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**STUDYING THE JUSTICE OF DISTRIBUTING MEDICAL HUMAN FORCE  
IN KERMANSHAH PROVINCE BASED ON GINICOEFFICIENT  
INDEX DURING YEARS 2006-2011**

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**Abstract**

**Introduction:** the aim of present research is to study the justice in distributing medical human force in Kermanshah Province based on index during years 2006-2011.

**Method:**

Present research is applicative and descriptive – analytical. Considering that the data related to the years 2006 -2011 are in a specific time during the past, therefore this is a longitude and historical research. Research society in this study includes all the medical human force including nurses, obstetricians, general practitioner, pharmacists, dentists and specialists.

Samples are in form of ensues from Iran statistic center and Ministry of Health and Medical Education's information technology and statistics management center and has been registered in information forms. The data was gathered by a form called fiche and Excel software was used to do the calculations.

**Results:**

The gini coefficient for the nurses variant during years 2006 to 2011 was equal to .447337, .454543, .456332, .457249, .457905, .449371. This amount for the obstetricians was equal to the following amounts during the six mentioned years of the study, respectively, .412894, .390148, .416362, .409499, .411633. this amount was also respectively equal to the following for the general practitioners 4115935, 401557, 416293, 412150, 412418, 398738 and was equal to the following amount for the specialists, respectively, .451770, .452371, .451055, .453712, .453692, .456367 and was equal to .443203, .445739, .448142, .461382, .463134 .438586 for pharmacists and finally the calculated gini coefficient for the dentists was respectively equal to 409416, .400297, .400588, .407787, .412601, .418977.

## **Discussion and conclusion:**

The rate of changes in studied variants during past six years was rather constant. The gini coefficient of studied variants during the study period was totally more than .35. Therefore we could say that the distribution of studied variants was rather unequal and the resources distribution condition was rather undesirable and it needs reconsideration and applying re-distribution policies.

**Key words:** justice, distribution of medical human force, gini coefficient index

## **Introduction**

Presenting medical and health services not only is dependent to the number and redundancy of human force but also other factors such as their work enthusiasm and more important the way distribution of resources happens in various areas of the country. Meanwhile, other resources existing in health section such as money, credit and also hospital beds and equipment's and buildings are considered to be complementary factors for human forces and the proper and enough number and distribution of these factors will lead to an increase in optimization of presenting health services to citizens (2). The issue of equality in distributing health resources and its effect on quality and quantity of presented services has long challenged health system policymakers and many issues have been discussed regarding to that. The importance of the right to have and enjoy these services in creating physical and mental health for doing social activities is very clear. Presenting clear and scientific policies to increase the level of health section resources and how these resources are devoted and distributed in health section is very important (2).

The quantity of the existing human force in all countries' health section is one aspect and the way we distribute them in various areas of the country considering population, Epidemiologic and nosology specifications is another aspect. The policy making in order to distribute human resources specially the medical force is among decisions which is done in state level and by each country's Ministry of health; and this fact has turned the documenting and proper distribution of that to a permanent concern for policymakers (3).

General performance of the health system not only is dependent on the existence of enough number and proper distribution of human resource but it is also dependent on the honesty of these two issues about other resources of the health section (3). The parallel and proper distribution of human force can be one of the effective factors on improving the health indexes in a country. So many problems exist for health system policy makers in relation to distributing the resources of treatment and health section that might lead to the lack of proper distribution of these important and strategic resources for the mentioned section (2). Though most determinants of the health are in an out

of reach area for the responsibility of medical and health section, there is no doubt that health and treatment systems play an important role on decreasing the inequalities.

This way, the systematic evaluation of social, political and economic condition related to inequality for editing the priority, analyzing, related suggestions related to the path and strategic planning required for favoring and enabling the society is considered to be effectively and properly critical (4). Human force is one of the most fundamental parts of the health and medical services. Planning the human force in a proper manner is most effective and acceptable action that would ease the satisfying and justified health care by proper usage of the employees. to present a proper service, not only we should consider the other effective human force but we should also consider it from two general aspect 1- proper quality of human force; which is affected by trainings, experiences and individual skills, his/her motivations and reward and punishment, 2- the proper quantity of human force affected by many factors such as the level of patients of the area, under cover population's medical and health behavior, number and how these health-medical centers are distributed, country's medical and health policies, decision makers massive health policies in using the human force, population growth and the regions' geography. Developing countries usually devote their resources in an unbalanced manner due to the issues such as lack of information, skill and expertise in planning health and medical programs.

