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RESEARCH ARTICLE

GENDER DIFFERENCE IN OCCUPATIONAL PERFORMANCE, QUALITY OF LIFE AND TRUNK MUSCLE ENDURANCE IN PHYSICAL THERAPISTS WITH LOW BACK PAIN.

Salma E Ahmad¹, Ebtessam F Gomaa², Nadia A Fayaz² and Ahmad H Azzam³.

1. Physical therapist at outpatient clinic of faculty of physical therapy, cairo university, giza, egypt.
2. Department of physical therapy for musculoskeletal disorders and its surgery, faculty of physical therapy, cairo university, giza, egypt.
3. Department of orthopaedic surgery and traumatology, faculty of medicine, cairo university, cairo, egypt.

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Abstract

Background: Low back pain has a profound impact on work ability and quality of life. Reduced trunk muscle endurance can be a cause or a consequence of low back pain.

Objective: the purpose of this study was to examine the effect of gender on trunk muscle endurance, occupational performance, and quality of life in physical therapists with non-specific low back pain.

Study Design: descriptive, cross-sectional study in a clinical setting.

Methods: researchers recruited ninety-seven (F= 55, M= 42) physical therapists with non-specific low back pain for this study. Population's mean $\pm$ SD age and body mass index were 25.04 ± 2 years, and 24.57 ± 2.93 kg/m² respectively. Researchers assessed trunk muscle endurance using McGill and Biering-Sørensen endurance testing. They conducted a self-reported Occupational Role Performance questionnaire to assess occupational performance. Researchers used the 36-Item Short Form Health Survey to assess quality of life. They used T-test and Mann-Whitney U test to evaluate difference between genders.

Results: Trunk endurance times were significantly lower in females than in males ($p = 0.0001$). Scores of Occupational Role Performance questionnaire were significantly higher in females ($p = 0.001$), while there was a significant decrease in quality of life scores of females compared with that of males ($p = 0.001$).

Conclusion: Female Physical Therapists with non-specific low back pain have lower scores of trunk muscle endurance, occupational performance, and quality of life. Results should be considered in assessment and management approaches to improve functional ability and quality of life.

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Introduction:-

Low back pain (LBP) is one of the extremely common musculoskeletal (MSK) disorders. It affects about 80-85% of population at some time during their lives. Low back pain may occur as a result of specific or non-specific causes (Paul, 2005). Non-specific low back pain (NSLBP) is the LBP at which no firm or conclusive pathoanatomical

Corresponding Author:-Salma E Ahmad.

Address:- Physical therapist at outpatient clinic of faculty of physical therapy, cairo university, giza, egypt.

source of pain can be reliably identified (van Tulder et al., 2006). Healthcare providers are one of the occupational groups who are at risk of developing MSK disorders and LBP with a higher prevalence among physical and athletic therapists. 49% of therapists reported having LBP in the previous 12 months (Hogan et al., 2016).

One out of 6 physical therapists changed work setting or quit their job due to work-related MSK disorders (Cromie et al., 2000). Job factors, age, and gender of the physical therapist may contribute to the high prevalence of LBP. Female therapists have a higher rate of LBP incidence. (Shehab et al., 2003).

Chronic LBP has a profound impact on health-related quality of life (QoL) (Salaffi et al., 2005). It was associated with lower QoL and diminished physical and psychological well-being (Hong et al., 2014). Workers with persistent LBP showed a lower level of work performance, although many continue to perform their jobs without ability loss in spite of the persisting pain (de Vries et al., 2013).

Strength and endurance are key elements of muscle performance and functional assessment (Mannion et al., 2001). Trunk muscle endurance can be considered as a valid predictor of back health (Payne et al., 2000). There is significant evidence that reduced muscular endurance can be both a cause and a consequence of LBP (Alaranta et al., 2006). Lack of trunk endurance was associated with reduced work productivity and participation (van den Berg et al., 2009). Static and dynamic endurance training significantly improved health-related QoL in patients with chronic mechanical LBP (Mbada et al., 2014).

