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Multiple morbidity combinations impact on medical expenditures among older adults

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ABSTRACT

This study aims to explore the medical needs of patients who have different combinations of multiple chronic diseases in order to improve care strategy for chronic patients. This study was based on a national probability proportional to size (PPS) sampling to older adults over 50 years old. We collaborated the files of the 2000–2001 health insurance claims and selected 8 types of common chronic diseases among seniors, for the discussion of multiple combinations of chronic diseases, including hypertension, diabetes, heart disease, stroke, dementia, cancer, arthritis and chronic obstructive pulmonary disease. Among the NHI users, there are 50.6% of the cases suffering from at least one chronic disease, 27.3% suffering from two types of chronic diseases and above. From possible combinations of eight common chronic diseases, it is found hypertension has the highest prevalence rate (7.5%); arthritis ranks the next (6.2%); the combination of hypertension and heart disease ranks the third (3.4%). In the 22 types of major chronic disease clusters, the average total medical expense for people who have five or more chronic diseases ranks the highest, USD 4465; the combination of hypertension, diabetes, heart disease, and arthritis ranks the next, USD 2703; the combination of hypertension, diabetes, and heart disease ranks the third, USD 2550; cancer only ranks the fourth, USD 2487. Our study may provide statistical data concerning co-morbidity among older adults and their medical needs. Through our analysis, the major population that exhausts the medical resources may be discovered.

1. Introduction

Comorbidity (Bayliss et al., 2003; Anderson and Horvath, 2004; Hall, 2006) among the elderly is caused by aging population and disease transition. For an individual, the more chronic diseases, the higher the death rate or disability rate (Guralnik and Kaplan, 1989; Boult et al., 1994; Satariano and Ragland, 1994; McGee et al., 1996; Incalzi et al., 1997; Fuchs et al., 1998; Fried et al., 1999; Librero et al., 1999; Moore et al., 1999; Menotti et al., 2001). Moreover, these medical conditions lower quality of life for the elderly and increase their chances of becoming inactive and dysfunctional (Guralnik, 1996; Hoffman et al., 1996; Fried et al., 1999; Gijsen et al., 2001; Anderson, 2003; Fortin et al., 2004). From a social perspective, comorbidity leads to high medical needs and costs which cause the elderly to become an economically disadvantaged group in society. There is not enough money to continue hospitalization, and in turn, the revolving-door effect causes more health issues (Tu, 2004) and financial risks for health insurances, such as Medicare expenditures for American seniors, accounting for 96% spent on people with more than two chronic diseases (Anderson and Horvath, 2002).

Seniors with comorbidity account for 30–75% of the senior population, while their medical expenses account for 78–95% of total senior medical expenses (Hoffman et al., 1996; Van den Akker et al., 1998; Moore et al., 1999; Fillenbaum et al., 2000; Lee et al., 2001; Wolff et al., 2002; Yu et al., 2003; Fortin et al., 2005). According to 1987 U.S. Medical Expenditure Panel Survey (MEPS), the analysis indicates the percentage of senior comorbidity was 62% (Hoffman et al., 1996). In 2001, the Medicare beneficiary registration shows 23% of seniors having more than five chronic diseases, accounting for 68% of Medicare expenditures (Anderson, 2005), indicating that, seniors with comorbidity are the majority of the population costing medical resources.

From the standpoint of medical providers, medical systems around the world mostly focus on emergency control instead of patient care for chronic conditions; many issues arise when providing chronic care, as follows: Medical staff seldom follows protocol to treat chronic patients; during brief patient hours, they are not able to teach and train patients in self-care. Resulting in treatments that are not followed-up or for patients with

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comorbidity, medical staff cannot provide a comprehensive care program, which causes the further ineffectiveness of chronic care. Thus, comorbidity care has become the most important issue for medical reform in the 21st century (Anderson, 2003).

In previous studies, three types of measurement are mainly adopted: the major disadvantage for the first type of disease computation is the hypothesis for patients with two chronic diseases; it is likely that these different diseases would cause great differences in the use of medical services (Yu et al., 2004). If disease computation is the only criterion for measuring comorbidity, it is impossible to differentiate patients with different diseases using the same numbers (Schoenberg et al., 2007). The second type is an indicator for comorbidity (such as the Charlson index), which has ability to control the graveness of disease, and make comparison of the adaptation among different indicators, instead of investigating the effects of comorbidity conditions for an individual on medical services (Hall, 2006); hence, the indicator is not appropriate for this study. The third type is to adopt indicator disease, combined with conditions of the other types of diseases, to evaluate the use of medical services. However, the measurement using indicator disease with a combination of the other diseases only focuses on patients with the indicator disease, instead of explaining the situation of chronic patients without one specific indicator disease.

