

## A Study of Outpatient Utilization Between Widowers and Widows among the Elderly in Taiwan

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**Abstract:** Both the numbers of aging and of widowed peers are gradually increasing in Taiwan. In this context, the aim of this paper is to compare outpatient services utilization from the perspective of predisposing, enabling and need characteristics between elderly widowers and widows. Subject data were obtained from the National Health Interview Survey of Taiwan in 2009. Among these data, 998 widowed persons aged 65 years old and over were analyzed. A Chi-square test and four different logistic regression models were used to investigate the influence of predisposing, enabling and need characteristics on outpatient utilization among elderly widowed persons. The empirical findings indicated that, for the predisposing characteristics, age showed significantly different outpatient utilization for widows. Nevertheless, there was a significant education gradient in outpatient utilization for elderly widowers. Next, for the enabling characteristics, economic status and national health insurance revealed significant effects on outpatient utilization for widows but not for widowers. In addition, for need characteristics, hypertension and kidney diseases played significant predictive factors related to outpatient utilization both for widows and widowers. However, other chronic diseases revealed significant differences on outpatient utilization only for widows. Finally, empirical results further indicated that widows were more likely to use outpatient services than widowers in later life. Therefore, study findings identified that predisposing, enabling and need characteristics were strongly correlated with the utilization of outpatient services for elderly widowers and widows. Administrators and managers could add the consideration of these three important characteristics into planning for the utilization of outpatient services, designing related policies, and allocation and use of health-care resources.

**Keywords:** Elderly, Widowers, Widows, Logistic regression, Outpatient utilization, Healthcare services

**JEL Classifications:** A10, I10, J10

### 1. Introduction

In recent years, average life expectancy has been steadily increasing in Taiwan. In 2014, almost 12% of the population was classified as elderly. This number is expected to be double over the coming decades (National Development Council, NDC, 2015). Therefore, Taiwan's population profile has been not only "ageing", but also has gradually "aged". The trends reflect declining mortality rates and increasing survival rates in Taiwan. However, long life does not always equate to good health. According to the 2015 report published by the Department of Statistics, Ministry of the Interior (MOI), the average life expectancy from birth is gradually increasing, from 77.3 years old in 2003 to 80.0 years old in 2013, but the average healthy life expectancy has only increased from 69.7 years old in 2003 to 71.1 years old in 2013. This indicates that most elderly people were not healthy in their later life.

Older adults usually show worse health status and are more likely to use health-care services than their younger peers. In Taiwan, due to the “aging society”, the percentage of medical expenditure for age 65 and over was less than 10% in 2002, sharply increasing to 39% in 2014 (Ministry of Health and Welfare, 2015). Moreover, nowadays, Taiwan’s medical resources are seriously abused and gradually emerged impoverished from the deficit of National Health Insurance. Thus, population aging in Taiwan is an important and timely issue around which to study the related issues.

Moreover, social networks are very important for older people, particularly family networks (Berkman & Syme, 1979; Blazer, 1982). The approaches of “marriage protection” and “marriage selection” have identified marriage as an important factor associated with health and health-care service use. Married people generally enjoy better health (Chen et al., 2007; Duncan, Wilkerson, & England, 2006) and lower utilization of health-care services (Chen et al., 2007; Ho, 2008) than their non-married counterparts. Widowed people typically experience the effects of bereavement, with spousal death affecting health and mortality, particularly in older people. These older widowed people need more family support to assist them in using health-care services and reducing mortality hazards. However, statistical reports from the Department of Statistics in the Ministry of the Interior (2015) indicate that the percentage of widowhood of Taiwan was 5.54% in 2002 quickly rising to 11.23% in 2014. As the proportions of widowed people and elderly people are increasing, this raises important related topics awaiting discussion and research among these specific groups. Therefore, this study focuses on elderly widowhood and tries to cover the basic building blocks to study the related health-care service issues.

