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Research Article

Effect of Structured Patient Education in Patients with Chronic Low Back Pain with Fear Avoidance Beliefs

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Abstract

The purpose of the study was to see the effect of structured patient education in patients with chronic low back pain with fear avoidance beliefs.

Objectives: To assess Fear avoidance beliefs, Emotional distress due to catastrophic thoughts, Self-perceived disability and Pain, pre and post intervention in two groups A and B. To compare and find out the difference in fear avoidance beliefs post intervention in both groups.

Methodology: Design: Pilot prospective assessor blind randomized interventional study

Set up: Physiotherapy Out Patient Department, tertiary care hospital

Age group: 18 to 65 years with low back pain more than 3 months

Intervention: Group A received structured patient education and conventional physiotherapy treatment. Group B received conventional physiotherapy treatment.

Outcome measures: Fear avoidance belief Questionnaire, Pain catastrophizing scale, Roland Morris Disability questionnaire and Numerical Pain rating scale, taken pre and post treatment.

Results: There was reduction in the score of Fear avoidance belief questionnaire subscales, Pain Catastrophizing Scale, Roland Morris Disability Questionnaire and Numerical pain rating scale in both groups which was statistically significant. Also there was significant improvement in group A as compared to group B.

Limitations: Post treatment how long the effect of Structured Patient Education lasts in patients was not assessed.

Conclusion: Structured patient education along with conventional physiotherapy is more effective.

Keywords: Chronic Low Back Pain; Patient Education; Fear Avoidance Beliefs.

Introduction

Low Back Pain (LBP) is a very common musculoskeletal condition affecting 80% of people [1]. It can be acute (Less than 4 weeks), sub- acute (4-12 weeks) or chronic (more than 12 weeks) [2]. When acute pain is perceived as non-threatening, patients are likely to maintain engagement in daily activities, through which functional recovery is promoted. Personal and environmental contextual factors may play significant intervening roles in the disablement. Some of them after an acute episode remain sedentary because of fear that movement will produce pain. If the complaints continue, the psychosocial factors like stress, distress, anxiety and depression can contribute in the transition from acute to chronic pain [3-5]. Physiotherapy interventions used for patients with LBP

include manual therapy, electrical modalities and specific exercise training programs all of them aim at reducing pain and disability and restoring normal functions and can provide marked improvements in the patient's condition, but some residual pain and disability can be left [6].

Central sensitization of pain can occur in most Chronic Low Back Pain (CLBP) disorders to varying degrees. This is due to increased excitability of the Central Nervous System (CNS) due to sustained peripheral nociceptive inputs. It tends to make changes at spinal cord and cortical levels. The nervous system undergoes changes to its cortical mapping and possesses a pain 'memory' which may leave it pre-sensitized to the exacerbation and recurrence of pain [7-11]. Pain related fear that is fear of pain or physical activity or re-injury may be more disabling than pain itself. Studies have suggested that anticipated pain before physical activity may strongly influence a patient's physical performance as well as beliefs regarding their overall status. In acute LBP elevated Fear Avoidance Beliefs (FABs) are decreased during recovery but they tend to remain unchanged in chronic low back pain over time. Elevated fear-avoidance beliefs are a maladaptive emotional response toward an excessive fear of pain that can eventually lead to avoidance behaviour. Avoidance refers to behaviour which is aimed at postponing or preventing an aversive or unpleasant situation from occurring. A vicious circle may be initiated when the pain is catastrophically misinterpreted. Pain catastrophizing, the tendency to fear the worst, is a psychological construct related to fear-avoidance [12-15]. These dysfunctional interpretations give rise to pain-related fear, and associated safety seeking behaviours such as avoidance/escape and hyper vigilance, that can be adaptive in the acute pain stage and worsen the problem in the case of long-lasting pain [16]. Several studies have found that the presence of elevated fear avoidance beliefs is predictive of the development of chronic disability and they exhibit avoidance behaviour, altered movement patterns, and reduced physical activity, which in turn contributes to the persistence of pain and disability [12,17]. The Fear-Avoidance Belief Questionnaire (FABQ) quantifies pain-related fears in relation to work and physical activity [17]. Pain catastrophizing is a psychological construct related to fear-avoidance. It is characterized by patients magnifying their feelings about painful situations and constantly thinking about these situations. Pain Catastrophizing Scale (PCS) is designed to assess catastrophic thoughts and feelings exhibited in response to pain [18]. The Roland Morris Disability Questionnaire (RMDQ), a reliable and valid measurement of self-perceived disability due to LBP [19].

