



Drug Expenditures of a Tertiary Hospital in Turkey: Before and After

Öncesi ve Sonrası: Türkiye’de Üçüncü Basamak Bir Hastanenin İlaç Harcamaları

Drug Expenditures of a Tertiary Hospital

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Özet

Amaç: Sağlık için ayrılan bütçe her yıl artmaktadır. Farmako-ekonomik araştırmalar ilaç tedavilerinin maliyet ve faydalarına odaklanmaktadır. Maliyeti etkileyen her türlü durum değerlendirilmelidir; minimum maliyet maksimum etki amaçlanmaktadır. Bu çalışmada üçüncü basamak sağlık kuruluşunun açılmasının ilaç maliyeti ve hasta sevk üzerine etkisinin değerlendirilmesi amaçlandı. **Gereç ve Yöntem:** Adiyaman ilinde bir hastanenin üçüncü basamak olmadan önce ve üçüncü basamak olduktan sonra acil servis, pediatri kliniği, pediatrik yoğun bakım ünitesi, yenidoğan yoğun bakım ünitesi, doğum salonu, riskli gebelik ve septik servise başvuran sevk edilen veya yatırılarak tedavi edilen hastaların sayıları ve ilaç maliyetleri karşılaştırıldı. Bu çalışmada elde edilen veriler sadece yılında bir ayını (Nisan 2012 ve nisan 2013) içermekte idi. Veriler retrospektif incelendi. **Bulgular:** Nisan 2012 ve nisan 2013 aylarında ayaktan ve yatarak tedavi edilen hastaların sayısı sırası ile 10838 ve 11066 idi. Nisan 2012’de ilaç maliyet 51515 TL (yaklaşık 25 000 USD) ve nisan 2013’de ise 75552 TL (yaklaşık 37 000 USD) idi. Yatan hastalardan nisan 2012’de 132’si, nisan 2013’de 91’i sevk edildi ($p<0.004$). **Tartışma:** Adiyaman’da üçüncü basamak sağlık kuruluşunun açılması ilaç maliyetini arttırmış fakat sevk sayısını azaltmıştır sonuç olarak total maliyet azalmıştır.

Anahtar Kelimeler

İlaç Giderleri; Sağlık; Üçüncü Basamak Hastane; Hastane Sevki

Abstract

Aim: The budget allocated to health is increasing every year. Pharmacoeconomic research focuses on the costs and benefits of drug therapy. All conditions affecting costs should be evaluated; minimum cost and maximum effect must be targeted. In this study we aim to analyze the effects of the opening of a new tertiary health center on the costs of treatment and patient referral. **Material and Method:** The changes in drug costs and the number of patients in the emergency departments, pediatric clinics, pediatric intensive care units, neonatal intensive care units, delivery rooms, wards for risky pregnancies, and the septic services of a new tertiary referral hospital in Adiyaman city were compared with those of its former secondary referral hospital. The data gained from the databases of the secondary referral hospital and the tertiary referral hospital was obtained in April of 2012 and April of 2013, respectively. The data were analyzed retrospectively. **Results:** The total number of patients who were managed as outpatients or hospitalized in April 2012 and April 2013 was 10,838 and 11,066, respectively. The total cost of the drugs was 51,515 TL (approximately 25,000 USD) for April 2012 and 75,552 TL (approximately 37,000 USD) for April 2013. The number of patients referred to other tertiary referral hospitals in April 2012 and April 2013 was 132 and 91, respectively ($p<0.004$). **Discussion:** Through the opening of a tertiary care center in Adiyaman city, the drug costs increased but the total number of referrals to other tertiary hospitals decreased; therefore the total costs were reduced.

