Central European Journal of Nursing and Midwifery

Cent Eur J Nurs Midw 2015;6(4):343–351
doi: 10.15452/CEJNM.2015.06.0026

ORIGINAL PAPER

NURSING INTERVENTION PROTOCOL FOR ADULT PATIENTS EXPERIENCING CHRONIC LOW BACK PAIN

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Received September 9, 2015; Accepted November 2, 2015.

Abstract

Aim: The aim of this study was to evaluate the effectiveness of a nursing intervention protocol targeting the knowledge and practice of adult patients experiencing low back pain. *Design:* A quasi-experimental research design. *Methods:* Pre-post assessment of outcome was used in this study. The study was conducted in the outpatient clinic of the physical therapy department at Zagazig University Hospital and Beni-Suef University Hospital, Egypt. Sample: 40 participants diagnosed with chronic low back pain (lasting for longer than six months). Seven of the 40 dropped out during the follow-up phase for personal or logistical reasons. Tools included sections for demographic characteristics, knowledge and practice assessment; in addition to the Oswestry Disability Index, and Visual Analogue Scale (VAS). *Results:* The application of an instruction protocol intervention for low back pain was effective in improving patient knowledge and practice, with associated amelioration of the severity of pain and disability among them. The effect was still apparent at the three-month follow-up. *Conclusion:* It is recommended that the study be replicated using a more robust randomized clinical trial design. Nonetheless, the instruction protocol with the designed booklet may be adopted as an element of the care services offered to patients suffering LBP, given the clear positive effects on patient knowledge, which would undoubtedly help them decide on the most preferential management approach.

Keywords: low back pain, intervention protocol, disability.

Introduction

Chronic low back pain (LBP) is defined as low back pain persisting for longer than 12 weeks (North American Spine Society, 2009). The Global Burden of Disease Study (2012) placed LBP among the top ten most burdensome diseases and injuries. The lifetime prevalence of non-specific LBP is estimated at 60–70% in industrialized countries, with a one-year prevalence of 15–45%, with lower, albeit rising, prevalence among children and adolescents. As the world population ages, LBP will increase substantially due to the aging of intervertebral discs (Priority Medicines for Europe and the World, 2013). It has a negative impact on performance at work and general well-being, leading to physical, social and psychological problems (Tavafian et al., 2007).

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Although several risk factors for LBP have been identified, such as age, obesity, job type, as well as lifestyle and psychological factors, the actual causes remain obscure, making its diagnosis difficult (Rubin, 2007; Vos et al., 2013). A minority of cases of LBP result from trauma, osteoporosis or prolonged corticosteroid use, vertebral infections, tumors and bone metastasis (Phillips et al., 2013). The underlying pathology is a reduction of blood supply so that nutrients and oxygen are not optimally delivered and removal of the irritant byproducts of inflammation is impaired, thereby creating a feedback loop of inflammation and pain (Hoy et al., 2010).

The diagnosis of LBP depends on history and physical examination to identify clinical signs and associated psycho-social and occupational factors that may influence recovery. Ancillary investigations are not generally indicated unless features of serious conditions are identified (Karjalainen et al., 2003). It is important to diagnose whether LBP is a mechanical or non-mechanical problem, or referred pain (Sprouse, 2012). The management goals are to restore normal function, return the individual to work, and minimize pain, and recovery is aided by attempting to return to normal activities as soon as possible within the limits of pain (Koes et al., 2010). Providing patients with coping skills through reassurance is useful in speeding recovery (Casazza, 2012). In longstanding LBP, multidisciplinary treatment programs may be needed (Hendrick et al., 2011; Choi et al., 2010), and exercise therapy protocols are effective in decreasing pain and improving function (Guild, 2012).

Low back pain is very common, with physical, psychological, social and economic burdens on patients and their families as well as the community and healthcare system. It is associated with decreased work capacity, absenteeism and early retirement. The literature indicates that patients seeking care for LBP ask for more information about their condition and the available treatment options (Crowe et al., 2010; Sokunbi et al., 2010). The findings of qualitative study (Sokunbi et al., 2010) also highlight the importance of well planned associated education support packages in the treatment of LBP. Nurses, as part of the health team can play a role in mitigating the occurrence and progress of the condition through properly designed educational endeavors.

