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## Effects of non-steroidal anti-inflammatory drugs (NSAIDS) aerobic exercise and combination therapy in the management of low-back pain in Kano metropolis Kano Nigeria

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### Abstract

This study investigated the effects of NSAIDS, Aerobic exercise and combination (NSAID & Aerobic Exercise) therapy in the management of low back pain (LBP) Quasi experimental of counter balance design was used in this study. The instruments used for data collection include; cycle ergometer, visual analogue scale, physician weighing scale, stop watch and height meter. Population of the study comprises patients with primary LBP referred to physiotherapy departments of Murtala Muhammed Specialists Hospital, Abdullahi Wasai Specialist Hospital, mohammed Sir Sunusi Specialist Hospital. Thirty patients with primary LBP were selected through stratified random sampling techniques, in each stratum ten (10) patients were selected. One major hypothesis and four sub-hypotheses were formulated. Each hospital was considered as a stratum and the patients selected in each stratum was a treatment group. Those in the aerobic exercise group were subjected to eight (8) weeks aerobic exercise of 30minutes continues cycle ergometer exercise at 50% maximal heart rate, and cool down of 5-10minutes, for 3-days per week. The NSAID group continued with their drugs but were advised to stick to their physician prescription (Ibuprofen 400mg bd X 8/52). While the combined group were subjected to both aerobic exercise and drugs for eight weeks. Description statistic (mean and standard deviation) were used to organize the data collected on the patients physical and performance characteristics. The difference between pre and post treatment values were analyzed using student t-test. One way analysis of variance (ANOVA) was used to test for significant difference among the three group management strategies. Scheffe post hock test was used to locate the point of difference. Result indicated that combine therapy had large treatment effect on the management of LBP, this is followed by aerobic exercise and lastly by NSAIDs. It was therefore recommended that combined therapy of NSAID and aerobic exercise should be the preferred option in the treatment and management of LBP.

**Keywords:** Anti-inflammatory drugs, aerobic exercise, combination therapy

### Introduction

Low Back Pain (LBP) is defined as a pain localized between the 12<sup>th</sup> rib and the inferior gluteal folds with or without leg pain it can be classified as 'specific' (suspected pathological cause) or nonspecific. Epidemiological studies continue to provide insight into the prevalence of LBP and have identified many individuals, psychosocial and occupational risk factors for its onset. The most frequently reported risk factors are heavy physical work frequent bending, twisting, lifting pulling and pushing, repetitive work, static posture and vibrations. Historically L.B.P. has taken up large part of primary care practice. It has been the second leading cause of office visit to primary care physicians, and the most common reason for office visit to occupational medicine physicians, orthopedic surgeons and Neuro surgeons.

Low Back Pain constitute important public health problem developing and industrialized Nations.

Low Back Pain is now assuming an epidemic proportions. Also he estimated that up to 80% of people are affected by the symptom of some time in their live. He also observed that LBP is the main reason for which people under 45years of age limit their physical activities, the 2<sup>nd</sup> leading symptomatic cause of physician visits, the third most common cause for surgical procedures and the fifth most common reason for hospitalization.

Fortunately, only a little percentage (10-20%) of these patients developed chronic Low Back Pain, which is defined as the in and disability persisting for more than 3months.

Non-steroidal anti-inflammatory drugs (NSAIDs) are the most frequently prescribed medication worldwide and are widely used for patient with LBP. The effectiveness of NSAIDs in the management of LBP is widely reported in literature. The rationale for the treatment of Low Back Pain with NSAIDs is based both on their analgesic potential and anti-inflammatory action. NSAIDs are considered the mainstay of pharmacological treatment of L.B.P. Aerobic fitness is highly associated with overall fitness and weight management, the importance of aerobic exercise is to help reduce L.B.P. is signified, through conclusive evidence of any proactive role is incomplete. Also the exact mechanism for reducing pain with aerobic exercise is not clear, since the intensity of muscular contractions is not considered intense enough to strengthen the muscles.

Aerobic exercise is one of the physical therapy interventions for L.B.P. and numerous studies have examined its effectiveness in the management of L.B.P. most of these studies asserted that aerobic exercise is effective for relief of pain and prevention of disability especially in the acute stage of the L.B.P.. however, there is no conclusive evidence as to which one is more effective between NSAIDs and aerobic exercise in the management of L.B.P. and there is also paucity of information regarding the effectiveness of the combination NSAIDs and aerobic exercise. This research is therefore undertaken to investigate the effect of NSAIDs alone, aerobic exercise and the combination of NSAIDs and aerobic exercise in the management of L.B.P.

