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Developing of the Urban Medical Environment towards Healthcare Expenditure – Empirical Study

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Abstract

Along with the economic development and the advance of time, people emphasize more on health and health care. Demands for medical care are satisfied by local medical resources, while general medical environment could not satisfy consumers' demands. It often appears on the news about patients in remote areas not being cared in time or the tragedy caused by inadequate local healthcare workers. It reveals the obvious difference in the density of medical resources among various regions. Taking medical environment in Shanghai City as the research object, medical environment statistics provided by Shanghai Municipal People's Government is utilized for the secondary data analysis. The research results reveal significantly positive effects of 1.medical environment on total health care, 2.medical environment on healthcare expenditure, 3.medical environment on outpatient fee, and 4.medical environment on medicine fee. Finally, suggestions are proposed according to the results, expecting to contribute to the development of the overall medical environment.

Keywords: medical environment, healthcare expenditure, medical economy, medical resource

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INTRODUCTION

The economic development and the advance of time have people stress more on health and health care. The weight of health department in the macroeconomy in various countries is growing, and the gross domestic product (GDP) ratio of health-related demand for medical care is increasing that demands for medical care are gradually concerned. In the health economics development process, economists found out the importance of health department in economic development and started to explore the relationship between health care and economy. With human demands for health care and health, the research subject gradually became the health care systems in various countries and the behavior affected by health care service. On the other hand, the national healthcare expenditure health care statistics of Organization for Economic Co-operation and Development revealed that the per capita health care expenditure was increasing annually in various countries. After people had richer life, health became the wealth pursued. From Maslow's hierarchy of needs, the fundamental psychological needs were not simply for food and clothing, but should have sufficient health capital for the survival. Health was therefore included in consumers' utility function, i.e. regarding health as consumption and leisure being a factor in consumers' utility satisfaction. Such a phenomenon should not be simply discussed from the overall country, but should pay attention to individual and household demands for medical care, which would directly reflect on individual needs. Individual demands for medical care could be satisfied with local medical resources, while the general medical environment could not satisfy consumers' needs. There were news reports about patients in remote areas not being cared in time or the tragedy caused by inadequate local healthcare workers. However, when measuring the density of medical resources with the number of medical professionals for every 10 thousand people and the number of hospitals for every 10 thousand people, it revealed obvious difference in the density of medical resources among various regions. For this reason, this study intends to discuss the effect of urban medical environment on healthcare expenditure and to explore the effect of medical supply, according to medical resources offered in various areas, on household demands for health care service.

LITERATURE REVIEW

Macro Medical Environment

To cope with certain proportion of health department in the macroeconomy in various countries, a lot of people studied the overall medical environment

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and mentioned the relationship between economy and healthcare expenditure (Weiss et al. 2015). Martins et al. (2015) published the groundbreaking article in which the linear relationship between per capita healthcare expenditure and GDP were found out with the data of 13 developed countries, where healthcare expenditure was about 7.9% of GDP and *R*2 was 0.92. It powerfully explained the close relationship between healthcare expenditure and economy, and even the constant proportion in economic expenditure. Reim et al. (2015) proposed that the structure to affect medical environment was administration decision and influence. (1) Financing, financial management, and how to purchase medical service (payment). (2) Resource generation: such as the cultivation of medical manpower, the establishment and application of medical facilities and equipment. (3) Care provided norms, including the organization, establishment standards, and treatment principles of medical institutions. Anna (2015) indicated the factors in the formation of medical environment resources that the amount of healthcare expenditure stood for the investment in medical systems to affect the medical resources of a country; and physician manpower and facilities (beds) were the policies of investment in medical resources. Silvia and Pramatarov (2016) pointed out the factors in medical environment as administration, economic development (Per capita GDP), per capita healthcare expenditure (Per capita HE), percentage of per capita healthcare expenditure in GDP (HE as % of GDP), and medical resources, which were related to medical service utilization; and, medical utilization was related to the public health standard.

Referring to Tseng et al. (2015), several evaluation factors in urban medical environment are used as the evaluation dimensions of medical environment in the study.

(1) Number of medical professionals per 10 thousand people: total number of medical professionals in various counties and cities divided by the population in such counties and cities (10 thousand people as the unit). Medical professionals refer to physicians (western medicine physicians, Chinese medicine physicians, dentists), pharmacists, assistant pharmacists, medical technologists, medical technicians, registered professional nurses (including nurse practitioners), nurses, midwives, maternity assistants, dental assistants, dietitians, physical therapists, physical therapist assistants, radiologists, medical radiological technicians, occupational therapists, occupational therapist assistants, clinical psychologists, counseling psychologists, respiratory therapists, speech therapists, audiologists, certified dental technicians, and certified dental technician assistants with the certificates authorized by Department of Health, Executive Yuan (Bocken et al. 2015). In this case, the more medical professionals show the richer medical resources in such counties and cities that the public need not spend too much time on waiting. The variable should be the major indicator of medical care accessibility.

