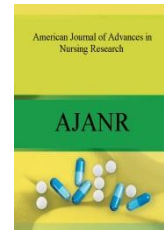




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EFFECTIVENESS OF BACK STRENGTHENING EXTENSION EXERCISES ON LOW BACK PAIN AND FUNCTIONAL PERFORMANCE AMONG BEAUTICIANS IN SELECTED BEAUTY PARLOURS AT MANGALORE

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ABSTRACT

Musculoskeletal disorders such as impairment of the back and spine are leading health problems and cause a disability, particularly in people during their employment years. The beauticians are at a greater risk of developing low back pain because of their long hours of work, repeated movements, attaining various positions which affect the level of their functioning and quality of life. A quasi experimental one group time series design was adapted for the study to assess the level of pain and functional performance among beauticians in selected beauty parlours at Mangalore. The samples consist of 30 beauticians working in the beauty parlours in the selected parlours of Mangalore with mild and moderate low back pain were selected by using purposive sampling technique and a pre test was conducted on the first day using Numerical Pain Rating Scale and Revised Modified Low Back Pain Disability Questionnaire among beauticians on the first day. Back strengthening extension exercises were taught on the 2nd day, 7th day, 14th day 15th and 21st day to the samples. A post test was conducted at 14th, 21st and 28th day to evaluate the effect of back strengthening extension exercises on low back pain and functional performance. In pre-test, all beauticians 30 had moderate low back pain, whereas in the post-test 1 majority 26 of beauticians had moderate low back pain, and the least 4 of them had mild low back pain. In post-test 2, majority 22 of beauticians had mild low back pain and the least 2 of them had moderate low back pain. In post-test 3 all the beauticians 30 had mild low back pain. In the pre-test regarding the functional performance of beauticians majority 24 of beauticians had severe disability, and the least percentage 6 of them had moderate disability. In the post-test 1, majority 18 of beauticians had severe disability and the least 12 of them had moderate disability. In the post test 2, majority 24 of beauticians had moderate disability and the least 6 of them had severe disability. In post-test 3, all 30 of the beauticians had moderate disability. The study also revealed that there was no significant correlation between the low back pain and the functional performance. The findings of the study concluded that the back strengthening extension exercises are effective in reducing low back pain and improving the functional performance in beauticians.

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Research Article



INTRODUCTION

The musculoskeletal system includes the bones, joints, muscles, tendons, ligaments, and bursae of the body. The functions of these components are highly integrated; therefore, disease or injury to one component adversely affects the others. The health and proper functioning of the musculoskeletal system is interdependent with that of the other body systems [1].

Work-related musculoskeletal disorders (WMSDs) have emerged as a major health problem among workers in the developing countries. Many episodes of low back pain are disabling, thus making it one of the costly occupational health problem. However, in the workplace, occupational risk factors such as forceful exertions during manual materials handling, awkward trunk postures and whole body vibration are often associated with development of back pain [2]. Low back pain is a major public health problem all over the world. Most people suffer incapacitating low back pain at some stages in their lives. It is estimated that, 6.5 million people in the United States are bed-ridden because of low back pain. Approximately 1.5 million new cases of low back pain are seen by physicians in each month. There has been growing concern about the low back disability in western society. In India, occurrence of low back pain is also alarming; nearly 60 per cent of the people in India have significant low back pain at some time or the other in their lifespan. Epidemiological studies provide important information regarding various risk factors such as sex, lifestyle, occupation, habit, socio-economic status and smoking associated with the history of low back pain [3]

Beauticians and cosmetologists are at risk for musculoskeletal disorders due to the physical demands of their work and to poorly designed equipment, tools and work spaces. Such disorders can include wrist and hand problems neck and back a problem, ranging from common aches and pains to serious conditions such as pinched nerves and ruptured discs [4]. Exercise is a widely prescribed treatment for chronic low back pain, with demonstrated effectiveness for improving function and work. Proper Exercise is safe for individuals with back pain, because it does not increase the risk of future back injuries or work absence. Substantial evidence exists supporting the use of exercise as a therapeutic tool to improve impairments in back flexibility and strength. Most studies have observed improvements in global pain ratings after exercise programs, and many have observed that exercise can lessen the behavioural, cognitive, affect and disability aspects of back pain syndromes [4].

