

## Original Research Article

# A Study of Services Based on a University Hospital in terms of Area of Influence and Health Geography

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## Abstract

**Introduction:** The research was carried out in order to evaluate the impact area of the services offered by a university hospital and to determine the health problems of the people who presented to this hospital.

**Material and methods:** In line with the purpose of the research, this research was conducted as a record research. Data were expressed as numbers and percentages.

**Results:** It was determined that the university hospital provides services in different branches in the region where it is located, and the impact area of hospital services covers the Eastern Anatolia Region (99.4%) the most. It has been determined that its impact area is wider than other hospitals due to its wider opportunities than neighboring provinces in terms of transportation convenience, bed capacity, number of personnel and medical devices. As a result of the research, the most common diseases in the society were determined as adult emergency (10.59%), ophthalmology (5.03%), child emergency (4.32%), cardiology (3.81%), neurology (3.58%), ear-nose-throat (ENT) (3.54%), orthopedics and

traumatology(3.44%), dermatology (2.84%), gastrointestinal system diseases (GIS) (2.76%), gynecological diseases and obstetrics (2.34%) related diseases.

**Conclusion:** It has been observed that there is a large number of patients from other provinces around the university hospital where the research was conducted, and its impact area is wide. While it was determined that chronic diseases such as brain and nervous system and cardiovascular diseases, which have an increasing number all over the world are common in the region where the research was conducted; it was determined that the diseases related to ear, nose, throat and dermatology, which are affected by the climate of the region are common as well. It is recommended that similar studies should be carried out in a multidisciplinary manner in order to plan preventive health services related to chronic and climate-related diseases that are common in the region.

## Key words

Health, Public health, Geography, Illness, Domain.

## Introduction

Living environment and climatic conditions play an important role in the emergence of some diseases seen in the society [1]. While endemic diseases are seen in a certain geography are encountered, different diseases may occur (due to culture-specific diets and habits), which are influenced by the geographical conditions of the region and the cultural characteristics of the society [2,3]. Environmental conditions and geographical features are important determinants in the relationship between health and disease of individuals, since humans are a biopsychosocial being and are in constant interaction with their environment [2].

Geographical conditions are also effective in changing the course of some diseases or triggering them, as well as the emergence of some diseases. Because it is a known fact that the physical, chemical, biological and hydrographic conditions of the living area and the human and social characteristics of the society are effective in the formation of diseases. It is also known that the geographical conditions of the region, water resources, soil and air quality are the predisposing factors for the emergence of some diseases [4]. As an example, minerals and elements that mix from rocks to soil, from soil to water and thus to plants in a geographical region can be taken into the body through respiration or food chain; the amount of these minerals and elements taken can also be a determinant of

health and disease status [5]. In addition, the conjunctival flora being affected by climatic conditions [6], the excessive amount of fluoride in drinking water in the Eastern Anatolia Region causing the appearance of dark stains on the teeth [7], the fact that the water in some regions of Africa play a role in the emergence of river blindness (Onchocerciasis) disease in the region and the prevalence of malaria in regions suitable for the living of mosquitoes [8] are important examples that reveal the relationship between geography and the disease. Therefore, it is very important to determine the effect of geographical conditions on the health and disease status of individuals. At this point, in-depth research on the subject should be considered within the scope of health geography in a multidisciplinary framework.

Health geography is a science that investigates the relationship of the people between the physical, human and economic characteristics of the earth, the connections between them and the cause-effect relationships regarding their being sick or not, their birth and death of people living on earth [9]. Health geography is an area that makes significant contributions to living a healthier life, identifying and preventing health-threatening factors, and planning health services accordingly [10]. Health geography has been defined by Ozcaglar as “the branch of social geography that deals with the distribution of the diseases that occur in the geographical space as a

result of the interaction of the natural environment and human beings on the earth, the causes of their emergence, the amount of the population they affect and the health services carried out in a synthesis" [11].

Climate changes, the impact of which has been felt in recent years, are an important factor that directly or indirectly affects human life. Especially with global warming, significant changes in geographical features have brought along important changes in ecological life. With climate change, events that directly affect human health such as the melting of glaciers, the formation of strong hurricanes, the occurrence of strong destruction in the regions where hurricanes occur, and the decrease in water resources occur. However, depending on the changes in the geographical and seasonal characteristics of the vectors, malaria, dengue fever, and viral encephalitis increase, and the decrease in water and food sources with corresponding increase in water and food-borne diseases indirectly affects human health and causes an increase in the incidence of diseases [4]. In addition, it is an important finding that the semi-arid climate plays an important role in the epidemic of *Neisseria Meningitidis*, the only agent responsible for the formation of epidemic meningitis cases in the world, and that it peaks in the dry season, especially in November-April [12]. It is clear from the examples given above that there is a very close relationship between health, disease and geography.

