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Contents

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Causes of Obstruction in the Outpatient Department of National Hospital, Sri Lanka: A Qualitative Study

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ABSTRACT

Sri Lanka is a country with a well-established healthcare system in South Asia. The National Hospital, Sri Lanka (NHSL), located in Colombo, is the country's largest hospital and final referral centre, with a bed occupancy rate of 75% and an average length of stay of 3.7 days.

The OPD of the National Hospital of Sri Lanka (NHSL) has been overburdened with the problem of congestion. The goal of this study is to figure out what's causing the congestion at NHSL's OPD and what can be done about it. The approaches employed were key informant interviews with important stakeholders, focus group discussions, desk evaluation of secondary data, and direct observation of OPD operations. The deputy director, OPD, medical officer-in-charge, and nursing sister in charge of the unit were all interviewed by the primary investigator. Twelve randomly selected medical officers and ten nursing officers with a minimum of one year of work experience at the OPD participated in two focus group talks. Secondary data was obtained through a desk review of the admission book and OPD monthly statistics. The data was triangulated using direct observation.

The NHSL OPD treats around 690,000 patients each year. On a daily basis,

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the average number of OPD patients is around 1900. A doctor at NHSL's OPD examines 36 persons every hour on average. As a result, the consultation time is restricted to 1.6 minutes, which is insufficient. The Ishikawa diagram was used to investigate the root causes of congestion. The fundamental causes were identified as poor layout arrangements, doctor delays, and a quota system of examinations, non-availability of the patient information management system, lack of a good referral mechanism, and a higher amount of staff patients.

The major recommendations of this study to reduce congestion at OPD, NHSL, included improving the layout of OPD in a unidirectional manner, advising doctors to start duties on time, abolishing the quota system of examination, establishing a computer-based patients' registration system, establishing a laboratory within OPD, and establishing two more counters at OPD pharmacy.

Keywords: Outpatient Department, Congestion, Waiting Time, Patient Care Process

INTRODUCTION

Sri Lanka is a country with a well-established healthcare system in South Asia. The government hospitals under the Ministry of Health in Sri Lanka provide the majority of curative services and 345 public health areas are called "MOH offices" providing preventive care services. The National Hospital Sri Lanka, Colombo is the largest hospital in Sri Lanka and the final referral centre in the country consisting of 3404 beds and the bed occupancy rate is 75% with 3.7 days of average lengths of stay. The National Hospital has 18 well-equipped intensive care units and 17 high dependency units which are located at each major care-providing sector such as the surgical department and the medical department. There are 19 surgical operation theatres. It is the training centre for undergraduates and post-graduate trainees of the faculty of Medicine (NHSL, 2015).

Outpatient care is defined as medical care or treatment that does not require an overnight stay in a hospital or medical facility (Andria, 2018). Since the outpatient department (OPD) is the first contact point of the hospital to the community, and more patients use its facilities than inpatient care, it is one of the most important departments in the hospital. The OPD must be placed with other sections of the hospital to deliver the best possible care to patients. The physical arrangement of the OPD is very important. It should allow the free flow of patients in one direction

to minimize the congestion (Ministry of Health, 1995).

OPDs are considered as the gateway to hospital services and a patient's impression of the hospital initiates at the OPD. This impression often influences the patient's image of the hospital and therefore it is mandatory to ensure that OPD services provide reasonable care for customers. It is also well-established that around 10 percent of OPD patients need hospitalization. When the number of patients in OPD increases, congestion will result. Congestion renders doctors see more patients in each period. Consulting more and more patients by the available number of doctors will increase the doctor-patient ratio, thus reducing the consultation time at OPD. Furthermore, this creates long queues at OPD. Waiting time has its own opportunistic cost to the patient. With increasing waiting time, the cost of waiting will go high, and the effectiveness of consultation may reduce. At this point, the authorities must employ more doctors to bring down waiting time. Another option is to "speed up" the consultation, i.e. shorten the time spent on treatment. Speeding up consultations, on the other hand, will have a negative impact on diagnosis and therapy (Adisak and Higgins, 2012).

Hospital managers made several steps to make OPD a responsive place for patients. Establishing a reception counter near the entrance, unidirectional patient flow, and building spacious public areas, easy accessibility from other units, catering to patients with different physical abilities, placing units providing ancillary services at OPD to minimize cross traffic are some of the solutions (Gupta, 2007). Congestion in healthcare institutions is a common event also in Sri Lanka. Ministry of Health noticed that congestion is observed at larger hospitals while underutilization in primary care hospitals (Jayamanne, 2010).

To minimize the congestion and waiting time at OPD: the hospital management should streamline all processes at OPD. This process improvement must be done in the clinical process, management process, and ancillary process. When all these processes are streamlined, we can expect to observe the minimized waiting time and the congestion. OPD of the National Hospital of Sri Lanka (NHSL) also faces the problem of congestion. The media has discussed much of this (Wijewardena, 2010). This study aims to identify the causes of congestion at OPD of NHSL and provide solutions.

Therefore, this study was conducted to identify the causes of congestion and solutions for it and thereby improve the service delivery, decision making on patient management at OPD of NHSL, Sri Lanka.

METHODOLOGY

This descriptive cross-sectional study was conducted in 2018 at OPD, NHSL, Sri Lanka. Key informant interviews, focus group discussions (FGD), the desk review of secondary data, and direct observation, were used as study instruments. All study instruments were pretested at District General Hospital, Kalutara.

Administrative clearance for the study was obtained from the deputy director-general, NHSL, deputy director, OPD. Since patients were not included in the study and it was conducted as a part of the quality improvement process of OPD, NHSL, ethical approval was not required.

The principal investigator used the validated interview guide to conduct key informant interviews with the deputy director, medical officer-in-charge, and nursing sister in charge of the OPD. Two focus group discussions were conducted, with 12 medical officers working in OPD and 10 nursing officers respectively. The focus group discussions were conducted on separate dates, and each discussion was last for 1 hour. Study participants with a minimum of one year of work experience at the OPD were selected out of all officers.

Discussions were conducted by the principal investigator in both English and Sinhala languages (first language) according to the participant's preference. The key informant's interview guides, formats for FGDs were predesigned and validated considering the ministry of health guidelines and circulars (Ministry of Health, 2012). Qualitative data were analyzed by using the content analysis method. All responses of key informants and participants of focus group discussions were audio recorded and transcribed by using the Jefferson transcription. Transcriptions were returned to the participants for comment and correction. Then, initial coding of data, arranging them into descriptive categories, subcategories, main categories were carried out. Finally, a narrative summary of the main finding was prepared. Secondary data was gathered from a desk review of the admission book of OPD, monthly statistics of OPD with the use of a checklist.

The process of service delivery of OPD was directly observed by all three investigators separately at randomly selected periods with the objective of triangulation of data gathered from key informants and focus group discussions. The observation was conducted during random 21 days from 8 am to 4 pm.

The time for data collection was discussed with the medical officer in charge, OPD, and the nurse in charge of OPD. Focus group discussions were conducted on 21st and 23rd August 2018 and key informant interviews were arranged on 28th, 29th, and 31st August 2018. Every possible measure had been made to prevent the disruption of routine works of OPD and interviews and focus groups were arranged between 4.00- 5.00 pm. All participants were given a brief introduction before the study. The participants were provided enough time to answer the questions and they were provided the contact details of the investigators and asked to contact them for any clarifications. Written administrative clearance for the study was obtained from relevant authorities.

The deficiencies and problems identified by the participants were prioritized by using standard priority techniques, and those identified as major problems were selected for further discussions and analysis.

RESULTS

The desk review and observations revealed the following data. About 690000 patients are treated annually in OPD of NHSL, Sri Lanka and the average number of OPD patients per day is about 1900. The average number of admissions per day was 653 in 2018. General OPD of the NHSL functions from 7.00 am. to 8.00 pm. Forty (40) medical officers are working in OPD and they start consultation of the patients at 7.00 am. Usually, a doctor at OPD of NHSL examines 36 patients per hour. Therefore, consultation time is limited to 1.6 minutes which is highly inadequate. Other than medical officers, there is an in-charge nursing officer and nurses as well as minor staff members. The process of service delivery at OPD, NHSL, Sri Lanka is given in Figure 1.

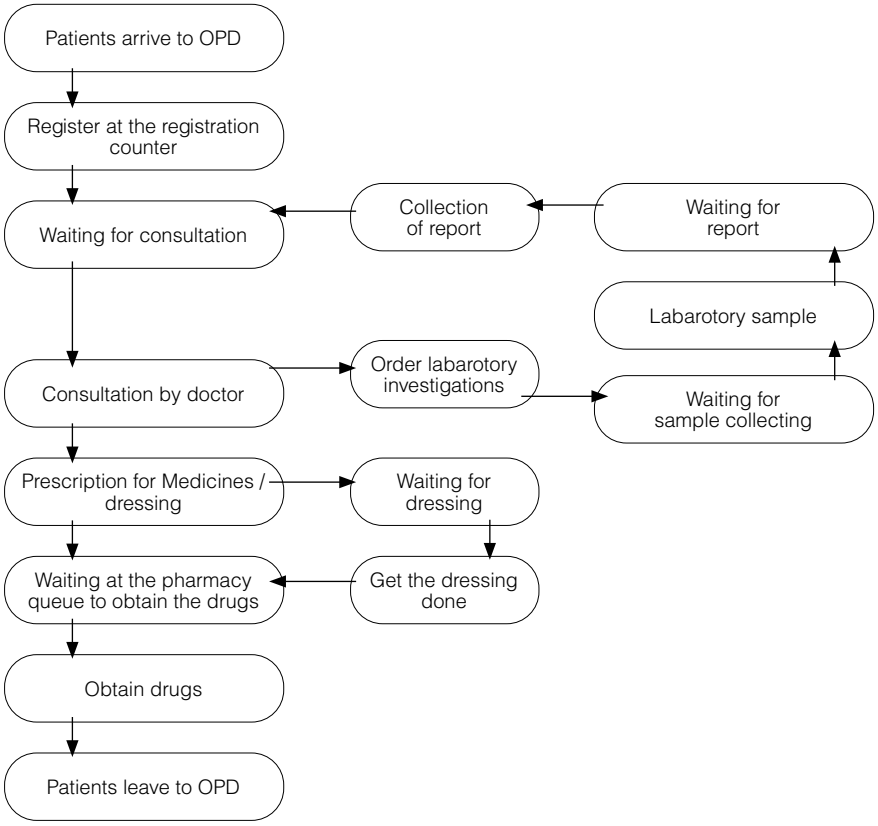

Figure 1: The process map of service delivery at OPD - NHSL, Sri Lanka.

The following major deficiencies of service delivery that caused congestion at the OPD, NHSL were identified at the focus group discussions and key informant interviews with the observational findings.

The majority emphasized the congestion of the OPD due to limited space in the waiting area and the patient consultation area. Twelve (12) doctors examined the patients in this small area and larger numbers of patients were in waiting without the seating facilities. Many complain of poor ventilation. Health care assistants registered the patients and arranged for them to sit in the waiting area accordingly. It was observed that there were considerable long queues at the registration desk and waiting room.

It was revealed that doctors of OPD examine only their quota of patients (a certain number of patients per hour). After finishing that quota, they leave the

place, even the patients are in the queue. It also increases the congestion as the patient must wait for a long time at OPD. Some doctors are usually late for duties, especially for the morning shift. Doctors stop the consultation for tea, around 15 -20 minutes, and during that time patients have to wait in the queues.

