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Review Article

Indirect costs of back pain – Review

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ABSTRACT

Introduction: Back pain is a major health problem and a leading cause of disability. It generates work absenteeism and great costs for the society.
Aim: The objective of this study is to review the literature on indirect costs of back pain and determine the amount of indirect costs among total costs.
Material and methods: Medline, Embase and Polish Medical Bibliography (PBL) databases were searched to identify studies about indirect costs of back pain published up to April 2013 with no country specific limitation. After screening of 210 titles and abstracts, chosen full-text papers were reviewed. Finally 13 articles met the inclusion criteria. Relevant characteristics were extracted and summarized.
Results and discussion: The data presented in reviewed studies referred to USA, Netherlands, Sweden, Australia, Germany, UK, and Switzerland but no dedicated analysis for Poland was identified. All studies were conducted from societal perspective. Mainly, the Human Capital Approach was used to assess indirect costs. One study was based on Friction Costs Method and four studies compared both methods. Few studies included presenteeism as a result of lost productivity. Indirect costs comprised 27.4%–95% of total costs.
Conclusions: Indirect costs composed a significant part of the total costs of back pain and should be taken into consideration in cost-of-illness analysis. The differences in indirect costs resulted from various methodologies. There is a need to elaborate uniform and generally accepted methodology for indirect costs assessment. As no social burden of back pain was calculated in Poland, there is a need for further research especially on indirect cost.

1. Introduction

Back pain is among the most common health problems in primary care.[1] It is often seen as a trivial problem compared to other diseases that generate a high mortality, like cancer or infectious diseases. However, in terms of morbidity, back disorders are the leading cause in many categories, including activity limitation and work absence.[2] Most patients return to work within one week and 90% return within two

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months, but the longer a person is on sick leave the less likely he or she is to return to work. After six months off work, less than 50% of people will return to work, and after two years' absence, there is little chance of the person returning, which greatly impacts on society.[3] In Poland, up to 72% of individuals with back pain experience reduction in daily activity, with 38% reporting reduced productivity due to back pain. In 38% of cases, pain limited the range of available leisure activities. In 2010, episodes of back pain resulted in almost 2.7 million days of sick leave in Poland which composed 1.1% of all sick leaves in Poland (Social Insurance Institution).

Musculoskeletal disorders including back pain increase with age. Across all European Union member states the workforce is ageing and with it the risk of increasing musculoskeletal disorders prevalence over the next 30 or 40 years.[4] There are 13.5% of people over 65 years old in Poland (over 5 million). According to GUS (Central Statistical Office) prognosis, this amount will be doubled by 2030. Over 30% of women and 8% of men, over 50 years old suffer from skeletal diseases.[5] The implication is that with the risk of acquiring back pain increasing with age, as the profile of the workforce ages, then the impact of back pain on work disability will intensify.

Back pain affects both genders at most ages. Most of the people (85%) have back pain at some time in their life. The annual prevalence of back pain ranges from 15% to 45%, with an average point prevalence of 30%. Its prevalence varies according to the definition used and the population studied. Back pain can be defined as ''pain in any segment of the spine, including the cervical spine.'' Usually patients are asked whether pain or discomfort was/is present in the back (often illustrated on a diagram) in a given period of time.[6] Acute back pain lasts less than six weeks, subacute between six weeks and three months and chronic more than three months.[7] Back pain can be classified as ''specific'' (suspected pathological cause) or ''non-specific''. The origin of back pain remains unclear in more than 80% of patients.[8]

The most common method to estimate the burden of a specific disease on a society is a cost-of-illness (COI) study. COI studies aim to identify and measure all the costs of a disease: direct, indirect and intangible costs. They describe the savings that could be done if the disease was to be eradicated and can be useful for policy makers in planning and financing.[9,10] Many studies focus only on direct costs of an illness and payers perspective, like e.g. costs of hospital services, physician services, medical devices, rehabilitation, drugs, and diagnostic tests. Indirect costs represent the other portion of estimated costs as a result of broader perspective – social perspective. These include mortality costs, morbidity costs due to absenteeism and presenteeism, and informal care costs.

