Comparison of cardiac rehabilitation programmes including patients' education in selected institutions in Portugal and Poland

Porównanie programów rehabilitacji kardiologicznej z uwzględnieniem edukacji pacjentów w wybranych placówkach w Portugalii i w Polsce

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A – preparing concepts
B – formulating methods
C – conducting research
D – processing results
E – interpretation and conclusions
F – editing the final version

Abstract

Introduction: Despite huge progress in the field of medicine and prevention, cardiovascular diseases remain the second most common cause of death in the European Union countries. One of the reasons for this not very optimistic (though decreasing) tendency seems to be ineffective education of patients.

Material and methods: The study sought to compare cardiac rehabilitation programmes in Poland and Portugal and to assess education of coronary patients who took part in the second phase of cardiac rehabilitation in institutions located in these two countries. A cardiac rehabilitation programme information card completed by a doctor or a physiotherapist as well as the authors' own questionnaire that included questions regarding medical history and rehabilitation of patients, their knowledge about risk factor control and their opinions about education in the process of rehabilitation were employed in the study.

Results: Patients from both groups demonstrated the same low levels of knowledge about risk factor control. It was noted that cardiac rehabilitation programmes in the two countries under investigation were based on similar standards but differed in such aspects as specialists participating in these programmes, patients referred to them, particular risk factor control or methods of education.

Conclusions: 1. Cardiac rehabilitation programmes implemented in the examined institutions are based on the same standards but differ, inter alia, in terms of interventions applied to control particular risk factors. 2. The patients' level of knowledge about modifiable risk factor control is the same in the Polish and Portuguese group and it differs considerably from the level described in the guidelines. 3. In both countries, doctors play the most significant role in educating patients.

Key words: **health education, cardiac rehabilitation, secondary prevention**

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The research was financed from the authors` own resources
Badania sfinansowane ze środków własnych autorów

Streszczenie

Wstęp: Choroby układu krążenia mimo ogromnego postępu medycyny i profilaktyki pozostają drugą, najczęstszą przyczyną śmierci w krajach Unii Europejskiej. Przyczyn tej mało optymistycznej, choć zmniejszającej się tendencji poszukuje się m.in. w nieskutecznej edukacji pacjentów.

Materiał i methody: Celem badania było porównanie programów rehabilitacji kardiologicznej w Polsce i w Portugalii oraz ocena edukacji pacjentów cierpiących na chorobę wieńcową, biorących udział w II etapie rehabilitacji kardiologicznej w ośrodkach zlokalizowanych w tych krajach. W badaniu posłużono się kartą informacyjną wypełnianą przez lekarza lub fizjoterapeutę, dotyczącą programu rehabilitacji kardiologicznej oraz ankietą autorską obejmującą pytania z zakresu historii choroby i rehabilitacji pacjenta, jego wiedzy na temat kontroli czynników ryzyka oraz jego opinii na temat edukacji w procesie rehabilitacji.

Wyniki: Pacjenci obu grup cechowali się takim samym, niskim poziomem wiedzy z zakresu kontroli czynników ryzyka. Zaobserwowano, że programy rehabilitacji kardiologicznej w badanych krajach są oparte na podobnych standardach, ale różnią się m.in. w zakresie składu specjalistów w nich uczestniczących, pacjentów do nich klasyfikowanych, kontroli poszczególnych czynników ryzyka i metod edukacji.

Wnioski: 1.Programy rehabilitacji kardiologicznej w przebadanych ośrodkach bazują na tych samych standardach, ale różnią się m.in. rodzajem stosowanej interwencji w kontroli poszczególnych czynników ryzyka. 2.Poziom wiedzy pacjentów na temat kontroli ich modyfikowalnych czynników ryzyka jest taki sam w grupie polskiej i portugalskiej i znacząco odbiega od poziomu opisanego w wytycznych. 3.Największą rolę w edukacji pacjentów w obu krajach odgrywa lekarz.