Optimizing the health level with justified distribution of health services always had a special place in Iran and policy makers tried to fulfill this goal during planning for economic, social development plans. the issue of justice is one of the important measures for distributing resources and presenting health and medical services and the Alma-Ata declaration in 2000 emphasized on the supplying minimum medical services to fulfill the Universal Health organization goals, which means health for everyone and was one of the basic elements of paying attention to justice in distributing economic resources in health and treatment section congress. the health and treatment section needs to do a proper job in training and distributing human force in all health and medical service provider centers and in all places and times that society members might need due to the extension and importance of its goals to achieve health and justice for everyone (5).

The unequal distribution in health manufacturing institutions (such as doctors, nurses, hospital beds and ...) could affect the justice and equality for achieving the healthcare and creates the basis for inequality and injustice in receiving health service. One of the important pre-conditions to present healthcare is the relation between individuals that need help ad people providing it. If there is an optimized level of services, there must be the possibility of

presenting these services in location and time of need. the essential condition to reach required services are having the quantitative efficiency, proper geographic distribution, and lack of the presence of cultural, economic and educational obstacles for medical healthcare, quantitative efficiency refers to the proportion between medical and service staff and technologic facilities such as nurses, doctors, pharmacists and equipment pieces such as hospital beds (6).Justice is the axis of presenting service despite all its various concepts. The concentration should be on the justified distribution of services between various social groups (8, 9). Although it might seem difficult to answer the issues related to justice in health but these issues deeply effect on policymaking, resource devotion and generally the state and society's legal principles (7 & 10). Paying attention to vulnerable social groups while evaluating social needs and creating compensative mechanisms to solve individuals' health problems that have an undesirable condition is very important (7 & 9). in a report published by Universal Health Organization it is mentioned that Bangladesh with 11 nurses for each 100000 individuals and United states with 970 nurses for each 100000 of the population have respectively the lowest and highest nurse for population rate. This domain and high variety at indexes related to the number are ratio of human forces in various parts of a country or various countries of the world shows the noticeable structural differences in office of governor general related to the level of using human forces and the quality and quantity of presenting services (11). One of the ways to evaluate and study medical and health systems is to consider the condition of distributing human forces. . Determine hospital needs in relation to human force is a common problem in all hospitals (12). Results presented by Zangane& et al. showed that the gini coefficient for year 2001 – 2006 for nurses was respectively equal to .0274,.0940, .226, .002, .007and .402 (13). The numerical amount of dozen indexes is between 0 to 1. 0 shows the complete equality and 1 shows complete inequality (14). This scale has a more desired statistical character and there for enables us to evaluate the significance of the effect of political changes on the unequal distribution of profits or expenses (15). usually, if this index is between .35-.2, the distribution is balanced, between .5-.35, the distribution is rather unequal and in case it is between .5-.7, its totally unequal (16 & 17). Results of Zandian & et al in 2012 shows that gini index coefficient amount for specialist during years 2001-2009 was respectively equal to 52,53, 55, 56, 54, 56, 58, 58, 58. the process of inequality level among specialists has less fluctuation and in fact the process of distributing these doctors haven't changed much during these eight years; although this procedure had a decreasing path and a little decrease in level of inequality in regard to the distribution of work force is observed (18). Results presented by Shahabi & et al. (2010) showed that the gini coefficient in years 2001 -2006 for specialist was equal to the fallowing amount, respectively .0876, .0874,.0909, .0329,.0951 and .520

(19). Hiroshi & et al. showed in a study called “health inequality in Thailand: the geographic distribution of medical practitioners in Thailand Provinces by means of Lorenz curve and gini index” that there was an improper distribution of medical staff specially doctors (dozen index- .433) (20). Shin concluded in studying the geographic distribution of doctors in Japan that the distribution of hospital doctors based on gini index during years 1996 to 2006 wasn't good (21). Now considering the basis of this introduction we could say that present research's goal is to study the justice in distribution of medical human force in Kermanshah province by means of gini coefficient index during years 2006-2011.

