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## Determinants of Access to Healthcare: A Survey in Istanbul

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# **DETERMINANTS OF ACCESS TO HEALTHCARE: A SURVEY IN ISTANBUL**

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## **Determinants of Access to Healthcare: A Survey in Istanbul**

### **Abstract**

Access to healthcare is formed according to the characteristics of the supply and demand. While siting hospitals, 'equity' in access to healthcare should be taken as a basis for all segments of society, and necessary measures should be taken to ensure that vulnerable groups benefit from health services adequately. This necessitates evaluating spatial and non-spatial dimensions of access to healthcare together. Spatial dimension emphasizes importance of the distance whereas non-spatial dimension includes factors such as level of income, educational attainment level, culture, ethnicity, age and sex.

In this paper, results of the survey conducted on 756 households in Istanbul were put to evaluation within the framework of the dimensions of the access to healthcare; spatial patterns of the access to inpatient services in Istanbul were examined over the survey results.

Dimensions of the access to healthcare put forward the level of access as well. Results of the survey show that different dimensions of the access to healthcare are effective with various degrees in hospital choices. However, as the level of income changes, so does the hospital preferences. Middle and low income groups have more limited budget for healthcare services and ownership of personal car is less frequent, so demand elasticity is lower compared to the high and high-middle income groups. Therefore, 'accessibility' and 'affordability' dimensions of the access come to the fore for middle and low income groups while 'acceptability' is cared more by the high and high-middle income groups.

The paper also deals with the relationship between supply characteristics and travel time / travel distance accepted and realized for going to hospital in Istanbul. According to the international practices and literature, the maximum travel time for access to hospital is accepted generally as '30 minutes', which turns out to be parallel with the survey results. However, the realized travel distance differentiates based on the type (public, private) and nature (regional-local) of the hospital. Distance covered for regional hospitals (training and research hospitals and university hospitals) and travel rate outside the district are higher than the distance covered for local hospitals. Similarly, distance covered for private hospitals is more than the distance made for public hospitals.

The paper not only evaluates the spatial and non-spatial factors together, but also considers health supply in various aspects, reveals user behaviors which change depending on the type of the supply and the characteristics and the pattern of the city, and defines distance thresholds and border-crossing according to these features.

**Keywords:** Access to healthcare, affordability, spatial accessibility, distance, İstanbul

## **1.Introduction**

‘Raison d’être’ of a healthcare system is realizing the objective of ‘being more healthy’. Development of healthcare systems requires the simultaneous consideration of the supply and demand for healthcare services and therefore, the improvement of the access to healthcare and health coverage based on the needs and expectations of the demand. ‘Access to healthcare’ is a broad concept which expresses different dimensions of the relation between the supply and demand, and it deserves to be examined in further detail.

In comparison to the studies which focus on the spatial aspect of access to healthcare (Luo, Qi: 2009, Loh et al.. 2009, Guagliardo et al., 2004, Luo and Wang, 2004, Fortney et al. 2000, Delamater et al. 2012, Kara and Egresi, 2013, Hare and Barcus 2007), studies which evaluate the spatial and non-spatial factors together (Wang and Luo, 2005; Goodman et al. 1997, Liu et al. 1999, Buchmueller et al. 2005) are less in number. Also, differentiation of access to healthcare by type of disease (Chan v.d. 2006, Govind v.d. 2008) and urbanization (Hiscock et al., 2008, Chan et al. 2006). has been researched. However, questions such as how the methods utilized in measuring spatial accessibility differ between the cases which are examined (degree of urbanization, socio-economic characteristics, etc.), how the expected value of spatial accessibility differs according to the disease or the type of healthcare services, what the acceptable supply-demand rate should be, how the relation between the spatial dimension of access and other non-spatial dimensions (accommodation, affordability and acceptability) should be established, the effects of change in spatial accessibility on the health of society, etc. are yet to be answered, and new studies are necessary to provide answers to these questions (Guagliardo, 2004: 3-4).