Słowa kluczowe: **edukacja zdrowotna, rehabilitacja kardiologiczna, profilaktyka wtórna**

Introduction

Coronary heart disease results from genetic and environmental determinants, i.e. smoking, inappropriate diet, sedentary lifestyle and stress. It may cause acute coronary syndrome, thus contributing to an increase in mortality and disability in a society [1]. In the years 2004-2013, a significant reduction in the number of deaths in the European Union (EU) countries caused by ischemic heart disease (IHD) was noted both in women (by 33.4%) and in men (by 30.6%). However, in 2013, IHD-related mortality rate was at the level of 132 deaths per 100,000 EU inhabitants. Thus, cardiovascular diseases became the second most common cause of death among the Europeans [2].

A chronic character of cardiovascular diseases leads to the fact that rehabilitation plays a significant role in the therapy of cardiac patients. It is aimed, inter alia, at reducing the risk of disease recurrence, increasing endurance, improving fitness and educating patients [3]. For the last several years, cardiac rehabilitation programmes have been transformed from simple interventions into very complex services [4]. In 1994, the American Heart Association (AHA) published the first guidelines concerning cardiac rehabilitation and secondary prevention. It revealed that physical effort in cardiac rehabilitation should be accompanied by multidirectional strategies aimed at reducing modifiable risk factors [5].

The EUROASPIRE I-IV research showed that in the years 1996-2013, the aforementioned guidelines were not sufficiently followed in the European countries. The number of obese and diabetic individuals increased, and Complex Cardiac Rehabilitation (CCR) included one-third of the patients who should participate in it. The control of blood pressure did not improve despite an increase in the use of hypertension drugs. The only aspect that improved was the control of a lipid profile; however, it did not reach the recommended norms [6].

Cardiac rehabilitation programmes differ among European countries. The *Carinex Survey* carried out in 1999 included 13 countries. It revealed that in the majority of the countries, less than 50% of the patients who should be referred to post-hospital rehabilitation used this type of treatment. It was also noted that cardiovascular disease mortality rate correlates with lower availability of cardiac rehabilitation. The second phase of cardiac rehabilitation lasted a minimum of 4 weeks in Germany, France and Austria up to 13 weeks in

Portugal. Specialists involved in the process of post-hospital rehabilitation most often included a cardiologist, a physiotherapist, a nurse and a dietician [7].

In the study carried out by the European Society of Cardiology 10 years later, the percentage of patients undergoing rehabilitation differed depending on a country and rehabilitation phase and fell within the following ranges: Phase I – 4%-100%, Phase II – 3%-90%, Phase III – 4%-58% [8].

Cardiac rehabilitation in Poland includes 3 phases. The first phase begins after stabilising a patient's state, usually within the first 24 hours after cardiovascular event. It is aimed at early mobilization of patients as well as preparing them to perform activities of daily living and self-care [5, 9]. According to the Model of Complex Rehabilitation and Secondary Prevention of the Polish Cardiac Society (PCS), patients leaving the hospital should continue their rehabilitation in the second phase. If no complications occurred in the course of the disease or the surgery and the patient belongs to a group of low risk, he or she is referred to a day clinic or to hybrid rehabilitation (on the first few days it is performed in an in-patient or out-patient clinic and later it is continued at a patient's place of living under remote supervision with telemedicine systems). In turn, patients who suffered from some complications and have other health problems should be referred to in-patient rehabilitation. The recommended forms of training include endurance training (treadmill, cycle ergometer), resistance training, breathing training and general training. Education is an indispensable element of this phase in Poland. It is implemented in the form of conversations, talks, lectures and brochures with information regarding the disease, physical activity and prevention [3].

After finishing early post-hospital rehabilitation (4-12 weeks), patients who do not control risk factor sufficiently are referred to the third phase of CCR. The other patients and their families are included in an 8-week out-patient programme of education and cardiac rehabilitation under the supervision of specialist doctors, nurses, physiotherapists and dieticians. The programme is divided into 8 educational sessions during which patients are taught to control risk factors both in a practical and theoretical manner [10].

Portugal is one of the countries with the lowest standardised ischemic heart disease mortality rate at the level of less than 100 deaths per 100000 inhabitants. In this country, cardiac rehabilitation developed at a very slow pace. In 2009, the country had 18 rehabilitation institutions (9 state and 9 private ones) located only in three biggest Portuguese cities, i.e. Porto, Lisbon and Faro. In the same year, only 3% of the patients after heart attack underwent rehabilitation. In 2014, many more patients were included in the CCR programmes (also after coronary artery bypass surgery (CABG) and after circulatory insufficiency). In 2015, there were already 22 institutions (including 12 state ones) which mainly offered the second and third phase of the CCR.

