

Assessing Direct Non-Medical and Indirect Costs for Patients Migrating from Underserved to Developed Regions in Iran: A Study from 2020-2021

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Abstract

Background: Access to healthcare services is a prerequisite for societal justice. Unfair distribution of these services can lead to patient migration to cities with higher quality medical centers for better medical services. This study aimed to determine the direct and indirect non-medical costs of patients referred from Sistan and Baluchestan to hospitals in Mashhad.

Methods: A descriptive-analytic study was conducted in Eastern Iran in 2020. The research sample included all patients who migrated from Sistan and Baluchestan to Mashhad for medical purposes and were hospitalized in government hospitals affiliated with Mashhad University of Medical Sciences. The total number of these patients was 2062, and they were identified using a census method in 2020. Given the large population size (2060 individuals), 350 patients were selected as a sample based on the Cochran method. A validated checklist was used for data collection, and SPSS-23 software was used for data analysis.

Results: The average direct non-medical cost for medical services in Mashhad was 61,686,857 Rials (270 USD). The highest and lowest costs were related to travel costs (26,545,714 Rials or 116 USD), and care received for children (37,142 Rials or 0.16 USD), respectively.

Conclusion: According to the results of this research, an increase in direct non-medical and indirect costs due to patient migration for treatment imposes significant costs on patients and their families. It is crucial to have an equitable distribution of health and treatment resources and facilities across a country's geographical regions to ensure access to health services.

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Introduction

Today, the healthcare system is one of the most important sectors and indicates social development and welfare.¹ In most developing countries, approximately 5-10% of government expenditures are allocated to the health sector.² The rapid increase in healthcare costs worldwide has posed challenges to economic experts, managers, physicians, and nurses, prompting

them to find new ways to limit these costs.³ Hospitals, which constitute the most significant and costly part of healthcare systems, account for more than two-thirds of health expenses and significantly impact the overall quality of healthcare.⁴⁻⁶ Despite the substantial financial resources allocated to the healthcare system and hospitals, a gap exists between the growth of available resources and those needed by the healthcare system.^{7,8}

Access to healthcare services is a prerequisite for justice in society.⁹ People can access healthcare information faster today than in the past, so they have higher expectations for the quality and performance of healthcare services.¹⁰ Human and financial resources remain limited despite all efforts to expand access to healthcare services. Regional differences caused by geographical disparities and other limitations lead to an unequal distribution of resources across different health and treatment centers. These regional inequalities can impact the quantity and quality of medical services, ultimately leading to the migration of patients to regions with higher-quality medical centers to receive better-quality medical services.¹⁰ Saber Mahani et al. demonstrated that focusing on the quality aspect of medical services, the cost of providing services and providing welfare facilities to patient companions are significant factors in eliminating or reducing unnecessary migrations.¹¹ The causes of these migrations are either unavoidable structural displacements (travel and displacement between different regions and the need for emergency services) or the lack of resources or lower quality of services provided, which are avoidable.¹² On one hand, patients' migration decreases the bed occupancy rate of regional hospitals and leaves resources and funds unused. Health system policymakers allocated these resources and funds based on the population rate of the regions. These displacements cause losses for central hospitals and increase their need for more government budgets.¹³ On the other hand, migration and the use of larger hospital services increase patient costs.¹³

The cost of hospital services can be burdensome for many people, so some individuals cannot afford these services. The increase in these costs places a heavy burden on patients, which can sometimes lead to treatment delays, lack of patient cooperation, reduced access to essential medical services, and ultimately, a decrease in the overall health level of society.¹⁴⁻¹⁶ Omidi et al. demonstrated that reducing the medical costs of hospitalized patients and promoting justice can increase patient satisfaction.¹⁷ An analysis of direct non-medical and indirect cost estimates can play a fundamental role in enhancing the understanding of healthcare systems by decision-makers. This analysis can provide better insight into identifying medical and management areas that need improvement to meet healthcare service needs.¹⁰

Sistan and Balouchestan, the largest province of Iran, covers 11.4% of the country's total area. Despite its size, it is one of the most deprived provinces in the country based on development indicators and is considered the least privileged region in terms of social welfare.^{8, 18, 19} The issue of migration to receive higher quality medical services and the associated costs has been a long-standing problem in Sistan and Balouchestan province. According to investigations,

no study has been conducted on the cost of patients who have migrated to hospitals in other cities. Therefore, this study aimed to determine the direct non-medical and indirect costs of patients referred from Sistan and Balouchestan to Mashhad hospitals.

