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Effect of retro-walking on pain, functional disability, quality of life and sleep problems in patients with chronic low back pain

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Abstract

Introduction. Chronic low back pain (CLBP) is an important clinical, social, economic, and public health problem with low treatment success rates. Retro-walking works on multiple factors of the causative agents of low back pain. Therefore, the aim of the current study was to investigate the effect of retro-walking on pain, functional disability, quality of life and sleep problems in patients with chronic low back pain.

Methods. It was a two parallel arm, single blinded, randomised, controlled clinical trial. Thirty-one patients, both males and females, with CLBP were recruited from December 2016 to April 2017, out of which twenty-nine completed the study. The experimental group had 16 patients (aged 24.7 ± 5.56 with 22.7 ± 4.28 body mass index, BMI) whereas the control group had 15 patients (aged 25.9 ± 5.61 with 22.1 ± 3.15 BMI). Pain, functional disability, quality of life and sleep problems were measured by the Numerical Pain Rating Scale, Oswestry Disability Index, 36-Item Short Form Health Survey and a sleep diary. Both groups received the same conventional treatment for three physiotherapy sessions per week for three weeks. The experimental group also participated in 15 minutes of retro-walking at a comfortable walking speed, which was determined prior to the commencement of the intervention, along with the conventional treatment.

Results. All variables of the sleep diary, i.e., sleeping hours/week [Time effect (p = 0.004), time × group interaction effect (p = 0.001)], sleep efficiency [Time effect (p = 0.024), time × group interaction effect (p = 0.004)] and restoration post sleep [Time effect (p = 0.014), time × group interaction effect (p = 0.034)], showed significant differences in the experimental group. The experimental group also demonstrated significant differences over time (p = 0.001) in all the other outcome measures, such as pain, pain disability, quality of life and sleep patterns and habits.

Conclusions. Conventional physiotherapy is an effective means of treatment for CLBP. However, retro-walking provided an added advantage, as the experimental group showed a faster recovery, thus making it an effective treatment adjunct.

Key words: chronic low back pain, retro-walking, disability, quality of life, sleep problems, sleep diary

Introduction

Chronic low back pain (CLBP) is an important clinical, social, economic, and public health issue affecting the population indiscriminately; it is extremely prevalent, complex and difficult to manage [1]. The prevalence of low back pain (LBP) during one's lifetime has been reported to be over 84% and the prevalence of chronic back pain is about 23%, where 11–12% of those affected suffer from disability [2]. Bindra et al. [3] in 2015 found the prevalence of LBP in the Indian population to vary between 6.2% (general population) to 92% (construction workers). CLBP has a significant impact on the health care system due to the combined high prevalence and associated disability [4]. It puts an enormous burden on health care costs, reduces the quality of life, and is also associated with insomnia [5]. As it is a multifactorial condition, it becomes an extremely difficult condition to manage. Hence, there is a need to find cost-effective methods to manage chronic low back pain.

The WHO defines the quality of life (QoL) as 'the individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals' [6]. Assessing the quality of life of patients suffering from back pain is essential to establish the proper treatment plan [7]. There is a large body of evidence that demonstrates that rehabilitation of CLBP also leads to improvement in health-related quality of life, thus making it an important factor in gauging improvement [8].

Sleep is defined as a rapidly reversible state of reduced responsiveness, reduced motor activity, and reduced metabolism [9]. Sleep disturbances are seen in more than 50% of CLBP patients [10]. It has been shown that patients with CLBP and sleep disturbances are more likely to present to the hospital for CLBP treatment compared to those without sleep disturbances [11]. Sleep disturbances have been shown to negatively impact QoL, daytime function, mood and pain [12], and they may negatively affect the clinical outcomes of patients with CLBP [13]. Despite of this evidence, sleep somehow seems to be a neglected outcome measure. The studies conducted on sleep as an outcome measure are minimal, creating a gap in the literature regarding a holistic approach to CLBP treatment.

