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ASSESSMENT OF THE EFFECT OF SELECTED STRETCHING EXERCISES ON MAGNITUDE OF DISABILITY AMONG YOUNG ADULTS WITH LOW BACK PAIN IN SAMARU ZARIA, KADUNA STATE, NIGERIA.

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Abstract

Stretching is one of the exercise interventions widely used in low back pain management in developed nations. It encompasses a heterogeneous group of interventions ranging from general physical fitness or aerobic exercise to muscle strengthening and various types of flexibility. The study assessed the effect of selected exercises among young adults with low back pain in Samaru Zaria, Kaduna State. Twenty-five (25) young male adults met the inclusion criteria for the study. Only one group was used as an experimental and control group. Each participant participated in a structured training programme, 3 sessions a week for eight (8) weeks with each session lasting for a maximum of 60 minutes with rest intervals. Data was collected at baseline, at the 4th and 8th week into the training programme for all participants magnitude of disability was measured using the Oswestry Disability Index (ODI) of the participants, Physical characteristics measurement of age, weight, height and body mass index were taken before administering exercise training using International Society for Advancement of Kinanthropometry (ISAK) protocol. Out of twenty-five (25) participants that started the training programme, only twenty-two (22) participants completed the training measuring and therefore, only their data was analyzed using repeated measure ANOVA. The results showed that the eight (8) weeks training programme had a significant effect on the magnitude of disability ($F(2,42) = 42.412$, $P=0.000$) of the participants. The study recommended that stretching exercise should be incorporated in the management of low back pain among Yung Adults with low back pain in Samaru Zaria, Kaduna state, Nigeria.

Keywords: Resistance exercise, Low back, Yung Adults, Magnitude of pain.

Introduction

Low back pain is a global health issue with a high prevalence rate; it is one of the most frequently reported health problems affecting the adult population and is the most prevalent musculoskeletal condition in orthopaedics practice in Nigeria. A change in lifestyle from a physically active population to a sedentary lifestyle in Nigeria has led to the emergence of new disease conditions including low back pain, and also excessive farm labour and lifting of heavy loads, poor physical condition, poor sleeping position and stress may also contribute to low back pain (Eyichukwu & Ogugua, 2012).

Low back pain is regarded as one of the most common musculoskeletal complaints, with many people experiencing back pain during their lifetime (Walker, 2012). Low back pain has been classified by duration of symptoms as acute, sub-acute and chronic. Within these classifications, there is no agreement across medical health and fitness organisations for a specific duration of symptoms but generally, pain lasting less than six weeks is classified as acute, pain lasting 6 to 12 weeks is classified as sub-acute and low back pain lasting more than 12 weeks is described as chronic (Koes et al., 2010). Low back pain is related to disability and work absence and accounts for high economic costs Dayo, et al., 2015. In the majority of cases of LBP the aetiology is not clear, and the term "nonspecific" is thus Sarahiotto, et al., 2016 One possible factor in the genesis and persistence of LBP is mobility, stability and control of the lumbopelvic region (Saragiotto et al., 2016).

Exercise rehabilitation programs commonly used for patients with LBP are based on strengthening exercises or trunk stabilization Shamsi, et al., 2016. Resistance training as observed by Juan, Sánchez and Salvador (2017), had a significant effect on fitness and quality of Life in females with low-back pain. Exercise is consistently recommended in modern treatment guidelines for low back pain defining return to work as the primary treatment goal (Akhtar, Karimi, & Gilani, 2017; Miyamoto, Moura, Franco, de Oliveira, Amaral, Branco, da Silva, Lin, & Cabral, 2016) no evidence was found for the effectiveness of specific exercises in the management of chronic low back pain. Tam, Mohamed, Puteh, and Ismail (2019), stated: "It appears that the key to success is the physical activity itself, i.e. activity of any form, rather than any specific activity".

Foster, Anema, Cherkin, Chou, Cohen, Gross, Ferreira, Fritz, Koes, and Peul (2018) reported that physical exercise can be associated with improvement in functional ability where patients reported a reduction in disability from severe to moderate, and these changes were similar to those reported in drugs trials studies which have a significant impact on patient's personal independent and quality of life, and can delay or even avoid the need for surgical intervention.

Resistance exercise is one of the few proven treatments for low back pain; however, its effect is often small, and no form is clearly better than another physical activity in general is considered important for health, depression, and pain experience, and exercise is recommended and widely used in low back pain management in many developed countries of the world (Alzahrani, Mackey, Stamatakis, Pinheiro, Wicks, & Shirley, 2019).

However, low back pain is one of the health problems in Samaru Zaria Kaduna state, Nigeria where young adults who are mostly self-employed, farmers and students often complain of pain, tiredness, discomfort, and difficulty in bending, carrying, standing and walking.

Purpose of the Study

The main purpose of the study was to assess the effect of selected stretching exercises on magnitude disability among young adults with low back pain in Samaru Zaria, Kaduna State, Nigeria. The following hypothesis was formulated to guide the study:

There is no significant effect of stretching exercises on the magnitude of disability of adults with low back pain in Samaru Zaria, Kaduna state Nigeria.