There is a lack of research on the gender effect on trunk endurance, occupational performance, and quality of life in patients with NSLBP. Therefore, the purpose of this study was to investigate the difference between genders in physical therapists with NSLBP.

Materials and Methods:-

Ninety-seven physical therapists with NSLBP participated in this study. Their mean $\pm$ SD age and body mass index (BMI) were 25.04 ± 2 years, and 24.57 ± 2.93 kg/m² respectively. Physical therapists who have been working for at least one year from the beginning of the work were eligible to participate in the study. The gender distribution of the study group revealed that there were 55 females with reported percentage of 57% while the number of male subjects was 42 with reported percentage of 43% of the total sample. Inclusion criteria were age limit within 22-32 years, and acceptable body weight (BMI <29.5). Exclusion criteria included refusal to participate in the study, LBP as a result of a specific spinal disease, tumor, osteoporosis, fracture, structural deformity, inflammatory disorder, radicular symptoms, or cauda equina syndrome (Cuesta-Vargas et al., 2014). Individuals who had recent trauma or major surgery, hip or knee pain, congenital abnormality, infection, any degenerative or rheumatic diseases, lower limb deformity, sacroiliac dysfunction, radicular pain or radiculopathy, obesity (BMI ≥ 30) were also excluded. Recruitment took place in different hospitals and physical therapy clinics at Cairo, Egypt. All participants signed a written informed consent and agreed with the study in advance. The study was approved by the Physical Therapy Ethical Committee of Cairo university (No: P.T.REC/012/001812).

Measurement Procedures:

All participants were familiarized with the objectives, equipment, and procedures of the study. Demographic and anthropometric data were recorded, including age, gender, weight, height, past and present history, medical treatment condition, and years of experience as a physical therapist.

Straight leg raise test (SLR) was used to rule in or out nerve root compression and radiculopathy (Magee, 2014a). If the test was positive, individual was excluded.

Gaenslen's test was used to exclude sacroiliac joint involvement (Magee, 2014b). Patrick test was used to exclude hip pain. It is both a provocative test for the sacroiliac joint and hip joints (Olson, 2016). Individuals were excluded if pain was reproduced. Passive lumbar extension test was applied to exclude lumbar instability (Olson, 2016). Test is positive when pain at the lumbar region was provoked.

Trunk Muscle Endurance:

Times were measured in seconds by a stopwatch using McGill's tests. Torso flexion was measured on a treatment table. Trunk was placed against support and flexed to 60° while both hips and knees were flexed to 90°. Both arms were crossed over the chest and feet were supported to the table using belts. Test was ended when the trunk fell

below 60° (McGill et al., 1999). Side-Bridging (side plank) had been used to test endurance of lateral trunk flexors (McGill, 1998).

Biering-Sorensen test had been used to evaluate isometric endurance of the trunk extensor muscles. This test is applied as the individual lies prone on a treatment table with the trunk unsupported in the neutral position and the arms are crossed over the chest. Belts are used to support the body at level of the buttocks and legs. Holding time is measured in seconds (Biering-Sorensen, 1984).

Occupational role performance questionnaire (ORQ) was used to assess occupational performance. It consists of 8 items to evaluate the impact of LBP on workers. It is divided into two sections: work productivity and job satisfaction. The productivity component includes 4 questions about extra work, ability to work quickly, productivity/efficacy, and quality of work. The satisfaction component includes four questions about opportunities to improve one's skills, job security, job satisfaction, and relations with co-workers. Scores are ranged between 24 (lowest occupational performance) and 0 (highest occupational performance) (Kopec and Esdaile, 1998).

The 36-Item Short Form Health Survey (SF-36) was used to assess health-related quality of life. It measures the following 8 dimensions of health: physical functioning, role limitation due to physical health, role limitations due to emotional problems, energy/fatigue, pain, social functioning, emotional well-being, and general health. Scores range from 0 to 100 with higher scores indicating greater quality of life (Ware et al., 1993).

