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Original Article (Pages: 7241-7251)

A Study of Children's Geographic Access to Health Services (Health Care Centers and Clinical Laboratories) in Kermanshah City, Iran

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Abstract

Background

Given that the protection of children's health is of special importance due to their special age and physical conditions, the present study aimed to investigate the condition of children's Geographic access to health services (Health Centers and Clinical Laboratories) in Kermanshah city, Iran.

Materials and Methods: In this applied study, the research approach was descriptive-analytic using quantitative models in Geographic information system (GIS) environment. The statistical population was the whole population of young girls aged 0-14 years old in Kermanshah, Iran. Moreover, to evaluate the spatial deployment pattern of health services and the correct and true access of this group to such services, all data and information were collected through the Iranian Statistics Center and evaluated using the Arc-GIS Software. The latest published population statistics on the Population and Housing Census in 2011 were considered the basis for the analyses.

Results: The results of the present study demonstrated that more than 40% and 60% of the young girls aged 0-14 years old in Kermanshah were deprived of proper access to health centers and clinical laboratories, respectively. In terms of the status of children's access in the Second Scenario (access to health services by vehicles) and during 5, 10, and 15 minutes, about 5.53%, 93.1% and 15.1% lacked access to health centers, respectively. In addition, in terms of the status of children's access to clinical laboratories during 5, 10, and 15 minutes, 17.26%, 65.4% and 51% lacked access to clinical laboratories, respectively.

Conclusion: The access of young girls aged 0-14 years old to health services in Kermanshah was undesirable in the access to health services through walking. Additionally, the access of this group to health services in the access to health services by vehicles was far better than the first one.

Key Words: Geographic Access, Health Services, Iran.

*Please cite this article as: Reshadat S, Saeidi Sh, Zangeneh A, Ziapour A, Choobtashani M, Saeidi F. A Study of Children's Geographic Access to Health Services (Health Care Centers and Clinical Laboratories) in Kermanshah City, Iran. Int J Pediatr 2018; 6(2): 7241-51. DOI: **10.22038/ijp.2018.28872.2519**

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Received date: Dec.10, 2017; Accepted date: Jan. 22, 2018

1- INTRODUCTION

Today, the Millennium Development Goals are actually eight common goals agreed upon by the United Nations. These goals include eradicating poverty and hunger, gender equality and empowerment of women, improving the maternal health, combating Acquired Immune Deficiency Syndrome (AIDS), malaria and other diseases, environmental sustainability, global participation in development, providing universal primary education, and reducing child mortality (1, 2). Given their age, physical and mental status, preserving the children's health is much more different from that among other members of societies and they have their own special needs. According to World Health Organization (WHO), 1.6 million children die worldwide every year due to lack of access to safe drinking water and health facilities (3).

Research indicates that in Iran, maladaptation and maldevelopment are the most acute problems among children. For example, 7% of Iranian children suffer from developmental disorders (4-7), which can be largely reduced by providing appropriate health services. In the meantime, what appears to be a problem is the inadequate distribution of health services in third world countries (5). This imbalance in the geographic distribution of health services causes inefficiencies in the provision of services and causes inequalities in access to them (6). Access denotes relative ease of access to activities such as work, purchase, treatment, etc. from a given location (7).

In fact, favorable access to health services for all areas and districts denotes providing the right services at the right time and place. Moreover, there should be a positive relationship between the availability of health services and the provision of services to all areas and districts. Therefore, the policies towards the allocation of health care resources in the access of consumers to services and the equity in accessing services play positive roles (8). Promoting access to public health services plays an important role as a quality of life and social well-being index (9). Access can be investigated from various dimensions, such as economic, social, cultural and spatial (10). In this study, the potential spatial dimension of access (geographic access) is considered. Given the fact that proper access to health care for children allows for the prevention of many deaths, the necessity of strengthening the health care system to provide appropriate care at any time and place is strongly needed.

Further, achieving this goal certainly requires policymaking, planning and decision making at various levels of management, accurate statistics and information as well as accurate interpretation of the status quo. To this end, an appropriate tool for this goal is GIS, whose application has grown increasingly in the healthcare sector (8, 9). This tool has turned into a valuable tool to identify the access of vulnerable and deprived populations to health services. This tool can also help with planning, monitoring and evaluation of health systems (10-12).

