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Burden of Chronic Low Back Pain in the Turkish Population

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Abstract

Objective: Chronic low back pain (CLBP) is a great economic burden to the society mainly in terms of the large number of the lost work days and disability, and it appears to be growing. The economic burden of LBP in Turkey is not known. This study aims to analyze the health care resource use, work and productivity loss, and health-related economics of CLBP in Turkey.
Material and Methods: The study was designed as a multi-centered cross-sectional survey of patients in physical therapy and rehabilitation clinics from eight different regions of Turkey and 662 patients with CLBP over 18 years of age were included. Data on patient sociodemographics, disease-related healthcare resource use during the previous 6 months, inability to work during the last 3 months, Roland Morris Disability Index for the functional status, and psychological health with Beck Depression Scale were collected. Direct costs included medical visits, investigations, medications, hospitalizations, orthopedic aids, and physical therapy. İndirect costs were evaluated mostly with productivity loss.
Results: The total annual direct costs for CLBP per patient were estimated at 1080 TL. The indirect costs were estimated at 5511 TL per patient. Direct cost was correlated with disease severity, duration, and age. Indirect cost was higher in women.
Conclusion: The indirect costs for CLBP were significantly higher than the direct costs.
Keywords: Low back pain, burden, economic cost

Introduction

Low back pain is a musculoskeletal disorder that is frequently observed and is a great economic burden to society (1, 2). Approximately 70%–84% of people experience low back pain at some period in their lives. The annual prevalence of low back pain is 15%–65%, and the point prevalence is 30%–33% (3, 4). In Turkey, the lifelong prevalence of low back pain was found to be 44%–79%, whereas the point prevalence was 20.1%–19.7% and annual prevalence was 35.99% (5,6).

Fifteen percent of low back pain cases were chronic. Although chronic low back pain cases constitute a small group, they result in high cost, together with severe pain and significant physical and activity restriction (7, 8).

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The economic burden of the disease is divided into two groups as direct and indirect costs and is generally calculated with the "human-capital method". While direct costs include the expenses for diagnosis, treatment, and rehabilitation, indirect costs are calculated considering the loss of production associated with morbidity and mortality (9).

In England, direct and indirect costs related to low back pain were reported to be 1.632 and 10.668 million pounds, respectively, in 1998 (10). In Australia, in 2001, direct costs were estimated to be 1.02 million Australian dollars and indirect costs were 8.15 million Australian dollars, with a total cost of 9.17 million Australian dollars (11). In USA, direct and indirect costs are 84.1 and 624.8 million dollars respectively (12).

Cost studies for low back pain include the data from industrial countries; however, there have been no data from Turkey. This study aimed to evaluate the use of health care resources and labor loss in patients with chronic low back pain and to calculate total economic burden of the disease in Turkey.

Material and Methods

The economic burden of a disease can be calculated using a "disease–cost method", which describes various categories of costs (13). In this type of study, direct and indirect costs are calculated.

Because this study was conducted from a social perspective, all expenses of an individual, employer, and health system were taken into consideration. Both direct and indirect costs were considered. For direct costs, hospital care, outpatient clinic visits, diagnostic tests, medical treatments, orthopedic aids, physical therapies, and financial supports for home care were calculated. Unit prices of medical resources were obtained from the 2013 Communiqué on Health Practices payment list (14) and drug reference guide Vademecum (15). Moreover, reported examination fees are the fees for examination packages. In other words, all radiology, biochemistry, and bacteriology tests are included in these fees (including examination fee), except featured examinations, such as magnetic resonance imaging (MRI), computed tomography (CT), and Doppler USG.