Each of the institutions has an interdisciplinary team including a cardiologist/internal medicine specialist, a physiatrist or a physiotherapist, a rehabilitation nurse and often a dietician and psychologist [11]. The whole rehabilitation process may be supervised by a physiatrist, an exercise physiologist, a cardiologist or an internal medicine specialist. Physical exercises are usually done with a physiotherapist or a rehabilitation nurse [12].

Cardiac rehabilitation in Portugal includes three phases, i.e. hospital phase, post-hospital phase and maintenance phase. The first one begins within the first 12-24 hours after the coronary incident and includes rehabilitation and education regarding prevention [12]. The second stage begins between the first and third week after leaving the hospital and lasts for 3-6 months. It includes complex medical care, i.e. an individual training programme, counselling and education in the form of group meetings with patients and their families [12]. Physical training in the post-hospital phase is usually performed in the out-patient conditions 3 times a week. It starts from endurance training which is followed by strength training. The maintenance phase begins more or less one year after the coronary incident and has no time limitations. It should be realised in clubs for people with coronary heart disease, gyms, swimming pools, etc. [13].

The study sought to compare CCR programmes in Poland and Portugal and to assess the knowledge of patients about coronary heart disease risk factor control.

Methods

The study was carried out at the Institute of Cardiology in Warsaw, at the Cardiac Rehabilitation Ward Magodent Sp. z o.o. and at Pedro Hispano

Hospital in Porto (Portugal). It included 56 patients aged 41 to 81 (20 from Portugal, 16 from the Institute of Cardiology and 20 from Magodent) with coronary heart disease who participated in the second phase of cardiac rehablitation at the day centre. The Portuguese group included 17 male patients and 3 female patients, while the Polish group consisted of 28 male patients and 8 female patients. Mean body mass of the inhabitants of the Iberian Peninsula was 76.2 kg and their BMI was 26.9, while in the Polish patients it was 84.6 kg and 28, respectively (tab. 1). The majority of the examined Portuguese patients (85%) were blue-collar workers, while most of the Polish patients (63%) were white-collar workers. In both groups, acute coronary syndrome treated with percutaneous coronary interventions (PCI) was the main reason for the participation in the second stage of rehabilitation – the Polish group included 28 such patients (78%), while in the Portuguese group there were 15 such patients (75%). The study also included 5 Polish patients (14%) and 4 Portuguese patients (20%) after CABG who took part in the rehabilitation.

Table 1. Description of the examined groups

	Age [years]	Body mass [kg]	BMI
Polish patients	63.2±8.1	84.6±12.0	28.0±3.5
Portuguese patients	57.3 ± 7.8	76.2±12.5	26.9±3.9
p	ns	<0.05	ns

A questionnaire designed on the basis of the American *Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs – Fifth Edition* [14] from 2013 was used in the study. Questions were divided into 6 parts. The first four question groups concerned such information as patients' personal data, history of the disease, hospital treatment and the course of cardiac rehabilitation. In the next part regarding the knowledge about risk factor control, the patients received points for their answers. They got 0 points for a wrong answer or "I don't know", while in the case of further answers they could obtain the following maximum point values: characteristics of the coronary heart disease – 1 point, body mass control – 3 points, nutrition – 5 points, lipid levels – 3 points, blood pressure – 2 points, stress and mental health – 4 points, quitting smoking – 4 points, physical activity and training – 7 points. The patients responded only to the questions connected with their risk factors. Points obtained by the patient were added and the percentage with regard to the maximal possible result was calculated. At the end, the patients assessed the level of education in the CCR process using a visual scale, where 0% meant a very low level and 100% indicated a very good level. The questionnaire was created in the Polish and Portuguese language versions (translations). The study participants received the questionnaire 2 weeks before the planned completion of the rehabilitation programme.

In order to describe the rehabilitation programmes in the institutions under investigation, an information card was developed based on the same standards as the questionnaire. It concerned patients undergoing rehabilitation, specialists participating in the second phase of rehabilitation, procedures employed in the treatment and education about particular risk factors. The form was completed by one specialist from each instiution. The information presented in points was later gathered and compared.

