Rate of inequality of access to kidney transplantation services in Iran

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Abstract

Aims: Having equal access to healthcare services is one of the basic rights of all people. Kidney transplant beds are one of the most important and valuable resources of healthcare system which their unequal allocation can cause irreversible complications in addition to emergency patients’ transfer. Present study was designed to evaluate the access to kidney transplantation services in different provinces of Iran.

Methods: In this applied descriptive-analytical study, number of kidney transplant beds for each province in portion with province population in year 2006 was analyzed using Gini coefficient and Lorenz curve with Excel 2007 software.

Results: The total number of kidney transplant beds in Iran was 295, which 163 (55%) of them were located in Tehran. Approximately, half of population only had access to 20% of kidney transplant beds and the other half had access to 80%. Gini coefficient was 0.4 which demonstrated the non-equality.

Conclusion: There isn’t equal access to kidney transplant services in Iran due to unequal distribution of kidney transplant beds.

Keywords: Equality, Access, Kidney Transplantation Services, Iran

Introduction

Among the issues that are emphasized by universal declaration of human rights is the right to enjoy from health care, and its importance is to the extent that the constitutions of most countries have considered it. Also, the twenty ninth principle of the constitution of Islamic Republic of Iran considers enjoying social security and health services and medical care, the right of public and has obliged the state to provide the above-mentioned services and financial support for all people across the country based on law, from the public revenues and incomes gained from their participation [1].

Equal access to health care services is the basic right of all human beings. In this respect, inequality in geographical distribution of health resources, make some difficulties for the equal access to health services for individuals [2, 3]. In developing countries, due to the lack of background information, skill and expertise in the field of health and medical planning, often sources are allocated unequally. In this regard, the distribution of hospital beds (as one of the health system resources), particularly special beds can be considered as one of the indicators of access to health services [4]. Major concern of health experts in this field is that some patients may suffer from inability or even die due to the lack of access to medical service facilities.

It is necessary to know that why some patients have inadequate access to intensive care and medical treatment skill and nurse care. One of the major causes of the shortage in special care facilities, at both regional and national levels, is the cost of intensive care services. ICU claims a high cost due to the type of employees and equipment. Treatment cost in intensive units is 3 to 4 times more expensive than the cost of care in normal wards. Lack of proper distribution of care facilities, after its shortage, is the most important factor that challenges the access to services. The existence of empty beds in some areas and lack of hospital beds in some regions is the evidence of this claim. Also, the unbalanced and irrational distribution of intensive care beds will lead to their use by patients who are mistakenly referred (who are not qualified for admission in the ICU) [5, 6].

The importance of access to intensive care beds is clear. Metcalfe et al. studied the increased mortality in patients who were not admitted in intensive care unit, during a three-month period in six intensive care units. Results showed that mortality was 24% higher among the patients who needed admission and were not admitted than patients who were admitted [7].

Despite the fact that intensive care beds should be available for patients who have physical discomfort to regain their health, the sources are often inadequate for needy individuals’ access to these services. Parker

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et al. have conducted a study in the field of identifying factors that may affect the increase of demand for intensive care services. Their research has shown that the number of patients referred to surgical expertise has significantly increased, that the maximum number of them are elderly patients requiring long admission and this issue has caused a deficiency in the number of specialized beds associated with expertise [8]. However, the increasing use of specialized beds in treatment and care activities is clear. Specialized beds which are considered as one of the most expensive equipments have a critical role in improvement and treatment of patients [9]. Kidney transplant beds are the most important and valuable existing beds that lack of their equal and fair allocation among provinces of the country may, in addition to critically ill patients’ transfer, lead to irrecoverable complications. Considering the high cost of kidney transplant beds and their specialized nature in providing vital services to patients, balanced and equitable geographical distribution across the country is very important that if being realized, equal access to these services and public consent will be obtained.

Today, researchers and policy makers are increasingly considering the rate of access to health resources (such as beds etc.) as the indicators of public health [4, 10]. According to the existing data, no such study has been done in the field of assessing the rate of equality of access to kidney transplant beds in Iran. This study was conducted aiming at evaluating the rate of access to kidney transplant beds as a representative of access to health services.

Methods

In this applied descriptive-analytical Study, the total number of kidney transplant beds was calculated to be 294 beds for all province of the country based on the documentary and reliable references of health ministry. Then, data was analyzed in proportion with population in each province according to the latest census statistics, using Gini coefficient and Excel 2007 software.

Gini coefficient or Gini index of inequality, which is extracted from the Lorenz curve, is the most widely used index of measuring justice in access to resources [2, 4]. Lorenz curve compares the distribution of a particular variable with identical distribution (the same variable), which shows the equality. As illustrated in Figure 1, in the Lorenz curve, X-axis stands for the cumulative population percentage and Y-axis shows the percentage of the variable which is expressed in proportion to population accumulation. The 45-degree line is called the equality line, due to displaying the perfectly equal distribution. As the Lorenz curve’s distance from this line increases, the inequality will increase [11].

