

The Impact of Rural Health Insurance on Reduction of Catastrophic Health Expenditure (CHE)

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ABSTRACT

Background: The equity in health is a major concern to the decision makers of public health in many countries. This study was planned to determine Catastrophic Health Expenditure (CHE) and Fairness in Financial Contribution (FFC_i) indices in Qazvin Province in order to analyze the impact of current rural insurance scheme on the households' on-going health related expenses.

Methods: The study was a survey including 402 rural and urban households residing in Qazvin Province in 2011. All the participants were selected through cluster sampling method. Data collected via World Health Survey questionnaire. The X²-test was used to establish the relationship between the type of insurance cover and CHE index.

Results: The majority of the households in the rural (59.6%) and urban (52.2%) areas were covered by the Rural Insurance Scheme (RIS) and the Social Security Insurance Scheme (SSIS). In the rural and urban areas 1.8% and 7.5% of population had no insurance coverage respectively. The FFC_i index was 79% and food-based poverty line was 52.02 USD (equivalent to 572,153 RIs). The number of households faced CHE was 39. In the urban areas 23.9% of the insured were covered by the SSIS which 17.6% of them faced CHE; in the rural areas 59.6% of the population were under the RIS cover and 70.6% of them were CHE cases. The X²-test indicated that a meaningful relationship between the insurance type and CHE index at 99% confidence level.

Conclusion: The figure for FFC and CHE indices showed that the RIS had not covered property and had failed in lowering CHE index. The SSIS was found to be a well-structured and comprehensive health service whereas those covered by the RIS faced CHE due to the drawbacks such as lack of second level support.

KEYWORDS: Health Expenses, Social Security, FFC_i, CHE, Equity, Iran.

1. INTRODUCTION

The provision of the standard health services and health equity are two major indicators of prosperity within any given community. The term health equity refers to the administration of social justice through providing those in need with the fair access to the medical and health services as well as non-discriminatory support services that eliminate their health issues. The recent studies in both national and international levels have revealed an upward trend of inequity in the health systems of many countries [1].

The crucial role played by governments in addressing the issue of health equity is a matter of general consensus; therefore, the government of the Islamic republic of Iran is held liable for health equity as the main provider of the health related services according to the Codes of Constitution and the 1404 outlook.

Both these legal instruments explicitly state that the government is responsible for the public health, education, and welfare without any ethical or racial discrimination. The provision of health equity is the cornerstone of these objectives. In other words, the government has to provide the less privileged citizens with the required professional health services to close the gap between the rich and the poor. Unfortunately, there is not enough data on the current state of health equity in Iran [2, 3]. The concept of health equity states that all members of community must have access to the required health services regardless of their financial status [4-6].

In the present study the following two factors of investment and access equities were taken into consideration in order to compare health mechanisms. The former refers to the notion that all members of the community must play a role in the health sector through capital investment; the latter holds that social equity is the expected outcome of health

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equity. The health equity will be better realized if the health system is designed based on the idea that the rich have to contribute more to the health services; as there are health systems in which every individual has an equal investment share disregarding his/her financial status or the rich contribution is kept low [7].

The alternative approach holds that all households must contribute to the health services through capital investment on the basis of their current financial status; this approach underscores the notion of investment capacity instead of households' financial contribution [8]. Each household has to spend on the basic needs (food, clothing, shelter) daily. The households' expenditure capacity (the consumable income) is the sum total of deducting the daily expenses from their total income [9].

The health equity results from even distribution of the capital investment among all households; it is to say that the households' share of health investment must be a reasonable component of the consumable income [8]. As a matter of principle all households should contribute financially to the health system as it facilitates and safeguards public access to the required services [10].

The concept of Catastrophic Health Expenses (CHE) has already been the focal point in a number of studies on the households' financial security within the health systems [11]. The question of the CHE threshold has proved to be a major concern to the researchers. Wagstaff and Doorslaer (2003) stated that CHE threshold is arbitrary [12]. The threshold is set at 2.5% to 15% of the consumable income as well as at 10% to 40% of non-food consumption in various studies. An early WHO study set the threshold at 50% before modifying it to 40% in 2002 [13]. The lower threshold shows that the households' total income or expenses has been taken into account by the researchers. The CHE affects the living standard of the households as a financial shock and in extreme cases ends up in unemployment which is an income shock with negative impact on all existing household resources [14].

The following step should be taken in the process of determining the FFC index [15]:

- The socioeconomic classification of population
- The determination of health status of the population
- The quantification of health inequity

The data on the economic status of the families are not easily available in the developing countries and in most instances the collected data is not reliable [15]. Therefore, there is a need for devising a set of standards for data analysis required for measuring the FFC index. The quantification of the inequity enables the researchers to compare characteristics of different health systems.