Istanbul metropolitan area is selected as the focus of this study. Studies also which address accessibility to health care(Kara and Egresi, 2013) and spatial distribution of healthcare facilities (Şentürk v.d. 2011) in Istanbul are limited in number and extent. This study contributes understanding the pattern of access to healthcare in Istanbul.

The paper is divided into four sections. Following the introduction, the second section of the article identifies the notion of access to healthcare is examined in detail with its spatial or non-spatial dimensions, and the spatial aspect and the distance problem were addressed. Subsequently, results of the field survey conducted with the participation of 756 households in Istanbul are evaluated in terms of the different dimensions of access to healthcare, and spatial patterns of access to inpatient services in Istanbul were examined according to the survey results.

## **2.Access to Healthcare: Scope and Dimensions**

Detailed discussions and explanations were made about definition and scope of ‘access to healthcare’ (Penchansky and Thomas, 1981: 127; Guagliardo, 2004: 2). It is caused by the fact that access to healthcare is a multi-dimensional and complex concept which depends on the characteristics of the supply (healthcare system) and demand (population) (Delamater et al, 2012: 3). Since supply and demand are not equally distributed, some spatial differences are inevitable in terms of access to healthcare as the location of the supply (health professionals, health facilities, etc.) and demand (population which benefits from healthcare services) directly affect access to healthcare (Luo and Wang, 2003: 865).

Researchers addressed the notion of access to healthcare with two approaches: in terms of process and dimensions of the access (Guagliardo, 2004: 2).

In terms of process, there are two different stages in accessing healthcare. The first stage, “potential access”, refers to the population which needs and have the opportunity to access healthcare services, and the “realized access” defines the population who actually benefits from healthcare services (examination, diagnosis, analysis, treatment, etc.) (Guagliardo, 2004: 2).

Loh et al. claim that in addition to “potential accessibility”, actual utilization of healthcare facilities by real users/patients should also be calculated while siting healthcare services. According to them, potential accessibility and actual utilization are respectively important for designating whether healthcare services are distributed ‘equally’ (distance of residential areas to healthcare facilities, ratio between the number of hospital beds and population, etc.) and whether these services are utilized efficiently (access of the population at risk to the healthcare services, etc.) (2009: 181).

In order to ensure that the population in need of healthcare services can benefit from them, in other words in order to turn the potential into actual utilization, some obstacles should be eliminated. These obstacles put forward the dimensions of access to healthcare as well. Travis et al. (2004: 901) classify the constraints which hinder access to healthcare as financial obstacles (payment difficulties and informal payments, etc.) and physical obstacles (distance to healthcare facilities, etc.).

Penchansky and Thomas (1981: 128-129) define five different dimensions to access to healthcare as follows: availability, accessibility, accommodation, affordability and acceptability. According to Khan (1992), two of the factors of access to healthcare, namely availability and accessibility, indicate the spatial dimension, and the remaining three factors show the non-spatial dimension of access to healthcare (Delamater et al (2012: 3). Spatial dimension emphasizes importance of the distance – as an obstacle or facilitator – while non-spatial dimension deals with issues such as level of income, culture, ethnicity, age and gender. Two spatial dimensions (availability, accessibility) of access are combined and the concept of ‘spatial accessibility’ is widely used in the literature (Luo and Wang, 2003: 865; Guagliardo, 2004: 2).

In addition to the healthcare supply in a specific settlement (medical institutions with and without beds, health professionals, etc.), access to healthcare is shaped based on the healthcare supply in the neighboring settlements, distance between these settlements and ease of travel (Luo and Wang, 2003: 866).

Distance is discussed in detail almost in each study which refer to access to healthcare because of the time/distance-depending nature of healthcare. According to many researches (Goodman et al. 1997; Jones et al 1998; Hare and Barcus 2007; Hiscock et al., 2008, Chan et al., 2006, Buchmueller et al. 2006) the longer the distance to healthcare facilities is, the less these facilities are utilized and the higher the incidents of death in emergency are.