The data from the questionnaires were analysed with the use of IBM SPSS Statistics 20 software taking into account data frequency. The knowledge of Polish and Portuguese patients was compared with the use of the student's t-test due to the fact that data distribution was within the norm. Statistical significance wa set at $p<0.05$.

Results

Description of the patients

All the Portuguese patients and 23 Polish patients (68%) were provided with information concerning the second phase of rehabilitation by a doctor. In the Polish group, 9 patients (26%) received information from a physiotherapist, while the remaining ones learnt about it from other people.

The patients from Portugal demonstrated lower levels of physical activity than the Polish patients before starting CCR, i.e. 3 out of 5 patients did not take up any physical activity, 4 individuals (20%) exercised less than once a week, while only 3 persons (15%) were active more than 3 times a week. Among the Polish patients, 12 individuals (33%) exercised more than 3 times a week, 10 persons (28%) – more than once a week, 9 patients (25%) declared that they exercised less than once a week, while 5 participants (14%) did not take up any physical activity.

The patients' level of knowledge

The study compared the level of knowledge of patients from Portugal and Poland taking into account their mean results expressed in percentages for each group of questions (tab. 2). Statistically significant differences were noted in answers concerning the characteristics of the coronary artery disease and mental health control. The patients from Poland knew less about their disease than Portuguese patients; however, they could deal with stress better.

Table 2. Mean point values of Polish and Portuguese patients obtained in the questionnaire concerning their knowledge about risk factor control

Group of questions	Nationality	N	Mean	SD	Student's t-test	p	Differences between the means
Characteristics of the coronary artery disease	PL	36	0.64	0.49	2.16	0.04	0.26
	PT	20	0.90	0.31			
Body mass control	PL	36	2.28	0.70	0.36	0.72	0.07
	PT	20	2.35	0.75			
Nutrition control	PL	36	2.97	1.38	-0.50	0.62	-0.17
	PT	20	2.80	0.89			
Lipid levels control	PL	36	2.14	0.90	0.62	0.54	0.16
	PT	20	2.30	0.98			
Blood pressure control	PL	36	1.03	0.70	-1.17	0.25	-0.23
	PT	20	0.80	0.70			
Mental health control	PL	35	2.74	0.66	-2.76	0.01	-0.59
	PT	20	2.15	0.93			
Addiction to smoking control	PL	16	2.88	0.89	-0.45	0.65	-0.18
	PT	10	2.70	1.06			
Physical activity control	PL	36	2.42	1.00	1.33	0.19	0.43
	PT	20	2.85	1.42			

According to the Polish patients, a doctor was the most important source of information in almost all the areas (fig.1). In the opinion of 27 patients (75%), a physiotherapist played the most significant role in the education regarding physical activity. The examined patients from Portugal claimed that a doctor provided them with the majority of information concerning their disease, nutrition and pharmacology (fig.2). A physiotherapist gave more information on performing activities of daily living and measuring blood pressure and heart rate than a doctor. Both specialists proved equally significant when teaching patients about physical activity and training.

The study participants stated in which areas they did not receive any information (fig.3). The biggest group of the Portuguese patients admitted that nobody talked to them about their return to work, sexual activity, quitting smoking and controlling mental health. According to the Polish patients, the most neglected topics included mental health control and sexual activity.

