



Original Article

Healthcare Service Utilization and Associated Factors in Community-Dwelling Elderly in Northern Taiwan: One Medical Center's Experience



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SUMMARY

Background/Purpose: To find differences in healthcare utilization among urban community-dwelling elderly in northern Taiwan in comparison with national survey data and to determine the factors associated with such utilization.

Methods: A cross-sectional survey was conducted among 1358 elderly (601 men, 44.3%; 757 women, 55.7%) who had received a senior-citizen health examination between March and November of 2009. Andersen's behavioral model of healthcare was adopted in this study.

Results: Up to 94.5% of elderly preferred utilizing Western medicine to treat their illnesses, which was higher than the 77.8% in 2005 and 68% in 2009. Only 2.1% chose to ignore their illnesses. Women and respondents aged 80 years old or older tended to utilize numerous types of healthcare services. Education level, living arrangement, being treated for chronic diseases, perceived health status, Brief Symptom Rating Scale score, and health concerns all influenced participants' healthcare service utilization.

Conclusions: To reduce the gap in healthcare utilization between different domicile people living in urban and non-urban areas, medical treatment should be modified by different health-seeking behaviors in these areas.

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1. Introduction

The Council for Economic Planning and Development predicted that elderly (more than 65 y/o) will reach 22.5% by 2028 (approximately 5,360,000 people).¹ A National Health White Paper (2020) reported that the main factor influencing the higher life span was medical care.² Thus, improving education or enhancing care services may be needed to ensure that elderly make wise decisions concerning medical care and their health.

A study by the National Institutes of Health in 2003 revealed that individuals aged older than 65 years were exhibiting greater healthcare utilization.³ Other studies have shown that individuals who were younger and had higher education levels tended to seek out Western medicine treatment,⁴ as did elderly who were conscious of being ill.⁵ One study found that, as age increased, so did the utilization rate of traditional Chinese medical treatment.⁶

Among individuals aged 65 years or older, 57% of women and 44% of men also used herbal medicine, vitamins, and mineral supplements. A higher likelihood of polypharmacy was also found with increasing age.⁷ Compliance awareness has been found to be closely related to education level.⁸ Additionally, among individuals with lower compliance with medical treatment, there was a greater tendency to purchase medication by themselves.⁸

One major factor determining accessibility to medical care is convenience.⁹ With greater convenience, elderly are more likely to seek out regular treatment, and would be less likely to purchase medication on their own or utilize folk therapies.⁹ The United States (US) Centers for Disease Control and Prevention found that the main reason for the US population aged more than 65 years old who delayed in seeking medical care when ill was the difficulty of accessing such care.¹⁰

To maintain the body's healthy functioning, elderly must engage in greater physical activity and healthy behaviors.¹¹ The motivation for health promotion was still high in the aging group, and they had sufficient time to engage in healthy behaviors.¹² Therefore, health

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protection and promotion are important concepts to maintain health of the elderly.

Andersen (2008) mentioned that one of the challenges of the 21st century in the medical field is to provide the best medical care possible for the elderly (aged ≥65 years).¹³ In 1968, Andersen devised the behavioral model of health services use, which help expand researchers' understanding of individuals' healthcare utilization behaviors.^{5,14} Individuals' healthcare use can be understood in terms of three sets of factors: predisposing, enabling, and need¹⁴ (Fig. 1).

The main goal of this article was to compare healthcare services utilization (Western, Chinese medicine, and complementary/alternative medicine) among elderly individuals in northern Taiwan with national survey data. Andersen's behavioral model was used to frame the influencing factors of such utilization.

2. Methods

2.1. Study participants

This study targeted elderly (aged ≥65 years) who had received a health examination from March to November of 2009 at medical centers in Taipei City. Questionnaires were completed via one-on-one interviews. A total of 1399 elderly individuals underwent these interviews. Of these, 43 provided incomplete questionnaires due to specific disabilities and, thus, were excluded. Ultimately, a total of 1356 complete questionnaires (response rate: 96.9%) were used in the analysis.

