RESEARCH ARTICLE

DOI: 10.34256/ijpefs20211

International Journal of
PHYSICAL EDUCATION, FITNESS AND SPORTS

Evaluating the Effectiveness of Lumber Corset Wearing in Low Back Ache: A Rehabilitation Center Based Cross-sectional Study

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Received: 27-04-2020, Accepted: 23-06-2020

Abstract: Patients are most commonly advised by medical practitioners even after remaining wide range of controversy regarding wearing of lumber corset in low backache (LBA). Therefore, this study aimed to determine the potential evidence of using lumber orthosis in LBA. The study adopted 50 participants (21 male and 29 female) ages ranging between 20 to 60 years as sample selecting randomly from September to December 2015. Outcome evaluated by calculating and presenting descriptive statistics at 0.05 p-value and x^2 test with confidence intervals (95%), Odd Ratio (OR), and Relative Risk (RR). Age and sex were not statistically significant determinants (x^2 1.172, p 0.279 and x^2 0.593, p 0.441, respectively). Wearing orthosis and reduce pain in a journey found as protective (RR 0.79 and RR 0.94) also poor relationship discovered in considering OR (OR 0.242, 95% CI 0.021-2.780 and OR 0.857, 95% CI 0.164-4.467). Our data were unable to provide adequate proof that wearing lumber corset bring any clinical or therapeutic benefit in managing LBA to the patients.

Keywords: Lumber Corset, Low Back Pain, Effectiveness, Cross-sectional study.

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List of Abbreviations

LBA= Low Back Ache

LC= Lumber Corset

EQ-5D-3L= EuroQol Group -5Dimensions - 3Severity levels

VAS= Visual Analog Scale

RR= Relative Risk

OR= Odd Ratio

CI= Confidence Intervals

SD= Standard Deviation

HR= Hazard Ratio

1. Introduction

Low Back Ache (LBA) is considering as the "20th Century Medical Disaster" condition and gain attention to greater health concerning issue [1]. It is the most frequent reason to seek a healthcare provider [2] with having many outcomes, including frequent taking time off from working-age adults [3, 4], rising the indirect cost [4-6], and disability [1].

Globally, LBA back pain is the most common musculoskeletal condition [7]. Hoy and colleagues [8] forecasted, sedentary lifestyle liable for increasing the number of individuals with lower back pain over the next decades. Their prophecy appears to has borne out in recent times, where the population has experienced at least one episode of lower spinal ache in their lifetime prevalence from 70% to 84% [9-13].

To treat this condition, non-operative treatments comprising rest, physiotherapy; by active therapies, for example exercise, patient education, and multimodal therapy or passive therapies like physical means, manual therapy, assistive device, injection and drug, and medication, are used before the surgical treatment [14, 15].

In managing backache, most patients are commonly advised to use lumber support [16, 17] to limit the impairment and disability, without expecting any long term adverse effect on muscle strength (18). In these days, many studies are supported by the lack of strong evidence that spinal orthosis prevents and improves the condition [19-21]. Nonetheless, the current trend among the medical practitioners is plummeting in advising to use the Lumber Corset (LC) without considering the large gaps between evidence and practices that persist in the management of LBA. Therefore, the current study is designed to investigate the effectiveness of wearing a backbelt among the Bangladeshi population for the first time to our knowledge, based on the interview response.

2. Participants and Methods

2.1 Ethical issue consideration

The research protocol for this study was approved by the ethical review board of the Bangladesh Health Professions Institute. After receiving approval, permission was taken to research the musculoskeletal unit through the department of physiotherapy, Centre for the Rehabilitation of the Paralyzed, Savar, Bangladesh. The researcher also took the individual consent form from each subject after explaining to them the aim of objectives. The subjects had the right to withdraw themselves at any point in the research.

2.2 Subject recruitment

This cross-sectional study included participants who had undergone treatment of the McKenzie approach for the LBA between September and December 2015. This method implemented for both the purpose of diagnosis by evaluating different directional repetitive movements and constant position, and treatment depends upon the flexion, extension, or lateral shift of the spinal direction. The investigator

referred to the process of randomly selecting 50 healthy subjects intension to treat based on the inclusion criteria; was low back pain arising from adopting bad posture, derangement and dysfunction persist at least a month, advised to use LC, age ranging from 20 to 60 years and exclusion criteria; pregnant women, several spinal instability, trauma or fracture from a recent major accident that aggravated by movements of the lumbosacral region, and serious spinal pathology for example tuberculosis, osteoporosis, cancer, cauda equine syndrome, and ankylosing spondylitis causes fusion of the spine or major surgery in any part of the body which produced pain as an acute inflammatory reaction.