Many considered the laboratory, X-ray room, and dispensary located a considerable distance away from the OPD also badly affect the waiting time and congestion. Even some patients had difficulty in finding those places. OPD laboratory is also located in a very small space within the congested OPD causing both patients and staff a lot of difficulties, and the condition was further aggravated due to the patients having to wait after collecting their sample for collection of reports. It was revealed that some patients had to visit the OPD just to show the lab reports, and they must take the number for it.

Many participants stated that the NHSL OPD dispensary's counters, pharmacists, and seating facilities are insufficient. As a result, the patient had to wait for a long time at the pharmacy in a crowded environment.

Many criticized the layout of the setting. Properly arranged clinic layout is very important in the smooth functioning of OPD. But the layout at OPD of NHSL was claimed not favourable as many participants. According to them, it does not facilitate the unidirectional flow at OPD due to its disorganized arrangement. Although the space is not enough, they also suggested that if the unidirectional flow is arranged, changing the layout of the OPD from registration to leaving the examination room congestion can be minimized.

Many accused the patients of staff members who come bypassing the routine queue, and also large numbers of patients were brought by health care assistants into the consultation rooms outside the queue, violating the routine queue system, aggravating the problem of waiting time and congestion.

The priority causes for congestion and suggestions for improvements identified through the focus group discussions and the key informant interviews are given in Table 1.

Table 1: The causes for congestion in the service delivery process of OPD, NHSL, Sri Lanka, and interventions suggested to overcome it.

	Identified component for congestion	Proposed intervention
01	Lack of space and delay in registration	Well-trained nursing officers should be assigned to registration throughout the clinic time to provide necessary information to patients. The introduction of a computer-based registration system and barcode or patient identification number to the patient can minimize the time spent at registration.
02	Delay in consultation by doctors	Doctors should be advised to start the duties on time, not to take tea breaks as a group, and the quota system of patient examination should be abolished.
03	Delay in getting laboratory investigations	Sample collection for investigations should be done within the OPD. A computer-based system should be established at OPD of NHSL linking the laboratory, dispensary, and examination rooms.
04	Inadequate Pharmacists and counters at OPD dispensary	The number of counters and dedicated pharmacists to OPD should be increased.
05	Disorganized arrangement of OPD	The layout of OPD should be arranged to maintain the unidirectional patient flow from registration to leaving the examination room.
06	The high number of staff/pseudo staff patients	If management can arrange a separate doctor to see the staff patients and lab reports, the patients' congestion can be reduced. Furthermore, a mechanism should be developed to identify the real staff patients.

The causes identified for congestions and suggested improvements were further confirmed by random observations.

DISCUSSIONS AND CONCLUSIONS

Each doctor in the outpatient department must examine at least 150–200 patients per day in Vietnam earlier. However, continuous efforts of the Ministry of Health, Vietnam have resulted in a reduction in the number of patients per doctor per day to 50 in 2015, with a predicted drop to 35 in 2020 (Sakano, 2015). Another study conducted in the outpatient department of a hospital in Iran revealed that the specific time consumed for each patient's visit by a doctor is 5 minutes. This consultation time must be at least 15 minutes for each patient. Despite the different diagnostic approaches of a doctor for the patient and the amount of money paid by the patient for the consultation, it is a right of the

patients to get examined for a considerable time (Mohebbifar et al., 2013). During this study, we found that medical officers who work at OPD of NHSL examine 36 patients per hour: which is a very high number. Therefore, consultation time is limited to 1.6 minutes which is highly inadequate to examine the patient, and quality of care may be compromised due to this low consultation time.

Another study revealed that the major cause for congestion is the type of appointment scheduling adopted in the unit. The schedule is inconsistent in terms of start time, number of patients per block, and time slots (Akintomide et al, 2019). The congestion varies depending on health facilities and many other factors, such as quality of medical facilities, quantity and quality of medical equipment, the capacity of human resources, and speed of a registration process (Babalola et al., 2013).

Another study conducted at the outpatient clinic of Thong Nhat Hospital in Vietnam showed that OPD is highly congested, and patients had to wait for a long time. Older age, early registration time, and undergoing several laboratory tests were significantly associated with a longer total waiting time. Longer registration time was found to strongly affect congestion and a total waiting time. Based on these results, establishing an appointment system, allocation and announcement of the time to get results of the blood test, as well as a flexible schedule for doctors, may be recommended to reduce congestion and waiting time (Thi Thao Nguyen et al.,2018).

OPD patients and their needs are not homogenous. They are not satisfied when there is congestion and when they have to wait a long time before being attended. Their dissatisfaction ultimately affects the poor rating of the quality of care offered in the unit (Blomberg et al., 2010). This study also revealed that registration delays occur, and patients must wait for an extended period of time at the registration desk, causing congestion. This finding is quite similar to previously explained studies in different countries.

During focus group discussions and key informant interviews of this study, participants suggested that the introduction of a computer-based registration system and appointment system would be useful to overcome congestion and long waiting in OPD. A similar study conducted in South Korea explained that patients' basic information could be entered in the reception of the outpatient through the internet site of the hospitals. In this case, an officer in charge of the reception

would organize the information and assign an appointment. By implementation of this method, when the patients require a consultation, they had to wait for less than a minute in the reception (Lee and Yoo, 1996)

Delay in consultation due to late reporting of doctors to duties, quota system of examination, group tea break, inadequate doctors, and examination rooms were identified as another major cause for congestion in this study. Queuing theory suggests that to reduce the queues of outpatient departments, there should be an increase in the number of examination rooms. This model is used when the outpatient number is too high. In addition, adequate doctors and physical resources must be present (Helbig et al., 2007). In another study, Osundina and Opeke (2017) recommended employing more primary care doctors in the general outpatient departments to reduce the congestion and waiting time. However, this will not be the most appropriate intervention in OPD, NHSL as doctors and examination rooms are limited. Therefore, eliminating the quota system for patient examinations and taking tea as a group, as well as improving punctuality, would improve the situation.

Another study has revealed that three major factors associated with congestion are registration time, insufficient number of physicians, and insufficient number of counter staff (Babalola et al., 2013). These findings are also similar to the findings of this study.

A study conducted in India found that laboratory services at primary care settings should be strengthened; to improve the outpatient care at primary care settings. It gives evidence to policymakers that the laboratory is important in enhancing primary health care performance and achieving the greater goal of universal health coverage (Jain and Rao, 2019). This also supports the findings and suggestions to improve outpatient care in the current study.

Babalola et al., (2013) explained the importance of organized and unidirectional patient flow to improve service delivery in outpatient departments. After conducting, process evaluation in the current study also found that patient flow is not organized at OPD, NHSL, and participants of focus group discussions and key informant interviews suggested to establish a unidirectional flow.

In another study conducted in OPD, NHSL calculated the number of counters required to OPD pharmacy in 2016 according to the arrivals for the pharmacy. They suggested having four counters (Dilrukshi et al., 2016). Although considering

the number of current patients and congestion, this study suggests increasing the number of counters at the OPD dispensary by two.

Lack of patient experience component and inability to calculate patient waiting time during an OPD visit were the limitations of the current study.

The standard service provision at OPD, NHSL was disturbed by congestion and long waiting. Congestion of OPD was mainly due to delays at registration, consultation delays, less organized process flow, and inadequate resource availability. Establishing a proper registration system that links consultation, laboratory and pharmacy, improving punctuality and availability of doctors at consultation room during the whole duration, establishing laboratory facilities within OPD, arranging unidirectional patient flow, and increasing two more pharmacy counters at OPD will release the congestion at OPD, NHSL.

Ethical Approval: Administrative clearance for the study was obtained from the deputy director-general, NHSL, deputy director, OPD. Since patients were not included in the study and it was conducted as a part of the quality improvement process of OPD, NHSL, ethical approval was not required.

Authors' Contributions: All three authors contributed to the design and implementation of this study. The first author supervised the whole study and coordinated the activities. All authors read and approved the final manuscript.

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Conflict of Interest Statement: All three authors declared that they have no conflict of interest for this study.

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Regional Health Disparities in the Aftermath of Health System Reforms in Turkey

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ABSTRACT

Starting in 2003, Turkey introduced major health system reforms through the Health Transformation Program (HTP). The HTP aimed to address inequities in health care services across Turkey. This study explores whether regional disparities in several health care indicators persist ten years after the HTP. For this purpose, we use administrative records and individual-level data from the only regionally representative survey, Life Satisfaction Survey, undertaken by the Turkish Statistical Institute in 2013. First, the disadvantaged North-East, Middle-East, and South-East Anatolia regions experienced the most substantial increases in all health inputs and the odds of receiving the non-contributory Green Card insurance was also higher in these regions. Yet, there is still substantial disparity across regions in many health care access and satisfaction indicators. Especially, the disadvantaged regions still have lower utilization, lower satisfaction with healthcare, and lower subjective health scores in 2013 even after accounting for a wide range of control variables. While the HTP enabled the provision of a generous insurance benefits package, there is still room for progress in regional distribution of other major indicators such as subjective assessment of health, healthcare utilization, and satisfaction with health services. To further reduce health inequities across regions, the quality

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aspect of healthcare provision needs to be prioritized.

Keywords: Health Status Disparities, Access to Health Care, Health Care Utilization, Patient Satisfaction

INTRODUCTION

Worldwide, many countries are reforming their health systems to introduce or expand universal health coverage (UHC) to enhance access to health care for their citizens and to reduce financial hardship (Tangcharoensathien et al., 2011; Wagstaff et al., 2007). An important objective of these health system reforms is to improve equity in access and health outcomes by targeting poorer population groups (World Health Organization, 2010), often by strengthening primary health care services (Engström et al., 2001; Kutzin, 2013; Tirgil et al., 2018). Following the expansion of health insurance coverage in the USA, health services use has increased and catastrophic out-of-pocket health expenditures were reduced (Baicker et al., 2013). In Thailand, expansion of UHC through the 30 Baht Scheme helped to increase health care utilization, especially for the poorest population groups (Gruber et al., 2014). In Mexico, the introduction of Seguro Popular, the non-contributory health insurance for the poor helped to expand utilization of healthcare services and reduce catastrophic health expenditures (King et al., 2009; Knaul et al., 2018; Knaul et al., 2012).

From 2003 to 2012, Turkey introduced major health system reforms, the Health Transformation Program (HTP), to expand UHC and to promote equity and reduce disparities in access to healthcare services and health outcomes (Atun, 2015; Atun et al., 2013). These reforms, described elsewhere (Atun et al., 2013)ÿÿ and briefly summarized in Appendix A effectively targeted poor households by expanding the Green Card Scheme (a non-contributory insurance scheme for poor households) to more than 11 million people. Many studies have examined the effects of the expansion of UHC through HTP. Concerning efficiency, the reforms improved the productivity of the Ministry of Health hospitals (Sahin et al., 2011). As a result of the HTP, patient satisfaction with healthcare services in 2004-2012 is found to increase (Stokes et al., 2015). Patient satisfaction with healthcare services in the 2003-2017 by different insurance groups has also risen through the HTP related improvements (Ugur and Tirgil, 2018). In terms of equity, substantial improvements are recorded

(Atun et al., 2013). Similarly, catastrophic health expenditures in the 2003-2009 period have been reduced with the HTP (Yardim et al., 2013). Also, it has been found that increasing benefits coverage for a non-contributory insurance scheme led to financial protection for low-income households by reducing out-of-pocket expenditures (Tirgil et al., 2019). On the other hand, the HTP had components such family practice services which operate with a profit margin that can contribute for the poor households to reduce their preventive care utilization. Earlier studies on the expansion of UHC in Turkey have analysed access to health care for the poor and the progressivity of out of pocket health expenditures to measure inequity. While improvement is demonstrated in access to healthcare services for women's health, children's vaccination and infant mortality across larger geographic areas (economically deprived east and richer west) (Atun et al., 2013), but whether UHC expansion helped to narrow regional disparities in the 81 provinces of Turkey have not been examined in detail.

