scale, ranging from 1 (highly disagree) to 7 (highly agree) [24]. Then, scores were averaged across items to form a scale score. The scale achieved reasonable reliability in our sample, with Cronbach's alpha value measured at 0.96.

Section 5 assessed social support, which referred to the opportunities available for the individual to receive assistance from other groups in the social environment. Social support was created by Xiaoshuiyuan in 1986 and publicly introduced in 1994. The scale was measured with a 10-item scale and classified social support into subjective support, objective support and support utilization. Subjective support was measured by 4 items: (1)How many friends you can get support; (3)The relationship between you and your neighbors; (4)The relationship between you and your colleagues; (5)support and care from family members. Objective support was measured by 3 items: (2)living conditions in recent year; (6)financial support in case of emergency; (7)comfort and care in the case of an emergency. Support utilization was measured by 3 items: (8)the way you pour out feeling when you are in trouble; (9)the way you seek help when you are in trouble; (10) the frequency with which you participate in group activities [25]. Each item was scored on a scale of 1 to 4. Within each subscale, score of each item were added to form a subscale score. The sum of three subscale scores was total social support. In addition, the Cronbach's alpha value for the individual scales ranged from 0.89 to 0.94. In the present study, the scale demonstrated appropriate reliability.

Data analysis

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Data were processed with Epidata and double-entered to ensure quality. The sample characteristics were analyzed using through SPSS 19.0. Descriptive analyses included frequencies and percentages for categorical variables and means and SDs for continuous variables. Mean differences were examined using t-tests and categorical variables differences were examined using chi-square with significance set at $p<0.05$. The influential factors for willingness of eldercare were analyzed by logistic regression, with $p<0.05$. In this study, the outcome variable was the willingness of the eldercare (0 for family eldercare and 1 for institutional eldercare). Based on the literature review and the purpose of this study, fifteen independent variables were identified as potential factors, including socioeconomic and demographic status, physical health, life satisfaction and social support.

The normal distributions of the continuous variables were verified using P–P plots and K–S tests. All the study variables were tested for multicolinearity.

Result

Socioeconomic and demographic status of respondents

Table 1 displayed the socioeconomic and demographic characteristics of the participants. The questionnaire was completed by 581 respondents from urban areas and 422 respondents from rural areas. In urban areas, female and male were 59% and 41% of the respondents, respectively, and the average age was 74.23. In rural areas, the average age of the participants was 72.39, with more male (55.9%) than female (44.1%). The income of urban elderly was higher than that of rural elderly. Most participants (91.6% in urban areas and 93.8% in rural areas) did not work. In the survey, the majority of the elderly had children (97.6% in urban areas and 90.8% in rural areas), with 19.4% of the urban elderly living alone compared to 18% of the rural elderly. The survey revealed that the proportion of the elderly who had house property in urban and in rural areas was quite similar, at 62.1% and 60.2%, respectively. Unfortunately, 76.6% and 72.0% the respondents in urban and rural areas were suffering from chronic diseases.

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Table 1 Socioeconomic and demographic characteristics of respondents in Urban and Rural areas

variables		Urban (n=581) N (%)	Rural (n=422) N (%)	Total (n=1003)
Sex	male	238 (41.0)	236 (55.9)	474
	female	343 (59.0)	186 (44.1)	529
Age（range≥60）	<70	238 (41.0)	270 (64.0)	508
	70-79	171 (29.4)	109 (25.8)	280
	≥80	172 (29.6)	43 (10.2)	215
	Mean (SD)	74.23 (25.71)	72.39 (46.24)	73.45 (35.80)
Monthly income （RMB）	<500	11 (1.9)	209 (49.5)	220
	500-999	23 (4.0)	111 (26.3)	134
	1000-1999	126 (21.7)	73 (17.3)	199
	2000-2999	258 (44.4)	20 (4.7)	278
	≥3000	163 (28.1)	9 (2.1)	172
Work	Yes	49 (8.4)	26 (6.2)	75
	No	532 (91.6)	396 (93.8)	928
Education	Primary school or below	192 (33.0)	330 (78.2)	522

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	Middle and high school	318 (54.7)	88 (20.9)	406
	Junior college or above	71 (12.2)	4 (0.9)	75
Have children	Yes	567 (97.6)	383 (90.8)	950
	No	14 (2.4)	39 (9.2)	53
Marriage status	Single/Widowed/Divorced	273 (47.0)	137 (32.5)	410
	Married	308 (53.0)	285 (67.5)	593
Living arrangements	Alone	113 (19.4)	76 (18.0)	189
	With children or others	468 (80.6)	346 (81.2)	814
House property	Yes	361 (62.1)	254 (60.2)	615
	No	220 (37.9)	168 (39.8)	388
Chronic diseases	Yes	445 (76.6)	304 (72.0)	749
	No	136 (23.4)	118 (28.0)	254

Physical health, Life satisfaction and Social support of the elderly in urban and rural areas

The results of t tests were shown in Table 2. There were statistically significant differences in life satisfaction ($t=6.71$, $p<0.001$), support utilization($t=10.706$, $p<0.001$), and overall social support ($t=3.5$, $p<0.001$)in relation to one's place of residence, with scores being higher for urban respondents than rural respondents.

Table 2 Physical health, Life satisfaction and Social support of the elderly in urban and rural areas

	Urban	Rural	t	p

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	Scale Range	Mean (SD)	Mean (SD)		
Physical health	1-5	3.26 (1.02)	3.36 (0.91)	-1.740	0.088
Life satisfaction	5-35	26.53 (5.73)	23.80 (6.78)	6.710	**0.000**
objective support	1-20	6.85 (2.28)	6.33 (2.17)	-0.395	0.693
subjective support	8-32	19.34 (4.65)	19.38 (5.09)	-0.142	0.885
support utilization	3-12	6.67 (2.64)	4.94 (2.42)	10.706	**0.000**
Overall social support	12-64	32.29 (7.14)	30.66 (7.41)	3.500	**0.000**

The willingness of eldercare

Chi-square test was used in Table 3. Results showed that 51.6% of the urban elderly and 54.7% of the rural elderly would prefer family eldercare when they are old. There was significant difference in the willingness of eldercare between urban elderly and rural elderly (χ^2=5.359, p=0.021).

