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Research Article

Low Back Pain and its Association with Energy Expenditure and Occupational Activities among Nigerian Physiotherapists

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Abstract

Objective: The objective of this study was to determine the association between low back pain and occupational activities and energy expenditure among physiotherapists.

Methods: Ethical clearance was obtained from institute of Public Health, forty-five (45) physiotherapists were recruited for this study using non-probability sampling technique, and procedure for data collection was explained to participants. A structured self-administered questionnaire on low back pain and occupational activities was then administered to each participant and subsequently pedometer was fixed on the waist and worn during working hours for two days. Data was analyzed using descriptive statistics of mean, standard deviation, frequencies, percentages, Chi square, independent t-test, ANOVA and Spearman rank correlation coefficient. Significance was set at 0.05 α-level.

Results: Results obtained showed that 73.3% of physiotherapists with average age of 32.64 ± 5.10 years had history of low back pain. Also, it was observed that there was significant association between all occupational activities studied viz bending or twisting, maintaining a position for a prolonged period of time, performing manual therapy technique, performing repetitive task, transferring of patients, working when physically fatigued and history low back pain. Only awkward position among all the occupational activities was significantly related to energy expenditure.

Conclusion: It was concluded that occupational activities rather the energy expenditure was associated with history of low back pain among physiotherapists.

Keywords: *Low-Back Pain; Occupational Activities; Energy Expenditure; Physiotherapists*

Background of the Study

Low back pain (LBP) has been reported among health workers [1,2], with nurses and physiotherapists more at risk as a result of repetitive lifting, prolong standing and sitting [3]. Jobs that require the workers to sit or stand for a long period put individuals at risk of LBP and similarly, persons required to do heavy or frequent lifting are also at risk of LBP [4] and LBP has remained one of the major causes of loss of working hours and days among the hospital workers. Low back pain being the most common musculoskeletal problem in workplaces [1] is a major cause of work-related disability [5], which is associated with major costs in terms of health resource usage, worker disability and absenteeism [6]. Low back pain has been established as one of the most common reasons for sick leave in the west-

ern world [7]. Physical therapy generally is assumed to be a physically demanding profession [8]. The occupational demands of physical therapy practice, however, have not been documented [9]. There is evidence that work-related musculoskeletal disorder (WMSDs) have a significant impact on physical therapists, for example [10,11]. Physical therapists reported taking sick time, changing practice habits, changing work settings, or leaving the profession due to WMSDs. Studies reported that 1 in 6 physical therapists changed settings or left the profession due to WMSDs.

Glover., *et al*. [11] reported that 32% of the physiotherapists with WMSDs lost work time. Molumphy M., *et al*. [8] reported that 18% of physical therapists with WMSDs of the low back changed their work setting and that 12% of the physical therapists reduced their patient care hours. Exposure to risk factors for WMSDs is likely to result from patient care activities that include lifting patients, transferring patients, and the performance of manual therapy.

Specific factors of high occupational activity (lifting and loading) and low perception of general health have been identified as contributory factors to low back pain in general population [12]. Hestbaek., *et al*. [13] noted how the protective effect of a sedentary occupation was lost once physical activity is undertaken. Sedentary lifestyles, as well as extremely active lifestyles are associated with increased prevalence of low back pain while moderate activity seems protective [14]. It is not implied that inactivity causes LBP, nor that high activity is a result of LBP, but studies have indicated that engaging in higher intensities of physical activity, particularly with a history of LBP is associated with LBP [15-17], or extremity of flexion and/or load in the lumbar region [12,17,18].

A previous study by Yang., *et al*. [18], found that lifetime prevalence of work-related musculoskeletal disorders among physical therapists is as high as 91% with younger physical therapists (those below the age of 30) being more at risk. According to Holder., *et al*. [19], low back pain accounts for about 62% of occupational injuries among physical therapists in US followed by injury to upper back, wrist and hand (23%). West and Gardner [20] reported about 35% of physical therapists in Australia experience LBP.

Furthermore, there is evidence of direct association between LBP prevalence and physical load during work [22].

Aim of the Study

The aim of this study was to determine, the association between level of low back pain, occupational activities, energy expenditure and distance covered during working hours among physiotherapists in different specialties in some selected teaching hospitals in south western part of Nigeria.

Methods

Forty-five (45) participants who were registered physiotherapists that volunteered to participate in this study were purposively recruited using probability sampling technique from selected government hospitals across southwestern part of Nigeria. The eligibility to participate in this study were the Physiotherapy that were registered with Medical Rehabilitation Therapist Board of Nigeria of more than four year postgraduate experience that also in a specialty for more than 3 months while the female Physiotherapist where were at their pregnancy state, mental health challenges and at the administrative level were excluded from this study. Ethical approval (IPHO AU/12/060) for the study was sought and obtained from Institute of Public Health Review committee, Obafemi Awolowo University Ile Ife. The purpose of the research was explained to the participants, and informed consent was obtained, Participants subsequently filled questionnaire on occupational activities and low back pain.