## **Method**

Present research is practical and its method is descriptive- analytical. Considering that the data related to years 2006 – 2011 are related to a specific time in past, therefor this research is longitude and historical. The statistical society of present study includes human force of nurses, obstetricians, general practitioners, pharmacists, dentists and specialists. These forces had educational degrees of Ph.D., M.A, B.A and technicians in Kermanshah general or governmental hospitals which were evaluated based on their proportion to the society. Samples were gathered in form of census from Iran's statistics center and Ministry of Health, Treatment and Medical Education's information technology and statistics management center and were registered in Data forms. The data were analyzed based on this method: data was gathered by a form called research fiche and the Excel software was used to do the calculations. In analyzing the distribution of medical human force we used the dozen coefficient standard technique and the researcher completed the province's townships population in an increasing manner by means of data of the forms. It means that to obtain the gini coefficient we should first calculate the associative percentage of the population and associative percentage of human force working in various groups and then its coefficient is calculated by means of its dozen formulas.

Based on below table results show that the gini coefficient for nurses during years 2006-2011 was respectively equal to .447337, .454543, .456332, .457249, .457905, .449371. This amount (dozen coefficient) for the obstetricians variant during past six studied years was respectively equal to .412894, .390148, .416362, .409499, .411633, .408220. what's more this level for general practitioners variant was respectively equal to .398738, .412418, .412150, .416293, .401557, .415935 and for the specialist variant it was respectively equal to .456367, .453692, .453712, .451055, .452371, .451770 and for the pharmacists variant it was respectively equal to 409416, .400297, .400588, .407787, .412601, .418977.

**Results**

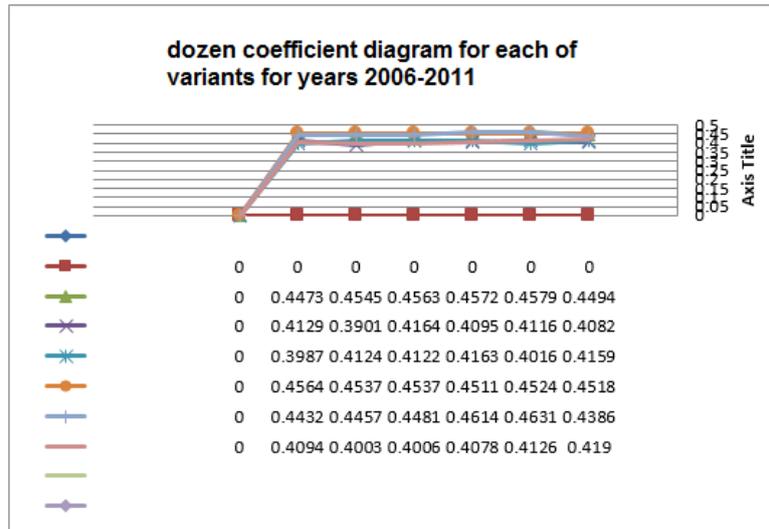
**Table 1: the redundancy distribution of general practitioners, specialists, nurses, obstetricians, pharmacists and dentists based on specialty type, population and active beds during years 2006-2011.**

| variant                 | Dozen<br>coefficien<br>t of 2011 | Dozen<br>coefficien<br>t of 2010 | Dozen<br>coefficien<br>t of 2009 | Dozen<br>coefficien<br>t of 2008 | Dozen<br>coefficien<br>t of 2007 | Dozen<br>coefficien<br>t of 2006 |
|-------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| nurse                   | 0.447337                         | 0.454543                         | 0.456332                         | 0.457249                         | 0.457905                         | 0.449371                         |
| obstetrician            | 0.412894                         | 0.390148                         | .416362                          | 0.409499                         | 0.411633                         | 0.408220                         |
| General<br>practitioner | 0.398738                         | 0.412418                         | 0.412150                         | 0.416293                         | 0.401557                         | 0.415935                         |
| specialists             | 0.456367                         | 0.453692                         | 0.453712                         | 0.451055                         | 0.452371                         | 0.451770                         |
| pharmacist              | 0.443203                         | 0.445739                         | 0.448142                         | 0.461382                         | 0.463134                         | 0.438586                         |
| dentist                 | 0.409416                         | 0.400297                         | 0.400588                         | 0.407787                         | 0.412601                         | 0.418977                         |