Table 3 Comparison of the willingness of eldercare between urban and rural areas.

	Urban areas N (%)	Rural areas N (%)	χ^2	p
Willingness of institutional eldercare	281 (48.4)	173 (45.3)		
Willingness of family eldercare	300 (51.6)	249 (54.7)	5.359	**0.021**
total	581 (100)	422 (100)		

Physical health, Life satisfaction and Social support of the elderly between the willingness of family and institutional eldercare in urban and rural areas

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Table 4 showed the mean level of physical health, life satisfaction and social support of the elderly and their differences between the willingness of family and institutional eldercare in urban and rural areas respectively.

In urban area, the elderly who preferred family eldercare reported significantly higher scores of objective support ($t=7.961$, $p<0.001$), subjective support ($t=4.788$, $p<0.001$), and overall social support($t=5.667$, $p<0.001$).

Also, the scores of objective support ($t=4.197$, $p<0.001$), subjective support($t=2.969$, $p=0.002$), and overall social support($t=3.459$, $p=0.001$) were higher in the elderly who preferred family eldercare.

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Table 4 Physical health, Life satisfaction and Social support of the elderly between family eldercare and institutional eldercare in urban and rural areas

	Urban areas				Rural areas			
	Family eldercare	Institutional eldercare	t	p	Family eldercare	Institutional eldercare	t	p
	Mean (SD)	Mean (SD)			Mean (SD)	Mean (SD)		
Physical health	3.21 (1.04)	3.31 (0.99)	-1.252	0.211	3.37 (0.95)	3.36 (0.84)	0.126	0.902
Life satisfaction	26.53 (5.76)	26.53 (5.70)	-0.008	0.994	23.52 (6.77)	24.20 (6.81)	-1.022	0.307
subjective support	20.21 (4.55)	18.40 (4.57)	4.788	**0.000**	20.01 (4.64)	18.48 (5.55)	2.969	**0.002**
objective support	6.97 (2.10)	5.54 (2.24)	7.961	**0.000**	6.70 (2.09)	5.81 (2.20)	4.197	**0.000**
support utilization	6.67 (2.59)	6.65 (2.71)	0.110	0.913	4.97 (2.44)	4.89 (2.39)	0.363	0.717
Overall social support	33.87 (7.02)	30.59 (6.89)	5.667	**0.000**	31.69 (6.97)	29.19 (7.77)	3.459	**0.001**

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Influencing factors of the willingness of eldercare

Table 5 showed two models to assess the influencing factors of the willingness of eldercare in urban and rural areas respectively.

Model 1 was used to analyze the influencing factors of the willingness of eldercare in urban area. Result showed that the age, house property and objective support were predictors of willingness of institutional eldercare. Compared with less than 70 years old, the elderly who older than 80 years old (OR=2.791, 95%CI =1.644 -4.737, p<0.001) were more likely to choose institutional eldercare. The participants who had house property (OR=0.494, 95%CI=0.329 - 0.740,p=0.001) reported less willingness of institutional eldercare. When objective support increased by one grade, the willingness of institutional eldercare decreased by 0.236 (OR=0.764, 95%CI =0.681- 0.858, p<0.001).

Model 2 was used to assess the predictors of the willingness of eldercare in rural area. Results showed the rural elderly who had children (OR=0.368, 95% CI= 0.146 - 0.930, p=0.035) and had house property (OR=0.371, 95% CI =0.231 - 0.596, p<0.001) were less willing to choose institutional eldercare. The elderly who were living alone (OR=3.361, 95% CI= 1.436 - 7.866,p=0.005) are more willing to choose institutional eldercare.

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Table 5 Logistic regression analysis for the influences on willingness of eldercare among the elderly in urban and rural areas

variables		Model 1:Urban areas			Model 2:Rural areas		
		OR	95%CI	p	OR	95%CI	p
Sex(ref=male)	female	1.086	0.732-1.612	0.682	0.857	0.536-1.372	0.521
Age(ref=<70)	70-79	1.309	0.836-2.050	0.239	0.750	0.438-1.286	0.296
	≥80	2.791	1.644-4.737	**0.000**	1.831	0.826-4.060	0.137
Monthly income (ref=<500)	500-999	0.161	0.029-0.891	**0.036**	1.625	0.939-2.811	0.083
	1000-1999	0.394	0.088-1.760	0.222	1.611	0.847-3.067	0.146
	2000-2999	0.349	0.079-1.548	0.166	1.717	0.580-5.077	0.329
	≥3000	0.316	0.069-1.443	0.137	1.002	0.178-5.645	0.998
Work(ref=no)	yes	1.077	0.553-2.099	0.827	2.163	0.854-5.477	0.104
Education	junior college and above	1.506	0.775-3.003	0.245	0.484	0.040-5.848	0.568

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(ref=Primary school and below)	Middle and high school	1.484	0.930-2.367	0.098	1.609	0.913-2.834	0.100
Have children(ref=no)	yes	0.611	0.161-2.314	0.468	0.368	0.146-0.930	**0.035**
marriage status(ref=Married)	Single/Widowed/Divorced	0.697	0.401-1.213	0.202	0.622	0.307-1.259	0.187
Living arrangement(ref=with children and others)	Alone	0.982	0.563-1.713	0.949	3.361	1.436-7.866	**0.005**
House property(ref=no)	yes	0.494	0.329-0.740	**0.001**	0.371	0.231-0.596	**0.000**
Chronic disease(ref=no)	yes	1.254	0.794-1.982	0.332	1.451	0.861-2.448	0.162
Physical health		1.140	0.927-1.403	0.216	0.979	0.742-1.292	0.882
Life satisfaction		1.009	0.972-1.049	0.630	1.020	0.980-1.061	0.340
Subjective support		0.962	0.916-1.011	0.126	0.963	0.908-1.020	0.200
Objective support		0.764	0.681-0.858	**0.000**	0.959	0.835-1.102	0.557
Support utilization		1.017	0.943-1.097	0.666	1.039	0.942-1.147	0.446

Ref=Reference categories; OR: odds radio；CI：confidence interval code; family eldercare=0; institutional eldercare=1

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DISCUSSION

By examining the urban and rural samples, this study provided new insights on urban-rural differences, not only to compare the different willingness of eldercare between urban and rural areas, but to analyze their influencing factors respectively. This study would provide a practical reference value in some extent for the policy-making about elderly people and for the eldercare resources allocating between family eldercare and institutional eldercare. And it would help investors to provide suitable service for different elders.

