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Education and Physical Activity in Osteoporosis

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Abstract

Background: Brazil´s life expectancy is increasing as is the incidence of osteoporosis. As we have a fair number of illiterates in the country, we created a basic educational program for patients with osteoporosis.

Methods: In a retrospective study, 49 patients (average age of 66.6 years) who participated in the program were asked to answer the Osteoporosis Assessment Questionnaire (OPAQ) at baseline and at the reassessment (average of 23.4 months, range 6 to 46 months). At the reassessment, patients were also asked to answer questions on their current medication, physical activity, existence and location of pain and number of falls and fractures before and after the educational program.

Results: The results showed that 80% were taking the correct medications for osteoporosis, 48% of the pain was back pain, falls improved from 62% to 20% after the intervention and only one patient (2%) had a fracture after the program. Only 22% did not engage in physical activity regularly. The program improved mobility ($p<0.0001$), back pain ($p<0.001$), social life ($p<0.0001$), pain ($p<0.0001$), quantity and quality of sleep ($p<0.0001$), work capacity ($p=0.0005$) and humor ($p=0.026$) but it did not significantly improve self-management and independence.

Conclusions: The educational program reduced falls, increased physical activity, improved adherence to drug treatment and increased the general quality of life in osteoporotic patients.

Keywords: Osteoporosis; Education; Treatment; Physical exercises; Quality of life

Introduction

Osteoporosis is a disease characterized by the loss of bone mass and by bone fragility and increased susceptibility to fractures [1]. The risk factors are gender, age, delayed menarche or early menopause, small body constitution, race (Caucasians and Asians), low calcium intake, lack of physical activity, smoking, alcohol and/or caffeine intake and heredity [2].

Osteoporosis is a major cause of morbidity among the elderly, and the incidence of osteoporosis increases with increased life expectancy [3-6].

Osteoporosis is referred to as a silent disease because bone loss is usually asymptomatic. The first clinical manifestation is often a fracture of the hip or the spine, which leads to the deterioration of the patient´s quality of life. Social isolation as a consequence of the disease brings changes in social behavior, including fear, anxiety and later depression [7].

Women who underwent educational programs showed changes in lifestyle and increased adherence to drug treatments, thus reducing the incidence of fractures [8].

We developed an educational program for patients with osteoporosis called "School of Osteoporosis" where patients attend classes eight hours a day, five days for a week with the aim to capacitate the patients to holistically self-manage their disease. We present these results in terms of physical activity, function and quality of life.

Methods

This is a retrospective study of 49 patients who attended the educational week program "School of Osteoporosis". Participants were patients clinically diagnosed with osteoporosis (either by a former osteoporotic fracture and/or by demonstrating a bone mineral density that was equal to or greater than -2.5 standard deviations lower than the young adult) referred for clinical treatment. Among the participants were 47 women and two men with ages between 41 and 90 years (average 66.6, ± 10.24 years). The time between program attendance and re-assessment ranged from 6 to 46 months (average 23.2 ± 11.8 months).

Patients answered the Osteoporosis Assessment Questionnaire (OPAQ) questionnaire at baseline and at re-evaluation. At re-assessment they also responded to five questions: current medication (choosing from one of five options: unknown, no medication, osteoporosis, osteoporosis and other diseases, and other), physical activity (none, 2 days/week, 3 days/week and every day), existence and location of pain (none, generalized pain, spine pain, lower limbs pain, and spine and lower limbs associated pain) and the number of falls and fractures before and after the program.

The program

Ten to fifteen patients per group attended 8 hours a day for one week (Monday to Friday) with the following professionals: physiatrist, physical therapist, occupational therapist, psychologist, nutritionist, social worker, nurse, rheumatologist and dance instructor. The physiatrist explained the disease, osteoporotic fractures, signs and symptoms, the importance of a holistic approach in the prevention and the treatment of osteoporosis as well as the importance of medication compliance. Through one explanatory lecture and three physical

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therapy workshops with patients during the week, the physical therapist called attention to the importance of physical exercise, demonstrating how to perform exercises correctly and how frequently to perform the exercises. The occupational therapist showed ergonomic methods for performing daily living activities, including protecting the spine and avoiding falls, in one explanatory lecture and two workshops. The psychologist carried three group sessions focusing on coping with emotional problems related to aging (e.g., retirement, empty nest syndrome, pain, fear of falling and loneliness). The nutritionist lectured only once and explained the importance of a calcium-rich diet, as well as the quantity of calcium and the quality of the diet needed in order to improve calcium uptake. Through one class session, the social worker explained the importance of the quality of life and of social life engagement and directed them to free options for entertainment offered by the government. The nurses explained proper self-medication methods, as well as the associated risks, and the importance of personal hygiene and self-management. The rheumatologist explained the importance of exams and medications. The dance teacher provided two workshops for the purpose of combining exercise with pleasure through music to improve strength, balance and mobility.

The course was held at the facilities of the university hospital (Instituto de Ortopedia e Traumatologia do Hospital das Clinicas – Faculdade de Medicina da Universidade de São Paulo - IOT-HC-FMUSP). The majority of the professionals (except the dance teacher) were staff at the hospital. The dance professor was paid per class lectured. Patients were admitted daily in a day-hospital basis. This allowed the program to provide meals every three hours and pay for the materials used and the dance lessons.