The effect of HTP might be varied across regions that have different levels of socio-economic development and there were historical inequities with regards to distribution of health resources (Hacettepe University Institute of Population Studies, 1994; Hacettepe University Institute of Population Studies, 2004). In Mexico, the health system reform had different effects depending on the demographic characteristics of insured households (Knaul et al., 2013) and again Mexico's Seguro Popular was found to be more effective in urban areas (Grogger et al., 2014). A growing body of literature shows the effect of geographic proximity to healthcare facilities on utilization and health outcomes (Karra et al., 2016; Masters et al., 2013).

In this study, we examine utilization and satisfaction with health-care services in Turkey to evaluate the effect on different regions of health system reforms which led to expansion of UHC. We use administrative records and the Life Satisfaction Survey conducted in 2013 with approximately 196,000 observations. We examine how the users assess various dimensions of healthcare services, such as physician behavior, nurse behavior, organization and hygiene.

METHODOLOGY

Turkey has 81 provinces which are divided into 12 NUTS[1]-1 regions. Our level of analysis in this study is these regions shown in Figure 1. For our analyses, administrative records of the number of physicians, hospital beds, and healthcare institutions belonging to the Ministry of Health are accessed from TurkStat and the Ministry of Health's Health Statistics Yearbooks. (Ministry of Health, 2010, 2014; TurkStat, 2013) The analysis is based on the 2003 and 2013 period as the HTP started as of 2003 and the main reforms were completed by 2012.

Individual-level data from the Life Satisfaction Survey (LSS) conducted by the Turkish Statistical Institute (TurkStat) is utilized.(TurkStat, 2013a) The LSS is representative of Turkey's adult population (aged 18+ years). This annual survey has been implemented since 2003 through face to face interviews. In 2013, the survey was designed to have a representative sample from province and included a sample size of 196,203 individuals. The LSS 2013 is the only survey that allows studying regional disparities as it provides province information. The LSS covers a wide range of topics, including utilization of health-care services, insurance coverage, satisfaction with health-care services, and a large number of background indicators on the socio-economic characteristics of individuals participating in the survey. We focus on three distinct outcome measures, including subjective health assessment, health-care utilization, and satisfaction with health-care services. People are asked to assess their health status from 1 (fully satisfied) to 5 (not satisfied at all). Our measure of health-care utilization comes from a question in which respondents were asked whether or not they have used health-care services in the last 12 months. We restrict our measure of satisfaction with health-care services to only those who used health-care services in the last 12 months in order to minimize recall bias, measured using the answers to the following question: "Are you satisfied with health care services?" ranging from 1 "fully satisfied" to 5 "not satisfied at all." The survey also provides information on insurance status, including whether an individual was part of the Green Card Scheme for the poor. Our measure of access is the degree of insurance coverage.

3 NUTS classification is a geocode standard for referencing the subdivisions of countries for statistical purposes established by Eurostat.

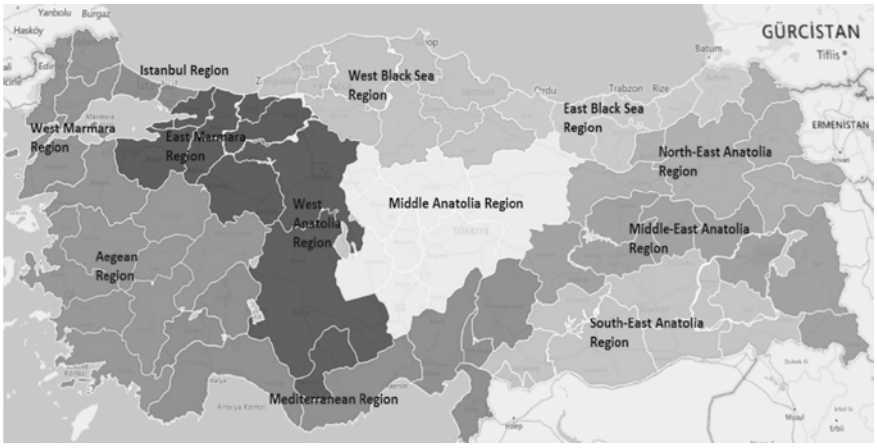

Figure 1: Turkey's Regions at NUTS 1 level

The LSS also asked many questions that allow controlling for a broad range of background variables. The respondents' gender, age, education level, marital status and employment status are available. Moreover, respondents' satisfaction with their friends is also added to account for the general disposition of the individual. Besides, from the household module, we can obtain the household income in 5 brackets, in which the individual income is not available.

To detect the problems in health services in different dimensions, several questions were administered, such as issues with physician's behaviour, nurse's behaviour, hygiene, trouble getting an appointment, and perceiving co-payments as non-affordable. Respondents can answer these questions as "Yes," "No," or "Do not know". We removed those who replied as "Do not know" for our control variables (age, gender, education level, marital status, and employment status).

To study the regional disparities in various health indicators, the following equations are used:

$$y_i = \beta_0 + \boldsymbol{A}X_i + \boldsymbol{B}R_r + \varepsilon_i, \qquad (1)$$

$$y_i = \beta_0 + \boldsymbol{A}X_i + \boldsymbol{B}R_r + \boldsymbol{C}I_i + \varepsilon_i, \qquad (2)$$

$$y_i = \beta_0 + \boldsymbol{A}X_i + \boldsymbol{B}R_r + \boldsymbol{C}I_i + \boldsymbol{D}S_r + \varepsilon_i, \qquad (3)$$

where y_i can be a health indicator such as subjective health assessment, health care utilization in the last 12 months, and satisfaction with health care services. X_i denotes background characteristics for individuals; R_r is regional fixed effects, consisting of 12 regions; I_i is insurance type fixed effects, composed of government employee retirement fund, social security institution, insurance for self-artisans, private insurance, green card; S_r indicates regional supply-side variables, which are the number of physicians per thousand persons, the number of public facilities per thousand persons, and the number of beds in public facilities per thousand persons. The main variables of interest are region dummy variables.

STATA 12.0 software is used for data analysis and P-value <0.05 is used as a cut-off for significance analyses. As this study uses secondary data, it is not necessary to obtain ethics approval and thus, we did not obtain ethics approval.

RESULTS

Figure 2 shows the percentage change in health-care inputs in 2003-2013. Appendix Table B-1 provides the details of the change in health inputs across regions over time (See Appendix Figure 10 to 13 for more details). Figure 2 shows the most substantial increase (110 %) in the South-East Anatolia region in terms of the number of physicians. The Middle-East Anatolia region also achieves a 70% increase in the number of physicians. For the North-East Anatolia region, we observe a considerable increase in all three health inputs. East and West Marmara regions also benefit from increased inputs as the number of physicians are raised by 64% and 65%, number of beds are raised by 32% and 4%, respectively.

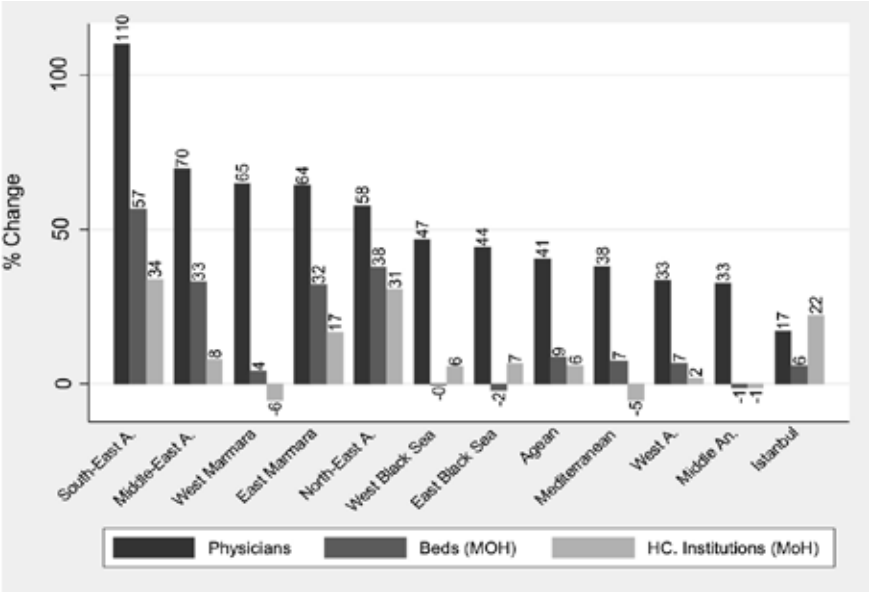

Figure 2: % Change in Healthcare Resources between 2003-2013 from TurkStat (2013b)

Istanbul region benefits the least in terms of the number of physicians, whereas Middle Anatolia experiences a 1% decline for both the number of health-care institutions and the number of hospital beds. In Mediterranean region, the number of health-care institutions declines by 5% and in East-Black Sea region, the number of hospital beds shrinks by 2%.

Table 1 provides summary statistics for the sample. The first row shows mean values and standard deviations for the whole sample, and the following 12 rows present the results for the 12 regions of Turkey. We conduct a one-way ANOVA to determine if health-care indicators were different for regions. Overall satisfaction with one's health for the whole sample out of 5 is 3.57, which implies that people are somewhat satisfied with their health. There is a statistically significant difference across regions in terms of average satisfaction with health as determined by the one-way ANOVA. When we analyze the percentage of people who are either not satisfied at all with their health or not satisfied, we also observe a statistically significant difference across regions according to the one-way ANOVA test results. We observe that 24% (SD=0.43) of people living in South-East Anatolia, 21% (SD= 0.41) of those living in North-East Anatolia, and 22% (SD= 0.41) of those living in Middle-East Anatolia

regions have the highest proportion of respondents in terms of unsatisfactory health assessment. The one-way ANOVA test result reveals a significant and well-defined difference across regions with respect to the utilization of health care services. The three regions with the highest level of poor health (South-East Anatolia, North-East Anatolia, and Middle-East Anatolia) are also the ones with the lowest level of health-care service utilization with 62% (SD=0.49), 62% (SD=0.49), and 61% (SD=0.49), respectively. Similarly, the test results indicates statistically significant differences in terms of satisfaction with health-care services across regions. South-East Anatolia, the North-East Anatolia, and the Middle-East Anatolia regions have considerably lower satisfaction with health-care services. Another notable difference across regions is the access to health-care services measured by those not having insurance coverage and those having a green card. South-East Anatolia, North-East Anatolia, and Middle-East Anatolia regions also have higher rates of uninsured individuals whereas, South-East Anatolia (M=33%, SD=0.47), North-East Anatolia (M=28%, SD=0.45) and Middle-East Anatolia (M=36%, SD=0.48) tended to have higher portions of Green Card holders.

Table 1: Health-care Services Indicators across Regions Notes: mean coefficients; sd in brackets, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The analysis is for the 12 regions of Turkey.