## **2. Literature Review**

Studies examining the association between marital status, health status and mortality have documented worse health and higher mortality in older widowed individuals than those married and whose spouses were still alive (Chen et al., 2007; Espinosa & Evans, 2008; Ho, 2008). The reasons might be that marital partners could provide important psychological benefits such as reducing stress, improving one’s disposition or integrating a person into their community (Waite, 1995). A detailed literature in epidemiology has established that those with greater social ties have better health (Cohen et al., 1997). In addition, marital partners may discourage risky behavior such as smoking, heavy alcohol use or illicit drug use (Duncan et al., 2006); criminal activities (Laub, Nagin, & Sampson, 1998) and encourage healthy behavior such as moderate exercise (Ho, Li & Liu, 2009). In general, older widowed individuals were less likely to follow health promoting behaviors and more likely to die than those whose spouses were still alive (Ho & Hung, 2013). Finally, elderly widowed people living alone typically lacked adequate assistance and care from family members (Li, Chen, & Kuo, 2005). Those who have lost their spouses may experience greater social isolation than their non-widowed peers. Therefore, elderly individuals who have experienced the death of their spouses experience a worse health status and higher mortality than those who have not (Ho & Hung, 2013).

In addition, the antecedents for the current study flow from different but related strands to compare results between widowers and widows. The first group of papers documented excess mortality for surviving men compared with women (Chen et al., 2007; Moon et al., 2013; Ho & Hung, 2013). Women typically have broader social networks than men, which might help alleviate the physical and mental stresses after the death of a husband (Espinosa & Evans, 2008; Ho & Hung, 2013). Moreover, Lee et al. (2001) further mentioned that the impact of widowhood on the incidence of depression was greater for men than women. Many widowers adopt strategies such as remarriage to combat the bereavement effect. Elderly widowers have been reported as more likely to remarry than elderly widows (Ho & Hung, 2013).

All of the studies mentioned above discussed the marital status, health, and mortality among the elderly, but little attention has been paid to the utilization of health-care services. Recently, some studies have discussed that how to improve patient care processes and quality, particularly for older patients presenting as emergencies (Edwards et al., 2014). In addition, Barba et al. (2006) and Horwich et al. (2009) further examined utilization of health services based on chronic disease focusing on inpatient services during nights and weekends. All mentioned that weekend admission was associated with similar quality of care to weekdays. Nevertheless, chronic diseases not only threaten directly elderly health, physical functional deterioration but also often lead to outpatient service use. Chan et al. (2011) mentioned that the proportions of outpatient service utilization were higher than inpatient services. Thus, Singh, Meyer, and Thomas (2014) and Weiss et al. (2011) using different observations and medical factors, empirically examined medical treatment effects from outpatient services. However, most of them did not specifically discuss the elderly widowed. Recently, although Moon et al. (2013) and Ho, and Hung (2013) mentioned the widowhood issues, they only focused on the mortality risk, little attention has been paid to the utilization of outpatient services. Particularly, elderly people not only show worse health but also use more outpatient services after the death of a spouse. Therefore, to fill the gap, this paper compared the utilization rate of outpatient services between widows and widowers among the elderly in Taiwan.

### **3. Materials and Methods**

#### **3.1 Design**

Data were derived from the 2009 National Health Interview Survey (NHIS) conducted by the Nation Health Research Institutes, Food and Drugs Administration, and Health Promotion Administration, Ministry of Health and Welfare in Taiwan. The NHIS used a multistage stratified systematic sampling program. First, according to geographic location and urbanization, 358 districts / townships were classified into seven levels. Then, the method of probability proportional to size (PPS) was adopted to select samples in each level of districts / townships. Next, in each selected district or township, the second-stage sampling region, *lin* (the smallest administrative region) were selected by using the same method of PPS. Finally, four households were selected randomly from each selected *lin*. Trained interviewers used structured questionnaires to interview and investigate these households.

#### **3.2 Sample**

The original population was 22,942,706 on NHIS in 2008. According to multistage stratified systematic sampling program, 25,632 participants completed the survey. Among them, 21,531 participants effectively responded questions; the response rate was about 84.0%. Furthermore, in order to conform to the study purpose, participants were restricted to those aged 65 years old and over. Hence, only 2,904 elderly were enrolled as observations. Of these, subjects who reported never having married, married with a currently living spouse, separated or divorced were rejected. Finally, the remaining sample was 998 people. This paper tracks the 998 individuals and analyzes outpatient clinic medicine utilization status for specific subgroups.

#### **3.3 Study instruments**

##### **3.3.1 Response variables**

The NHIS survey looks at outpatient utilization statuses of individuals during the past month. For purposes of this study, outpatient utilization included both western and Chinese clinics. This paper works to a binary format, with a value of 1 if the respondent had used outpatient clinic medicine during the past month in 2008; 0 if the respondent had not.

