Original Article

Economic Inequality in the Healthcare Quality and its Decomposition

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ABSTRACT

Background and Aim: Assessing the quality of the health care system is considered a basic step in the development of quality improvement programs. To date, no research has been conducted assessing the inequality in satisfaction with health care services in Iran using the assets. This study aimed to determine the satisfaction with healthcare services and determine the inequality of satisfaction with the quality of healthcare services.

Methods: This study was a descriptive-analytical survey of 844 people in Arak, multi-stage sampling was performed. The asset variables were used for Principal Component Analysis (PCA). In the present study, satisfaction with healthcare quality was a categorical variable. All analysis was conducted using STATA 12.0, and a P-value lower than 0.05 was taken to show statistical significance.

Ethical Considerations: After the explanation of the study objectives, written informed consent was obtained from all participants.

Results: Mean age of the participants was 33 ± 10.4 years. The level of satisfaction with the quality of health care services was that of agreed. Satisfaction with the quality of health services among people with higher socioeconomic status is more concentrated and statistically significant. The percentage of illiteracy in inequality is 84.18 percent.

Conclusion: Lower-than-high-school education can reduce inequality. Being single, living in rural areas, and having old age can decrease inequality. Among the variables, lower socioeconomic status has the largest contribution to inequality of satisfaction with health care. The results of the study revealed a significant inequality in the quality of health services in such a way that satisfaction with the quality of health care is significantly concentrated among the people with higher socioeconomic status. Decomposition of inequality index indicated that education level, age, gender, place of residence, marital status, and socioeconomic status play a significant role in the formation of this inequality, the largest contribution of which is attributable to socioeconomic status.

Introduction

Healthcare quality is a complex and multi-dimensional concept (1). The quality of the health care system plays a significant role in providing and promoting public health (2). Assessing the quality of this service system is considered a basic step in the development of quality improvement programs (3). Customer satisfaction is a very important element in assessing the quality of the health care system (3). Patients can provide useful information about the quality of care, and it can be regarded as an indicator of primary healthcare. This approach focuses on service performance through expectations approval or disapproval (4).

The health care system in Iran is defined at three levels; the most peripheral level which offers the primary health care services to the community is composed of rural health houses as well as rural and urban health centers (1). Roughly 90 percent of Iranian people are covered by health insurance, and around 90 percent of the rural population as well as the majority of the population in urban areas have adequate access to PHC services. Life expectancy at birth has increased to 73 years (1). Generally, a lot of positive points can be perceived in the healthcare supply in Iran. Despite all these facts, however, the health care system in Iran faces serious challenges in terms of quality and efficiency (1). Satisfaction with the quality of healthcare services is affected by numerous factors such as socioeconomic status, age, location of residence, and education (1, 5-7). There is a consensus that many inequalities are wrongly established (8). There are some extents of deprivation and poverty even in developed countries. Nevertheless, some nuances can be perceived in the actual use of services. The poorer populations are more willing to use emergency and unplanned services than the more affluent populations. They are also more likely to see a general practitioner than to see a specialist doctor or to use preventive or elective services (5). To our knowledge, although some research has been carried out on the utilization of healthcare services in the area under study (7, 9, 10), to date no research has been conducted assessing the inequality in satisfaction with healthcare services in Iran using the assets and the methods used in this study. Therefore, there is an urgent need for a thorough understanding of the quality of services in this area. The aims of this study was to determine the satisfaction with healthcare services in Arak, Iran and to determine the inequality of satisfaction with the quality of healthcare services in terms of socio-economic, gender, place of residence, marital status, and to decompose them.

Ethical Considerations

Ethical principles were considered in searching and citing the literature.

Methods

Study population:

This is a cross-sectional study conducted in 2016. The study population was the residents of Arak, the capital of Markazi province, located in the center of Iran. Based on the guideline for conducting a health care utilization survey (10), we applied a systematic sampling method including 415 households. Data collection was carried out on subjects aged > = 15 and was conducted by trained interviewers.

Demographic variables information including age (years), sex (male / female), marital status (married / single), place of residence (rural / urban), education level (illiterate / less than high school/ high school and diploma/ academic). The asset variables to obtain socioeconomic status included having a bathroom, toilet, using a kitchen stove, fridge, freezer, refrigerator, microwave, and safe heating, television (black and white, color, or LCD), mobile phone, dishwasher, washing machine, vacuum cleaner, computer, Internet access at home, motorcycle, car, and ownership of residence, that all were questioned by yes / no answer. The data collection tool was a questionnaire including these variables.