	Satisfaction w. Health	Unsatisfied w. Health	Utilization of HCS	Satisfaction w. HCS	No Health Insurance	Green Card	N
Total	3.57 [0.89]	0.16 [0.37]	0.69 [0.46]	3.66 [0.85]	0.08 [0.27]	0.12 [0.32]	196,203
South-East An.	3.41 [0.99]	0.24 [0.43]	0.62 [0.49]	3.60 [0.87]	0.11 [0.31]	0.33 [0.47]	19,225
North-East A.	3.50 [1.03]	0.21 [0.41]	0.62 [0.49]	3.63 [0.96]	0.12 [0.32]	0.28 [0.45]	10,077
Middle-East A.	3.49 [1.00]	0.22 [0.41]	0.61 [0.49]	3.50 [1.03]	0.08 [0.27]	0.36 [0.48]	15,552
West Marmara	3.66 [0.81]	0.12 [0.32]	0.69 [0.46]	3.71 [0.78]	0.07 [0.25]	0.05 [0.22]	13,885
Aegean	3.64 [0.83]	0.13 [0.34]	0.71 [0.46]	3.73 [0.79]	0.08 [0.28]	0.04 [0.20]	26,465
East Marmara	3.64 [0.82]	0.13 [0.34]	0.68 [0.47]	3.67 [0.82]	0.06 [0.24]	0.02 [0.13]	19,690
West An.	3.63 [0.82]	0.14 [0.34]	0.76 [0.43]	3.62 [0.82]	0.08 [0.26]	0.04 [0.20]	12,862
Mediterranean	3.51 [0.88]	0.17 [0.38]	0.72 [0.45]	3.63 [0.82]	0.08 [0.27]	0.10 [0.30]	25,101
Middle An.	3.57 [0.92]	0.17 [0.37]	0.72 [0.45]	3.74 [0.79]	0.07 [0.26]	0.08 [0.27]	16,278
West Black S.	3.60 [0.91]	0.16 [0.36]	0.72 [0.45]	3.78 [0.81]	0.06 [0.23]	0.06 [0.24]	17,515
East Black S.	3.57 [0.82]	0.15 [0.36]	0.72 [0.45]	3.79 [0.67]	0.06 [0.23]	0.09 [0.28]	7,344
Istanbul	3.68 [0.85]	0.12 [0.33]	0.70 [0.46]	3.53 [0.95]	0.08 [0.27]	0.02 [0.12]	12,209
F Test	144.30	188.84	161.63	178.29	69.44	2706.81	
P value	0.00	0.00	0.00	0.00	0.00	0.00	

Table 2 presents regression results for subjective health. The first three columns of Table 2 show the results for one's subjective health (one's health satisfaction) which are estimated using OLS models for the sake of ease of interpretation of coefficients. We also provide ordered probit estimates in Appendix B Table 2 for the same models which are very close to OLS estimates. The 4th-6th columns show the logit regression results (odds ratios) for being dissatisfied with one's health dummy variable.

According to Model 1 and Model 4 in Table 2, there are significant differences with regard to subjective health across regions after controlling for a large set of background variables. Results suggest that people living in North-East, Middle-East, and South-East Anatolia have lower subjective health scores and are more likely to be dissatisfied with their health compared to people living in West Marmara, East Marmara, Aegean, West Anatolia, West Black Sea, and East Black Sea. In Model 2 and Model 5, we included four dummy variables for each of the insurance schemes (Social Insurance Organization for formal sector employees, Government Employees Retirement Fund for retired civil servants, Active Civil Servants Insurance Fund for civil servants in work and their dependents, Bağ-Kur for artisans, self-employed and agricultural workers and Green Card Scheme for the poor) with the reference category of no health insurance to account for the differential health insurance holding across regions. In Model 3 and 6, healthcare inputs are added as additional control variables to examine whether differences in subjective health indicators stem from differences in the numbers of health-care facilities and personnel across regions.

What we observe from these results is that adding additional controls produce lower coefficient estimates for the subjective health for the regions South-East Anatolia, Middle-East Anatolia, North-East Anatolia, and the Mediterranean and higher coefficients for many other regions, which indicates differences in insurance and supply-side variables across regions. For the rest of the regions, it appears that controlling health insurance categories and supply-side interventions indicate higher satisfaction. Another significant result is that satisfaction with health for those in Istanbul showed no statistically significant point estimates for Model 1 and Model 2, where only baseline characteristics and health insurance categories are included in the regression

analyses. However, when supply-side information is added to the regressions, we observe a 7-percentage point higher subjective health assessment for people living in Istanbul compared to people living in Middle Anatolia. Nevertheless, there are still persistent differences in subjective health across regions.

Table 3 presents regression results for the utilization of healthcare services in the last 12 months (the first three columns) and satisfaction with health care services (the last three columns). The first three columns provide odds ratios for utilized healthcare dummy variables, and the last three columns provide OLS estimates of satisfaction with healthcare services on a 5-point scale. (Appendix B Table B-2 provides ordered probit estimates which essentially leads to similar conclusions) What stands out from the utilization results is that North-East, Middle-East, and South-East regions utilization is statistically significantly lower than Middle Anatolia even in Model 3, which controls for differences in health insurance and healthcare inputs. When we examine other regions, we see a concentration of the odds of 1 with some insignificant differences (Aegean, Istanbul, West Black Sea, and East Black Sea regions), significantly lower (East and West Marmara regions) and significantly higher (West Anatolia, Mediterranean regions) utilizations. These differences suggest that there might be cultural differences across regions that prevent people from North-East, Middle-East, and South-East regions.

Table 2: Regression Results for Subjective Health

	SWH (1)	SWH (2)	SWH (3)	DDV-OR (4)	DDV-OR (5)	DDV-OR (6)
South-East An. (ref: Middle An.)	-0.17*** (0.01)	-0.14*** (0.01)	-0.12*** (0.01)	1.70*** (0.05)	1.55*** (0.05)	1.45*** (0.05)
Middle-East An.	-0.13*** (0.01)	-0.10*** (0.01)	-0.11*** (0.01)	1.62*** (0.05)	1.45*** (0.05)	1.50*** (0.05)
North-East An.	-0.08*** (0.01)	-0.05*** (0.01)	-0.06*** (0.01)	1.42*** (0.05)	1.30*** (0.05)	1.31*** (0.05)
Mediterranean	-0.04*** (0.01)	-0.04*** (0.01)	-0.01 (0.01)	1.02 (0.03)	1.01 (0.03)	0.92** (0.03)
West Marmara	0.08*** (0.01)	0.08*** (0.01)	0.10*** (0.01)	0.65*** (0.02)	0.66*** (0.02)	0.63*** (0.02)
East Marmara	0.03*** (0.01)	0.03*** (0.01)	0.04*** (0.01)	0.85*** (0.03)	0.85*** (0.03)	0.82*** (0.03)
Istanbul	-0.00 (0.01)	0.00 (0.01)	0.07*** (0.01)	0.96 (0.04)	0.95 (0.04)	0.78*** (0.04)
Aegean	0.08*** (0.01)	0.08*** (0.01)	0.12*** (0.01)	0.73*** (0.02)	0.74*** (0.02)	0.67*** (0.02)
West An.	0.02** (0.01)	0.02** (0.01)	0.10*** (0.01)	0.90*** (0.03)	0.90*** (0.03)	0.74*** (0.03)
West Black Sea	0.05*** (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.87*** (0.03)	0.87*** (0.03)	0.89*** (0.03)
East Black Sea	0.06*** (0.01)	0.07*** (0.01)	0.06*** (0.01)	0.75*** (0.03)	0.75*** (0.03)	0.78*** (0.03)
Health Insurance	-	+	+	-	+	+
Healthcare Inputs	-	-	+	-	-	+
Baseline controls	+	+	+	+	+	+
R-squared	0.142	0.146	0.146	0.111	0.114	0.115
N	196,203	192,875	192,875	196,203	192,875	192,875

Notes: SWH stands for Satisfaction with Health, DDV stands for Dissatisfied Dummy Variable. Std. errors are clustered at household level and provided in ( ), *** p<0.01, ** p<0.05, * p<0.10. The reference category is Middle Anatolia region which includes the Aksaray, Kayresi, Kırıkkale, Kırşehir, Nevşehir, Niğde, Sivas and Yozgat provinces. **All models include baseline controls. Baseline Controls:** gender, age, age squared, 5 household income bracket

dummy variables, employment status dummy variables (categories: employed, unemployed, doing house-care, student, retired, unable to work, other employment status), marital status dummy variables (categories: married, divorced/separated, widowed, single), educational attainment dummy variables (categories: primary school or less, secondary school graduate, high school graduate, university or more), and satisfaction from relationship with friends. **Health insurance** categories include Social Insurance Organization for formal sector employees, Government Employees Retirement Fund for retired civil servants, Active Civil Servants Insurance Fund for civil servants in work and their dependents, Bağ-Kur for artisans, self-employed and agricultural workers and Green Card Scheme for the poor with the reference category of no insurance. **Healthcare inputs** include number of physicians per thousand persons, number of public healthcare institutions per thousand persons, number of public hospital beds per thousand persons.

Table 3: Regression Results for Utilization and Satisfaction

	HCU-OR (1)	HCU-OR (2)	HCU-OR (3)	SHS (4)	SHS (5)	SHS (6)
South-East An. (ref: Middle An.)	0.67*** (0.02)	0.70*** (0.02)	0.72*** (0.02)	-0.12*** (0.01)	-0.11*** (0.01)	-0.07*** (0.01)
Middle-East An.	0.66*** (0.02)	0.68*** (0.02)	0.68*** (0.02)	-0.25*** (0.01)	-0.24*** (0.01)	-0.27*** (0.01)
North-East An.	0.66*** (0.02)	0.70*** (0.02)	0.69*** (0.02)	-0.13*** (0.01)	-0.12*** (0.01)	-0.13*** (0.01)
Mediterranean	1.05* (0.03)	1.05** (0.03)	1.04 (0.03)	-0.08*** (0.01)	-0.08*** (0.01)	-0.03*** (0.01)
West Marmara	0.93*** (0.03)	0.93** (0.03)	0.89*** (0.03)	-0.05*** (0.01)	-0.05*** (0.01)	-0.04*** (0.01)
East Marmara	0.81*** (0.02)	0.81*** (0.02)	0.80*** (0.02)	-0.06*** (0.01)	-0.06*** (0.01)	-0.05*** (0.01)
Istanbul	0.92*** (0.03)	0.94** (0.03)	0.94* (0.03)	-0.17*** (0.01)	-0.17*** (0.01)	-0.05*** (0.01)
Aegean	0.97 (0.02)	0.98 (0.02)	0.95* (0.03)	-0.03*** (0.01)	-0.02*** (0.01)	0.02** (0.01)
West An.	1.19*** (0.04)	1.20*** (0.04)	1.13*** (0.04)	-0.08*** (0.01)	-0.08*** (0.01)	0.02 (0.01)
West Black Sea	1.02 (0.03)	1.00 (0.03)	0.98 (0.03)	-0.00 (0.01)	-0.00 (0.01)	-0.03*** (0.01)
East Black Sea	1.00 (0.03)	0.97 (0.03)	0.94* (0.03)	0.03*** (0.01)	0.03** (0.01)	-0.01 (0.01)
Health Insurance	-	+	+	-	+	+
Healthcare Inputs	-	-	+	-	-	+
Baseline controls	+	+	+	+	+	+
R-squared	0.062	0.071	0.071	0.111	0.114	0.115
N	196,203	192,875	192,875	196,203	192,875	192,875

Notes: HCU stands for Health Care Utilization, SHS stands for Satisfaction with Health Services. Std. errors are clustered at household level and provided in ( ), *** p<0.01, ** p<0.05, * p<0.10. The reference category is Middle Anatolia region which includes the Aksaray, Kayresi, Kırıkkale, Kırşehir, Nevşehir, Niğde, Sivas and Yozgat provinces. **All models include baseline controls and 5 point scaled subjective health assessment. Health insurance** categories include Social Insurance Organization for formal sector employees,

Government Employees Retirement Fund for retired civil servants, Active Civil Servants Insurance Fund for civil servants in work and their dependents, Bağ-Kur for artisans, self-employed and agricultural workers and Green Card Scheme for the poor with the reference category of no insurance. **Healthcare inputs** include number of physicians per thousand persons, number of public healthcare institutions per thousand persons, number of public hospital beds per thousand persons.