Methods

A descriptive-analytical study was conducted in the east of Iran from 2020 to 2021. The study population comprised all patients who migrated from Sistan and Balouchestan to Mashhad for medical purposes and were hospitalized in government hospitals affiliated with Mashhad University of Medical Sciences (MUMS) during the same period. The inclusion criteria encompassed all patients whose residences were listed in the provinces of Sistan and Baluchistan and who sought treatment at MUMS hospitals from 2020 to 2021. A willingness to participate in the research was another criterion for inclusion in the study. Exclusion criteria included the patient's and their companion's inability to respond and communicate in Persian.

Approximately 2063 individuals migrated to Mashhad to receive medical treatment during 2020-2021. According to the Cochran method, 350 patients were selected as study samples ($d=5\%$, confidence level= 95% , and $P=0.5$).

$$n = \frac{Z_{1-\frac{\alpha}{2}} \cdot p(1-p)}{d^2}$$

Stratified and systematic sampling methods were employed to identify patients transferred to the hospitals affiliated with Mashhad University of Medical Sciences (MUMS). Initially, the total number of patients was categorized based on different hospitals. Subsequently, samples were systematically selected from each category. The remaining samples were chosen from those whose hospitalization time was closer to the interview time and who were willing to participate in the interview. The interview was then conducted, and the information was recorded.

The study was approved by the Ethics Committee of Zahedan University of Medical Sciences (IR.ZAUMS.REC.1399.522). The study's objectives were initially explained to the participants, and necessary clarifications were provided regarding the confidentiality of information and voluntary participation in the study. Additionally, participants were informed about their rights, such as the option to withdraw from the study at any point during the research process.

In this study, a checklist was utilized to collect data. The checklist was designed based on demographic information and the information recorded in the patients' medical files. It included questions about the direct non-medical and indirect costs incurred by

the patient and their accompanying person from the start to the end of the medical journey. These included travel costs to and from Mashhad, accommodation and food costs, caring for older adults or children in the patient’s absence, and the cost of telephones and similar communication devices. The direct non-medical costs in this study included the costs related to travel, accommodation, food, and communication, which the patient and their companions bore during their migration to Mashhad for medical services. Indirect costs refer to the loss of income of the patient and their companions due to the patient’s migration to Mashhad for medical services. The researchers conducted data collection via telephone to enhance accuracy. Following the data collection process, the collected data were analyzed using SPSS-23 software. The costs were reported in Iranian Rials (IRR) and could be converted to US Dollars according to the mean exchange rates at the time of data collection (from April 2020 to March 2021) obtained from the Statistical Center of Iran (1 USD=228809 IRR).²⁰ The Kolmogorov-Smirnov test was used to check the normality of data distribution. Descriptive statistics, such as frequency, frequency percentage, and average, and inferential statistics, such as the Mann-Whitney test, were used to analyze the data.

Results

The number of patients referred from Sistan and Balouchestan to the hospitals affiliated with Mashhad University of Medical Sciences (MUMS) was 2063 in 2020. Their demographic information is presented in Table 1. According to this table, most migrant patients were men, accounting for 1110 individuals or 54% of the total. Approximately 36% of the patients were in the 30 to 59 age group. Additionally, 1108 patients, or 54%, were married, and 112 individuals, or 5%, did not have basic insurance coverage.

As depicted in Table 2, the average direct non-medical cost for the examined samples undertaking medical travel to Mashhad was 61,686,857 Rials. Furthermore, the largest and smallest portions of direct non-medical costs were associated with travel costs (26,545,714 Rials) and receiving care from others (37,142 Rials), respectively.