CLBP is of a multifactorial aetiology, therefore, there are multiple approaches to address it. These techniques focus on different aspects of the condition, bringing about an improvement in different outcome measures. The most widely used are brief education about the problem, advice to stay active, non-steroidal anti-inflammatory drugs, weak opioids (for short-term use), exercise therapy, spinal mobilisation [14], self-management strategies such as health-promoting activities, and self-monitoring of the status [15]. Nowadays, secondary recommendations such as multidisciplinary rehabilitation, adjunctive analgesics, and cognitive behavioural therapy are gaining attention. General conditioning programs to train strength and endurance of the spine musculature have been shown to reduce pain intensity and disability in CLBP [16].

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Conventional physiotherapy treatment for CLBP helps in decreasing the intensity of pain and improving function [17], but due to its low efficiency and the lack of consensus, a huge gap exists between evidence and practice [17, 18]. There is insufficient data on particular types of exercises/techniques which can play a role in the management of CLBP. At present, the role of conventional treatment and specific exercises is uncertain [19].

There are many treatment approaches for CLBP, and they are effective too. But we want to explore an adjunct technique for the treatment of CLBP which is cost effective and feasible, to improve the effectiveness of physiotherapy management. Retro-walking, also known as backward walking or retro-pulsion, is gaining significance in the field of physiotherapy and rehabilitation [20]. This method of rehabilitation arose in ancient China, where it was utilised to attain physical fitness and well-being [21]. As compared to forward walking, retro-walking differs in its gait characteristics, such as decreased speed, increased cadence, and decreased stride length [22]. Retro-walking has a favourable effect on pain, balance and disability in patients with knee osteoarthritis [20]. Retro-walking for CLBP has not received a thorough scientific analysis, even though it seems to be a promising technique. Therefore, we sought to expand on these findings and question the efficacy of retro walking as a possible adjunct modality for the treatment of CLBP. If it proves to be effective in reducing the pain and functional disability while enhancing the quality of life and improving the sleep patterns and habits of CLBP patients, it may prove to be a noteworthy addition to the existing treatments. This study will have application for the therapist dealing with chronic low back pain to use retro-walking as a therapeutic intervention combined with conventional physiotherapy for the better management of chronic low back pain patients. Therefore, the aim of the study was to determine the effect of retro-walking on sleep problems, QoL, disability, and pain in CLBP patients.

Subjects and methods

A sample size of 31 chronic low back pain patients was determined using the G. Power 3.1.9.2 software using the changes observed in the values of the Oswestry disability index (ODI) from the study done by Son et al. [23]. The effect size was 1.423, alpha level of 0.05 and power (1-beta) of 0.95. A sample of 31 CLBP patients was included in the study based on the inclusion criteria: (i) age between 20–59 years, (ii) chronic (≥ 3 months) nonspecific non-radiating CLBP, (iii) Numerical Pain Rating Scale (NPRS) score (2–6/10), (iv) ODI score in between 10–60%, and (v) Having a working knowledge of English. Patients were excluded if they had been diagnosed with a sleep disorder, had a history of spinal surgery or congenital disorder, an uncontrolled heart or respiratory condition, other serious medical conditions such as cancer or orthopaedic/rheumatological condition such as fibromyalgia, pregnancy-associated back pain or patients with red flags for physiotherapy treatment. Patients who were taking medication for sleep and/or pain, and patients who were seeking concurrent treatment were also ruled out.

The researcher carried out a baseline assessment before randomisation. The patients were allocated to groups (experimental = 16; control = 15) by the permuted block design with a block size of four at a ratio of 1:1. The group allocation was known only to the physiotherapists treating the patients, and it was concealed from each patient until the first sitting. One patient dropped out of the experimental and one dropped out of the control group, so the final analysis was done on 29 patients. The pre- and post- assessments of all the outcome measures were done before and after the intervention by the therapist, who was unaware of the group allocation.