Data Analysis:-

Descriptive statistical analyses were conducted for presentation of data. Normal distribution of data was checked using the Kolmogorov-Smirnov test for all variables. As SF-36 scores showed non normal distribution, they followed non parametric statistics.

T test was conducted for comparison of trunk muscles' endurance time and ORQ between females and males. Mann-Whitney U test was conducted for comparison of SF-36 scores between females and males. The level of significance for all statistical tests was set at $p < 0.05$. All statistical tests were performed through the statistical package for social studies (SPSS) version 22 for windows. (IBM SPSS, Chicago, IL, USA).

Results:-

There was a significant decrease in the trunk muscle endurance times in females compared with that of males. (Table 1).

Table 1:-Comparison of mean value of trunk muscle's endurance time between females and males:

Trunk muscles' endurance time (sec)	Females	Males	MD	t-value	p-value	Sig
	$\bar{X} \pm SD$	$\bar{X} \pm SD$				
Extensors	54.89 $\pm$ 12.42	79.04 $\pm$ 13.76	-24.15	-9.05	0.0001	S
Flexors	45.21 $\pm$ 16.06	78.69 $\pm$ 16.48	-33.48	-10.05	0.0001	S
Right lateral musculature	27.33 $\pm$ 8.49	47.55 $\pm$ 10.51	-20.22	-10.47	0.0001	S
Left lateral musculature	25.45 $\pm$ 9	50.41 $\pm$ 9.94	-24.96	-12.92	0.0001	S

$\bar{X}$: Mean / SD: Standard deviation/ MD: Mean difference/ t value: Unpaired t value / p value: Probability value/ S: Significant

There was a significant increase in the ORQ of females compared with that of males, which means that females have lower occupational performance than males (Table 2).

Table 2:-Comparison of mean value of ORQ between females and males:

	Females	Males	MD	t-value	p-value	Sig	
	$\bar{X} \pm SD$	$\bar{X} \pm SD$					
ORQ	11.52 $\pm$ 3.92	8.16 $\pm$ 4.25	3.36	4.02	0.001	S	

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$\bar{X}$: Mean SD: Standard deviation MD: Mean difference t value: Unpaired t value p value: Probability value S: Significant

There was a significant decrease in the quality of life score of females compared with that of males. Aspects of physical functioning, limitations due to physical health, social functioning, pain, and general health were significantly lower in females compared with that of males. While there were no significant difference in scores of limitations due to emotional problems, energy/fatigue, and emotional well-being (Table 3).

Table 3:-Comparison of median value of 36-Item Short Form Health Survey scores between females and males:

36-Item Short Form Health Survey	Females	Males	U-value	p-value	Sig
	Median (IRQ)	Median (IRQ)			
Physical Function	75 (60-85)	82.5 (70-95)	758	0.004	S
Limitations due to physical health	25 (0-50)	50 (25-75)	600	0.0001	S
Social Function	50 (50-75)	75 (50-87.5)	866	0.03	S
Pain	45 (45-57)	62.5 (45-68.12)	762	0.004	S
General health	45 (30-55)	60 (30.93-65)	876	0.04	S
Limitations due to emotional problems	33.33 (0-100)	33.33 (33.33-100)	950	0.11	NS
Energy/Fatigue	50 (40-60)	55 (45-60)	964	0.16	NS
Emotional Well- being	56 (40-72)	64 (47-73)	926	0.09	NS

U- value: Mann-Whitney test value p-value: Probability level S: Significant NS: Non Significant

Discussion:-

The purpose of this study was to provide descriptive data on the gender difference in trunk muscle endurance, occupational performance, and quality of life scores among physical therapists with NSLBP. Occupational Role Performance Questionnaire and the 36-Item Short Form Health Survey were used; and results were compared between males and females.