(2) Number of hospitals per 10 thousand people: number of hospitals in counties and cities divided by population in such counties and cities (10 thousand people as the unit). Such medical resources are classified into medical hardware (place), as remarkable regional resources. The public would select the places with distance and habits.

(3) Number of pharmacies per 10 thousand people: number of registered pharmacies in counties and cities divided by the population in such counties and cities (10 thousand people as the unit). The more such medical resources represent the better medical care accessibility in such areas.

(4) Number of clinics per 10 thousand people: number of clinics in counties and cities divided by the population in such counties and cities (10 thousand people as the unit). The higher clinic density shows the higher number of hospitals, presenting the characteristics of local resources. It is an important variable of medical care accessibility that the more clinics would have households incline to health care service consumption.

(5) Number of beds per 10 thousand people: number of beds in counties and cities divided by the population in such counties and cities (10 thousand people as the unit). Number of beds contains acute beds, chronic beds, psychiatric beds, T.B. beds, and intensive care beds. Consumers requiring such medical resources are major injuries and cannot be treated in general outpatient, nor cured with western medicines (Kaplan and Berkman 2016).

(6) Governmental health care expenditure per 10 million people: Governmental health care

expenditure contains general final accounts of general health businesses in health bureaus, public health centers, and county & municipal institutions. General health businesses cover general administration, epidemic prevention, health care, medical administration, food and drug, environmental health, sanitary inspection, education & outreach, and others. Such medical resource values are rather large that such variables are handled with 10 million people as the unit (McNatt et al. 2014).

Healthcare Expenditure

Chaneta (2015) estimated the price flexibility and income flexibility of demands for medical service. The research results revealed notable effects of economic variables on consumers' selection for medical service, and such economic variables were mostly characteristic variables of households, e.g. household head gender, family population, total family mortality, family saving-consumption ratio, total family education, and family food expenses. Abdelkafi and Täuscher (2016) discussed farmers in current societies under industrial and commercial development. The medical attitudes were affected by low income and uneven medical resource allocation. It was discovered that income and age (particularly infants and the aged) appeared the largest effects on farmers' healthcare expenditure. In terms of non-farmers, Mutingi et al. (2015) mentioned that income, visit time, education of financial head, and individual age were the factors in healthcare expenditure. Bennett et al. (2015) pointed out the significant effect of number of beds on visit time, education of financial head being elementary or junior high schools showed remarkable effects on healthcare expenditure, and three age stages (infant, middle-aged, the aged) appeared notable effects on healthcare expenditure. Lorenzo et al. (2017) revealed several factors in non-farmers' healthcare expenditure and farmers' healthcare expenditure was related to income and age.

Referring to Roome and Louche (2016), several healthcare expenditure evaluation factors are used as the healthcare expenditure dimensions in this study.

(1) Total health care: including the medical equipment and facilities, inpatient treatment and non-hospital employed healthcare service, expenses for medical appliances, accident and disaster medical insurance, and health insurance healthcare expenditure of households.

(2) Healthcare expenditure: all expenses related to seeing a doctor.

(3) Outpatient fee: including registration fee, health insurance copayment, other self-pay expenses, e.g. self-purchase medical appliances, medicine, and health care appliances.

(4) Medicine fee: such as vitamin injection, anti-inflammatory drugs, cold medicine, cough medicine, topical ointment or potion, oral solution, antibiotic, birth control pills, normal saline, and family standing medicine.

ESTABLISHMENT OF RESEARCH HYPOTHESIS AND DESIGN OF EMPIRICAL RESEARCH METHOD

Research Hypothesis

Tseng et al. (2015) revealed medium to highly negative correlations between urbanization and number of physicians, medium to highly negative correlations between urbanization and average annual medical resource consumption of a consumer, medium to higher negative correlations between mortality of ten leading diseases and urbanization of the area, and medium positive correlations between reported medical resource consumption of a physician and urbanization. Aital and Kumar (2015) indicated that, from the aspect of unit population, the distribution of number of western medicine physicians, number of beds, and number of medical institutions in counties and cities was relatively fair; however, from the aspect of unit land area, the medical resource distribution of such three types was relatively uneven. It was considered that the medical resource distribution among counties and cities was still unfair; medical care accessibility and health conditions in counties and cities appeared remarkable correlations. Accordingly, the fairness of the public acquiring medical resources should be improved. Paras (2014) pointed out medical professionals and health care expenditure per 10 thousand people as the key factors in health care in counties and cities. Silvia and Pramatarov (2016) indicated that the effect of variables on healthcare expenditure obviously changed with geographic locations. Finally, Kadushin (2014) found out notable effects of average amount of emergency allowances for a person, unemployment rate, and health care expenditure on healthcare expenditure. Accordingly, the following hypotheses are established in this study.

H1: Medical environment presents significantly positive effects on total health care.