Given the importance of psychosocial factors in CLBP, it isn't clear whether physical interventions alone are of benefit in treating the disorder. In some patients, these psychosocial factors are thought to be enduring barriers to improvement. These patients may obtain more benefit from programs that directly address cognitive and psychological aspects of pain in addition with Physiotherapy interventions. An educational booklet in the Europe known as 'Back Book' had shown a significant beneficial effect on patient's beliefs and disability with non-specific LBP [20]. Another study says that cognitive behavioural therapy is an effective intervention for patients with disability having a persistent pain [21]. The use of education which guides the patients to change their beliefs and perceptions about low back pain would possibly minimize the fear related to physical activity. Therefore, this would promote better function; and minimize disability. Also it will encourage them to stay active and reduce concerns about LBP. Currently, there is paucity of literature in India addressing the issue of fear-avoidance beliefs in physiotherapy management for LBP which include patient education program. Thus, this study was conducted to identify fear avoidance beliefs, pain catastrophizing thoughts and disability in patients with chronic low back pain. And to determine the effect of structured patient education combined with physiotherapy treatment among CLBP patients on these components.

Purpose of the Study

Recent evidence suggests that fear avoidance beliefs may be the most important risk factor for recurrence in disability in patients with chronic low back pain. Combined physiotherapy and patient education is efficacious in patients with chronic low backache and there is paucity of literature in Indian population. Hence, the purpose of this study is to find out the effect of structured patient education with conventional physiotherapy intervention in comparison to routine education delivered during conventional physiotherapy intervention in patients with chronic low back pain, with fear avoidance beliefs.

Aim

To study the effect of structured patient education program in patients with chronic low back pain with fear avoidance beliefs.

Objectives

To assess-

1. Fear avoidance beliefs by using Fear Avoidance Belief Questionnaire (FABQ),

Emotional distress due to catastrophic thoughts the Pain Catastrophizing Scale (PCS),

Self-perceived disability by using Roland Morris Disability Questionnaire (RMDQ),

Pain levels using Numerical Pain Rating Scale (NRS) pre and post intervention, in both Group A and Group B.

2. To compare and find out the difference in fear avoidance beliefs post intervention in both group A and group B using above men-

tioned outcome measures.

Materials and Methods

Materials:

1. Projector
2. Measuring tape
3. Skin- marking pen

Methodology

Study design: - Pilot prospective assessor blind randomized interventional study

Sample size: - 60 divided into 2 groups by computerised randomisation sheet (30 each group)

Study setup: Physiotherapy Out Patient Department, tertiary care hospital.

Duration of the study: total 4 weeks, Physiotherapy treatment program sessions were given 2 times per week to both groups. Structured patient education was given once per week 20-30 minutes to Group A (one to one session) for 4 weeks (4 sessions).

Patient selection: The patients were selected as per the inclusion and exclusion criteria.

Inclusion criteria

Patients between the ages of 18 to 65 years with low back pain duration more than 3 months and are willing to participate in the study.

Fear avoidance belief questionnaire physical subscale cut off score was taken more than 15 and work subscale cut-off score was taken more than 29.

Exclusion criteria

Patients with acute or sub-acute low back pain, spinal malignancy, infection or inflammation, fractures and structural deformities, Cauda equina syndrome, ongoing pregnancy, history of previous lumbar surgeries and history of primary psychiatric disease or alcohol abuse, prolapsed Intervertebral disc.