Objectives

1. To determine the level of low back pain among beauticians.

2. To determine the functional performance among beauticians.

3. To evaluate the effectiveness of back strengthening extension exercises on reduction of low back pain and functioning level of performance.

4. To find out the relationship between low back pain and functional performance among beauticians.

Hypotheses

The hypotheses are tested at 0.05 level of significance.

H₁: There is a significant difference between low back pain scores before and after the back strengthening extension exercises.

H₂: There is a significant difference in functional performance scores before and after the back strengthening extension exercises.

H₃: There is a significant relationship between functional performance and low back pain among beauticians.

MATERIALS AND METHODS

A quasi experimental one group time series design was adapted for the study to assess the level of low back pain and functional performance among beauticians in selected beauty parlours at Mangalore.

Participants

The study population consisted of 30 beauticians working in the beauty parlours in the selected parlours of Mangalore. Purposive sampling technique was used to select the sample. Inclusion criteria for the sample were beauticians who have mild and moderate low back pain, are willing to participate, are present at the time of study, work in this profession for at least 6 months and the exclusion criteria for the sample were beauticians who have previously undergone spinal surgery, severe low back pain, previously received physical therapy during the last 3 months

Instrument

Data collection tool are the procedure or instruments used by the researcher to observe or measure the key variables in the research problem. Based on the objectives, a demographic proforma and Zero-Ten Numerical Pain Rating Scale, Revised Modified Low Back Pain Disability Questionnaire were prepared and administered to evaluate the effectiveness of the back strengthening extension exercises on low back pain and functional performance among beauticians. The Revised Modified Low Back Pain Disability Questionnaire is a questionnaire designed to assess the back pain. The questionnaire consists of 10 areas where the back pain will be affected (pain intensity, personal care, lifting,



walking, sitting, standing, sleeping, social life, travelling, and homemaking/employment). For each section the total possible score is 5: if the first statement is marked the section score = 0; if the last statement is marked, it = 5. If all 10 sections are completed the score is calculated as follows :Total score/Total possible score X 100 .The interpretation is 0-20 %- Minimal disability,21-40%- Moderate disability,41-60%-Severe disability,61-80%-Crippled,81-100%- Bed bound. The 0-10 pain scale is commonly and successfully used scale. The scale is often displayed as a line numbered from zero-ten. This scale asks the person in pain to assign a number from zero-ten, to the severity of pain. The scoring is classified into four categories: [No pain(0), Mild pain (1-3), Moderate pain (4-6), Severe pain(7-10)]. The prepared instruments (demographic proforma and exercise protocol) were validated by eight experts: four physiotherapy experts, two nursing experts from the department of medical surgical nursing and two orthopedic surgeons. The reliability of the translated tool was established by administering the tool to 8 beauticians in selected beauty parlours of Mangalore. Test retest method was used to estimate the reliability of translated Kannada version of the Revised Modified Low Back Disability Questionnaire. The internal consistency of the translated Kannada version was $r=0.81$. Hence the tool was found to be reliable.

Ethical Considerations

Any proposed research should consider ethical clearance at both the application and implementation stages. Ethical clearance for involvement of human subjects in research should be sought prior to any research undertaken, including pilot study. Ethical clearance was obtained through the Institutional Ethics Committee. Informed consent means that the participants have adequate information regarding the research, are capable of comprehending the information, and have the power of free choice, enabling them to consent to or decline participation voluntarily. Written informed consent was obtained from the participants on the day of admission. The purpose of the study was explained to each subject. Code number was assigned to each participant.

