ASSESSMENT OF THE QUALITY OF LIFE THROUGH THE SF-36 QUESTIONNAIRE IN PATIENTS WITH CHRONIC NONSPECIFIC LOW BACK PAIN

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ABSTRACT

The objective of this study was to evaluate the quality of life (QL) with the use of the SF-36 Questionnaire in patients with chronic nonspecific low back pain (CNLBP). Thirty patients with CNLBP were randomly assigned to one of three groups (Iso group (Isostretching), GPR group (Global Postural Reeducation), and the Iso+GPR group. Patients underwent physical therapy assessment with the use of the Vertebral Spine Assessment, the Visual Analog Scale of Pain (VASP), and the SF-36 life quality questionnaire before the first session (first assessment), after three months of treatment (second assessment) and reassessed two months after the final session in the follow-up (third assessment). The results indicated that both physical therapy techniques reduced pain ($p<0.001$); when the techniques (Iso+GPR) were combined, the reduction in pain was significantly greater; and, in the follow-up assessment, the GPR method was more efficient. As for the QL, physical therapy techniques were effective after the interventions ($p<0.001$), and the Iso method was more effective when patients were reassessed in the follow-up. We conclude that the physical therapy techniques used in this study were efficient to treat CNLBP in the patients since they reduced pain and increased QL according to the results of the SF-36 questionnaire. ***Level of Evidence II, Randomized Controlled Clinical Trial.***

Keywords: Quality of life. Low back pain. Physical therapy specialty.

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INTRODUCTION

Pain in the spine is the most common musculoskeletal cause of physical problems, and 80% of the affections are located in the lumbar region.[1] Mancin et al.[2] stated that 50 to 80% of the population is affected by low back pain during their life, which makes it a public health issue in modern society. Another important aspect is the elevated public and private costs generated by absence from work, insurance and healthcare.[3]

Chronic low back pain causes a significant impact on the lives of workers, who may become depressed, anxious, unsatisfied and, often, afraid to be dismissed from work.[1]

Therefore, the objective of this study was to evaluate the quality of life of patients who suffer from low back pain with the use of the SF-36 questionnaire (functional capacity, physical aspects, pain, general health status, vitality, social aspects, emotional aspects and mental health) before and after physiotherapeutic interventions and a two-month follow-up reassessment.

MATERIALS AND METHODS

This study was characterized as a quantitative experimental study. The research was developed at the Palmas Orthopedic Institute (Instituto Ortopédico de Palmas – IOP) and the Multifunctional Assistance Center (Núcleo de Atendimento Multifuncional – NAC) of Centro Universitário Luterano de Palmas - CEULP/ULBRA, both located in the city of Palmas – TO, Brazil.

This study was approved by the CEULP/ULBRA Ethics Committee for research under case number 13/2009. The orthopedic doctors used the criteria of the Brazilian Society of Rheumatology[5] to diagnose chronic nonspecific low back pain (CNSBP).

Fifty volunteers diagnosed with CNLBP were recruited from the waiting list of IPO and NAC's Outpatient Physical Therapy clinic. These volunteers underwent an initial screening and thirty patients were selected, according to criteria described below.

Criteria for inclusion: thirty people who had chronic nonspecific low back pain diagnosed by doctors specialized in spinal col-

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umn disorders, followed by complementary exams (CT scan or MRI), were included in the sample. These patients had ages ranging between 19 and 60 years, from both genders, presented low back pain for more than twelve weeks, without radicular symptoms (pain radiating to the knee, numbness, muscle dysfunction or hyporeflexia) as characterized by the Brazilian Society of Rheumatology.[5] They consented to participate in the study by signing the Free and Informed Consent Form in fully able physical, mental and intellectual conditions; they had sufficient cognitive capacity, which was tested with the use of Folstein's Mini-Mental State Examination (MMSE),[6] to comprehend the procedures and follow the given instructions. All of them were sedentary and inexperienced in the practice of GPR and Isostretching methods.