Procedure

Approval was taken from Institutional ethics committee. All subjects fulfilling inclusion criteria participated in this study and written informed consent was taken from them. Patients got divided into 2 groups (group A and B) by using computerized randomization sheet. Subjective and physical examination to find the impairments, activity limitations and participation restriction was done using assessment sheet. All the self reported questionnaires scores were documented by another therapist. Pain at rest, on movement and on activity was taken on Numerical pain rating scale. Pre and post treatment assessment was done which included range, strength, flexibility of muscles and neurodynamic testing. Both the groups received conventional physiotherapy treatment sessions depending on individual patient assessment, twice per week, for 4 weeks. Group A, in addition received structured patient education once per week, for 4 weeks as per patient's understanding. Education was delivered by one to one session with audio visual aids and practical demonstration. All the queries were answered by the end of each session. Subjects in both the groups were given home exercise program. Post study, all self-reported outcome measures FABQ, PCS and RMDQ and Numerical Pain Rating Scale were again assessed by the same therapist.

Outcome Measures: Questionnaires: Fear avoidance belief Questionnaire [22], Pain catastrophizing scale [23], Roland Morris Disability questionnaire [24] and Numerical pain rating scale [25]

Structured Patient Education

Group A received education in the audio-visual format on the projector for 20- 30 minutes once per week and session was conducted on one to one based for 4 weeks (4 sessions). The knowledge on functional anatomy and mechanics was explained in pictorial and video format. How movements occur at the spine was shown with the help of videos. The right patterns of the movements at work and at home and postures to be achieved during Activities of Daily Living (ADL) were demonstrated. Reasoning of why they have to perform activities in certain manner was provided at every step so that they can perform those activities efficiently. Importance of exercise was explained. In every session they were asked whether they have modified the right movement patterns during ADL or not. Reinforcement was given at every session. Education was provided to give a new insight and changing his/her perception, emphasising the positive aspects rather than focusing on possible abnormalities and developed more confidence in managing the condition into the future. Components of education program included- pain, types of pain (central and peripheral) and its effects. Risk factors like sedentary life style, bad postures or wrong techniques while carrying out any movements, obesity and stress; how they contribute to low back pain was explained. Importance of education was given to update their information, to reduce their fear avoidance beliefs to improve physical performance. Functional anatomy the information on postural curves of the spine, pictorial presentation of structures of the spine (bones and the joints of the spine, the intervertebral disc, the trunk and back muscles) and how they help while carrying movement was explained. Function of muscles stabilising spine was also explained. Importance of each structure and how load sharing or forces act on the spine

according to different postures were explained. This information was explained with pictures and videos for better impact and understanding. Also Importance and benefits of exercises were explained. How exercises give stability to the spine which is helpful in reduction of pain and improving performance was explained. Ergonomic advices at work place and at home were explained. They were taught correct techniques of lifting loads, good and bad postures in standing, sitting and walking. Also proper body mechanics to be achieved during activities of daily living tasks including cleaning, cooking, wearing shoes, lifting bags while shopping and standing in the kitchen. Energy conservation techniques like prioritizing, planning, modifying environment to avoid excessive bending, carrying and reaching were explained. They were explained that taking frequent short breaks between activities rather than one long break at the end to save energy. Reinforcement was given every time patients used to come.

Results

Data was analysed using SPSS version 16.

		MEAN (SD)	MEDIAN	P VALUE
AGE	Group A	43.33(8.314)		
	Group B	46.43(10.862)		0.220 NS
NPRS	Group A	7.23(1.104)	7	
	Group B	7.36(0.922)	7	0.7048 NS
FABQ PA PRE	Group A	21.07(1.911)	21	
	Group B	20.63(2.646)	21	0.632 NS
FABQ W PRE	Group A	34.87(3.884)	36	
	Group B	34.37(4.047)	34	0.587 NS
PCS PRE	Group A	34.7(7.648)	36	
	Group B	37.33(4.551)	38	0.159 NS
RMDQ PRE	Group A	16.4(3.081)	16	
	Group B	17.77(3.636)	18	0.119 NS

Table 1: Baseline demographic data.

NS- Not significant,

NPRS- Numerical pain rating scale,

FABQ PA- Fear avoidance belief questionnaire physical activity subscale score,

FABQ W- Fear avoidance belief questionnaire work subscale score,

PCS- Pain catastrophizing scale,

RMDQ- Rolland Morris disability questionnaire

The above table explains that all pre- treatment median scores in Group A and B were not statistically significant.