2.3 Low Back Pain

Low back pain is defined as the pain located in the lumbosacral region associated with some abnormality of the intervertebral discs with or without traveling pain in the lower limbs whether bilateral or unilateral [22].

2.4 Confirmatory Diagnosis of LBP

Participants recruited after confirmation by the fulfilling the McKenzie Institute Lumbar Spine Assessment form examination containing a) history taken from the patient, and b) physical examination through observing posture in a different position, identify lost movement, find out the neurological deficit by reflex, motor, sensory and dural signs test by the assigned physiotherapist.

2.5 Lumber corset and wearing instruction

It was collected from the local shop and made locally. Though there were a wide variety of lumbar supports, for instance, flexible and rigid, but we instructed to wear hard one rather not to use soft one. Flexible to wear under or over clothing, without shoulder straps, during the journey, and in the workplace in severe cases as well as those were housewives instructed to dress in household work especially work related to bending activities. Respondents were not advised to wear it the whole day or during sleeping. However, in the long journey with sitting position participants were instructed to wear the orthosis and remove every two hours for a few 15 minutes, thereafter fasten again. It was also compulsory for the person who drives their car. For bicker who ride for more than 30 minutes advised using LC as they were possessed forward ending.

2.6 Questionnaire

The researcher developed a questionnaire by following the EQ-5D-3L questionnaire; developed by EuroQol Group, which included five dimensions, and usually each of which has three severity levels, quantify the effect of Lumber Corset use in backache and then selected the LBA participants as the sample for data collection. It included baseline characteristics, backache, and pain before and after the use of LC related information. Data were collected through the face to face interview.

2.7 Pain and satisfaction level measurement procedure

LBP categorized by the combination of Visual Analog Scale (VAS) graded from 1 to 10 points and three-point pain scale (mild, moderate and chronic) of symptoms as mild or acute LBA [1–3], moderate or sub-acute LBA [4–6], and severe LBA [7-10]. Patients were asked how much they felt the pain if you scored it from 0 to 10 and then the researcher put it into the three categories. Satisfaction level was rated on a four-point Likert scale ranging from 1 (non-satisfaction) to 4 (strongly satisfied).

2.8 Quality control of date

The data quality of the participant was managed through their language. Therefore, the developed questionnaire was translated into Bengali from the English language. Data were gathered by the investigator himself. Collecting for the best quality of data the researcher, acquired important training and orientation by the supervisor and from the teaching institution. Then assembled data were input into the statistical software, thereafter check, recheck and cross check for its consistency.

2.9 Statistical Analysis

Data were analyzed using the Statistical Package for Social Science- 16 (SPSS Inc., Chicago, IL, USA) software. After the collection of data, all interview questions checked, excluded missing and inconsistent data, those described, as well as corrected data entered into SPSS. Continuous data reported as mean, and frequency tables used for categorical data. Chi-squire (x2) test, P-value, Relative Risk (RR) including Odd Ratios (ORs) and 95% confidence intervals (95% CI) were computed. Chi-square test and P-value presented to find the significant association between dependent and independent variables. Level

of significance accepted at p< 0.05. Relative Risk indicated which characters were protective and ORs (95% CI) determined to compare the effectiveness of LC use with age in years (<30 and >30), gander, corset in a journey, and pain reduction in the journey.

3. Results

In this section, the results obtained from the analysis of the aforementioned participants are presented. More specifically, the relationship between Lumber orthosis user and low back pain is determined in this section.

3.1 Baseline characteristics of the patients

The study was conducted on 50 participants of having low back pain. Most of the participants were females 58% (n= 29) of a high number 19 (38%) of the respondents' age was less than 40 years, ranging from 31 to 40 years with a mean (±SD) 41.82 (±9.7115) years. About 18% (n =9) of the participants noted that they could not read and write, while, highest almost double of them (36%, n= 38) attended primary school. More than three fourth (86%, n= 43) of them were married as illustrated in Table 1.