In the studies on spatial accessibility, different methods such as Euclidean distance (straight line) (Kara and Egresi, 2013; Guagliardo, 2004; Guagliardo et al. 2004), travel distance (Buchmueller v.d., 2006) and travel time (Luo and Qi, 2009, Hiscock v.d., 2008; Wang and Luo, 2005, Luo and Wang, 2003) are used to measure the distance. In some researches, the two or three of them are employed together (Chan v.d., 2006, Govind v.d., 2008, Fortney et al 2000).

According to Bosanac et al. (1974), the maximum travel time to access a non-emergency healthcare service is accepted as 30 minutes in many countries around the world (Loh et al., 2009:175). Similarly, researchers who adopt the ‘travel time’ for measuring the distance, generally accept the distance traveled in 30 minutes as a threshold (Fortney et al., 2000: 176, Luo and Wang, 2003: 867).

In order to explain the connection of accessibility with socio-economic status, ‘social distance’ and ‘physical distance’ are differentiated as well. Those who advocate that physical distance cannot be a dominant factor when measuring accessibility, suggest the ‘social distance’ concept which signifies the change in the level of access to services as a result of socio-economic status (Berkman, 1994:37, Vaguet, 2008: 107).

### 3. Dimensions of Access to Healthcare in Istanbul: An Evaluation of the General Hospitals

In order to examine dimensions of the access to healthcare facilities in overall Istanbul based on the supply and demand characteristics, a survey was conducted on 756 households in 21 districts.<sup>1</sup> According to the survey results, relation between the supply characteristics and hospital preference will be examined over five dimensions of access to healthcare mentioned above (availability, accessibility, accommodation, affordability and acceptability).

In addition, changes in distance thresholds and border-crossing of patients will be explained via trips to different types of hospitals.

The respondents of the survey were directed questions about the name of the hospital they frequently visit and why they prefer these hospitals. Following these open-ended questions, some criteria were listed, and the respondents were expected to make an assessment according to Likert scale in the form of ‘not important at all’ - ‘not important’ – ‘somewhat important’ – ‘important’ – ‘very important’.

In response to the question which inquired about **the reasons behind their hospital preferences**, 60.3% of the respondents stated that the main reason behind their hospital preference is proximity to their houses. This shows that the most important factor is existence of a hospital in an accessible location (spatial accessibility). The following most important reason is quality of the doctors. 11.2% of the respondents were not contented with the closest hospital but embarked on a quest of doctors with desired qualifications. The third most important reason is being satisfied with the services of the relevant hospital. This indicates the relation between hospital-patient(‘consumer’). Furthermore, it is a critical result since it reveals the “private sector” dimension of healthcare services. It is apparent in the table that all dimensions of access to healthcare have different levels of importance for the participants of the survey.

However, hospital preferences were observed to differ based on income groups (One-way ANOVA:  $F:6.733$ ,  $sig:0.000$ ). According to Duncan test, hospital preference reasons of the upper and upper-middle income groups are similar. For the low income group, effect of proximity increases to 69.1% , while it decreases to 49.7% for upper income group. Reliability of the hospital, insurance and qualification of the doctors are considered more by the upper and upper-middle income groups compared to the middle and low income groups.

Following this question, various preference criteria were listed to the participants of the survey, and the respondents were asked to assess these criteria by indicating a value between 1-5. According to these, ‘price’ turned out to be the most important criterion. The most important reason why ‘price’ was not expressed in the open-ended question is that the respondents generally prefer the hospitals which fall under the coverage of their insurance, so they do not consider the amount to be paid for healthcare services at the first instance. Most of the individuals who provided the response, as ‘because it is close to my house’ to the open-ended question above are evaluated to mean the ‘closest public hospital’ when evaluated together with other questions of the survey.

‘Hygiene’ was the second most important criterion, and this indicates that the absence of hygienic conditions in a hospital, which is supposed to grant ‘health’, is unacceptable.

The third criterion is ~~is-~~trusting the doctor. This also emphasizes the significance of trust in doctors to whom individuals entrust their lives and secrets.