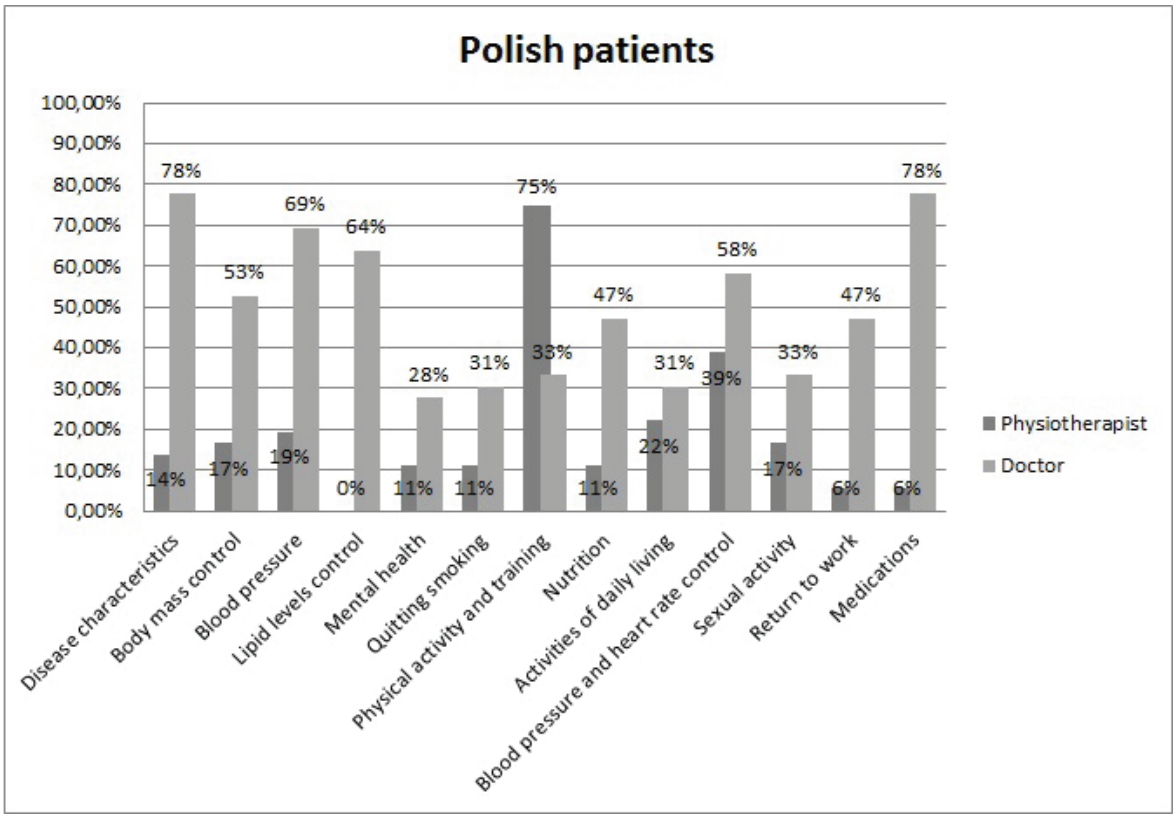

Fig. 1. The source of information about risk factor control and returning to activities of daily living among Polish patients