Statistical analysis:

The asset variables were used for Principal Component Analysis (PCA). These included having living facilities: freezer, refrigerator, black and white television, color television, LCD television, mobile telephone, washing machine, dishwasher, microwave, vacuum cleaner, computer, Internet access at home, motorcycle, and private car. Based on the PCA findings, five quintiles were created, and they were used as an indicator of the socio-economic status in the study.

In the present study, satisfaction with healthcare quality (outcome) was a categorical variable; the arithmetic means of acquired scores from the questionnaire (quietly agree, agree, no comment, disagree, quietly disagree).

The concentration index is defined as twice the area between the concentration curve and the line of equality (the 45-degree line). So, in the case in which there is no socioeconomic-related inequality, the concentration index is zero. The index takes a negative value; indicating a disproportionate concentration of the health variable among the poor, and a positive value when it lies below the line of equality. If the health variable is "bad" such as ill-health, a negative value of the concentration index means ill-health is higher among the poor (11, 12). The concentration index (C) separately was measured for sex, socioeconomic status, place of residence,

and marital status. The C calculation was calculated from the regression model (7, 11).

A decomposition approach allows one to estimate how regressors (determinants) proportionally contribute to inequality in an outcome variable (11). For decomposition analysis, the following steps were used: 1. Regress the health variable against its determinants by an appropriate model. This was done due to finding the coefficients of the independent variables. 2. Calculate the means of the outcome variable and each of its regressors. 3. Determine the concentration indices for the outcome variable and the regressors. Eventually, the contribution of each regressor to the inequality in the outcome variable can be calculated by: 4. Determine the absolute contribution of each regressor by multiplying the outcome variable elasticity concerning that regressor and its concentration index. 5. Calculate the percentage contribution of each regressor simply by dividing its absolute contribution by the concentration index of the outcome variable (7, 8, 11).

All analysis was conducted using Stata 12.0, and a P-value lower than 0.05 was taken to show statistical significance.

Findings

Descriptive results

Eventually, 844 subjects completed the study data. The mean age of the participants was 33 ± 10.4 years (age range of 12 to 93 years). The majority of participants were female (63.9%), married (89%), urban residents (55%), and holding a diploma (29%) (Table 1). In general, the level of satisfaction with the quality of health care services was that of agreed (mean 4.11 ± 0.62). These findings resulted from the mean scores obtained from ranking each of the questions answered by the participants. The lowest satisfaction score was for the question "patients' comments are collected in this center" with a mean of 3.6 ± 1.1. In other words, the participants in this study had chosen the "I have no idea" option. The highest satisfaction score, on the other hand, was for the question "center staff have an appropriate appearance and they are clean and tidy" with a mean of 4.38 ± 0.76. In other words, the participants in this study had chosen the "I agree" option (Table 1).

The effects of socioeconomic inequality on satisfaction with the quality of health care

Using convenient covariance method, the concentration index was calculated as 16% (p = 0.002) for the socioeconomic variable (CI 95%: 0.01 – 0.03) (Figure 1). Put the other way, satisfaction with the quality of health services among people with higher socioeconomic status is more concentrated and statistically significant (p = 0.002).

Decomposing the contribution of variables in the concentration of satisfaction with the quality of health services in the people with higher socioeconomic status (Table 2), it can be said that the percentage of illiteracy in inequality is 84.18 percent. The share of lower-than-high-school education in this inequality is obtained as -51.31 percent (i.e. lower-than-high-school education can reduce the inequality by as much as 51.31 percent). People with high school degrees and diplomas are calculated to have a 20.29 percent share of inequality. Women are responsible for 7.12 percent of socioeconomic inequality under study. Old age can also decrease the inequality under study by as much as 70.36 percent. Being single can reduce inequality by as much as 13.68 percent. Living in rural areas can also reduce the inequality in satisfaction with the quality of services to 42.52 percent. Socioeconomic status in the first quintile is responsible for a 128 percent increase in inequality in satisfaction with the quality of services provided. Socioeconomic status is also responsible for 6.32, 7.40, and 3.21 percent increase in the inequality in the second to fourth quintiles. Thus, among the studied variables, lower socioeconomic status has the largest contribution to inequality of satisfaction with health care.

