

Perceived unmet need for hospitalization service among elderly Chinese people in Zhejiang province

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ABSTRACT

Background In this study, we determined the prevalence of unmet need for hospitalization service and the characteristics of the elderly with this unmet need in Zhejiang province, China.

Methods Data were collected from a random sample of 4046 Chinese aged 60 years and older in Zhejiang province. Based on the Andersen-Newman service utilization framework, multivariable logistic regression analysis was used to determine independent effects of these variables on the likelihood of having an unmet need for hospitalization service.

Results Overall, the prevalence of unmet need was 16.2% for hospitalization service. Among predisposing factors, only educational level was statistically significant. Individuals with higher education were less likely to report unmet needs. Among enabling factors, residential area, social support, personal yearly income and personal healthcare expenditure were strongly associated with the presence of unmet need. Those with less enabling resources (e.g. residing in rural areas) were more likely to report unmet need [Odds ratio (OR) = 1.5–6.5]. All the need factors, except for physical function, were strongly associated with the presence of unmet need. Seniors in poorer health (e.g. in fair or poor health) were more likely to report unmet need than their counterparts in better health (OR = 1.5–2.8).

Conclusions In spite of relatively high insurance coverage rates, unmet need for hospitalization service remains high among the elderly people of Zhejiang province in China. Application of comprehensive intervention strategies such as conducting health education, creating social support, promoting community participation and promoting inter-sectional cooperation may be more effective in reducing unmet need for hospitalization service.

Keywords aging, Chinese, elderly, hospitalization, unmet need

Introduction

Unmet need for health care is a concept commonly used in health service research to describe the difference between health-care services deemed necessary to deal with a particular health problem and the actual services received.¹ Those who perceive unmet need for medical care are of particular interest, because perceptions of unmet need may influence health outcomes, attitudes toward health care and future help-seeking behaviors.^{2,3}

Health care for the elderly has been the focus of recent attention. The escalating healthcare expenditure and the aging population trend make this focus understandable.^{4,5} It is noteworthy that the number of studies examining unmet need among the elderly in China is limited^{6–12} and five of these seven studies suggest unmet need for health care among the elderly is significant.^{7–11} For example, the Third

National Health Service Survey in 2003 assessed unmet needs for physician visits and hospitalizations. First respondents were asked whether they needed the service. For those who responded that the service was needed, respondents then were asked whether they received the needed service. The findings indicated that 54.3% of elderly people reported having unmet need for physician visits, and 34.7% were referred by doctors for hospital admission but did not receive it. However, existing studies tell us little about the

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characteristics of the elderly exhibiting these unmet needs. Only one study elucidated correlations between unmet health care needs and three demographic characteristics including age, gender and residential area in the whole population (Ministry of Health of People's Republic of China). Consequently, there remains a need to better understand the characteristics of the elderly with unmet needs so that solutions can be devised to identify these elderly people and ensure that needed care is provided.

The purpose of this study is to determine the prevalence of unmet need for hospitalization service and the characteristics of the elderly with this unmet need in Zhejiang province. As the earliest province to get into an aging society in this country, Zhejiang province has experienced rapid growth in population aging.¹³ In 2007, the elderly population (persons 65 years old and over) accounted for 10.6% of the Zhejiang population, a 22.9% increase from 1995 (8.7%), while the proportion of the elderly population in China was 9.4% in 2007, a 39.7% increase from 6.7% in 1995. Although the growth rate was below the national average, the proportion of elderly in the population was higher than the national figure for 13 consecutive years (<http://www.sei.gov.cn/hgjj/yearbook/2008/indexch.htm>; <http://www.stats.gov.cn/tjsj/ndsj/>). Obtaining an understanding of the characteristics of the elderly with this unmet need will help to develop and target strategies to reduce unmet need for hospitalization service.

An adequate assessment of factors influencing unmet need for hospitalization service needs to cast a broad net. For this reason, the Andersen-Newman model of health-care utilization, with its inclusion of multiple explanatory factors, was chosen to serve as a conceptual framework.^{14–18} This model posits that a person's use of health-care services can be explained by three factors: predisposition to use of services (predisposing factors), presence of enabling resources (enabling factors) and need for care (need factors). The behavior model has been employed frequently in the research as it has the flexibility to adapt to varying contexts, given that there is great diversity in the conceptualization and measurement of its components.

