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### **THE EFFECT OF SELF-RATED HEALTH STATUS AND HEALTH BEHAVIOUR ON MEDICAL RESOURCE UTILIZATION OF THE ELDERLY**

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# The Effect of Self-Rated Health Status and Health Behaviour on Medical Resource Utilization of the Elderly

Hsin-Ming HSIEH<sup>1</sup>, Alex MARITZ<sup>2</sup>

## Abstract

Changes in the global demographic structure in past years have resulted in different types of population aging. Along with the advance of medical technology, the improvement of public health, the extension of life expectancy, and the decrease in fertility rates, the global demographic structure is gradually aging. The aging speed is increasing in various countries, and domestic aging speed is fast and rush that how to effectively deal with various elderly care problems shows the urgency; otherwise, it would become troublesome when becoming a national, governmental, social, and family burden. Precautions are therefore essential and urgent; especially, elderly economic problems involving in living standards may have a burden on families. Taking the elderly in Taiwan as the questionnaire samples, a total 500 questionnaires were distributed. After excluding invalid and incomplete questionnaires, 367 copies were valid, with the retrieval rate of 73%. Based on the results we propose suggestions, assisting governmental sectors to implement welfare policies conforming to national benefits and taking care of elderly health and wellbeing to cope with the population aging trend. We also provide social and economic suggestions in the form of mature aged entrepreneurship as a driver of social innovation.

*Keywords:* the elderly, self-rated health status, health behaviour, medical resource utilization.

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## Introduction

Factors of development of medicine advance in technology, and increasing opportunities in education and economic activity in global population result in changes in demographic structure to appear different types of population aging in the world. Along with the advance of medical technology, the improvement of public health, the extension of life expectancy, and the decrease in fertility rate, global demographic structure is gradually becoming aging. The total fertility rate of women in major industrialized countries in the world is rapidly decreasing and the extension of life expectancy largely enhances elderly population on top of age structure. It highlights the problem of elderly population, which is called “age wave” in western countries. Along with the changes in demographic structure and people’s lifestyles, chronic diseases gradually become a primary factor in national health. The cognition of chronic diseases and the importance are gradually emphasized and concerned. Chronic diseases are the cause of death and the suffering for the elderly. Cardiovascular diseases, cerebrovascular diseases, diabetes, and hypertensive diseases are the major causes of death for the elderly in past years. Such diseases are mostly caused by bad control of chronic diseases, e.g hypertension, hyperlipidemia, and diabetes, where hypertension is the most common chronic disease for the elderly. In this case, allowing the elderly having good lifestyles and good health behavior would postpone the occurrence of such chronic diseases.

The aging speed is increasing in various countries and domestic aging speed is fast and rushed. How to effectively deal with various elderly care problems presents the urgency. Otherwise, it would become troublesome when resulting in national, governmental, social, and family burdens. Taking precautions is the most important and urgent policy; especially, elderly economic problems might drag families. According to the statistics, the elderly in some communities cannot engage in basic daily activities, such as eating, bathing, and putting on clothes, some could not engage in instrumental daily activities, such as shopping and cooking, and about a half of the elderly show bad self-rated health conditions. Such loss of physiological functions and negative psychological conditions caused by aging would affect the quality of life of the elderly to further increase the demands for various medical services. Much research on social health care finance revealed population aging as the key factor in rising medical expenses. Maritz *et al.* (2021) stated that enhancing elderly quality of life to reduce medical financial burden is an issue requiring concerns. This study discusses elderly self-rated health status, health behaviour, and medical resource utilization, expecting to assist governmental sectors apply to apply welfare policies conforming to national benefits and taking care of the population aging trend.

## Literature review

Idiaquez *et al.* (2018) mentioned that self-rated health status was individual overall assessment of personal health, which was generally measured with a specific scale. It could be the subjects' self-rated current health conditions, the comparison of health condition changes between present and the previous year, or the comparison of health conditions between an individual and others at the same age. Gabarron *et al.* (2018) stated that health behavior described individual behavior in daily life which might endanger the health or explain the health. It was generally divided into health promotion behavior and health risk behavior. Good personal health behavior, such as regular exercise, vitamin taking, vaccination, balanced diet, and sleep habit, showed positive effects on quality of life. Zieda *et al.* (2018) proposed that bad health behavior would result in chronic diseases, which might increase the disease onset and even death chance with increasing age. Bacci *et al.* (2019) explained medical resource utilization as the actual amount of medical service consumed when needs were changed into medical seeking behavior, containing utilization type, medical seeking purpose, service location, and utilization frequency. Utilization type referred to the received type of service, e.g Chinese medicine, western medicine. Vinge *et al.* (2019) indicated that medical seeking purpose responded to different demands for medical care, e.g prophylactic health, early diagnosis and treatment of disease, and rehabilitation. Service location referred to the place where the public received medical service and care, such as hospital outpatient, emergency, clinics, public health center, Chinese and western pharmacy, support agency, and home care. Farmakidis *et al.* (2018) regarded medical resource utilization frequency as the number of medical service use in a certain period. Although scholars revealed diverse definitions of medical resource utilization, it was generally classified into medical expenses and utilization frequency, where expenses covered total medical expenses and the details and utilization frequency contained length of stays and number of outpatient visits.