First, we researched the difference of physical health, life satisfaction and social support of the elderly in urban and rural areas. Improving life satisfaction of the elderly was a topic that has been studied extensively by researchers and managers. This study indicated that life satisfaction in urban areas was higher than that in rural areas (Table 2), which was consistent with previous studies [26]. Several factors may have contributed to these findings. The first reason was the influence of income. A study pointed that a higher economic level provided more life protection, so as to maintain and improve life satisfaction [27]. In this study, the income of urban elderly was higher than that of rural elderly. Another reason was the impact of the physical health of the elderly. Being ill not only affected the normal life of the elderly, but also brought pain, which as a result reduced the satisfaction of life [28]. In this study, the prevalence rate of illness for the elderly in rural areas was higher than for the urban elderly. The formation of the two-dimensional structure of urban and rural areas in China resulted in a great difference in living standards and convenience, which certainly influenced the differences in life satisfaction as well [29-31].

With regard to social support, results showed the subscale of support utilization and the overall social support for the urban elderly were higher than that of the rural elderly (Table 2) . Our results were consistent with the findings of previous research [32,33]. Social support was the main source of relationships and social networks, and retained a sense of happiness for members [34]. In Taiwan, higher cognitive function in community-living elderly was associated with increased social support [35]. Another study pointed that social relations played an important role in health of the elderly [36]. Therefore, it was important for us to take measures to ensure the social support for the elderly. Firstly, the community should build an activity center

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according to the actual situation of the elderly. And participatory programs should be improved [37]. Many participatory programs for older people, such as village services in England and social activity formal support networks in the Philippines [38], have demonstrated that the elderly who participated in social activities have a corresponding increase in the level of their support utilization.

Then, the study compared the differences in the willingness of eldercare among the elderly between urban and rural areas. The proportion of the urban elderly who chose institutional eldercare is higher than that of the rural. The result was consistent with the other findings that the elderly in rural areas had less favourable opinions of institutional eldercare and more willingness to live in their home [5,39]. The phenomenon due to the elderly in rural areas were hold strong traditional views about eldercare [11].

In the meanwhile, we found that both in urban and rural areas, the willingness of family eldercare is higher than the willingness of institutional eldercare (Table 3). This phenomenon indicated that family eldercare was still the primary choice for the elderly in China. However, the proportion of willingness to institutional eldercare were really high both in urban and rural areas (more than 40%). By the end of 2016, 230 million were aged 60 years or older in China, with 7.302 million beds available beds [2,40], which can meet the needs of 3.2% of the elderly. Based on the need of eldercare and resource planning ratios, there is a shortfall of eldercare bed. Paradoxically, although there were many the elderly prefer institutional eldercare, but they did not go to the eldercare institution in fact. One reason for the low occupancy may be the facilities, fees, and nursing of the eldercare institution does not meet the needs of the elderly. Therefore, to better develop eldercare service, much more research on the willingness of the elderly was needed.

Last, the study compared the willingness of eldercare and its influencing factors among the elderly in urban and rural areas. This result would be very important to divide the elders into different categories, which would help contribute to allocate eldercare resources reasonably and better meet the elders' demands.

The results showed that both urban and rural elders who had a house property were more inclined to choose family eldercare (Table 5). We also found different influential factors of the willingness of eldercare for urban and rural elders.

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The elderly in urban areas who were over 80 years old and received lower objective support prefer institutional eldercare(Table 5). This may be because that self-care ability of the elderly declined with age. When life care and nursing care provided by the family were inadequate, the elderly need more professional care [41].

When we made a single factor analysis, objective support and subjective support influence the willingness of eldercare (Table 4). Liu noted that the elderly tended to live in their existing living environment in order to maintain the established social support [17]. This indicated that when the objective and subjective support of the elderly met their needs within the family and community, the elders were more inclined to choose family eldercare. However, when we put demographic and economic factors, physical health and life satisfaction together in logistic regression analysis, only objective support affected the willingness of eldercare (Table 5). Objective support included individual social networks, as well as financial and emotional support from others in the past. The elderly had a fundamental need to receive emotive and informational communication with their families and society, which gave them spiritual consolation. Therefore, when objective support met the needs of the elderly, they preferred to live in home [42].

In rural areas, the elderly who have children and live with family were willing to choose family eldercare (Table 5). Similar results had also been found in other studies [43-46]. The elderly who have children will choose family eldercare regardless of whether they have social support. There was a traditional concept that raising children ensures a warm old age, which was not only part of the culture, but also a kind of eldercare strategy for rural residents [47]. In the opinion of some elders, if they live in an eldercare institution, their children may be considered unfilial and they may be ridiculed [48].

Conclusions:

This article focused on the differences of the willingness of eldercare and the influencing factors in urban and rural areas respectively.

This study generated valuable findings. It was found that 51.6% of the urban elderly and 54.7% of the rural elderly would prefer family eldercare. Although both

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urban and rural elderly preferred to family eldercare, the proportion of the willingness of institutional eldercare was also high. In the future, we should not only pay more attention to improve the function of family eldercare, but also promote the development of variable eldercare services.

We also found that factors influenced the willingness of eldercare for the urban elderly were age, house property, and objective support, which were having children, having house property, and living arrangement for rural elderly. Investment and targeted policies should be made for different subgroups of urban and rural elderly. Besides, government should also improve medical and endowment insurance and optimize the disposition of resources for the elderly according to the demand for eldercare [49].

Acknowledgment

The authors thank all participants in this study helping us complete this study.

Funding

Funding this study was funded by the National Science Foundation of China (NSFC), Contract No.71573066/G0308 and Contract No.71203050/G0308.

Availability of data and materials

Data will not be shared because, when we sought informed consent from the participants, we promised them that we would not disclose their information.