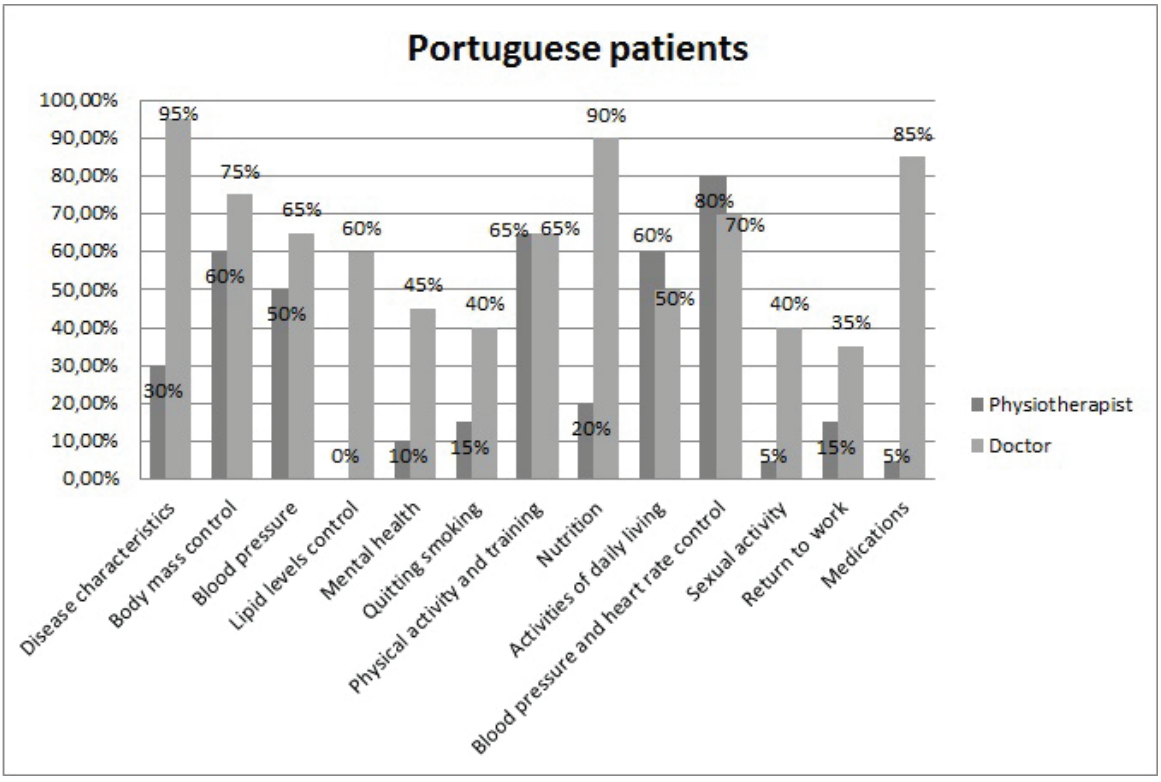

Fig. 2. The source of information about risk factor control and returning to activities of daily living among Portuguese patients

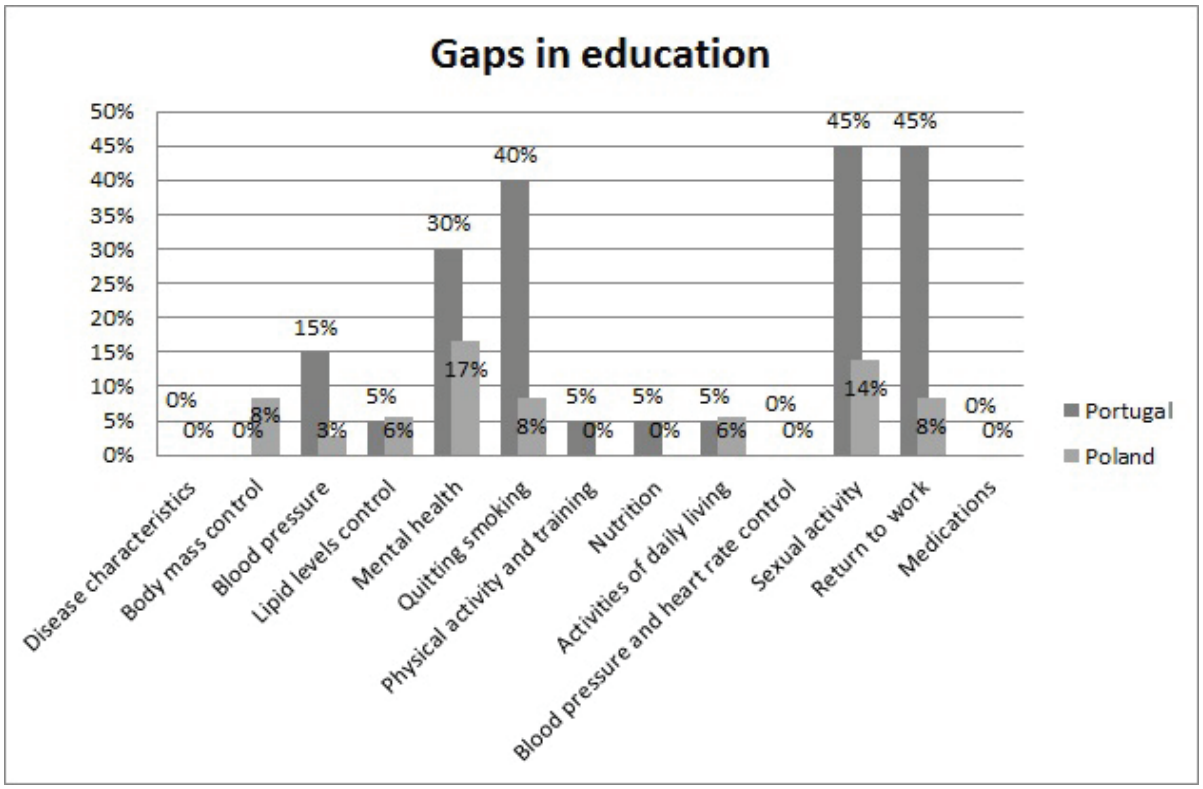

Fig. 3. Gaps in education concerning risk factor control and return to activities of daily living among the Portuguese and Polish patients