Predisposing factors refer to individual demographic characteristics that influence needs, recognition of problems or service use. Previous studies demonstrated that age, gender, race/ethnicity and education level were related to unmet need for health care.^{5,8,19,20}

Enabling factors include personal and community resources that facilitate or impede service use, such as accessibility of services, income, insurance coverage and social support from family and friends. Previous research suggests that individuals with lower income, without a regular source

of care, less access to health-insurance coverage and living in non-metropolitan areas were at higher risk of having unmet need.^{19,21–24}

Need factors pertain to the assessment of one's condition and comprise the objective, professional evaluation of need, such as self-reports of diagnosed disease (used as proxies for physicians' assessment) and the subjective assessment such as self-rated health status.²⁵ Previous research has found that those in depressed health status (e.g. in only good, fair or poor health; having a week or more of bed confinement due to illness; or being limited in activity due to a chronic health problem or condition) are more likely to report having an unmet need.^{2,19,21,24,26}

Our objective in this study is to present estimates of the prevalence of unmet need for hospitalization service and descriptive characteristics of the elderly with this unmet need in Zhejiang province in China using the Andersen-Newman model as a conceptual framework.

Design and methods

Study sample

Participants in this cross-sectional survey were residents aged over 60 years in Zhejiang province. Gongshu district and Wuyi County were selected as the urban and rural field of study, respectively, on the basis of convenience, ease of access and local officials' expressed willingness to participate in this research. Gongshu district is in the central area of the city of Hangzhou (the capital of Zhejiang province), with six street committees, an area of 88 km² and a population of 700 000. Wuyi County is in the southwest of Jinhua city, with 16 towns, an area of 1577 km² and a population of 301 223. The respondents were recruited by a two-stage stratified cluster sample design. First, the study field was divided into two strata, namely urban areas (Gongshu district) and rural areas (Wuyi County). In each stratum, the sample street committees or towns were randomly selected using a random number table and from these sample communities or villages were randomly selected. The sample size was estimated at 2000 persons for an expected prevalence of unmet need for hospitalization service of 30%, a desired accuracy of 2.0% and a confidence level of 95%. The sample was oversized by 500 individuals to ensure a minimum response rate of 80%. The target sample size is 2500 for both urban and rural areas. Finally, two urban communities and 20 rural villages were randomly selected with probability proportional to the overall population size, and a total of 4995 persons aged 60 or over were enumerated from residency registration lists. Figure 1 is a flow