The study protocol was examined and approved by the Human Research Ethics Committee of the researcher's hospital (project research number 09MMHISO11).

All participants provided written informed consent.

2.2. Physical and mental status

2.2.1. Physical health status

Two questions were asked: "How many chronic diseases are you receiving treatment for?" and "Compared to other people of your age, how is your current health status?" Respondents answered this latter question by choosing one of the following five options: excellent, good, the same, not good, and bad.^{16,17}

2.2.2. Brief Symptom Rating Scale

Mental health was screened using the Brief Symptom Rating Scale (BSRS-5). This self-rated questionnaire requires respondents to report whether, in the past week, they had felt tense, blue,

irritated, or inferior or had trouble falling asleep. Responses are rated on a scale from 0 to 4 with 0 meaning "not at all" and 4 meaning "extremely." Total scores ranged from 0 to 20.^{18,19} When a score of ≥6 was used as the cut-off for psychiatric cases, the classification accuracy of the BSRS-5 was 76.3% (78.9% sensitivity, 74.3% specificity, 69.9%).¹⁸

2.3. Assessment of socio-demographic variables

Socio-demographic variables assessed included gender, age, education level, and living arrangement. Age was divided into four groups: 65–69, 70–74, 75–79, and ≥80 years old. Education level was classified into the following five levels: illiterate, elementary school, junior high school, senior high school, and college or higher. Living conditions were defined as living alone or living with family.

2.4. Questionnaire development

A questionnaire was developed based on the available literature.^{16,17,20–22}

1. Health-risk behaviors: Three types of health-risk behaviors were assessed during the interview: alcohol consumption, smoking tobacco, and sedentary lifestyle in the previous six months.²⁰
2. Health concerns: Three questions were used: "Do you usually discuss your own or others' health issue with others?" "Do you pay attention to news coverage of relevant medical and health issues?" and "Do you pay attention to food labels?", Participants answered each question as "never," "seldom," "sometimes," or "usually".^{16,17}
3. Health-seeking behavior and healthcare utilization: To assess health-seeking behavior, the following question was used: "When you feel uncomfortable, what is the most common way you deal with?" Five areas were listed as responses (Table 1). Participants were asked to indicate the frequency with which they utilized six types of healthcare services: (1) Western medicine outpatient services (2) Chinese medicine outpatient services (e.g., herbal medicine, acupuncture, moxibustion) (3) purchasing Western medication (4) purchasing Chinese medicine (5) eating an organic diet, and (6) complementary/alternative medicine (e.g., recalling the soul²¹, gua sha, cupping therapy, manipulation, chiropractic, massage, reflexology, bone reduction, and traditional trauma dislocation).²²

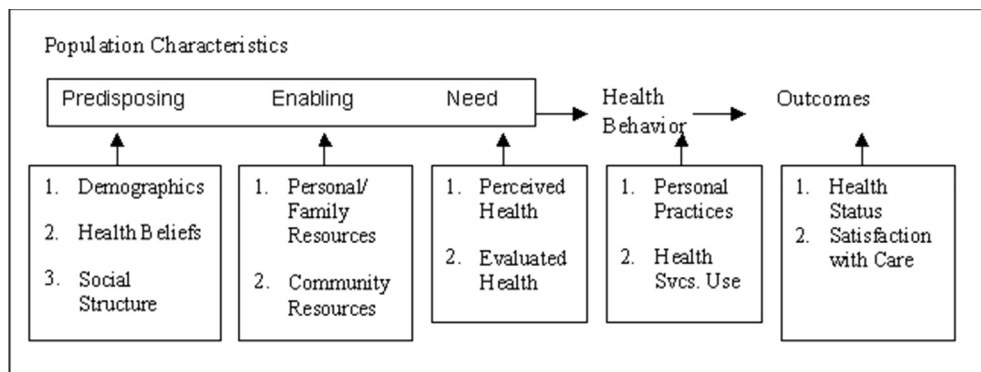


Fig. 1. The Behavioral Model^{15,16}.