In our study indirect costs were mostly evaluated considering the loss of production (decreased production potential due to changes in the health status or being off, labor loss, a patient's not being able to go to work on the day of visiting a health institution, early retirement, accompanying person's not going to work, and taking financial support for travel expenses or household chores). Indirect costs were attempted to be estimated by multiplying lost working hours that were associated with chronic low back pain by the average hourly wages in Turkey. Hourly wage was determined as 6.12 TL over the minimum wage by considering 8 working hours in a day. Decreased performance was evaluated by multiplying the decrease in working capacity declared by a patient (%) by the normal working hours (8 h for full-time employment). The support for household chores was calculated on the basis of the minimum wage because of the absence of a standard in Turkey.

Annual costs were calculated by multiplying direct costs by 2 (2×6 months) and indirect costs by 4 (4×3 months).

In Turkey, the monthly wage (minimum wage) was 978.60 TL in 2013.

The study was conducted with 10 physical medicine and rehabilitation specialists from seven geographical regions of Turkey, including Anatolian and the European sides of the Marmara, Aegean, Central Anatolia, Black Sea, Mediterranean, Eastern Anatolia, and Southeastern Anatolia Regions, between August 2012 and January 2013. In this study, 662 patients with mechanic low back pain, who were 18 years old or more, who had low back pain for at least half of the days within the last 3 months, and who applied to the clinics of physical medicine and rehabilitation, were included. Patients with acute fracture, neoplasia, infection, and low back pain that was associated with pregnancy or that radiate from the abdominal and pelvic organs were excluded from this study.

A questionnaire, including the sociodemographic data, use of healthcare resources within the last 6 months, and ability to work within the last 3 months, the Roland Morris Disability Index (R&M) for evaluating functional status (16,17), and the Beck Depression Scale (BDS) for evaluating depression status (18) were used.

The first questionnaire was completed by a physiatrist and patient together. The patients' demographic features (age, height, weight, and occupation), duration and feature of pain, number of visits to a physician because of low back pain, names of the physicians visited, availability of an accompanying person with the patients, working status of the accompanying person, whether he/she got permission from work or not, travel costs, names and number of diagnostic methods within the last 6 months, drugs that were used for low back pain within the last 6 months, treatments that were applied, accessory devices that were used (corset, belt, wheel chair, and orthopedic bed), durations of labor loss within the last 3 months (the number of days for which health reports were provided, inability to do household chores, receiving support for household chores, early retirement because of low back pain, being paid for disablement, and decrease in working capacity), and hospitalization histories were recorded. The R&M and BDS questionnaires were completed by patients after the visit.

This study was approved by the ethics committee of the İstanbul Medeniyet University Göztepe Training and Research Hospital. Written informed consent forms were obtained from all patients who participated in this study.

Statistical Analysis

The mean, standard deviation, median, frequency, and ratio were used for defining the data in the statistical analysis. In the comparison of quantitative data, one-way variance analysis was used for intergroup comparison of the normally distributed variables and Tukey's HSD test was employed for detecting the group that caused differences. The convenience of variables to normal distribution was evaluated by the Kolmogorov–Smirnov test. In the intergroup comparison of variables that did not display a normal distribution, the Kruskal–Wallis test was used. Furthermore, the Mann–Whitney U test was used for detecting the group that caused differences and for evaluating this according

to the two groups. The linear relationship between numerical variables was assessed using Spearman's correlation analysis. Multiple linear regression analysis was preferred for investigating the effects of other variables on the total cost. For statistical controls of the hypotheses, a significance level of α=0.05 and a p value of p<0.05 were accepted.

Results

Characteristics of Patients

Of 662 patients with chronic low back pain, 30.4% were male and 69.6% were female. The mean age was 46 years. The mean time for the onset of symptoms was 5 years. Most patients were housewives. Descriptive data of the patients are presented in Table 1.

Direct Costs

The total costs for hospitalization, outpatient clinic examination, and physical therapy are shown in Table 2.

The cost per person was 91.01 TL for 662 patients who were examined in the outpatient clinic of physical therapy and rehabilitation. The other examination fees are shown in Table 2.