Table 1 Base line characteristics information

Variable	Character	n (%)	Mean±SD
Sex	Male	21 (42)	
	Female	29 (58)	
Age	20-30	6 (12)	41.82±9.7115
	31-40	19 (38)	
	41-50	15 (30)	
	50-60	10 (20)	
Marital Status	Married	43 (86)	
	Unmarried	7 (14)	
Literacy Level	No formal school	9 (18)	
	Less than primary school	3 (6)	
	Primary school	18 (36)	
	SSC complete	8 (16)	
	HSC complete	8 (16)	
	Graduation complete	4 (8)	
Total		**50 (100%)**	

Table 2 Characteristics of Low back Ache before using Lumber Corset (Nature of the pain prior to lumber orthosis use)

Variable	Character	n (%)
Region	Central lower back	25 (50)
	Both buttock	1 (2)
	Radiate Below knee	14 (28)
	Radiate above knee	10 (20)
Duration	1 months	5 (10)
	2-6 months	6 (12)
	7-12 months	8 (16)
	2-3 Years	22 (44)
	>3 years	9 (18)
Severity	Mild	7 (14)
	Moderate	27 (54)
	Severe	16 (32)

The analysis showed in Table 2, the half 50% (n= 25) of the patients presented that the region of their LBA was central low back, and more than one-fourth (28%, n= 14) of their pain radiated below the knee. A few (10%, n= 5) of them pain persisted one month and more than half (54%, n= 27) of them reported their severity of pain was moderate.

The statistics indicated that 46% (n= 23) out of the total (n= 50) participants wearing a lumber belt. Among the orthosis user, assessing the pain at the beginning and the follow-up day almost equal number of cases 60.9% (n= 14) and 65.3% (n= 15), respectively, suffered from a moderate level, while the number of severe cases reduced in the eventual (21.7%, n= 5) from the initial (30.4%, n= 7) follow-up day. Back belts lead to reduce the pain around 60.9% (n= 14) cases during the journey. Among the four satisfactory levels, higher 47.8% (n= 11) described their minimum satisfaction, although one-quarter (26.1%, n= 6) expressed dissatisfaction.

On respondent age, the non-significant difference found between <30 years and > 30years participants (x2= 1.172, p= 0.279), the study also revealed that participants aged greater than 30 years were 2.632 times more at risk for the LC user than those aged less than 30 years using (OR=2.632, 95% CI= 0.435-4.907).

Similar trends have revealed regarding gender and corset use in the journey, there was no statistically significant difference between male and female respondents (x2=0.593, p 0.441 and x2=0.66, p 0.417). The odds of experiencing LC used during the journey in back pain disorder was 0.857 times more probable among females than males (95% CI= 0.164-4.467) and noted the negative relationship (p= 0.854, RR= 0.79). Moreover, 46% of the likelihood of using LC were dissatisfied among the participants who were female than male (OR= 1.125, 95% CI= 0.175-7.243).

4. Discussion

Participants who visited the medical practitioner for LBA received instruction to wear the lumber orthosis in general. The causes behind the lack of understanding of the key pathology of low backache syndromes, the overlapping symptomatology between various back problems, the deficit of diagnosis excellent objective signs and symptom of the backache syndrome, the lack of knowledge about variable course followed by numerous patients. The stabilizing effect of a lumbar orthosis is rhetorical [23] due to increases in trunk stiffness by restricting extension movement [24]. This situation catches attention and thereafter the researcher decided to evaluate the evidence of the effectiveness of using a backbelt in treating LBA and to the authors' knowledge, this is the first subjective cross-sectional study conducted in Bangladesh.

Table 3 Experience of Lumber orthosis use in Low back Ache (Pain evaluation after lumber belt wearing)

Variable	Character	n (%)
Lumber corset	Yes	23 (46%)
	No	27 (54%)
Pain at first consultation	Mild	2 (8.7)
	Moderate	14 (60.9)
	Severe	7 (30.4)
Pain at final evaluation	Mild	3 (13)
	Moderate	15 (65.3)
	Severe	5 (21.7)
Pain reduction in journey	Yes	14 (60.9)
	No	9 (39.1)
Satisfaction level	Neither	6 (26.1)
	Minimally	11 (47.8)
	Moderately	5 (21.7)
	Strongly	1(4.3)

Table 4 Associated factors of Low Back Ache with Lumbar Corset user among Bangladeshi population, 2015 **(**Significance of Lumber corset application)