Demographic characteristics such as age and body mass index (BMI) and general assessments of patients were completed at baseline, which includes pain history, physical assessment, functional assessment, observation, range of movement, and muscle power and length. Patients in both groups were given a session to become familiarised with the procedure. The experimental group received the familiarisation session of exercises and retro-walking on a treadmill and their preferred walking speed was noted. The control group received the familiarisation session of their set of exercises. Each participant received three physiotherapy sessions per week for three weeks. Those in the control group received a conventional treatment of five minutes of continuous ultrasound (1 MHz at 1.2 W per cm square intensity, 10 minutes of interferential current therapy by the placement of 4 medium-sized (8×6 cm) cutaneous electrode pads on the lower back (the electrodes were placed on the paraspinal area, the positive and negative electrodes were positioned parallel to the vertebral column at the lateral limits of the painful area) at a modulated frequency of 200 Hz) (PhysSys 622417, Zimmer Ultrasound and IFT combination machine), and lumbar extension exercises (10 repetitions each of prone lying leg elevation, prone lying chest elevation and supine lying bridging) with a 10-second hold. Those in the experimental group received the same treatment as the control group along with retro-walking at the predetermined speed for 15 minutes on a treadmill (JKexer Treadmill, Serial No. QAP9809702). Exercise intensity and repetitions were increased based on the participant's tolerance and feedback.

Outcome measures

Pain: It was measured by the NPRS, which is a verbal or written self-reporting measurement tool consisting of a numerical point scale with extreme anchors of 'no pain' to 'extreme pain'. It is typically set up on a horizontal or vertical line, and most commonly ranges 0–10 or 0–100. The participant is asked to rate his/her pain intensity and a particular time frame or descriptor is established (e.g., within the last 24 h, today, worst pain, average pain, or least pain) [25]. The test-retest reliability for the NPRS has been demonstrated to be moderate to high, varying from 0.67 to 0.96 [26].

Functional disability: The Oswestry Disability Index (ODI) was used to measure the functional disability associated with low back pain. The ODI is a validated tool and was first published by Jeremy Fairbank et al. [27]. It covers areas concerning pain intensity, ability to lift, ability to care for oneself, ability to sit, stand and walk, ability to travel, quality of sleep, and sexual function [27]. It has a high degree of reliability (test-retest intraclass correlation coefficient (ICC) 0.99, internal consistency 0.87) [28] and validity [29].

Quality of Life: The QoL was assessed using the 36-Item Short Form Health Survey questionnaire (SF-36). It is easy to administer and provides a concise and direct indication of an individual's health status. It is a reliable instrument created to assess the health status of the general population aged ≥ 14 years [30,31].

Sleep problems: A sleep diary is a valid tool used for measuring subjective sleep. It is widely used in sleep research and clinical practice and is considered the gold standard for subjective sleep assessment [32]. In our study, we derived the following parameters from the sleep diary for the analysis:

Number of sleeping hours/week, Sleep efficiency (total time spent asleep while in bed), and restoration post-sleep. This was assessed throughout the week on a 3-point scale (feeling refreshed = 3; feeling somewhat refreshed = 2; feeling fatigue = 1) where a higher score was considered positive and a lower score was indicative of fatigue.

ODI, SF-36 and NPRS were taken at baseline, and at the end of the 1st, 2nd and 3rd weeks, whereas the sleep diary parameters were taken at the end of the 1st, 2nd and 3rd weeks.

Statistical analysis

The data obtained from the study was analysed using IBM SPSS Statistics for Windows (Version 25.0. IBM Corp, Armonk, NY, USA). They were assessed for normality by the Shapiro–Wilk test. Non-normal data was log-transformed for further analysis (NPRS and Sleep diary measures). The demographic characteristics and the baseline criterion measures were compared between the control and experimental groups at the study entry by the independent *t*-test. A 2×4 split plot ANOVA with group (experimental and control), time (baseline, 1st week, 2nd week, 3rd week) and interaction effect (Group × Time) was employed for the NPRS, ODI and SF-36. To test the differences between groups across three assessments of the sleep diary variable, a 2 × 3 split plot ANOVA with group (experimental and control), time (at the end of the 1st, 2nd and 3rd week) and interaction effect (Group × Time) was employed. If the main effect of time was significant, post hoc with Bonferroni was employed to locate the time points having a significant difference. Significance level was set at $p < 0.05$.

Ethical approval

The research related to human use has complied with all the relevant national regulations and institutional policies, has followed the tenets of the Declaration of Helsinki, and has been approved by the institutional ethical committee of the university (approval No.: 4/10/91/JMI/IEC/2016).

