



# Effect of Stabilization Exercise on Pain and Quality of Life of Patients with Non-specific Chronic Low Back Pain

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## **SUMMARY**

Patients with chronic low back pain have lower quality of life compared to patients with other chronic diseases and the general population. This study was designed to assess the effect of stabilization exercises on the quality of life of patients with non-specific chronic low back pain (NSCLBP).

A total of 23 patients with NSCLBP, aged 27-65 years, participated in this study. They were recruited from the Orthopaedic Clinic of Lagos University Teaching Hospital (LUTH), Lagos, Nigeria. They were put through core stabilization exercises twice weekly for 4 consecutive weeks and assessed with the World Health Organization Quality of Life (WHO QoL) questionnaire and Verbal Rating Scale (VRS) at baseline and at four weeks post-treatment intervention. Ethical approval was sought and obtained from the Health Research and Ethics Committee of LUTH. Data was analysed using the Statistical Package for Social Science (SPSS) version 17, and the level of significance was set at  $p < 0.05$ .

Patients recorded significant reduction in pain severity following intervention ( $p = 0.01$ ). There was also significant improvement in the quality of life domains (psychological health and social relationship) ( $p = 0.01$ ) post intervention, and only age correlated directly with social relationship of the quality of life domain ( $r = 0.59$ ,  $p = 0.01$ ).

This study concluded that stabilization exercises reduced pain and improved the psychological health as well as social relationship domains of the quality of life of patients with non-specific chronic low back pain.

**KEY WORDS:** stabilization, quality of life, non-specific low back pain

## **INTRODUCTION**

Low back pain (LBP) is a major health problem which affects up to 80% of the adult population (Walker et al, 2004) and accounts for considerable healthcare and socio-economic costs (Gray and Maniadakis, 2000), while non-specific low back pain (NSLBP) accounts for about 85% of LBP in patients seen in primary health care settings (Deyo and Philips, 1996).

Patients suffer physical disabilities and psychological distress concurrently with low back pain (Bogduk, 2014). Waddell et al. (1996) described chronic low back pain (CLBP) as a 21st century epidemic. The prognosis of acute NSLBP is relatively favourable as a significant percentage

of sufferers; probably over 50%, do not consult a healthcare professional for the problem because it resolves on its own (Waxman et al., 1998). However, in a small group of acute patients, the problem fails to resolve as it should. Perhaps 10% go on to develop chronic, disabling LBP (Klenerman et al., 1995; Carey et al., 2000). This disability of patients with CLBP is predicted by pain duration, and the quality of life of such patients is predicted by disability (Kovacs et al., 2005).

Back pain affects the quality of life of its sufferers, particularly with regard to enjoyment of leisure-time activities (Heliovaara et al., 1989), reduction in work production output, difficulty in performing household

chores (Lamers et al., 2005), sporting activities (Duquesnoy et al., 1998).

Stabilization exercise is aimed at protecting and supporting the spinal segment from re-injury by re-establishing and enhancing muscle control to compensate for any loss of muscle action caused by injury or degenerative changes (Richardson et al., 1999). Gatti et al. (2011) reported that stabilization exercise was found to be effective in reducing disability in patients with CLBP. It was also concluded, in a study by Akodu et al. (2015), that stabilization exercise is effective in the reduction of pain and improvement of functional disability in patients with NSCLBP. In another study by Akodu et al. (2013), it was established that stabilization exercise is effective in increasing the cross-sectional area of the lumbar multifidus muscle, which is one of the muscles needed to maintain proper stability of the spine.

This study was however designed to assess the effect of stabilization exercise on pain and the quality of life of patients with NSCLBP.

## MATERIALS AND METHODS

### Participants

A total of 30 patients (16 males and 14 females) with NSCLBP were recruited for this study from Lagos University Teaching Hospital, Idi-Araba. All the patients included in the study were subjects with a history of NSCLBP with or without pain radiating to one or both lower limbs, and whose clinical assessment indicated that they were suitable for stabilization exercise training. Excluded from the study were: patients confirmed to be pregnant, and patients with specific LBP or with medical or surgical conditions that might hinder exercise performance.

### Procedure for Data Collection

Prior to the commencement of the study, the demographic data of the patients were obtained, such as age, gender, weight, height, occupation, marital status, clinical history of LBP and number of LBP episodes during the 12 months prior to the study. Baseline assessment of pain and quality of life using the verbal rating scale (VRS) and the World Health Organization Quality of Life questionnaire was conducted. The subjects gave their consent by filling an informed consent form. Ethical approval was sought and obtained from the Health Research and Ethics Committee of Lagos University Teaching Hospital, Idi-Araba, Lagos.