Conclusions

The results of the study revealed a significant inequality in the quality of health services in such a way that satisfaction with the quality of health care is significantly concentrated among the people with higher socioeconomic status. Analysis of the inequality index indicated that education level, age, gender, place of residence, marital status, and socioeconomic status play a significant role in the formation of this inequality, the largest contribution of which is attributable to socioeconomic status. To date, much research has been conducted about the inequality in health outcomes in Iran; yet, to our knowledge, ours is the first research carried out on the socioeconomic

inequality in health care quality and its decomposition in Iran.

In a study in Iran by Mohammadbeigi et al. (10), it has been found that there was no significant inequality in health care utilization; however, the people with higher household economic index were more likely to refer to specialists and general practitioners while the people with lower household economic index were more likely to refer to health workers. The richer they were, the more they benefited from health care services.

Numerous other studies have shown the effect of socioeconomic status on health outcomes (10, 13-19). Our study also confirmed the unequal distribution of health outcomes in terms of socioeconomic status. In this study, the concentration index for socioeconomic status was calculated as 0.016. In other words, people with higher socioeconomic status were more satisfied with the quality of health services.

In a cross-sectional study in Nepal by Eiko Saito et al. (20) a significant inequality in the use of health services is reported in such a way that using the services of the private sector was more concentrated among individuals with higher socioeconomic status. Similar results in other studies have also been reported in Hong Kong and China (21, 22).

Just like the present study, other studies have also shown that age, gender, and self-expressed health status can significantly affect the inequality in benefiting from health care services and the quality of health services (21, 23). In this study, the decomposition of the concentration index also revealed that age and gender play a significant role in the formation of this inequality in a way that women were responsible for 7.12 percent of socioeconomic inequality under study. On the other hand, old age could also decrease inequality by as much as 70.36 percent.

The percentage of illiteracy in inequality is 84.18 percent. This means that illiteracy increases the amount of inequality. In addition, the share of lower-than-high-school education in this inequality is obtained as -51.31 percent (i.e. lower-than-high-school education can reduce the inequality by as much as 51.31 percent). People with high school degrees and diplomas are calculated to have a 20.29 percent share of inequality. In some other studies, the role of education in creating inequality is also addressed. In the study by Eiko Saito et al. (20), having a higher degree reduced the amount of inequality in

health care services utilization. In other studies, however, it has been shown that higher degrees of education has increased the inequality in health service utilization and access to such services. These conflicting results could be related to different studied outcomes. Or, different study settings can be a determining factor in this contradiction. It should be noted that in our study, only 5.70 percent of the participants (n=48) were illiterate; even this small sample size can also lead to a different result.

Residence in rural areas can also reduce the inequality in satisfaction with the quality of services by 42.52 percent. In Iran, all health care services in urban and rural areas are available to the public free of charge. Rural health centers, due to less crowding and better access, can deliver better services to the villagers; as a result, residents in the village could also have a role in reducing inequality. Nevertheless, this relationship may be due to relatively low expectations of the health services quality by the villagers. This means that they are satisfied with the minimum qualifications. In the present study, the results indicated that being single can reduce the amount of inequality.

In our study, it was found that lower socioeconomic status has the largest contribution to inequality of satisfaction with health care. Many other studies have examined the effect of socioeconomic status, and the relationship between socioeconomic status and health outcomes is that of a known relationship (10, 13-19). People with higher incomes will benefit from better services and will use more specialized centers to get the services. That is why we are more satisfied with the service provided.

Compared to other related studies, asset-based methods have been used for measuring the socioeconomic situation in this study. To measure socioeconomic status, there are the three methods asset-based, consumption expenditure, and income; out of which the asset-based is an easy and accurate method for assessing the socioeconomic status of individuals. On the other hand, PCA, which is an essential part of this method, has its complexities.

Of the strengths of this study, this can be noted that this study is one of the few studies which has addressed the socioeconomic inequality in health services in Iran and the world while in many other studies health care utilization has been studied. One of the limitations of this study includes its

relatively small sample size. It is therefore recommended to conduct the same study with larger sample size. Another limitation may be the possibility of reporting bias in self-reported variables (24).

The results of the study revealed a significant inequality in the quality of health services in such a way that satisfaction with the quality of health care is significantly concentrated among the people with higher socioeconomic status. Decomposition of inequality index indicated that education level, age, gender, place of residence, marital status, and socioeconomic status play a significant role in the formation of this inequality, the largest contribution of which is attributable to socioeconomic status.

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Authorship
All persons listed as authors have made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

Conflict of Interest Statement
The author declares that they have no conflicts of interest.