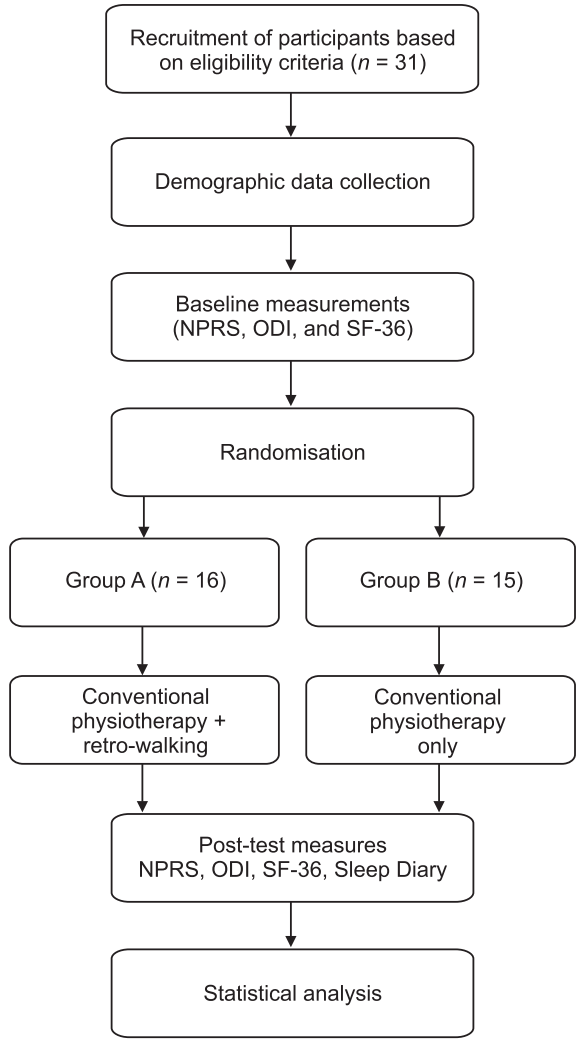
Informed consent

Informed consent has been obtained from all individuals included in this study. All patients were also informed about their right to withdraw from the study at any point during the study.

Results

The flow chart of the study is shown in Figure 1. There was no statistically significant difference at the baseline for age, BMI, NPRS, ODI, or SF-36 between the groups, hence they were comparable at baseline level ($p \geq 0.05$) (Table 1).

Results of the 2×4 ANOVA revealed that the NPRS ($p < 0.001$), ODI ($p < 0.001$), and SF-36 p (< 0.001) showed significant differences in time effect, thus showing an improvement in both groups (Table 2). Group ($p = 0.016$) and group × time ($p = 0.001$) interaction effect was found to be statistically significant only in NPRS (Table 2). All variables of the sleep diary, i.e., sleeping hours/week [Time effect ($p = 0.004$), time × group interaction effect ($p = 0.001$)], sleep efficiency [Time effect ($p = 0.024$), time × group interaction effect ($p = 0.004$)] and restoration post sleep [Time effect ($p = 0.014$), time × group interaction effect ($p = 0.034$)] showed significant differences in the experimental group but not in the control group. Post hoc analysis of the NPRS in the experimental group revealed a significant decrease from baseline to 1st week ($p = 0.002$), 2nd week ($p < 0.001$), and 3rd week ($p < 0.001$) with an effect size of 3.3 (Table 3) whereas, in the control group, post hoc demonstrated a significant decrease in NPRS when baseline was compared to 2nd week ($p = 0.002$) and 3rd week ($p = 0.011$) with an effect size of 1.4 (Table 4). Post hoc analysis of the SF-36 in the experimental group showed a significant decrease between baseline and 2nd week ($p = 0.001$), and baseline and 3rd week ($p = 0.008$) with an effect



NPRS – Numerical Pain Rating Scale
ODI – Oswestry Disability Index
SF-36 – Short Form – 36

Figure 1. Study flow chart

Table 1. Comparison of demographic data and criterion measures between groups at baseline

Variable	Experimental group (*n* = 16) Mean (*SD*)	Conventional group (*n* = 15) Mean (*SD*)	*t*-value	*p*-value
Age	24.7 (5.56)	25.9 (5.61)	0.589	0.56
BMI	22.7 (4.28)	22.1 (3.15)	0.421	0.67
NPRS	4.7 (0.87)	4.33 (0.72)	1.07	0.29
ODI	20.6 (9.89)	26.5 (11)	1.54	0.14
SF-36	59.4 (12.3)	59.9 (17.5)	0.084	0.93