Table 4: Regression Results for Access to Healthcare

	GC-OR (1)	**GC-OR (2)**	**NOINS-OR (3)**	**NOINS-OR (4)**
South-East An. (ref: Middle An.)	3.74*** (0.17)	3.41*** (0.16)	1.02 (0.05)	1.00 (0.05)
Middle-East An.	5.32*** (0.26)	5.15*** (0.25)	0.76*** (0.04)	0.76*** (0.04)
North-East An.	3.86*** (0.20)	4.04*** (0.21)	1.35*** (0.08)	1.36*** (0.08)
Mediterranean	1.25*** (0.06)	1.14*** (0.06)	1.08 (0.05)	1.06 (0.05)
West Marmara	0.70*** (0.05)	0.68*** (0.05)	1.04 (0.06)	1.03 (0.06)
East Marmara	0.27*** (0.02)	0.28*** (0.02)	1.02 (0.06)	1.03 (0.06)
Istanbul	0.29*** (0.03)	0.26*** (0.03)	1.45*** (0.08)	1.41*** (0.08)
Aegean	0.55*** (0.03)	0.51*** (0.03)	1.38*** (0.07)	1.35*** (0.07)
West An.	0.70*** (0.05)	0.65*** (0.05)	1.32*** (0.08)	1.30*** (0.08)
West Black Sea	0.85*** (0.05)	0.82*** (0.05)	0.88** (0.05)	0.88** (0.05)
East Black Sea	1.09 (0.07)	1.07 (0.07)	0.77*** (0.05)	0.77*** (0.05)
GDP per capita		0.07*** (0.02)		0.55* (0.17)
Baseline controls	+	+	+	+
R-squared	0.324	0.325	0.105	0.105
N	192,875	192,875	192,875	192,875

Notes: GC stands for Green Card Ownership, NOINS stands for having No Health Insurance dummy variable. Std. errors are clustered at household level and provided in ( ), *** p<0.01, ** p<0.05, * p<0.10. The reference category is Middle Anatolia region which includes the Aksaray, Kayresi, Kırıkkale, Kırşehir, Nevşehir, Niğde, Sivas, and Yozgat provinces. **All models include baseline controls, and 5 points scaled subjective health assessment.**

As shown in the last three columns of Table 3, there are also significant variations across regions about satisfaction with healthcare services. Again, these three regions (North-East, Middle-East, and South-East) have lower satisfaction with health services. Istanbul is observed to have the second-largest negative coefficient in terms of satisfaction with health services. When we account for health insurance and health inputs, we observe a considerable reduction in the coefficient of the South-East region in terms of dissatisfaction with health care services. However, we do not observe a drop in the coefficients of North-East and Middle-East regions.

Table 4 presents regression results for access to health care measured by the non-contributory green card ownership dummy variable (the first two columns) and having no health insurance dummy variable (the last two columns). The first two columns provide odds ratios for Green Card ownership, and the columns 3-4 provide odd ratios for having no health insurance. The first two columns present strong evidence that people in North-East, Middle-East, and South-East are more likely to have a green card after accounting for their income and many other background characteristics. We observe that those people living in the generally affluent regions of Turkey, such as Istanbul, Aegean, Marmara are less likely to hold a Green Card. The results in the last two columns also show that people in South-East are not statistically different from people in Middle Anatolia in terms of having no insurance, and people in the Middle-East Anatolia region are less likely to have no health insurance. However, we still observe a higher likelihood of having no insurance in the North-East Anatolia region. Columns 3-4 of Table 4 show that many region coefficients are not statistically significant. Also, Istanbul, Aegean and West Anatolia present a higher likelihood of having no health insurance.

Although North-East, South-East, and Middle-East regions are the regions that benefited the most from the HTP, we do not observe higher utilization

nor satisfaction with healthcare services in these regions. To examine the differences in the quality of health care inputs, we study people's self-reported problems in various domains of health care services across regions. We also provide the distribution of problems across provinces in Appendix Figure B-1 to B-8.

In Figure 3, we report the percentage of people experiencing problems related to an appointment across regions. We observe higher discrepancy rates across regions about appointment waiting times and less discrepancy concerning appointment taking. 49% of people in the Middle-East, 41% of people in South-East and 40% of people in North-East Anatolia have problems in appointment waiting times. Interestingly, Istanbul is the region with 39% of people reporting appointment waiting problems, and that has the highest percentage of people who experience problems in appointment taking (27% of people). Except for Istanbul, Middle-East, South-East, and North-East Anatolia are again the highest regions for experiencing problems in terms of getting an appointment.

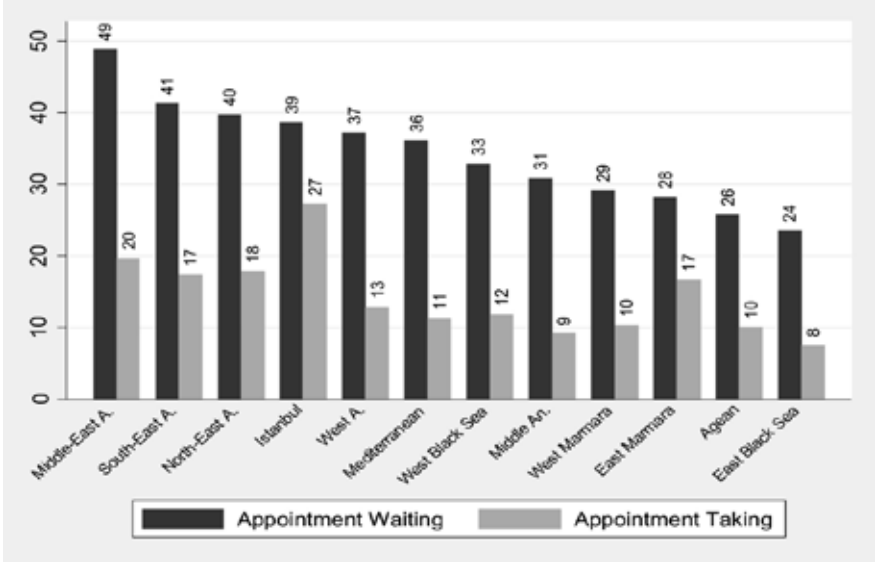

Figure 3: Problems related to Appointment by Region

Figure 4 presents the breakdown of problems with shortages of health care staff and lack of hygiene. The range of people who finds health care staff insufficient varies between 61 to 43%, with an average of 52%. That implies that the inadequacy of health care personnel is a prevalent problem for all regions. Hygiene issues are lesser of a problem as people having issues with hygiene is approximately 15% ranging from 11% to 24%. As in the same line with Figure 3, Middle-East, South-East, North-East Anatolia, and Istanbul are the highest regions for considering inadequate health care staff and experiencing problems in terms of hygiene.

Another aspect of measuring the quality of health care services is the behaviour of health care personnel to their patients. Figure 5 provides the percentages of people who find physician's and nurse's behaviour problematic. We observe fewer people experiencing trouble in terms of health care staffs' behaviour, and the discrepancy between regions is mild. However, three regions (North-East Anatolia, Istanbul, and Middle-East) except South-East Anatolia are again the highest regions for having problems due to health care staffs' behaviour.

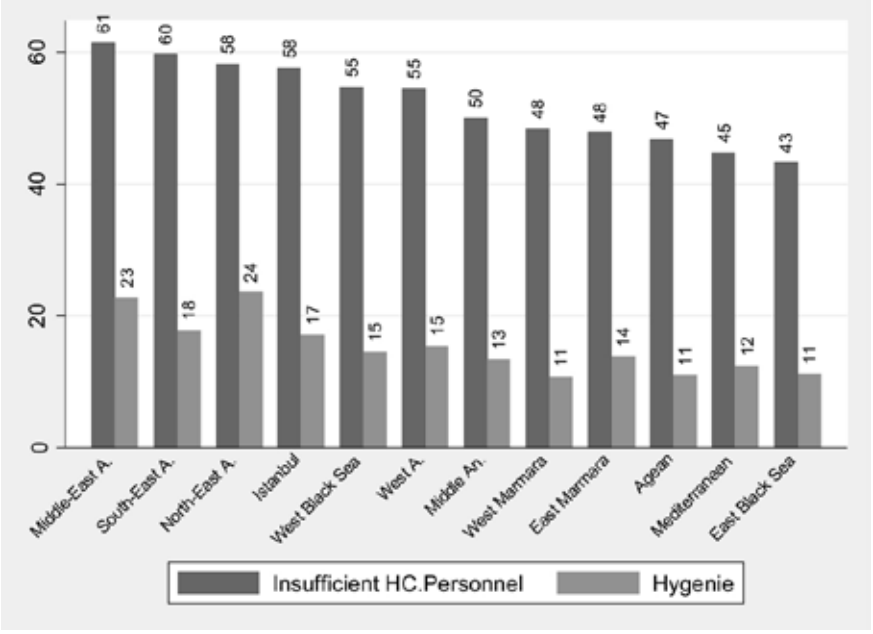

Figure 4: Organization Problems by Region

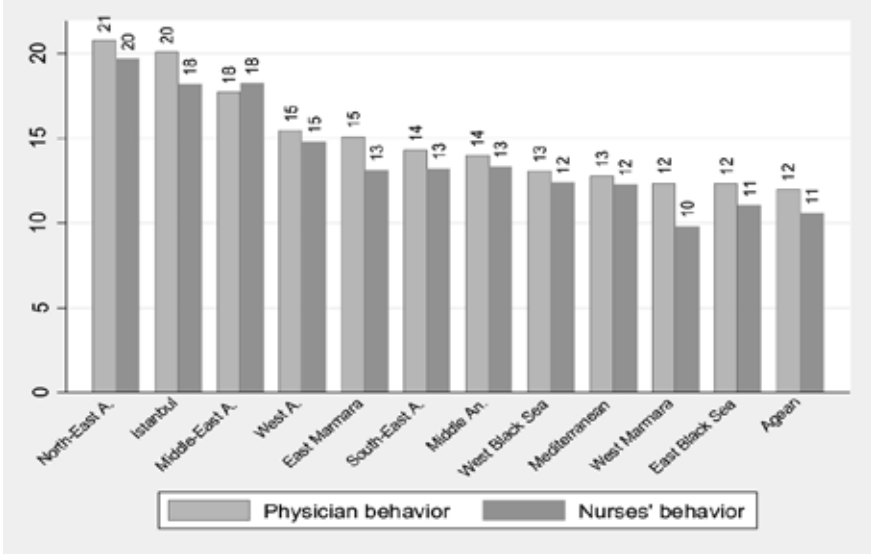

Figure 5: Problems due to Health Care Staff by Region

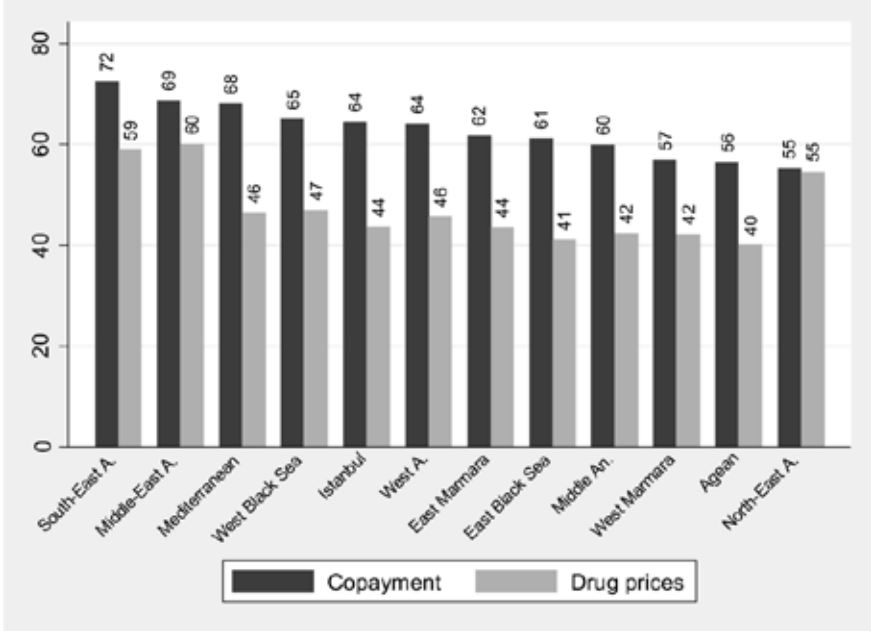

Figure 6: Problems due to Health Care Service Costs by Region

Figure 6 shows the percentage of people that find drug prices high and consider co-payments to be not affordable. When we compare the percentage of people who experience troubles in various domains of health care services, the highest percentages are observed among price-related problems. Approximately 63% of people find co-payments to be problematic, and 46% of people are uncomfortable with drug prices. There do not exist significant discrepancies across regions if we take North-East, South-East, and Middle-East Anatolia out of consideration. As before, South-East, North-East, and Middle East Anatolia are the top 3 regions that are uncomfortable with drug prices.