In the five-point assessment, dimension of accessibility was inquired about from three different aspects. Proximity to the main transport axis and important public transportation

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<sup>1</sup> The survey was financed by the Rectorship of Istanbul Technical University- Department of Scientific Research Projects (BAP) and GENAR Research Company was assigned to conduct the surveys. Surveys were made between 28.08.2013 and 15.09.2013; 65 surveys which were decided to be renewed after the preliminary evaluation were conducted again between 13-15.12.2013.

stations proved to be more important than proximity to the house. This finding provides evidence on how critical transportation issue is in Istanbul.

Response options regarding acceptability dimension indicate similar meanings, therefore their preference rates are close to each other.

Among the preference criteria inquired on a five-point Likert scale, ‘price’, ‘cleanliness’, ‘trust to doctor’, ‘specific recommendation of the doctor’, ‘proximity to main transportation axis’ and ‘proximity to metro/metrobus/tram stops’ have meaningful differences based on income levels. The criteria listed are more important for the middle and low income groups.

### 3.1. Non-spatial dimension of ‘access’: Affordability

Among the non-spatial dimensions of access to healthcare, ‘affordability’ is the most important for the respondents. This dimension of access was investigated further in the field survey, and results were classified by income groups.

Participants of the survey were inquired about **the maximum amount they can spend for examination, diagnosis and treatment**. The amounts can go up to TRY3,500 in some of the households. However, the average values were calculated as TRY20, TRY35 and TRY227 for examination, diagnosis and treatment, respectively. Significant differences were ascertained between the amounts spent by different income groups. Average values between TRY9-33, TRY16-68 and TRY96-344 were found for examination, diagnosis and treatment, respectively, from the lowest income group to the highest. According to the Duncan test, middle and low income groups exhibit similar behaviors in terms of the amount spent on examination; the highest income group differs from the rest in terms of the amount spent on diagnosis, and the lowest and highest income groups clearly differ from the other groups in terms of the amount spent on treatment.

Participants of the survey were also inquired about the **average monthly healthcare expenses of their households (including private health insurance, if any, insurance cost)**. According to the findings of the research, the average monthly health expenses are TRY226. This expense item varies between TRY130-415 in different income groups. As suggested by the Duncan test, the lowest and highest income groups greatly differ from the others. Table 1 shows the average healthcare expenses per month and the acceptable upper expense limits.

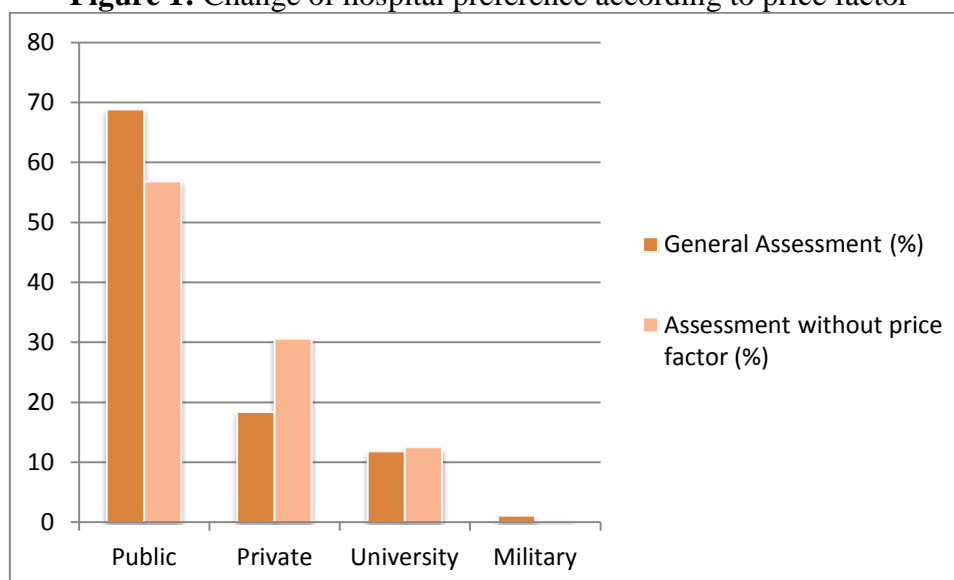
**Table 1:** Acceptable and realized healthcare expenses according to income groups