BMI – body mass index, NPRS – Numerical Pain Rating Scale, ODI – Oswestry Disability Index, SF-36 – Short Form – 36
* significant difference at $p < 0.05$

Table 2. Summary of split plot ANOVA

Variable	Source	*df*	*F*	*p*-value	Partial η^2
NPRS	Time	1.94	47.25	< 0.001*	0.66
	Group	1	6.72	0.016*	0.02
	Time × group	1.94	12.04	< 0.001*	0.33
ODI	Time	3	17.33	< 0.001*	0.40
	Group	1	2.57	0.12	0.09
	Time × group	3	0.69	0.55	0.02
SF-36	Time	3	9.16	< 0.001*	0.26
	Group	1	0.04	0.84	0.002
	Time × group	3	0.85	0.46	0.03
No. of sleeping hours per week	Time	2	6.179	0.004*	0.192
	Group	2	7.425	0.011*	0.022
	Time × group	1	7.841	0.001*	0.232
Sleep efficiency	Time	1.527	4.606	0.024*	0.151
	Group	1	0.015	0.904	0.001*
	Time × group	1.527	7.536	0.004*	0.225
Restoration post sleep	Time	2	4.626	0.014*	0.146
	Group	1	0.171	0.682	0.006
	Time × group	2	3.587	0.034*	0.117

NPRS – Numerical Pain Rating Scale, ODI – Oswestry Disability Index, SF-36 – Short Form – 36
df – degree of freedom, * significant difference at $p < 0.05$

Table 3. Change in pain, disability and quality of life with time in experimental group

Time	NPRS Mean (*SD*)	Effect size (between baseline and 3rd week)	ODI Mean (*SD*)	Effect size (between baseline and 3rd week)	SF-36 Mean (*SD*)	Effect size (between baseline and 3rd week)
Baseline	4.69 (0.87)	3.3	19.9 (2.51)	4.6	59.9 (3.27)	3.2
1st week	3.33 (1.05)		16.7 (2.05)		62.4 (2.89)	
2nd week	2.47 (0.91)		14.7 (2.27)		69.77 (1.97)	
3rd week	1.60 (0.99)		10.33 (1.52)		70.89 (3.55)	

Post hoc analysis			
Baseline vs 1st week	0.002*	0.006*	0.99
Baseline vs 2nd week	< 0.001*	0.031*	0.001*
Baseline vs 3rd week	< 0.001*	< 0.001*	0.008*

NPRS – Numerical Pain Rating Scale, ODI – Oswestry Disability Index, SF-36 – Short Form – 36
* significant difference at $p < 0.05$

Table 4. Change in pain, disability and quality of life with time in control group

Time	NPRS Mean (*SD*)	Effect size (between baseline and 3rd week)	ODI Mean (*SD*)	Effect size (between baseline and 3rd week)	SF-36 Mean (*SD*)	Effect size (between baseline and 3rd week)
Baseline	4.33 (0.72)	1.4	24.9 (2.68)	3.06	61.2 (4.60)	1.3
1st week	3.93 (0.73)		19.9 (2.26)		63.5 (3.39)	
2nd week	3.38 (0.87)		18.8 (2.18)		68.4 (2.30)	
3rd week	2.92 (1.25)		16.9 (2.54)		66.6 (3.64)	

Post hoc analysis			
Baseline vs 1st week	0.13	0.309	1.00
Baseline vs 2nd week	0.002*	0.05	0.594
Baseline vs 3rd week	0.011*	0.024*	1.00

NPRS – Numerical Pain Rating Scale, ODI – Oswestry Disability Index, SF-36 – Short Form – 36
* significant difference at $p < 0.05$

size of 3.2 (Table 3), while in the control group, there was no significant improvement over time in the SF-36 (Table 4). Post hoc analysis of the experimental group revealed a significant decrease in the ODI from baseline to: 1st week (p = 0.006), 2nd week (p = 0.031), and 3rd week (p < 0.001) with an effect size of 4.6 (Table 3), whereas, in the control group, there was a significant decrease between baseline and 2nd week (p = 0.05), and baseline and 3rd week (p = 0.02) with an effect size of 3.06 (Table 4). Group × Time Interaction for the NPRS, ODI, SF36, and sleep diary are explained in Figure 2–5, respectively.