Reviewing the previous studies in this field suggests that various models and indexes have been used to investigate access to health services (13-17). It should be noted that no studies have been undertaken about the children’s (0-14 years) geographic access to health services (Health Care Centers and clinical laboratories); no previous studies have been conducted so far about the children population using this method across Iran and Kermanshah, an indication that conducting the present research is necessary both in terms of the novelty of the subject under study and the target group in Kermanshah City. On the other hand, according to the statistics reported by the National Department of

Civil Status and Registration, the child mortality rate in Kermanshah (23.7%) is higher than the national statistics (17.1%)(18). Besides, Kermanshah City, like other Iranian cities, is faced with physical extension and proliferation of marginalization (19), thereby leading to the failure of the health care distribution system (20-23). Due to the above-mentioned reasons as well as the lack of statistics and information on young girls aged 0-14 years old access to health services in Kermanshah City, the condition of young girls' access to health services in Kermanshah City should be investigated. The present study aimed to investigate the condition of children's access to health services (health centers and clinical laboratories) in Kermanshah city, Iran.

2- MATERIALS AND METHODS

2-1. Study design and population

The statistical population of the present study was 81,450 young girls aged between 0 and 14 years old residing in Kermanshah city, Iran. The latest published population statistics on the Population and Housing Census in 2011 were considered the basis for the analyses. Given that the girls' population is of special importance for the continuation of the next generation and due to the existence of psychological, social problems, economic and health-related issues and the presence of some diseases in the city of Kermanshah, the present study aimed to focus on this group (24-34).

In the present research, first, the spatial and demographic data of Kermanshah city (data from the Population and Housing Census of Iran's Statistical Center in 2011 and the statistical blocks of Kermanshah city) were collected through the Iranian Statistics Center. Additionally, the information about the health services (e.g., the addresses of health centers and urban health bases) and clinical laboratory centers (e.g., independent laboratories, hospitals and clinics in two private and public sectors) were collected through City Health Center Kermanshah University of Medical Sciences. The statistical blocks of 2011 were used because the statistical blocks of 2016 have not been announced yet (https://www.amar.org.ir/).

2-2. Methods

In this study, two scenarios were considered for the radius of health services. In the first scenario, access to health services through walking was considered based on standard time. Given that the speed of a pedestrian in normal mode is between 1.75 to 0.75 m/s in the technical calculations of transportation (35), the average speed of a person accompanying a girls were considered, i.e., 1 m/s. According to the standard radius of access defined for health centers (750 meters), a 12.30-minute walking time was regarded as the basis for women from the place of residence to the health centers (20, 21, 36). In addition, as for clinical laboratories, with a 700-meter access radius, an 11.66-minute walking time was considered the basis (16, 17).

In the second scenario, access to health services was calculated considering a real time and through real passages. The criteria were vehicles and driving time (5, 10 and 15 minutes). To calculate the speed, the roads of Kermanshah were first classified into three main types: 1) main arteries with a maximum speed of 60 km, 2) streets with a maximum speed of 50 km, and 3) local routes with a maximum speed of 30 km. Then, the level of access to health centers was calculated using the driving time (5 minutes, 10 minutes and 15 minutes) with vehicles in the streets of Kermanshah.

2-3. Measuring tools

In this applied research, the research approach was descriptive-analytic using

quantitative models in Geographic information system (GIS) environment.

2-4. Ethical consideration

The study was approved in the Research Council and Ethics Committee of Kermanshah University of Medical Sciences, (Project number: 96226).

2-5. Inclusion and exclusion criteria

The inclusion criterion was young girls aged between 0 and 14, and the children over the age of 14 were excluded from the study.

2-6. Data Analyses

To evaluate the geographic access, all of the collected data and information were digitized using the network Analyze in the environment of Arc Map-GIS, and the location of the health services were identified on the statistical blocks.

3- RESULTS

According to the statistics collected from the Census of Population and Housing, Kermanshah city had a population of 851,405, of which 81,450 were young girls aged 0-14 years old (9.56%). Additionally, the statistics collected from Kermanshah University of Medical Sciences showed that there were 36 health centers and 47 clinical laboratories in Kermanshah city.