A good analysis of the relationship between the concepts of health and disease and environmental conditions and geographical effects and the correct evaluation of these relationships can provide important data in the correct planning and implementation of preventive health services [13]. Because, evaluating and preventing the direct and indirect effects of geographical conditions on health and disease before they cause disease is an important predictor of public health [14]. As a matter of fact, the COVID-19 disease that emerged in 2020 has had devastating

political, economic and social effects in all countries as an important global epidemic that reveals the consequences of climatic changes and geographical displacement.

Health-related problems and developments have gained a global dimension in today's world, not just a situation that affects a place or a region [15]. For this reason, it is important to determine the causes, effects, course of various diseases and their various effects on individuals within the scope of health geography. Health geography guides the health planning studies carried out in order to distinguish diseases that develop depending on geographical conditions, to determine the factors that cause disease, to minimize health problems, to optimize the benefit of individuals from health institutions and organizations, and to contribute to public health. It is of great importance for the planning of public health services that more health geography researches, which are few, are carried out especially in order to protect health. Necessary evaluations will be facilitated by health geography researches so that health professionals working in primary care where preventive health services are offered can plan and deliver their services. In this context, with health geography researches, the most common diseases in the region are determined, the reasons arising from the region are revealed and it could be ensured that these causes can be eliminated with public health services and in case they cannot be removed, it can be ensured they can affect fewer people, they are diagnosed earlier and their complications can be prevented. For this reason, health geography studies, which will provide a proactive approach, are even more important in terms of public health nursing services. Because public health nurses provide preventive health services in primary health care services. For this reason, the results of studies in the field of health geography will be a guide for those working in the field of public health nursing. In particular, the aim of health geography, which is "to improve the health status of people living in the world and to minimize health inequalities" [9], constitutes its aspect similar to public health.

Both branches of science aim to protect and develop health and lead people to live a healthy life. The first tradition in health geography is the ecological tradition that explores the relationship between diseases and health and the environment. The second tradition is the approach where geography and the delivery of health services are used together for the protection of health, which includes the location of health services, accessibility to these services and the planning of health services [9]. In this study, it has been tried to do examinations in terms of these two traditions. Especially university hospitals are effective on the health of people in a wide geography because they generally have higher bed numbers. For this reason, this research, which will set an example for the health geography in Turkey, was conducted to determine the area of influence of the only university hospital in a province of the Eastern Anatolia Region of Turkey and the health profile of the society served.

## **Materials and methods**

### **Research Design**

The research was conducted as a descriptive record research. The presentations to the university hospital in 2007-2011 were the data basis of the study, and the diagnosis of the disease was also examined on the basis of the subject.

### **Research Place and Features**

The altitude of the plain where the province is located, which is an Eastern Anatolian Region city extending in the southwest-northeast direction, increases from south to north and varies between 950-1067 meters. The area covered by the plain is 35-36 km<sup>2</sup>. The province is adjacent to Bingol from the east, Malatya from the west, Tunceli from the north and Diyarbakir from the south. Due to the fact that they constitute the important agricultural and animal husbandry areas of Eastern Anatolia, the large settlements of the region that have gained or are gaining the city character have also been established and developed around these

depressions. The climate of the city, which has a transition climate between the continental climate and the Mediterranean climate, has changed due to the location of the city and the effect of the dam lakes, and temperate climate characteristics have begun to be seen in the recent years. In this province, there is a university hospital, which is a large and comprehensive hospital in the region. The university hospital provides services like a regional hospital due to its equipment, health professionals and location.

### **Data Collection and Evaluation**

The data of the study were obtained from the records containing patient applications between the years 2007-2011 obtained from the IT department of a university hospital. Number and percentage distributions were used in the evaluation of the data. During the research, graphics and tables were made by means of various computer programs, and the impact area and the health profile of the population were revealed.

### **Ethical Aspect of the Study**

Written permission was obtained from the relevant institution in order to conduct the research in the university hospital.