Author Contributions

LL conceived and designed the experiments; YX RP JQ HZ performed the experiments; YX RP JQ ZW analyzed the data; LL JW TS contributed reagents/materials/analysis tools; NX wrote the paper. ZW WY XS provide technical support. LL critically revised the paper. All authors checked and proofread the final version of manuscript.

Conflicts of Interest

The authors have no conflicts of interest.

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Ethical approval

This study was approved by the Medical Ethics Committee of Harbin Medical University.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Line1-3, P1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Line1-23, P2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Line3-30, P3 and P4 and line 1-11,P5
Objectives	3	State specific objectives, including any prespecified hypotheses	Line12-20, P5
Methods			
Study design	4	Present key elements of study design early in the paper	Line 23, P5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Line 23-30, P5 and line1-3, P6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Line 4-16, P6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Line17-30, P6 and P7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Line 1-14, P8

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Bias	9	Describe any efforts to address potential sources of bias	Line 12-13, P6
Study size	10	Explain how the study size was arrived at	Line 11-16, P6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Line 1-8, P8
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Line 2-3, P8
		(*e*) Describe any sensitivity analyses	Line 13-14, P 8
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Line 4-16, P6
		(b) Give reasons for non-participation at each stage	Line 12-13, P6
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Line 15-30, P8 and P9
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	P9-P12
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	P13-P15

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		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	P16, P17 and line 1-21,P18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Line 7-8, P3
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	P16, P17 and line 1-21,P18
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Line 8-9, P19

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Urban-rural differences in factors associated with willingness to receive eldercare among the elderly: A cross-sectional survey in China

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-020225.R3
Article Type:	Research
Date Submitted by the Author:	09-Mar-2018
Complete List of Authors:	Xing, Yanan; Harbin Medical University School of Public Health, Department of Health Management Pei, Ruijuan; Harbin Medical University School of Public Health, Department of Health Management Qu, Jing; Harbin Medical University School of Public Health, Department of Health Management Wang, Juan; Harbin Medical University, Propaganda and United Front Work Department Zhou, Hao; Center for Disease Control and Prevention, Harbin , China, Department of Quality Control Wang, Zhaoqing; Harbin Medical University School of Public Health, Department of Health Management Yan, Wenxin; Harbin Medical University School of Public Health, Department of Health Management Sun, Xinran; Harbin Medical University School of Public Health, Department of Health Management Sun, Tao; Harbin Medical University School of Public Health, Li, Li; Harbin Medical University School of Public Health, Department of Health Management
Primary Subject Heading:	Public health
Secondary Subject Heading:	Health services research, Public health
Keywords:	willingness to receive eldercare, elderly, urban, rural

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Urban-rural differences in factors associated with willingness to receive eldercare among the elderly: A cross-sectional survey in China

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Abstract

Objective: Willingness to receive eldercare is an important factor affecting the reasonable allocation of resources and appropriate development of eldercare services. This study aimed to investigate the differences in willingness to receive eldercare and the influencing factors in urban and rural areas.

Design: Cross-sectional survey.

Setting: Research was conducted in the urban and rural areas of three cities (Harbin, Qiqihaer, and Jiamusi) in Heilongjiang Province, China.

Participants: A total of 1,003 elderly were selected through multistage sampling in Heilongjiang Province, including 581 in urban areas and 422 in rural areas.

Main outcome measures: Descriptive statistics were reported for socioeconomic and demographic status, physical health, life satisfaction, and social support in urban and rural areas. Mean differences were examined using t-tests, and categorical variable differences were examined using chi-squared tests. The factors influencing willingness to receive eldercare in urban and rural areas were analyzed using logistic regression.

Results: The results showed that 51.6% of urban elderly and 59.0% of rural elderly preferred family eldercare. Factors that influenced willingness to receive eldercare for urban elderly were age (OR=2.791, 95% CI=1.644-4.737), house property (OR=0.494,

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95% CI=0.329-0.740), and objective support (OR=0.764, 95% CI =0.681-0.858). For rural elderly, the factors were having children (OR=0.368, 95% CI=0.146-0.930), house property (OR=0.371, 95% CI=0.231-0.596), and living arrangement (OR=3.361, 95% CI=1.436-7.866).

Conclusion: More attention should be paid to not only improving the functioning of family eldercare but also promoting the development of varied eldercare services. Investments and targeted policies should be undertaken for different subgroups of urban and rural elderly.

Keywords: willingness to receive eldercare; elderly; urban; rural

Strengths and limitations of this study

Strengths: This study is one of the first to not only examine differences in willingness to receive eldercare between urban and rural areas but also analyze the influencing factors.

The samples were selected through multistage sampling and were divided into urban and rural samples.

Limitations: There could be an inherent bias in self-reporting measures, and the small sample size limits the generalizability of the findings.

This was a cross-sectional study; no causal relationships can be identified.

Introduction

The aging population has become a major social problem worldwide. In China, the world's largest developing country, the trend of population aging has become a serious issue, raising concerns around the world [1]. At the end of 2016, 230 million people in China were aged 60 years or older, comprising 16.7% of the total population [2]. There were 40.63 million disabled elderly in China, accounting for 18.3% of the aged population. Since aging populations typically experience increasing health issues, the problems associated with eldercare pose challenges for both government and

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society.

In China, family and institutional eldercare are the primary means of eldercare. In family eldercare, elderly live at home and receive care from their families. In institutional eldercare, elderly live in an institution that provides their care.

The one-child policy has created "4-2-1" families, in which a couple cares for four older people as well as their own child [3]. In recent years, younger people have increasingly moved away from home for work. Thus, the functioning of family eldercare has been weakened, and the availability of eldercare provided by adult children has become uncertain [4]. Meanwhile, traditional institutional eldercare has been unable to meet the high levels and multiple types of elderly needs.

As a result, China's central and local governments have introduced policies aiming to develop eldercare services. A great deal has been invested in infrastructure construction, intended to improve everyday convenience and enrich spiritual and cultural life for the elderly under family eldercare. The government has also promoted the development of both public and private eldercare institutions by enacting preferential policies for private institutions.

Willingness to receive eldercare—which has been defined as attitudes toward and selection preferences for certain types of eldercare among the elderly [5]—can influence the final choice for a given type of eldercare. Previous studies have suggested that it is very important for governments to consider elders' willingness to receive eldercare when allocating eldercare sources [6-8].