In **Table.1**, the statistics relating to the population of young girls aged 0-14 year-old with and without access to Health Care Centers are shown. The results of the present study indicated that 43.65% of the population of young girls aged 0-14 years old (35,561 individuals) were deprived of access to health care Centers, as opposed to 56.35% with proper access (45,889 individuals) (**Figure.1**).

The results of analyses relating to clinical laboratories showed that 60.87% (49,576 individuals) lacked access whereas 39.13% (31,874 individuals) had proper access to health care services (**Figure.2**).

Based on the second scenario in **Table.1**, the results of health centers indicated that with five minutes of driving, about 4,503 people (53.5%) had no access whereas 76,947 people (94.47%) had proper access to health care services. Furthermore, with ten minutes of driving, about 1,569 people (1.93%) had no access whereas 79,881 people (98.07%) had proper access to health care services. On the other hand, with 15 minutes of driving, 121 people (0.15%) had no access whereas 81,329 people (99.85%) had proper access to health care services (**Figure.3**).

In addition, in terms of the status of young- girl aged 0-14 year- old access to clinical laboratories during five minutes of driving, 17.26% (14,064 individuals) lacked access whereas 82.74% (67,386 individuals) had proper access to health care services. In terms of 10 minutes of driving, 4.65% (3,788 individuals) lacked access whereas 95.35% (77,662 individuals) had proper access to health care services. Furthermore, in terms of 15 minutes of driving, 0.51% (418 individuals) lacked access whereas 99.48% (81032 individuals) had proper access to health care services (**Figure.4**).

Table-1: The Number of young girls aged 0-14 years old with and without Access to Health Services in Kermanshah, Iran

Health Services	The walking time	Number	Percent	The driving time					
				5 minutes		10 minutes		15 minutes	
				Number	%	Number	%	Number	%
Health Care Centers	Population with Access	35,561	43.65	4,503	5.53	1,569	1.93	121	0/15
	Population without Access	45,889	56.35	76,947	94.47	79,881	98.07	81,329	99/85
	Total	81,450	100	81,450	100	81,450	100	81,450	100
Clinical Laboratory	Population with Access	49,576	60.87	14,064	17.26	3,788	4.65	418	0/51
	Population without Access	31,874	39.13	67,386	82.74	77,662	95.35	81,032	99/48
	Total	81,450	100	81,450	100	81,450	100	81,450	100