## **Results**

### **Demographic and Health Characteristics of Patients presented to the UH**

#### **Distribution of Individuals by Age Groups**

When the age distribution of patients presented to the UH was examined, it was determined that the majority of them were adults (**Table - 1**).

#### **Distribution of Patients by Gender Groups**

It was observed that there was no difference between the gender distribution of the patients who presented to the university hospital. It was determined that female patients came to the obstetrics and oncology departments intensively. Although it is not regular in the last five years, it is seen that the number of applications of female patients is higher than the number of applications of male patients (**Table - 2**).

**Table – 1:**Distribution of Patients by Age Groups.

Age Groups	YEARS					
	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)	Total n (%)
Children (0-14)	32080 (9.65)	42195 (14.45)	52412 (17.54)	58771 (18.24)	54094 (17.33)	239552 (15.38)
Young (15-25)	68816 (20.70)	24265 (8.31)	30278 (10.13)	36456 (11.31)	38428 (12.31)	198243 (12.73)
Adult (26+)	231520 (69.65)	225501 (77.24)	216112 (72.33)	227054 (70.45)	219638 (70.36)	1119825 (71.89)
<b>Total</b>	<b>332.416 (100)</b>	<b>291.961 (100)</b>	<b>298.802 (100)</b>	<b>322.281 (100)</b>	<b>312.160 (100)</b>	<b>1.557.620 (100)</b>

**Distribution of Individuals by Outpatient Clinic and Services They Applied**

It was determined that the highest number of applications were made to the adult and pediatric emergency service units of the hospital. Considering the distribution of patients coming to outpatient clinics; it was determined that the most commonly applied polyclinics were adult

emergency (10.59%), ophthalmology (5.03%), child emergency (4.32%), cardiology (3.81%), neurology (3.58%), ear-nose-throat (ENT) (3.54%), orthopedics and traumatology(3.44%), dermatology (2.84%), gastrointestinal system diseases (GIS) (2.76%), gynecological diseases and obstetrics (2.34%) related diseases (**Table - 3**).

**Table – 2:** Distribution of Patients by Gender Groups.

Gender	Years				
	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)	2011 n (%)
Female	188920(56.83)	129075(44.21)	163545(54.73)	164121(50.92)	168405(53.95)
Male	143496(43.17)	162886(55.79)	135257(45.27)	158160(49.08)	143755(46.05)
<b>Total</b>	<b>332416(100)</b>	<b>291961(100)</b>	<b>298802(100)</b>	<b>322281(100)</b>	<b>168405(100)</b>

**Table – 3:**Distribution of Patients to Clinics / Outpatient Clinics by Years.

CLINICS / OUTPATIENT CLINICS	2007 n(%)	2008 n(%)	2009 n(%)	2010 n(%)	2011 n(%)	Total n(%)
Eye Diseases	14427 (4.34)	17000 (5.82)	18341 (6.14)	14149 (4.39)	14382 (4.61)	78299 (5.03)
Cardiology	9566 (2.80)	13269 (4.54)	11355 (3.80)	12474 (3.87)	12662 (4.06)	59326 (3.81)
Ear, Nose, Throat	7947 (2.30)	10251 (3.51)	9742 (3.26)	13285 (4.12)	13969 (4.47)	55194 (3.54)
Neurology	7330 (2.20)	10663 (3.65)	10538 (3.53)	13856 (4.30)	13452 (4.31)	55839 (3.58)
Orthopedics Traumatology	8768 (2.60)	11916 (4.08)	10749 (3.60)	11596 (3.60)	10580 (3.39)	53609 (3.44)
Dermatology	7144 (2.10)	8409 (2.88)	7627 (2.55)	10814 (3.36)	10200 (3.27)	44194 (2.84)