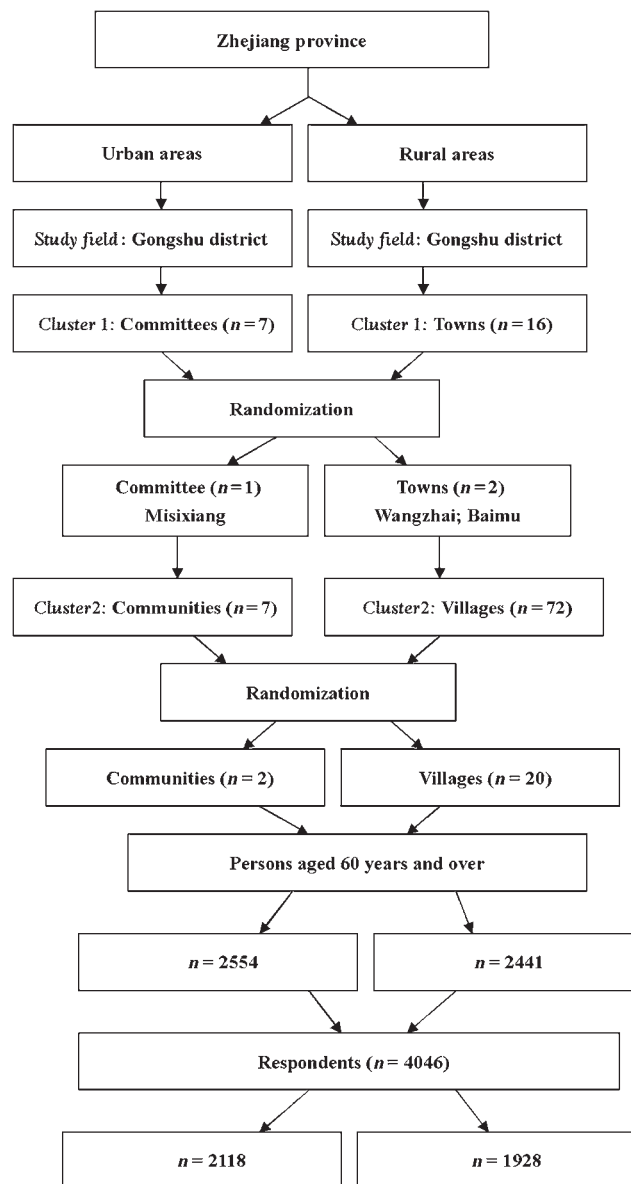


Fig. 1 Flow chart for sample selection procedure.

chart depicting a procedure for sample selection. Attempts were made to interview all eligible persons on the day of the survey. If the person selected could not be interviewed due to health reasons, a proxy could be interviewed. Households in which no residents were available were skipped, and those living outside of households, including homeless and institutionalized seniors, were excluded from the survey. Due to logistical constraints, it was not possible to return to the household on a different day. In the analysis, the final sample is weighted to be representative of the Zhejiang elderly population aged 60 or above by age, sex and residential area using the 2000 Population Census of China.

Data collection

The data were collected through face-to-face interviews during July–December 2007. Respondents were contacted directly by local health personnel (mainly composed of community doctors in the urban areas and bare foot doctors in the rural areas) and were asked to be interviewed, following a brief explanation about the purpose of the study. The interviews used a structured questionnaire and lasted for 20–30 minutes.

Measures

Dependent variable

As with previous studies,^{1,2,19} our dependent variable of perceived unmet need for hospitalization service was defined as a positive response to the following question: 'During the past 12 months, was there ever a time when you were referred by doctors for hospital admission, but you didn't receive it'.

Independent variables

The independent variables in our study are divided into predisposing factors, enabling factors and need factors.

Predisposing factors

Predisposing factors included gender, age, marital status, race/ethnicity (Han and non-Han), living arrangements (live alone or with others) and level of education. Education refers to the highest level of education attained. We have scored it on a three point scale: 1 = primary school and below, 2 = middle school, 3 = college and above.

Enabling factors

The enabling factors in this study included residential area, yearly personal income, social support, out-of-pocket medical expenditure and kinds of insurance coverage. The yearly personal income, measured as the total amount, in RMB Yuan [1 Yuan RMB = 0.142857 US dollars (June, 2008 rate)], of funds received in the past year from all sources, was grouped into less than 5000, 5000–20 000 and 20 000 and above. The following two questions were used to measure social support: 'How much difficulty do you now have in acquiring physical help (e.g. money, products, daily care)?' and 'How much difficulty do you have when needing emotional support (e.g. expressions of care, concern, affection, and interest)?' There are four possible scores for each question: 1 (no difficulty at all), 2 (a little difficulty), 3 (a moderate amount of difficulty) and 4 (a great deal of difficulty or unable to acquire). Scores for the two

questions were summed to form a social support index ranging from 2 to 8, with higher scores indicating lower levels of social support (Cronbach's $\alpha = 0.87$). For the analysis, the sum scores were dichotomized based on a median split into high-level or low-level support according to social support index (median 2 scores). Out-of-pocket medical expenditure included yearly spending on all medical services (e.g. inpatient hospitalizations, emergency department visits, prescription drugs). In this study, health insurance was classified into uninsured, new rural cooperative medical insurance, urban employee basic medical insurance and other social medical insurance.

Need factors

In this study, we used self-reports of diagnosed chronic disease as the objective, professional evaluation of need. Respondents were asked long-term conditions that had lasted or were expected to last 6 months or longer and that had been diagnosed by a health-care professional. Interviewers read a list of conditions and the number of positive responses that respondents answered to the 30 specific conditions plus an 'other, specify' option were summed and categorized as 0, 1, 2 and 3 or more. The 30 chronic conditions considered were: hypertension, gastric ulcer, diabetes, gallstone disease, arthritis or joint conditions, stroke, bone hyperplasia, osteoporosis, chronic faucitis, intervertebral disc disease, chronic bronchitis, chronic pulmonary heart disease, pulmonary emphysema, asthma, coronary heart disease, anemia, chronic hepatitis, hyperthyroidism, Alzheimer's disease, depression, anxiety, cataract, prostate hyperplasia, womb flesh tumor, cervical cancer, lung cancer, liver cancer, breast cancer, stomach cancer and colorectal cancer.