Criteria for exclusion: the following subjects were excluded from the trial: those who had nerve root compression, prolapse or disc herniation, spondylolisthesis or retrolisthesis, severe scoliosis or significat changes in the alignment of the spine, advanced spondyloarthrosis, tumors, history of surgery and other specific and/or serious causes of back pain; presence of respiratory or neurological diseases, polio sequelae, prosthesis, discrepancy of limbs, umbilical hernia, pregnancy, infectious diseases; incapacity to respond to the questionnaires: mentally disabled and those who had cerebrovascular accidents (CVA); depression (diagnosed with the Beck scale). Patients who were smokers, exercised regularly or refused to participate in the study, as well as those that could not answer the questionnaires due to mental illness or cerebrovascular accident (CVA) were also excluded.

We established as criteria for discontinuation: patients who, for any reason, were absent for more than two consecutive weeks from the physical therapy techniques intervention or refused to participate in the study until its conclusion.

The thirty volunteers included in this study where randomly distributed into three groups of ten subjects each (the randomization was done by a random number table): one group (Iso) was submitted to the Isostretching protocol; another (GPR) was submitted to global stretching in two postures of the Global Postural Reeducation method; and the third group (Iso+GPR) was submitted to the Global Postural Reeducation method and the Isostretching protocol. All the subjects who participated in this study were treated individually by the researcher of this study who was trained in both Isostretching and GPR methods.

After signing the Free and Informed Consent Form, subjects were submitted to a sequence of procedures by an independent and previously trained examiner. The volunteers were submitted to a physical-functional evaluation using a specific form, as described by Alexandre et al.[7]

To quantify low back pain, we used the Visual Analog Scale of Pain (VASP). To assess quality of life, we used the Short-Form Health Survey (SF-36). This multidimensional instrument was developed in 1992 by Ware and Sherbourne and validated in Brazil by Ciconelli et al.[8] The evaluation of the results was done by attributing scores to each question, which were then transformed into a scale ranging from 0 to 100, where 0 corresponds to the worst quality of life and 100 to the best. Each dimension was analyzed separately. Random assignment to interventions.

Random assignment to one of the 3 groups was done at the beginning of the interventions. For such, we established three groups of intervention: Iso Group (group treated only with the Isostretching method), GPR Group (group treated only with the GPR method) and Iso+GPR Group (group treated with both the Isostretching and the GPR methods).

Physiotherapeutic intervention:The physiotherapeutic interventions were conducted at the Instituto Ortopédico de Palmas, Palmas, TO, where there are a GPR and Iso clinic . All subjects with chronic nonspecific low back pain (CNLBP) were treated by the researcher, reducing the likelihood of personal interference on the results.

Interventions with the Isostretching method (Iso Group)

The subjects of the Isostretching group performed seven exercises from Redondo's concept.[9] Each exercise was repeated eight times. The time for remaining in the posture was according to a deep and prolonged exhalation for about six to ten seconds. After each exhalation, only the tension was relaxed, and the the isometric contraction was maintained without modifying the base position. We observed an increase in the muscular tension by stretching with the isometric contraction, with deep and prolonged exhalation, pelvis repositioning, lowering of the scapula (isometric fixation) and self-growth of the spine.[9]

Treatment occurred during three months in individual sessions twice a week for 60 minutes each, totalizing 24 sessions.[9]

Interventions with the GPR method (GPR Group)

The subjects of the GPR group were treated with stretches of the static anterior internal muscle strings of the hip, the posterior master string and the respiratory string.[10] In each session, two global postures were performed with no weight on the supine, and were maintained for twenty minutes each: one posture for the anterior string and another for the posterior one.

Treatment lasted for three months in individual sessions once a week for 60 minutes, totalizing 12 sessions.

Intervention by Isostretching method+GPR method (Iso+GPR Group)

The subjects were treated with the GPR method once a week and with the Isostretching method twice a week for three months (a total of 12 GPR sessions and 24 Isostretching sessions).

The physical therapist who assisted with data collection received previous training. We also conducted a pre-test to adjust the research instruments, the time of application of the questionnaires and the physical-functional exam. To prepare for work field, a pilot project was conducted with six subjects who had CNLBP, two of them having been treated by the GPR method, two by the Isostretching method and two by Iso+GPR. These subjects were not included in the statistical analysis.