Materials and Methods

Repeated measures of experimental research design was used in this study. A total of twenty-five (25) participants were selected as a sample size for this study, the participants were drawn from the clinic record through a purposive sampling technique. This is because only young male adults, who complained of low back and met the inclusion criteria for this study, were used as participants. Three (3) participants were dropped during the cause of the training as a result of inconsistency. According to Dikmen and Tuncer (2018), a minimum of twenty (20) and a maximum of thirty (30) participants for experimental research would produce desirable effects. Therefore, for this study, only twenty-two (22) participants were used, who were identified with low back pain through the use of a self-administered questionnaire that sought information on the respondents' demographic profile, history and pattern of back pain, perceived risk factors and mode of treatment. The measurement of the magnitude of disability was taken by the Oswestry disability index (ODI).

The training programme was conducted three times a week at Ahmadu Bello University Gymnasium Zaria on alternate days (Tuesdays, Thursdays and Saturdays) for 8 weeks. According to Boucher, Preuss, Henry, Dumas, and Larivière (2016), stated that both short-term and long-term exercises, offer numerous health benefits, after one session, an individual may notice some physical and psychological changes within four weeks.

The exercise instructor demonstrated the exercises to the subjects on their first day while they watched and joined later. The exercises were carried out in groups to make it more interesting. Each exercise session began with a 10-minute warm-up comprising brisk walking and jogging. The main exercise workout includes exercise to the back muscles, muscles of the lower extremities and abdominal muscles. Stretches to exercised muscles were done as warm-down exercises. Each exercise session lasted for 60 minutes with 5 minutes rest after every 20 minutes of workout.

Each participant, participated in warm-up for 5 to 10 minutes, using brisk walking, jogging, single knee pull, double knee pull and seated pike stretch with a training intensity of 50% – 60% low maximum heart rate determined by placing a hand on the radial artery and was taken for sixty (60) seconds using the manual or direct method. The aim was to prepare the subjects physically for the main exercises and allow blood to pump to all the muscles needed for the main workout. The intensity will gradually increase to 50% - 60% from week 5 (Heyward & Gibson, 2012).

The resistance training was taken using body weight for stretching and strengthening of the muscles of the spine (erector spinea) and abdomen (rectus abdominis, oblique absominiis, transverse abdominis) including the hip extensors (gluteal maximus) and flexors (Iliopsoas), and the quadriceps femoris. These exercises included prone trunk raises, prone alternate arm/leg lifts, double knee pulls and seated pike stretches.

The data collected for this research was analysed using Statistical Package for Social Science (SPSS) version 21. The descriptive statistics of mean, standard deviation and range of scores were used to calculate the average range of pain for each participant. A repeated measure analysis of variance (ANOVA) was used to evaluate whether a significant change occurred between the pre-test, 4^{th} week and 8^{th} week on the magnitude of disability of the participants. Where the result of the repeated measure analysis of variance (ANOVA) gave a significant result, the Bonfer roni pairwise comparison *post hoc test* was used to determine which time pair(s) gave results that were significantly different. An alpha level was set at 0.05 for all statistical analyses.

Results

Table 1: Demographic Information of Participants

Demography	Frequency	Percentage (%)	Mean	Std. Dev.
Age			28.9	3.8
20 - 25 years	4	18.2		
26 - 30 years	10	45.5		
31 - 35 years	8	36.4		
Occupation			NA	NA
Farmer	8	36.4		
Self-employed	14	63.6		
Weight			49.16	4.71
40 - 45kg	5	22.7		
46 - 50kg	9	40.9		
51 - 55kg	6	27.3		
56 - 60kg	2	9.1		
Height			1.64	0.08
1.50 - 1.60m	7	31.8		
1.61 - 1.70m	10	45.5		
1.71 - 1.80m	5	22.7		
BMI			26.79	4.30
<18.5 BMI	2	9.1		
18.5 - 24.9 BMI	2	9.1		
25.0 - 29.9 BMI	15	68.2		
30.0 - 34.9 BMI	3	13.6		
Total	**22**	**100.0**	**NA**	**NA**

Key: Std. Dev. = Standard Deviation, NA = Not Applicable

Table 1 shows the demographic characteristics of the participants. The demographic information collected from the participants included: age, occupation, height, weight, and body mass index of the participants.

Table 2 Mean and Standard Deviation of Weekly Average Magnitude Disability of Respondents

Magnitude of disability	Mean	Std. Deviation
Week 0	3.09	0.811
Week 4	2.41	0.666
Week 8	1.68	0.716

The variables were tested for all participants at baseline, at 4th week and 8th week of the exercise programme. The results of the tests were analysed using descriptive statistics of mean and standard deviation. The descriptive statistics of the variable are presented in Table 2.