In the evaluation of the laboratory and imaging costs, it was observed that the most common radiological examination technique that was ordered was MRI (n=337, total cost= 21905 TL). The second most common one was X-ray. Blood analysis and X-ray costs were calculated in the package price. Total laboratory and imaging costs were found to be 24239 TL.

The most common drugs administered to patients were non-steroidal anti-inflammatory drugs (NSAIDs), whereas gastroprotective drugs and muscle relaxants and analgesics fol-

Table 1. Distribution of the descriptive features

		Min–Max	M±SD
Age (year)		18–88	46.37±15.14
Height (m)		1.42–1.90	1.64±0.08
Weight (kg)		42–120	73.36±13.41
BMI (kg/m^2)		16.98–44.96	27.19±4.98
Duration of pain (month)		3–480	53.19±90.91
		n	%
Age group	Young (<60)	523	79
	Elderly (>60)	139	21
Gender	Male	201	30.4
	Female	461	69.6
BMI (kg/m^2)	Thin	35	5.3
	Normal	201	30.4
	Overweight	244	36.9
	Obese	182	27.5
Working status	Working	205	31
	Retired	121	18.3
	Other (housewife)	336	50.8

BMI: body mass index; Min: minimum; Max: maximum; M: mean; SD: standard deviation

Table 2. Direct costs

	n (%)	Total number	Total direct cost (TL)	Direct cost per person (TL)
Neurosurgery/ hospitalization (day)	3 (0.5%)	12	408	0.62
Physical therapy and rehabilitation/ hospitalization (day)	62 (9.4%)	868	36456	55.07
Physical therapy and rehabilitation (outpatient clinic)	662 (100%)	1 205	60250	91.01
Practitioner (outpatient clinic)	108 (16.3%)	259	11396	105.52
Orthopedics (outpatient clinic)	82 (12.4%)	120	5880	71.71
Neurosurgery (outpatient clinic)	159 (24.0%)	235	12925	81.28
Emergency unit (outpatient clinic)	65 (9.8%)	116	6438	27.66
Other (outpatient clinic)	34 (5.1%)	49	2695	79.26
Physical therapy and rehabilitation	489 (73.9%)	5 627	14648.4	22.14
X-ray	257 (38.8%)	318	*	*
MRI	310 (46.8%)	337	21905	33.09
CT	25 (3.8%)	30	1650	2.49
BMD	38 (5.7%)	38	684	1.03
Blood	210 (31.7%)	335	*	*
Analgesic	211 (31.9)	11.46	2418.06	3.65
NSAIDs	417 (63.0)	89.73	37417.41	56.52
Muscle relaxant	379 (57.3)	140	53060	80.15
Antidepressant	50 (7.6)	57.54	2877	4.35
Cox-2 inhibitor	20 (3.0)	89.73	1794.6	2.71
Other	252 (38.1)	65.3	16455.6	24.86
Gastroprotective drugs	265 (40.0)			
PPI	239 (90.2)	139.08	33240.12	50.21
Antacid	20 (7.5)	50.9	1 018	1.54
Prostaglandin	1 (0.4)	57.6	57.6	0.09
H_2antagonist	11(4.2)	57.6	633.6	0.96
Wheel chair	5 (0.8%)	5	2500	3.78
Corset	78 (11.8%)	78	6240	9.43
Belt	58 (8.8%)	58	2320	3.50
Orthopedic bed	22 (3.3%)	22	22000	33.23

MRI: magnetic resonance imaging; CT: computed tomography; NSAIDs: non-steroid anti-inflammatory drugs; PPI: proton pump inhibitor; BMD: bone mineral density

Table 3. Indirect costs

	n (%)	Total indirect cost (TL)	Indirect per person (TL)
Loss for days with health report	60 (9.1%)	153448.2	231.79
Loss for housework (TL)	177 (26.7%)	207727.2	313.79
Decrease in working capacity (%)	218 (32.9%)	10755.0	2741
Capacity loss	218 (32.9%)	105248.43	635.94
Travel cost (TL)	662 (100%)	5612.0	36
Loss for accompanying person's permission (TL) (n=34)	34 (77.3%)	740202	1118.13