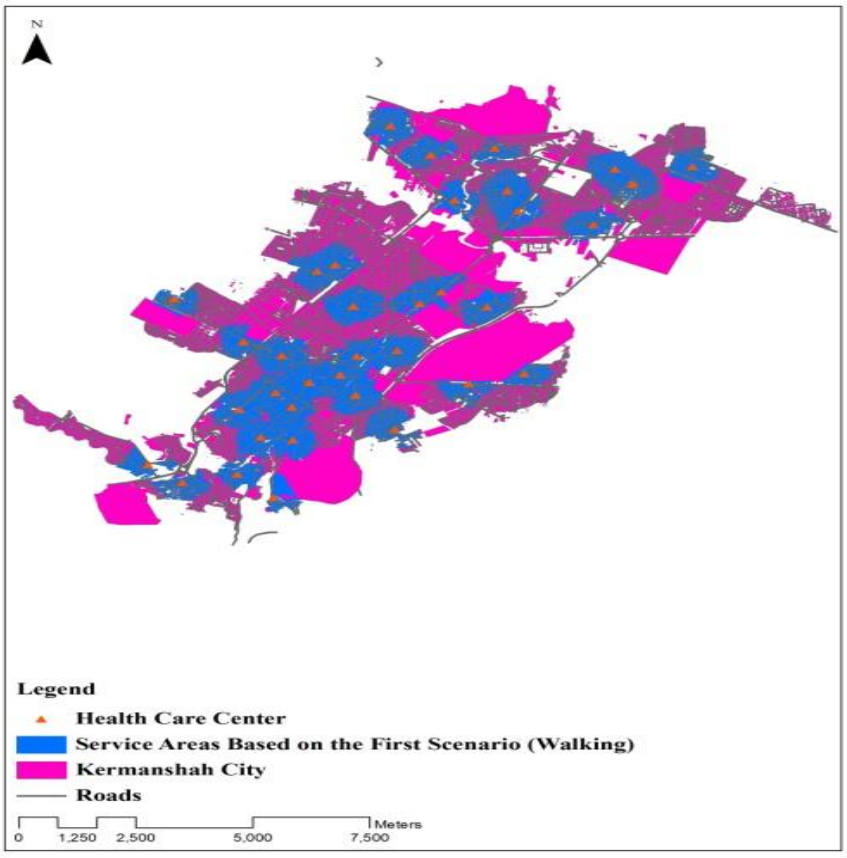

Fig.1: The Area Covered by Health Care Centers Based on the First Scenario (Walking), Kermanshah, Iran (Source: Iran's Statistical Center, 2011).

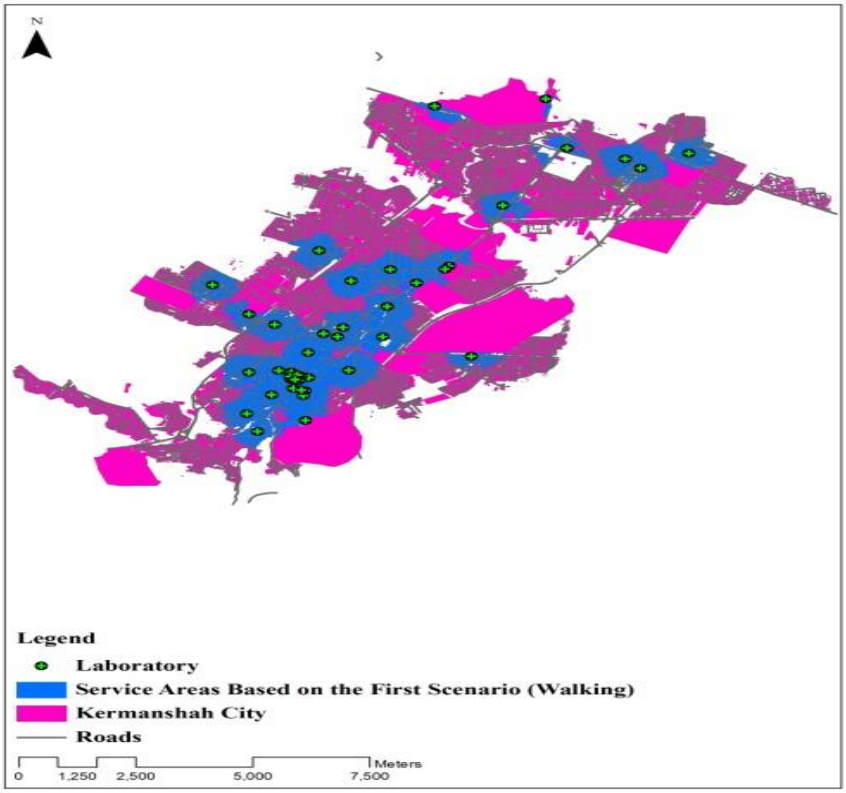

Fig.2: The Area Covered by Clinical Laboratories Based on the First Scenario (Walking), Kermanshah, Iran (Source: Iran's Statistical Center, 2011).