Patients in both groups were instructed not to seek other forms of treatment for relief of chronic low back pain during the study period. After three months of treatment, subjects in both groups were assessed with the VASP and the SF-36 questionnaire. In order to verify the effectiveness of the physiotherapeutic interventions, these instruments were reapplied two months after the end of treatment (follow-up) by the same examiner responsible for the initial data collection.

Statistical Analysis

To analyze the data we used the following software: Excel® 2007 and SPSS® v13 for Windows®. We used a mixed design

ANOVA model with the factors Group (factor among groups – Independent variable with three degrees of freedom) and Assessment (three degrees – repeated measures). The values of the degrees of freedom were corrected using the Greenhouse-Geisser method to determine the statistical significance value of the test when the criterion for sphericity was not assumed. However, in the results we described the non-corrected degrees of freedom. The *post hoc* (repeated measure of ANOVA) analyses were developed to evaluate the significant effects when authorized by the mixed design ANOVA test. In the multiple comparisons procedure we used the Bonferroni method to correct the level of statistical significance. The value of statistical significance was set at $p \leq 0.05$ for all tests.

RESULTS

Table 1 shows a summary of the sociodemographic variables of the sample.

The results obtained with the Visual Analog Scale of Pain (VASP) showed that the index of chronic nonspecific low back pain decreased in a statistically significant manner after the first and second assessments ($p<0.001$). (Table 2)

The VASP proved to be useful, since we observed a reduction of pain for most subjects. Subjects treated with the Isostretching technique, at the start of treatment had an average rating of 5.3; after treatment the average was 0.9; and, 60 days after the end of treatment, pain was measured at an average of 1.4. Subjects who were treated with the GPR technique had an average of 5.5 at the start of treatment; at the end it decreased to 0.4; and, after 60 days, the average was maintained at 0.4. For subjects who were treated with the Iso+GPR techniques, the average VAS value at the start of treatment was 6.6; decreasing to 0.1 at the end; and, after 60 days, increasing to 0.3. This result indicates an improvement after physiotherapeutic intervention in all treatment groups (Figure 1), and indicates that treatment was most effective when both techniques (Iso+GPR) were combined.

We also observed that subjects who underwent treatment with the GPR method showed a tendency to maintain the improvement 60 days after intervention. When we compared the Iso group to the Iso+GPR group, we observed a tendency of increasing pain in the follow-up for the Iso group. (Figure 1)

When assessing the quality of life, according to the domains of the SF-36, we found a statistically significant effect of the Time factor on the scores of the SF-36 questionnaire on the items functional capacity, physical aspects, pain, general health, vitality, social aspects, emotional aspects and mental health. (Table 3) The procedure for multiple comparisons showed that all items of the evaluation were significantly lower in the first evaluation, when compared to the second and third evaluations ($p<0.009$ in all cases). There was no difference between the second and third evaluations ($p>0.392$, in all cases). We did not observe a significant effect of the factor Group, nor of the interaction Group *vs* Time.

Table 1. Distribution of the sociodemographic variables of the sample.

Variables	Iso	Group GPR	Iso + GPR
Gender			
Female	6 (60%)	7 (70%)	7 (70%)
Male	4 (40%)	3 (30%)	3 (30%)
Total	10 (100%)	10 (100%)	10 (100%)
Marital status			
Single	2 (20%)	4 (40%)	1 (10%)
Married	8 (80%)	5 (50%)	9 (90%)
Divorced	0 (0%)	1 (10%)	0 (0%)
Education			
Primary school	2 (20%)	1 (10%)	0 (0%)
Secondary school	4 (40%)	5 (50%)	3 (30%)
College/University	4 (40%)	4 (40%)	7 (70%)

Table 2. Summary of the analysis of the effect of treatments in pain measured by VASP.