The subjective assessment of one's condition was indicated by three indicators including (i) an assessment of their health on a 1–5 scale ranging from excellent (1) to poor (5); (ii) an average score from the 10-item RAND Medical Outcomes Study's physical functioning scale^{27,28} [items range from 1 (a lot of trouble) to 3 (no trouble)] and assess whether, for example, they have trouble with lifting, climbing, bending or walking various distances) and (iii) the mean response to the five-item Mental Health Index subscale from the RAND Health Survey SF-36, which assesses mood in the previous 4 weeks, for example, nervousness, depression, calmness, sadness or happiness. Scores range from 1 (all of the time) to 6 (none of the time) and were reverse-scored where appropriate, so that higher scores indicate less distress.²⁹ Given the markedly skewed distribution of scores for physical function and psychological distress, the median, lower or upper quartile was used to determine

dichotomization to either high or low and the best approach (i.e. the one able to stratify seniors into two groups with the greatest difference in median unmet need, as determined by bivariable analysis) was chosen. Consequently, the lower quartile and the upper quartile were used to dichotomize scores of physical function and psychological distress into 'high' and 'low' scores, respectively.

Data analysis

All estimates presented in the text and tables have been statistically weighted to reflect Zhejiang province's elderly population totals. The analysis was conducted in the three following steps. The first stage of the analysis involved a description of all the factors in the Andersen-Newman model of health-care utilization. Secondly, variables were screened as candidate predictors for the regression model on the basis of the results of bivariable analysis. For categorical variables the chi-squared test was used, and for ordered categorical variables the chi-squared test for trend was implemented. Finally, a stepwise logistic regression model for multivariable analysis was constructed to identify variables that would predict unmet need. All P values < 0.05 were taken as statistically significant. Odds ratio (OR) and 95% confidence interval (CI) were calculated. All the data analysis was conducted using SAS version 9.2 (SAS Institute Inc, Cary, NC, USA).

Results

Response rate

The response rate was 80.9% (4046/4995) after excluding the 184 participants who failed to answer the question whether they had an unmet need for hospitalization service. Some 17% of the interviews were answered by a 'proxy' respondent, mainly because the eligible participant had difficulty responding due to health reasons.

Descriptive statistics

The weighted population estimates are presented in Table 1. Out of 4046 seniors in the sample, 654 (16.2%) perceived unmet need for hospitalization service in the past 12 months. The largest age group in this sample is persons aged 60–69 years (55.3%). Half (50.2%) of these respondents were females and 74.6% were currently married. The majority of respondents (98.8%) were Han. Of the seniors in the study, less than 20% (19.0%) lived alone and more than 90% (94.8%) had a high school education or less.

Table 1 Bivariable analysis of factors associated with unmet need for hospitalization service ($n = 4046$)^{a,*}