### 3.3.2 Main explanatory variables

The purpose of this study, as discussed, is to examine the relationships between outpatient utilization and predisposing, enabling, and need factors among the elderly widowed. Hence, variables included widowhood, predisposing factors, enabling factors, and need factors based on data from 2009. First of all, original marital types of participants were classified into seven groups: never married, married and whose spouse was still alive, married but whose spouse seldom lived together, separated, divorced (did not marry again), married and whose spouse was dead (did not marry again) and others. In order to conform to the study purpose, this paper adopted the sixth group and described elderly whose spouses were dead (they did not marry again) as in “widowhood”. In addition, Liu, and Umberson (2008) indicated that marriage showed different influence on health between men and women. Weiss et al. (2011) further described utilization of outpatient clinic services by gender. Moreover, due to the gender factor having a revealed significant effect ( $p < 0.001$ ) during the earlier empirical test, this study used elderly widowers and widows variables separately to discuss outpatient service utilization.

### 3.3.3 Control variables

In terms of influence factors for health-care resource utilization, Andersen’s behavior model is the most commonly used theoretical model (Andersen, 1995; Andersen, & Newman, 1994; Andersen, Pamela, & Ganz, 2005). This model indicates that predisposing factors might be an explanatory process or causal order, but it was exogenous, some enabling characteristics were necessary but not sufficient, and other need characteristics might be required for actual use. Thus, Andersen’s health behavior model indicated that people’s use of health-care resources was affected by predisposing, enabling and need characteristics. This paper followed Andersen’s health behavior model and controlled predisposing characteristics (age, education and living arrangement); enabling characteristics (life satisfaction, financial budget, residence and nation health insurance); and need characteristics (self-perceived health, functional limitations and chronic disease) to examine the utilization of outpatient services among the elderly widowed.

First of all, in terms of predisposing characteristics, age and education variables divided into three peer groups, i.e., aged 65 to 74 years old, 75 to 84, 85 and over; no formal education, primary education, and more than primary education respectively. Regarding the living arrangements, this study divided into living alone and others. Based on the findings of previous studies (Ho, 2008; Moon et al., 2013), this paper hypothesized that different age groups, education levels and living arrangements would be expressed in different utilization of outpatient services between widows and widowers.

Next, regarding enabling characteristics, life satisfaction and residence were classified into three different groups, namely satisfied, average and dissatisfied; urban, town and rural respectively. For economic status and national health insurance, only classified two groups were used, namely surplus and deficit balance; with national health insurance and without. Based on gender significant difference and previous studies (Chen, Liao, & Lin 2010; Hsieh, Chen, & Chu 2013), this paper hypothesized that different life satisfaction level, financial budget status, residence area and national health insurance status would be expressed in different utilization rates of outpatient services between widows and widowers.

In terms of need characteristics, this paper simplified responses into “Good”, “Average” and “Poor” health. Good health included “excellent” and “good”; whereas poor health included “worse than average” and “the worst” health statuses. Moreover, this study obeyed the definition of activities for daily and living (ADL) and instrumental activities for daily living (IADL) on NHIS and used the ability to carry out daily activities (such as taking a shower, eating and dressing, purchasing daily commodities, sweeping, taking the bus alone, going around the house and so on) as the physical function index. In order to conform to NHIS estimated scores, this study followed the method of Ho and Hung, (2013) and

1 presents the worst physical function and 0 the best physical function. Finally, this study considered hypertension, diabetes, cholesterol, stroke, asthma, and kidney disease as chronic diseases. 1 indicates presented with one or more of these chronic diseases and 0 without. Following the results of Shah et al. (2012), this study hypothesized that elderly widowed people who had worse physical function or with chronic diseases might be more likely to use outpatient services than those who had better physical function or without chronic diseases.

### 3.4 Ethical considerations

The National Health Research Institutes approved use of NHIS data for this study program. In addition, researcher further obtained expedited approve to do this study from the research ethics committee, China Medical University & Hospital, Taichung, Taiwan.