Keywords

Drug Costs; Health; Tertiary Hospital; Hospital Referral

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Introduction

A society's most important resource is, obviously, its people. Hospitals are the main sites for the provision of health care to a country's populace. However, the cost of protecting people from disease and the resultant health-care expenditures account for a significant portion of a country's budget. Along with advances in medical science and technology, hospitals represent the largest portion of health-care expenses. Turkish health care centers are classified according to the services they offer: primary degree, secondary degree, and tertiary degree health care. State hospitals provide secondary degree services, while research and education hospitals and university faculties of medicine are the tertiary health-care providers (Official newspaper 2006, 26215/8). Emergency services, intensive care units, and inpatient services operate 24 hours a day [1]. Tertiary care centers offer the most advanced health care; therefore, they incur higher drug costs than other hospitals. According to the Turkish Ministry of Health's Annual Health-Statistics 2012, health-care expenses in 2012 increased by 10% over the previous year, reaching 59 billion Turkish Liras (TL) (approximately 25 billion USD). Nearly 50% of these expenses were related to hospital expenditures.

In economics, costs are classified as direct costs, indirect costs, and intangible costs [2]. Drugs and health-care expenditures are examples of direct costs. Pharmaco-economics is the discipline that investigates how to provide optimum health-care services with available resources by identifying, measuring, and comparing costs, risks, and benefits of health-care programs, services, and therapies [3,4]. In recent literature, much attention has been given to the pharmaco-economic analysis of the effects of obesity, diabetes, cancer, and smoking but there is no research indicating how costs are affected when a hospital is promoted from a secondary degree status to a tertiary degree status [5-7].

In this study, we compared two parameters before and after the Adiyaman University hospital became a tertiary care center: drug costs and the number of patients referred and transported to a distant health-care center because of the unavailability of sufficient health care facilities at their original location.

Material and Method

The changes in the drug costs and the number of patients in emergency departments, pediatric clinics, pediatric intensive care units, neonatal intensive care units, delivery rooms, wards for risky pregnancies and the septic services of a new tertiary referral hospital in Adiyaman city were compared with those of its former secondary referral hospital (April 2012: Group 1; April 2013: Group 2). Legal permission was obtained from the hospital authorities to conduct this study (Document number: 23.01.2014-624). The Anatomical Therapeutic Chemical (ATC) system was used to determine the drug groupings. Data were retrospectively evaluated.

The Statistical Package for the Social Sciences (SPSS) version 13 for Windows (IL, USA) software was used for the statistical analysis. The two rate test was used to compare and analyze the number of patients treated in each department. An independent Student's t test was used to track the number of patients referred to hospitals outside of the province and taken

there by ambulance, drug expenditures per patient, and drug expenditures of Groups 1 and 2. The results were considered significant at $p < 0.05$.

Results

The total number of patients who were treated as outpatients in emergency departments or hospitalized for inpatient services in Groups 1 and 2 was 10,838 and 11,066, respectively (Table 1). The total cost of the drugs was 51,515 TL (approx-

Table 1. The number of patients in each department.

Delivery Room Risky Pregnancies Service	Number of patients		P<0.05
	Group 1 (April 2012) n (%)	Group 2 (April 2013) n (%)	
Septic Services	760 (7)	839 (7.5)	0.11
Pediatric Clinic	489 (4.6)	568 (5.1)	0.03
Pediatric Intensive Care Unit	92 (0.8)	70 (0.7)	0.3
Neonatal Intensive Care Unit	143 (1.3)	129 (1.2)	0.06
Emergency Department	9354 (86.3)	9460 (85.5)	0.08
Total	10838 (100)	11066 (100)	

mately 25,000 USD) for Group 1 and 75,552 TL (approximately 37,000 USD) for Group 2 (Table 2). Drug expenditures per pa-

Table 2. Description and expenditures of drugs as Anatomical Therapeutic Chemical (ATC) group.