Table 1. Analysis of medical environment to healthcare expenditure

dependent variable →	healthcare expenditure							
independent variable ↓	total health care		healthcare expenditure		outpatient fee		medicine fee	
medical environment	Beta	t	Beta	t	Beta	t	Beta	t
number of medical professionals	0.233	2.411**	0.206	2.133**	0.226	2.331**	0.172	1.833*
number of hospitals	0.211	2.232**	0.221	2.334**	0.235	2.443**	0.247	2.557**
number of pharmacies	0.205	2.136**	0.231	2.423**	0.222	2.312**	0.257	2.688**
number of clinics	0.198	2.055**	0.215	2.221**	0.204	2.146**	0.235	2.462**
number of beds	0.227	2.327**	0.246	2.533**	0.243	2.538**	0.183	1.924*
expenditure	0.251	2.658**	0.248	2.574**	0.255	2.662**	0.261	2.713**
F	26.437		31.552		35.263		38.426	
significance	0.000***		0.000***		0.000***		0.000***	
R2	0.296		0.322		0.363		0.389	
adjusted R2	0.374		0.305		0.347		0.368	

Note: * stands for $p<0.05$, ** for $p<0.01$, and *** for $p<0.001$.
Data source: Self-organized in this study

H2: Medical environment shows remarkably positive effects on healthcare expenditure.

H3: Medical environment reveals notably positive effects on outpatient fee.

H4: Medical environment appears significantly positive effects on medicine fee.

Research Object

The medical environment in Shanghai City is selected for the evaluation area in this study, and medical environment statistics provided by Shanghai Municipal People's Government are used for secondary data analyses.

Analysis Method

Regression analysis is applied to understand the effect of urban medical environment on healthcare expenditure.

ANALYSIS RESULT

Effects of Urban Medical Environment on Healthcare Expenditure

Influence analysis of medical environment on total health care

To test H1, the analysis results, **Table 1**, reveal remarkable effects of number of medical professionals (t=2.411**), number of hospitals (t=2.232**), number of pharmacies (t=2.136**), number of clinics, (t=2.055**), number of beds (t=2.327**), and expenditure (t=2.658**) on total health care that H1 is supported.

Influence analysis of medical environment on healthcare expenditure

To test H2, the analysis results, **Table 1**, show notable effects of number of medical professionals (t=2.133**), number of hospitals (t=2.334**), number of pharmacies (t=2.423**), number of clinics (t=2.221**), number of beds (t=2.533**), and expenditure (t=2.574**) on healthcare expenditure that H2 is supported.

Influence analysis of medical environment on outpatient fee

To test H3, **Table 1**, the analysis results appear significant effects of number of medical professionals (t=2.331**), number of hospitals (t=2.443**), number of pharmacies (t=2.312**), number of clinics (t=2.146**), number of beds (t=2.538**), and expenditure (t=2.662**) on outpatient fee that H3 is supported.

Influence analysis of medical environment on medicine fee

To test H4, the analysis results, **Table 1**, present remarkable effects of number of medical professionals (t=1.833*), number of hospitals (t=2.557**), number of pharmacies (t=2.688**), number of clinics (t=2.462**), number of beds (t=1.924*), and expenditure (t=2.713**) on medicine fee that H4 is supported.

CONCLUSION

From the research results, the proportion of healthcare expenditure in GDP is emphasized in various countries and the proportion is increasing. It is also estimated that per capita health care expenditure is increasing annual. Medical equipment, such as hospitals, clinics, pharmacies, and beds could truly explain that the selection of households is affected by medical care accessibility. The estimation of total health care shows that the above medical equipment would positively affect healthcare expenditure. Besides, governmental health care expenditure is measured from different directions, but the empirical result reveals that medical resources present certain degree of effects on household healthcare expenditure. Clearly, various medical resources show notable effects on consumers' selection for health care service. The empirical results

reveal that medical resources are the factors in household healthcare expenditure and demands for health care service.

SUGGESTION

Aiming at above research results, the following suggestions are proposed in this study.

1. In terms of public medical education, the ideas and behaviors of health promotion should be implanted to educate the public cherishing medical resources, correct behaviors and attitudes toward seeking health care, as well as teach the idea of risk sharing and preventive education measures.

2. The operation of current medical environment mechanisms has hospitals be restricted to the system and appear correspondent institution orientation to practice some preventive communication and medical treatment. It is suggested that the dialogue and communication channels among relevant organization units should be established and smoothened to avoid benign measures becoming the interference in professional health care and medical overwork, due to inadequate conversation, and result in medical resource waste.

3. In addition to the dialogues with medical clinics and healthcare workers, governmental medical units should provide open and transparent medical payment policies for the public. The ideas of medical payment are not simply explained to medical clinics, but more importantly, the limited concepts of medical resources should be clearly delivered to the public to avoid disputes between medical staff and the public due to cognition gap. It therefore could reduce the doctor-nurse-patient relationship tense.

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