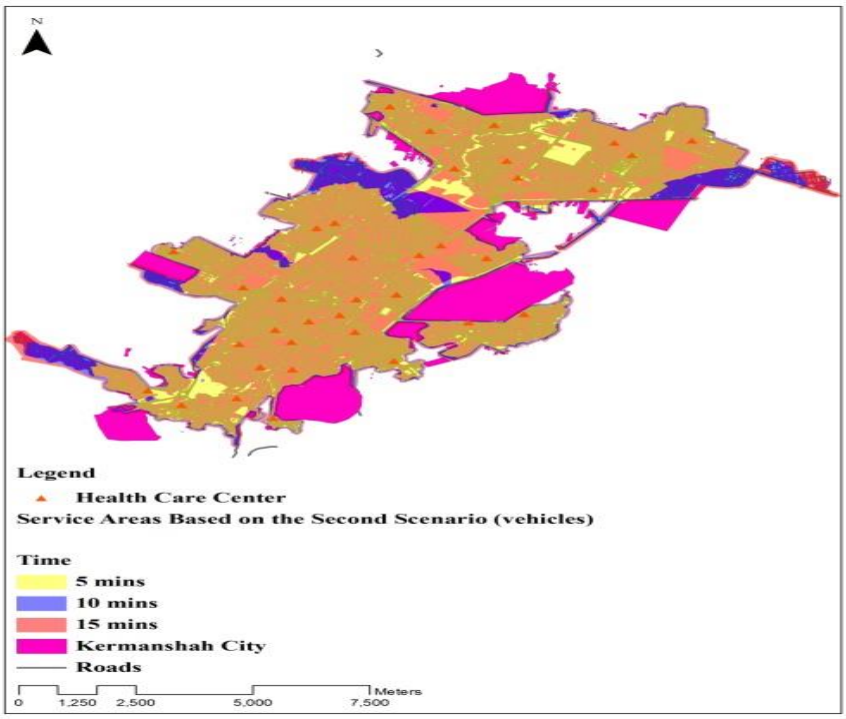

Fig.3: The Area Covered by Health Care Centers Based on the Second Scenario (vehicles), Kermanshah, Iran (Source: Iran's Statistical Center, 2011).

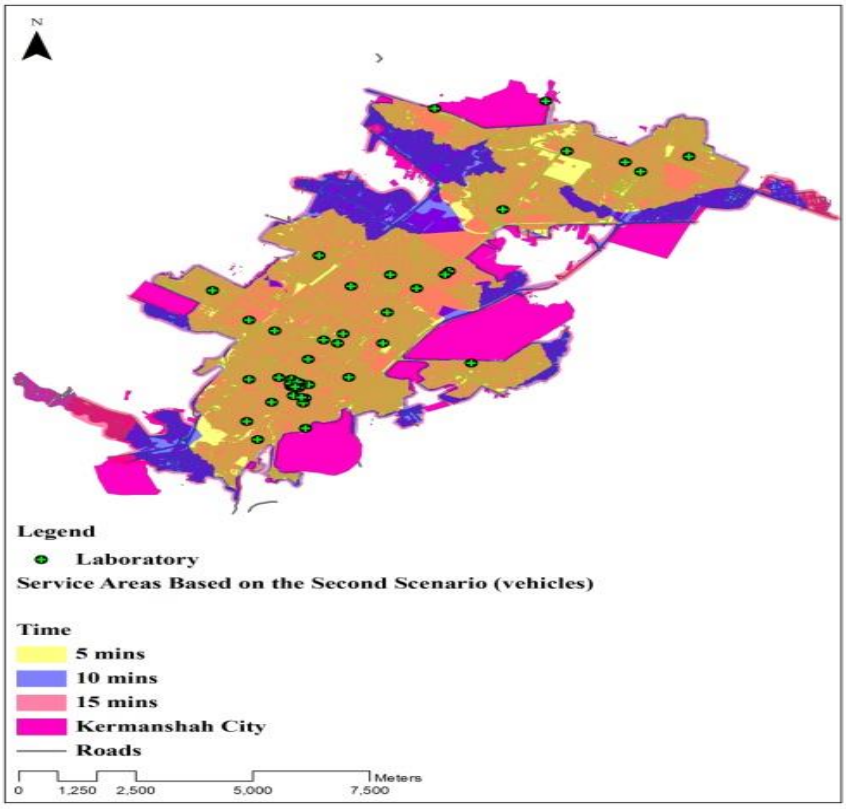

Fig.4: The Area Covered by Clinical Laboratories Based on the Second Scenario (vehicles), Kermanshah, Iran (Source: Iran's Statistical Center, 2011).