INCOME GROUPS	ACCEPTABLE UPPER EXPENSE LIMIT (average, TRY)			MONTHLY AVERAGE HEALTHCARE EXPENSE (TRY)
	FOR EXAMINATION	DIAGNOSIS (Analyses, X-ray, etc.)	TREATMENT (Operation, delivery, etc.)	
Low income group	9	16	96	130
Low-middle income group	12	29	259	179

Middle income group	15	33	216	220
High-middle income group	32	35	242	227
High income group	33	68	344	415
<b>TOTAL</b>	<b>20</b>	<b>35</b>	<b>227</b>	<b>226</b>

56.8% of 710 families who responded to the question that seeks **the change of hospital preference depending on the chance to go any hospital free of charge** said they would prefer a public hospital even then; 12.5% and 30.6% preferred university hospitals and private hospitals, respectively (Some of those who answered this question directly indicated the name of a hospital, some of them simply answered as ‘public’, ‘private’ or ‘university’). As seen in Figure 1, 12% of the individuals shift from public to private when the price factor is disregarded. The reason to why the differentiation continues on this level can be explained through the fact that public hospitals are more equipped in comparison to many private hospitals and through personal habits/lifestyle.

**Figure 1:** Change of hospital preference according to price factor



### 3.2. Spatial Accessibility

It was mentioned in the previous chapter that ‘spatial accessibility’ is used to express two spatial dimensions (accessibility and availability) of the access to healthcare.

The most important measure of accessibility is ‘distance’. In order to measure distance, different methods such as Euclidean distance, travel time and travel distance are used.

Participants of the survey were asked **the average travel time they spend for going to hospital (one way)**, 86.5% of 745 households who answered the question stated to arrive hospital within 0-30 minutes; 13.3% within 30-60 minutes and only 0.3% more than 1 hour. However, the duration can vary based on the vehicle used for transportation (One-way ANOVA, F:14.081, sig:0.000). As presented in Table 2, the group with the highest flexibility of travel time is those who prefer public transportation. Personal car follows public transportation. Using commercial taxi or walking are not generally preferred for travels which last more than 30 minutes.



**Table 2:** Comparison between the average travel times spent for going to hospital and vehicle used for transportation

TYPE OF VEHICLE	AVERAGE TRAVEL TIME		
	0-30 minutes	31-60 minutes	More than 1 hour
Private car	88,2%	11,3%	0,5%
Taxi	98,0%	2,0%	0,0%
Mass transportation	74,3%	25,7%	0,0%
Hospital shuttle	83,3%	8,3%	8,3%
On foot	98,6%	1,4%	0,0%

Respondents were also inquired about **the maximum travel time that can be borne for going to a hospital** to which 89% of them answered as between 0-30 minutes. In international standards and literature, the maximum time which is acceptable for accessing a hospital is 30 minutes, and this is in parallel with the results of the survey.

79.7% of 651 households which provided an answer to the question on **the maximum travel distance that can be borne for going to a hospital** stated 0-5 km as the acceptable distance; while 10% said 5-10 km, 5.5% said 10-20 km and 3.5% said 20-40 km. The rate of those who stated that they travel more than 40 km to reach a hospital is only 12%.

Respondents were also requested to name the hospital which they frequently visit and the travel distances between the district where the survey was conducted and the district where the corresponding hospital is located were calculated separately. Then, outliers were eliminated for each hospital type and maximum, minimum and average travel distances were calculated for the most frequented hospitals. As seen in Table 3, individuals of the households who participated in the survey cover maximum 14.4 km to go to any hospital. The maximum travel distance is higher to access teaching and research hospitals and university hospitals.