Differences and similarities between the programmes

The institutions under investigation follow the same standards, i.e. *Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs by AACVPR* [13] and *European Guidelines on Cardiovascular Prevention and Rehabilitation by ESC* [15]. Moreover, in Poland the guidelines set out by the Cardiac Rehabilitation and Exercise Physiology Section of the Polish Cardiac Society are applied. Other similarities between the programmes include the range of patients' education concerning their return to work, driving, household chores, carrying heavy objects, sexual activity, walking, activities related to social life and entertainment, maximum heart rate, adapting breathing to physical activity, the scale of fatigue, symptoms of a disease, self-control of heart rate and blood pressure as well as medications. In the examined institutions, the same risk factors are controlled; however, they differ in terms of the applied activities.

In all the institutions, the whole team of specialists is involved in helping patients to overcome their smoking addiction. Contrary to the Polish institutions, the clinic in Porto follows the rule of 5 R's, i.e. relevance, risk, rewards, roadblocks and repetition.

Patients with dyslipidemia are treated with the use of pharmacotherapy in all the institutions. However, in the Portuguese hospital, a dietician prepares diet plans for patients. Treating obesity is similar in each of the assessed institutions and includes BMI measurements and control, diet modifications and implementing physical training. In Portugal, waist circumference is also measured.

In case psycho-social disorders occur, the patients are taught relaxation techniques and ways of coping with stress and anxiety. Moreover, pharmacotherapy is applied. In the Polish institutions, patients can also consult a psychologist.

The team of specialists conducting the second phase of rehabilitation in the Polish institutions includes a cardiologist, a nurse, a physiatrist, a physiotherapist, a dietician and a psychologist. In the Portuguese hospital, the team does not include a psychologist.

In each of the institutions under investigation, patients with the same profile, i.e. after acute coronary syndrome, with cardiac insufficiency, coronary artery disease, with more than three risk factors,

congenital heart diseases, after aortic valve surgery or after coronary artery bypass surgery are referred to cardiac rehabilitation. Moreover, the Institute of Cardiology and the hospital in Porto deal with patients after heart transplant.

In each of the institutions, the costs of rehabilitation are covered from the state health insurance. In Porto, rehabilitation is conducted only in a day centre, while in Poland the range of its forms is broader, i.e. in-patient, out-patient and hybrid rehabilitation.

Educating patients during post-hospital rehabilitation in Polish institutions includes group and individual meetings, handing out brochures with information and providing audio and video recordings. In Portugal, instead of organising meetings of patients with specialists, they are educated by a specialists during training sessions.

In Poland, patients are qualified to particular models of rehabilitation on the basis of an exercise cardiac stress test and the risk of coronary incidents. A series of training sessions is finished with another cardiac stress test. In Portugal, patients are qualified to a group of low, medium or high risk. A cardiac stress test is performed at the end or sometimes also during the series of training sessions. In the Polish group, 75% of the patients underwent a cardiac stress test prior to the rehabilitation, while in the Portuguese group, it was only 15% of the patients.

Discussion

Secondary prevention activities may, in the long term, significantly reduce the number of coronary deaths and heart attacks as well as surgeries and revascularization procedures. The majority of the results of research on educating cardiac patients reveal a low level of patients' knowledge about modifiable risk factor control [16,17,18]. The effectiveness of educational activities is limited, which is confirmed by a constant need for implementing more modern methods that would increase patients' awareness of the disease and its risk factors. Unfortunately, numerous strategies and tools seem to be inefficient in practice [19].

The findings of our own study also showed that the knowledge of patients in Polish and Portuguese institutions constituted only 53% of the estimated amount of information that should be acquired during cardiac rehabilitation. This tendency may be caused, inter alia, by the development of low-invasive revascularization procedures which produce immediate effects and lead to the fact that patients quickly forget about the existing danger, thus making them less motivated to work hard in order to modify the risk factors. The process of implementing numerous changes in lifestyle is mentioned as another reason. Quitting smoking, blood pressure control, body mass loss, diet or taking up physical activity turn out too difficult for patients [19]. In this situation, focusing on primary prevention seems to be a good solution. Proper pro-health attitudes should be promoted already among young people. Both Poland and Portugal aim their national health programmes at young and healthy people.