An extensive body of literature has focused on the present situation as well as the factors influencing willingness to receive eldercare among the elderly. A study of willingness to use a nursing home among Korean American elderly showed that 45% were willing to use a nursing home [9]. In a study of the elderly in Taiwan, however, it was much lower, at around 16.7% [10]. Another study, from 2009, showed that in urban and rural areas, only 20% and 17%, respectively, of older adults were willing to

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live in eldercare institutions [11]. Finally, a 2017 study found that 81% of elderly preferred family eldercare [12].

Regarding the factors influencing willingness to receive eldercare, many studies have found that certain socioeconomic and demographic factors—including age, sex, sociocultural beliefs, and self-assessed economic status—are associated with willingness to receive eldercare [3,13,14]. Gruber [15] suggested that reductions in social security benefits could significantly alter the living arrangements of the elderly; specifically, a 10% cut in benefits could cause more than 600,000 independent elderly households to switch to shared living arrangements. Other research has shown that the demand for institutional eldercare increases with declining physical health and self-care ability [16]. Meanwhile, social support, perceived family harmony, and perceived filial piety can also affect willingness to receive eldercare. Liu found that the more social support the elderly received, the more likely they were to accept family eldercare [17]. Chou, moreover, found that willingness to receive eldercare was influenced by feelings of loneliness and life satisfaction [11]. When there is lower life satisfaction, elderly tend to prefer institutional eldercare [18,19].

However, the effects of these factors on willingness to receive eldercare are not isolated. Previous studies on willingness to receive eldercare have used different theoretical frameworks. Following WHO's definition—that health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity [20]—this study established a conceptual framework stemming from four resources: socioeconomic and demographic status, physical health, life satisfaction, and social support.

In China, there are huge differences between urban and rural areas in terms of income and living environments [21]. A previous study of willingness to receive eldercare between urban and rural areas showed that urban elderly were less willing to receive family eldercare than rural elderly (23.4% and 55.8%, respectively) [22]. Many other recent studies have examined differences in willingness to receive

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eldercare between urban and rural areas. However, there has not been an analysis of the different factors influencing willingness to receive eldercare among urban and rural elderly.

This study not only compared willingness to receive eldercare among urban and rural elderly but also analyzed the influencing factors. The results are very important for dividing elderly into different categories, which can contribute to the reasonable allocation of eldercare resources and better meet elders' needs.

The purposes of this study were as follows: (1) to study willingness to receive eldercare in terms of socioeconomic and demographic factors, physical health, life satisfaction, and social support, and (2) to compare and analyze urban-rural differences in the factors associated with willingness to receive eldercare.

Methods

Data and sample

Multistage sampling was used to select participants. First, 15 cities in Heilongjiang were divided into three grades according to per capita GDP, and one city was selected at each level. Three cities (Harbin, Qiqihaer, and Jiamusi) were selected. At the end of 2016, the populations of Harbin, Qiqihaer, and Jiamusi were 1.066 million, 0.536 million, and 0.255 million, respectively. The rates of elderly over 60 years old were 17.3%, 18.5%, and 10.8%, respectively. Second, three communities in urban areas and three villages from rural areas were randomly selected in each city. Individuals were included in the study if they met the following criteria: aged 60 years or older, clear consciousness, and competent at verbal communication. Additionally, participants were told that participation in the survey was voluntary and that returning the questionnaires represented informed consent.

Data collection

A cross-sectional survey was conducted from March 1, 2016, to August 31, 2016. Data were collected through face-to-face interviews using a structured questionnaire.

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The interviews were conducted by nine undergraduate and nine graduate students from Harbin Medical University who had received training. A manual was created to provide suggestions on how to ask each question. Moreover, a pre-investigation was conducted to identify problems and provide further training for the interviewers.

In total, 1,200 questionnaires were distributed (600 urban, 600 rural). Participants who did not respond to the survey or did not answer the question about willingness to receive eldercare were excluded. A total of 1,003 valid questionnaires were returned (581 urban, 422 rural), for a response rate of 83.6%. The response rates for urban and rural areas were 96.8% and 70.3%, respectively.

Assessment tools

The instrument used in this study consisted of a questionnaire composed of five sections. Section 1 focused on the respondents' socioeconomic and demographic characteristics, including sex, age, monthly income, work, education, children, marriage status, living arrangement, house property, and chronic disease. WHO defines chronic diseases as those not passed from person to person [23]. They typically have a long duration and generally slow progression. The four main types of chronic diseases are cardiovascular diseases (e.g., heart attack, stroke), cancers, chronic respiratory diseases (e.g., chronic obstructed pulmonary disease and asthma), and diabetes. For this study, we listed these diseases and set up multiple choice questions. Respondents were asked, "Are you suffering from the following chronic diseases?" They were considered to have chronic disease if any of the diseases were selected. A "yes" answer was coded 0 while "no" was coded 1.

Section 2 assessed willingness to receive eldercare, based on a single-item measure. Respondents were asked, "Which are you willing to choose between: family eldercare or institutional eldercare?" Respondents marked 0 for family eldercare and 1 for institutional eldercare.

Section 3 assessed self-rated physical health. Respondents were asked, "How do

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you rate your health?" They answered on a 5-point scale, ranging from 1 (worst) to 5 (best).

Section 4 assessed life satisfaction. The 5-item version of Pavot and Diener's Life Satisfaction Scale was used for measurement. Respondents were asked to indicate the strength of their agreement with statements on a 7-point scale, ranging from 1 (highly disagree) to 7 (highly agree) [24]. Then, scores were averaged across items to form a scale score. The scale achieved reasonable reliability in our sample, with a Cronbach's alpha of 0.96.