Gastroenterology	5978 (1.80)	8365 (2.87)	7582 (2.54)	10298 (3.20)	10827 (3.47)	43050 (2.76)
Gynecology and Obstetrics	7206 (2.10)	9046 (3.10)	7000 (2.34)	7146 (2.22)	6010 (1.93)	36408 (2.34)
General Emergency	18794 (5.60)	32028 (10.97)	36672 (12.27)	37303 (11.57)	40158 (12.86)	164955 (10.59)
Child Emergency	6723 (2.00)	10572 (3.62)	14475 (4.84)	16550 (5.14)	18929 (6.06)	67249 (4.32)
Endocrinology	5791 (1.70)	7019 (2.40)	7648 (2.56)	8278 (2.57)	8376 (2.68)	37112 (2.38)
Physical Therapy Rehabilitation	5755 (1.70)	6730 (2.31)	5939 (1.99)	6066 (1.88)	5600 (1.79)	30090 (1.93)
Psychiatry	5663 (1.70)	7440 (2.55)	7763 (2.60)	8568 (2.66)	7200 (2.31)	36634 (2.35)
Urology	5579 (1.60)	10245 (3.51)	8443 (2.83)	9150 (2.84)	9176 (2.94)	42593 (2.73)
Clinics	215745 (64.90)	129008 (44.19)	134928 (45.16)	142748 (44.29)	130639 (41.85)	753068 (48.35)
<b>Total</b>	<b>332416</b> <b>(100)</b>	<b>291961</b> <b>(100)</b>	<b>298802</b> <b>(100)</b>	<b>322281</b> <b>(100)</b>	<b>312160</b> <b>(100)</b>	<b>1557620</b> <b>(100)</b>

**Table – 4:** Area of Domain by Regions (2011).

Regions	n(%)
Aegean	133(0.04)
Black Sea	150(0.05)
Central Anatolia	216(0.07)
Mediterranean	310(0.10)
Marmara	329(0.11)
Southeastern Anatolia	593(0.19)
Eastern Anatolia	310429(99.45)
<b>TOTAL</b>	<b>312160(100)</b>

#### Area of Domain of the University Hospital

When it comes to the area of domain, it is seen that one of the most important factors is transportation. In this context, it is extremely important to what extent transportation facilities affect urban functions. By following the north of the wide arc drawn by the Southeast Taurus Mountains, its various plains are naturally connected with each other. This system, which includes cities on its large plains and towns and villages on its small plains, is connected to the Gulf of Iskenderun, Kahramanmaras, Malatya, Elazig, Bingol and Mus.

Located on the roads and crossings connecting Anatolia to Iran and the Far East, this city, in addition to its favorable conditions and convenient location, has also served as a trade center of a large region for a very long time.

#### Area of Domain by Regions

It has been observed that the university hospital accepts individuals / patients from every region of Turkey. When analyzed regionally, it was determined that the highest number of individual/patient applications to the hospital were made from the Eastern Anatolia Region (**Table - 4**). It can be said that this situation stems from the location of the UH in the region, the fact

that it is a more equipped hospital compared to the surrounding provinces, and that it has the characteristics of a regional hospital.

## Discussion

Environment is an important determinant of health. With this point of view, concept of health and illness has a direct or indirect relationship with each other and its environment. The disease phenomenon arises as a result of the incompatibility of the environment and the human organism, as well as genetic and physiological characteristics [9]. For this reason, health geography is a field that focuses on examining the effects of the environment on human health and helping people live a healthier life. In this study, it was aimed to determine the prevalence of the diseases seen in the province where the research was conducted, based on the applications to the hospital. At this point, it was determined that the most commonly applied outpatient clinics in the region were ophthalmology, neurology, ENT, cardiology, orthopedics, dermatology and GIS diseases, respectively. From this point of view, it can be said that patients who apply to the UH are more at risk for chronic diseases. These results are similar to the increasing number in chronic diseases seen all over the world and in Turkey. According to the data of the Turkish Statistical Institute (TUIK), it is reported that circulatory system diseases are the leading causes of death in 2018 and 2019 [16]. Again, according to TUIK 2019 data, it is stated that deaths due to circulatory system diseases are below Turkey's average in Batman, Agri, Sirnak, Van and Hakkari provinces, and these diseases are among the ten provinces where these diseases are seen the least. In addition, Erzurum and Agri are among the provinces with the highest number of deaths due to benign and malignant tumors, which are the second causes of death and the provinces with the lowest incidence are Mardin, Siirt, Sirnak, Hakkari and Sanliurfa [17]. Although a comparison cannot be made about the mortality rate, it can be said that there is a similarity between the causes of illness and death

in the region and the application to the hospital outpatient clinics in the region where the research was conducted.