Table 1
Respondent characteristics by gender (n = 1356).

	Male (n = 600, 44.3%)	Female (n = 756, 55.7%)	p
	n (%)	n (%)	
Age (y, mean ± SD)	74.7 ± 5.5	73.3 ± 5.6	<0.001 ^a
Age group (y)			<0.001
65–69	111 (18.5)	212 (28.0)	
70–74	205 (34.1)	265 (35.0)	
75–79	164 (27.3)	171 (22.6)	
≥80	120 (20.1)	108 (14.4)	
Smoking status	55 (9.2)	5 (0.7)	<0.001
Alcohol consumption status	129 (21.5)	16 (2.1)	<0.001
Sedentary lifestyle	48 (8.0)	85 (11.2)	0.038
Living arrangement			0.010 ^b
Alone	37 (6.2)	78 (10.3)	
With family	563 (93.8)	678 (89.7)	
Education level			<0.001
Illiterate	14 (2.3)	57 (7.5)	
Elementary	121 (20.2)	291 (38.5)	
Junior high school	74 (12.3)	159 (21.0)	
Senior high school	174 (29.0)	169 (22.4)	
≥College	217 (36.2)	80 (10.6)	
Physical and mental status			
Receiving treatment for chronic disease	425 (70.8)	497 (65.7)	0.048
Perceived health status compared to those of same age			0.037
Excellent	55 (9.2)	26 (3.4)	
Good	265 (44.2)	280 (37.1)	
The same	243 (40.6)	381 (50.4)	
Not good	30 (5.0)	57 (7.5)	
Bad	7 (1.0)	12 (1.6)	
BSRS-5 (mean ± SD)	1.83 ± 2.8	2.50 ± 3.0	<0.001 ^a
Health behaviors			
Do you usually discuss your own or others' health issues with others?			0.005
Never	76 (12.7)	99 (13.1)	
Seldom	171 (28.5)	156 (20.6)	
Sometimes	249 (41.5)	340 (45.0)	
Usually	104 (17.3)	161 (21.3)	
Do you pay attention to news coverage of the relevant medical and health issues?			0.016
Never	56 (9.3)	98 (13.0)	
Seldom	103 (17.2)	93 (12.3)	
Sometimes	241 (40.2)	292 (38.6)	
Usually	200 (33.3)	273 (36.1)	
Do you pay attention to food labels?			0.009 ^b
Never	37 (6.2)	74 (9.8)	
Seldom	62 (10.4)	68 (9.0)	
Sometimes	124 (20.6)	117 (15.5)	
Usually	377 (62.8)	497 (65.7)	
Health-seeking behavior			
When you feel uncomfortable, what is the most common way you deal with? (Multiple choice)			
Western medicine practitioners	573 (95.5)	708 (93.5)	
Traditional Chinese medicine	53 (8.8)	101 (13.4)	
Pharmacy	58 (9.7)	49 (6.5)	
Laymen or unprofessional treatment	8 (1.3)	13 (1.7)	
Ignore it	8 (1.3)	20 (2.6)	

Note: Chi-square test, a: independent *t*-test, b: Fisher's exact test.

2.5. Statistical analysis

SPSS Statistics 17.0 (SPSS Inc., Chicago, USA) was used for all statistical analyses. Continuous variables are reported in terms of means ± standard deviations (SD), and categorical variables are reported in terms of numbers and percentages. The differences in numbers and means were assessed using the chi-square test, *t*-test, and Fisher's exact test. Multiple logistic regression analysis was used to examine the associations between the various factors and utilization of healthcare services.