The data on Numerical pain rating scale, FABQ scale, PCS scale, RMDQ scales are ordinal type of data, so Non- parametric tests (for intra group comparison Wilcoxon and intergroup comparison Mann Whitney test) were used.

Fear Avoidance Belief Questionnaire Physical Activity Subscale

	Group A		Group B	
	Pre	4 Weeks	Pre	4 Weeks
MEAN (SD)	21.067(1.911)	6.533(3.98)	20.63(2.646)	14.13(4.191)
MEDIAN	21	6	21	14
IQR(Q1-Q3)	(20-23)	(4-8)	(19-23)	(11-17)
SEM	0.3488	0.726	0.483	0.765
95%CI-LL	20.353	5.047	19.646	12.568
UL	21.78	8.019	21.621	15.698
P- Value		<0.0001 S*		<0.0001 S*

Table 2: Intra group comparison.

*S- significant, Intra group comparison- Wilcoxon test

	Group A	Group B
MEAN (SD)	6.533(3.98)	14.133(4.191)
MEDIAN	6	14
IQR (Q1-Q3)	(4-8)	(11-17)
SEM	0.726	0.765
95% Cl-LL	5.047	12.568
UL	8.019	15.698
P Value		0.000 S#

Table 3: Intergroup comparison.

#S- significant, Intergroup comparison- Mannwhitney test

The score of Fear avoidance belief physical activity subscale statistically significantly reduced in Group A ($p< 0.0001$) and in Group B. ($p< 0.0001$)

Between two groups comparison the score of Fear avoidance belief physical activity subscale statistically significantly reduced in Group A. ($p= 0.000$)

Comparison of Score on Fear Avoidance Belief Questionnaire Work Subscale

	Group A		Group B	
	Pre	4 Weeks	Pre	4 Weeks
MEAN (SD)	34.867 (3.884)	11.333 (3.884)	34.367 (4.047)	25.233 (4.4)
MEDIAN	36	10	34	26
IQR(Q1-Q3)	(32-38)	(8-16)	(30-37)	(22-27)
SEM	0.7091	1.05	0.7389	0.803
95%Cl-LL	33.417	9.187	32.856	23.591
UL	36.317	13.48	35.878	26.876
P- Value		<0.0001 S*		<0.0001 S*

Table 4: Intra group comparison.

*S- significant, intra group comparison- Wilcoxon test

	Group A	Group B
MEAN (SD)	11.333(3.884)	25.233(4.4)
MEDIAN	10	26
IQR (Q1-Q3)	(8-16)	(22-27)
SEM	1.05	0.803
95%Cl-LL	9.187	23.591
UL	13.48	26.876
P- Value		0.000 S #

Table 5: Intergroup comparison.

#S- significant, intergroup comparison- Mann Whitney test

The score of Fear avoidance belief work subscale statistically significantly reduced in group A (p< 0.0001) and in group B. (p<0.0001)

Between two groups comparison the score of Fear avoidance belief work subscale statistically significantly reduced in Group A. (p= 0.000)

Comparison of Score on Pain Catastrophizing Scale

	Group A		Group B	
	Pre	4 Weeks	Pre	4 Weeks
MEAN (SD)	34.7 (7.648)	12.8 (7.392)	37.333 (4.551)	25.933 (6.142)
MEDIAN	36	11	38	26
IQR(Q1-Q3)	(29-40)	(8-14)	(37-40)	(21-28)
SEM	1.396	1.35	0.8309	1.121
95%Cl-LL	31.844	10.04	35.654	23.64
UL	37.556	15.56	39.033	28.226
P- Value		<0.0001 S*		<0.0001 S*

Table 6: Intra group comparison.

*S- significant, intra group comparison- Wilcoxon test

	Group A	Group B
MEAN (SD)	12.8(7.392)	25.933(6.142)
MEDIAN	11	26
IQR (Q1-Q3)	(8-14)	(21-28)
SEM	1.35	1.121
95%Cl-LL	10.04	23.64
UL	15.56	28.226
P- Value		0.000 S #

Table 7: Intergroup comparison.