### Methodology

The design used in this study Quasi experimental of counter balance where there is no control group and the participants are in three groups, each group receiving different treatment and post treatment test. The population of this study comprises of patients referred to the physiotherapy outpatient clinic of Murtala Mohammed Specialist Hospital, Abdullahi Wase Specialist hospital and Sir Sunusi General Hospital with primary cases of low back pain. Thirty (30) participants were selected for the study through stratified random sampling. Ten in each of the three treatment group that is, ten subjects in the NSAIDs group those that are on drug only, while 10 subject in the Aerobic exercise and the remaining 10 subjects in the combination of both and NSAIDs drug and the aerobic exercise purpose and procedure of the study were thoroughly explained to the participants after which informed consent was obtained from them. They were also informed that they reserve the right to withdraw from the study any time without retribution.

### Anthropometric measurement

Participant's height were measured using the methods of ISAK 2001. Subjects stood bare-footed with feet together on a level cemented floor, the upper back, buttocks and heels touching the wall, the head held erect, and the eyes looking forward so that the lower margin of the bony orbit and the upper margin of the external auditory canal opening were in the Frankfurt horizontal plane. The point of the greatest height to the nearest 0.1 cm was then marked off on the wall with flexible steel tape. The weights were measured using a portable physicians scale with provision for calibration. The weights were recorded to the nearest 0.5kg, participant's body mass index (BMI) was derived as a ratio of their weight (Kg) to height (in meters squared kg/m<sup>2</sup>) according to Franks. Visual analogue scale is for rating of pains as perceived by patients

and begins from a point of 0 indicating no pain (i.e. absence of pain) to 100mm indicating maximal level of pain with no calibrations. Participants were assessed on the extent of the pain perceived due to low back pain pre and post intervention by adopting the Roland-Morris Disability Questionnaire (RMDQ). The questionnaire centered on disabilities associated with the discomfort associated with the presence of L.B.P. it was administered to individual patients for them to indicate low discomforting is their pain prior to enrolment into the intervention programme and subsequently post intervention.

### Training programme

Aerobic exercise training group were measure to obtain their baseline score prior to the commencement of the aerobic exercise. Three bicycle ergometers with the same Trajan Bach NO (EK234 (100) were used. Three patients exercised consecutively on the ergometer with the intensity of 50%-70% heart rate at 90RPM/HR. each participant attended three session weekly. The procedures for each aerobic exercise are as follows: 5minutes general warm up exercise which involves the whole body stretching and low impact aerobic exercise. 30 minutes aerobic exercise on cycle ergometer at maximal heart rate of 90RPM/HR. 5 minutes cool down exercise that involve stretching and relaxation exercises. This procedures lasted for 8wks.

### NSAID group (NOG)

This group received non-steroidal anti-inflammatory drug according to the recommended dosage by the physician. Participants were motivated to adhere strictly to their medication as prescribed for 8weeks. At the end of eight weeks posttest measurements were conducted to evaluate the effect of drug used. These were obtained from responses from the questionnaire given to them and the visual analog scale combined therapy.

### Exercise & NSAIDs Group (COTG)

In this category, participants received both aerobic exercise and NSAID following similar protocol in the exercise group for the same length of time (8weeks) three times in a week. Both pretest and posttest measurement were recorded. Before the commencement of the training programme, a pilot test was conducted using 15 patients of the same age bracket with the participants in the study. Result indicated positive correlation coefficients for all measurements (0.769 to 0.995) the rationale for the pilot test was to refine test administration procedures and determine the precision of the instruments to be used for data collection.

### Statistical analysis

Participant's data were analyzed using both descriptive and inferential statistics. The demographic characteristics of participants were expressed using frequency percentage, mean and standard deviation. The difference between baseline and outcome within each group, was obtained using student's t-test in determining significant difference in the effectiveness among groups one-way analysis of variance (ANOVA) was used. All analyses were performed using statistical package for social science (SPSS version 15) at the probability level of 0.05.

### Results

**Table 1:** physical and performance characteristics of participants

Variance	n=30 mean	±SD	Range	(min)	(Max)
Age	45.70	±17.49		17.00	- 67.00
Height (M)	1.67	±.09		1.53	- 1.85
Weight (kg)	56.79	±6.71		46.00	- 68.00
BMI (kg/m <sup>2</sup> )	24.60	±5.05			
Combination therapy	27.00	±9.49		10.00	- 40.00
Aerobic therapy	51.00	±11.97		40.00	- 80.00
NSAIDS	77.00	±20.58		50.00	- 100.00

The physical characteristics and performance outcomes of the participants indicated that participants were within the same range of physical characteristics. There was also wild variations in the performance of the participants. There is an

indication from the result that combined therapy was highly affected by the intervention followed by aerobic exercise and lastly NSAIDs group

**Table 2:** t-test summary on the effect of NSAIDs in the management of Low Back Pain (LBP)

NSAIDS	N	X	SD	Se	df	t	Prob.
Source of variation							
Pre test	10	79.00	12.87	4.6	9	6.00	0.001
Post test	10	51.00	11.97				

T=6.00, 9 P<0.05

The result of the paired sample t-test indicates that the mean of post test scores (51.00) when compared with mean of

pretest mean score (70.00) has significantly reduced that is, the level of LBP has reduce as a result of the NSAIDS.