### 3.5 Modeling out-patient utilization

First, a Chi-square test was performed to identify examination items to establish whether they were significantly related to the different utilization of outpatient services among the elderly widowed. Next, binary logistic regression models were used to simultaneously compare the utilization of outpatient services between widows and widowers among the elderly. Based on Greene (2012), the general expression for the conditional probability in the binary logistic model is

$$\Pr(y_i = j) = \frac{e^{\beta_j x_i}}{\sum_{j=0}^1 e^{\beta_j x_i}}, \quad j = 0, 1 \quad (1)$$

where  $j$  denotes the  $j + 1$  possible choices,  $y_i$  is the indicator variable of outpatient utilization,  $x_i$  denotes the vector of the explanatory variables, including widows and widowers; predisposing, enabling and need characteristics.  $\beta_j$  is the corresponding coefficient vector. Since this paper compares the utilization of outpatient services between widows and widowers among the elderly, the estimation function could then be formulated as:

$$\begin{aligned} \ln(p_j / (1 - p_j)) &= \beta_j' x_i \\ \ln(p_0 / (1 - p_0)) &= \beta_0' x_i \end{aligned} \quad (2)$$

where  $p_j$  denotes the probability of outpatient clinic  $j$ , such as the outpatient utilization of a widow.  $p_0$  denotes the probability of the benchmark, such as the utilization of a widower. Finally, statistical significance was defined as a  $p$  value of  $< 0.05$ .

## 4. Results

Table 1 shows 998 married subjects who had lost their spouse in 2009. Of these, 786 (78.8%) married women lost their husbands and 212 (21.2%) married men lost their wives. As expected, the percentage of widows was larger than that of widowers. The sum of widows was about 3.7 times larger than sum of widowers. Mean ages were 77.13 and 78.52 for widows and widowers respectively. The proportion of widows decreased with education improvement. Only 9.9% ( $n = 78$ ) of women who attained more than primary education lost their husbands. On the contrary, men who had no formal education showed the lowest percentage of widowers (20.8%,  $n = 44$ ). In terms of enabling characteristics, more than 70% of elderly widow/ers satisfied (and average) their life status and surplus balance for their later life. Finally, in terms of need characteristics, more than half of elderly widow/ers showed physical function limitations. Particularly, widows (71.8%,  $n = 564$ ) showed a higher proportion than widowers (56.6%,  $n = 120$ ). Furthermore, about 50% elderly widow/ers (53.7% for widows, 49.5% for widowers) experienced hypertension. Less than 10% elderly widow/ers experienced asthma and kidney diseases.

Table 1 Demographic characteristics of widows and widowers

Variables		Widows		Widowers	
		<i>n</i>	%	<i>n</i>	%
<b>Predisposing Characteristics</b>					
Age	65-74	324	41.2	73	34.4
	75-84	338	43.0	95	44.8
	85 over	124	15.8	44	20.8
Education	No formal education	441	56.1	44	20.8
	Primary education	267	34.0	116	54.7
	More than primary	78	9.9	52	24.5
Living Arrangement	Alone	188	23.9	62	29.3
	Others	598	76.1	150	70.7
<b>Enabling Characteristics</b>					
Life Satisfaction	Satisfied	296	37.7	78	36.8
	Average	339	43.1	81	38.2
	Dissatisfied	151	19.2	53	25.0
Economic Status*	Surplus	573	72.9	150	70.8
	Deficit	213	27.1	62	29.2
Residence	Urban	411	51.3	95	44.8
	Town	135	17.2	44	20.8
	Rural	240	30.5	73	34.4
NHI**	Yes	783	99.6	211	99.5
	No	3	0.4	1	0.5
<b>Need Characteristics</b>					
Self-Perceived Health	Good	203	25.8	61	28.8
	Average	303	38.6	73	34.4
	Poor	280	35.6	78	36.8
Functional limitation	Yes	564	71.8	120	56.6
	No	222	28.2	92	43.4
<b>Chronic disease</b>					
Hypertension	Yes	422	53.7	105	49.5
	No	364	46.3	107	50.5
Diabetes	Yes	165	21.0	36	17.0
	No	621	79.0	176	83.0
Cholesterol	Yes	189	24.1	36	17.0
	No	597	75.9	176	83.0
Stroke	Yes	69	8.8	29	16.7
	No	717	91.2	183	83.3
Asthma	Yes	37	4.7	15	7.1
	No	749	95.3	197	92.9
Kidney	Yes	48	6.1	17	8.0
	No	738	93.9	195	92.0
<b>Observations:</b> N=998		786	100.0	212	100.0

**Notes:** \* The surplus of economic status shows that person has enough money, with some left over or no difficulty in covering living and household expenditure; the deficit of economic status shows that person has some difficulty or much difficulty in covering living and household expenditure.