Variable	Character	Lumber Corset Use		Relative Risk	Odd Ratio (OR)	95% Confidence Interval (CI)		x^2	p-value
		Yes	No			Lower	Upper		
Age	<30 years	4	2	1.54	2.632	0.435	4.907	1.172	0.279
	> 30years	19	25						
Gender	Male	11	10	1.27	1.558	0.503	4.803	0.593	0.441
	Female	12	17						
Use corset in journey	Male	8	3	0.79	0.242	0.021	2.780	0.66	0.417
	Female	11	1						
Pain reduce in journey	Male	6	5	0.94	0.857	0.164	4.467	0.033	0.854
	Female	7	5						
Satisfaction level	Male	3	8	1.09	1.125	0.175	7.243	0.015	0.901
	Female	3	9						

In our study, the mean (±SD) age of the participants was 41.82 (±9.7115) years. We did not find any significant relationship of the patient's age (x2= 1.172, p= 0.279) and LC user (OR=2.632, 95% CI= 0.435-4.907). This finding did not support wearing a backbelt considering any age. Our statement supported by a randomized control trial (RCT) study of where the intervention group (back support and education) initially found to statistically decrease the rate of recurrent episodes of work-related LBA (23.1% vs. 31.1%, P= 0.059) but when adjusted for age [Hazard Ratio (HR) 1.001, CI; 0.98-1.03, p= 0.911] measured by the electronic LC devise discovered non-significant relationship [25].

Investigators tried to understand the relationship between the LC user in back pain and gender, in this regard, the results revealed the non-significant differences (x2 0.593, p 0.441; OR=1.558, 95% CI= 0.503-4.803), too. Similar results reflected in the trial noted that there were no statistically significant differences between groups at baseline like age, sex, race, referred pain, and education [26]. Oleske and colleagues [25] analyzed the occasion between the back belt and education receiver group with the sex (23.1% vs. 31.1%) did not find any significant relationship (HR 0.563, CI; 0.37-0.86, p= 0.008) though p-value (0.059) was indicating the reduction frequency of low back disorder (23.1% vs. 31.1%).

The current result showed that the region of the pain traveled to the central lower back was half (n= 25) of the total cases. As to the effect of orthosis management on backache control, we did not invent any substantial association (RR= 0.79; OR=0.242, 95% CI= 0.021-2.780) examining the effectiveness of spinal orthosis use in the journey. A study measured the consequence of wearing the lumbosacral orthosis by electromyographic, the intervention group received standard physiotherapy and medication found all parameters remain unaffected [27].

This study revealed that pain relief during the traveling was more than half (60.9%) in out all. Even after that, there was no significant relationship conceived between the back belt user with respect to pain reduction in the journey (x2=0.033, p 0.854; RR= 0.94, OR=0.857, 95% CI= 0.164-4.467). A previous study measured subjectively, in contrast to our study that reported a considerable improvement in those with LC compared with those without. While assessed objectively find that removed the corset did not differ within the groups was similar to our findings [28]. Indeed, the clinical study explained that the movement has an imperative impact on the distribution of pressure applied by the back belt [29].

Experiencing wearing orthosis was not comfortable (neither 26.1% and minimal 47.8%) according to the opinion of the representatives. Findings in the present study regarding the satisfaction level discovered non-significant (x2= 0.015, p= 0.901, RR= 1.09; OR= 1.125, 95% CI= 0.175-7.243) relationship in response to the LC user. With the exception of the study conducted on athletes, at the time of physical training they feel protected and experienced relieving pain while wearing corset by restraining movement and decreasing stress on the injured area [30, 31].

The present study had some limitations. Firstly, it was a subjective study and secondly, involved

a small number of patients. Therefore, further study with a higher number of samples is required for the generalization of our findings. Despite these limitations, given the fact that few recent studies were discussing the effect of LC in LBA patients, the essentiality of the present study as it offers an important contribution to the partial body of descriptive information on this topic in the literature. Besides, the strength of this study, the LBA syndrome of participants were examined and selected by the registered (Bangladesh Physiotherapy Association) and professional physiotherapist.

5. Conclusion

This study investigated the effectiveness of lumber corset among the patients treated with low backache and failed to prove that there was any effect of orthosis treatment on the clinical and therapeutic outcomes. Therefore, clinicians supposed to be cautious before considering prescribing lumbosacral support in similar populations. More research is desirable on the effects of LC use on the outcome measures for LBA before drawing definite conclusions regarding lumbar supports that may be most effective in managing back pain.

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Acknowledgement

The authors would like to express their gratitude to all participants for their patience and assistance at the time of the interview.

Informed consent

All participants gave written informed consents to participate in this study.

Funding

No funding was received for conducting this research.

Conflict of interest

None of the authors have any conflicts of interest to declare.

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