Aim

The aim of this study was to evaluate the effectiveness of a nursing intervention protocol targeting the knowledge and practice of adult patients experiencing LBP. The research hypotheses were that adult patients receiving the designed intervention protocol will make significant improvements in their knowledge and practice, with less pain and disability due to LBP.

Methods

Design

A quasi-experimental research design with pre-post assessment of outcome was used in this study which was conducted in the outpatient clinic of the physical therapy department at Zagazig University Hospital in Zagazig city and Beni-Suef University Hospital in Beni-Suef city, Egypt. The intervention consisted of a non-pharmacological nursing intervention protocol for adult patients experiencing chronic LBP. It involved pre-, post- and three-month follow-up assessments.

Sample

Inclusion criteria for participants included the following: being adult (18–60 years), and suffering from diagnosed chronic LBP (for longer than six months). The exclusion criteria included the following: LBP of oncological origin, pregnancy, and patients with very severe pain preventing them from following the protocol. Sample size: The sample size was calculated to demonstrate a targeted 50% improvement in patient knowledge or disability score, at 95% level of confidence and 80% power. Using the sample size equation for the difference between two proportions (Schlesselman, 1982), the required sample size was 40 after accounting for a dropout rate of around 20%. Sampling technique: patients were consecutively recruited in the study sample according to the eligibility criteria.

Data collection

The researchers prepared an interview form including sections for demographic characteristics such as age, marital status, education, etc.; medical characteristics such as LPB interference with work and duration, and body mass index (BMI); and assessment of knowledge and practice regarding LPB; in addition to the Oswestry Disability Index, and Visual Analogue Scale (VAS). The knowledge assessment section included open and closed questions about LBP risk factors such as obesity and smoking, and alleviating factors such as physical exercise and hot compresses. A correct answer was scored as 1 and an incorrect answer as 0. The scores were totalled and converted into a percentage score. A patient who achieved 50% or higher total score was considered to have satisfactory knowledge, and those with lower scores, unsatisfactory knowledge. The practice assessment section consisted of an observation checklist testing correct procedures for lifting, getting out of bed, sitting, and standing. Again, for scoring, an item correctly performed was scored as 1 and incorrectly as 0. The scores were totalled and converted into a percentage score. A patient who achieved a total score of 60% or higher was considered to have adequate practice, while those with lower scores were deemed to have inadequate practice.

The Visual Analogue Scale (VAS) for pain (Wewers, Lowe, 1990) is a simple assessment tool consisting of a 10 cm line with “0” at one end representing no pain, and “10” at the other representing the worst pain ever experienced. The pain score consists of a measurement of the segment selected by the patient, with a higher score indicating more severe pain. The VAS is widely used due to its simplicity and adaptability to a broad range of populations and settings as a generic pain measure (Hawker et al., 2011).

The Oswestry Disability Index (Fritz, Irrgang, 2001)is considered the gold standard for assessing the disability level of back pain. It consists of ten sections covering pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, travelling, and employment/homemaking. The score level for disability ranges from 0 for minimal disability, needing no treatment, to 10 for the bed-ridden. It has been translated and validated in many languages, such as Hungarian (Valasek et al., 2013), Indian (Nishant et al., 2014), and Tamil (Vincent et al., 2014). Once the tools were prepared, their face and content validity were ascertained by a panel of five experts in medical-surgical nursing, who revised the tools for clarity, relevance, applicability, comprehensiveness, and ease of implementation. In light of their assessments, minor modifications were applied. Moreover, the validity and reliability of the two scales used were previously ascertained in the literature as mentioned before. Finally, the reliability of the Oswestry Disability Index was assessed in the present study, showing excellent reliability with a Cronbach's alpha coefficient of 0.93.