#S- significant, intergroup comparison- Mann Whitney test

The score of Pain catastrophizing scale statistically significantly reduced in Group A

(p< 0.0001) and in group B. (p< 0.0001)

Between two groups comparison the score of Pain catastrophizing scale is statistically significantly reduced in Group A as compare to group B (p= 0.000)

Comparison of Score on Rolland Morris Disability Questionnaire

	Group A		Group B	
	Pre	4 Weeks	Pre	4 Weeks
MEAN (SD)	16.4(3.081)	8.133 (3.608)	17.766 (3.636)	15.666 (3.575)
MEDIAN	16	8	18	16
IQR(Q1-Q3)	(14-19)	(5-11)	(16-21)	(13-18)
SEM	0.5624	0.6587	0.6638	0.6527
95%Cl-LL	15.25	6.786	16.409	14.332
UL	15.25	9.48	19.124	17
P- Value		<0.0001 S*		<0.0001 S*

Table 8: Intra group comparison.

*S- significant, intra group comparison- Wilcoxon test

	Group A	Group B
MEAN (SD)	8.133(3.608)	15.666(3.575)
MEDIAN	8	16
IQR (Q1-Q3)	(5-11)	(13-18)
SEM	0.6587	0.6527
95%Cl-LL	6.786	14.332
UL	9.48	17
P- Value		0.000 S #

Table 9: Intergroup comparison.

#S- significant, intergroup comparison- Mann Whitney test

The score of Roland Morris disability questionnaire statistically significantly reduced in group A (p< 0.0001) and in Group B. (p<0.0044)

Between two groups comparison the score of Roland Morris disability questionnaire is statistically significantly reduced in group A (p= 0.000)

Comparison of Score on Numerical Pain Rating Scale

	Group A		Group B	
	Pre	4 Weeks	Pre	4 Weeks
MEAN (SD)	7.233 (1.104)	1.9 (1.583)	7.333 (0.922)	2.066 (0.6915)
MEDIAN	7	1.5	7	2
IQR(Q1-Q3)	(7-8)	(1-3)	(7-8)	(2-3)
SEM	0.2016	0.2891	0.9223	0.1262
95%Cl-LL	6.821	1.309	6.989	1.808
UL	7.646	2.491	7.678	2.325
P- Value		<0.0001 S*		<0.0001 S*

Table 10: Intra group comparison.

*S- Significant, for intra group comparison: Wilcoxon test

	Group A	Group B
MEAN (SD)	1.9(1.583)	2.066(0.6915)
MEDIAN	1.5	2
IQR (Q1-Q3)	(1-3)	(2-3)
SEM	0.2891	0.1262
95%Cl-LL	1.309	1.808
UL	2.491	2.325
P- Value		0.000 S #

Table11: Intergroup comparison.

#S- Significant, intergroup comparison: Mann Whitney test

The score of Numerical Pain Rating scale statistically significantly reduced in Group A

(p< 0.0001) and in Group B. (p=0.0001)

Between two groups comparison the score of Numerical Pain Rating scale is statistically significantly reduced in Group A. (p= 0.000)

Discussion

The mean age of subjects involved was 43.33 in group A and 46.43 in group B and the median of pain on activity was 7 for both group A and B. This study demonstrated that structured education combined with conventional physiotherapy which included thermal therapy, manual therapy, ergonomic advices, exercises and home exercise program resulted in reduction of fear-avoidance beliefs, pain catastrophizing thoughts, disability and pain than conventional physiotherapy management alone. Reduction in the scores of FABQ physical activity subscale (p<0.0001), FABQ work subscale (p<0.0001) and PCS (p <0.0001) could be attributed to the effects of structured patient education in addition to conventional physiotherapy treatment. On physical examination, it was found that posture and lumbo-pelvic rhythm were altered. Altered posture gives rise to muscle- length imbalance which leads to weakness of the muscles. And when they are not in the co-ordination, patients do perform asymmetrical or guarded movements [26]. When movements of the lumbar spine were checked, they were stiff or hypomobile and it was compensated either from thoracic spine or pelvis or hip joint. Due to all these reasons, during static and dynamic postures there is an abnormal loading on the intervertebral disk and facet joints of the spine. This was

explained in pictorial and video format. Further, education regarding age related degenerative changes and the excessive loads due to above mentioned factors on degeneration were explained. This leads to increase in pain and this vicious cycle continues. Along with that they were explained how distress, anxiety, depression and inappropriate fears and beliefs affect their performance in day today activities which make them feel less confident.