Based on the results presented in Table 3, the data normality test indicated that the average direct non-medical cost does not follow a normal distribution ($P < 0.05$). Consequently, the non-parametric Mann-Whitney test was employed to examine the relationship between the variables. The outcomes of

Table 1: Demographic and Descriptive Analysis of Patients from Sistan and Balouchestan Referred to Mashhad University Medical Hospitals

Variable	Dimension	Frequency	Percentage
Sex	Male	1110	54%
	Female	953	46%
Age	Lower than 5 years old	402	19.5 %
	5-17 years old	308	15%
	18-29 years old	234	11.3%
	30-59 years old	744	36%
	More than 60 years old	375	18.2%
Marital Status	Single	832	40%
	Married	1108	54%
	Divorced etc.	123	6%
Basic Insurance	Healthcare	1354	66%
	Social Security	521	25%
	Armed Forces	60	3%
	Other	16	1%
	Without Basic Insurance	112	5%
Supplementary Insurance	With Supplementary Insurance	8	0.5%
	Without Supplementary Insurance	2055	99.5%

Table 2: Distribution of Direct Non-Medical Costs Among Patients from Sistan and Balouchestan Seeking Medical Care at MUMS’ Hospitals (in Rials)

Variable	Number	Minimum	Maximum	Average	Standard Deviation	Total Costs
Intercity transportation costs	350	10,000,000	60,000,000	26,545,714	10,193,650	9,291,000,000
Intra-city transportation costs	350	1,000,000	20,000,000	2,242,857	1,943,217	785,000,000
Accommodation costs	321	0	100,000,000	14,327,142	12,007,375	5,014,500,000
Food expenditure	349	0	50,000,000	15,725,714	10,565,889	5,504,000,000
Communications expenditure	346	0	5,000,000	614,000	621,075	214,900,000
Souvenir costs	102	0	20,000,000	2,194,285	4,057,180	768,000,000
The cost of receiving care from children	2	0	8,000,000	37,142	503,617	13,000,000
Total	350	11,000,000	263,000,000	61,686,857	27,175,989	21,590,400,000

Table 3: Demographic Analysis of Direct Non-Medical Costs for Patients Migrating to MUMS' Hospitals (2020-2021)

Variable		Direct non-medical costs (Rial)	Average	Standard Deviation	Minimum	Maximum	P
Sex	Female	61,872,154	26,482,255	21,200,000	145,000,000	0.779	
	Male	61,548,756	27,743,270	20,100,000	201,000,000		
Place of Residence	City	64,390,187	28,240,170	21,200,000	146,000,000	0.057	
	Rural	57,433,088	24,743,074	20,100,000	201,000,000		
Age	<5	64,418,000	27,032,412	28,100,000	146,000,000	0.672	
	5-18	58,482,465	25,834,052	21,200,000	113,000,000		
	19-29	63,119,230	30,802,230	20,100,000	201,000,000		
	30-59	62,384,732	2,649,697	25,200,000	145,000,000		
	>60	59,690,000	27,165,479	21,200,000	132,000,000		
Basic Insurance	Yes	62,107,917	27,305,646	20,100,000	201,000,000	0.042	
	No	45,733,333	15,386,601	26,200,000	79,000,000		
Type of Basic Insurance	Iranian Health (Rural)	62,939,285	27,934,488	21,200,000	201,000,000	0.693	
	Social Security	59,910,377	25,777,302	20,100,000	151,000,000		
	Armed Forces	65,711,111	32,832,127	21,200,000	126,500,000		
	Others	69,250,000	14,495,689	59,000,000	79,500,000		
Education Level	Illiterate	62,190,909	26,362,104	22,200,000	146,000,000	0.585	
	High school	58,481,981	25,590,673	21,200,000	132,000,000		
	Diploma	60,723,076	22,365,678	27,200,000	114,000,000		
	Associate Degree and more	53,047,058	22,282,872	20,100,000	102,500,000		
Income	Yes	64,061,538	28,749,221	24,100,000	201,000,000	0.259	
	No	60,414,107	26,572,678	20,100,000	151,000,000		

the Mann-Whitney test revealed that the distribution of non-medical direct costs among individuals with one of the basic health insurances is distinct, and the average direct non-medical costs are higher in individuals with one of the basic medical insurances ($P < 0.05$). Furthermore, the Mann-Whitney test results demonstrated that the average direct non-medical costs differ between those with and without income ($P < 0.05$).

According to Table 3, the average direct non-medical costs do not vary in gender, place of residence, age groups, different basic health insurance, and education ($P > 0.05$).