Pilot study

A pilot study was conducted on five adult patients suffering from chronic LBP from the study setting to ensure the clarity, applicability, relevance and feasibility of the tools, to identify the difficulties that might be faced during implementation, and to estimate the time needed for completion of the study tools and, subsequently, final modifications were made to the tools. The patients involved in the pilot study were not included in the main study sample.

Study manoeuvre

The study was carried out through assessment, planning, implementation, and evaluation phases. The assessment phase started with recruitment of patients according to eligibility criteria and with informed consent. The researchers collected baseline data using the finalized tools and these were taken as the pre-intervention baseline data. Every patient interview lasted 30–45 minutes. Researchers interviewed two patients per day.

In the planning phase, the researchers designed an instruction protocol based on the educational needs identified and guided by relevant literature (Greenfield et al., 1975; Chou et al., 2007). It included theoretical as well as practical sections. The theoretical section provided background about back pain, causes, risk factors, signs and symptoms, diagnosis, and prevention, as well as medical, nursing and self-care management such as nutritional and weight control, body mechanics, exercises and spinal manipulation therapy, use of firm mattresses, comfortable chairs, and follow-up schedule. Moreover, a colour booklet was designed by the researchers and distributed to each patient or their accompanying relatives.

During the implementation phase, each patient received the instruction-protocol individually, together with a family member to help them follow the protocol at home. Each patient received two theoretical and five practical sessions. In the theoretical sessions, different teaching strategies were used, such as, mini-lectures, discussions, and media, such as posters and videos. In the practical sessions, the researchers showed patients and family caregivers how to improve body mechanics through correct lifting and positioning (sitting, standing, sleeping), to perform suitable back exercises, to use hot or cold compresses and correct positions for pain, with back support. Each patient was given the opportunity to perform these activities after demonstration and re-demonstration.

The evaluation phase included an immediate post-test and three-month follow-up assessments of the effects of the nursing protocol, using the aforementioned tools. The fieldwork was carried out three days weekly throughout a period of twelve months from January 2012 to January 2013.

Data analysis

Data entry and statistical analysis were made using the SPSS 16.0 statistical software package. The Cronbach alpha coefficient was calculated to assess the reliability of the scale used through its internal consistency. Continuous quantitative data were compared using the non-parametric Kruskal-Wallis tests. Qualitative categorical variables were compared using the chi-square test. Spearman rank correlation was used for assessment of the inter-relationships among quantitative and ranked variables. In order to identify the independent predictors of the pain and disability scores, multiple linear regression analysis was used after testing for normality, and homoscedasticity, and analysis of variance for the full regression models were performed. Statistical significance was considered at p-value < 0.05.

Results

The study involved 33 adult patients with LBP. As Table 1 shows, their age ranged between 20 and 65 years-of-age, with approximately two-thirds (63.6%) being male, and the majority (90.9%) married. More than one-third (36.4%) had no formal education. According to BMI, more than half (57.6%) were overweight/obese. Although all patients experienced LBP, 54.5% reported having severe pain interfering with work, mostly lasting for < 30 days (66.7%).

Table 1 Socio-demographic characteristics of participants in the study sample (n = 33)

	Frequency	Percent
Age		
<50	18	54.5
50 +	15	45.5
Range	20.0–65.0	
Mean±SD	45.3 ± 11.1	
Median	47.0	
Gender		
Male	21	63.6
Female	12	36.4
Education		
High school	8	24.2
Diploma	13	39.4
No formal education	12	36.4
Marital status		
Married	30	90.9
Single	3	9.1
BMI		
Normal	14	42.4
Overweight	16	48.5
Obese	3	9.1
BMI		
Normal	14	42.4
Overweight/obese	19	57.6

Table 2 illustrates the generally low percentage of accurate knowledge among the patients before implementation of the instruction protocol. This was most obvious regarding the actions of turning the feet rather than the back while lifting (15.2%), contracting abdominal muscles while standing (18.2%), smoking (24.2%) and obesity (27.3%) as risk factors, and correct weight as an alleviating factor (21.2%). On the other hand, around three-quarters were aware of the hazards of prolonged standing (75.8%). Overall, less than half of the patients (45.5%) had totally satisfactory knowledge. Meanwhile, in the post instruction protocol phase, statistically significant improvements in patient knowledge ($p < 0.001$) were revealed, with all patients having satisfactory knowledge in almost all individual areas and in overall awareness. This improvement persisted during the follow-up period in all areas of knowledge ($p < 0.001$).

