

ECONOMIC COST BENEFIT ANALYSIS OF REHABILITATION IN PATIENTS WITH LUMBAR INTERVERTEBRAL DISC DAMAGE WITH RADICULOPATHY

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INTRODUCTION

One of health care priorities in recent years is the process of rehabilitation. In this connection different programs are developed, which support this process for patients with wide range of diseases. The Program for prophylaxis and rehabilitation of NSSI (National Social Security Institute) was introduced in Bulgaria in the year 2001. **Material and method:** The present study analyzes the health effect of the rehabilitation, conducted within the NSSI Program for prophylaxis and rehabilitation for patients with lumbar intervertebral disc damage with radiculopathy (ICD 51.1). Health economic evaluation was performed by economic cost benefit analysis. The study includes 100 patients, which attended in three following years (2007, 2008 and 2009) Specialized hospital for rehabilitation – National complex PLC branch Banite. Their health condition was evaluated using the functional index of Steinbrocker before and after undergoing the rehabilitation. **Results and discussion:** A tendency for significant improvement of the patients' health condition was reported for the studied three years. The average number of patients with improvement was increased from 42% in 2007 to 51% in 2008 and reached 60% in 2009. The performed economic analysis shows objectively the connection between rehabilitation benefit for the patient and costs.

Key words: rehabilitation, health care program, health effect, cost benefit analysis

The development of various programs, related to providing qualified rehabilitation and increasing the possibility for access of the patients is a priority of the health care systems all over the world. In 2001 in Bulgaria was introduced a program, partially financed by NSSI (National Social Security Institute), aiming the provision of prophylaxis and rehabilitation of wide spectrum of diseases (2). During the period 2007-2009 state funding for this program was 23 million leva average per year. Constant increase in the number of patients, willing to join the program, is observed - on one hand the rehabilitation process is characterized with increased interest and on the other hand - with more restricted resources. This requires thorough health economic analyses, which could contribute to expansion of the existing and the development of new concepts in the rehabilitation area. The aim of the present study was to conduct health economic evaluation of the Program for prophylaxis and rehabilitation of patients with lumbar intervertebral disc damage with radiculopathy (code in ICD 51.1), financed by NSSI.

MATERIAL AND METHOD

The study includes 100 patients with lumbar intervertebral disc damage with radiculopathy aged between 27 and 63 (mean age 49.87 ± 0.74), which underwent rehabilitation in three following years (2007, 2008 and 2009) in Specialized hospital for rehabilitation- National complex PLC, branch Banite. Every year the patients' condition was evaluated on admission and on discharge by specialized physiotherapists using the functional index of Steinbrocker (14) (tabl. 1).

Table 1. Functional index of Steinbrocker

Class I	Complete functional capacity with ability to carry on all usual duties without handicaps
Class II	Functional capacity adequate to conduct normal activities despite handicap of discomfort or limited mobility of one or more joints.
Class III	Functional capacity adequate to perform only few or none of the duties of usual occupation or of self-care
Class IV	Largely or wholly incapacitated with patient bedridden or confined to wheelchair, permitting little or no self-care.

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Table 2. Distribution of the patients according to their condition on discharge divided into classes (functional index of Steinbrocker) for 2007, 2008 and 2009

Class	Admission Number of patients	Discharge	Number
2007			
I	-	with improvement	-
		no alteration	-
II	24	with improvement	11
		no alteration	13
III	58	with improvement	23
		no alteration	35
IV	18	with improvement	8
		no alteration	10
Total	100	with improvement	42
		no alteration	58
2008			
I	9	with improvement	-
		no alteration	9
II	33	with improvement	18
		no alteration	15
III	44	with improvement	24
		no alteration	20
IV	14	with improvement	9
		no alteration	5
Total	100	with improvement	51
		no alteration	49
2009			
I	14	with improvement	-
		no alteration	14
II	40	with improvement	26
		no alteration	14
III	37	with improvement	27
		no alteration	10
IV	9	with improvement	7
		no alteration	2
Total	100	with improvement	60
		no alteration	40

The rehabilitation program of NSSI for patients with lumbar intervertebral disc damage with radiculopathy includes the following five procedures:

- group medical gymnastics;
- bath with mineral water;
- medical massage;
- lye therapy;
- low frequency /middle frequency/ electrotherapy including electrophoresis.

The performed analysis studies the health effects of the program, the expenses for the rehabilitation and the collateral benefits, calculated relevantly by GDP (Gross domestic product) per person at working age.

RESULTS AND DISCUSSION

Health effect of the rehabilitation

We analyzed the health status of the patients on their discharge, evaluated again using the functional index of Steinbrocker for the studied years (tabl 2). Condition with improvement is considered when passing from IInd to Ist class, from IIIrd to IInd and from IVth to IIIrd class. Preserving the same class is regarded as condition without alteration. No one from the studied patients had deterioration of his condition.