In this study, X-axis was the cumulative percentage of the population based on the country provinces and Y-axis was the cumulative percentage of kidney transplant beds of provinces.

Gini coefficient is calculated based on the Lorenz curve and is obtained by dividing the surface trapped between the diagonal line and Lorenz curve by the whole surface below the diagonal line [12]. The numeric value of Gini index is between zero and one that “zero” shows complete equality and number “one” represents total inequality. In the case that the Gini index value is lower than 0.2, complete equality is observed in distribution. When the Gini index value is between 0.2 and 0.3, the equality in distribution is largely observed. Values between 0.3 and 0.4 show inequality in the distribution, values between 0.4 and 0.6 represent high inequality in the distribution and finally the values higher than 0.6 indicate the complete inequality [13, 14].

Results

Out of 294 beds in the country, 163 beds (55% of renal transplant beds) were located in Tehran (Table 1). In other words, Tehran had more than half of all kidney transplant beds. Meanwhile, this province has accommodated only 19% of the population of Iran. After Tehran, Khorasan-e-Razavi had the second place
having 21 kidney transplant beds and Khuzestan and Mazandaran jointly with 16 kidney transplant beds are in the third place. The average number of kidney transplant beds per million populations, was approximately 4 beds that in this regard, Tehran and North Khorasan were in the first place having the number of 12, Mazandaran was in the second position having 5 and Lorestan was in third place with 4.6 beds.

<table>
<thead>
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<th>Index</th>
<th>Population</th>
<th>Frequency of kidney transplant bed</th>
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<tbody>
<tr>
<td>Place</td>
<td>Number</td>
<td>Percent</td>
</tr>
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</tr>
<tr>
<td>Other</td>
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<td>81</td>
</tr>
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<td>70495782</td>
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</table>

Lorenz curve of kidney transplant beds shows an inequality in their distribution, with respect to the curve’s distance from the 45-degree line (Figure 1). Gini coefficient of kidney transplant beds was also calculated to be 0.43 based on the mentioned equation that in fact showed the inequality in the distribution of kidney transplant beds numerically and through the calculation of the ratio of the area of Lorenz curve distance from 45-degree line to the ratio of total area under the curve.

Diagram 1- Lorenz curve of kidney transplant beds in Iran

Discussion

As mentioned above, approximately 20% of the population possesses more than half of the kidney transplant beds, while the 80% remaining population have less than half of all kidney transplant beds. Definitely, the above-mentioned issues have compared the unequal distribution of kidney transplant beds in Tehran to other parts of the country, just for further comprehension. Overall, to show the inequality, the Lorenz curve was used that the extracted Gini coefficient geometrically and numerically, was representative (index) of the inequality rate of distribution. Analysis of the diagram 1 reveals that Lorenz curve of kidney transplant beds in the country is not superposed on the line of equality. So certainly, there is no complete equality in the distribution of kidney transplant beds in the country. Also looking at the Gini coefficient of inequality, one can also say that this inequality is statistically significant and since the calculated Gini coefficient is between 0.4 and 0.6, there is a significant inequality in the distribution of kidney transplant beds in Iran based on Gini and Lorenz indexes.

This fundamental point should be noted that hospital beds are the most important criteria for calculating other needed resources, including physicians, nurses and equipment. In the framework of calculating the number of needed nurses, the bed factor is used as a computational base. Therefore inequality in the distribution of kidney transplant beds implicitly includes inequality in the distribution of nursing and medical services. In general sense, unequal distribution of these resources makes inequality in access to treatment and care services. For investigating the reasons of observing such an inequality in the distribution of kidney transplant beds, the following issues can be cited:
- The referral system and providing more specialized services at higher levels
- The specialized nature of kidney transplant beds and the existing expertise in this field
- Lack of a comprehensive monitoring system of resource allocation, including physicians, nurses, beds and imaging diagnostic equipments
- Allocation of resources, regardless of geographical distribution in gaining access to services and solely based on the bargaining power of medical sciences university authorities

Although some parts of this inequality can be attributed to the referral system and provision of more specialized services at higher levels and the specialized nature of these services, however, studying bed per person also shows that this inconsistency is unreasonable despite considering the referral system and the specialized nature of services. In this field the last two reasons, i.e. lack of a comprehensive monitoring system of resource allocation and allocation of resources regardless of geographical distribution in gaining access to services, play a greater role.
Finally, establishing a system for comprehensive and continuous monitoring of allocation of health system resources, including the intensive care beds and manpower employed for providing diagnostic services is recommended as a part of justice in access to health services in Iran. In addition, with more attention to nurses (as the main sources of providing services), a study using the Lorenz curve, on the geographical distribution of nurses based on their specialty and unit and also the quality of available training is suggested across the country.

**Conclusion**
Geographic distribution of kidney transplant beds and subsequently kidney transplantation services is not equal in Iran and there is no distributive justice and consequently no equal access to these services. This problem has led to unequal allocation of other resources including nurses and deprivation of a great proportion of patients from the necessary services, which has led to massive transfer of critically ill patients along different provinces.

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**References**
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