Similarly, the table indicates that all the patients initially demonstrated totally inadequate practices in lifting, getting up, sitting and standing before the protocol instruction. The post protocol instruction phase showed statistically significant improvement in patient practices ($p < 0.001$), with all the patients except one (97.6%) having adequate practice in keeping the back straight and, with the exception of two patients (93.9) did not contract abdominal muscles. As with knowledge, improvements in practice persisted until the follow-up ($p = 0.001$).

The changes in Oswestry disability and pain scores among participants throughout the study phases are presented in Table 3. It illustrates statistically significant improvements in patients' disability scores in all areas, except for travelling, where the improvement did not reach statistical significance ($p = 0.09$). Similar statistically significant improvements were shown in the VAS scores for pain ($p < 0.001$). The improvements in all scores were evident at the follow-up phase except for the area of lifting, where the median increased from 2.0 (post) to 3.0 (FU), but it was still lower than the pre-intervention median of 4.0.

Table 4 indicates statistically significant moderate correlations between the scores for patient knowledge, pain, and disability. These were positive between the pain and disability scores and negative for knowledge. Moreover, the pain score had statistically significant weak positive correlation with BMI. Meanwhile, the disability score exhibited a negative moderate correlation with level of education, and positive correlations with patient age and with duration of pain, which were statistically significant.

In multivariate analysis (Table 5), the knowledge score turned out to be a statistically significant independent negative predictor of the pain and the disability scores, and is the most important predictor as revealed from the values of its standardized coefficients. Meanwhile, patient's BMI was a positive predictor of the pain score. With regard to the disability score, it was positively predicted by patient age and negatively predicted by level of education. The models' r-square values indicate that these variables explain 58% and 65% of the changes in pain and disability scores respectively.

Discussion

The present study was carried out to test the research hypothesis that adult patients with chronic LBP receiving the designed instruction protocol will, as a result, have significant improvements in their knowledge and practice, and reduced pain and disability from LBP. The study findings indicate the validity of this hypothesis. Moreover, the improvements persisted during the follow-up phase.

Table 2 Knowledge and practice regarding back pain among participants throughout the study phases