Chronic diseases are diseases that cause a slow and progressive deviation, irreversible changes in normal physiological functions, cover a long period of life, and require continuous medical care and treatment. Chronic diseases can also be defined as non-communicable diseases (NCD), that is, diseases caused by genetic predisposition, lifestyle or environmental exposure that are not caused by an infectious agent [20]. NCDs such as cardiovascular diseases, diabetes, obesity, some cancers and chronic respiratory system diseases constitute important problems affecting human health. These diseases are the cause of many deaths every year and it is predicted that they will continue to be [21, 22]. According to the results of the research, it is seen that female patients apply to outpatient clinics and emergency services more than male patients, although it is not regular in the last five years (**Table - 2**). In the Turkish Household Health Survey Risk Factors of Non-Communicable Diseases (2017), it was determined that men are at higher risk than women. In this respect, the results of the research are not similar to the sample of Turkey [23]. It can be said that this may be due to the fact that women apply to obstetrics and gynecology outpatient clinics for fertility reasons and are followed up for a period of 9 months. In addition, the reason for the increase in women's applications can be explained by the increase in the incidence of diseases such as uterine and breast cancer, which have an important place among gynecological diseases in recent years.

“Chronic diseases are among the most common causes of death worldwide and in Turkey (Source). It can be said that with the demographic aging of the population in Turkey in recent years, the increasing incidence of chronic health problems and the fact that the increase will continue will pose a threat to the country's health system in terms of various risks in the future. The treatment and care of these diseases is important in terms of preventing disease-related

complications and reducing disability and death” [22]. In terms of public health nursing, the increase in chronic diseases is an important public health problem. For this reason, nurses working in this region should intervene to prevent the emergence of these diseases and advocate for the development of health policies specifically for this region. In individuals where these diseases cannot be prevented, interventions should be made to prevent complications. Public health nurses provide services to the society by taking a role in rehabilitation services in case of complications in chronic diseases. These initiatives of public health nurses also serve the goal of health geography to lead people to a healthier life. In addition, it would be beneficial for health geographers or multidisciplinary teams to investigate the environmental effects on the prevalence of chronic diseases in this region. It is emphasized that these studies will be important in terms of developing national policies and long-term strategies in the fight against risk factors of chronic diseases [23]. It is a group of diseases that require urgent intervention because the negative effects of non-communicable diseases on the health system are constantly increasing and they threaten socioeconomic development. Because these diseases consume a significant part of the country's health resources and constitute an obstacle to development (Public Health Institution of Turkey, 2017). Reducing the threats to the economic, social, environmental and public health of NCDs stands out as an important topic in the Multi-Stakeholder Action Plan for Non-Communicable Diseases of Turkey (2017-2025) [23]. As this research reveals, it is important at this point to place public health nursing practices in the fight against NCDs.

Within the scope of the research, it was seen that the UH affected the Eastern Anatolia region the most. This finding shows that the UH is an important hospital especially for the provinces in Eastern Anatolia. Considering that transportation is the most important factor that plays a role in determining the impact area of hospitals, it is seen that the ease of transportation of the UH stands out. The wide area of domain reveals that

the services to be provided in this hospital are important among other provinces in the Eastern Anatolia Region. In fact, it turns out that it is necessary to provide service to a region with a single hospital.

## **Conclusion**

As a result of the research, it is a center of attraction since it is further ahead than neighboring provinces in terms of transportation convenience, bed capacity, number of personnel and medical devices. The UH, where the research was conducted, is one of the most important health institutions in the Eastern Anatolia Region. It has been determined that it is a hospital with a wide impact area, as it has more facilities in terms of transportation convenience, bed capacity, number of personnel and medical devices compared to neighboring provinces. It is observed that the patients mostly presented to emergency, ophthalmology, cardiology, neurology, ear-nose-throat (ENT), orthopedics and traumatology, dermatology, gastrointestinal system (GIS) and gynecology and obstetrics outpatient clinics, respectively. Health geography provides research on the causes and distribution of diseases, as well as on the planning and provision of health services. Research in these two areas is interlinked and supports the development of health policy. Based on the polyclinic presentations determined as a result of the research, it is thought that it is necessary to focus on the provision of preventive health services for chronic diseases. Considering the effects of this hospital on the surrounding provinces; it is foreseen that the reorganization of health services in a preventive and improving direction will contribute both to the consequences of these diseases and to the reduction of the costs of health services in this region. It is recommended that further research should be conducted to determine why women are more likely to present to the UH. Again, it is recommended to plan researches to be conducted by health professionals and geographers in order to examine the common problems in the region from a geographical point of view.



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