Group	VAS			F	p-value
	1st	2nd	3rd		
Iso	5 .3 (2 .6)	0 .9 (1 .2)	1 .4 (1 .5)		
GPR	5 .5 (2 .7)	0 .4 (0 .7)	0 .4 (0 .9)	164.169	<0 .001
Iso + GPR	6 .6 (1 .8)	0 .1 (0 .3)	0 .3 (0 .6)		
Total	5 .8 (2 .4)	0 .5 (0 .9)	0 .7 (1 .2)		

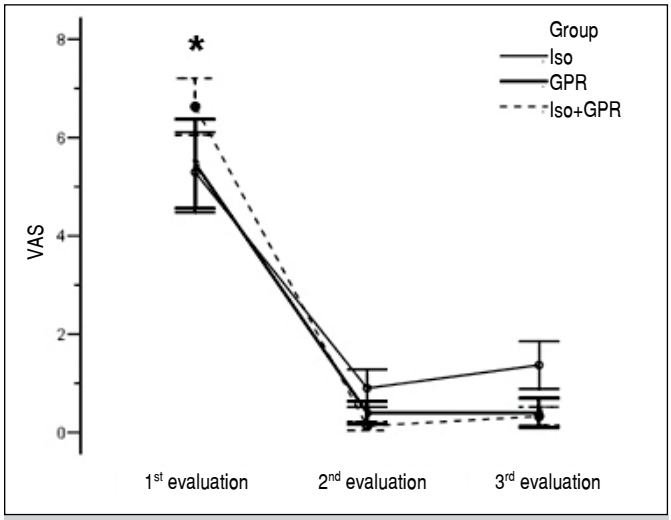

Figure 1. Comparison of mean measures of pain (VAS) in the first assessment, after treatment (second assessment) and two months after interventions (third assessment).

DISCUSSION

Pain is a personal experience that can only be evaluated by others through verbal or behavioral activities of the sufferer. To measure and accurately quantify the degree of low back pain or sciatic pain in patients with chronic low back pain before and after clinical treatment has been the target of studies by authors who seek a better correlation between clinical findings and imaging[11]. There are several questionnaires that subjectively measure pain. The top five with most potential to identify the limitations of back pain that are self-administered, easy to

understand and assess points (scores) and that can be applied within thirty minutes are: a) Oswestry Disability Questionnaire, b) Quebec Back Pain Disability Scale, c) Roland-Morris Disability Questionnaire, d) Waddel Disability Index, e) Medical Outcomes Study 36-Item Short-Form Health Survey (SF- 36).[12,13]

Assessments that measure a patient's general state of health are not able to tell a healthcare professional exactly what to do, but they are able to demonstrate whether patients can perform certain activities they normally do and how they feel when they are performing them. The repeated application of these instruments over a period of time may determine improvement or worsening of a patient in different aspects, both physical and emotional, which makes it useful for evaluating a specific intervention.[8]

As a resource used in strategies to control low back pain, physical therapy programs have been recommended, especially exercise therapy, as they have proven to be effective in reducing the intensity of low back pain, increasing mobility and function, producing gains in resistance and muscle strength, reducing chronicity, dysfunction and medical care, especially in chronic patients.[7]

Stabilization programs involving the rehabilitation of stabilizing muscles of the torso, in various postures and positions associated with pain, are described in the literature as effective methods for treating chronic low back pain.[13] Physical exercise has been characterized as a treatment to reduce low back pain, because it is low cost, noninvasive and is a physiological activity that can be used as a therapeutical resource for the patient.[7]

In the last decades the forms of treatment have been modified, however there are few well documented studies on the subject. Many therapeutic procedures are used without proof of their efficiency.[14]

Studies have examined the mechanisms by which physical activity maintains, improves and/or prevents musculoskeletal symptoms. However, precise explanations for these occurrences are not known. Weisel et al.[15] reviewed the literature and presented two theories about the relationship between exercise and the presence of musculoskeletal symptoms. The first is that exercise causes physiological changes in muscle structures. One of these changes is related to intramuscular density. Individuals with chronic and intermittent pain show lower density when compared to healthy individuals, indicating that the former have high fat levels and high levels of low contractile tissue (characteristics related to inactivity), which facilitates the appearance of lesions. Other changes generated by inactivity are a decrease in the ability to withstand static and repetitive loads, and a decrease in the potential action of oxidative enzymes and the activity of catecholamines. The second theory is that physical activity produces many side effects that indirectly improve musculoskeletal discomfort, because they improve mood, increase a sense of control and self-reliance and improve balance and skill acquisition.[16]