Statistics

Basic statistics were carried out with the Statistical Package for the Social Sciences (SPSS). When comparing OPAQ results, we used the Wilcoxon test. In all tests we applied the significance level of 5%.

Results

The average time between the program implementation and the questionnaire evaluation was 23.2 months. Twenty-five patients (51%) were reassessed at an interval greater than two years after the intervention, nine patients (18.3%) were reassessed between 12 and 23 months after the intervention and 16 patients (32.7%) were assessed in less than a year after the intervention.

The time between the completion of the program and the evaluation of the questionnaires was used to divide the patients into three groups. The first, second and third groups included patients with a respective elapsed time between the program and the re-assessment of over 24 months, between 12 and 23 months, and 12 months or less. All items of the questionnaires were tested in these three groups and compared across groups. No significant difference was found. We chose therefore to present them jointly.

With respect to physical activity, 22.4% did not practice physical activity, 20.4% practiced twice a week, 24.5% practiced 3 times a week and 32.7% practiced daily (Table 1).

Eighty percent of all patients were taking medication for osteoporosis (47% of these patients used medication for osteoporosis and other diseases – Table 1).

The predominant location of pain in our patients was the spine (48%), followed by widespread pain (14%), pain in the lower limbs (14%) and pain associated with both the spine and the lower limbs (6%). Eighteen percent of patients had no pain.

With respect to falls, only one patient (2%) showed an increase after the educational program (Table 1). The percentage of patients who suffered falls after the "School of Osteoporosis" program was 20% (10 patients) while the percentage was 62% (31 patients) for those who presented falls before the intervention.

There was no increase in fractures after the program. Nineteen

Medication	**Unknown**	**No Medication**	**Osteoporosis**	**Other**	**Osteoporosis and Other**
	N umber/ (Y,)	**N umber / (%)**	**N urrber 1 (%)**	**N urrber/ (%)**	**N urrber / (%)**
	3 16.1 %1	61122%1	16132.7%1	1 2.0%1	23146.9%1
Pain	None	Generalised	Spine	Lower Limbs	Spine and Lower Limbs
	N umber/ (%)	N umber 1 (%)	N urrber / (%)	N urrber/ (%)	N urrber / (%)
	9 (18.4%)	7114.3%)	23146.9%1	7 (14.3%)	316.1%)
Physical Activity	None	Twicea Week	Three times a week	Daily	
	N umber/ (%)	N umber / (%)	N urrber / (%)	Number/ (%)	
	11 Q2.4%1	10 (20.4%)	12 (24.5%)	16 (32.7%)	
Falls	Improvements	Worsening	Unaltered		
	N umber/ (%)	N umber / (%)	N urrber / (%)		
	27 155.1%1	1 am%)	21 (42.9%)		
Fractures	Improvements	Worsening	Unaltered		
	N umber/ (%)	N umber / (%)	N urrber / (%)		
	21 142.9%1	010%1	28(57.1%1		
Time between intervention and reassessment	>24m	12-23	<12m		
	N umber/ (%)	N umber / (%)	N urrber / (%)		
	25 (51.0%)	9118A%1	15 (30.6%)		

Table 1: Medication intake, pain, physical activity, falls, fractures at reassessment. Time between intervention and reassessment.

	Improvements	Worsening	Unaltered
	Number/(%)	Number/ (%)	Number / (%)
Mobility	24(49.0%)	14(28.6%)	11(22.4%)
Back Pain	26(53.1%)	16(32.7%)	7(14.3%)
Self- Management	6 (12.2%)	3(6.1%)	40(81.6%)
Social Life	27(55.1%)	16(32.7%)	6(12.2%)
Pain	28(57.1%)	13(26.5%)	8(16.3%)
Sleep	31(63.3%)	13(26.5%)	5(10.2%)
Work	20(40.8%)	16(32.7%)	13(26.5%)
Humor	24(49.0%)	10(20.4%)	15(30.6%)
Independence	23(46.9%)	12 (24.5%)	14(28.6%)

Table 2: Changes in OPAQ parameters from baseline to reassessment.

	Baseline	Reassessment	Significance
	Mean(SD)	Mean(SD)	
Mobility	1.85 (1.6)	1.64 (1.7)	p<0.0001 (W=135)
Back Pain	3.64 (2.3)	3.21 (2.5)	P<0.001 (W=178)
Self-Management	0.05 (0.2)	0.27 (1.4)	P= 0.2 (W=-7.0)
Social Life	5.11 (1,9)	4.47 (1,7)	P<0.0001 (W 308)
Pain	4.29 (2.8)	330 (2.5)	P<0.0001 (W=371)
Sleep	4.13 (2.2)	3.47 (1.9)	P<0.0001 (W=399)
Work	2.90 (2.0)	2.82 (2.3)	P=0.0005 (W=32)
Humor	3.04 (1.6)	2.88 (1.6)	P= 0.026 (W=139)
Independence	2.14 (2.0)	2.07 (1.9)	P= 032 (W=30)

Table 3: Results of the OPAQ questionnaire at baseline and at reassessment.

patients had suffered at least one fracture prior to the program and only one patient had a fracture at the reassessment.