	Drug Costs (Turkish Liras)		P <0.05
	Group 1	Group 2	
Group A (Alimentary tract and metabolism)	2080	1925	<0,001
Group B (Blood and blood forming organs)	1542	4742	<0,001
Group C (Cardiovascular system)	1088	356	<0,001
Group D (Dermatologicals)	496	390	<0,001
Group G (Genito-urinary system and sex hormones)	3782	14878	<0,001
Group H (Systemic hormonal preparations, excluding sex hormones and insulins)	3835	5592	0,77
Group J (Antiinfectives for systemic use)	20586	28728	<0,001
Group M (Musculo-skeletal system)	230	584	<0,001
Group N (Nervous system)	1800	1933	<0,001
Group P (Antiparasitic products, insecticides and repellents)	773	404	<0,001
Group R (Respiratory system)	15217	15976	<0,001
Group S (Sensory organs)	86	45	<0,001
Total (Turkish Liras)	51515	75552	

tient were 4.75 TL (approximately 2.20 USD) in Group 1 and 6.8 TL (approximately 3.30 USD) in Group 2 ($p = 0.59$). There was a decrease in the number of patients admitted to the pediatric intensive care and the neonatal intensive care units; however, there was no statistical difference between the numbers of patients in these groups. The number of pediatric clinic patients increased between April 2012 and April 2013. There were 132 patients in Group 1 and 91 patients in Group 2 who were transferred and hospitalized outside of the province ($p < 0.004$). The number of patient transfers was significantly higher in Group 1 than in Group 2.

Discussion

According to the Turkish Statistical Institute report for Adiyaman 2012, Adiyaman province has a population of 595,261 people, 217,463 of whom live in the city center. In 2012, there were three hospitals in the city center associated with and financially dependent on the Turkish Ministry of Health. These were secondary degree hospitals, and the number of referrals from outside of the province was expectedly high. Because Adiyaman province had the lowest number of hospital beds per 100,000 people (93/100,000) in 2011, naturally, the number of referrals to other hospitals was high.

The World Health Organization (WHO) has been involved in the debate about the contribution of technological innovation to improvements in health indicators. They have stated that new drugs, medical devices, and overall improvements in health-care technology have played an important role worldwide in the positive upward trend in the status of health care. According to the WHO, improvements in health-care technology accounted for approximately 40–50% of the decrease in infant and child mortality and the increase in life expectancy in the 20th century. It should be noted that the expected improvement to health care is related to the quality of the services provided.

In this study, we evaluated whether or not drug expenditures and the number of referrals to other hospitals increased or decreased after a tertiary hospital was opened in Adiyaman city. When the Adiyaman University School of Medicine began operating, it provided Adiyaman with a tertiary health care center in its Pediatric and its Obstetrics and Gynecology Clinics. This hospital began to serve as a tertiary health care center in August 2012. Two pediatric cardiologists, two neonatal specialists, and a professor of pediatric infectious diseases were working in the pediatric clinics at the time of the study. There were no significant statistical differences in the incoming number of patients at these clinics. However, along with the decrease in the number of referrals to other hospitals, there was an increase in drug expenditures. For each patient who was referred to a hospital outside of the province and taken there by ambulance, there were additional expenses. The patient's relatives and a health officer were also transported with the patient, increasing the overall costs for the ambulance, social worker, and driver. The Ministry of Health spends a considerable amount of money for ambulances and ambulance workers' salaries. After these referrals, the patients' relatives also incur additional expenses as long as the patients remain in the referral hospital. Hospital referrals consume time and money that could otherwise be spent on treatment. All capital required to fund these services must be provided by the state.

Cost-minimization, cost-benefit, cost-utility, and cost-effectiveness are used for cost evaluation [2]. But these techniques have primarily been used to compare the efficacy of treatments for common diseases such as diabetes mellitus, asthma, and cancer [8-10]. However, this study could not identify a complete approach that would also analyze direct costs, indirect costs, and the intangible costs that are all involved in total hospital expenses. A limitation of this study is that these costs were not calculated. Studies considering these approaches should be considered for expanded research in the future.

Opening of the tertiary health center in Adiyaman has de-

creased the number of referrals to hospitals outside of the province, but has increased the hospital's drug costs. This factor is generally disregarded in the literature. However, this study indicates that increasing the quality of health-care service by promoting hospitals from secondary to tertiary status significantly reduces patient mobility costs, which were higher than initially estimated.

Competing interests

The authors declare that they have no competing interests.

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