Out of the 30 patients, 5 were found ineligible for the study after screening and were therefore excluded. However, only 23 patients (12 males and 11 females) completed the study; two patients did not complete due to illness.

Subjects went through the stabilization exercise protocol twice weekly for 4 consecutive weeks.

### Stabilization Exercise Protocol

**Abdominal bracing:** Subjects were instructed in supine lying position to perform drawing-in manoeuvre of the abdomen, holding it for 8 seconds, doing 30 repetitions.

**Bracing with heel slides:** Subjects were instructed in supine lying to perform drawing-in manoeuvre of the abdomen, holding it for 8 seconds, doing 20 repetitions with sliding of each heel for 4 seconds.

**Bracing with bridging:** Subjects were instructed in supine lying to perform drawing-in manoeuvre of the abdomen, gently raising the buttocks from the supporting surface and holding it for 8 seconds, doing 30 repetitions.

**Bracing with leg lift:** Subjects were instructed in supine lying position to perform drawing-in manoeuvre of the abdomen, holding it while raising each leg for 4 seconds, doing 20 repetitions.

**Bracing with bridging and leg lift:** Subjects were instructed in supine lying to perform drawing-in manoeuvre of the abdomen while gently raising the buttocks from the supporting surface, holding this position while raising each leg for 8 seconds, doing 30 repetitions.

**Bracing with standing:** Subjects were instructed while standing to perform drawing-in manoeuvre of the abdomen for 8 seconds, doing 30 repetitions.

**Quadruped arm lift with bracing (one upper limb flexed):** Subjects were instructed, while in prone kneeling position to perform drawing-in manoeuvre of the abdomen for 8 seconds, with one upper limb flexed, doing 30 repetitions.

**Quadruped leg lift with bracing (one lower limb is extended and lifted off the supporting surface):** Subjects were instructed, while in prone kneeling position, to perform the drawing-in manoeuvre of the abdomen with one lower limb flexed for 8 seconds, doing 30 repetitions.

**Quadruped alternate arm and leg lift with bracing (contralateral upper and lower limbs are extended alternately):** Subjects were instructed, while in prone kneeling position, to perform the drawing-in manoeuvre of

the abdomen with contralateral upper and lower limbs extended alternately for 8 seconds, doing 30 repetitions (Hicks et al., 2005).

Pain and quality of life assessments were conducted at baseline and at the end of 4 weeks post exercise.

**Data Analysis**

The data collected was analysed using SPSS version 17 and was summarized with the descriptive statistics of frequency, mean, standard deviation, and range. Inferential statistics of Chi-square and Wilcoxon’s signed rank test were used to compare variables. Results are presented in tables and pie charts. The level of significance of this study was set at  $p < 0.05$ .

**RESULTS**

A total of 23 patients with non-specific chronic low back pain (NSCLBP) participated in the study. They comprised 12 (52.2%) males and 11 (47.8%) females, with mean age of  $42.30 \pm 12.60$ , weight of  $76.22 \pm 9.59$  kg, height of  $1.70 \pm 0.43$ m, and a BMI of  $26.31 \pm 2.95$ kg/m<sup>2</sup>.

**Baseline and 4 Weeks (Post Exercise) Quality of Life Assessment of the Subjects**

The parameters of quality of life (QOL) domains that showed statistically significant differences pre- and post-treatment intervention were psychological stress ( $P = 0.01$ ) and social relationships ( $P = 0.01$ ) (table1).

**Table 1.** Baseline (pre) and 4 weeks (post) quality of life assessment of the subjects

QOL	Pre-treatment (Baseline) Mean ± SD	Post-treatment (After 4 weeks) Mean ± SD	Z -value	P-value
Domain 1 (Physical Health)	56.23 ± 14.63	56.39 ± 7.27	0.21	0.83
Domain 2 (Psychological)	64.35 ± 14.26	72.17 ± 11.48	3.63	0.01*
Domain 3 (Social relationships)	52.46 ± 9.70	62.61 ± 11.32	3.65	0.01*
Domain 4 (Environment)	60.87 ± 11.52	63.04 ± 10.33	2.74	0.06

\*Significant at  $p < 0.05$

Key: Z value= Wilcoxon’s signed rank test ; SD= standard deviation; QOL= Quality of Life

**Correlation of Physical Characteristics and Post Treatment (4 Weeks) Assessment of the Subjects’ Quality of Life Domains**

The physical characteristics of the subjects which include age, height, BMI, and weight, were correlated with post-treatment assessment of quality of life domains. Only age ( $p = 0.01$ ) showed a statistically significant relationship on correlation with domain 3 (social relationships). The other physical characteristics (weight, height, BMI) did not show any statistically significant relationship on correlation with each parameter of the post-treatment assessment of quality of life domains (psychological, social relationships, and environment) (table 2).