**Table 3:** Distance covered for the most frequented hospital by hospital type

HOSPITAL TYPE	FREQUENCY (number of patients) **	THE COVERED DISTANCE (km)*			Travel within the district (%)	Travel outside the district (%)
		Min.	Max.	Average		
Public (Teaching and Research Hospitals)	1231	0,9	23,6	5,91	41,2	58,8

Public (State Hospitals)	703	1,2	8,8	2,91	94,7	5,3
Private Hospitals	350	0,9	11,6	3,06	61,8	38,2
University Hospitals	97	1,1	18,4	6,17	35,1	64,9
Private Univ. Hospitals	58	1,1	19,5	4,93	58,6	41,4
Military Hospitals	1	1,4	1,4	1,4	100	0
<b>TOTAL</b>	<b>2440</b>	<b>0,9</b>	<b>14,4</b>	<b>4,02</b>	<b>59,7</b>	<b>40,3</b>

\*These are the results of the calculation made after the outliers are excluded.

\*\*Outliers are included in the number of patients as well. But those who specified the hospital type without stating the name of it are not included.

Maximum distance which is travelled in relation to the hospital type provides clues on if patients prefer the hospitals located within their districts. Observing the travel rates within/outside the district based on hospital type; trips outside the district are higher for teaching and research hospitals and university hospitals (Table 5). This reveals the regional nature of these two hospital types.

In the 21 districts where the survey was conducted, separating the travels of the patients to the general hospitals within the district borders and to the hospitals outside the district borders is critical to reveal the relation between the demand and supply. These travel patterns shows that **number of hospital beds (availability) and hospital diversity (public-private-university)** are the most prevalent factors which determine the travels outside the district. In addition to this, **location of the district and travel distance to other districts (accessibility)** are other important factors which affect trips outside the district.

Another finding is that **border crossing of the patients** is quite high in districts close to each other. In addition to distance thresholds stated above according to the hospital type, it was also observed that the Bosphorus constitutes an important threshold for the travels made to hospitals.

#### 4. Conclusion

Health is ‘among the most important conditions of human life and a critically significant constituent of human capabilities which we have reason to value’ (Sen, 2012: 660). Therefore, one of the most important indicators of an effective healthcare system is that people in need of healthcare services can access these services on a sufficient level.

The main components listed above and their interrelation defines the scope and dimensions of the access to healthcare. In the paper, it is also pointed out that the spatial and aspatial dimensions of access which are necessary for turning the potential into real utilization. In the spatial dimension, the importance and variations of the distance and distance thresholds are remarked.

Results of the field survey conducted with 756 households in Istanbul show that different dimensions of access to healthcare are effective at various degrees in hospital choices. However, as the level of income changes, so does the hospital preferences. Middle and low income groups have a limited budget to reserve for healthcare services and ownership of personal car among these groups is less frequent, so demand elasticity is lower in comparison to the upper and upper-middle income groups. Therefore, accessibility and affordability dimensions of access are more important for middle and low income groups while acceptability is more important for upper and upper-middle income groups.

The characteristics of supply characteristics are also determinants in hospital preferences. Distance covered to access regional hospitals (teaching and research hospitals and university hospitals) and travel rate outside the district are higher than the distance covered to access local hospitals. Likewise, distance covered for private hospitals is more than the distance covered to access public hospitals.

While selecting a site for hospitals, the multi-dimensional characteristic of access to healthcare should be analyzed in detail; the relation between the needs and preferences of the demand and availability and the diversity of the supply should be taken into account by decision-makers.