Post hoc analysis of the sleep diary variables was also performed. Sleeping hours/week revealed a significant increase from the 1st week to: 2nd week (p < 0.001) and 3rd week (p < 0.001) with an effect size of 1.2 in the experimental group (Table 5). For sleep efficiency, the experimental group revealed a significant increase from the 1st week to: 2nd week (p = 0.029) and 3rd week (p = 0.015) with an effect size of 1.3 (Table 5). The experimental group revealed a significant increase from the 1st week to: 2nd week (p = 0.009) and 3rd week (p = 0.024) with an effect size of 0.6 (Table 5) for restoration post sleep. No significant improvement in the control group was observed in any of the sleep diary variables (Table 6).

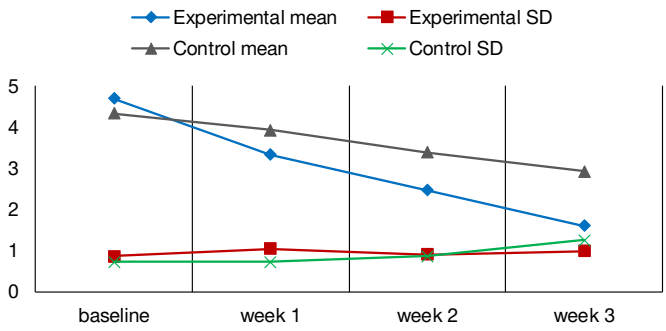


Figure 2. Group × Time interaction for the Numerical Pain Rating Scale

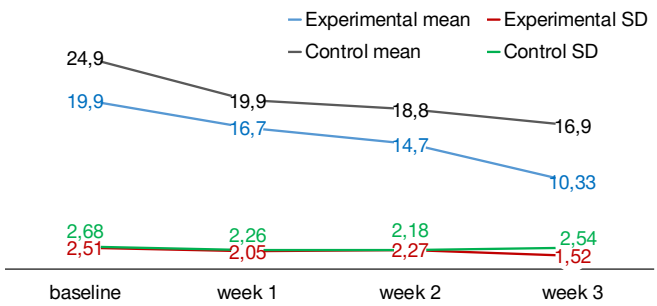


Figure 3. Group × Time interaction for the Oswestry Disability Index

Discussion

The present study was designed to investigate the effects of retro-walking on pain, functional disability, quality of life, and sleep problems in patients with CLBP. The results demonstrated that there was a significant improvement in the pain, functional disability, quality of life, and sleep diary parameters in the experimental group. Both groups showed a statistically significant decrease in pain, however, the retro-