**Table 3:** t-test summary on the significant difference between pre and posttests scoreson the effect of aerobic exercise in the management of LBP

Aerobic exercise	N	X	SD	Se	df	T	Prob.
Source of variation							
Pre test	10	93.00	9.49	4.0	9	4.00	0.003
Post test	10	77.00	20.58				

T=6.00, 9 P<0.05

The intervention of aerobic exerice has reuced the figure in fore-test scores from (93.00) to (77.00) in the post test scores; showing that there is significant difference in the two

different scores respectively. The implications of this differences is showing the effectiveness of aerobic exercise in the management of L.B.P.

**Table 4:** t-test summary on the effect of combination therapy in the management of LBP

Combination therapy	N	X	SD	Se	df	t	Prob.
Source of variation							
Pre test	10	89.00	11.97	5.1	9	12.11	0.001
Post test	10	27.00	9.49				

T (12.11, df 9) P<0.05

The mean of the post test score (27) of combine therapy shows statistical significance 9t=12.11, df 9), P<0.05) lower

than the pre-test mean score (89.00).

**Table 5:** ANOVA summary on the effect of three management strategies (NSAIDS, exercise and combination therapy in the treatment of LBP

Source of variation	Sum of square	Df	Mean square	F=ratio	Pro
Between groups	12506.67	2	6253.33	28.57	0.01
Within groups	5910.00	27	218.89		
Total	18416.67	29			

The table indicated significant at F (2, 27) = 28.57, P<0.05) showing that significant differences exist among the three strategies used the

treatment and management of low back pain.

**Table 6:** post HOCsheffe test on the effect of three managemet strategies in the treatment of LBP

Independent i	Dependent J	Mean differences i-j	Sign
NSAIDS	Aerobic exercises	-26.000*	0.002
	Combination therapy	-24.000*	0.005
Aerobic Exercise	NSAIDS	26.000*	0.002
	Combination therapy	50.000*	0.000
Combination therapy	NSAIDS	24.000*	0.005
	Aerobic exercises	50.000*	0.001

The post hoc sheffee analysis shown above indicated significant difference exists among the three management techniques, but stronger statistical significance was between combination therapy and aerobic exercise.

### Discussion

The findings of the research work indicated that each individual therapy demonstrated better post-treatment effect on L.B.P. management but the combined therapy depicted better outcomes of the variables individualized treatment strategies. This result of the intervention NSAIDs indicated its efficacy in managing and treating LBP as supported by who carried out similar research using NSAIDs on patients with acute low back pain. The significant effect of NSAIDs in this study may be attributed to their effectiveness as pain killer”, a mechanism which has been supported and proven pharmacologically.

The result of the study further revealed that aerobic exercise was found to be statistically significant in managing and treating LBP patients. This is in line with the study of Paup, who reported low to moderate aerobic exercises improve mood state, work status and reduce and need for physical therapy. This finding is also supported by the research work of Wai 2008 & Van Tulder *et al.*, 2000) <sup>[2, 1]</sup> whose work in aerobic exercise has proven effectiveness in the management of LBP

The combination therapy going by the outcome of this study depicted significant effect on the management and treatment in patients with LBP. This is in agreement with the work of Chertin, Sherman, who found out in their study that combination therapy produce more significant effect in management of LBP than the individual therapy.

From all indications the best option in the management of LBP is the combination therapy which was found out to yield better outcomes in terms of patient functional ability and relieve of pain.

### Conclusion

Based on the findings of this study for effective result in the treatment and management of LBP Aerobic exercise on bicycle ergometer and NSAIDs therapy have their individual effect in managing LBP, however the most effective therapy was the found to be the combination of both therapies with which yielded better outcomes in term of LBP patient functionality ability and relieve of pain.

### Recommendation

From the findings of this study, it was observed that combination of aerobic exercise and NSAIDs therapies have beneficially improve the functional ability and reduce pain of LBP patients: it is therefore recommended that both physiotherapists and other health care providers include aerobic exercise in their usually NSAIDs modification for better efficacy.

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