**Table 2.** Correlation between physical characteristics and quality of life domains

	Correlations	Domain1 post	Domain2 post	Domain3 post	Domain4 post
Age	R	0.30	0.21	0.59	0.29
	P- value	0.89	0.34	0.01*	0.17
Weight	R	0.16	1.92	0.01	0.21
	P- value	0.46	0.38	0.99	0.33
Height	R	0.01	0.17	0.19	0.20
	P- value	0.99	0.45	0.40	0.93
BMI	R	0.14	0.13	0.09	0.22
	P- value	0.54	0.55	0.70	0.31

\*Significant at  $p < 0.05$

Key: r: Pearson’s correlation coefficient

Domain 1: Physical health; Domain 2: Psychological; Domain 3: Social relationships; Domain 4: Environment

BMI : Body mass index

**Baseline and 4 Weeks (Post Exercise) Pain Assessment of the Subjects**

Pain intensity ranged from 4 to 10 at baseline with a mean of  $5.78 \pm 1.68$ , while at the end of 4 weeks, pain intensity ranged from 0-9 with a mean of  $2.26 \pm 2.28$ . The result showed a significant difference ( $p = 0.01$ ) between the VRS at baseline and after 4 weeks post- intervention assessment (table 3).

**Table 3.** Baseline and 4 weeks (post exercise) pain assessment of the subjects

		Mean ± SD	T	P-value
Pain Intensity	Pre-treatment	5.78 ± 1.68	11.47	0.01*
	Post-treatment	2.26 ± 2.28		

\*Significant at  $p < 0.05$

### Correlation Between Pain and Post Intervention Assessment of Quality of Life Domains of the Subjects

There was a statistically significant difference between pain and domain three (social relationships), post treatment (4 weeks) assessment of quality of life ( $p < 0.05$ ).

**Table 4.** Correlation between pain and quality of life domains

Correlation	Domain 1	Domain 2	Domain 3	Domain 4
PAIN R	0.22	0.40	0.50	0.07
p- value	0.30	0.06	0.02*	0.73

\*Significant at  $p < 0.05$

Key:

r : Pearson's correlation coefficient

Domain 1: Physical health; Domain 2: Psychological; Domain 3: Social relationships; Domain 4: Environment

### DISCUSSION

There was a significant reduction in pain severity between the pre and post-intervention period for the subjects in this study. This supports the result of the study by Akodu et al. (2015), who reported that stabilization exercise alone is effective for reducing pain in non-specific chronic low-back pain patients.

According to the result of this study, there was a statistically significant difference in the psychological aspects of the quality of life of the subjects as well as social status. This improvement could be as a result of the pain reduction ability of the stabilization exercises following proper adherence to the stabilization exercise protocols for four weeks, and the general relaxation effect that follows exercises. This result agrees with the study of Moussouli et al. (2014) who studied the effects of stabilization exercises on health-related quality of life in women with chronic low-back pain for four weeks. They concluded that stabilization exercises improved the quality of life of the subjects studied. It is also in support of the result of the study by Horng et al. (2005) and Schiphorst et al. (2008) who reported that psychological factor and functional status seem to determine quality of life in chronic low-back pain patients.

This study showed a statistically significant relationship between the ages of the subjects and post-treatment (4 weeks) QOL domain 3 (social relationships). This could be as a result of re-establishment of the normal control of the deep spinal muscles which must have been lost due to the increasing age of the patients following degenerative changes. This is in agreement with the findings of the study by Ogunlana et al. (2012) that increasing age adversely

affects the health-related quality of life of low-back pain patients.

The findings of this study showed a statistically significant difference between pain and social relationships (quality of life domain 3). This could be the result of an increase in the psychological aspect of the patients QOL. This agrees with the findings of a study by Majtas and Liscacova (2007) that there is a link between pain relief from effective use of analgesia and improvement in several QOL domains, most notably improvement in social functioning.

### CONCLUSION

This study established that stabilization exercises reduced pain and improved psychological health as well as the social relationship domains of the quality of life of patients with non-specific chronic low back pain.

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