The results from the OPAQ are shown in (Tables 2 and 3). Of the patients who attended the school of osteoporosis, mobility improved in 49.0% of the patients and remained unchanged in 22.4% of the patients. Back pain improved in 53.1% of the patients, worsened in 32.7% of the patients and remained the same in 14.3% of the patients. Self-management remained the same in 81.6% of the patients, improving in only 12.2% of those who attended classes. Social life improved in 55.1% of the patients, remaining the same in 12.2% and worsening in 32.7% of the patients. A shorter period of pain presented in 57.1% of the patients after they have completed the program, whereas 16.3% of the patients remained the same and 26.5% of the patients worsened. Improvement in the quality and quantity of sleep was reported in 63.3% of the patients, whereas 26.5% worsened, and 10.2% remained the same. The capacity to perform, and the quantity and quality of daily work (employment or household) improved in 40.8% of the patients, remained the same in 26.5% and worsened in 32.7% of the patients after the program. There was an improvement in the humor of 49% of the patients and worsening in 20.4%. The program did not significantly improve the ability to live without help from others despite an improvement of independence in 46.9% of the patients (Tables 2 and 3).

Discussion

The School of Osteoporosis is a program formed by a multi-professional team to inform the patient of the osteoporosis disease and treatment. The program aims to help patients understand the disease, change habits and propagate information to the community. All this makes this program a method of treatment and prevention of complications, resulting in an improved quality of life.

The OPAQ questionnaire, which evaluates quality of life of osteoporotic patients, is easily understood and applied. The only issue that was not considered was the sexual activity of patients because most of them had no sexual relations due to old age or widowhood.

One of the weaknesses of the study is the range of time elapsed between the intervention and the reassessment. It ranged from 6 to 46 months, yet we found no differences between groups (less than a year, between 12 and 23 months and over 24 months) with respect to the questions asked. Hence, habits that may or may not have changed at the program remained in place. We believe that our positive outcomes are due to the one-week program with several professionals and the repetition of many classes, especially with physical therapy, where exercises were repeated until the patients performed the exercises properly. Short educational programs are not better than educational material alone or health screening programs [9-11].

The interesting but not practical side of this program is that it was relatively costless. The program used vacant facilities of the Institute of Orthopedics and Traumatology of the Clinic's Hospital of the University of São Paulo – Brazil. The classes were administered during the staff's regular labor time, with the exception of the dance teacher. Meals were paid for because patients were in a day-hospitalization arrangement for five consecutive days. The program was terminated because the vacant facilities became necessary for other purposes of the Institute. Measuring the results of this program is important for assessing the program's cost-benefit ratio.

Another limitation of our study is the lack of a control group. There are several studies on educational programs for patients and health professionals showing the improvement in medication intake with the knowledge of the disease [8-15]. Patients learn the onset of the disease, its complications, treatment and the importance of prevention; thus, the patients become vectors of information about the disease [8,10]. In our study, we observed that 77.6% of the patients are practicing physical activity and 79.6% of the patients are using medication for osteoporosis, demonstrating a change in the lifestyle of these patients after the program.

The greater the extent of vertebral deformity, the worse was the complaints related to pain and duration of symptoms, mood, functional limitation and quality of life [16]. Our study showed that the majority of complaints concerned back pain (53% of the cases).

Only one patient fell more times after the program than before, but there was no worsening of the number of fractures. Indeed, only one patient had a fracture after the program, but if we consider the fact that this patient already had more than three fractures before the program and that he was reassessed 43 months after the intervention, we can consider this a significant improvement.

A significant improvement was observed in the discomfort caused by back pain (53.1% of the patients) and in the frequency and difficulties related to pain (57.1% of the patients), most likely due to the increased physical activity and the day-to-day correct posture application, which were emphasized during the program. Sleep improvement was observed in 63.3% of the patients, which may be the consequence of improvement in pain, physical and emotional aspects.

No significant improvement in self-care was observed our study because these are only for those with severe disability, and thus eighty-two percent of the patients remained the same with respect to self-care.

Vertebral fractures may limit the ability to perform daily activities, causing restrictions in work and interference in social and leisure activities [17,18]. Social life and work improved in 55.1% and 40.8% of the patients, respectively, likely due to improvements in physical aspects.

Humor improved or remained the same in 79.6% of the patients. This aspect improved after the educational program, as a result the information about the disease and its complications and the improvement of the physical aspects that increased the patient confidence and safety. The mood did not show statistically significant improvement most likely due to the small number of samples and also because mood depends on factors unrelated to the disease.

Independence improved in 46.9% of the patients, but this was statistically insignificant and can be attributed to the misunderstanding of the questions on the OPAQ form.

The School of Osteoporosis program showed changes in lifestyle and improved adherence to drug treatment with subsequent improvements in physical, emotional and social aspects of these patients.

Conclusion

The educational program reduced falls, increased physical activity and improved adherence to drug treatment and increased the general quality of life in osteoporotic patients.

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