The FFC index, which is based on fairness in financial support, was first introduced in the year 2000 with respect to these features:

- Reflection of both Vertical and Horizontal equity
- Households with similar financial status spend different sums for different needs (Horizontal Equity)
- Households with different financial status spend different sums for similar needs (Vertical Equity)
 - Reflection of Ascending and Descending expenses
- The rich spend more on health services (Ascending Expenses)
- The poor spend more on health services (Descending Expenses)
- The distinction of the expenses might be a drawback in a number of instances.
 - Reflection of the average health expenditure through vertical and horizontal equity.
- The households that spend in proportion to their income are excluded.

The FFC index enables the researchers to compare the health systems and pinpoint the households that spend more on the health services. In other words, these households have a real potential to face CHE. The numerical value of the FFC index is between 0 to 1 and figures closer to 1 show a higher degree of equity [16]. The application of this index to a study in China indicated that 77% of the statistical population faced CHE. A similar 2007 study in Iran showed that 2.5% of the households dealt with CHE. These studies have made the decision-makers understand that health policies and relying on insurance as a support measure are failure prone because there had not been the desired reduction in the CHE cases [17]. The present research was conducted aiming at determination of Catastrophic Health Expenditure and Fairness in Financial Contribution indices in Qazvin Province of Iran in order to analyze the impact of the current rural insurance scheme on the households' on-going health related expenses.

2. METHODS

The present study in both rural and urban regions of Qazvin Province of Iran was carried out in 2011. The statistical population consisted of 402 households chosen through single-phase cluster sampling. These subjects expressed their willingness before data collection through questionnaires by the first capable over member of the household aged 18 years or older as per the recommendation practice of Iranian Statistics Centre.

The study was conducted in the following phases:

- Literature Review
- Field Study (application of WHO questionnaires, data collection, applying official data and published Statistics, surfing websites)
- Economic Analysis

The “World Health Survey “(2003) was the data collection tool. The World Health Survey (WHS) is a valid, reliable and comparative instrument developed by the World Health Organization for countries in order to monitor health system performance. The WHS contains two main sections: the household questionnaire and the individual questionnaire. In this manuscript we report the results of the household questionnaire. It includes the following modules: ‘household roster’, ‘health intervention coverage’, ‘health insurance’, ‘health expenditure’, ‘indicators of permanent income’ and ‘health occupation’[18]. The data on the main reasons of receiving health services were extracted. The collected data also included information on insurance type, health expenses, family expenses, and family income index. The households’ members received the necessary trainings before filling up the questionnaires. The CHE and FFC indices were then calculated. The expenditures were in US dollar at the rate of 11,000 Iranian Rials per USD.

2.1. CHE Calculation

The CHE index was calculated by application of WHO suggested method:

- Determination of Total Household Expenses (THHE_x), Household Food Expenses (HFEx), Household Size (HS)
- Determination of Household Equivalent Size (HEqS), Household Equal Per Capita Food Expenses (HEqPCFEx), Subsistence Expenditure (SE), Capacity To Pay (CTP), and the proportion of Out Of Pocket(OOP) to CTP.

The ranking of the figures gained as HFEx was divided by THHE_x. HE was raised to the β (=0.65) power in order to calculate HEqS. The HEqPCFEx was calculated by dividing HFEx by HEqS; the HEqPCFEx and HEqS figures were obtained (data not shown). The average of HEqPCFEx for the households in the rank of 45% to 55% was taken as Food-Based Poverty Line (FBPL). This index was applied to the statistical population. The SE for each household was calculated by the following formula:

$$SE_i = HEqS_i \times FBPL$$

The comparison of the figures for SE and THHE_x shows whether a household would be below the poverty line (THHE_x < SE). The CTP was calculated using the following formulae:

$$CTP_i = THHE_{x_i} - SE_i$$

Finally the proportion of OOP to CTP was calculated as any figure above 40% showing the household deals with CHE.

2.2. FFC_i Calculation

The FFC_i is calculated on the basis of HFC_i was calculated by dividing HEx_i by CTP_i. The figures would be from 0 to 1. The figures closer to 1 indicated greater degree of equity [19, 20].

3. RESULTS

The questionnaires were completed for 402 households province-wide in Qazvin (middle-west of Iran), %94.8 of respondents were male, two third of the respondents were between 30 and 49 years old, and about one third of theirs were employed in governmental organizations (Table 1).