3. Results

Table 1 shows the basic characteristics of the 1356 elderly individuals who took part in this study. There was no statistical

difference between the number of participants from these areas even distribution within Taipei City ($p > 0.1$). Table 2 reports that the majority of respondents utilized Western medicine outpatient services. Table 3 shows the odds ratios of the different healthcare services via multiple logistic regression. Overall, respondents with higher education levels, those who were living with family, and those who had BSRS scores of ≥ 6 tended to utilize Western and Chinese medical outpatient services. Women were more likely to utilize Chinese medical outpatient services. Respondents who were 80 years old or older tended to utilize Western medicine outpatient services whereas respondents younger than this utilized Chinese medicine outpatient services. Respondents who were receiving treatment for chronic disease also tended to utilize Western medical outpatient services.

Table 2
Health care service utilization rates (n = 1356).

Over the past year, how often did you utilize the following health care services? (n, %)	Never	Seldom	Sometimes	Usually
1. Western medicine outpatient services	33 (2.4)	157 (11.6)	450 (33.2)	716 (52.8)
2. Chinese medicine outpatient services	808 (59.6)	322 (23.7)	182 (13.4)	44 (3.3)
3. Purchase of Western medicine	627 (46.3)	250 (18.4)	362 (26.7)	117 (8.6)
4. Purchase of Chinese medicine	1050 (77.4)	171 (12.6)	115 (8.5)	20 (1.5)
5. Eating an organic diet, healthy food, or a special diet	535 (39.5)	181 (13.3)	422 (31.1)	218 (16.1)
6. Complementary/alternative medicine				
Recalling the soul	1264 (93.2)	50 (3.7)	39 (2.9)	3 (0.2)
Gua sha	1228 (90.6)	56 (4.1)	61 (4.1)	11 (0.8)
Cupping therapy	1266 (93.8)	40 (2.9)	48 (3.5)	2 (0.1)
Manipulation and physical therapy	1200 (88.5)	75 (5.5)	67 (4.9)	14 (1.1)
Chiropractic	1265 (93.3)	39 (2.9)	44 (3.2)	8 (0.6)
Massage and Reflexology	1161 (85.6)	65 (4.8)	100 (7.4)	30 (2.2)
Bone reduction, traditional trauma, dislocation, fracture treatment	1292 (95.3)	38 (2.8)	22 (1.6)	4 (0.3)

4. Discussion

Table 4 depicts national survey results (including 21 counties and 187 villages and towns) in 2005 and 2009,^{16,17} and in the results of the present study (which focused specifically on an urban community), the proportion of elderly who perceived their health status as good or excellent was 46.2%, which was notably higher than those reported in the national surveys in 2005 (35.8%) and 2009 (38%). Furthermore, up to 94.5% of elderly preferred Western medicine and 11.4% Chinese medicine; only 2.1% chose to ignore their illness condition, which was less than the proportion from the national surveys.^{16,17}

In both the national survey and this study focusing on Taipei City, the majority of elderly utilized Western medicine when ill. As

shown in Table 4, the proportions of elderly living in Taipei who preferred Western medicine, Chinese medicine, and laymen or unprofessional treatment were higher than those in the national survey data. In contrast, the proportions of respondents who purchased medicine on their own from a pharmacy and ignored illness were lower. The differences between these studies might be due to the differences in accessibility of medical care and a greater attention to health in the urban community.

Drawing on Andersen's behavioral model, the results are discussed according to the differing factors influencing healthcare service use:

A. Predisposing factors

1. Gender: In this study, women were more likely to utilize healthcare service than were men. Same result was found in a study by Yeh, the reason being that women were judged to pay more attention to their physical and mental conditions.²³
2. Age: This study showed that different age groups had different choosing healthcare service. The results showed that no statistical difference of Trend test in age in health care services utilized. Tsai found that elderly with chronic diseases were more likely to choose traditional Chinese medicine.⁶
3. Education level: In this study, people with higher education levels (e.g., college or higher) were more likely to utilize healthcare service than were respondents with an education of less than junior high school. In contrast, recalling the soul declined with education level. Another results showed that statistical difference of Trend test in education level in Chinese medicine outpatient service, and organic diet (p < 0.05). It has been noted that elderly with lower education levels are less likely to be concerned about their health status.¹⁵ Furthermore, elderly with higher education levels may be more motivated to engage in self-care and are more compliant with a healthy lifestyle.⁵
4. Health concerns: Respondents with greater health concerns were more likely to utilize Chinese medicine outpatient services and an organic diet than were those with lower health concerns. Weng noted a higher utilization rate of Western medicine among those whose perceived health statuses or actual health states were poor.²⁴