From the evaluation of previous disease-management programs, indications are not significant that, the death rate is higher among patients who participated in the program, compared with those who did not. There is no significant difference for the occurrence of care issues; yet, the care program does cost more medical resources (Coleman et al., 1999; Brand et al., 2004). In addition, patients with comorbidity have worse health conditions, because those who have different diseases participate in different disease management models (Krause et al., 2006), indicating current disease management programs cannot offer appropriate treatment and health care for patients with comorbidity. Since insurance systems in Taiwan are different from those in the other countries, the number of medical institutions that have joined health insurance (Western hospitals, Western clinics, Chinese medical hospitals, Chinese medical clinics) has reached 12,099 (Statistics on National Health Insurance Medical Care, 2005), which is convenient for the general public to seek medical attention. Because of more options, the freedom to choose medial services, and the lack of a proper referral system, it is probable that issues of cost increases from doubled services, and questionable quality for patient's medical expenses from multiple chronic diseases, and for those who have the tendency to shop around hospitals and doctors. Hence, this study aims to explore the medical needs of patients who have different combinations of multiple chronic diseases in order to improve care strategy for chronic patients.

2. Methods

This study was based on a two-phase "National Long-term Care Evaluation" program of the Department of Health, Executive Yuan. It collected data from face-to-face questionnaire interviews with the assistance from the Department of Health Bureau of Health Promotion Population and the Health Survey Research Center. Led by an excellent research team, the staffs surveyed townships and villages, and collected high quality data. The first-stage survey included three indicators for functional disorders, which were activities of daily living (ADL), the instrumental activities of daily living (IADL), and cognitive status, which served as the basis for screening future, to-be-interviewed cases for the second-stage survey. If any persons fit the description of functional disorder in the above-mentioned three types, they were considered a mentally or physically disabled, and require long-term care and further evaluation. For those who could not answer on their own due to health conditions or the other factors, their caretakers were asked to provide answers. For those who were relocated, this study followed up to increase the response rate.

The samples of the first-stage study were based on county/city household registration lists from the Ministry of the Interior. PPS sampling was conducted from the national population, and over 50 years old, for each county/city, respectively. Disproportional sampling was adopted among every county and city; higher sampling probability was given for county and city with less population in order that there were enough research samples in every county and city. Sampling results showed that there are 204 villages, towns, cities, and districts, which include 303,545 sample data in 2960 neighboring areas. After survey interviews, it is discovered that 2144 people were deceased, and 239,861 people completed interviews; the response rate is 79.6%.

Concerning the issue of disproportional sampling, and differences of response rates, in every county and city, this study weights in sampling percentages of every county and city, every age group, and every gender to modify distribution percentage of the elderly in Taiwan areas to ensure accurate national representation of survey data.

To collaborate with the 2001 national long-term care evaluation program, this study collected the files of the 2001 health insurance claims, including files of outpatient prescriptions, detailed treatments, and files of detailed check-lists of medical expenses for hospitalization, in order to understand conditions of chronic diseases, and their medical expenses, of every researched case.

This study selected 8 types of common chronic diseases among seniors, for the discussion of multiple combinations of chronic diseases, including hypertension (ICD-9-CM: 401-405), diabetes (ICD-9-CM: 250), heart disease (ICD-9-CM: 390-398, 410-414, 420-429), stroke (ICD-9-CM: 430-438), dementia (ICD-9-CM: 290-294), cancer (ICD-9-CM: 140-208), arthritis (ICD-9-CM: 710-719) and chronic obstructive pulmonary disease (ICD-9-CM: 490-496) (Fisher et al., 2005). When sample cases have been hospitalized more than once, or have been treated in outpatient departments on more than three occasions due to diagnosis, it is recognized that the sample cases have suffered from a listed disease. From this national representative samples of the middle-aged and seniors, we may have an understanding of comorbidity, including the prevalence rates and combinations of prevalent diseases, in order to calculate medical expenses for different combinations of multiple, chronic diseases.

3. Results

Among 239,861 cases, 221,256 people used one of the health insurance services in 2001, accounting for 92.24% of the total cases.

The 18,605 middle-aged and seniors who have not used any health insurance services are mostly males, accounting for 67.8%; among them, 76.6% of the cases are in the age group of 50–64. In 2001, seniors over 65 years old, who did not seek medical attention via health insurance accounted for 33.4%; and 95.5% of those who did not use any health insurance have no inabilities (including ADL, IADL, and cognitive function). There is a higher percentage, 43.7%, of middle-aged and seniors who did not seek medical attention that year, who live in villages or towns; county cities ranked the next (23.8%); metropolitan cities rank the third (21.1%); provincial cities rank the last (11.4%).

This study mainly analyzes 221,256 people in the entire sample who sought medical attention during 2001 in clinics, hospitals, and institutions that have contracts with the Bureau of National Health Insurance. Characteristics of the representative sample for middle-aged and seniors who are over 50 years old nationwide are shown in Table 1. Females, accounted for 50.9%, slightly more than male