The amount of the household expenditures in urban and rural area were calculated; the mean food expenditures and the mean direct health expenditures were almost equal in two areas, but the mean non-food-non-health expenditures in urban area were higher than rural area (Table 2). The health financial contributions of the households were determined. The health expenses were USD 693.00 for the rural households and USD 694.64 for the urban households (Table 3), these figures were almost equal. The hospital expenses of the urban households equaling to USD 143.00, was more than the rural households of USD 111.45. The same was applicable to the expenses related to use of medical equipment. The household members in urban areas paid more on medication, consultation fees, and other services. While the higher expenses in the urban regions were partly due to the extent of health related issues as well as below the standard services and referral complications, there is a need for further research in this area.

The WHO guidelines were used to determine the CHE index. The food- based poverty line was USD 479.21 showing that 40 individuals faced CHE (11.2% of the total, 5.9% of the rural, 17.4% of the urban statistical population). The majority of the rural population (59.6%) was covered by the Rural Insurance (RI). The urban population was mainly covered by Social Security Insurance Organization (SSIO), (52.2%). In the urban centers 7.5% of population were not insured, 19.5% had two insurance covers and 0.7% had three insurance covers. (Table 4)

In the rural regions 1.8% of the population was not insured and 5.5% held two insurance policies. There was no self-insurance or complementary insurance coverage available in the rural areas, whereas 4.1% of population in urban

centers held these insurance policies. In the urban regions 34.8% of the households facing CHE were covered by SSIO (5.2% of the total covered by this insurance type); the 30.4 % of the population which faced CHE were not covered by any type of insurance, which is one-third of the non-insured. In the rural areas while 70.6% of the CHE-exposed households (18.5% of total) were covered by rural insurance, 11.5% of the population facing CHE were under SSIO cover (17.6% of the total CHE cases). (Table 4)

The X^2 -test was applied to determine the relationship between the insurance type and the CHE households. The statistical population was divided into four categories:

- Covered by SSIO
- Covered by RI
- Covered by Medical Services Insurance Organization (MSIO)
- Others

There was a significant relationship between the number of households facing CHE and their insurance type at the freedom level (=3) and Alpha (=0.01). The critical figure (=6.2514) and statistical figure (=0.000) indicated that there is such a significant relationship at the confidence level of 99%. For the urban areas those holding MSIO insurance and urban insurance holders were regarded as belonging to the same category. In the urban areas there was a significant relationship between the insurance type and the CHE households at the confidence level of 99% (critical figure =4.6052, statistical figure=0.000) (Table 4)

Table 1: Age range and occupation of the respondents

Characteristics		No.	%
Age	<29	70	17.4
	30-39	180	44.8
	40-49	90	22.4
	50-59	40	10.0
	>60	22	5.5
Total		402	100
Occupation	Labor and farmer	112	27.9
	Gov. Employee	124	30.8
	Self-employed	128	31.8
	Other	36	9.0
	Unknown	2	0.5
Total		402	100

Table 2: Household Expenditures (USD)

expenditure	Urban Areas	Rural Areas
Mean food exp.	101.59	104.05
Mean direct health exp.	69.46	69.30
Mean non-food non-health exp.	438.39	349.74
Total household expenditure	609.46	523.09

Mean direct health expenditure in urban and rural areas are nearly equal, Mean non-food non-health expenditure, in cities are higher, Mean food expenditure in rural areas is a little higher.

Table 3: Household Health Direct Expenditures (USD)

Health Direct Expenditures	Urban Areas	Rural Areas
Mean hospital exp.	143.00	111.45
Mean outpatient exp.	428.64	452.55
Mean drug exp.	103.45	87.00
Mean medical equipment exp.	25.09	34.09
Mean other healthcare related exp.	2.18	0.55
Total household expenditure	694.64	693.00

Outpatient expenditures in both rural and urban is the highest, in two items rural residents, and in three items urban residents expend more. (exp. =expenditure)

Table 4: The relationship between type of insurance and number of people exposed to CHE, in RURAL, URBAN and TOTAL population under study

Insurance Types	Urban Areas				Rural Areas				TOTAL			
	No. of Insured	% Insured	No. of CHE exposed	% CHE exposed	No. of Insured	% Insured	No. of CHE exposed	% CHE exposed	No. of Insured	% Insured	No. of CHE exposed	% CHE exposed
Only MSIO	36	12.3	4	17.4	9	8.3	1	5.9	45	11.2	5	12.5
Only SSIO	153	52.2	8	34.8	26	23.9	3	17.6	179	44.5	11	27.5
Only RI	6	2.1	0	0.0	65	59.6	12	70.6	71	17.7*	12	30.0*
Non insured	22	7.5	7	30.4	2	1.8	0	0.0	24	6.0**	7	17.5**
other	76	25.9	4	17.4	7	6.4	1	5.9	83	20.6	5	17.5
Total	293	100	23	100	109	100	17	100	402	100	40	100

*People covered by Rural Insurance (RI) comprised 17.7% of the population; some 30% of CHE exposed were among them.