Hendricks *et al.* (2019) indicated that common medical resource utilization models included general behavioral model, which was developed by Andersen and the peer. Andersen's general behavioral model presented complete theoretical structure and operational definitions, and general measurement was used as the concepts in the model that it was often used for empirical investigation and applied to health care accessibility.

Rus & Tiemensma (2018) stated that, after general behavioral model proposed by Andersen & Newman in 1973, three revised versions were successively developed along with the change in medical environment. The contents and characteristics of the versions are explained as below. Basta *et al.* (2018) revealed that the first-stage model discussed factors in individual medical resource utilization from tendency, enabling, and need. Tendency referred to the tendency of a case using medical resources before disease onset, including demographic variable (age,

gender, marital status, family population, past medical history), social structure (race, education, employment, religion, occupational family pattern, morbidity rate in the residential area, with/without caregiver), and health belief (value judgment of health and disease, belief in and attitudes towards medical service, and cognition of diseases). Enabling referred to an individual being able to use medical service, containing personal or family resources (e.g household income, health insurance) and social resources (e.g. medical resources, medical resource accessibility, accessibility, medical service price, medical treatment time, social support, and urban-rural characteristics). Need referred to personal health needs, which was the direct factor in the use of medical resources and services, including self-rated health status (number of days not being able to do daily routine, type and total of self-rated symptoms, self-rated physiological and psychological health conditions) and clinical assessment of disease (disease assessment or diagnosis done by medical personnel). Alanazy (2019) added health policy, health care system, and consumer satisfaction in the second-stage model to study people's use behavior. The major concept was that health policy would affect medical service utilization and satisfaction through the changes in health care system or patient characteristics, the change in health care system would affect patients' characteristics, and medical resource utilization would mutually affect satisfaction. Furthermore, tendency and enabling in individual factors were divided into changeable and unchangeable. The former contained individual health belief, income, and health insurance, and the latter covered gender, age, and race. Eliassen *et al.* (2018) further included external environment (e.g political and economic factors), personal health behavior (e.g diet, exercise, self-care), and health result to form the third-stage model. According to the model, the explanation of personal health result could be displayed through personal cognition of health conditions, expert evaluation of health conditions, and consumer satisfaction. Stojanov *et al.* (2019) revealed that the third-stage model particularly stressed on medical service being used for maintaining and improving personal health conditions, effects of personal cognition of medical service on medical service utilization, and factor of personal health behavior in medical service utilization. After integrating the idea of Evan, Scoddart, and Partrick, Hehir & Silvestri (2018) proposed the fourth-stage revision model, which stressed on the interaction among factors, and regarded medical resource utilization as a feedback system with dynamic loop. In other words, personal health conditions would affect personal medical needs and medical resource utilization behavior, and medical resource utilization would affect personal needs. Moreover, the health condition result after the utilization of medical service was covered in the model that personal health condition result after the utilization of medical service (e.g cognition of health conditions, assessment of health conditions, and consumer satisfaction) would further affect personal health behavior. The following hypotheses are therefore proposed in this study.

*H1: Self-rated health status presents positive effects on personal health behavior.*

*H2: Personal health behavior shows negative effects on medical utilization.*

*H3: Self-rated health status reveals negative effects on medical utilization.*

## **Methodology**

### *Definition of research dimension*

*Self-rated health status.* Referring to Guo *et al.* (2018), self-rated health status in this study is individual subjective assessment of personal health, where the normative data of SF-36 physical component scale (PCS) and mental component summary (MCS) are used for assessing physiological health and psychological health, respectively, and number of chronic diseases is the sum of individual chronic diseases suffered.

*Health behavior.* Referring to Chu *et al.* (2019), health behavior in this study is personal behaviors which would affect health, where health maintenance behavior includes car-use safety behavior, exercise, nutrition, tooth cleaning, and weight control, and health risk behavior contains smoking and drinking, acquired by the sum of items in the questionnaire.

*Medical resource utilization.* Referring to Zhu *et al.* (2019), medical resource utilization in this study is the actually consumed medical service in health seeking behavior, covering consumption cost and utilization frequency, where consumption cost refers to the outpatient and hospitalization benefits claimed by hospitals, and utilization frequency refers to total number of outpatient claimed in the year.