Section 5 assessed social support, which referred to the opportunities available for the individual to receive assistance from other groups in the social environment. This social support scale was created by Xiaoshuiyuan in 1986 and publicly introduced in 1994. It comprises a 10-item scale that classifies social support into subjective support, objective support, and support utilization. Subjective support was measured by four items: (1) how many friends you can get support from, (2) the relationship between you and your neighbors, (3) the relationship between you and your colleagues, and (4) support and care from family members. Objective support was measured by three items: (5) living conditions in the last year, (6) financial support in case of an emergency, and (7) comfort and care in case of an emergency. Lastly, support utilization was measured by three items: (8) how you express feelings when you are in trouble, (9) how you seek help when you are in trouble, and (10) the frequency with which you participate in group activities [25]. Each item was scored on a scale of 1 to 4. Within each subscale, the score for each item was added to form a subscale score. Total social support was the sum of the three subscale scores. The Cronbach's alpha values for the individual scales ranged from 0.89 to 0.94. In the present study, the scale demonstrated appropriate reliability.

Data analysis

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Data were processed using Epidata and were double-entered to ensure quality. Sample characteristics were analyzed using SPSS 19.0. Descriptive statistics were reported for socioeconomic and demographic characteristics, physical health, life satisfaction, and social support in urban and rural areas. Mean differences were examined using t-tests, and categorical variable differences were examined using chi-squared tests, with the significance set at $p<0.05$. The factors influencing willingness to receive eldercare in urban and rural areas were analyzed using logistic regression, set at $p<0.05$. In this study, the outcome variable was willingness to receive eldercare (0 for family eldercare, 1 for institutional eldercare). Based on the literature review and the aims of this study, 15 independent variables were identified as potential factors, including socioeconomic and demographic characteristics, physical health, life satisfaction, and social support.

The normal distributions of the continuous variables were verified using P-P plots and K-S tests. All study variables were tested for multicollinearity.

Patient and Public Involvement

This study was not involved with patient and public.

Results

Socioeconomic and demographic characteristics of respondents

Table 1 shows the socioeconomic and demographic characteristics of the participants. The questionnaire was completed by 581 respondents from urban areas and 422 from rural areas. In urban areas, 41.0% of respondents were male and 59.0% were female; the average age was 74.23. In rural areas, the average participant age was 72.39, with more males (55.9%) than females (44.1%). The income of urban elderly was higher than that of rural elderly. Most participants (91.6% in urban areas, 93.8% in rural areas) did not work. Most had children (97.6% urban, 90.8% rural), while 19.4% of urban elderly lived alone compared to 18% of rural elderly. The proportions of urban and rural elderly who had house property were quite similar

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(62.1% and 60.2%, respectively). In addition, respondents suffering from chronic diseases in urban and rural areas were 76.6% and 72.0%, respectively.

Table 1 Socioeconomic and demographic characteristics of urban and rural respondents

Variables		Urban 581 (100) N (%)	Rural 422 (100) N (%)	Total 1003 N
Sex	Male	238 (41.0)	236 (55.9)	474
	Female	343 (59.0)	186 (44.1)	529
Age (range≥60)	<70	238 (41.0)	270 (64.0)	508
	70-79	171 (29.4)	109 (25.8)	280
	≥80	172 (29.6)	43 (10.2)	215
	Mean±SD	74.23±25.71	72.39±46.24	73.45±35.80
Monthly income (RMB)	<500	11 (1.9)	209 (49.5)	220
	500-999	23 (4.0)	111 (26.3)	134
	1000-1999	126 (21.6)	73 (17.4)	199
	2000-2999	258 (44.4)	20 (4.7)	278
	≥3000	163 (28.1)	9 (2.1)	172
Work	Yes	49 (8.4)	26 (6.2)	75
	No	532 (91.6)	396 (93.8)	928

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Education	Primary school or below	192 (33.1)	330 (78.2)	522
	Middle and high school	318 (54.7)	88 (20.9)	406
	Junior college or above	71 (12.2)	4 (0.9)	75
Have children	Yes	567 (97.6)	383 (90.8)	950
	No	14 (2.4)	39 (9.2)	53
Marriage status	Single/widowed/divorced	273 (47.0)	137 (32.5)	410
	Married	308 (53.0)	285 (67.5)	593
Living arrangements	Alone	113 (19.4)	76 (18.0)	189
	With children or others	468 (80.6)	346 (82.0)	814
House property	Yes	361 (62.1)	254 (60.2)	615
	No	220 (37.9)	168 (39.8)	388
Chronic diseases	Yes	445 (76.6)	304 (72.0)	749
	No	136 (23.4)	118 (28.0)	254

Physical health, life satisfaction, and social support of urban and rural elderly

T-test results are shown in Table 2. There were statistically significant differences in life satisfaction ($t=6.71$, $p<0.001$), support utilization ($t=10.706$, $p<0.001$), and overall social support ($t=3.5$, $p<0.001$) in relation to place of residence, with scores being higher for urban respondents than rural respondents.

Table 2 Physical health, life satisfaction, and social support of urban and rural elderly

	Urban	Rural

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	Scale range	Mean±SD	Mean±SD	t	p
Physical health	1-5	3.26±1.02	3.36±0.91	-1.740	0.088
Life satisfaction	5-35	26.53±5.73	23.80±6.78	6.710	**0.000**
Objective support	1-20	6.85±2.28	6.33±2.17	-0.395	0.693
Subjective support	8-32	19.34±4.65	19.38±5.09	-0.142	0.885
Support utilization	3-12	6.67±2.64	4.94±2.42	10.706	**0.000**
Overall social support	12-64	32.29±7.14	30.66±7.41	3.500	**0.000**

Willingness to receive eldercare

Table 3 shows the results of the chi-squared tests. The results indicated that 51.6% of urban elderly and 59.0% of rural elderly would prefer family eldercare. There were significant differences in willingness to receive eldercare between urban and rural elderly (χ^2=5.359, p=0.021).

Table 3 Comparison of willingness to receive eldercare between urban and rural areas

	Urban areas N (%)	Rural areas N (%)	χ^2	p
Willingness to receive institutional eldercare	281 (48.4)	173 (41.0)		
Willingness to receive family eldercare	300 (51.6)	249 (59.0)	5.359	**0.021**
Total	581 (100)	422 (100)		

Physical health, life satisfaction, and social support among urban and rural elderly in their preferences for family or institutional eldercare

Table 4 shows the mean levels of physical health, life satisfaction, and social

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support of urban and rural elderly and the differences in their willingness to receive family or institutional eldercare.