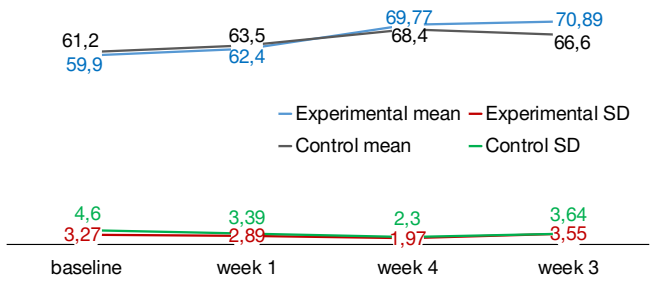


Figure 4. Group × Time interaction for the Short Form – 36

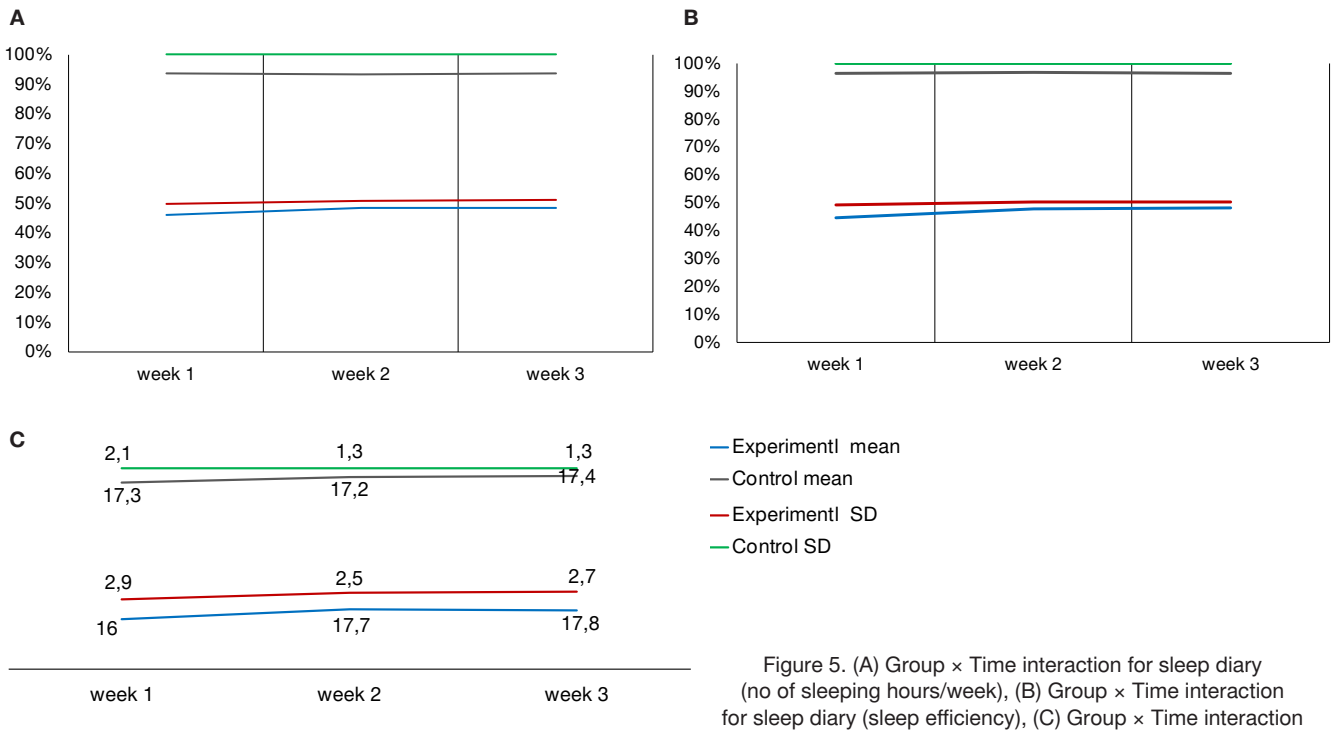


Figure 5. (A) Group × Time interaction for sleep diary (no of sleeping hours/week), (B) Group × Time interaction for sleep diary (sleep efficiency), (C) Group × Time interaction for restoration post sleep

Table 5. Change in variables of sleep diary with time in experimental group

Time	No of sleeping hours/week Mean (*SD*)	Effect size (between 1st week and 3rd week)	Sleep efficiency (%) Mean (*SD*)	Effect size (between 1st week and 3rd week)	Restoration post sleep Mean (*SD*)	Effect size (between 1st week and 3rd week)
1st week	51.6 (4.1)		83.7 (8.44)		16.00 (2.9)	
2nd week	56.5 (2.8)	1.2	89.3 (4.54)	1.3	17.7 (2.5)	0.6
3rd week	55.9 (2.9)		92.1 (4.17)		17.8 (2.7)	
Post hoc analysis						
1st week vs 2nd week	< 0.001*		0.029*		0.009*	
1st week vs 3rd week	< 0.001*		0.015*		0.024*	

* significant difference at $p < 0.05$

Table 6. Change in variables of sleep diary with time in control group

Time	No of sleeping hours/week Mean (*SD*)	Effect size (between 1st week and 3rd week)	Sleep efficiency (%) Mean (*SD*)	Effect size (between 1st week and 3rd week)	Restoration post sleep Mean (*SD*)	Effect size (between 1st week and 3rd week)
1st week	49.4 (7.3)		88.7 (6.9)		17.3 (2.1)	
2nd week	50.08 (7.9)	0.2	87.6 (5.9)	0.01	17.2 (1.3)	0.05
3rd week	49.4 (7.3)		88.6 (6.9)		17.4 (1.3)	
Post hoc analysis						
1st week vs 2nd week	1		0.898		1	
1st week vs 3rd week	0.924		1		1	

