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Original research article

Physiological outcomes of spinal mobilization on non-specific low back pain

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Abstract

Background: The burden of musculoskeletal disorders increases every year, with low back pain (LBP) being the most frequently reported conditions for seeking manual therapy treatment. Spinal mobilization is widely used for the benefit of the patients with chronic low back pain.

Objective: To assess the physiological outcomes of spinal mobilization therapy in non-specific chronic LBP patients.

Materials & Methods: Fifty eligible patients of Chronic LBP were enrolled in the present study. Socio-demographic data of all the subjects were analyzed. The entire participants received spinal mobilization therapy and evaluate the physiological outcomes (blood pressure, heart rate, skin response and respiratory rate) of this therapy.

Results: In our study majority of the participant (38%) were 18-30 years of age, mean age was 35.6 ± 12.3, with slight male predominance (52%). LBP, blood pressure (SBP/DBP), heart rate and respiratory rate were significantly decreases after spinal mobilization therapy.

Conclusions: Spinal mobilization technique is an effective intervention for reduction of pain, functional disability and enhancing physiological outcomes in chronic low back pain patients.

Keywords: Spinal mobilization therapy, chronic LBP, physiological outcomes

Introduction

Non-specific pain in low back is the pain that occur at low back without any specific reason. It is a main cause of limitation of activity, absence and high health care costs [1-2]. LBP is one of the most common musculoskeletal conditions encountered in clinical practice. Multiple studies have indicated the beneficial effects of manual therapy in treating spinal pain conditions [3-4].Spinal manual therapy (SMT)is widely applied in the clinical setting to treat musculoskeletal pain; however, the mechanisms underlying its effectiveness remain largely unknown. Over the last two decades there has been increasing interest in the neurophysiological responses of the sympathetic nervous system (SNS) to SMT [5]. Increased spinal mobility leads to low back pain improvement. Hence, spinal mobility exercises can be recommended to low back patients [6]. Many reasons and factors affect the low back pain that includes from age, sex, body mass index (BMI) to the physical movement of the Participants. The reason of constant pain is multifactorial that can include pain, emotional, societal, job-related, and money related factors [7-8]. The incidence is higher in women and the most affected age range is from 35 to 55 years. In addition, it commonly presents with concurrent musculoskeletal pain [9]. According to American Physical Therapy Association (APTA) there is strong evidence to show that vertebral mobilization and manipulation procedures can be used to improve spinal and hip mobility and reduce pain and incapacity in low back pain patients that fit the clinical prediction rule [10-11].

Aim: The objectives of this study was to determine the physiological outcomes of spine mobilizations in subjects with nonspecific low back pain.

Material and Methods

This prospective study was conducted in the Department of Physiotherapy in a tertiary care hospital, India. A total 50 subjects with chronic LBP were enrolled in this study

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Inclusion criteria

- Chronic non-specific LBP patients.
- 18 to 60 years of age, both gender.
- Participant who give written consent for the study.

Exclusion criteria

- Patients having neurological disorder, spine fracture, osteoporosis, arthritis, neoplasm, vascular disease or cognitive disorder.
- Pregnant women.
- Caudaequina lesions producing disturbance of bladder and/or bowel function.
- Patients had undergone surgery within the previous 3 months.
- Who did not give consent for the study.

We have investigating the physiological responses to spinal mobilization treatment using a lower back pain (LBP) patient population.
All potential participants were seen by the primary investigator and explained the procedure.
The standard subjective assessment was completed, including demographic information (age, gender, BMI and duration of LBP). The pain threshold, blood pressure (SBP & DBP), Respiratory rate, heart rate and skin response were measured at the before and after the mobilization technique.

Statistical Analysis: All statistical analyses were performed with SPSS 18.0 All data were summarized as the mean ± standard deviation. A paired t-test was used to compare pre- and post-test results within each group. P value < 0.01 was considered significant.

Results

A total of 50 chronic low back pain subjects, majority of them (38%) were 18-30 years age group, mean age was 35.6 ± 12.3 Years, and slight male predominance was found (52%). Mean Body mass index of this study was 24.9 ± 4.35 (Kg/m^2). Details shown in table: 1.
Significant reduction of pain grade (VAS score), blood pressure (SBP/DBP), heart rate and respiratory rate after spinal mobilization therapy ($p<0.001$), but no significant changes was observed in skin response ($p<0.01$) [table: 2].

Table 1: Socio-demographic characteristics of the study participants

Characteristics		Frequency	Percentage
Gender	Male	26	52%
	Female	24	48%
Age group (in years)	18-30	19	38%
	31-40	13	26%
	41-50	8	16%
	51-60	10	20%
Mean age ± SD		35.6 ± 12.3	
Body mass index (Kg/m^2)		24.9 ± 4.35	
Duration of LBP (months)		6.7 ± 5.6	

Table 2: Physiological changes in pre and post spinal mobilization in study subjects

Variable		Pre-treatment (Mean ± SD)	Post-treatment (Mean ± SD)	P value
Pain Grades		8.72 ± 0.92	3.62 ± 1.15	P < 0.0001
Blood Pressure	Systolic Blood Pressure	153.48 ± 19.73	136.84 ± 11.44	P < 0.0001
	Diastolic Blood Pressure	90.68 ± 6.75	86.6 ± 5.21	P = 0.0010
HR		77.6 ± 4.26	72.86 ± 3.83	P < 0.0001
Skin Response		6.98 ± 0.38	6.82 ± 0.37	P = 0.0354
Respiratory Rate		18.1 ± 1.41	16.6 ± 1.45	P < 0.0001

Discussion

Current study found majority of the subjects were 18-30 years age group with mean age was 35.6 ± 12.3 Years, our finding are comparable to the Sidney M *et al*.,[12] and K Sarker*et al*.,[13].
In our study male participants were slightly more than female, concordance finding reported by EL Desoky*et al*.,[14] and Hahne JA *et al*.,[15], whereas Zunke*et al*.,[16] and Pasquier M *et al*.,[17], reported female predominance in their study.
Mean Body mass index of this study was 24.9 ± 4.35 (Kg/m^2), majority of them were normal weight and height, our results were comparable with many other studies M N Fiaad*et al*.,[18] and Walkyria*et al*.,[19].
Significant reduction of pain grade (VAS score) after spinal mobilization therapy, accordance to the Gong C *et al*.,[20] and Taeseong*et al*.,[21].

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There was a significant reduction of systolic blood pressure (SBP/DBP) spinal mobilization treatment as compared to pre spinal mobilization, similar finding observed in study conducted by Shankar, N. *et al*.,[22] and Shafton, A. D *et al*.,[23].
There was a slight change in heart rate and respiratory rate measurements during mobilisation treatment and the final rest period compared to the pretreatment measurements found statistically significant ($p<0.001$), our results are comparable to Yung *et al*.,[24] and Ylinen*et al*.,[25].
There was a non-significant difference in skin conductance (skin response) pre and post spinal mobilization, similar observation reported by Perry at al [26].

Limitations of the study
There were several limitations to this study. First, only chronic low back pain population was enrolled in this study. This study used a sample of convenience. Sample size was less and control group was not used in this study.

Conclusions
We concluded that, low back pain was significantly reduces after spinal mobilization therapy. Spinal mobilization also decreases systolic and diastolic blood pressure, heart rate and respiration rate, but no significant changes are seen in skin response.

Conflicts of interest: None.
Source of funding: None.

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