Many scholars are aware of the positive effects of physical activity and have begun to investigate the effects of its decrease on the body. Scholars agree that most of the training effects on cardio respiratory, biochemical and metabolic abilities are lost within a relatively short period of time after training is suspended. Measurable reductions were observed (6-7%) in VO_{2max}, in physical work capacity, hemoglobin and blood volume after only one week of complete bed rest.[16] In general, the rate of decline of the fitness benefits is completely lost after four to eight weeks of no training.[17]

Our study demonstrated that the reduction in pain continued for two months after the interventions when the GPR method was used. These findings are in agreement with the study of Barr et al.[18] that compared a program of lumbar stabilization with manual therapy in patients with sub acute and chronic low back pain and noted an improvement in pain and function after three and twelve months of intervention. Clinical trials have shown that training muscles that stabilize the trunk reduces short and long term symptoms of chronic low back pain.[19]

Reduction of pain intensity in patients undergoing lumbar stabilization exercises can be attributed to better support and

Table 3. Summary of the analysis of the effect of the three types of treatment on the scores of the SF-36 questionnaire.

Items	Assessment	Iso	GPR	Iso + GPR	F between assessments	p-valor
Functional capacity	1st	58.5 (27.5)	50.5 (15.2)	47.5 (27)		
	2nd	98 (4.8)	89 (20.4)	93.5 (13.3)	34.283	<0.001
	3rd	98 (4.8)	78 (33.7)	87.5 (31.4)		
Physical aspects	1st	20 (38.7)	-2.5 (24.9)	-5 (35)		
	2nd	50 (0)	47.5 (7.9)	50 (0)	41.303	<0.001
	3rd	50 (0)	41.5 (16.7)	45 (15.8)		
Pain	1st	43.5 (20.3)	29.7 (8.8)	32.4 (19.5)		
	2nd	91 (9.9)	82.6 (24.6)	95.8 (9.2)	82.598	<0.001
	3rd	91 (9.9)	73.1 (34.5)	86.4 (31.3)		
General health	1st	62.2 (17.9)	59.2 (23)	57.9 (23.5)		
	2nd	85.3 (9.9)	87.9 (15.1)	91.4 (10.9)	16.153	<0.001
	3rd	86.1 (10)	79.3 (31.5)	85.2 (30.8)		
Vitality	1st	55 (24.5)	45 (17) 50	(25.5)		
	2nd	85.5 (3.7)	82.5 (11.1)	87.5 (7.5)	27.347	<0.001
	3rd	85.5 (3.7)	74.5 (28.5)	82 (29)		
Social aspects	1st	78.8 (15.6)	60 (25.5)	58.8 (25)		
	2nd	98.8 (4)	95 (15.8)	98.8 (4)	20.245	<0.001
	3rd	100 (0)	85 (33.7)	88.8 (31.4)		
Emotional aspects	1st	56.7 (44.6)	30 (42.9)	56.7 (47.3)		
	2nd	96.7 (10.5)	100 (0)	96.7 (10.5)	22.573	<0.001
	3rd	100 (0)	90 (31.6)	90 (31.6)		
Mental health	1st	66.4 (12.8)	67.2 (19.8)	65.6 (23)		
	2nd	92.4 (6.4)	88.8 (9.9)	94.4 (6)	15.186	<0.001
	3rd	92.4 (6.4)	82.8 (30)	86.8 (31)		

stability of the lumbar spine and the adaptation of cognitive strategies to avoid the pain and improve proprioception related to the dysfunction.[20]

The results of this study suggest that physiotherapeutic interventions by Isostretching and GPR methods, and their combination (GPR+Iso), improved functional capacity, physical aspects, general health, vitality, social and emotional aspects and mental health as well as reducing pain. Their contribution to the increase in scores was statistically significant ($p<0.001$). Scientific research shows a set of data demonstrating the importance of exercise in modifying the parameters of quality of life. Spirdurso and Cronin[21] draw attention to the importance of healthy behaviors, including the practice of physical exercises.

Positive effects of therapies, like those applied in this study on low back pain, have already been reported by other studies using different exercise protocols.[11]

We did not find studies in the literature that proposed a program for assessing quality of life using the SF-36 in patients with chronic nonspecific low back pain and comparing Isostretching and GPR methods.