Table 4. The relationship between cost and body mass index, duration of pain, functional status, and depression

	Direct cost		Indirect cost		Total cost	
	r	p	r	p	r	p
BMI	0.159	0.001**	0.102	0.080	0.152	0.001**
Duration of pain	0.196	0.001**	0.033	0.399	0.139	0.001**
Beck depression total score	0.212	0.001**	0.209	0.001**	0.259	0.001**
Roland Morris total	0.338	0.001**	0.274	0.001**	0.358	0.001**

Spearman's correlation analysis, **p<0.01, BMI: body mass index

Table 5. Evaluation of total and direct costs according to gender

Gender		All patients	Male (n=201)	Female (n=461)	[a]p
Total cost	Min–Max	50–6168.73	50–6168.73	50–3609.42	0.001**
	M±SD	1003.04±880.83	831.56±901.78	1077.81±861.90	
	Median	708.2	571.81	823.13	
Direct cost	Min–Max	50–2073.08	50–2073.08	50–1839.81	0.286
	M±SD	470.63±326.56	486.39±331.53	463.76±324.48	
	Median	422.81	456.08	418.19	
Indirect cost	Min–Max	0–5379	0–5379	0–3129	0.001**
	M±SD	532.41±736.15	345.17±755.46	614.05±713.14	
	Median	48.88	0	244.65	

[a]Mann–Whitney U Test, **p<0.01, M: mean; SD: standard deviation; Min: minimum; Max: maximum

Table 6. Evaluation of total and direct costs according to age

		Young	Elderly	[a]p
Total cost	Min–Max	50–6168.73	53.00–3594.84	0.640
	M±SD	1013.82±907.76	962.48±772.80	
	Median	706.31	720.19	
Direct cost	Min–Max	50–2073.08	53.00–1839.81	0.001**
	M±SD	449.56±329.76	549.89±302.41	
	Median	405.19	523.81	
Indirect cost	Min–Max	0–5379	0–2152	0.016*
	M±SD	564.25±749.75	412.59±627.80	
	Median	97.80	0.0	

[a]Mann–Whitney U Test, **p<0.01, M: mean; SD: standard deviation; Min: minimum; Max: maximum

lowed them. Moreover, the most commonly used orthopedic aid was a corset. Total drug and device costs were 182031.99 TL (274.97 TL per person).

Total annual direct costs were calculated as 714734.78 TL, and the annual cost per person was found to be 1 079.66 TL.

Indirect Costs

In our patient group, there were no patients who was retired early because of low back pain. Of the 662 patients, 31% (205 patients) worked. Sixty patients (9.1%) stated that they could not go to work because of low back pain for at least one day during the previous 3 months. According to the statements of patients, 784.5 of 12 300 (205×60) working days involved some form of health report. The total annual cost associated with the inability to go to work was 38312.05 TL. The annual cost per person was found to be 231.79 TL (Table 3).

Most patients were housewives (336 people). Of them, 177 (26.7%) patients specified that they could not do housework for approximately 10 days in the last 3 months. The annual cost per person was calculated to be 1 255.15 TL (out of the minimum wage).

Furthermore, 52.1% of working patients stated that a decrease of approximately 50% occurred in their working capacity for about half of the days within the last 3 months. The annual cost per person, which was related to decreased working capacity, was calculated to be 2741 TL.

The number of accompanying people with patients having low back pain was 209 (31.6%). Forty-four of them were working, and 34 accompanying people got permission from their work for a total of 183 h to come to the hospital.

Travel costs of patients for coming to the hospital were approximately 5.37 TL per person. Considering the visits to all outpatient clinics, the annual travel cost per person was 36 TL.

Furthermore, 26.1% (59) of patients came to the hospital with at least one accompanying person and 5.2% (11 people) of them were working. For all outpatient clinic visits, the annual number of off-days per person was 13.3, which created an annual cost of 530 TL per patient. The annual indirect costs were calculated as 3 648057 TL, and indirect cost per patient was 5510.66 TL.