Table 4 shows that the total indirect cost in patients due to medical travel to Mashhad was 12,972,126 Rials.

According to Table 5, the average indirect cost did not differ between men and women, nor between individuals covered by one basic health insurance and those without it ($P > 0.05$). Additionally, the distribution of indirect costs among individuals covered by different basic health insurances and between those with and without income did not show any significant difference ($P > 0.05$).

Based on Table 5, the distribution of indirect costs (lost productivity) is not equal between city and rural

residents. The average indirect cost was higher in city residents than rural areas ($P < 0.05$). Also, the average indirect cost varied among different age groups ($P < 0.05$). This difference was observed in the age group of less than five years and more than 60 years ($P < 0.05$). The results indicated that the distribution of indirect costs among educational groups is different ($P < 0.05$). This difference in the illiterate and educated group is less than that in the diploma group ($P < 0.05$).

Discussion

This study investigated the direct and indirect non-medical costs of patients who were referred from Sistan and Balouchestan to MUMS' hospitals to receive treatment services. According to the results, the total direct non-medical costs and indirect costs were 61,686,857 and 7465893 Rials, respectively, among migrated patients. This figure is 1.5 times more than the average income of the patients (49,152,857 Rials), and this cost is added to the direct treatment costs. Patients referring to other cities face high costs, so providing quality medical services can prevent migration. In the study by Saber Mahani et al., one of the reasons for the migration of patients from Kerman to Yazd is the lower cost of receiving services in that city. These costs include the direct costs of receiving services in hospitals,

Table 4: Average Indirect Costs for Patients from Sistan and Balouchestan Seeking Medical Care at MUMS (in Rials)

Variable	Number	Minimum	Maximum	Average	Standard Deviation	Total Costs
Indirect costs	77	0	54,000,000	3,204,714	7,829,578	1,121,300,000
Indirect costs for companions	231	0	97,000,000	9,750,000	12,544,095	3,393,000,000
Total	300	0	151,000,000	12,972,126	14,300,253	4,514,300,000

Table 5: Demographic Analysis of Indirect Costs for Patients Migrating to MUMS' Hospitals (2020-2021)

Variable	Direct non-medical costs (Rial)	Average	Standard Deviation	Minimum	Maximum	P
Sex	Female	12,122,108	10,882,428	0	62,500,000	0.856
	Male	13,593,781	16,353,329	0	114,000,000	
Place of Residence	City	14,788,967	16,528,993	0	114,000,000	0.016
	Rural	10,105,555	9,153,787	0	75,000,000	
Age	<5	15,340,000	10,238,710	0	40,000,000	0.001
	5-18	12,155,262	10,742,630	0	70,200,000	
	19-29	11,622,884	13,212,006	0	75,000,000	
	30-59	13,337,000	14,631,591	0	114,000,000	
	>60	12,139,830	19,639,328	0	97,000,000	
Having basic Insurance	Yes	13,042,005	14,461,130	0	114,000,000	0.836
	No	10,340,000	5,154,143	3,000,000	20,040,000	
Type of Basic Insurance	Iranian Health insurance	13,194,009	12,948,144	0	75,000,000	0.053
	Social Security	12,070,660	17,296,058	0	114,000,000	
	Armed Forces	19,631,111	14,474,968	0	40,000,000	
	Others	14,182,121	9,654,320	0	40,000,000	
Education Level	Illiterate	10,509,181	14,339,626	0	97,000,000	0.000
	High school	7,450,769	6,098,484	0	22,500,000	
	Diploma	8,323,529	7,142,835	0	23,380,000	
	Associate Degree and more	14,477,692	17,910,602	0	114,000,000	
Income	With income	12,405,313	12,536,849	0	97,000,000	0.861
	Without income	1,303,367	14,384,002	0	114,000,000	

especially private hospitals, and the indirect costs during the treatment process, such as accommodation for the patient and his companions.¹¹ High direct payment costs can reduce patients' access to essential treatments, reduce the use of effective drugs, and ultimately reduce the health status and quality of life, especially for low-income patients. These costs can quickly increase and affect the family budget.²⁰