In urban areas, elderly who preferred family eldercare reported significantly higher scores for subjective support ($t=4.788$, $p<0.001$), objective support ($t=7.961$, $p<0.001$), and overall social support ($t=5.667$, $p<0.001$).

In addition, in rural areas, the scores for subjective support ($t=2.969$, $p=0.002$), objective support ($t=4.197$, $p<0.001$), and overall social support ($t=3.459$, $p=0.001$) were higher among elderly who preferred family eldercare.

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Table 4 Physical health, life satisfaction, and social support of urban and rural elderly in relation to preference for family or institutional eldercare

	Urban areas				Rural areas			
	Family eldercare	Institutional eldercare			Family eldercare	Institutional eldercare		
	Mean±SD	Mean±SD	t	p	Mean±SD	Mean±SD	t	p
Physical health	3.21±1.04	3.31±0.99	-1.252	0.211	3.37±0.95	3.36±0.84	0.126	0.902
Life satisfaction	26.53±5.76	26.53±5.70	-0.008	0.994	23.52±6.77	24.20±6.81	-1.022	0.307
Subjective support	20.21±4.55	18.40±4.57	4.788	**0.000**	20.01±4.64	18.48±5.55	2.969	**0.002**
Objective support	6.97±2.10	5.54±2.24	7.961	**0.000**	6.70±2.09	5.81±2.20	4.197	**0.000**
Support utilization	6.67±2.59	6.65±2.71	0.110	0.913	4.97±2.44	4.89±2.39	0.363	0.717
Overall social support	33.87±7.02	30.59±6.89	5.667	**0.000**	31.69±6.97	29.19±7.77	3.459	**0.001**

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Factors influencing willingness to receive eldercare

Table 5 shows the two models used to assess the factors influencing willingness to receive eldercare in urban and rural areas.

Model 1 was used to analyze the factors influencing willingness to receive eldercare in urban areas. The results showed that age, house property, and objective support were predictors of willingness to receive institutional eldercare. Compared to those under 70, elderly who were older than 80 (OR=2.791, 95% CI=1.644-4.737, p<0.001) were more likely to choose institutional eldercare. Participants with house property (OR=0.494, 95% CI=0.329-0.740, p=0.001) reported less willingness to receive institutional eldercare. When objective support increased by one grade, willingness to receive institutional eldercare decreased by 0.236 (OR=0.764, 95% CI =0.681-0.858, p<0.001).

Model 2 was used to assess the predictors of willingness to receive eldercare in rural areas. The results showed that rural elderly who had children (OR=0.368, 95% CI=0.146-0.930, p=0.035) and had house property (OR=0.371, 95% CI =0.231-0.596, p<0.001) were less willing to choose institutional eldercare. Elderly who lived alone (OR=3.361, 95% CI=1.436-7.866, p=0.005) were more willing to choose institutional eldercare.

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Table 5 Logistic regression analysis on the factors influencing willingness to receive eldercare among urban and rural elderly

Variables		Model 1: Urban areas			Model 2: Rural areas		
		OR	95% CI	p	OR	95% CI	p
Sex (ref=male)	Female	1.086	0.732-1.612	0.682	0.857	0.536-1.372	0.521
Age (ref=<70)	70-79	1.309	0.836-2.050	0.239	0.750	0.438-1.286	0.296
	≥80	2.791	1.644-4.737	**0.000**	1.831	0.826-4.060	0.137
	500-999	0.161	0.029-0.891	**0.036**	1.625	0.939-2.811	0.083
Monthly income	1000-1999	0.394	0.088-1.760	0.222	1.611	0.847-3.067	0.146
(ref=<500)	2000-2999	0.349	0.079-1.548	0.166	1.717	0.580-5.077	0.329
	≥3000	0.316	0.069-1.443	0.137	1.002	0.178-5.645	0.998
Work (ref=no)	yes	1.077	0.553-2.099	0.827	2.163	0.854-5.477	0.104
Education	Junior college and above	1.506	0.775-3.003	0.245	0.484	0.040-5.848	0.568

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(ref=primary school and below)	Middle and high school	1.484	0.930-2.367	0.098	1.609	0.913-2.834	0.100
Have children (ref=no)	Yes	0.611	0.161-2.314	0.468	0.368	0.146-0.930	**0.035**
Marriage status (ref=married)	Single/widowed/divorced	0.697	0.401-1.213	0.202	0.622	0.307-1.259	0.187
Living arrangement (ref=with children and others)	Alone	0.982	0.563-1.713	0.949	3.361	1.436-7.866	**0.005**
House property (ref=no)	Yes	0.494	0.329-0.740	**0.001**	0.371	0.231-0.596	**0.000**
Chronic disease (ref=no)	Yes	1.254	0.794-1.982	0.332	1.451	0.861-2.448	0.162
Physical health		1.140	0.927-1.403	0.216	0.979	0.742-1.292	0.882
Life satisfaction		1.009	0.972-1.049	0.630	1.020	0.980-1.061	0.340
Subjective support		0.962	0.916-1.011	0.126	0.963	0.908-1.020	0.200
Objective support		0.764	0.681-0.858	**0.000**	0.959	0.835-1.102	0.557
Support utilization		1.017	0.943-1.097	0.666	1.039	0.942-1.147	0.446

Ref: reference categories; OR: odds radio; CI: confidence interval code; family eldercare=0; institutional eldercare=1.

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Discussion

By examining urban and rural samples, this study provides new insights into urban-rural differences, not only to compare differences in willingness to receive eldercare between urban and rural areas but also to analyze their influencing factors. This study's findings can serve as a practical reference for policy making related to the elderly and for eldercare resource allocation between family and institutional eldercare. Moreover, this research can help guide investors in providing suitable services for different types of elderly people.

First, we examined differences in the physical health, life satisfaction, and social support of urban and rural elderly. Researchers and managers have extensively studied the topic of improving life satisfaction for the elderly. The present study found that life satisfaction is higher in urban areas than in rural areas (Table 2), which is consistent with previous studies [26]. Several factors might have contributed to these findings. First is the influence of income. One study noted that higher economic levels provide more protection, thus maintaining and improving life satisfaction [27]. In the present study, urban elderly had higher incomes than rural elderly. Another reason concerns the impact of physical health. Being ill not only affects daily life but also causes pain, which reduces life satisfaction [28]. China's two-dimensional urban-rural structure has resulted in great differences in living standards and convenience, which most certainly influence differences in life satisfaction [29-31].