Correct knowledge of:	Time						X^2 Test	*p*-value
	Pre (n = 33)		Post (n = 33)		FU (n = 33)			
	n	%	n	%	n	%		
Risk factors								
Lifting with bent back	21	63.6	33	100.0	33	100.0	27.31	< 0.001*
Obesity	9	27.3	33	100.0	33	100.0	63.36	< 0.001*
Smoking	8	24.2	33	100.0	33	100.0	66.89	< 0.001*
Vibrations	18	54.5	33	100.0	33	100.0	35.36	< 0.001*
Stress	23	69.7	33	100.0	33	100.0	22.25	< 0.001*
Malnutrition	15	45.5	33	100.0	33	100.0	44.00	< 0.001*
Lack of rest	23	69.7	33	100.0	33	100.0	22.25	< 0.001*
Lack of exercise	19	57.6	33	100.0	33	100.0	32.61	< 0.001*
Bending back	20	60.6	33	100.0	33	100.0	29.93	< 0.001*
Alleviating factors								
Physical exercise	17	51.5	33	100.0	33	100.0	38.17	< 0.001*
Hot compresses for pain	17	51.5	33	100.0	33	100.0	38.17	< 0.001*
Back support	18	54.5	33	100.0	33	100.0	35.36	< 0.001*
Proper positioning	12	36.4	33	100.0	33	100.0	53.31	< 0.001*
Proper weight	7	21.2	33	100.0	33	100.0	70.52	< 0.001*
Proper lifting	11	33.3	32	97.0	32	97.0	48.51	< 0.001*
Back exercises	14	42.4	33	100.0	32	97.0	42.98	< 0.001*
Proper sitting	17	51.5	33	100.0	33	100.0	38.17	< 0.001*
Use one pillow	19	57.6	33	100.0	33	100.0	32.61	< 0.001*
Proper position change	12	36.4	33	100.0	33	100.0	53.31	< 0.001*
Total knowledge								
Satisfactory (50% +)	15	45.5	33	100.0	33	100.0		
Unsatisfactory (< 50%)	18	54.5	0	0.0	0	0.0	44.00	< 0.001*
Lifting								
Not bending	9	27.3	30	90.9	33	100.0	52.25	< 0.001*
Keep weight near body	17	51.5	33	100.0	33	100.0	38.17	< 0.001*
Turn feet not back	5	15.2	32	97.0	33	100.0	73.84	< 0.001*
Getting up								
By rising head first	14	42.4	33	100.0	33	100.0	47.02	< 0.001*
Sitting								
Straight back	19	57.6	33	100.0	32	97.0	28.76	< 0.001*
Feet on floor	21	63.6	31	93.9	33	100.0	20.63	< 0.001*
Standing								
Not prolonged	25	75.8	33	100.0	33	100.0	17.41	< 0.001*
Contract abdomen	6	18.2	33	100.0	31	93.9	66.23	< 0.001*
Total practice								
Adequate (60% +)	7	21.2	33	100.0	33	100.0		
Inadequate (< 60%)	26	78.8	0	0.0	0	0.0	51.00	< 0.001*

FU – three-month follow-up

The study sample consisted of adult patients experiencing LBP mostly affecting their ability to work or perform physical activities. The selection of the adult group was based on the high prevalence of this condition in this age group. In line with this, Therkleson (2010) mentions that almost half of the adult population suffer from LBP. Moreover, this age group includes the main workforce of the country. Their suffering from LBP would have a negative impact on the national economy, in addition to the costs of absenteeism, treatment, and compensation. In accordance with this, Samad et al. (2010) found that LBP is by far the most costly cause of compensation claims made by workers.

According to the present study findings, over half of the patients were overweight or obese. This might be a possible reason underlying the occurrence and severity of LBP among these patients. In fact, multivariate analysis revealed that BMI is positively correlated to pain score and identified it as a significant positive independent predictor of this score. The result is in agreement with Häuser et al. (2014) whose study in Spain showed that obesity was a modifiable risk factor of LBP. Moreover, a recent review (Samartzis et al., 2013) discusses the mechanisms leading to disk degeneration and/or LBP in overweight/obesity, and the role of fat cells and adipokines in this. Interestingly, Smuck et al. (2014) in an American study demonstrate that increased BMI is a risk factor for LBP, but physical activity gives better results in mitigating this pain risk among overweight and obese people.

Table 3 Oswestry disability and VAS scores among participants throughout the study phases