### *Research object*

To reinforce elderly health education, elderly prophylactic health, elderly medical diagnosis and treatment and largely promote elderly medical resources and nursing service, long-term care service, palliative care service, specific requirements for elderly health service systems are proposed in Taiwan. It definitely indicates that the establishment of geriatrics department in general hospitals above level 2 would reach 50%, nurse-patient ratio in primary-level medical and health care institutions would achieve 30%, and more than 80% general hospitals, rehabilitation hospitals, nursing homes, and primary-level medical and health care institutions would become elderly-friendly healthcare institutions by 2022. Various areas and departments in the province have to enhance the guarantee from policy support, talent team establishment, information construction, and organization and fund guarantee to ensure the practice of elderly health service systems.

The elderly in Taiwan, as the research samples, are distributed 500 copies of questionnaire. After deducting invalid and incomplete ones, total 367 copies are valid, with the retrieval rate 73%.

*Analysis method*

Regression analysis is applied to understand the relations among self-rated health status, health behavior, and medical resource utilization.

**Results**

*Correlation analysis of self-rated health status and health behavior*

Regression analysis is used in this study for testing hypotheses and the theoretical structure. The first regression analysis result, *Table 1*, shows the significance of regression equation ( $F=22.183$ ,  $p < 0.001$ ). Self-rated health status presents remarkable effects on health maintenance behavior, where “physiological health”, “psychological health”, and “chronic diseases” in self-rated health status notably and positively affect health maintenance behavior in health behavior, with significance ( $\beta = 2.075$ ,  $p < 0.01$ ,  $\beta = 2.164$ ,  $p < 0.01$ ,  $\beta = 1.896$ ,  $p < 0.05$ ).

The second regression analysis result, *Table 1*, reveals the significance of regression equation ( $F=26.381$ ,  $p < 0.001$ ). Self-rated health status significantly affects health maintenance behavior, where “physiological health”, “psychological health”, and “chronic diseases” in self-rated health status appear remarkably positive effects on health risk behavior in health behavior, with significance ( $\beta = 2.114$ ,  $p < 0.01$ ,  $\beta = 2.257$ ,  $p < 0.01$ ,  $\beta = 2.044$ ,  $p < 0.01$ ). H1 is therefore partially supported.

Table 1. *Regression analysis of self-rated health status and health behavior*

Dependent variable→	health behavior			
Independent variable↓	health maintenance behavior		health risk behavior	
self-rated health status	$\beta$	$\rho$	$\beta$	$\rho$
physiological health	2.075**	0.000	2.114**	0.000
psychological health	2.164**	0.000	2.257**	0.000
chronic diseases	1.896*	0.014	2.044**	0.000
F	22.183		26.381	

P	0.000***	0.000***
R2	0.177	0.198
Adjusted R2	0.154	0.168

Note: \*\* stands for  $p < 0.01$ , \*\*\* for  $p < 0.001$ .

*Correlation analysis of self-rated health status and health behavior to medical resource utilization*

Applying regression analysis to test hypotheses and the theoretical structure in this study, the first regression analysis result, *Table 2*, shows the significance of regression equation ( $F=32.462$ ,  $p < 0.001$ ). Self-rated health status reveals remarkable effects on consumption cost, where “physiological health”, “psychological health”, and “chronic diseases” in self-rated health status appear notably negative effects on consumption cost in medical resource utilization, with significance ( $\beta = -2.341$ ,  $p < 0.01$ ,  $\beta = -2.123$ ,  $p < 0.01$ ,  $\beta = -2.285$ ,  $p < 0.01$ ). The second regression analysis result, *Table 2*, appears the significance of regression equation ( $F=37.855$ ,  $p < .001$ ). Self-rated health status presents significant effects on utilization frequency, where “physiological health”, “psychological health”, and “chronic diseases” in self-rated health status show remarkably negative effects on utilization frequency in medical resource utilization, with significance ( $\beta = -2.356$ ,  $p < 0.01$ ,  $\beta = -2.104$ ,  $p < 0.01$ ,  $\beta = -2.291$ ,  $p < 0.01$ ). Accordingly, H3 is supported.