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Table 1. Socioeconomic and underlying characteristics of the respondents

Variable	N	%
Sex		
Male	303	36.07
Female	537	63.93
Marital Status		
Married	733	88.74
Single	93	11.26
Education level		
Illiterate	48	5.70
less than high school	276	32.78
high school and diploma	328	38.95
academic	190	22.57
Place of residence		
Urban	452	55.19
Rural	367	44.81
Socioeconomic status		
The first quintile	75	20.66
The second quintile	71	19.56
The third quintile	72	19.83
The fourth quintile	73	20.11
The fifth quintile	72	19.83
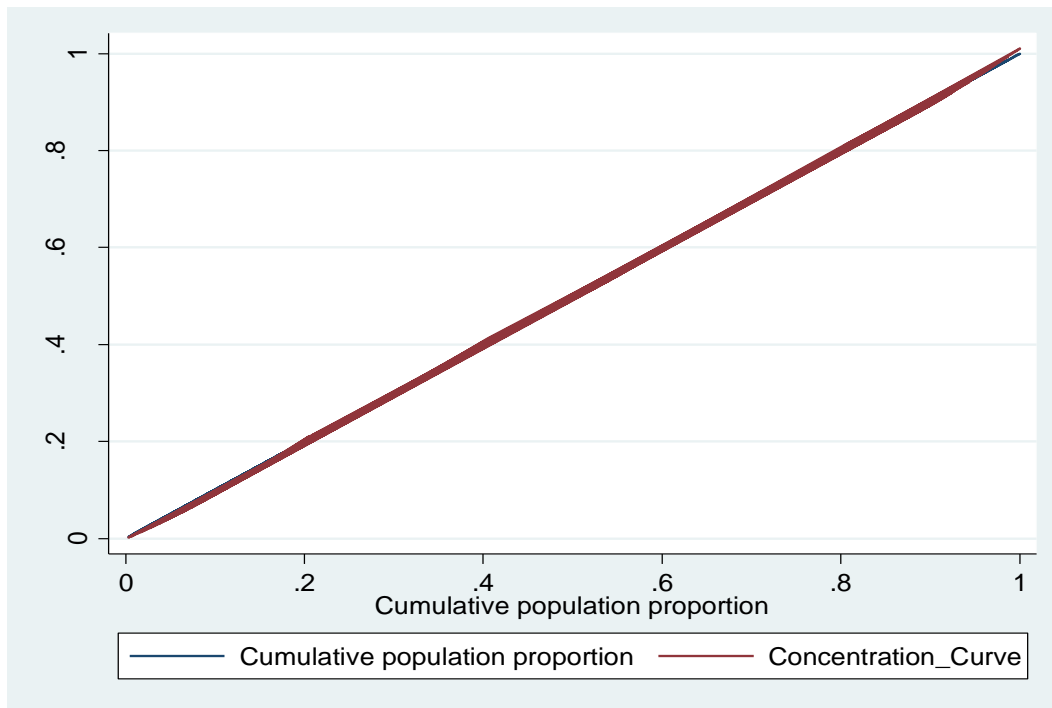
Figure 1. Concentration curves of socioeconomic status (x-axis) and a Satisfaction of Health care (y-axis) in osteoporotic women. The line is exactly 45 ° show the equity line, and other curve show concentration curve.

Table 2. Decomposing socioeconomic inequalities among participants

Variables	Elasticity	Concentration Index	Contribution	Contribution from Total	Contribution Percent
Age	.40437655	.03619765	.01463748	-.70358849	-70.36
Sex	.12978426	-.01148345	-.00149037	.07163854	7.12
Marital status	-.1715265	-.0165966	.00284676	-.13683673	-13.68
Place of residence	.14529641	.06088037	.0088457	-.42519146	-42.52
Socio-Economic situation in the first quintile	.03351707	-.79423167	-.02662032	1.2795745	128
Socio-Economic situation in the second quintile	-.00330706	-.39746385	.00131444	-.0631819	6.32
Socio-Economic situation in the third quintile	-.05302891	.02903285	-.00153958	.07400393	7.40
Socio-Economic situation in the fourth quintile	-.01099815	.39780822	-.00437515	.2103031	21.03
Socio-Economic situation in the fifth quintile	-	-	-	-	-
Education level in illiterate	-.0423418	.41359292	-.01751227	.8417727	84.18
Education level in less than high school	.04166554	.25617332	.0106736	-.51305423	-51.31
Education level in high school and diploma	.10441298	-.04043052	-.00422147	.20291597	20.29
Education level in academic	-	-	-	-	-