Due to the fact that the EUROASPIRE questionnaire revealed alarming results [6], 9 European countries (including Poland) implemented the EuroAction research programme (in the years 2003-2006) that was supervised by trained nurses and was aimed at patients with coronary heart disease or at individuals with a high risk of coronary incidents as well as their families. Its objective was to help patients undergoing rehabilitation in an out-patient centre to achieve therapeutic aims and implement changes in their lifestyle. The programme helped to reduce the risk of coronary artery disease, mainly due to the fact that family members changed their habits together with patients. The effectiveness of the programme shows it ought to be implemented in the standards of treatment in Europe [20]. Moreover, including family members in the treatment process may reduce the risk of overprotectiveness which frustrates the patients and leads to the deterioration of their clinical state [19].

The Polish model of the CCR slightly reflects the above model in implementing educational meetings and phone controls performed by nurses after the second phase of rehabilitation. The advantage of this programme is a possibility to refer the patient with a low risk and an uncomplicated first phase of CCR to hybrid rehabilitation, which helps to lower the costs of treatment and reduce (the longest in Europe) waiting time for specialist appointments.

In the Portuguese group, 30% of the patients declared the lack of knowledge concerning stress and mental health control. Their mean level of knowledge in this area was significantly lower than in the Polish group. It is worth noting that, contrary to the Polish group, the patients treated in Portugal

did not have access to a psychologist. Numerous Portuguese patients declared that they did not get any guidelines for quitting smoking, which is the main coronary heart disease risk factor in this country.

The Portuguese patients knew more about physical activity and body mass control than the Polish group, which may be related to a few facts. Their training sessions in the second phase of rehabilitation are more complex (they include strength, endurance, agility and balance), and waist circumference and body mass are measured during each training session, which is not observed in Poland. Moreover, approximately 80% of the Portuguese patients were blue-collar workers, while among the Polish patients, the tendency was reverse. However, the Polish patients declared much higher levels of physical activity before the coronary incident. The difference between the results was not statistically significant, while the problem of overweight and low physical activity is at a similar (insufficient) level in both countries.

Most Portuguese patients complained about the lack of information regarding sexual activity and return to work. Sick leave or an inability to work is a serious social and economic problem. Therefore, professional activation in this group of patients, particularly in the productive age, is very important. Cardiac patients frequently do not work for non-medical reasons, so educating and activating them on the job market should constitute one of the priorities in secondary prevention [21].

Previous analyses of the effectiveness of particular methods of educating patients led to the following conclusions: individualisation in educating patients and their families is more effective than educating a group; applying standard teaching methods is not effective in cardiac rehabilitation; implementing appropriate legal regulations may be potentially more effective than teaching patients to change their lifestyle into a healthier one [19].

Our own questionnaire allowed us to obtain a lot of information about the patients' disease history, their rehabilitation and the level of knowledge. In further research, it would be worth including questions related to their level of education, as better educated individuals demonstrate higher levels of knowledge about health and risk factor control. Moreover, the study should be conducted both at the beginning and at the end of the second phase of rehabilitation as well as after some time due to the fact that the percentage of patients following doctor's recommendations decreases with time [19]. The comparative study of cardiac rehabilitation in Poland and Portugal could be extended by adding more institutions, taking into account also private centres which constitute nearly half of all the CCR centres in Portugal [1]. The study limitations also included a small sample size and a small number of institutions.

Conclusions

1. Early post-hospital rehabilitation in the institutions under investigation is performed according to the same standards, the same risk factors are controlled and patients are taught to the same extent. There exist slight differences in rehabilitation programmes regarding the teams of specialists, types of patients qualified to the second phase of CCR, types of interventions concerning smoking addiction control, dyslipidemia, body mass and psychosocial disorders as well as methods applied in educating patients.
2. A mean level of the patients' knowledge about the modifiable risk factor control is similar in both countries and significantly differs from the level described in the guidelines. The knowledge of the patients from Poland and Portugal differed significantly with regard to the two groups of questions.
3. Doctors play the most significant role in educating patients in both countries.

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