Data Collection

Data collection is the gathering of information needed to address a research problem. Prior to the data collection, permission was obtained from the concerned authority of the organisation for conducting the study. The data collection period extended from 11-10-2013 to 7-11-13. Prior to the data collection, permission was obtained from the concerned beauty parlours for conducting the study. Subjects were selected according to the selection criteria and confidentiality was assured.

Written consent was obtained from the subjects . Subjects were assigned through purposive sampling technique. A pre-test was done on the beauticians with low back pain to assess their level of pain and functional performance on day one. Back Strengthening Extension Exercises were taught to the subjects i.e. type I on the 2nd day, type II on the 7th day, type III on the 14th day, type VI on the 15th day and type V on the 21st day. Then post-test was conducted at 14th,21st and 28th day to assess the effect of back strengthening extension exercises on pain and functional performance among beauticians with low back pain.

Data Analysis

The data obtained was planned to be analyzed by both descriptive and inferential statistics on the basis of objectives of the study. To compute the data, a master data sheet would be prepared by the investigator. Baseline proforma was analysed by using frequency and percentage .Range, mean, median, and standard deviation of the pain and functional performance among beauticians with low back pain elderly was calculated before and after intervention .One way ANOVA was used to determine the effect of back strengthening extension exercises on pain and functional performance among beauticians with low back pain at 0.05 level of significance. Karl Pearson's correlation coefficient was used to find out the relationship between the pain and functional performance among beauticians with low back pain.

RESULTS AND DISCUSSION

Participant demographics

The data presented in the table 1 shows the following findings: Highest percentage 11(36.6%) of the beauticians were in the age group of (26-30) years and the least percentage 3 (10%) of them were in the age group of (36-40) years. Majority 28(86.6%) had full time work and the least 2(13.4%) had part time work. Majority 24 (80%) of beauticians were working for 6 -8 hours duration and the least percentage 1(3.4%) of them were working for 10-12 hours. Majority 20(66.6%) of the beauticians had rest period of ½-1 hr and the least percentage 2(6.8%) of them, were working without any rest. Majority 19 (63.4%) of them were not using sandals while working and none of them were using heeled sandals while working. Majority 18(60%), of the beauticians were using heeled sandals while walking and the least 12(40%) of them were using flat sandals while walking. Majority 24(80%) of the beauticians were not on any medications, remaining 3 (10%) were on pain killers and another 3 (10%) were on vitamin supplements. Majority 16(53.4%) of the beauticians were not performing any exercise and the least 2 (6.6%) of them were performing exercises once a week. Majority 28 (93.4%) of the beauticians had no



previous history of surgery and only 2 (6.6%) of them had history of neurosurgery. Majority 26(63.4%) of the beauticians had no history of spinal anaesthesia and the least 4(36.6%) of them had history of spinal anaesthesia

Frequency and Percentage Distribution of Samples Based on the Level Of Low Back Pain

The data presented in figure 1 shows that in pre-test all beauticians 30 (100%) had moderate low back pain , whereas in post-test 1 majority 26 (86.66%) of beauticians had moderate low back pain and in post-test 2, majority 22 (73.34%) of beauticians had mild low back pain . In the post-test 3 all the beauticians 30 (100%) had mild low back pain.

Frequency and Percentage distribution of Samples based on the Level of Functional Performance

The data was collected by administering Revised Modified Low Back Pain Disability Questionnaire

The data presented in Figure 2shows that in pre-test majority 24 (80%) of beauticians had severe disability. In the post-test 1 majority 18(60%) of

beauticians had severe disability and in post-test 2 majority 24 (80%) of beauticians had moderate disability. In the post-test 3 all 30 (100%) of the beauticians had moderate disability.

Effectiveness of Back strengthening Extension Exercises on Reduction of Low Back Pain and Functional Level of Performance

Table 2 shows that there was a significant difference in pre-test and post-test low back pain scores among beauticians.