Disability items	**Time** **Pre (n = 33)**	**Post (n = 33)**	**FU (n = 33)**	**Kruskal Wallis Test**	***p*-value**
Pain intensity					
Range	3.0–6.0	1.0–4.0	1.0–5.0		
Mean ± SD	4.0 ± 1.0	2.2 ± 0.9	2.5 ± 0.9	40.72	< 0.001*
Median	4.0	2.0	2.0		
Personal care					
Range	1.0–6.0	1.0–4.0	1.0–5.0		
Mean ± SD	3.8 ± 1.2	2.6 ± 1.1	2.7 ± 1.1	19.58	< 0.001*
Median	4.0	3.0	3.0		
Lifting					
Range	2.0–6.0	2.0–5.0	2.0–6.0		
Mean ± SD	4.2 ± 1.5	3.1 ± 1.2	3.3 ± 1.2	11.16	0.04*
Median	4.0	2.0	3.0		
Walking					
Range	2.0–6.0	1.0–5.0	2.0–5.0		
Mean ± SD	3.8 ± 1.4	3.1 ± 1.0	3.1 ± 1.0	6.31	0.04*
Median	4.0	3.0	3.0		
Sitting					
Range	2.0–5.0	2.0–5.0	2.0–4.0		
Mean ± SD	3.8 ± 1.0	3.0 ± 0.8	3.0 ± 0.7	15.65	< 0.001*
Median	4.0	3.0	3.0		
Standing					
Range	2.0–6.0	1.0–5.0	2.0–5.0		
Mean ± SD	4.0 ± 1.1	2.9 ± 1.0	3.0 ± 0.9	17.81	< 0.001*
Median	4.0	3.0	3.0		
Sleeping					
Range	1.0–5.0	1.0–4.0	1.0–4.0		
Mean ± SD	3.3 ± 1.2	2.3 ± 1.1	2.4 ± 0.8	13.42	0.001*
Median	3.0	2.0	2.0		
Social life					
Range	1.0–5.0	1.0–4.0	1.0–4.0		
Mean ± SD	3.4 ± 1.0	2.4 ± 0.8	2.5 ± 0.8	20.70	< 0.001*
Median	3.0	2.0	2.0		
Traveling					
Range	2.0–5.0	2.0–5.0	2.0–5.0		
Mean ± SD	3.7 ± 1.0	3.3 ± 0.8	3.3 ± 0.8	4.86	0.09
Median	4.0	3.0	3.0		
Work/home making					
Range	1.0–6.0	2.0–5.0	2.0–5.0		
Mean ± SD	3.5 ± 1.1	2.7 ± 0.8	2.8 ± 0.8	13.05	0.001*
Median	4.0	3.0	3.0		
Total disability					
Range	2.4–5.0	1.7–3.9	1.9–4.0		
Mean ± SD	3.8 ± 0.9	2.8 ± 0.7	2.9 ± 0.7	22.07	< 0.001*
Median	3.7	2.7	2.8		
Pain score (VAS)					
Range	2.0–5.0	0.0–2.0	0.0–3.0		
Mean ± SD	3.3 ± 1.1	1.5 ± 0.6	1.6 ± 0.7	50.59	< 0.001*
Median	3.0	2.0	2.0		

FU – three-month follow-up, *statistically significant at $p < 0.05$

Table 4 Correlation between participants' knowledge, pain, and disability scale scores and their socio-demographic and health characteristics

	Spearman's rank correlation coefficient		
	Pain	**Disability**	**Knowledge**
Pain (VAS)			
Owestry disability scale	0.57**		
Knowledge score	-0.69**	-0.47**	
Patient characteristics			
Age	0.11	0.51**	-0.05
Education	-0.00	-0.54**	-0.01
BMI	0.25*	0.00	-0.06
Duration of pain	-0.04	0.33*	0.09

*statistically significant at p < 0.05; **statistically significant at p < 0.01

Table 5 Best fitting multiple linear regression model for pain and disability scores

	Unstandardized Coefficients		Standardized Coefficients	t-test	*p*-value	95% Confidence Interval for ß	
	ß	**Std. Error**				**Lower**	**Upper**
			Pain score				
Constant	2.97	0.64		4.66	< 0.001	1.70	4.23
BMI	0.07	0.02	0.20	2.98	< 0.001	0.02	0.11
Knowledge score	-0.03	0.00	-0.74	-11.24	< 0.001	-0.04	-0.03
r-square = 0.58; Model ANOVA: F = 69.43, p < 0.001 Variables entered and excluded: age, sex, education							
			Disability score				
Constant	3.63	0.31		11.78	< 0.001	3.02	4.25
Age	0.03	0.01	0.37	6.05	< 0.001	0.02	0.04
Education	-0.65	0.11	-0.36	-5.81	< 0.001	-0.87	-0.43
Knowledge score	-0.02	0.00	-0.55	-9.14	< 0.001	-0.02	-0.01

r-square = 0.65; Model ANOVA: F = 62.35, p < 0.001; Variables entered and excluded: sex, education