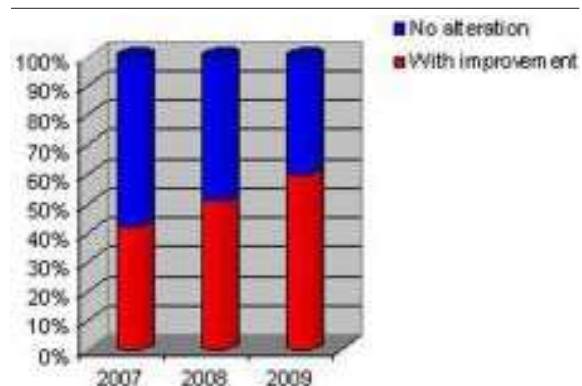


Fig 1. Distribution of the patients according to their condition on discharge for the period 2007-2009

For year 2007 improvement of the health condition was reported in almost half of the patients (42%) - 11 patients passed from class II to class I, 23 - from class III to class II and 8 - from class III to class IV. The rest of the patients (58%) were not influenced by the rehabilitation.

In 2008 we observed improvement of the health condition in more than half of the patients (51%) and no alteration in 49% of the patients. Compared to 2007 an increase of 21.43% in the number of patients with improvement was detected.

The health condition of the patients from the discharge till the next admission could be improved, deteriorated or preserved the same due to different reasons. After research of the medical documentation of the patients was observed that the condition of part of the patients during the year was deteriorated within the period between the two rehabilitations (2007-2008) and on ad-

mission in 2008 two of the patients passed from class I to class II and 4 - from class III to class IV.

On admission in 2009 the distribution of the patients in classes reveals that most of them preserved the same health condition as discharged in 2008.

After the third rehabilitation course in 2009 60% of the patients were with improvement and 40% had no alteration in their condition. During the third year (2009) the number of patients with improvement compared to those in the first year was increased with 42,8%.

The obtained results show ascending tendency with marginal statistical significance of improving the health condition of the patients after undergoing rehabilitation for the studied three years ($\chi^2=3.080$, $P=0.07$, Fig.1).

Cost benefit analysis

The costs for rehabilitation within the NSSI program are presented for each year in table 3.

Table 3. Costs for rehabilitation within the Program for prophylaxis and rehabilitation of NSSI (10-day course) of patients with lumbar intervertebral disc damage with radiculopathy for the period 2007-2009

Year	Funding by the patient (lv)			Funding by NSSI (lv)			Expense for 10-day period (lv)
	Registration fee	Insurance	Food, day expenses, V A T	Sleeping expenses	Funding for food	Examinations and rehabilitation procedures	
2007	15	6	99	16	45	113	417
2008	20	6	99	16	45	150	454
2009	20	6	150	16	45	160	515
Average expense per year	18.33	6	116	16	45	141	462

The method cost benefit was applied, which studies and analyzes costs concerning the treatment of patients and the anticipated benefits and savings (3,6). The indirect estimation of the benefit for the society from certain treatment could be determined relatively using GDP (Gross domestic product) per person at working age (8).

For the studied three years the benefit was calculated using the number of patients with improvement in class I and class II, evaluated by functional index of Steinbrocker after undergoing rehabilitation (table 4).

Table 4. Evaluation of the benefit from the rehabilitation using GDP per person

Year	Number of patients with improvement	GDP (lv)	Benefit (lv)
2007	47	7412.72	348 364
2008	50	8790.60	439 500
2009	81	8482.88	687 042

The benefit for year 2009 is significantly higher, because the patients, which improved passed mainly into class I and

class II. Comparing the accomplished benefit in the first year with that of the third the increase is 1.97 times more. During every following rehabilitation course the number of patients with improvement was increased, i.e. the effect of the rehabilitation is cumulating.

DISCUSSION

Our country provides immense opportunities for conducting rehabilitation programs, considering the diverse combinations of physical (natural and reshaped) methods and means for prophylaxis, treatment and rehabilitation. Bulgaria has traditions regarding climate and balneotreatment. At the same time the health care system reform, the alteration of the way of funding (including for rehabilitation activities) and restructuring of the health resort activities re-

structuring considerably obstructs the access of the patients to effective treatment and rehabilitation as the possibilities are restricted - clinical pathways, NSSI programs and free admission (1).

Every year the numbers of people willing to benefit from the NSSI program is increasing. Developing more similar programs created in cooperation with research units (Department of Physical Medicine and Rehabilitation at the Medical Universities) and specialized hospitals for rehabilitation may provide an opportunity for early and long-term rehabilitation of patients with different diseases. Developing, testing and evaluating new screening instruments, diagnostic methods for detecting individual problems and the related rehabilitation needs is a prerequisite for achieving optimal results in preservation of the patients' working ability (13).

Most European countries have national programs for rehabilitation, funded completely or partially by health insurance funds and pension funds (4,10,11). A number of studies provide health economic analyses of rehabilitation programs, which evaluate the benefits from those programs, expressed in reduction of morbidity or temporary disability. It is additionally emphasized on the evaluation of educational programs for patients, comparison of outpatient and inpatient rehabilitation and others (5,7,9,11,12,15,16).

CONCLUSION

Health economic analyses contribute to the objective assessment of the health effect and costs, which assists the restricted resources distribution for rehabilitation activity. The performed cost benefit analysis showed that the NSSI Program for prophylaxis and rehabilitation contributes to the patients' health improvement and thus to the society benefit. This demonstrates the necessity of introducing more rehabilitation programs in Bulgaria.

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