For many diseases, indirect costs are substantial and can be significantly greater than the direct medical costs.[11] A literature review on studies considering indirect costs of diseases indicated that on average indirect costs represented 52% of the total disease costs or total costs saved by health care intervention.[12,13] In Poland, indirect costs are assessed to make up about 58% of the total costs of an illness.[14]

2. Aim

The objective of this study is to review the literature on indirect costs of back pain and to determine the amount of indirect costs among total costs, as a part of a very timely debate on role of indirect cost in health-related decision-making process.

3. Material and methods

The Embase, Medline and Polish Medical Bibliography (PBL) databases were searched in April 2013. The keywords ''back pain,'' ''back ache'' and ''indirect costs'' were used. Searches identified 210 potentially relevant titles and abstracts, from which 37 reports were selected for full-text eligibility screening. Search results were screened according to eligibility criteria presented below.

Inclusion criteria:

1. Primary studies.
2. Back pain, low back pain or back and neck pain.
3. Acute, subacute and chronic pain.
4. Indirect costs and total costs in monetary value or percentage of indirect costs.
5. Adults.

Exclusion criteria:

1. Neck pain only.
2. Indirect or direct costs only.
3. Indirect costs expressed as workday lost without monetary values.
4. Secondary studies (e.g. reviews).

The search was limited to studies in English and Polish; 12 articles fulfilled the inclusion/exclusion criteria. Additionally, all references were screened. Finally, 13 relevant articles were included to be reviewed. Following characteristics were extracted: country, disease unit, study perspective, time horizon, population, indirect costs, direct costs, total costs, percentage of indirect costs, method used to assess indirect costs, year of data, components of indirect costs, data source, prospective/retrospective, and representativeness.

4. Results

The eligibility criteria were met in 13 studies (Table 1). Studies were conducted in the Netherlands,[15–18] Sweden,[11,19–21] USA,[22] Germany,[23] UK,[24] Switzerland[25] and Australia.[26] All the studies were held from the societal perspective. Disease unit was mainly defined as low back pain, back pain in general or low back pain with neck pain. Population of reviewed studies ranged from 110 patients to national (Table 2). There were 6 prospective studies that followed over a period of time (from three months to one year) groups of patients with back pain.[11,15,20,21,23,25] The other 7 studies were based on existing data from previous surveys or national or institutional

Table 1 – Costs of back pain. Components and methods of indirect costs assessment. LBP, low back pain, HCA, Human Capital Approach; FCM, Friction Cost Method; GNP, Gross National Product.