The present study revealed a deficiency of accurate knowledge about LBP risk factors, and alleviating factors, as well as in reported practice related to activities mitigating LBP. This might be attributed to the generally low level of education in the study sample, in that more than one-third of the participants had no formal education. Moreover, the level of education correlated negatively with disability score, and was a significant independent negative predictor of this score. In congruence with this study finding, Birabi et al. (2012) reported deficient knowledge about LBP among patients in Nigeria. Such deficiencies in patient knowledge and practice may be attributed to related deficiencies in knowledge or educational role among their caregivers. In agreement with this explanation, Learman et al. (2014) in a study in the United States and Canada found that only 16.6% of the participating physiotherapists correctly answered questions regarding LBP imaging, appropriate medication, and advice to stay active.

The application of the present study instruction protocol had a positive impact on participants' knowledge and reported practice. This may be attributed to the content of the protocol, which focused on applied knowledge in simple, straightforward, understandable language, with illustrations and aimed to address their concerns and reduce their fears. The booklet provided to them during the intervention may also have contributed. Koes et al. (2010) stress that international guidelines recommend that education of patients suffering from LBP should be aimed at lessening distress and anxiety attached to LBP, and should encourage active recovery. The present study findings are also in agreement with a review in France regarding the positive effects of educational interventions on knowledge and practice of patients suffering from LBP (Dupeyron et al., 2011).

Moreover, after the implementation of the present study protocol, significant improvements were revealed in patients' severity of pain and disability scores, which were also maintained throughout the follow-up. These improvements may be attributed to the intervention, which emphasized practical training aimed to reduce aggravating activities such as prolonged sitting and standing, in addition to emphasizing correct lifting and handling techniques. More important is the knowledge acquired during the intervention, which turned out to be the most significant independent predictor of improvements in pain and disability scores. The merits of similar protocols and guidelines have been shown in previous studies (Patel et al., 2014; University Health Services, 2014). In addition, Marlowe (2012) highlights the beneficial effects of such interventions on patient's coping and behaviour and consequently on their pain and disability.

Limitation of study

The researchers were faced with many logistical problems and were required to devote considerable effort to convincing patients to accept the objectives and procedures of the study. Seven out of the 40 participants dropped out during the follow-up phase for personal or logistical reasons. Although this dropout rate was considered in the calculation of the sample size, it may have had some biasing effect on the results.

Conclusion

In conclusion, the application of an instruction protocol intervention for LBP is effective in improving patient knowledge and practice, with associated amelioration of the severity of pain and disability experienced. The effect is still evident at the three-month follow-up. However, the findings should be regarded with caution in the light of the non-randomized design used and the high dropout rate. Therefore, it is recommended that the study be replicated using a more robust randomized clinical trial design. Nonetheless, the instruction protocol with the designed booklet may be adopted as an element of the care services offered to patients suffering LBP given their clear positive effects on patient knowledge, which would undoubtedly help them in deciding on the management approach they prefer.

Ethical aspects and conflict of interest

To carry out the study the researchers obtained necessary approvals from the Head of the outpatient Department, and from the General Director of the Zagazig University Hospitals and Beni-Suef University Hospitals through letters issued by the Faculty of Nursing, Zagazig University, explaining the aim and procedures of the study. All Helsinki principles of research ethics were observed. The study protocol was approved by the ethics and research committee at the Faculty of Nursing, Zagazig University. Informed consent was obtained from each potential participant after explaining the nature, purpose, and benefits of the study, informing them of their right to refuse or withdraw at any time, and about the confidentiality of any obtained information. Anonymity was assured through coding of all data. The study intervention had no predictable harmful effects on participants.

Author contribution

The first author contributed to the conception of the research, the development of the tools, statistical analysis, and commentary on the tables, wrote the discussion and references, prepared the patient protocol and help in data collection. The second author contributed to the sample collection, provided the pre, post and follow-up test, applied the protocol on patients, and participated in the reference collection and analysis data. The third author contributed to the translation of the tools and booklet into Arabic, participated in the reference collection and data collection and administered the protocol.

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