Table 3shows that there was a significant difference in the pre-test and post-test functional performance scores among beauticians

Relationship between Low Back Pain and Functional Performance scores among Beauticians

Table 4, shows that pre-test and post-test 1, 2 and 3 on two observations, the post-test 2 and post-test 3 pain and functional performance scores of beauticians were negatively correlated, (-0.010, -0.245), i.e., when pain decreases functional performance increases and vice versa .

Table 1. Frequency and Percentage Distribution of Samples according to the Demographic variables

Sl. No.	Demographic variables	Frequency	Percentage (%)
1.	Age (in years)		
a.	20-25	7	23.4
b.	26-30	11	36.6
c.	31-35	9	30
d.	36-40	3	10
2.	Type of work		
a.	Full time	28	86.6
b.	Part time	2	13.4
3.	Duration of work hours		
a.	<4 hrs	-	-
b.	4-6 hrs	2	6.6
c.	6-8 hrs	24	80
d.	8-10 hrs	3	10
e.	10-12 hrs	1	3.4
4.	Duration of resting hours in between the work		
a.	<30mts	-	-
b.	½- 1 hr	20	66.6
c.	1-2 hr	8	26.6
d.	>2 hr	-	-
e.	No rest	2	6.8
5.	Types of sandals used while working		
a.	Flat sandals	11	36.6
b.	Heeled ones	-	-
c.	Bare foot/not used	19	63.4
6.	Type of sandals while walking		
a.	Flat sandals	12	40
b.	Heeled ones	18	60



7.	On medication		
a.	Pain killers	3	10
b.	Sedatives	-	-
c.	vitamin supplements	3	10
d.	Not applicable	24	80
8.	Frequency of exercise		
a.	Once a day	-	-
b.	Two to three times a day	-	-
c.	Once a week	2	6.6
d.	Occasionally	12	40
e.	Not applicable	16	53.4
9.	History of previous surgery		
a.	Ortho surgery	-	-
b.	Neuro surgery	2	6.6
c.	Any other surgeries	-	-
d.	Not applicable	28	93.4
10.	History of spinal anaesthesia		
a.	Yes	4	36.6
b.	No	26	63.4

Table 2. Bonferroni test showing Significant Difference in Pre-test and Post-test Low Back Pain scores among Beauticians

Group	(I) Time	(J) Time	Mean difference (I-J)	P
Beauticians	Pre	Post 1	1.1667	0.000
		Post 2	2.3333	0.000
		Post 3	4.0000	0.000
	Post 1	Post 2	1.1667	0.000
		Post 3	2.8333	0.000
		Post 2	1.6667	0.000

$t_{29}=2.045$, $p<0.05$, $p<0.001$ significant

Table 3. Bonferroni test showing Significant Difference in the Pre-test and Post-test Functional Performance scores among Beauticians

Group	(I) Time	(J) Time	Mean difference (I-J)	P
Beauticians	Pre	Post 1	3.8333	0.005
		Post 2	9.0333	0.000
		Post 3	16.2333	0.000
	Post 1	Post 2	5.2000	0.000
		Post 3	12.4000	0.000
		Post 2	7.2000	0.000