Author	Country	Disease unit	Currency	Indirect costs	Indirect costs of total costs	Direct costs	Total costs	Indirect costs method	Productivity loss measure	Year of data	Indirect costs components
Ekman et al.[11]	Sweden	LBP	EURO	17 600/patient	85%	3 100/patient	20 700/patient	HCA	Average hourly labour cost	2002	Absenteeism, presenteeism, disability payments, household activities
Boonen et al.[15]	Netherlands	Chronic LBP	EURO	2 182 373 116	34%	4 236 371 342	6 418 744 458	FCM	GNP	2002	Absenteeism
Hutubessy et al.[16]	Netherlands	Back pain	USD	4 600 000 000 (HCA) 1 500 000 000 (FCM)	95% 30%	240 000 000	4 840 000 000	HCA, FCM	Earned wage	1991	Absenteeism, disability payments
Lambeek et al.[17]	Netherlands	Back pain	EURO	From 3 828 000 000 (2002) to 3 060 000 000 (2007)	From 89.4% (2002) to 86.6% (2007)	From 453 000 000 (2002) to 474 000 000 (2007)	From 4 281 000 000 (2002) to 3 534 000 000 (2007)	HCA	Daily wages per person	2002–2007	Absenteeism, disability payments
van Tulder et al.[18]	Netherlands	Back pain	USD	4 400 000 000	91%	367 600 000	4 800 000 000	HCA	Daily wage	1991	Absenteeism, disability payments
Ekman et al.[19]	Sweden	LBP	EURO	1 549 000 000	84%	308 000 000	1 860 000 000	HCA	Labour cost per hour	2001	Absenteeism, disability payments
Hansson et al.[20]	Sweden	LBP, neck pain	EURO	43 639 574	93%	3 228 285	46 867 859	HCA	Average monthly salary	1994, 1995	Absenteeism, disability payments
Seferlis et al.[21]	Sweden	LBP	SEK	2 885 400	94.6%	164 602	3 050 002	HCA	Mean income	1995	Absenteeism
Ivanova et al.[22]	USA	LBP	USD	2 606/patient	27.4%	6 892/patient	9 498/patient	HCA	Daily wage	2006	Absenteeism
Wenig et al.[23]	Germany	Back pain	EURO	26 438 400,000	54%	22 521 600 000	48 960 000 000	HCA	Yearly labour cost	2005	Absenteeism
Maniadakis et al.[24]	UK	Back pain	GBP	10 668 000 000 (HCA) 5 018 000 000 (FCM)	86% 75%	1 632 000 000	12 300 000 000 (HCA) 6 650 000 000 (FCM)	HCA, FCM	Earnings	1998	Absenteeism, household activities
Wieser et al.[25]	Switzerland	LBP	EURO	4 080 000 000 (HCA) 2 190 000 000 (FCM)	61.4% 46%	2 600 000 000	6 600 000 000 (HCA) 4 800 000 000 (FCA)	HCA, FCM	Gross income per week	2005	Absenteeism, presenteeism, disability payments
Walker et al.[26]	Australia	LBP	AUD	8 149 000 000 (HCA) 5 063 590 000 (FCM)	88.8% 83.2%	1 020 000 000	9 174 930 000 (HCA) 6 089 430 000 (FCM)	HCA, FCM	Average salary	2001	Absenteeism, household activities

Table 2 – Perspective, time horizon, population, data source, prospective/retrospective and representativeness. LBP, low back pain.

Author	Perspective	Time horizon	Population	Prospective/ retrospective	Data source	Representative
Ekman et al.[11]	Societal	Direct costs: 6 months, indirect costs: 3 months	302	Prospective	14 outpatient clinical centres in 5 different regions in Sweden.	No
Boonen et al.[15]	Societal	52 weeks	110	Prospective	Rehabilitation Center in Hoensbroek.	No
Hutubessy et al.[16]	Societal	1 year	653 500	Retrospective	Social Insurance Council in the Netherlands Data.	Yes
Lambeek et al.[17]	Societal	6 years	National	Retrospective	Occupational health care authorities databases.	Yes
van Tulder et al.[18]	Societal	1 year	National	Retrospective	All health care authorities in The Netherlands (including medical insurance and social security agencies).	Yes
Ekman et al.[19]	Societal	1 year	7 224	Retrospective	Swedish National Social Insurance Data	Yes
Hansson et al.[20]	Societal	2 years	1 822	Prospective	5 Swedish regional social insurance offices (located in northern, middle and southern parts of Sweden and in the two largest cities).	Yes
Seferlis et al.[21]	Societal	1 year	180	Prospective	Karolinska Hospital	No
Ivanova et al.[22]	Societal	3 years (2004–2006)	211 551	Retrospective	Nationwide privately insured database covering 8 million beneficiaries from 40 companies.	No
Wenig et al.[23]	Societal	3 months	15 750	Prospective	Population-based multi-region postal survey.	No
Maniadakis et al.[24]	Societal	No data	6 000	Retrospective	Survey carried out by Office of Population Censuses and Surveys.	Yes
Wieser et al.[25]	Societal	1 year	2 507	Prospective	Self-administered questionnaire in the German-speaking part of Switzerland.	No
Walker et al.[26]	Societal	6 months	3 000	Retrospective	Australian adult LBP prevalence survey, Australian databases.	Yes

databases[16–19,22,24,26] and 7 studies can be representative for the national population.[16–20,24,26]