\*\* NHI shows that person's eligibility for National Health Insurance.

The empirical results of chi-square tests for predisposing, enabling and need characteristics were presented as frequencies or proportions. First of all, in terms of predisposing characteristics,

Table 2 indicates that the utilization of outpatient services showed significant difference in age for widows ( $p < 0.001$ ) and in education for widowers ( $p < 0.01$ ). The proportions of outpatient utilization significantly decreased with age among elderly widows. Nevertheless, the proportions significantly increased with education among elderly widowers. Next, in terms of enabling characteristics, Table 3 indicates that the utilization of outpatient services showed significant difference in economic status and nation health insurance for widows ( $p < 0.05$ ). The prevalence rates of outpatient utilization in surplus and with NHI groups were significantly higher than in deficit groups and without NHI.

**Table 2** The proportions of predisposing characteristics and their association with outpatient service

Variables	Widows			Widowers		
	Yes	No	<i>p</i> -Value	Yes	No	<i>p</i> -Value
	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	<i>n</i> (%)	
Age			0.000***			0.654
65-74	216 (66.7)	108 (33.3)		43(58.9)	30 (41.1)	
75-84	215 (63.6)	123 (36.4)		55(57.9)	40 (42.1)	
85 over	58 (46.8)	66 (53.2)		29(65.9)	15 (34.1)	
Education			0.129			0.002**
No formal education	261 (59.2)	180 (40.8)		20 (45.5)	24 (54.5)	
Primary education	178 (66.7)	89 (33.3)		66 (56.9)	50 (43.1)	
More than primary	50 (64.1)	28 (35.9)		41 (78.8)	41 (21.2)	
Living Arrangement			0.600			0.725
Alone	120 (63.8)	68 (36.2)		36 (58.1)	26 (41.9)	
With others	369 (61.7)	229 (38.3)		91 (60.7)	59 (39.3)	

Note: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Table 3** The proportions of enabling characteristics and their association with outpatient service

Variables	Widows			Widowers		
	Yes	No	<i>p</i> -Value	Yes	No	<i>p</i> -Value
	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	<i>n</i> (%)	
Life Satisfaction			0.169			0.199
Satisfy	181 (60.3)	115 (39.7)		52 (66.7)	26 (33.3)	
Average	213 (62.8)	126 (37.2)		46 (56.8)	35 (43.2)	
Dissatisfy	95 (62.9)	56 (37.1)		29 (54.7)	24 (45.3)	
Economic Status			0.041*			0.235
Surplus	360 (62.8)	213 (37.2)		95 (63.3)	55 (36.3)	
Deficit	129 (60.6)	84 (39.5)		32 (51.6)	30 (48.4)	
Residence			0.124			0.265
Urban	263 (64.0)	148 (36.0)		60 (63.1)	35 (36.9)	
Town	78 (57.8)	57 (42.2)		29 (65.9)	15 (34.1)	
Rural	148 (61.6)	92 (38.4)		38 (52.8)	35 (47.2)	
NHI			0.026*			0.220
Yes	489 (62.4)	294 (37.6)		127 (60.2)	84 (39.8)	
No	0 (0.0)	3 (100.0)		0 ( 0.0)	1 (100.0)	

Note: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Finally, in terms of need characteristics, Table 4 indicates that self-perceived health and functional limitation did not reveal any significant difference in outpatient utilization for either widows or widowers. These findings contrast to those for hypertension and kidney disease. Both of them (hypertension:  $p < 0.001$ ; kidney:  $p < 0.05$ ) showed significant effects on the utilization of outpatient

services regardless of gender. Nevertheless, diabetes ( $p < 0.05$ ), cholesterol ( $p < 0.001$ ) and asthma ( $p < 0.05$ ) significantly raised the utilization rates of outpatient services for widows only.