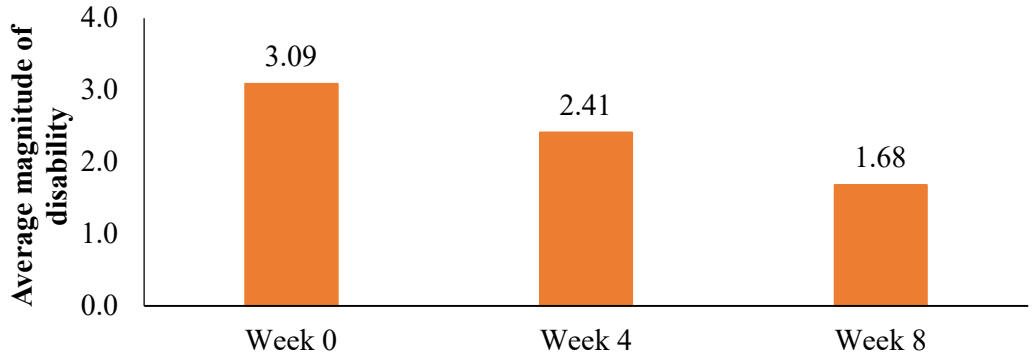


Figure 1: Average magnitude of disability of participants

- A repeated measures analysis of variance was carried out at a 95% confidence level to test the null hypothesis which states that resistance training has no significant effect on the magnitude of disability of the participants. The result (Table 3), $F(2, 42) = 42.412$, $p < 0.001$ shows that resistance training does have a significant effect on the magnitude of disability of the participants, table 2.

Table 3: ANOVA Table for Participants' Magnitude of Disability Output

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Disability	Sphericity Assumed	21.848	2	10.924	42.412	0.000
	Greenhouse-Geisser	21.848	1.752	12.469	42.412	0.000
	Huynh-Feldt	21.848	1.899	11.506	42.412	0.000
	Lower-bound	21.848	1.000	21.848	42.412	0.000
Error(Disability)	Sphericity Assumed	10.818	42	0.258		
	Greenhouse-Geisser	10.818	36.797	0.294		
	Huynh-Feldt	10.818	39.877	0.271		
	Lower-bound	10.818	21.000	0.515		

A Bonferroni post hoc test was carried out to determine the periods in which the participants' magnitude of disability significantly changed. The result (table 4) revealed that the average magnitude of disability of 3.09 ± 0.811 at week 0 significantly reduced to 2.41 ± 0.666 ($p = 0.001$) by week 4. The magnitude of disability then further decreased to 1.68 ± 0.716 ($p < 0.001$) by week 8. It is therefore concluded that resistance training does have a significant on reducing the magnitude of disability of the participants over eight weeks.

Table 4. Bonferroni post hoc pairwise comparisons test for the magnitude of disability

(I) Disability	(J) Disability	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Week 0	Week 4	0.682*	0.153	0.001	0.285	1.079
	Week 8	1.409*	0.126	0.000	1.082	1.736
Week 4	Week 0	-0.682*	0.153	0.001	-1.079	-0.285
	Week 8	0.727*	0.176	0.001	0.269	1.186
Week 8	Week 0	-1.409*	0.126	0.000	-1.736	-1.082
	Week 4	-0.727*	0.176	0.001	-1.186	-0.269

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b Adjustment for multiple comparisons: Bonferroni

Discussion

Low back pain is related to disability and work absence and accounts for high economic costs. Exercise rehabilitation programmes were used for patients with LBP, and the exercises were based on stretching exercises or trunk stabilization (Shamsi et al., 2016). The results of this study showed that eight (8) weeks of stretching exercises had a significant effect on the magnitude of disability among young adults with low back pain in Samaru Zaria, Kaduna State, Oswetry disability index was used to measure the disability of the participants at baseline, within and after training. The result revealed that stretching exercises had a significant effect on the magnitude of disability of the participants (p ⁻= 0.001). Juan, Sánchez and Salvador (2017), in experimental research on the effects of functional resistance training on fitness and quality of Life in females with low-back pain, observed a significant effect on fitness and quality of Life in females with low back pain after 12 weeks of resistance training. Chan, Adnan, and Azmi (2019) assessed the effect of stretching exercises on the pain and disability of individuals with chronic low back pain, and the result revealed that there was a significant reduction in pain and disability, and 89% of participants considered their pain intensity and functional disability acceptable after six (6) weeks programme of resistance exercises. Foster et al. (2018) reported that physical exercise can be associated with improvement in functional ability where patients reported a reduction in disability from severe to moderate, and these changes were similar to those reported in drug trials studies which have a significant impact on patients' personal independent and quality of life, and can delay or even avoid need for surgical intervention. Tam et al. (2019), revealed that individually designed stretching or resistance exercises delivered with supervision may reduce pain and disability of low back pain after eight weeks of resistance exercise.

Conclusion

Based on the findings of the study, it was concluded that eight (8) weeks of stretching exercise reduce the magnitude of disability among young adults with low back pain.

Recommendations

Based on this conclusion, it is, therefore, recommended that Resistance training should be incorporated in the management of low back pain among Young Adults with low back pain in Samaru Zaria, Kaduna state, Nigeria.

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