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## REFERENCES

- Berkman, G.** (1994). *Geography of health and location of health facilities in Ankara*, METU Faculty of Architecture Press, Ankara.
- Buchmueller, T.C.; Jacobson, M.; Wold, C.** (2006). How far to the hospital? The effect of hospital closures on access to care, *Journal of Health Economics* 25 : 740–761.
- Chan, L.; Hart, L.G.; Goodman, D.C.** (2006). Geographic access to health care for rural Medicare beneficiaries, *Journal of Rural Health*, 22(2):140-6.
- Delamater, P.L., Messina, J.P., Shortridge, A.M. and Grady, S.C.** (2012). Measuring geographic access to health care: raster and network-based methods. *International Journal of Health Geographics* 11 (15)
- Fortney, J., Rost, K., Warren, J.,** (2000). Comparing alternative methods of measuring geographic access to health services. *Health Services and Outcomes ResearchMethodology* 1 (2), 173–184.
- Goodman, D.C.; Fisher, E.; Stukel, T.A.; Chang, C.** (1997). The distance to community medical care and the likelihood of hospitalization: Is closer always better? *American Journal of Public Health*, 87: 1144-50.
- Govind, R.; Chatterjee, R. ve Mittal, V.** (2008). Timely access to health care: Customer-focused resource allocation in a hospital network, *International Journal of Research in Marketing* 25: 294–300.
- Guagliardo, M.** (2004). Spatial accessibility of primary care: concepts, methods and challenges. *International Journal of Health Geographics*, 3(3):1–13
- Guagliardo, M.F.; Ronzio, C.R.; Cheung, I.; Chacko, E.; Joseph, J.G.** (2004). Physician accessibility: An urban case study of pediatric primary care. *Health and Place* (10) : 273-283.
- Hare, T.S. and Barcus, H.R.** (2007), Geographical Accessibility and Kentucky's Heart-Related Hospital Services. *Applied Geography*, 27 (3-4), pp. 181-205.
- Hiscock, R.; Pearce, J.; Blakely, T. and Witten, K.** (2008). Is Neighborhood Access to Health Care Provision Associated with Individual-Level Utilization and Satisfaction?, *Health Services Research*, 43(6): 2183–2200.
- Jones, A.P.; Bentham, G.; Harrison, B.D.; Jarvis, D.; Badminton R.M. and Warenham, N.J.** (1998). Accessibility and Health Service Utilization for Asthma in Norfolk, England. *Journal of Public Health*, 20 (3), pp. 312-317.
- Kara, F., Egresi, I.O.** (2013). Accessibility to Health Care Institutions: A case study by using GIS, *International Journal of Scientific Knowledge*, 3(4), 16-25.
- Liu, Y.; Hsiao, W.C.; Eggleston, K.** (1999). Equity in health and health care: the Chinese experience, *Social Science & Medicine*, 49 1349-1356
- Luo, W.; Qi, Y.** (2009). An enhanced two-step floating catchment area (E2SFCA) method for measuring spatial accessibility to primary care physicians, *Health & Place* 15: 1100–1107.

- Loh, C.A., Cobb, S.C. ve Johnson, C.K.** (2009). Potential and Actual Accessibility to Hospital and Hospital Services in Northeast Florida, *Southeastern Geographer*, 49(2) ss. 171–184.
- Luo, W., Wang, F.** (2003). Measures of spatial accessibility to healthcare in a GIS environment: Synthesis and a case study in Chicago region. *Environment and Planning B*, 30(6):865-884.
- Penchansky, R. and Thomas, J.W.** (1981). The Concept of Access. *Medical Care*, 19(2):127-140.
- Sen, A.** (2002). Why Health Equity, *Health Economics*, 11, pp.659-666.
- Şentürk, T. , Terzi, F. ve Dokmeci, V.** (2011). Privatization of Health Care Facilities in Istanbul, *European Planning Studies*, 19:6, 1117-1130.
- Travis, P.; Bennett, S.; Haines, A.; Pang, T.; Bhutta, Z.; Hyder, A. et al.** (2004). Overcoming health systems constraints to achieve the Millennium Development Goals. *Lancet* 364 :900-6.
- Vaguet, A.** (2008). One model may conceal another: models of health geographies, in ed. Guermond, Y. *The Modeling Process in Geography*, pp.101-112, Wiley Press.
- Wang, F.; Luo, W.** (2005). Assessing spatial and nonspatial factors for healthcare access: towards an integrated approach to defining health professional shortage areas, *Health & Place* 11: 131–146.