Table 3
Odds ratios (ORs; [95% CI]) of health care services utilized.

	Western medicine outpatient services	Chinese medicine outpatient services	Purchase of Western medicine	Purchase of Chinese medicine	Organic diet	Manipulation and physical therapy	Recalling the soul
Gender (ref.: male)	0.92 (0.65–1.22)	1.40 (1.02–1.97)	1.05 (0.85–1.28)	1.46 (1.10–1.98)	1.84 (1.33–2.54)	1.54 (1.11–2.15)	1.44 (1.13–1.83)
Age (y; ref.: 65–69)							
70–74	1.14 (0.85–1.52)	1.39 (1.05–1.85)	0.86 (0.65–1.12)	0.80 (0.56–1.12)	0.72 (0.55–1.02)	0.98 (0.71–1.38)	0.66 (0.44–0.98)
75–79	1.22 (0.91–1.62)	1.44 (1.04–2.01)	0.90 (0.67–1.21)	0.81 (0.63–1.09)	0.85 (0.64–1.13)	0.77 (0.45–1.11)	0.51 (0.33–0.78)
≥80	1.33 (1.03–1.75)	1.10 (0.79–1.51)	0.74 (0.54–1.01)	0.68 (0.46–1.02)	0.70 (0.48–1.08)	0.75 (0.48–1.05)	0.44 (0.32–0.61)
Education level (ref.: lower than junior high school)							
Senior high school	1.41 (0.97–2.01)	1.42 (1.08–1.90)	1.25 (0.71–1.74)	1.10 (0.70–1.69)	1.41 (1.02–1.97)	1.37 (1.03–1.77)	0.95 (0.58–1.36)
≥College	1.73 (1.21–2.47)	1.85 (1.35–2.52)	1.58 (1.23–2.02)	1.14 (0.74–1.76)	1.77 (1.32–2.12)	1.43 (1.09–1.97)	0.90 (0.55–1.30)
Living arrangement (ref.: alone)							
With family	1.87 (1.38–2.12)	1.50 (1.11–1.91)	1.11 (0.60–1.63)	0.94 (0.45–1.43)	1.53 (1.11–1.96)	1.24 (1.05–1.43)	0.78 (0.55–1.01)
Receiving treatment for chronic disease (ref.: no)							
Yes	1.66 (1.32–2.22)	1.05 (0.88–1.28)	0.87 (0.52–1.17)	0.61 (0.21–1.04)	1.38 (1.08–1.72)	1.08 (0.81–1.32)	0.62 (0.34–1.05)
Health status (ref.: bad/not good)							
Excellent/good	0.81 (0.65–1.15)	0.67 (0.35–1.05)	0.85 (0.62–1.12)	0.77 (0.52–1.09)	1.15 (1.01–1.33)	1.04 (0.56–1.50)	0.45 (0.32–0.67)
BSRS-5 group (ref.: <6)							
≥6	2.21 (1.64–2.96)	1.75 (1.27–2.02)	1.39 (0.95–1.85)	1.20 (0.89–1.53)	2.32 (1.79–3.01)	1.85 (1.52–2.34)	1.05 (0.79–1.44)
Health concerns (ref.: never/seldom)							
Sometimes/usually	0.74 (0.50–1.07)	1.99 (1.62–2.43)	0.92 (0.74–1.25)	0.90 (0.61–1.32)	1.62 (1.25–2.10)	1.09 (0.85–1.42)	0.58 (0.35–0.85)

Adjust variables: smoking status, alcohol consumption status, sedentary lifestyle.