**Table 4** The proportions of need characteristics and their association with outpatient service

Variables	Widows			Widowers		
	Yes	No	<i>p</i> -Value	Yes	No	<i>p</i> -Value
	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	<i>n</i> (%)	
Self-Perceived Health			0.273			0.227
Good	117 (57.6)	86 (42.4)		40 (65.6)	21 (34.4)	
Average	191 (63.0)	112 (37.0)		38 (52.1)	35 (47.9)	
Poor	181 (64.6)	99 (35.4)		49 (62.8)	29 (37.2)	
Functional Limitation			0.098			0.414
Yes	361 (64.0)	203 (36.0)		69 (57.5)	51 (42.5)	
No	128 (57.6)	94 (42.4)		58 (63.0)	34 (37.0)	
Chronic Disease						
Hypertension			0.000***			0.005**
Yes	289 (68.5)	133 (31.5)		73 (49.5)	32 (30.5)	
No	200 (54.9)	164 (45.1)		54 (50.5)	53 (80.4)	
Diabetes			0.040*			0.871
Yes	114 (69.1)	51 (30.9)		22 (61.1)	14 (38.9)	
No	375 (60.4)	246 (39.6)		105 (59.6)	71 (40.4)	
Cholesterol			0.000***			0.364
Yes	140 (74.1)	49 (25.9)		24 (66.7)	12 (33.3)	
No	349 (58.5)	248 (41.5)		103 (58.5)	73 (41.5)	
Stroke			0.985			0.576
Yes	43 (62.3)	26 (37.7)		16 (55.2)	13 (44.8)	
No	446 (62.2)	271 (37.8)		111 (60.7)	72 (39.3)	
Asthma			0.015*			0.994
Yes	30 (81.1)	7 (19.9)		9 (60.0)	6 (40.0)	
No	459 (61.3)	290 (38.7)		118 (59.9)	79 (40.1)	
Kidney			0.028*			0.049*
Yes	37 (77.1)	11 (22.9)		14 (82.4)	3 (17.6)	
No	452 (61.2)	286 (38.8)		113 (57.9)	82 (42.1)	

**Note:** \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

In addition, this paper further used logistic regression and four different models to compare the utilization of outpatient services between widows and widowers. Table 5 illustrates the adjusted odds ratios and 95% confidence intervals. First, statistical significance ( $p < 0.001$ ) was listed in the last row regardless of models. Thus, the results can reject the null hypothesis. Binary logistic regression was fitted.

Next, the estimated odd ratios related to utilization of outpatient services for widowers in Model 1 was larger than 1. This means that the utilization probabilities of outpatient services for widows compared to that of widowers, was 1.007 times higher. Furthermore, the estimated odd ratios in the other three models were also greater than one and significantly higher than that for widowers. This illustrates that widows were more likely to use outpatient services than widowers. Moreover, odd ratios of outpatient services increased when variables related to predisposing, enabling and need characteristics were included (1.007, 1.071, 1.109 and 1.176, respectively). These results show that the utilization of outpatient services was strongly correlated with predisposing, enabling and need characteristics among the elderly widowed.

**Table 5** Outpatient utilization estimation for widowhood

Variable	Model 1		Model 2		Model 3		Model 4	
	O. R	(C. I.)	O. R	(C. I.)	O. R	(C. I.)	O. R	(C. I.)
<b>Widowers</b>	1		1		1		1	
<b>Widows</b>	1.007**	(0.743 1.364)	1.071*	(0.777 1.474)	1.109*	(0.802 1.534)	1.176*	(0.716 1.422)
Include								
Predisposing Factors			Yes		Yes		Yes	
Enabling Factors					Yes		Yes	
Need Factors							Yes	
Log likelihood	-691.631		-690.778		-685.481		-656.758	
Log Likelihood ratio	$\chi^2(1) = 29.99^{***}$		$\chi^2(4) = 30.83^{***}$		$\chi^2(8) = 34.45^{***}$		$\chi^2(16) = 65.32^{***}$	

**Note:** O.R. = Odd Ratio; C.I. = 95% Confidence Interval. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## 5. Discussion

A number of current studies discuss the utilization of health-care service medicine from socio-demographic and health behavior characteristics. This paper is different from previous studies, in that it focuses on elderly widow/ers and uses predisposing, enabling and need characteristics to examine the utilization of outpatient services. Most findings backed up the results of previous health-care resources studies, while the remainder did not. In addition, this paper further illustrates some special results which had rarely been mentioned before.