DISCUSSION AND CONCLUSIONS

In this study, we examined regional disparities in subjective health assessment, health care utilization, and satisfaction with health services. Before the HTP, health inputs had been distributed unequally across regions in Turkey, which led to inequity in access to health services and health outcomes. One primary tool to narrow inequities across regions is the allocation of health inputs. In this sense, supply-side interventions such as the distribution of physical capital and human capital are of great importance. We show that the most disadvantaged regions, the North-East, South-East and Middle-East Anatolia, benefited the most from the HTP, as the most significant percentage increases in the number of physicians, hospital beds and healthcare institutions are observed in these regions. Our results suggest that the historically poor regions, North-East, South-East, and Middle-East Anatolia, benefited more from the Green Card scheme compared to other regions. In that sense, HTP was successful in reducing regional inequalities concerning access to health insurance and health-care services.

However, our findings also indicate that while accounting for health insurance and supply-side factors in regression analyses reduces the variation across regions to some extent, there still exists substantial heterogeneity among regions in terms of subjective health, utilization and satisfaction with healthcare services. Moreover, the disadvantaged North-East, Middle-East, and South-East Anatolia regions have lower utilization, lower satisfaction with healthcare, and lower subjective health scores in 2013 even after accounting for a wide range of control variables.

Although differences in utilization patterns across regions could be interpreted as an indication of inequity in health care access (Waters, 2000) M, utilization differences may stem from other factors such as differences in cultural acceptability of the health services provided.(Thiede et al., 2007)

Our findings suggest that a significant cause of differences across regions was not related to the quantity of healthcare resources but rather the differences in the quality of services. According to Appendix Figures B.9, B.10, and B.112, North-East, Middle-East and South-East regions fared better than many other regions in terms of quantity of health inputs. However, we observe that North-East, Middle-East and South-East Anatolia regions have greater problems in all aspects of health-care service delivery from appointment to hygiene, from organizational aspects to behaviour of health workforce.

Further, although the Green Card scheme intended to increase access to health care services for the poor, 60% of respondents reported issues with co-payment and drug prices which was the most common problem across all regions in relation to the cost of healthcare services. Ideally, the combination of different insurance schemes under the roof of Social Security Institution enables equal access to the same benefits. However, in reality, the green card holders need to renew their status and prove their eligibility. This could hinder their utilization of healthcare services from time to time.

Overall, the findings suggest health insurance coverage is not enough to close the gap between less developed and more developed regions. Indeed, studies show that co-payment might be hindering the utilization of health-care services in less developed regions even if the health benefits of these services far exceed cost.(Banerjee and Duflo, 2011; Dupas, 2009)

A major finding of this study is that although the underdeveloped regions benefited quantitatively higher from the HTP, there is considerable quality differential across regions. There were more problems reported in less developed regions of Turkey in terms of physicians' and nurses' attitudes towards patients, which can easily erode the much-needed trust between healthcare staff and patients. The variation in quality of services has also been reported in India (Das amd Hammer, 2005) and elsewhere (Arsenault et al., 2019; Chaudhury et al., 2006). Our results are in line with the findings for Tanzania in which following expansion of access to healthcare facilities to

rural populations, large variation in the quality of care provided is reported. (Leonard and Masatu, 2007) The variation in the quality of services in certain regions of Turkey can help explain underutilization in these areas.

Further research is necessary for shedding light on what drives regional disparities in Turkey. For example, with The HTP, primary care and preventive care systems are combined into the family practice system. This started to operate with a profit margin which was for free before the HTP.

There are certain limitations of this study. We used a one-year cross-section survey to examine the regional health disparities, which means that we were unable to watch the same regions over time. Unfortunately, in recent versions of life satisfaction surveys, TurkStat does not provide region or province information. Another limitation is that the survey was conducted in 2013 which is almost eight years ago.

Notwithstanding limitations, our study provides new evidence on the regional differences and disparities in health care system following health system reforms. In order to realize the full benefits of UHC, regional disparities need to be examined and systematically addressed.

Ethical Approval: No need for ethics approval as secondary data is used in this study.

Authors' Contributions: ZU conceived the study, analyzed the data and wrote the first draft. AT redrafted the paper. Both authors reviewed and approved the final version.

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Appendix A: Key Reforms under the Health Transformation Program

- The very first change made with the HTP was to eliminate the involuntary incarceration of patients in hospitals who cannot pay their health care expenditures
- The coverage of the Green Card was expanded to include outpatient, outpatient prescriptions, eye, and dental services.
- A performance-based supplementary payment system was initiated at all MoH facilities.
- Social Insurance Organization hospitals were transferred to MoH, which led to unification of all public health-care provisions in the hand of Ministry of Health.
- Members of both Social Insurance Organization and Bağ-Kur were also given the same status as Government Employees Retirement Fund members in terms of ability to visit university hospitals directly.
- The VAT rate of pharmaceutical products has been reduced from 18% to 8%, which reduced the burden on patients.
- Different health insurance holders' status with regard to receiving treatment from private health care providers was equalized.
- The extra charges private hospitals made to patients receiving health-care services was standardized and the extra fee which is charged to patients is bounded to be up to 30% of what private hospitals receive from the Social Security Institution.
- All different health insurance schemes with various benefits packages and financing systems were unified under one umbrella of Social Insurance Organization to reach Universal Health Insurance.
- Those who are younger than 18 years of age included in the coverage of UHI and were eligible to use all health services free of charge
- A contract-based family medicine system across the country was introduced
- The patients were given a chance to choose their doctors so that health care providers feel more the need to pay more attention to their patients' needs and satisfaction.
- All ambulance services were made available for everyone, including those in rural areas.
- The co-payment system was introduced for outpatient services, doctor visits, and dental care services when obtained at hospitals.
- A full-time practice was made compulsory for university and MoH personnel.

Appendix B

Table B-1. Health Inputs across Regions

	# Physicians		# of MoH inst.		# of Beds (MoH)	
Region	2003	2013	2003	2013	2003	2013
South-East Anatolia	5888	12374	65	87	7395	11585
North-East Anatolia	1988	3138	36	47	3100	4274
Middle-East Anatolia	2743	4654	51	55	5210	6935
West Marmara	3175	5242	54	51	5715	5952
Aegean	15187	21343	117	124	16260	17683
East Marmara	5531	9088	60	70	7499	9914
West Anatolia	14367	19176	50	51	10594	11312
Mediterranean	11994	16570	91	86	14021	15063
Middle Anatolia	3033	4025	71	70	5648	5566
West Black Sea	5447	7998	88	93	11093	11038
East Black Sea	2822	4073	61	65	6635	6482
Istanbul	22291	26094	45	55	14601	15465

Table B-2 Ordered Probit Regression Results

	SWH (1)	SWH (2)	SWH (3)	SHS (4)	SHS (5)	SHS (6)
South-East An. (ref: Middle An.)	-0.22*** (0.01)	-0.18*** (0.01)	-0.16*** (0.01)	-0.17*** (0.01)	-0.16*** (0.01)	-0.10*** (0.02)
Middle-East An.	-0.16*** (0.01)	-0.11*** (0.01)	-0.13*** (0.02)	-0.30*** (0.02)	-0.29*** (0.02)	-0.33*** (0.02)
North-East An.	-0.08*** (0.02)	-0.04** (0.02)	-0.04** (0.02)	-0.14*** (0.02)	-0.12*** (0.02)	-0.14*** (0.02)
Mediterranean	-0.07*** (0.01)	-0.07*** (0.01)	-0.03* (0.01)	-0.13*** (0.01)	-0.13*** (0.01)	-0.06*** (0.01)
West Marmara	0.09*** (0.01)	0.09*** (0.01)	0.12*** (0.01)	-0.08*** (0.01)	-0.08*** (0.02)	-0.06*** (0.02)
East Marmara	0.02* (0.01)	0.02 (0.01)	0.04*** (0.01)	-0.09*** (0.01)	-0.09*** (0.01)	-0.07*** (0.01)
Istanbul	0.01 (0.02)	0.01 (0.02)	0.09*** (0.02)	-0.20*** (0.02)	-0.20*** (0.02)	-0.03* (0.02)
Aegean	0.10*** (0.01)	0.10*** (0.01)	0.15*** (0.01)	-0.03*** (0.01)	-0.03** (0.01)	0.04*** (0.01)
West An.	0.01 (0.01)	0.01 (0.01)	0.11*** (0.02)	-0.12*** (0.02)	-0.12*** (0.02)	0.02 (0.02)
West Black Sea	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.02 (0.01)	0.02 (0.01)	-0.00 (0.02)
East Black Sea	0.06*** (0.02)	0.06*** (0.02)	0.05*** (0.02)	0.02 (0.02)	0.02 (0.02)	-0.03 (0.02)
Health Insurance	-	+	+	-	+	+
Healthcare Inputs	-	-	+	-	-	+
Baseline controls	+	+	+	+	+	+
Pseudo R-squared	0.069	0.070	0.071	0.053	0.054	0.055
N	196,203	192,875	192,875	196,203	192,875	192,875

Notes: SWH stands for Satisfaction with Health, SHS stands for Satisfaction with Health Services. Std. errors are clustered at household level and provided in ( ), *** p<0.01, ** p<0.05, * p<0.10. The reference category is Middle Anatolia region which includes the Aksaray, Kayresi, Kırıkkale, Kırşehir, Nevşehir, Niğde, Sivas and Yozgat provinces. **All models include baseline controls. Baseline Controls:** gender, age, age squared, 5 household income bracket dummy variables, employment status dummy variables (categories: employed, unemployed, doing house-care, student, retired,

unable to work, other employment status), marital status dummy variables (categories: married, divorced/separated, widowed, single), educational attainment dummy variables (categories: primary school or less, secondary school graduate, high school graduate, university or more), and satisfaction from relationship with friends. **Health insurance** categories include Social Insurance Organization for formal sector employees, Government Employees Retirement Fund for retired civil servants, Active Civil Servants Insurance Fund for civil servants in work and their dependents, Bağ-Kur for artisans, self-employed and agricultural workers and Green Card Scheme for the poor with the reference category of no insurance. **Healthcare inputs** include number of physicians per thousand persons, number of public healthcare institutions per thousand persons, number of public hospital beds per thousand persons.