**Non-insured people were only 6% of the studied population, but 17.5% of CHE exposed households were in this group.

Fifty nine were holding complementary insurance type; no one was in rural regions (Not shown).

* $X^2=0.000$

There is a significant relationship between the type of insurance and number of people exposed to CHE, in the rural areas, the Rural Insurance was not able to protect the covered people.

** $X^2=0.000$

There is a significant relationship between the type of insurance and number of people exposed to CHE, in the urban areas, the MSIO and Other were not able to protect the covered people

*** $X^2=0.000$

There is a significant relationship between the type of insurance and number of people exposed to CHE; the SSIO covered people in the whole population are better protected.

4. DISCUSSION AND CONCLUSION

The article 90 of the fourth development plan of the Islamic Republic of Iran, states that the FFC index must be 90% while public contribution to the health services must not exceed 30%. The fifth development plan, which repeats the same issues in article 90, stresses on FFC index that must be no less than 90% and close to 1. It is obvious that the health system has not achieved these objectives.

In the present study the food-based poverty line was 584,798 and the FFC index was 79% based on households' spending capacity and daily expenditures. The FFC index showed that there was relative inequity in the provision of health services. In the health system studies the following factors are taken into consideration which the present study focused on the first one:

- The number of households facing CHE
- The number of households below the poverty line

The present study showed that 40 households (10.2% of the total, 15.6% of the rural, and 7.9% of the urban statistical population) faced with CHE. Kavosi [21] has done comprised the CHE index in Tehran municipality zone 17 in 2003 and 2007. In 2003 out of each 1000 households, 123 CHE instances (12.3%) were reported, and with a slight decrease, this figure was 121 (12.1%) households for 2007. These findings indicated that the objectives of the fourth development plan (reducing health expenses to 30% and CHE cases to 1%) had not been realized in practice. The slight difference between the findings of the present study and Kavosi's can be explained by regarding the sampling methods employed. The main issue here is that these studies which carried out in different time frames have shown the shortcomings of the health system in addressing the objectives and policies.

In the rural areas 2/3 of households facing CHE were rural insurance holders (18.5% of the total). This figure showed that the referral and family health scheme were not successfully implemented in these regions. There were also practical drawbacks in respect to implementing a set of new health policies such as hospitalization insurance and free treatment of those injured in road accidents (stated in Article 92 of Fourth National Development Plan). All these drawbacks lead to an increase in the households' health expenses, the main reason for health system failure, in realizing set objectives. Kavosi [21] had stated that the increase in medication prices and other health services had a negative impact on the overall condition of the health system.

In a 2002 study by Iranian Statistics Organization, the number of households facing CHE was 2.3% of the total population [22]. These findings show that the data collected in the national level mismatches the data collected in the

local level. In other words the number of CHE instances in Qazvin Province and Tehran municipality zone 17 was found to be above the national average. The mismatch in these figures may be due to differences in research methods, types of data collections as well as sampling techniques.

The more reliable findings on CHE and lower figures would be obtained when the researchers focus on the families' income as the main factor. The 2003 report on the basis of family income indicated that 0.01% to 10.5% of the population faced CHE in 59 countries around the world [13]. These findings have shown that following factors affect the CHE instances:

- Health insurance system
- Medical services not included in the insurance policies
- Medical services paid for by the non-insured households

Limwattananon et.al, (2007) and Somkorta et.al, (2008) in Thailand have stated that insurance policies which included almost all possible health risks and advance payment measures address and reduce the CHE cases. These insurance policies had a positive impact on Thailand health system in form the reduction of CHE instances and the families below the poverty line [23, 24].

In China, Wagstaff and Lindlows (2008) indicated that since health insurance facilitate public access to the medical services; the high demand for specialized health care would lead to an increase in the CHE households [25]. This finding underscores the importance of the following factors in designing the health systems:

- The insurance service package
- The payment method
- The insurer undertakings

Kavosi has also stated that health policies need to address the poverty issue along with other health related concerns [21]. The present study also indicated that there was a meaningful relationship between the CHE index and the insurance type in both urban and rural areas.

The social security proved to be systematic and structured in offering health services whereas rural insurance lacked in these respects and the households with this insurance cover were potential CHE instances.

Finally the researchers recommend the implementation of the following measures and policies that require the close cooperation of the all involved parties in both private and public sector:

- Implementing family medical care scheme
- Defining the social factors involved in health services
- Defining the health policies that address poverty
- Defining the features of basic insurance cover, complementary insurance, and insurance packages
- Defining insurance potentials
- Unified health services management practices
- On-going inspection of the health services by the insurance companies as the main client
- Modifying and improving referral procedures

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