**Table 2: Gini coefficient calculated for general practitioners, specialists, nurses, obstetricians, pharmacists and dentists during years 2006-2011.**

| Number of<br>population | Number of<br>pharmacists | Number of<br>dentists | Number<br>of general<br>practitioners | number<br>of special<br>ists | Number<br>of obstetricians | of numero<br>f nurses | year |
|-------------------------|--------------------------|-----------------------|---------------------------------------|------------------------------|----------------------------|-----------------------|------|
| 1879385                 | 25                       | 55                    | 365                                   | 238                          | 352                        | 600                   | 2006 |
| 1885248                 | 19                       | 62                    | 330                                   | 217                          | 323                        | 941                   | 2007 |
| 1891612                 | 27                       | 64                    | 363                                   | 253                          | 376                        | 944                   | 2008 |
| 1941819                 | 27                       | 74                    | 403                                   | 273                          | 374                        | 1048                  | 2009 |
| 1905793                 | 28                       | 78                    | 420                                   | 272                          | 408                        | 1131                  | 2010 |
| 1945227                 | 37                       | 89                    | 440                                   | 294                          | 473                        | 1279                  | 2011 |

**Diagram 1: the gini coefficient calculated for general practitioners, specialists, nurses, obstetricians, pharmacists and dentists during years 2006-2011.**



based on the above diagram the level of gini coefficient for nurses variant related to 2011 was the highest, and then we have the variant of obstetricians of 2009, the general practitioners variant related to year 2008, the variant of specialists related to the year 2011, the variant of pharmacists related to year 2007 and the dentists variant related to the year 2006.

**Discussion and conclusion**

based on the research results, the location and the extension of each township of the province and the dispersion, volume, number of studied groups with different gini coefficient and distribution in other words the rate of variants change rate that were studied during six years were rather constant. The gini coefficient usually has a rather balanced distribution in case it's between .2-.35, rather unequal distribution if between .5-.35 and in case it's between .7 - .5, the distribution is totally unequal (16, 17). Considering that the gini coefficient of variants namely nurses, obstetricians, general practitioners, specialists, pharmacists and dentists in the study period were totally more than 35. Therefore we could say that the distribution of studied variants was rather unequal. The distribution condition wasn't that satisfying and requires re-evaluating and applying re-distribution policies. Results presented by Zandian & et al. (2012) shows that the amount of gini coefficient for specialists during years 2001 – 2009 was respectively equal to .58, .57, .58, .56, .54, .56, .55, .55, .53, .52. The procedure of inequality level among specialists had less fluctuation and in fact the condition of distribution of these doctors didn't change very much during past 8 years; although this procedure was generally decreasing and a little decrease was observed in inequality level of distribution in this work force (18). Hiroshi & et al. in a research titled inequality of health in Thailand: the geographic distribution of medical providers

in Thailand provinces by means of Lorenz curve and gini coefficient showed that there is an improper distribution among medical staff specially doctors (dozen index - .433) (20). Shin concluded in a study about the geographical distribution of doctors that the hospital doctors distribution wasn't good based on gini coefficient during years 1996 to 2006 (21) which is similar with present research. Findings presented by Shahabi& et al (2010) showed that the gini coefficient of years 2001-2006 for specialists was respectively equal to .0876, .0874,.0909,.0329,.0951And.0520 (19) which aren't similar with findings of the present research, in other words the results presented by Shahabi&et al. were less than .2 and therefor their distribution was rather justified. This difference is probably due to these facts that, first, there was no specific index for distribution of medical human force and second, the time period studied is different and there are also differences in regard to the studied population and society in comparison to present research. although, counting the number of human forces doesn't expresses greater availability and/or benefiting but we should have more detailed and extended planning's for devoting the human force in an optimized and justified manner based on need and availability to improve the presented services in an qualitative and quantitative manner. Therefor it is suggested to policy makers to change their attitude toward the distribution of resources and human resource in province level and apply more scientific and identical measures for distributing the resources and try to decrease the gini coefficient in future years.

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