So they were explained, how activities which they were initially performing in an altered manner where stress on the tender joints was giving rise to pain which was increasing their fears to perform movements. So they were explained functional anatomy of the spine, how exactly lumbar spine moves and how this mechanics takes place with videos and pictures which could have help them to incorporate right pattern of movement. One of the studies concluded that educational program was beneficial in reducing fear avoidance beliefs as compare to individual symptom- based physical training programme. Their education program was based on creating confidence that back is strong and emphasis was given to facilitate more natural and less painful movements which are beneficial to stay physically active [27]. Information given with respect to kinematics and kinetics and loading of the spine in this study may have also facilitated reduction in the elevated avoidance behaviour and catastrophizing thoughts. They were also explained about ergonomics at work place and at home with the help of videos and pictures. Correction was demonstrated and they were asked to follow these techniques in activities of daily living which may have resulted in improved efficiency and performance. Subjects were also explained the importance of performing exercises and how exercises can improve stability of the spine. And how this will improve abnormal movements performed. During activities of daily living and further it will help to reduce pain. Along with that, energy conservation techniques like prioritizing, modifying environment and taking rest breaks were explained. Crombez et al. in their study found that there is a significant relationship between disability and fear-avoidance belief for physical activity and fear-avoidance belief for work. The pain-related fear and the fear of movement lead to disabling low back pain. Reductions in fear avoidance beliefs about work and physical activity as well as increased perceptions of control over pain, have been associated with reductions in disability [28]. Johann et al. concluded that functional restoration program which including counseling, exercises, aerobic activities, manual handling and lifting techniques, muscle strengthening using machines, stretching and relaxation was effective to improve work-and-leisure activities score in patients with chronic LBP [29]. Hence structured patient education targeted on their fear avoidance beliefs, which helped to reduce negative perceptions like they should stop doing their work and remain sedentary and a catastrophic interpretation that activity will cause injury and exacerbate the pain. This normalisation of pain cognitions were associated with active participation and improved physical performance as seen in the reduction of the scores for disability with RMDQ ($p< 0.0001$) observed in group A.

Both the groups received exercises targeting lumbo-pelvic-hip stability and flexibility. Functional stability of the spine is dependent on integrated local and global muscle function.

Studies report increased fatigability, changes in muscle fiber composition and motor control in people with acute and chronic LBP [30]. When structures get overloaded because of imbalance beyond tissue tolerance, there is a pain and related pathology. When these patients perceive pain in a threatening catastrophizing manner; there are increased fear avoidance beliefs. There is also increase in the anxiety level which lowers pain threshold [31]. And it has been suggested that increased stiffness is a biomechanical manifestation of pain [32].

Exercise is widely used in the rehabilitation of CLBP patients. However, no studies exist as to the most effective exercise programme for LBP. Evidence says that exercises decreased pain, disability, secondary physical deconditioning or time off work in patients with chronic low back pain [33-37]. There is a study which gives moderate evidence that exercise was more effective than a placebo or no treatment [38]. It is also thought to decrease fear avoidance behaviour and facilitate functional improvement, despite ongoing pain [39]. Hence, as these maladaptive emotional responses, fear avoidance beliefs and pain catastrophizing thoughts reduce, the disability also reduces hence physical performance improves.

Therefore this study concludes that structured patient education along with conventional physiotherapy is more effective as compare to conventional physiotherapy in patients with chronic low back pain.

Conclusion

Fear Avoidance Beliefs, Pain Catastrophizing thoughts, self perceived disability and pain intensity were high in patients with chronic low back pain. They decreased post intervention in both groups A and B, which was statistically significant. It was also found that group A shows statistical significant improvement as compare to group B which received structured patient education along with conventional physiotherapy treatment. Therefore, structured patient education along with conventional physiotherapy is more effective as compare to only conventional physiotherapy in patients with chronic low back pain.

Clinical Implication

Structured patient education should be given with the conventional physiotherapy treatment in patients with chronic low back pain.

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