In this study, the most significant direct non-medical cost was related to traveling from Sistan and Balouchestan to Mashhad and back, and the reason is the distance from the origin to the destination, which was consistent with the results of previous studies.^{14, 21-24} The increase in direct non-medical costs due to migration decreased the quality of services.¹⁴ This finding shows that patients from farther regions face more side costs, which can be unaffordable, and this can impose heavy financial pressure on the health system and especially on patients and their families.^{25, 26}

Income level is also one of the variables that have a significant relationship with direct non-medical costs. As a main and fundamental factor, financial status is effective in most aspects of people's lives and gives more scope for choice and freedom of action to people in society.^{7, 8} The higher a household's income level, the higher its capacity and ability to pay, and the lower the probability of facing catastrophic costs. In various studies, this result has been confirmed and proven.^{21, 22, 24} Catastrophic healthcare costs occur when households need to spend a significant portion of their net income on healthcare.^{19, 27, 28} In most Low and Middle-Income Countries, households with higher

financial capabilities usually have a larger share of family resources for healthcare services, while people experiencing poverty have to devote their resources to other basic needs and requirements such as food, housing, and clothing.²⁴ A study conducted by Semnani and Keshtkar in northern Iran demonstrated that low-income households spend about 40% of their income on healthcare costs, while this ratio is about 9% for wealthy households.²⁹

In this study, the indirect costs of illiterate patients were higher than others. This finding could be because people with higher education can have governmental jobs and obtain permission from their workplace for treatment. In this study, this opportunity was not considered for illiterate people, and they did not have this advantage.

In this study, the direct non-medical costs in patients without basic medical insurance were lower than in patients with basic insurance. This issue could be because the cost of treating patients without basic insurance is higher than that of those with basic insurance, so they are forced to save as much as possible in order to be able to pay for their treatment.³⁰ In their study, Ghiasvand et al. and Ekman et al. did not consider the effects of basic insurance in reducing costs.^{22, 24} Also, they reported greater sensitivity of the insured people in health care use.²⁴ Sepehri et al. also showed that people with compulsory health insurance are hospitalized more often than those without insurance.³⁰ It seems that the design and implementation of government insurance plans without taking into account important factors such as

socio-economic status, demographic characteristics, pattern trends, and finally, the epidemiology of diseases in our country is one of the causes of the ineffectiveness of health insurance plans in supporting patients.²² In a study conducted by Akman et al. in 2007, it was concluded that the insurance programs in Zambia had no effect. They have not been able to prevent the occurrence of heavy costs of healthcare services. This is due to the existence of several key factors that include issues related to quality assurance and monitoring of service delivery.²²

According to the results, the indirect costs of urban residents were more than those of rural patients, which could be due to the type of occupation of patients and their companions and the higher income of urban residents compared to rural residents. A higher income level can indicate that more people enjoy all the blessings of life, so higher income positively affects people's lives.³¹ Indirect costs have more effect on people with higher incomes.³² For this reason, people with high incomes seek the best care to improve their health status, and people with low incomes choose self-care due to the increasing costs of hospitals.⁷ By the way, most of the rural population includes farmers and ranchers, so they may go for treatment when it is not their income-generating season, and they may not experience a decrease in income. Due to the type of urban jobs, most city dwellers usually experience a decrease in income when they leave their city.³³

Based on the present results, the indirect costs of patients under five years old are higher than those of other patients. Probably, these persons need to be accompanied and cared for by their parents at the same time, which causes a decrease in the family's income.

One of the limitations of this study is that some patients are referred to private hospitals in Mashhad. As a result, the obtained statistical data do not represent all Sistan and Baluchestan patients referred to Mashhad hospitals. Hence, more attention is needed to the generalizability of research results to other regions or countries.

Conclusion

According to this research, increasing direct non-medical and indirect costs due to patient migration for treatment imposes many costs on patients and families. Since there is a positive relationship between the level of access to healthcare services and the health of people in society, equality is necessary in the distribution of health and treatment resources and facilities between the geographical regions of a country. The first step in preventing and reducing inequality in the distribution of healthcare resources and facilities is gaining information and understanding the status of access to healthcare services and facilities in the regions.

Authors' Contribution

All the authors made significant contributions to this study. In addition, all authors have agreed to take responsibility for the accuracy and integrity of the work as a whole.

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