Factors	All (n = 4046)		Unmet need (n = 654)		No unmet need (n = 3392)		χ^2 Test	P-value
	n	%	n	%	n	%		
Predisposing factors								
Age (year)								
60–69	2236	55.3	342	52.2	1895	55.9	2.56	0.1099
70–79	1387	34.3	238	36.5	1148	33.8		
≥80	423	10.4	74	11.3	349	10.3		
Gender							0.03	0.8671
Male	2016	49.8	324	49.5	1692	49.9		
Female	2030	50.2	330	50.5	1700	50.1		
Marital status							7.83	0.0051
Currently married	2991	74.6	450	70.2	2540	75.4		
Unmarried/divorced/separated/widowed	1019	25.4	191	29.8	828	24.6		
Race/ethnicity							0.17	0.6776
Han	3950	98.8	641	99.0	3309	98.8		
Non-Han	48	1.2	7	1.0	41	1.2		
Living arrangement							2.22	0.1360
Living alone	749	19.0	131	21.1	618	18.6		
Living with others	3202	81.0	489	78.9	2713	81.4		
Educational level							20.00	<0.0001
Primary school and below	3124	78.4	544	84.0	2579	77.3		
Middle school	652	16.4	91	14.0	561	16.8		
College and above	209	5.2	13	2.0	196	5.9		
Enabling factors								
Residential area							39.39	<0.0001
Urban	1012	25.0	100	15.3	912	26.9		
Rural	3034	75.0	554	84.7	2480	73.1		
Personal yearly income (Yuan)							29.54	<0.0001
≤5000	2735	69.3	481	77.3	2254	67.8		
5001–19 999	956	24.3	126	20.3	830	25.0		
≥20 000	253	6.4	15	2.4	238	7.2		
Medical expenditure (Yuan)							237.95	<0.0001
≤100	1230	31.6	42	6.6	1187	36.5		
101–2999	2252	57.9	472	73.7	1781	54.8		
≥3000	410	10.5	127	19.7	283	8.7		
Score for social support							81.85	<0.0001
2 (High)	2489	62.0	297	46.1	2191	65.0		
3–8 (Low)	1526	38.0	347	53.9	1180	35.0		
Health insurance							29.34	<0.0001
New rural cooperative medical insurance	2902	72.2	523	80.8	2379	70.5		
Uninsured	84	2.1	11	1.7	74	2.2		
Urban employee basic medical insurance	996	24.7	110	17.1	885	26.2		
Others	40	1.0	3	0.4	37	1.1		
Need factors								
No. of diseases							60.20	<0.0001
0	941	23.3	66	10.1	876	25.9		
1–3	2692	66.7	505	77.5	2187	64.5		
4–10	406	10.0	81	12.4	325	9.6		

Continued

Table 1. Continued

Factors	All (n = 4046)		Unmet need (n = 654)		No unmet need (n = 3392)		χ^2 Test	P-value
	n	%	n	%	n	%		
Health status								
Excellent/very good	1995	49.4	277	42.4	1718	50.8	62.41	<0.0001
Good	1560	38.6	217	33.2	1342	39.6		
Fair/poor	485	12.0	160	24.4	325	9.6		
Score for physical functioning								
2.0–3.0 (High)	3106	76.8	441	67.6	2665	78.6	36.85	<0.0001
1.0–1.9 (Low)	939	23.2	213	32.4	727	21.4		
Score for psychological distress								
5.0–6.0 (High)	1063	26.6	95	14.7	968	28.9	56.09	<0.0001
1.0–4.9 (Low)	2931	73.4	553	85.3	2378	71.1		

1 Yuan RMB = 0.142857 US dollars (June, 2008 rate).

^aWeighted $n = 4046$. All ns and percentages are weighted to be representative of the Zhejiang elderly population and were rescaled to preserve the sample size.

*Data were missing for some respondents in the following characteristics: Marital status, 36; Race, 48; Living arrangement, 95; Educational Level, 62; Yearly personal income, 102; Personal healthcare expenditure, 154; Scores for social support, 31; Health insurance, 24; Number of illness, 7; Score for physical functioning, 1; Score for psychological distress, 5.

Three-quarters of the respondents resided in rural areas. Yearly personal income was low, whereas health-care expenditure was high. Among these respondents, only 6.4% reported they had a yearly income of more than RMB 20 000 Yuan, but 10.5% stated their health service spending exceeding RMB 3000 Yuan. Almost all respondents (97.9%) were covered by medical insurance, with 72.2% of the respondents participating in new rural cooperative medical insurance and 24.7% of the respondents joining employee basic medical insurance. Nearly two-thirds (62.0%) of seniors reported that they had no difficulty in receiving physical and mental support from people within or outside their household.

The data in this study illustrated negative associations between self-reported excellent or very good health and increased number of chronic diseases. To our surprise, nearly half of the respondents (49.4%) rate their own health status as 'excellent' or 'very good', although nearly four-fifths (76.7%) had at least one chronic disease. The reason for this potential divergence is unclear, but we can speculate that it might be that chronic disease is thought inseparable from old age. This thought made some seniors rate their health as excellent or very good in disregard of the existence of chronic diseases. The proportions of 23.2% and 73.4% were obtained for low physical function ($1.0 \leq \text{PFscores} \leq 1.9$) and high psychological distress ($1.0 \leq \text{PDscores} \leq 5.0$), respectively.