The third regression analysis result, *Table 2*, reveals the significance of regression equation ( $F= 34.713$ ,  $p < 0.001$ ). Health behavior appears remarkably effects on consumption cost, where “health maintenance behavior” and “health risk behavior” in health behavior present notably negative effects on consumption cost in medical resource utilization, with significance ( $\beta = -2.332$ ,  $p < 0.01$ ,  $\beta = -2.201$ ,  $p < 0.01$ ). The fourth regression analysis result, *Table 2*, reveals the significance of regression equation ( $F = 42.683$ ,  $p < 0.001$ ). Health behavior shows notable effects on utilization frequency, where “health maintenance behavior” and “health risk behavior” in health behavior present significantly negative effects on utilization frequency in medical resource utilization, with the significance ( $\beta = -2.375$ ,  $p < 0.01$ ,  $\beta = -2.253$ ,  $p < 0.01$ ). As a result, H2 is supported.



Table 2. Regression analysis of self-rated health status and health behavior

Dependent variable→	medical resource utilization							
	consumption cost		utilization frequency		consumption cost		utilization frequency	
Independent variable↓	β	ρ	β	ρ	β	ρ	β	ρ
Self-rated health status								
Physiological health	-2.341**	0.000	-2.356**	0.000				
Psychological health	-2.123**	0.000	-2.104**	0.000				
Chronic diseases	-2.285**	0.000	-2.291**	0.000				
Health behavior								
Health maintenance behavior					-2.332**	0.000	-2.375**	0.000
Health risk behavior					-2.201**	0.000	-2.253**	0.000
F	32.462		37.855		34.713		42.683	
P	0.000***		0.000***		0.000***		0.000***	
R2	0.298		0.353		0.321		0.396	
Adjusted R2	0.265		0.323		0.295		0.371	

Note: \*\* stands for  $p < 0.01$ , \*\*\* for  $p < 0.001$ .

## Discussion

The lower self-rated health appears the higher medical resource utilization. Such a situation might be caused by bad objective health of the elderly to enhance the dependency on medical resources. On the other hand, self-rated health might reflect elderly cognition of disease susceptibility and severity. Those with higher cognition present lower disease sensitivity and endurance that the need for medical resource utilization is comparatively lower than ones with low cognition. Elderly self-rated health status, health related behavior patterns, and positive medical resource utilization (e.g regular health examination, health counseling) frequency reveal positive correlations. It is inferred that the elderly with higher positive

medical utilization frequency could acquire sound prophylactic health information and service to further enhance the positive health responsibility, nutrition, and pressure handling or promote the emphasis. Such a situation is possibly because the elderly, after outpatient or hospitalization, start to adjust the health-related behavior according to professional medical personnel's suggestions or medical orders. However, outpatient and hospitalization utilization content and elderly objective health conditions (e.g the elderly suffering from chronic diseases) should be included for more definite inference.

## Conclusion

The research results reveal that the domestic people's medical resource utilization situations would change personal health behavior to further improve health result. Medical resource utilization of domestic elderly expects to extend "health". To achieve the objective, the elderly would acquire health promotion behavior and routine through medical resource utilization and counseling to eventually increase the cognition of "health". When the elderly receives richer health concepts nowadays, it could be discussed whether medical resource utilization should be used as the sole route for extending "health" or affecting the cultivation of health behavior. The government could encourage more health education propaganda and community health activities as the options to change good living habits and promote elderly health to further acquire correct medical resource utilization concepts for reducing expenditure. Along with domestic people's extending life expectancy, long life is no longer difficult. However, to live healthily and happily without psychological burden is not easy. Health refers to completely physical, mental, and social balance. Our nation is gradually getting into an aging country that medical policies for the middle-aged and elderly should be emphasized by the government.

### *Recommendations*

The findings provide an opportunity for senior or mature-aged entrepreneurship, which may also be viewed as a driver for social innovation and active ageing, whilst providing economic motives to financially support mature-aged people. Based on the research results, the following suggestions are proposed in this study:

- 1) Further discussion is required as to whether medical resource utilization should be used as the sole route to extend "health" or affect the cultivation of health behavior nowadays when the elderly receive richer health concepts. The government could encourage more health education propaganda and community activities as the options to change good living habits and enhance elderly health to further acquire correct medical resource utilization for reducing expenditure.
- 2) The elderly would increase the outpatient and hospitalization frequency due

to suffering from chronic diseases. People with unhealthy behaviour, such as smoking and drinking, would comparatively not be willing to see a doctor, in order not to be educated by physicians. Medical treatment for improving and correcting the behaviors could be promoted by governmental sectors to prevent such people from being sent to hospital in emergent sickness.

- 3) In addition to taking drugs for chronic diseases, the elderly would consume health food. Nevertheless, health food could be bought anywhere; some unscrupulous stores might largely sell health food to the elderly with lack of appropriate health knowledge. However, excessively consumption of health food would result in physical burden to induce diseases, such like kidney dialysis. Besides, the cross function of drugs and health food would affect the curative effect of drugs for elderly chronic diseases. The government is recommended to prioritize the integration of medicinal and health food supplements. .

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