This instrument has been used in several studies to evaluate quality of life, including in patients with chronic low back pain.[2] The instruments for QL assessment should enable the detection of changes in health status, as well as evaluate the prognosis, risks and benefits of a particular therapeutic intervention.

Regarding the results on "general aspects", shown in Table 3, we observed that the groups of interventions progressed satisfactorily with treatment. The Iso Group had a score of 62.2 at baseline, which increased to 85.3 at the end of treatment and then 86.1 after 60 days of intervention. The GPR Group had a score of 59.2 at baseline, 87.9 at the end of the treatment and 79.3 60 days after the interventions. The Iso+GPR Group exhibited a score of 57.9 at baseline, 91.4 at the end of treatment and 85.2 after 60 days. This domain evaluates how the patients feels about their health in general.[22] We also observed the need for continued maintenance of physical activity. Often, patients will start treatment but stop due to lack of time, lack of interest or little motivation.

The best results after physiotherapeutic interventions were observed on "social aspects" and "emotional aspects". According to Matsudo et al.[23], exercising should be included in healthy life habits, in addition to other general health measures. Thus, the practice of systematic physical activity has often been indicated by doctors and specialists, both for prevention and for rehabilitation of different types of diseases, such as cardiovascular, endocrine-metabolic, diseases of the bone-muscular system or psychological conditions.[24]

Another aspect that drew our attention was "functional capacity" (Table 3). We observed that the groups had a satisfactory progression because the scores increased from the second assessment in relation to the first and after the interventions, especially when both physiotherapy techniques were associated (Iso+GPR). This item assesses the presence and extent of limitations related to physical capacity.[23]

According to Tsukimoto et al.,[25] functional evaluations should describe functional status, integrating data on performance in view of activities performed and allow for more appropriate and timely interventions when necessary, in order to enhance independence and personal autonomy. These evaluations are an important health marker, useful in identifying clinical and functional results, as they make it possible to relate functional improvement with the decrease of difficulties in daily activities, including caring for oneself, communication and mobility, instrumental activities of daily living (IADL), which include everyday household activities, such as going to the bank, shopping, managing medication; work and leisure activities.

The data in Table 3 allows us to conclude that the physiotherapeutic interventions used in this study contributed to the increase in scores ($p<0.001$), which were statistically significant results. Alexandre et al.[7] believe that exercise can reduce pain, increase mobility and function and reduce chronicity.

In this study, we evaluated quality of life two months after exercising ceased and noted that the Iso method was superior when compared to the other techniques, GPR and GPR+Iso, in the physical functioning, physical aspects, pain, general health, vitality, social aspects, emotional aspects and mental health categories.

Isostretching is a French technique, created in 1974 by Bernard Redondo, and is also known as Gymnastics Maintenance. It can be defined as a postural workout, because most of the exercises are performed with correct spinal position; a global exercise, since the body as a whole exercises at each position; and an upright technique, as it calls for self-growth, maintains and controls the body in space, in a non-traumatic manner, and is sufficiently complete to relax the rigid muscles and strengthen weaknesses. It also requests maximum muscle command, induces body awareness in the brain and ensures proper breathing control and active participation of the individual.[9]

The Isostretching method works with stretching and isometric contraction exercises maintaining postures during expiration in order to promote greater joint mobility and muscle tone, development of awareness of the correct positions of the spine and breathing capacity, development of proprioception and improvement of body functioning to improve posture and balance and, consequently, gait and quality of life parameters.[9]

The ultimate goal of any physical therapy is the acquisition of pain-free movement and functioning. Therefore, understanding the lesion process and using valid tools for evaluating results are essential for the proper development of a physical therapy plan of care.

CONCLUSION

We conclude that the physical therapy techniques reduced pain after the interventions. When both techniques (Iso+GPR) were associated, improvement was more significant; however, at the two month follow-up, GPR proved to be most effective. The physiotherapy techniques were effective in improving the quality of life according to SF-36. The Isostretching method was more effective when patients were reevaluated during follow-up. We conclude that the physical therapy techniques used in this study were effective to treat patients with chronic nonspecific low back pain, because they reduced pain and improved quality of life.

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