* significant difference at $p < 0.05$

walking group had a faster and greater reduction, on average. The control group was given conventional physiotherapy, which showed significant improvements in all the parameters over time. This result was consistent with the findings of Cairns et al. [34], in which the pain reduced significantly following physiotherapy treatment for CLBP. The result of our study is also supported by various other authors [35, 36]. The pain reduction in the experimental group was significant from the 1st week to the last week, but the reduction in pain in the control group was only noticeable from the second week, which implies that following retro-walking there was a faster reduction in the pain.

The exact mechanism of how retro-walking reduces pain is not clear, but the faster decrease in pain in the retro-walking group could be due to the fact that retro-walking works at multiple levels. Some probable causative factors for CLBP can be hamstring tightness, increased intervertebral pressure [37], reduced core muscle strength, and disturbed pelvic alignment [38]. Retro-walking helps to increase the flexibility of the hamstring muscle [39] which may be due to the difference in the pre-stretching of the hamstring muscle that occurs in retro-walking prior to thigh reversal due to greater hip flexion and lesser extension [40]. During retro-walking, hip extension and knee flexion are greater than during forward walking, which leads to a concomitant extension of the lumbar spine. This increasingly loads the facet joints, thus opening the disc spaces, causing a reduction in compressive loads of the intervertebral discs [41]. An increase in the lower back's range of motion (ROM) and reduced pain for athletes with LBP following retro-walking has been reported, and it is the probable cause of the reduction of pain in CLBP patients [42].

The kinematics of the retro-walking also helps in correcting the pelvic alignment, as heel strike associated with ground contact is eliminated, which has the potential to manifest itself in a more anteriorly aligned pelvis, which opens up the facet joints further [40]. Furthermore, this pelvic alignment is maintained by an increased hamstring flexibility [39, 42].

There was a statistically significant improvement in the functional disability of both groups, with greater improvement in the experimental group. There is a dearth of literature on the effect of retro-walking on CLBP patients. Studies conducted on osteoarthritis of the knee joint have demonstrated a significant improvement in functional disability after a retro-walking program [36, 37, 43, 44]. Improvement in quality of life has also been observed following conventional and therapeutic intervention for CLBP patients [34, 45]. These results hold immense clinical significance as they provide an overall picture of improvement in the experimental groups, thus proving retro-walking an efficient treatment technique.

Sleep parameters were measured using a sleep diary. Our study is one of the very few studies where physiotherapy intervention for sleep parameters has been examined in association with CLBP. It is evident from the results that retro-walking favours sleep parameters. The association of pain intensity with sleep has been well documented [46]. Exercise intensity has also been implicated in the improvement in sleep parameters [47]. In our study, the intensity of exercise in the experimental group was higher, which might have been reflected in the form of improvement in the sleep diary parameters. Improvements in sleep parameters has also been observed in preliminary evidence in which physiotherapy intervention has a positive effect on sleep in CLBP patients where pain reduction seems to be a probable cause [13].

Limitations

Our study highlights the role of retro-walking in bringing about a rapid and clinically meaningful improvement in CLBP but, nonetheless, there are a few lacunas that can be corrected in future studies. The purported reciprocal relationship between pain and sleep disturbances in CLBP patients needs more investigations that objectively assess the sleep parameters, such as polysomnography. A randomised trial, with an untreated control group would have made the study more convincing by ruling out natural recovery, but ethically, this is deemed difficult. The effect of retro-walking may be studied on other outcome measures and in association with other treatments in CLBP to add to the body of knowledge. We regard the results of our research to be encouraging enough to necessitate future research to determine and further establish the role of retro-walking in the treatment of CLBP.

Conclusion

Established treatment techniques may be lacking in alleviating the symptoms of CLBP. Hence, researchers are always looking for better treatment techniques and retro-walking seems to be one such technique, which may work as an adjunct to the existing management plans to improve the quality of care of chronic low back pain patients.

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