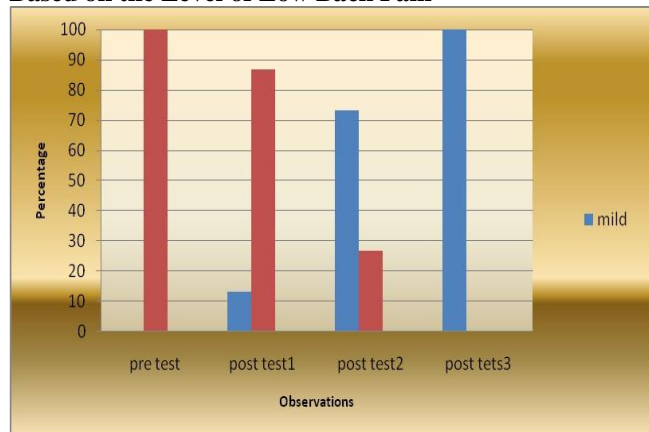
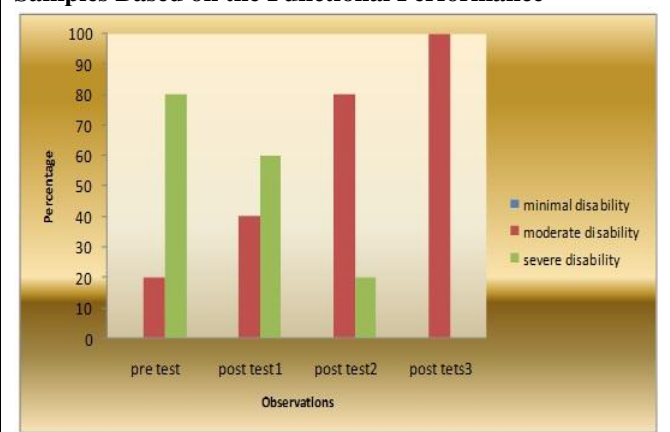
$t_{29}=2.045$, $p<0.05$, $p<0.001$ significant

Table 4. Karl Pearson's correlation coefficient showing the relationship Between the Low Back Pain and Functional Performance among Beauticians

Observations	Pain scores		Functional performance scores		r value
	Mean	SD	Mean	SD	
Pre-test	5.46	0.68	46.23	5.02	0.239
Post-test 1	4.30	0.70	42.40	4.76	0.313
Post-test 2	3.13	0.62	37.20	4.31	-0.010
Post-test 3	1.46	0.50	30.00	2.77	-0.245

$r_{28}=0.361$, $p<0.05$



Fig 1. Frequency and Percentage Distribution of Samples Based on the Level of Low Back Pain**Fig 2. Frequency and Percentage Distribution of Samples Based on the Functional Performance**

DISCUSSION

The highest percentage 11 (36.6%) of the beauticians were in the age group of 26-30 years and the least 3 (10%) of them were in the age group of 36-40 years.

The present study findings were contradicted by a cross-sectional study conducted to investigate the relationships between physical, psychosocial and individual characteristics and different end points of low back, neck, shoulder, hand/wrist and knee musculoskeletal complaints among cosmetologist in Athens, Greece in 2009, showed that majority of samples were (93%) female with a mean age of 38 years respectively [5].

In the present study majority 28 (86.6%) of samples had full time work and the least 2 (13.4%) had part time work, as most of the beauticians had their own beauty parlour. In the present study majority 24 (80%) of beauticians were working for 6 -8 hours duration and the least percentage 1 (3.4%) working for 10-12 hours. The working hours of the selected beauty parlours was between 6-8 hours taking into consideration the needs of the employees who were mainly women. Majority 20 (66.6%) of the beauticians rested for ½-1 hour and least 2 (6.8%) worked without any rest. It was observed by the investigator that afternoon resting hours is a common phenomenon in almost all the beauty parlours.

In the present study majority 19 (63.4%) of them were not using sandals (barefooted) while working and the least 11 (36.6%) of them working with flat sandals. Beauticians felt, more convenient to carry out the work with the bare foot. Majority 18(60%), of the beauticians were using heeled sandals while walking and the least 12(40%) of them were using flat sandals while walking because they considered it as a style and being the propitiators of fashion made it mandatory for them.

Majority 24(80%) of the beauticians did not any

medications, remaining 3 (10%) used pain killers and another 3 (10%) used other medication. Majority 16 (53.4%) of the beauticians were not performing any exercise and the least 2 (6.66%) of them were performing exercise once a week as they found no time and also did not feel the necessity to do exercise.