Regarding social support, the subscale of support utilization and overall social support were higher for urban elderly than for rural elderly (Table 2). These results are consistent previous research [32,33]. Social support was the main source of relationships and social networks, and it created a sense of happiness for members [34]. In Taiwan, higher cognitive functioning among community-living elderly was associated with increased social support [35]. Another study found that social relations played an important role in elderly health [36]. Therefore, it is important to take measures to ensure social support for the elderly. First, communities should build activity centers based on the actual situation of the elderly. In addition, participatory programs should be improved [37]. Many participatory programs for older people, such as village services in England and formal social activity support networks in the Philippines [38], have shown that elderly who participate in social activities have a

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corresponding increase in their level of support utilization.

Next, we examined differences in willingness to receive eldercare among urban and rural elderly. The proportion of urban elderly who chose institutional eldercare was higher than that of rural elderly. This result is consistent with other findings showing that rural elderly have less favorable opinions of institutional eldercare and prefer home care [5,39]. This phenomenon can be attributed to rural elderly holding strong traditional views about eldercare [11].

We also found that in both urban and rural areas, willingness to receive family eldercare was higher than the willingness to receive institutional eldercare (Table 3). This suggests that family eldercare is still the primary choice among China's elderly. Nevertheless, the proportion willing to receive institutional eldercare was very high in both urban and rural areas (more than 40%). At the end of 2016, 230 million people in China were over 60, with 7.302 million available beds [2,40], which could meet the needs of only 3.2% of the elderly. As such, there is a shortfall in available eldercare beds. Interestingly, while many elderly said they preferred institutional eldercare, many did not actually seek services at such institutions. One reason could be that the facilities, fees, and nursing at eldercare institutions do not meet the needs of the elderly. Thus, to develop better eldercare services, more research is needed on preferences among the elderly.

Lastly, we compared willingness to receive eldercare and its influencing factors among urban and rural elderly. The results can help to divide elderly into different categories, which, in turn, can support the reasonable allocation of eldercare resources to better meet elderly needs.

The results showed that both urban and rural elderly who had a house property were more inclined to choose family eldercare (Table 5). We also found different factors influencing willingness to receive eldercare among urban and rural elderly.

Elderly in urban areas who were over 80 years old and received lower objective support preferred institutional eldercare (Table 5). This could be because the self-care ability of elderly declines with age. When family-provided care is inadequate, elderly require more professional care [41].

In the single-factor analysis, objective support and subjective support influenced

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willingness to receive eldercare (Table 4). Liu noted that elderly tend to stay in their existing living environment to maintain their established social support [17]. This means that when objective and subjective support meet elders' needs within the family and community, elderly are more inclined to choose family eldercare. However, when logistic regression analysis was performed on demographic and economic factors, physical health, and life satisfaction, only objective support affected willingness to receive eldercare (Table 5). Objective support includes individual social networks as well as financial and emotional support from others. Elderly have a fundamental need for emotional and informational communication with families and society, which gives them spiritual consolation. Therefore, when objective support meets the needs of the elderly, they prefer to receive home care [42].

Rural elderly who had children and lived with family preferred family eldercare (Table 5). Other studies have obtained similar results [43-46]. Elderly who have children tend to choose family eldercare regardless of whether they have social support. There is a traditional concept that raising children ensures warmth in old age, which is not only part of the culture but also a kind of eldercare strategy for rural residents [47]. According to some elderly, if they live in an eldercare institution, their children might be considered unfilial and could be ridiculed [48].

Conclusion

This study investigated differences in willingness to receive eldercare and the influencing factors among urban and rural elderly.

This study provides valuable findings. We found that 51.6% of urban elderly and 59% of rural elderly would prefer family eldercare. Although both urban and rural elderly preferred family eldercare, the proportion of those willing to receive institutional eldercare was high. In the future, we should not only focus on improving the functioning of family eldercare but also promote the development of varied eldercare services.

We also found that the factors influencing willingness to receive eldercare among urban elderly were age, house property, and objective support. Among rural elderly, the factors were having children, house property, and living arrangement. Investments

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and targeted policies should be conducted for different subgroups of urban and rural elderly. In addition, governments should improve medical and endowment insurance, and optimize the disposition of resources for the elderly according to the demand for eldercare [49].

Acknowledgment

The authors thank all participants in this study helping us complete this study.

Funding

Funding this study was funded by the National Science Foundation of China (NSFC), Contract No.71573066/G0308, Contract No.71203050/G0308 and Contract No.71603066/G0406.

Availability of data and materials

Data will not be shared because, when we sought informed consent from the participants, we promised them that we would not disclose their information.

Author Contributions

LL conceived and designed the experiments; YX RP JQ HZ performed the experiments; YX RP JQ ZW analyzed the data; LL JW TS contributed reagents/materials/analysis tools; YX wrote the paper. ZW WY XS provide technical support. LL critically revised the paper. All authors checked and proofread the final version of manuscript.

Conflicts of Interest

The authors have no conflicts of interest.

Ethical approval

This study was approved by the Medical Ethics Committee of Harbin Medical University.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Line1-3, P1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Line1-28, P2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Line8-30, P3 and P4 and line 1-13,P5
Objectives	3	State specific objectives, including any prespecified hypotheses	Line14-21, P5
Methods			
Study design	4	Present key elements of study design early in the paper	Line 24, P5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Line 24-30, P5 and line1-4, P6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Line 5-16, P6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Line17-30, P6 and P7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Line 1-15, P8

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Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	Line 10-16, P6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Line 1-7, P8
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Line 2-3, P8
		(*e*) Describe any sensitivity analyses	Line 14-15, P 8
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Line 5-16, P6
		(b) Give reasons for non-participation at each stage	Line 12, P6
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Line 17-30, P8 and P9
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	P9-P12
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	P13-P15

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		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	P16, P17 and line 1-13,P18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Line 5-7, P3
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	P16, P17 and line 1-13,P18
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Line 1-2, P19

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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