4- DISCUSSION

The present study aimed to investigate the condition of young girl's access to health services (health centers and clinical laboratories) in Kermanshah city, Iran. The results of the present study demonstrated that, based on the first scenario, 43.65% of the 81,450 young- girl aged 0-14 years old lacked proper access to health services in Kermanshah. This result was concurrent with the results of a study conducted by Allison and Manski (2007), in which the inappropriate access of children to dental care services was stressed (37). In addition, it seems that the difference between the Reshadat et al. (2015) (21), and the present one (37) is related to the target populations in both studies. In other words, the target population of the present study was 0-14 year-old and urban health centers were also studied in addition to health care centers. The presence of more than 43% of children without proper access to health care can damage communities, especially vulnerable ones, thereby spoiling the ecological and human structure of healthy cities. Not to mention, the urban health management system will witness inefficiencies in spite of allocation of big funds. The results of the present study indicated that more than 60% of children lacked proper access to clinical laboratory centers. This finding was consistent with the results of a study conducted by Sadighi et al. (2016) (38). This is important because in urban development projects, the per capita land is defined only for independent clinical laboratories, and the specialized medical laboratories are grouped under the "profitable services" section of the Iranian Supreme Council for Urbanism and Architecture and are not included in "the

therapeutic use" (39). As a result, the independent medical diagnostic laboratories (outside the hospital and clinic) comply with the rules and regulations of the business centers and are not subject to the rules and regulations for therapeutic applications, including budget definitions. This could be very important in discussing the health of the children's group, which should be taken into consideration by authorities. Based on the second scenario (access through vehicles), the results showed that using vehicles for 5, 10 and 15 minutes, about 5.53%, 1.93% and 0.15% of the total population of children lacked adequate access to health centers. In other words, at given times, more than 90% of children have access to health centers, which is considered an appropriate statistic in this regard. These results were not consistent with the results of studies done by Hu et al. (2013)(40), Ebrahimzadeh et al. (2010)(14), and Munoz (2012)(41).

This situation seems to be affected by the area of Kermanshah, which is about 10,000 hectares, and the number of health centers (36 centers) distributed throughout the city. In this regard, it is suggested that the first scenario be considered by policymakers (access to health-care centers through walking). In addition, in terms of the status of children's access to clinical laboratories during 5, 10, and 15 minutes, 17.26%, 65.4% and 51% lacked access to clinical laboratories, respectively. This means that Kermanshah has witnessed development in this field. These results were inconsistent with other studies (17, 23) because Kermanshah is a semi-developed province in terms of access to health care indexes (15, 23). Although the obtained results about the use of vehicles for children's access to clinical laboratories are acceptable, it should be noted that clinical laboratories should provide citizens with services at the district level, and the least permitted distance with other clinical laboratories and other applications should be observed (16). Accordingly, separate studies should be performed in this respect in the future. The status of access to health centers and clinical laboratories in Kermanshah is indicative of the inappropriate condition of access in the first scenario and appropriate access in the second one. Spatial location and investment patterns must be in a way that responds to the needs of all citizens living in neighborhoods. In cities like Kermanshah, in which there are fertility, AIDS and poverty hot spots (42-45), the concentration of services in one or more parts of the city exacerbates the effects of inequity, thereby resulting in abundant problems. To solve this situation, it is suggested to find a fair method for determining the need for different segments of society, and using efficient techniques such as GIS Software towards strengthening managerial decisions will largely solve this problem.

Given that one of the most important goals of the post-revolution economic-social programs has been the reduction of deprivation and elimination of inequalities among the different regions, and the fact that a decline has been witnessed in the development gap between the different regions during the Islamic Revolution, the present study intended to develop a relative balance in regional development.

As stated above, one the limitations of the present study was the lack of access to the statistical blocks of 2016. Therefore, the results may be different in the case of using the statistical blocks of 2016 (https://www.amar.org.ir/).

5- CONCLUSION

The access of young girls aged 0-14 years old to health services in Kermanshah was undesirable in the walking time. For example, more than 40% and 60% of the population lacked access to health centers and clinical laboratories, respectively. In

addition, the access of young- girl aged 0-14 years old to health services in the driving time was far better than the walking time. For instance, in terms of using vehicles for 5, 10, and 15 minutes, about 5.53%, 93.1% and 15.1% lacked access to health centers, respectively. Moreover, 17.26%, 65.4% and 51% lacked access to laboratories, respectively. The authorities in Kermanshah should take the required actions to change the spatial patterns of health services for children (health centers and laboratories), especially in relation to the walking time.

6- CONFLICT OF INTEREST

There is no conflict of interest to declare.

7- ACKNOWLEDGMENTS

The authors hereby bestow their gratitude to the staff of Kermanshah health center and the vice chancellery for treatment of Kermanshah University of Medical Sciences due to their spiritual and financial support.

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