Andersen's behavior model (1995) indicated that demographic variables such as age, gender and education revealed biological necessity suggesting the possible different probability that people would use health-care resources. The empirical results echoed that age illustrated a significant difference on outpatient clinic use among the elderly widows. The lower utilization rates of outpatient services showed in aged 85 years old and over (46.8%), is perhaps due to these older peers experiencing greater social isolation than those aged 85 and under. For very old women, being single might enhance the risk of mental and physical vulnerability as a result of reduced health-care services utilization. Nevertheless, for the elderly widowers, age lost significance. This finding was unlike the results of Weiss et al., (2011). In addition, there was a significant education gradient in outpatient clinic use for elderly widowers. Utilization rates of outpatient clinic medicine in the no formal education group were significantly lower (45.5%) than those with primary and more than primary education levels. The reason might be that lower education individuals were likely to be in the lower income categories. They were less likely to visit clinics even though the expenses would be covered by the national health insurance (Dinh, Hebert, Mill, Prentice & Ward, 2012). Moreover, because they had little formal education, they had not enough knowledge to know how to use modern health-care services. Thus, widowers with no formal education were less likely to use outpatient services.

Nevertheless, except for age and gender, people must have the economic ability and know how to obtain and use those health-care resources (Andersen, 1995; Andersen et al. 1994, 2005). Of these, this study finds that economic status and national health insurance showed significant differences in outpatient clinic use for widows. A reason for this might be that women understood clearly they were at risk of displaying lower economic status than men, particularly in old age (Lusardi, & Mitchel, 2011). They must be thrifty and set better financial programs after the death of a spouse. Economic surplus and NHIS were effective tools for increasing utilization of modern healthcare services particularly outpatient care which could protect people from the potentially

catastrophic healthcare expenditures (Sekyi & Domanban, 2012). Therefore, economic status and national health insurance appeared significant only for widows but not for widowers. The result echoes the opinion of Lusardi, and Mitchel (2011); Rooij, Lusardi, and Allesie (2011) that there were large gender differences in financial knowledge and health-care service expenditure.

Finally, people's perceived health might impact medical utilization, changing their financial incentives to seek services. Similarly, evaluated needs for medical resources might also be altered by physical functions and chronic diseases (Andersen, Pamela, & Ganz, 1994). However, the findings from this study revealed that self-perceived health and physical function lost significance on the utilization of outpatient services. Thus, the reliability of self-perceived health was questionable (Clarke, & Ryan, 2006; Crossley, & Kennedy, 2002). For chronic diseases, most (except stroke) revealed significant difference on outpatient clinic use for widows. Nevertheless, hypertension and kidney diseases showed significant difference on outpatient clinic both for widows and widowers. The results coincided with government statistics of Taiwan that hypertension, as a major cause of outpatient medicine expenditure increased largely in recent years as did dialysis treatments expenses. Now, both of these chronic diseases were major national health insurance medical expenses in Taiwan. Hence, as the numbers of aging and widowed peers are gradually increasing we should be concerned about the influence of hypertension and kidney diseases on outpatient utilization.

In spite of the above, this study indicates that widows had more than one hundred percent probability of using outpatient clinic medicine than widowers among these four models, suggesting the greater likelihood for widows than widowers in using outpatient clinic services. This finding was similar to the result of Weiss et al. (2011) that females had a statistically significant higher utilization rate of outpatient services than males. In general, health risk was generated by the emotional stress of the death a spouse, particular for the older women. When women suffered from bereavement effects and faced mental and physical anguish, they usually eased their stress by exercise or visiting doctors to reduce mental isolation and physical pain.

## **6. Conclusion**

Taiwan's population profile has been not only "ageing", but has also gradually "aged". The average life expectancy is 80.0, but the average healthy life expectancy is only 71.1 years old in 2013. This suggests that most elderly people were not healthy during their last nine years. Particularly, older widowed people lacked family networks and spousal support to maintain better health. They usually show worse health status and are more likely to use health-care services than those whose spouses are still alive. Therefore, this paper focuses on elderly widowed and studies the related health-care service issues.

The health-care resource analysis indicates different utilization of outpatient resource between widowers and widows among the predisposing, enabling and need characteristics. Moreover, this study further found relatively larger odd ratios of outpatient utilization for widows than widowers. The average life expectancy of women is longer than men and the numbers of widows were significantly greater than that of widowers. Hence, we should pay attention to health-care resource utilization problems. In addition, both hypertension and kidney disease were associated significantly with outpatient utilization regardless of gender among the elderly widowed in Taiwan. Therefore, health-care resource utilization should consider these two chronic diseases among the elderly widow/ers. Finally, as the number of elderly widow/ers is increasing and while the deficit of Taiwan's health insurance gradually expands, administrators and managers should pay attention to this issue of the health-care resource utilization for the target group.

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