Indirect costs ranged from 27.4%[22] to 95.0%.[16] To assess the indirect costs, human capital approach (HCA) method was used in most studies.[11,17–23] This method measures productivity losses by multiplying the work-time lost as a consequence of an illness by the gross earnings of the individual affected. Only one study used friction cost method (FCM),[15] which assumes that production loss is limited to the period of time unless the work of the sick person is not replaced – friction period. In four studies both methods, HCA and FCM, were used.[16,24–26] The lengths of friction periods were: 22 weeks = 110 working days,[15] 3 months,[16] 90 days,[24] 22 weeks,[25] 10.3 weeks for males and 6.2 weeks for females.[26] Studies that used both methods showed that indirect costs were higher while using HCA: in Netherlands 3.07 times higher,[16] in UK 2.13 times higher,[24] in Switzerland 1.86 times higher[25] and in Australia 1.6 times higher.[26] All the studies estimated costs taking into consideration absence from work. Only two studies included costs caused by reduced work efficiency while performing work activities when being ill (presenteeism).[11,25] In Switzerland, 4.4% of respondents were absent from work and 19.7% of respondents reported LBP-related presenteeism, which made up an important part of productivity losses in both methods: HCA – 44.1% of total costs and the FCM – 82.2%.[25] Questions regarding absenteeism and presenteeism were in part derived from the PRODISQ questionnaire. In Sweden, the largest indirect cost item was absence from work, resulting in an average yearly cost per patient of 9 563 Euro.[11] Average yearly cost per patient because of reduced work capacity was estimated at 3 212 Euro. Disability payments and household activities were also components of indirect costs in reviewed articles. Measures used to value productivity loss were based mainly on labour costs (e.g. average monthly salary, daily labour cost), and not on gross domestic product (GDP).

5. Discussion

Back pain represented an important economic burden wherever it was studied. Indirect costs were significant part of total costs of back pain and they differed considerably ranging from 27.4%[22] to 95%[16] in reviewed studies. The indirect costs evaluated with HCA method exceeded those evaluated with FCM.

There have been several studies concerning indirect costs of back pain and their substantial role in the society. This review confirmed previous findings according to indirect costs

assessment, which were mostly the largest component of costs in studies reporting both direct and indirect costs.[27]

Indirect costs differed because of imprecise definition used and lack of standardized methodology. The review showed differences in indirect cost values and their percentage of total costs obtained even within one country. In Netherlands, indirect costs composed 30%–95% of total costs of back pain. There were different methods used to assess indirect costs, different indirect cost components and different measures were used to value productivity loss.

Attention was usually focused on costs related with absence from work. However, it is obvious that absence from paid work is not the only situation causing production losses related to disease. Besides impaired ability to perform work, people may be at work while not being in optimal health. Several studies were population specific for which data are not valuable for decision makers.

This review did not find any study on indirect costs of back pain in Poland. Existing literature confirms that back pain remarkably influences health of Polish workers. The fourth European Working Conditions Survey found that in 2005 nearly 46% of Polish workers experienced work-related back pain, far more than the European Union average of 25%. There is still lack of coherent and comprehensive analysis of efforts concentrating on perception of patients with low back pain in relation of their labour activity and societal costs resulting from their disability.[28] The majority of health technology assessments in Poland are conducted from the perspective of public payer – National Health Fund.[29] Cost estimation from the societal perspective will enable for a wider look, beyond just resources used during treatment. Results and conclusions based also on indirect costs may influence decision for better resource allocation and better understanding and for developing of public health priorities. There is a need to elaborate uniform and generally accepted methodology for indirect costs assessment.[30]

6. Conclusions

Assessment of indirect costs of back pain in Poland may be useful in estimating low back pain costs covering the entire classification of disease, enabling mutual comparison of disease costs and putting these in perspective, in prioritizing diseases or topics for future economic evaluation, and in clarifying the most important cost components of treating back pain. Insufficient information in this area in Poland creates a need for further research.

Conflict of interest

There is no conflict of interest.

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