Figure B-1. % of People Having Problem with Taking Appointment

Figure B-2. % of People Having Problem with Appointment Waiting Time

Figure B-3. % of People Having Problems with Hygiene in Healthcare Institutions

Figure B-4. % of People Who Finds Healthcare Personnel Insufficient

Figure B-5. % of People Experiencing Problems due to Physician Behaviour

Figure B-6. % of People Experiencing Problems due to Nurses' Behaviour

Figure B-7. % of People Having Issues with Co-payment

Figure B-8. % of People Having Issues with Drug Prices

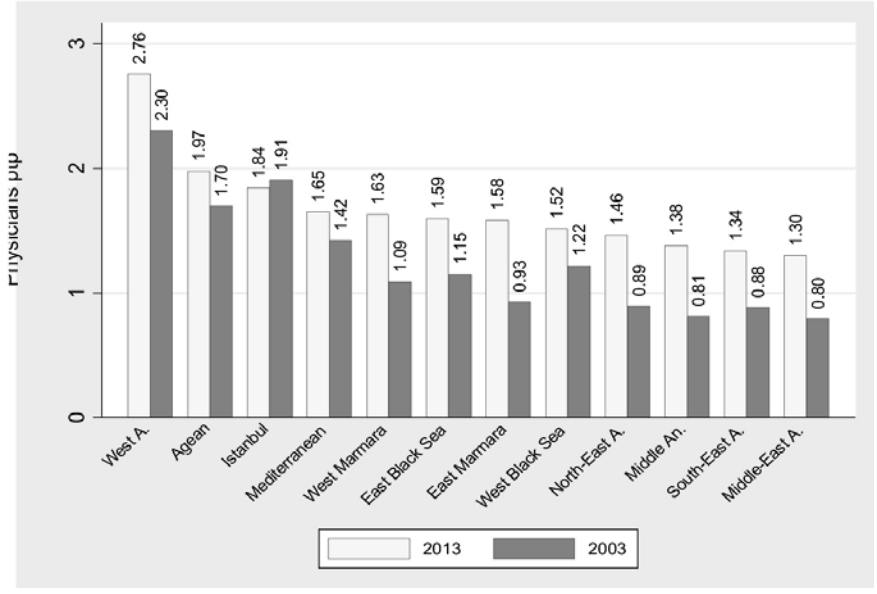

Figure B-9. Number of Physicians ptp across Regions

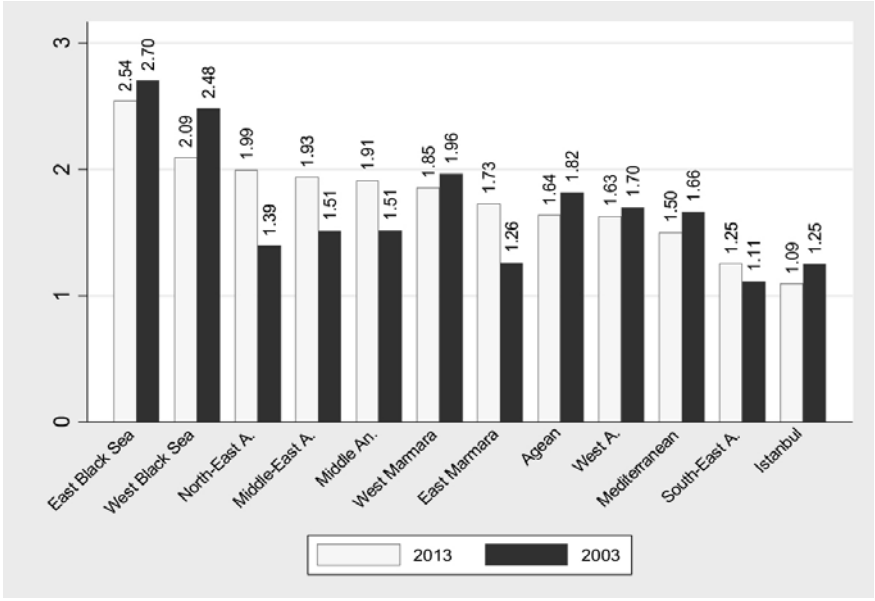

Figure B-10. Number of Hospital Beds ptp across Regions

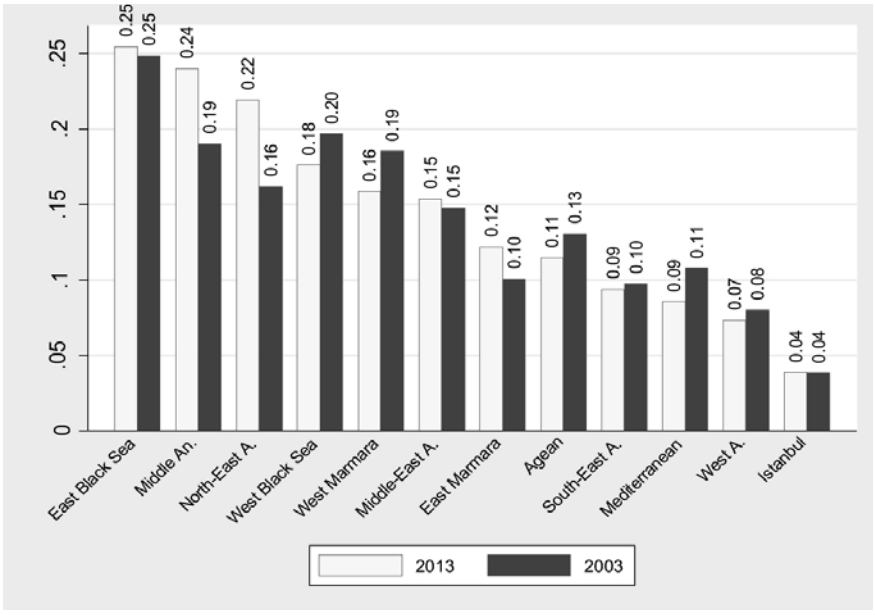

Figure B-11. Number of Health-care Institutions ptp across Regions

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How Healthy is Health Sector?

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ABSTRACT

Financial distress is a condition in which a company cannot create sufficient income, thus making it unable to meet its financial obligations. Ignoring signs of financial distress can be detrimental for the companies, and it may even cause bankruptcy. The financial distress is about financial health of a company and credit rating is a good early warning indicator of financial health.

This paper attempts to investigate the financial health of health sector in Turkey for the period from 2000 to 2020. In order to evaluate financial health of the health sector in Turkey, we use Central Bank of Republic of Turkey's Company Accounts and calculate credit ratings via Altman Z- Score Methodology. The basic conclusion of the paper is that although the credit rating is not sufficient for investors, there are some improvements in the rating grades.

Keywords: Altman Z-Score, Financial Health, Health Sector in Turkey

INTRODUCTION

The health sector may be the key element of sustainable economic growth for Turkey because of its considerable service quality. Although, there is an incredible development in the Turkish health system because of the governmental support since the beginning of the 2000s, we do not have any analytical view of the financial structure of the sector as a whole. Turkey has

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the perspective of earning more revenue with the help of health tourism, so the health of the health sector is critical.

One can think the healthy financial structure of a sector is the sign of the life quality of the companies. We use the term "financial health" to describe the state of firms' financial position. As expected, there are many pillars of financial health, such as cash, debt and equity of the firm. To clarify, the working capital, earnings and all assets of the firms are the contributors of the financial health.

The healthy sector is attractive for all stakeholders. To illustrate, entrepreneurs for new opportunities in the new sectors to earn more money, investors need profit, workers want stability in their wages. Healthy financial companies have critical roles in achieving their goals; therefore, the financial structure of the firms is important for all the units in the financial ecosystem.

The healthy company experience a financial distress condition which a company cannot generate enough cash via its income, so cannot meet or pay its financial obligations.

Financial distress is the state of financial tightness experienced by a company occurs before bankruptcy or liquidation and can be experienced by all companies (Nustini and Amiruddin, 2019). Financial distress forecasting has been used since the 1960s as a critical area of financial research in corporate finance literature. It is important for many issues such as managerial decision-making for firms, investment decision-making for investors, credit decision making for lenders, customer credit rating for banks (Sun et al., 2014). Also in the health sector, financial distress forecasting can affect patients' access to the health sector (Langabeer et al., 2018).

There are too many reasons for financial distress (Steel, 2021):

- Cash flow problems
- Defaulting on bills
- Extended terms
- High interest payments and other financial costs such as exchange rates
- Falling margins
- Decrease in sales
- High levels of outstanding receivables
- Lack of customer satisfaction and loyalty
- High turnover and decreased morale in the markets

To summarize, tight financial condition causes financial distress. Financial distress, for a company, is the final declaration which shows that it cannot continue its current operations given its current debt obligations (Ray, 2011). The last phase of the continuous financial distress is the bankruptcies. In order to avoid from these situations, early warning system is adapted by the companies. The aims of the financial early warning system (are) monitoring and reporting all financial processes before they affect the financial health of the companies.

A financial early warning system will help a company to track its performance and to identify important trends. By the help of early warning indicators, companies have time to prepare an action plan in order to reduce financial loss. It is very important to identify and understand the factors that lead to financial failure in the health sector, where important service providers are located, for the successful execution of the activities, the continuation of the existence and the provision of social benefit (Erkılıç and Aksoy, 2020).

One kind of early warning system may be credit ratings. A credit rating is an evaluation of the credit risk of a borrower, thus predicting its ability to pay back the financial obligation. To sum up, credit ratings evaluate a company's value of financial instruments like a bond but also the company itself.

The calculation method of credit rating may differ agency to another. Each different agency such as S&P, Moody's and Fitch has their own methodology and grade. The lower grades imply higher default risk while the higher grades imply lower default risk. In short, healthy companies have higher grades and lower default probability. The "investment grade" rating is beneficial to the companies because investors accept that companies as a attractive and healthy one. In addition, if a company has a "investment grade" rating, investors can have tendency to make higher investment because this company can meet its financial obligations (see Table 1). According to table 1, one can easily understand that once the credit risk diminishes, the rating moves on the opposite direction.

To this end, we try to grasp that "how healthy company looks like from the financial perspective**".** If a company does not experience financial distress, it can have higher rating grade thus it is a healthy company regarding to financial criteria. The remaining part of this paper is structured as follows: Firstly, we

are going to introduce our proposed methodology for credit rating in health sector. Then we are going to analyze literature about this methodology, at the final phase we are going to give information about results of our empirical analysis and are going to make discussion about future research.

Table 1: Credit Ratings

	Median Altman Z" Score	S&P	Moody's	Fitch	Meaning
					Lower Credit Risk
Investment	8.80	AAA	Aaa	AAA	Prime
	8.40	AA+	Aa1	AA+	High Grade
	8.22	AA	Aa2	AA	
	6.94	AA-	Aa3	AA-	
	6.12	A+	A1	A+	Upper Medium Grade
	5.80	A	A2	A	
	5.75	A-	A3	A-	
	5.70	BBB+	Baa1	BBB+	Lower Medium Grade
	5.65	BBB	Baa2	BBB	
	5.52	BBB-	Baa3	BBB-	
Speculative	5.07	BB+	Ba1	BB+	Non Investment Grade Speculative
	4.81	BB	Ba2	BB	
	4.03	BB-	Ba3	BB-	
	3.74	B+	B1	B+	Highly Speculative
	2.84	B	B2	B	
	2.57	B-	B3	B+	
	1.72	CCC+	Caa1	CCC+	Substantial Risk
	0.05	CCC	Caa2	CCC	Extremely Speculative
		CCC-	Caa3	CCC-	
	0.00	CC C D	Ca C	CC C D	Default Process
					HigherCredit Risk

Source: *Genç & Başar (2019) ; Altman (2018)*

METHODOLOGY AND LITERATURE REVIEW

There are too many metrics to calculate credit ratings of companies. Well-known method which is Altman Z- Score dates to 1968. Since the first implementation of the method, it has changed due to the different reasons. One important reason for these updates is different risk structure of countries and

sectors. As a result of this ongoing process, the updated formula for emerging market and service industries is that (Altman, 1995, 2018):

$Z = 3.25 + 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$

where

X_1 = working capital / total assets

X_2 = retained earnings / total assets

X_3 = earnings before interest and taxes / total assets

X_4 = book value of equity / total liabilities

In order to the calculate the components of the Z Score, we use Central Bank of Republic of Turkey's Company Accounts in which one can see balance sheet, income statement and some other information retrieved from these. In addition, the company accounts cover the information about composition of assets and liabilities, financial risks and ratios.