Table 7. Cost analysis according to working status

		Working status			
		Working	Retired	Other	[a]p
Total cost	Min–Max	50–6168.73	50–3594.84	50–3609.42	0.015*
	M±SD	982.39±1000.52	818.47±728.65	1082.11±843.97	
	Median	640.81	586.73	868.97	
Direct cost	Min–Max	50–2073.08	50–1638.36	50–1839.81	0.570
	M±SD	487.30±353.42	484.69±315.08	455.39±313.55	
	Median	424.46	461.73	416.04	
Indirect cost	Min–Max	0–5379	0–2164.42	0–2152.20	0.001**
	M±SD	495.09±846.19	333.77±576.06	626.72±700.25	
	Median	97.80	0.00	293.58	

[a]Kruskal–Wallis Test, *p<0.05, **p<0.01, M: mean; SD: standard deviation; Min: minimum; Max: maximum

Table 8. Regression analysis obtained for total costs

		%95 CI	
	p	Lower	Upper
(Constant)	0.543	-250.138	474.448
Age	0.062	-8.854	0.217
BMI	0.049*	0.048	27.662
Gender	0.036*	9.847	289.545
Roland Morris total	0.000**	36.356	57.976
Beck depression total	0.172	-2.148	11.982
Dependent variable: Total cost			

BMI: body mass index

Evaluation of Functional Status and Depression

The mean score of patients who answered the R&M questionnaire was found to be 13.14±6.16. They had a moderate level of disability. The mean score was 14.09±10.10 in the BDS evaluation. Among the patients, 339 (51.2%) had mild depression, 231 (34.9%) had moderate depression, and 92 (13.9%) had severe depression.

A positive [increasing as body mass index (BMI) increases] and statistically significant relationship was found between direct and total costs and BMI values (p<0.01).

Moreover, a positive (increasing as the duration of pain increases) and statistically significant relationship was observed between direct and total costs and duration of pain (p<0.01).

There was a statistically significant relationship between the BDS and R&M scores and direct, indirect, and total costs (p<0.01) (Table 4).

A statistically significant difference was found between indirect and total costs of cases according to gender (p<0.01). Indirect and total costs were significantly lower in males than in females. This difference was not observed in direct costs (Table 5).

No statistically significant difference was found between total costs of cases with regard to the state of old age (p>0.05). While indirect costs were significantly higher in young patients than in elderly patients, direct costs were significantly lower (p<0.01) (Table 6).

In terms of working status, a statistically significant difference was found between indirect and total costs of cases (p<0.05, p<0.01). In contrast, no difference was detected in direct costs (Table 7).

Regression Analysis

Direct and total costs were found to be significantly correlated with the severity of disease (p<0.01), depression (p<0.01), age (p<0.01), duration of disease (p<0.01), and BMI (p<0.01). Indirect costs were high in female patients (p<0.01). There was no difference in direct costs in terms of gender (Table 8).

Working status had no effect on direct and total costs. There was a statistically significant difference in indirect costs of working cases compared with other groups, where the indirect costs were higher.

Discussion

The cost of chronic low back pain has been found to be high in all studies conducted in developed countries (10,11,19-24). However, there are no data on developing countries, such as Turkey, in the literature. Our study is the first study investigating the multiple center financial burden of chronic low back pain. Annual direct costs were found to be 714 734.78 TL for chronic low back pain and direct costs per person were found to be 1 080 TL. Annual indirect cost and indirect costs per person were found to be 3 648 057 TL and 5 511 TL, respectively.