Trunk Muscle Endurance:

The present findings showed that trunk muscle endurance times of back extensors, trunk flexors, right and left lateral musculatures were lower in females than in males.

McGill et al., (1999) tested trunk muscle endurance of healthy adults; aimed to establish normative values. They found that women have longer times for torso extension than men; but not for torso flexion and lateral flexion; as men have longer values. The mean age of the McGill's sample was lower than that of the present study.

Males had longer times of right and left lateral musculature tests than their female counterparts; It was suggested that sex can affect trunk muscle endurance times (Jalayondeja and Kraingchieocharn, 2015). Mbada et al., (2009) reported that back extensor endurance is higher in men than in women in healthy Nigerian adults.

This sex difference could be due to the fact that males have higher levels of physical activity and sports participation than females at almost all age groups (Butt et al., 2011) (Deaner et al., 2012). Physical inactivity is associated with LBP and disability (Teichtahl et al., 2015). Sedentary lifestyle was linked to reduced back muscle endurance (Smith et al., 2010).

On examining patients with several chronic pain conditions, women experienced more clinical pain and pain-related distress than men (Paller et al., 2009). There is evidence that LBP severity is correlated with back muscle endurance and disability (Naveen et al., 2014).

Occupational Performance:

In the present study, females were lower in occupational performance scores than males.

Female workers with back pain showed more pain exacerbations than male workers. Pain exacerbations were found to be correlated with activity limitation and lost productivity time (absenteeism and presenteeism) (**Ricci et al., 2006**).

Men had higher rates of actual return to work; as they have more social support and lower emotional distress (**Opsahl et al., 2016**).

However, a prospective study by **Natvig et al., (2002)** found no significant difference between genders in the long term work disability due to LBP. **Miranda et al., (2010)** found that women and men did not differ regarding work ability and retirement plans due to musculoskeletal pain.

According to the findings of the present study, males have higher trunk endurance than females. This may contribute to their higher job performance.

Clinically, it was remarkable that male physical therapists have more motivation to work. They work longer hours when compared to their female counterparts. They also have more financial responsibilities; which may lead them to develop more self-management and coping strategies.

Quality of Life:

On examining quality of life (using SF-36), female participants were lower in the scores of physical functioning, limitations due to physical health, social functioning, pain, and general health.

The current results were consistent with that of **Lamé et al., (2005)**; as back pain patients were more limited in all QoL domains than patients with other chronic pain conditions. The most affected domains were physical functioning, role limitations due to physical health, vitality, bodily pain, and general health. Women were more affected than men. Pain intensity, coping, and catastrophizing were higher in women than in men. These factors were proposed as predictors for low QoL scores among female patients.

High levels of depressive symptoms among women with back pain were associated with higher levels of pain (**Leveille et al., 2005**).

Older women with MSK pain (including LBP) reported more pain intensity and disability than men. They also reported lower health status. There was an association between pain/disability and higher BMI (> 27), as well as with depressive symptoms (**Antonopoulou et al., 2009**).

Possible cause is that sex hormones affect pain perception in ovulating women; as pain perception increases during the luteal phase (**LeResche et al., 2003**).

On the other hand, a study by **Ono et al., (2012)** showed that men had lower scores of health-related QoL than women. This difference can be referred to that investigation was based on counting LBP days.

This study was conducted on people from the Middle East, in which women who are around 25 years of age are likely to be responsible for housework and child care in addition to work outside the home. This requires extra effort and time; which may lead to more bodily fatigue and pain.

Limitations:

Causal relationship cannot be established due to the study's cross-sectional design. Other limitation is that participant's physical activity levels were not assessed, which could have influenced their ability to perform motor tasks.

Conclusion:-

This study found that female physical therapists with NSLBP have lower scores of trunk muscle endurance, occupational performance, and quality of life. These results should be taken into consideration in assessment and management approaches in order to improve functional ability.

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