Bivariable analysis

The results of the bivariable analysis are shown in Table 1. Those who perceived unmet need tended to be currently unmarried, having lower levels of education, individuals from rural residential areas, lower income, higher medical expenditure, weaker social support, joining new rural cooperative medical insurance, poorer self-perceived health status, more chronic diseases, poorer physical function and greater psychological distress. No significant differences were reported between unmet need and no unmet need in age, gender, race and living arrangement.

Multivariable logistic regression analysis

The stepwise multiple logistic regression model predicting unmet need for hospitalization service is shown in Table 2. Among predisposing factors, educational level was the only significant predictor of unmet need for hospitalization service. Respondents having a college degree or above were less likely to report unmet need ($\text{OR} = 0.49$, 95% $\text{CI} = 0.30, 0.80$) than respondents entering primary school and below.

Among enabling factors, residential area, social support, personal yearly income and personal healthcare expenditure were strongly associated with the presence of unmet need. Those with less enabling resources were more likely to report unmet need. Out-of-pocket medical expenditure was

Table 2 Logistic regression analysis of factors associated with unmet need for hospitalization service

Factors	Adjusted OR	95% CI	P-value
Predisposing factors			
Educational level			
Primary school and below (reference)	1.00		
College and above	0.49	(0.30, 0.80)	0.0047
Enabling factors			
Residential area			
Urban (reference)	1.00		
Rural	1.48	(1.15, 1.89)	0.0019
Score for social support			
2 (High) (reference)	1.00		
3–8 (Low)	1.61	(1.30, 1.99)	<0.0001
Personal yearly income (Yuan)			
≥20 000 (reference)	1.00		
≤5000	1.56	(1.02, 2.44)	0.0425
Personal healthcare expenditure (Yuan)			
≤100 (reference)	1.00		
101–2999	3.84	(2.83, 5.21)	<0.0001
≥3000	6.39	(4.45, 9.17)	<0.0001
Need factors			
Health status			
Excellent or very good (reference)	1.00		
Fair or poor	1.66	(1.29, 2.14)	<0.0001
Score for psychological distress			
4.6–6.0 (High) (reference)	1.00		
1.0–4.5 (Low)	1.52	(1.20, 1.94)	0.0006
Number of diseases			
0 (reference)	1.00		
1–3	2.14	(1.51, 3.04)	<0.0001
4–10	2.70	(1.77, 4.12)	<0.0001

Only significant correlates are presented.
1 Yuan RMB = 0.142857 US dollars (June, 2008 rate).
OR, odds ratio; CI, confidence interval.

the most powerful predictor of unmet need. Compared with seniors who reported spending no more than 100 Yuan on health care, the odds of unmet need were 3.84 and 6.39 for individuals with personal healthcare expenditure being 101 Yuan to 2999 Yuan and 3000 Yuan or more, respectively. Elderly people in the low income group (≤5000 Yuan) were more likely to report unmet need (OR = 1.56, 95% CI = 1.02, 2.44) than those in the high income group (≥20 000 Yuan). The odds of unmet need were 1.61 times of respondents who had lower levels of social support

compared to that of those with high levels of social support. In addition, seniors residing in rural areas were more likely to report unmet need (OR = 1.48, 95% CI = 1.15, 1.89) than those living in urban areas. All the need factors, except for physical function, were strongly associated with presence of unmet need. Seniors in poorer health status were more likely to report unmet need than their counterparts in better health. The respondents who rated their health as fair or poor were more likely to report unmet need (OR = 1.66, 95% CI = 1.29, 2.14) than those with excellent or very good self-rated health. The odds of unmet need in the presence of 4–10 diseases and 1–3 diseases were 2.70 and 2.14 times, respectively, of those having no disease. Also, the respondents who had higher psychological distress scores were more likely to report unmet need (OR = 1.52, 95% CI = 1.20, 1.94).

Discussion

Main finding of this study

In our community sample, 16.2% of elderly people in Zhejiang province reported having an unmet need for hospitalization service. This underscores the urgent need for improving the hospitalization service for the elderly. Based on the Andersen-Newman framework, we identified that one predisposing factor (educational level), four enabling factors (residential area, social support, personal yearly income and personal healthcare expenditure) and three need factors (number of diseases, health status, psychological distress) were significantly associated with the presence of unmet need. The odds of unmet need for those with a college or higher degree were 0.48 times the odds for those with primary or lower education. Those with less-enabling resources (e.g. residing in rural areas) were more likely to report unmet need (OR = 1.48–6.45). Seniors in poorer health (e.g. in fair or poor health) were more likely to report unmet need than their counterparts in better health (OR = 1.52–2.78).