In pre-test all beauticians 30 (100%) had moderate low back pain. The present study findings are supported by a cross-sectional study conducted in Athens on musculoskeletal disorders among cosmetologists, reported that hand/wrist and low back complaints were more frequent type of musculoskeletal problems in the study sample. The study results also suggest that effective intervention strategies most likely have to take into account both ergonomic improvements and organisational aspects. This finding emphasizes the need to educate the beauticians on exercises [5]

In the present study, majority 24 (80%) of beauticians had severe disability and the least 6 (20%) of them had moderate disability. The findings of the study was supported by a cross-sectional study conducted in 2009, among individuals with chronic low back pain have a lower level, and altered pattern of physical activity compared with matched controls in Scotland. The findings of the study showed that over an average 24 hrs a days the chronic low back pain groups spent 0.7 fewer steps than the healthy controls. The conclusion was individuals with chronic low back pain have an altered pattern of physical activity compared with matched controls [6].

In the present study, the mean post-test 1 (4.33±.702), post-test 2 (3.13±.628), and post-test 3 (1.46±.507) were lower than mean pre-test pain scores (5.46±.681) and there was a significant difference between the mean pre-test and post-test scores of low back pain among beauticians [F(3,116)=2.68; p<0.05]. In



an experimental study conducted in Karnataka on effect of back strengthening exercises on nursing students showed that the mean post-test low back pain score of the subjects (2.53) was significantly lower than mean pre-test low back pain scores (4.78) and this was statistically significant ($t = 12.93$) at 0.001 [7].

In the present study, the mean post-test 1 (42.40 ± 4.76), post-test 2 (37.20 ± 4.31), post-test 3 (30 ± 2.77) functional performance scores were lower than mean pre-test (46.23 ± 5.02) functional performance scores. There was significant difference between mean pre-test and post-tests functional performance scores among beauticians [$F(3,116) = 2.68$]; $p < 0.05$. The study findings are supported by the following studies:

A study conducted in Karnataka on effect of back strengthening extension exercises among nursing students revealed that the mean post-test level of function scores (6.97) of subjects was lower than the mean pre-test level of function scores (27.70) and this is statistically significant (t value 24.459) at 0.05 level of significance [7].

In a study conducted to assess effects of two 4-week proprioceptive neuromuscular facilitation programs on muscle endurance, flexibility, and functional performance in women with chronic low back pain, multivariate analysis of variance indicated that both training groups demonstrated significant improvements in lumbar mobility (8.6%-24.1%), static and dynamic muscle endurance (23.6%-81%), and Oswestry Index (29.3%-31.8%) measurements. Static and dynamic proprioceptive neuromuscular facilitation programs may be appropriate for improving short term trunk muscle endurance and trunk mobility in people with CLBP [8].

On two observations, the post-test 2 and post-test 3 pain and functional performance scores of beauticians were negatively correlated with the functional performance, (-0.010, -0.245), i.e., when pain decreases functional performance increases and vice versa. There was no statistically significant correlation between the

Low Back Pain and Functional Performance among beauticians. There was negative co relation between Low Back Pain and Functional Performance among beautician in post-test 2 and 3.

The following findings are consistent with the present study findings about the relationship between low back pain and functional performance among beauticians. A study conducted to establish a co relation of self reported disability, self efficacy, physical performance, level of pain and estimates of aerobic capacity in subjects with low back pain, reveals that the disability correlated moderately with physical performance. The findings also go with the findings of another research study conducted on early prediction of chronic disability after occupational low back injury which revealed that those individuals who had back pain remained absent from their job [10].

CONCLUSIONS

The findings of the study revealed that a planned demonstration on back strengthening extension exercises was an effective strategy to improve the functional performance and to reduce low back pain among beauticians. The beauticians can practice regularly the back strengthening extension exercises and proper body mechanics during the work time which may reduce the occurrence of low back pain and also help them to improve the functional performance.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

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