Current assets, current liabilities, book value of equity (shareholders equity) and total assets can be seen explicitly in the balance sheets whereas working capital, total liabilities, retained earnings and earnings before interest and taxes have to be calculated in order to use Altman Z-Score. The calculation of these is given below:

- Working Capital = Current Assets – Current Liabilities

from Balance Sheets

- Total Liabilities = Short Term Liabilities + Long Term Liabilities

from Balance Sheets

- Retained Earnings = Reserves from Retained Earnings + Profit Brought Forward + Loss Brought Forward (-) + Net Profit or Loss for the Financial Year

from Balance Sheets

- Earnings Before Interest and Taxes = Profit or Loss Before Taxes + Financing Expenses (-)

from Income Statements

Once we calculate Z scores, we use these ratings to determine bond-rating equivalent (BRE) peer of these scores. The concept BRE give information about the financial health of the companies. The link between Z- Score and credit rating is given above Table 1.

The literature about Altman Z- Core is abundant in Turkey whereas there is limited paper about health and other related sectors. We only focus on health sector related papers.

Yiğit (2020) used the "Q-861 Hospital Services" sub-sector from CBRT's Company Account Database. The paper reported that the average of Altman Z- Score of the sector was 1.77, the highest was 2.97 in 2009, and the lowest was in 2018 with 0.91. That implies the financial health of the sector is in deterioration from 2009 to 2019.

One interesting paper is about financial health of the public hospitals is Civan and Dayı's (2014) paper. They examined public hospital's financial situation between the years 2008-2012 with the Altman Z-Score. Their main finding is that Altman Z-Score was in increasing trend and the default probability is very low in that period.

Bağcı and Sağlam (2020) used two publicly open hospitals' data in Borsa Istanbul in their analysis. They reported that financial structure and financial performance of health sector companies are good enough and the probability of facing bankruptcy risk is low in the sector. They also showed that the movements of the rating grades are the same direction for all the firms.

As for pharmaceutical companies operating in Borsa Istanbul Gülençer and Hazar (2010) made a comprehensive analysis. According to their findings, none of the pharmaceutical companies are in financial distress through the results of the Altman Z- scores in the 2016 – 2020 period.

To summarize of current literature, we have some stylized facts:

- There are not too many works which consider the health sector as a whole using Company Accounts but single firm or institution-based Altman Z-Score approach is widespread.
- Different types of health sector companies have been analyzed.
- The BRE assessment regarding the Altman Z-Score is not common.

To contribute to existing financial distress literature, we calculate Altman Z- Score and employ BRE from the beginning of the 2000's thus trying to see developments in the health of the health sector. Then, we analyze movements of ratings within the different firm scale in the health sector.

RESULTS

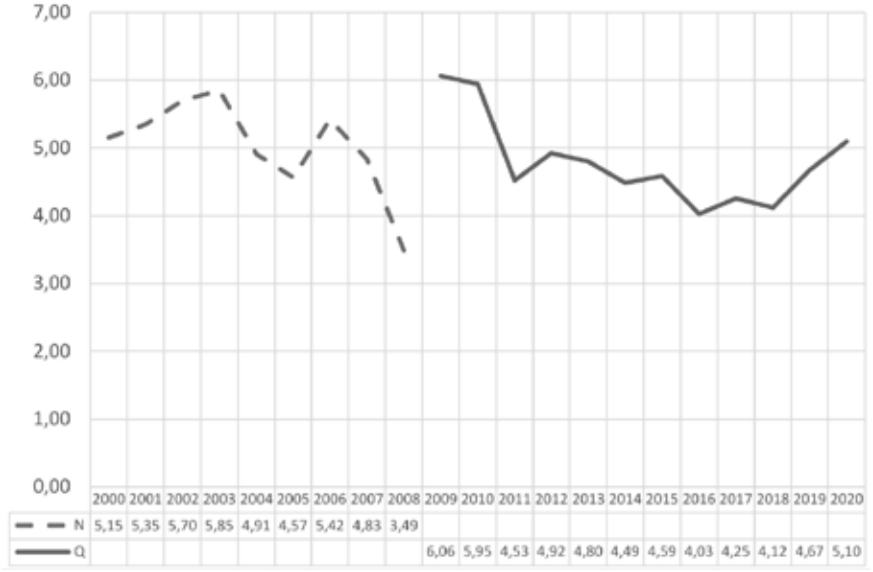

Figure 1: Altman Z- Score for All Companies
Source: *Authors' Calculation from CBRT Company Accounts*

The calculated Z- Score results are seen in the Figure 1. Because of the data limitation, we used two separate series. The dashed line, which is N series, covers the period from 2000 to 2008 and the other line which is Q series, covers the period from 2009 to 2020. The N line shows "Health and Social Work Companies" whereas Q line shows only "86- Human Health Companies". These two lines were good proxies for health sector in their years. In order to focus on human health activities and exclude residential care activities, we use this data set.

Between the period of 2000 and 2008, the Altman Z- Score was in downward trend. The average of the Altman Z- Score in this period was 5.03. The BRE of this score was B+. Similarly, the Altman Z- Score was in downward trend in the period of 2009 to 2020. Altman Z- Score in this period was 4.79. The BRE of this score was B.

Figure 2: Altman Z- Score for companies of different sizes
Source: *Authors' Calculation from CBRT Company Accounts*

The comparison of the Z- Score results according to the company size are seen in the Figure 2. Due to data limitation, we can only cover from 2009 to 2020 period. As it can be seen in the Figure 2, the Altman Z- Score of all firms is above the medium-size and large-size companies while below the micro-size and small-size companies generally. The minimum Altman Z- Score value for the companies is in 2016 except for small-size ones. Besides, the maximum Altman Z- Score value for the companies is in the beginning year, 2009 except for the large-size ones.

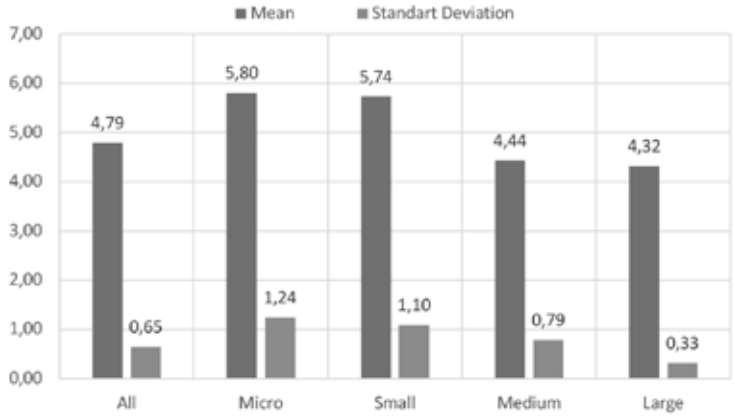

Figure 3: Mean and Standard Deviation of Altman Z- Score for Different Sizes
Source: *Authors' Calculation from CBRT Company Accounts*

The mean and standard deviation of the Z- Score results between 2009 and 2020 according to the company size are in the Figure 3. The highest average Altman Z- Score is the micro-size firms' whereas the lowest is large-size firms. In addition, the standard deviation is the highest in micro-size companies while the lowest is large-size companies.

Table 2: Z- Score Trend (2000-2008)

	2000	2001	2002	2003	2004	2005	2006	2007	2008		C *	Mean
X_1	0.32	0.47	0.6	0.41	0.41	0.09	0.21	-0.17	-0.24		1.53	0.23
X_2	0.03	-0.12	-0.16	-0.02	-0.83	-0.45	0.41	0.47	-0.06		-0.27	-0.08
X_3	0.32	0.69	0.61	0.8	0.49	0.59	0.52	0.47	0.17		3.47	0.52
X_4	1.24	1.06	1.4	1.41	1.59	1.09	1.04	0.82	0.36		1.17	1.11

Source: *Authors' Calculation from CBRT Company Accounts*

One can see the mean and contribution of the pillars in the Table 2&3. The darker color implies stronger positive or negative relationships than others. Here, mean is the average of contribution of each component of the Altman Z-Score without its coefficients. C* is the contribution of each of the component, which is calculated as follows:

C*= Mean of the Component * Coefficient of the Component

To illustrate for X_1

6.56*0.23 so 1.53 (numbers may not add to total due to rounding)

According to the results of Table 2, the highest contributor to Altman Z-Score is X_3 component for the 2000-2008 period which means profitability is the one of the most significant factors whereas the X_2 is negative. Therefore, we can understand that retained earnings is in trouble. Due to one component of retained earnings is net profit, when we compare two pillars, not net profit but interest expenses may be the reason of the X_3 pillar's contribution.

Table 3: Z- Score Trend (2009-2020)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		C *	Mean
X_1	0.13	0.14	0.08	0.06	0.06	0.04	0.05	0.02	0.02	0.00	0.04	0.08		0.40	0.06
X_2	0.11	0.1	0.01	0.02	0.03	0.01	0.02	0.00	0.01	0.00	0.02	0.05		0.10	0.03
X_3	0.09	0.07	-0.01	0.07	0.06	0.05	0.07	0.04	0.06	0.06	0.09	0.1		0.41	0.06
X_4	1.00	0.97	0.74	0.73	0.62	0.55	0.49	0.42	0.39	0.41	0.48	0.46		0.64	0.60

Source: *Authors' Calculation from CBRT Company Accounts*

According to the results of Table 3, the main contributor to Altman Z- Score is X_4 component because of the improvement of equity structure for the 2009-2020 period. This development is too beneficial for the sector. In addition to this, other components provide limited contribution to the rating for this period.

DISCUSSIONS AND CONCLUSIONS

To summarize, the financial distress of companies caused serious socio-economic losses and brings along some economic problems which have been effective in the implementation of financial distress forecast studies. With this regard, financial distress estimation has become an important research topic on businesses operating in different sectors. In order to deal with financial failure in the health sector, it is vital to have a specific management approach which focuses on early warning indicators such as Altman Z-Score.

Financial health of an industry can be shown via the credit ratings. Though there are ample of ways to calculate credit ratings, Altman Z- Score may be an easy way and it provides wider perspective to understand financial structure of the companies. The usage of Altman Z- Score has some advantages. The most significant one is its adaptive structure for different countries and sectors.

By implementing Altman Z- Score analysis, we can analyze sectoral financial statements at least in four different angles. The X_1 component reflects liquidity and the others reflect profitability, coverage and leverage respectively. In addition, bond equivalent ratings are the simple and clear sign of financial health for all stakeholders. One basic limitation of our paper is that we only concentrate on financial ratios.

When we look at the Altman Z-Score grades, we see that the "health and social work" and "human health" sectors are below investment grade on the average. In addition, the book value of companies is the key factor for the ratings in the period.

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