In a human-capital approach, the cost related to working loss of an individual is calculated. In contrast, in a 'friction-cost method', which is another calculation approach, it is assumed that there is no working loss when an individual does not go to work because another person is assigned to that work. However, the cost paid to the worker is not calculated in this method (25). Therefore, it is considered that, in the human-capital method, cost is calculated higher than it really is, but in the friction-cost method, it is calculated as lower than it really is. In a Swiss study conducted in 2004 (20), questionnaire forms were sent to 23 673 patients with low back pain. As a result of the questionnaire survey and phone interviews with 1253 patients with chronic low back pain, the total annual direct cost was found to be 2.6

million Euros. Productivity loss was calculated as 4.1 million Euros with the human-capital method and as 2.2 million Euros with the friction-cost method. In a study comparing 101 294 patients with chronic low back pain after scanning the hospital's information processing data and ICD codes in USA in 2008 (22), the total direct cost was found to be 8386±17507 dollars. In a study conducted in Sweden (21), patients that applied to outpatient clinics with complaints of chronic low back pain were given questionnaire forms and they were asked about their inability to go to work in the last 3 months and about their medical expenses in the last 6 months. Annual direct costs and indirect cost were calculated by multiplying by 4 and 2, respectively. They were found to be 3100 Euro and 17600 Euro, respectively. In our study, the high indirect cost was consistent with data of other countries (20-22,26).

Our cases were most frequently the patients of outpatient clinics of physical therapy, while the second most frequently applied outpatient clinic was neurosurgery. The most frequently required imaging technique was MRI. Approximately half of the patients had mild depression and moderate disability (RMDA 13.14±6.16). NSAID was generally preferred as the first drug for low back pain (Table 2). In a study conducted by Walker (11), in which the cost of Australian patients with low back pain was evaluated, it was reported that patients mostly applied to chiropractors, and that direct radiographic examination was the most frequent imaging technique. The cost of magnetic imaging was almost half of the cost of direct radiographic imaging. In the study of Gore et al. (22) from the USA, the drugs used for low back pain varied as opioids (14%–37%) and NSAIDs (26.2%–96%). In contrast, in a study based on the population in England, it was revealed that 12-16% of all adults applied to a family physician with a complaint of low back pain and 3% of patients visited a specialist physician (10). In the study of Ekman et al. (21), which was conducted in Sweden, most patients applied to a practitioner, and the most frequently required imaging technique was an X-ray. Analgesics, NSAIDs, and antidepressants were preferred for pharmacotherapy. RMDA scores in functional evaluation was 12.2±5.1.

The features and habits in the health system of each country create differences in diagnosis and treatment algorithms. In our study, the direct cost was found to be significantly consistent with the severity and duration of disease and age, while the indirect cost was higher in females. Moreover, the results of Ekman et al. (21) were also similar.

Itoh et al. (27) from Japan evaluated the cost of low back pain associated with the loss of work, but the loss that was related to housework was not considered in the calculation of the cost. In our study, almost half of our patients were housewives, and they were evaluated under the status of worker in the indirect costs. However, in fact, the working loss of a housewife is not paid work.

It seems inappropriate to compare data of different countries on a one-to-one basis due to the differences in the diagnosis of low back pain, its prevalence, the different health systems, working and retirement conditions, pricing, and culture (24). Countries have also not been compared with others because of some reasons such as economic differences and different currency units.

Limitations of the Study

Methods used for economic analysis of low back pain differ in various studies. In this study, 3- and 6-month data were evaluated and an annual estimation was done. Private examinations and private hospital data were not included in the study.

Conclusion

Direct and indirect costs associated with low back pain pose an issue not only for industrial countries but also for developing countries like Turkey. Particularly in young populations, as diseases such as low back pain cause working and labor loss increases, direct and indirect costs also increase. These data are needed while planning the health expenses of countries. Therefore, disease-cost studies become more important every day. To reduce economic losses, diagnosis and treatment algorithms should be developed. Moreover, the importance of the subject should be emphasized with real numbers and with the contribution of governmental institutions, including statistical and finance units, and necessary precautions should be taken.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of İstanbul Medeniyet University, Göztepe Training and Research Hospital local ethics committee.

Informed Consent: Was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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