What is already known on this topic?

Previous studies which assessed perceived need for hospitalization service found that 35–64% of seniors were unable to obtain hospitalization service,^{7–11} which is higher than the prevalence noted in this study (16.2%). Because different definitions of unmet need were used in these studies, it is impractical to derive further analysis and conclusions on the reasons for the differences. A whole population-based study found that unmet need for hospitalization service was found to be more common with increasing age and among men.⁸ In this elderly population, age and gender were not significantly associated with

unmet need for hospitalization service. Among the array of predisposing variables included, a significant role was found only in 'educational level'. Individuals with higher education level were less likely to report unmet need for hospitalization services. This finding is not surprising as it fits the general education level pattern of service use. Those with higher levels of education often gain a better insight into symptoms of illness, know more about the availability of health-care services and use this information more effectively to access hospitalization service.³⁰

The concentration of unmet need among the elderly with higher health-care expenditure and lower income is especially notable. These findings from this study support previous studies that have found that financial difficulties were factors affecting unmet needs. For example, the Third National Health Service Survey in 2003 showed that patients' difficulty in paying their medical costs plays a critical role in determining underutilization, accounting for 75% of those who were not admitted to hospital despite reported need.⁸ In a more recent study, Lei *et al.*³¹ reported that being able to pay out-of-pocket medical expenses accounted for 84.3% of those rural residents who were not admitted to hospital despite reported need.

As with previous studies, elderly people residing in rural areas were more likely to report unmet need for hospitalization service than were urban elderly people.⁸ These data are consistent with the low number of hospital beds, doctors and nurses in rural areas. For example, in 2005, hospital beds, doctors and nurses per 1000 people in cities were 3.59, 2.14 and 1.66, respectively, compared with 1.43, 0.96 and 0.51 in rural areas.³² In addition, the health-care system remains bifurcated between rural and urban areas in China. The new cooperative medical insurance system (NRCMI) is an essential insurance type for the rural population, while the urban employee basic medical insurance (UEBMI) exists for urban residents. Compared with NRCMI, UEBMI has much higher benefit packages. For instance, the premium per enrollee in NRCMI was on average 40 Yuan, while the premium per enrollee in UEBMI was nearly 1000 Yuan in 2005. Therefore, one part of the high level of unmet need for hospitalization services among rural elderly people likely is the result of the limited number of health resources for providing care in their area.

Consistent with previous research in which social support was identified as a significant enabling factor that assists users in gaining more adequate access to services,^{33,34} a similar result was reported in this study. For sick, older Chinese people, social support probably has played an important role in providing the hospitalization charge, accessing hospitalization services and easing subsequent physical and mental discomfort.

The effects of need factors are consistent with previous findings in which diminished health status is related to a higher risk of reporting unmet need for health-care service.^{19,24} This could be partially explained by the fact that individuals with poorer health status are more likely to require hospitalization service compared with those reporting better health. Consequently, these individuals have more opportunities to experience unmet need and, therefore, are at higher risk compared with those less likely to need and use hospitalization service.

What this study adds?

While other studies have described hospitalization service as a frequently cited unmet need, ours is the first to identify factors associated with the likelihood of having unmet need for hospitalization service based on the Andersen-Newman framework in Zhejiang province as well as the whole China. Our findings suggested that equal use of hospitalization service for equal needs has not been achieved, and that respondents with unmet need were mainly 'lower-educated', 'fewer enabling resources' and 'more needs'. Consequently, four types of intervention aimed at reducing unmet need for hospitalization service are recommended.