Table 4
Comparison the characteristics of data from this study (Taipei 2009) with national survey data (NHIS 2005 and 2009).

	NHIS 2005	NHIS 2009	Taipei 2009
Gender			
Male	50.5%	43.2%	44.3%
Female	49.5%	56.8%	55.7%
Perceived health status			
Good or excellent	35.8%	38.0%	46.2%
The same	40.9%	42.4%	46.1%
Not good or bad	23.3%	19.6%	7.7%
Medical services utilized			
Western medicine	77.8%	68%	94.5%
Chinese medicine	4.3%	3.6%	11.4%
Purchase medicine	8.4%	10.7%	7.9%
Laymen or unprofessional treatment	0.2%	0.1%	1.5%
Ignore	6.4%	2.7%	2.1%

NHIS: National Health Interview and Drug Abuse Survey.

B. Enabling factors

1. Living arrangement: Elderly living with their families were more likely to utilize healthcare service than were those living alone. Liao also showed that elderly living with family tend to have relatively good physical and mental health.²⁵ In contrast, living alone was significantly related to lower use of outpatient care services, decreased utilization of medical services overall, and a lower likelihood of searching for health knowledge.²⁶
2. Community resources (e.g., accessibility of medical care): In this study, as many as 94.5% of elderly preferred Western medicine for treatment when ill while 11.4% preferred Chinese medicine. Both of these rates are higher than those in the national survey data (77.8% in 2005, 68% in 2009 and 4.3% in 2005, 3.6% in 2009, respectively).

C. Need factors

1. Perceived need (e.g., perceived physical and mental health): Respondents who were receiving treatment for chronic diseases were more likely to utilize Western medicine outpatient services and an organic diet compared to those not receiving such treatment. Furthermore, respondents who perceived their health status as excellent or good were more likely to utilize an organic diet and were less likely to utilize the recalling the soul method. Additionally, those with higher BSRS (≥ 6) scores were found to be more likely to utilize Western and Chinese medicine outpatient services, an organic diet, and manipulation and physical therapy than were those with lower BSRS scores (< 6).

The lower individuals' health awareness was, the lower their willingness was to avoid health hazards and poor health-related behaviors.²⁷ As such, their use of medical resources is generally rather low. Previous studies have similarly found a close association between health cognitions and behaviors and use of medical resources.²⁷

Furthermore, self-reported health status is related to suffering from chronic disorders, functional limitations in daily life, and emotional factors.²⁸

In our preliminary analysis showed that IADL (instrumental activity daily living) is significantly affected by age ≥ 80 group compared to age < 80 group. The main goal of this study was to discuss the respondents' autonomy behaviors of healthcare utilization, if the IADL functional impaired, seeking healthcare behavior would be replaced by the primary caregiver that was not the

purposes of this study. Therefore, there is no comparison between the two groups. The score of ADL (activity daily living) of these participants was no significant difference.

Based on our data, the group belonged to "not good and bad health status group", there were 37 men (2.7%) and 70 women (5.2%). It was difficult to show statistical significance due to small sample size.

Some limitations were found in our article. The first is that little questionnaire content mentioned health prevention and promotion (only such as health behaviors and eating organic diet). This study focused on explaining healthcare utilization and weakly explained the effect on health prevention and promotion.

Second, the details of the status of chronic diseases and medication history were not completed; a simple question of "receiving treatment for chronic disease" was used. Therefore, the actual effect needs to be determined.

5. Conclusion

The main goal of our study is to alter those factors influencing healthcare utilization, such as education level, health concepts or accessibility to medical care, to prevent elderly living in non-urban areas from ignoring their illness and delaying in seeking out care. Thus, there is a strong need for large-scale longitudinal studies to identify the nature and directional relationship between care-seeking for illness and diseases.

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