- (1) Conduct health education: health education interventions can increase seniors' knowledge of identifying symptoms of illness, and provide the information about the availability of hospitalization services. Accordingly, seniors with increased knowledge and information can more effectively use hospitalization service.
- (2) Create social support: because of the importance of the social support in lowering unmet need for hospitalization service, health educators should work more closely with the local community to design culturally appropriate methods for health-promotion activities to reach the elderly population and their families.
- (3) Promote community participation: the community should be involved in the policy-making process. As China continues to implement policies for reducing inequalities in healthcare, its experiences should be closely monitored and evaluated. Involvement of communities in policy evaluation is desirable to really meet the need of the people. Especially, in the design of allocation of health-care resources, the voices from the rural population, especially the poor, need to be heard.
- (4) Promote inter-sectional cooperation: inter-sectional collaboration and cooperation with other departments should be enhanced. In China, it is especially important to have harmonious coordination between sectors

because there are at least four departments (including Departments of Health, Women's Federation, Committee on Aging Population) at the community level that are related to health issues of the aging population. For example, in conducting health education, effective communication is needed between the Departments of Health and Propaganda.

Limitations of this study

The results of this study must be interpreted in the light of a number of limitations. First, because this analysis relied on cross-sectional data, extreme caution must be exercised in claiming causal relationships. Secondly, although this study is designed to provide provincially representative estimates, seniors living outside of households, including homeless and institutionalized seniors, are excluded from the survey. These seniors are likely to experience greater levels of unmet need for hospitalization service than seniors included in the sample frame for this study. Consequently, our estimates of the prevalence of unmet need for hospitalization service may be somewhat understated. Thirdly, data for this study relied on self-reported survey methods. Previous studies found older adults under-report health services use including hospitalizations.^{35,36} For example, Wallihan and colleagues found that 24.1% of older adults failed to report a hospitalization in the past 12 months and almost one-half under-estimated the number of hospitalizations by at least one episode. It is possible that for personal reasons, some respondents may not have accurately reported variables such as age, education, marital status or chronic health conditions, thus introducing reporting bias into the sample. Fourth, information on unmet needs is based on self- or proxy-reported experiences and so is open to interpretation. Respondents may interpret this unmet need as a situation in which they did not receive hospitalization service for a health problem, or when they received hospitalization service, but not at the time they were referred by doctors for hospital admission. In the latter case, such experiences may be more representative of problems with access to care rather than true unmet need for hospitalization service. Because of the wording of the question addressing unmet need, it is not possible to distinguish situations in which people did not receive services at all from situations in which they did not receive them in a timely manner. This ambiguity limits the interpretation of the data, particularly in relation to specific policy options that might be considered to reduce the occurrence of unmet needs. In addition, Newacheck *et al.*¹⁹ has also described the potential problems with self-report of unmet needs and alternative approaches in detail. We share the concern that prevalence estimates

for unmet need based on self- or proxy report may underestimate or overestimate the true prevalence of need. Fifth, social support was measured by two items: one for emotional, and the other for physical support. From the abundance of recently published research, there is a lack of agreement concerning the content of social support and perhaps the most frequently used typology of support content, first proposed by House³⁷ defines four different types of social support: emotional, instrumental, appraisal and informational. Although we found a strong relationship between our two-item measure of social support and unmet need for healthcare service, it may not be exhaustive. Sixth, although the overall response rate is reasonable (80.9%), 17% of interviews were completed by proxy respondents because of physical or mental incapacity of the sampled individual. Proxy respondents often are used in epidemiological research when the subjects of interest cannot give information themselves.³⁸ Inclusion of proxy respondents increases sample size and study power and improves the representativeness of the study sample. The proxy reporting has also been shown to produce biased assessments depending on the proxy's relationship to the subject.³⁹ To minimize proxy bias, we choose an eligible proxy based on the following two conditions: firstly, it was imperative to be responsible for caring for the seniors, and secondly, it was desirable to live with him or her to guarantee an in-depth knowledge of the seniors.⁴⁰ The results of this study indicated that the majority of proxy respondents (91.1%) were spouse (76.7%) and child (14.4%). In addition, when trying to account for the effect of proxy interviews by comparing the results with and without proxy responses, we found that all these independent variables were consistent predictors of unmet need for hospitalization. Therefore, the use of proxy respondents was an appropriate strategy given the purposes of the current investigation (i.e. obtain provincially representative sample). Seventh, in the present study, the assessment of determinant variables was limited to the individual level of barriers, and future studies may need to consider a broader spectrum of barriers, including environmental and system level variables (for example, unavailability of services or long waiting times). Also, research interests should be extended to an assessment of access and quality problems in hospitalization services to increase effectiveness of services for the elderly populations.

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