Participants were each given the questionnaire on occupational activities and low backpain to fill. Participants' energy expenditure and distance covered during working hours, height and weight were obtained and recorded. This questionnaire that was utilized by Obembe., *et al*. [23] on occupational injuries among physiotherapists in south western part of Nigeria was used in the study.

Pedometer (Measurement of calorie, distance covered): Sport pedometer (model no JS-206B) was used to record participants' calorie spent, distance covered. Pedometer was attached to the participants' shirts and trousers. The pedometer was worn level to the hip bone in line with the midpoint of the right knee, hence participants were asked to attach the device to their belts or the top of the waist band and they were instructed to position the device such that the display was upright. Participants were given a pedometer to wear for two days at work. At the end of each day, the pedometer was retrieved and outputs were recorded.

Body weight: This was measured on bathroom weighing scale with participants' bare foot, standing in an erect posture looking straight ahead. The reading obtained was recorded to the nearest 1.0 kg.

Height: Height meter was used to measure the height of the participants with bare foot, standing in erect position and the horizontal bar attached to the height meter was adjusted to touch the vertex of the head. The measurement was recorded in centimeters (cm) to the nearest 0.01 cm.

Data was summarized using descriptive statistics of mean, standard deviation, standard error of mean, frequency distribution and percentage. Also, independent t-test, ANOVA, Chi square test were used to analyze the study. Significance was set at 0.05 alpha level.

Results

Demographic characteristics of all participants

A total number of 45 physiotherapists from Obafemi Awolowo University Ile Ife, Wesley Guild hospital, Ilesa, University College Hospital and Asubiaro state hospital, Osogbo in South west Nigeria participated in the study. Participants were 32 (71.1%) males and 13 (28.9%) females, 37 (82.2%) were from teaching hospitals and 8 (17.8%) from state hospital. Result obtained showed that 26 (57.2%) had degree in physiotherapy and 19 (42.2%) had postgraduate degrees. 34 (75.6%) were physiotherapists grade level 1, 6 (13.3%) were of higher cadre. Participants were from three specialties; orthopaedics, paediatrics and neurology; 15 (33.3%), 10 (22.2%) and 20 (44.4%) respectively. The participants' working experience ranged from 2 and 35 years (Table 1).

Variables		Frequency	Percentage (%)
Sex	Male	32	71.1
	Female	13	28.9
	Total	45	100.0
Marital status	Married	26	57.8
	Single	19	42.2
	Total	45	100.0
Qualification	Degree	26	57.8
	Postgraduate	19	42.2
	Total	45	100.0
Cadre	PT	34	75.6
	SPT	6	13.3
	Others	5	11.1
	Total	45	100.0
Specialty	ortho	15	33.3
	Paedo	10	22.2
	Neuro	20	44.4
	Total	45	100.0
Work experience	2 - 5 yrs	24	53.3
	6 - 10 yrs	10	22.2
	11 - 15 yrs	10	22.2
	Others	1	2.3
	Total	45	100.0
Workplace	TH	37	82.2
	SH	8	17.8
	Total	45	100.0

Table 1: *Demographic data of participants (N = 45).*

FREQ: Frequency; PT: Physiotherapist; SPT: Senior Physiotherapy; ORTHO: Orthopaedics; PAEDO: Paediatrics; NEURO: Neurology, TH: Teaching Hospital, SH: State Hospital.

Comparison of participants profile by gender

This is illustrated in table 2 which showed that there was no significant different in weight, energy expenditure and distance covered during working hours by male and female physiotherapists ($p > 0.05$). There was however, a significant difference in their height with male physiotherapists being taller than their female counterparts.

	Male X ± SD	Female X ± SD	t	p
WT (kg)	70.34 ± 15.61	66.50 ± 9.00	0.830	0.411
HT (m)	1.72 ± 0.08	1.62 ± 0.05	4.279	0.001*
Kcal	114.97 ± 65.98	82.86 ± 65.42	1.501	0.041
Distance (km)	2.62 ± 1.50	1.86 ± 1.38	1.564	0.125

Table 2: *Independent t-test for comparison of participants profile by gender.*
Key: SD: Standard Deviation; WT: Weight; HT: Height; Kcal: Energy Expenditure.
**: Significant at 0.05 α-level.*

Comparison of energy expenditure and distance covered across the specialties

It was observed in the study that, there was significant difference in energy expenditure and distance across the specialties ($p = 0.05$). Physiotherapist in orthopaedics expended significantly more energy and covered distance more during working hours than paediatrics in comparison using (Table 3).

	ORTHO X ± SD	PAEDO X ± SD	NEURO X ± SD	F-ratio	p
WT (kg)	71.90 ± 17.55	66.00 ± 8.94	68.85 ± 13.41	0.53	0.59
HT (m)	1.69 ± 0.07	1.66 ± 0.08	1.71 ± 0.09	1.83	0.17
Kcal	125.39 ± 84.22a	61.57 ± 44.65b	112.98 ± 50.24a	3.35	0.05*
Distance (m)	2.84 ± 1.90a	1.42 ± 1.04b	2.56 ± 1.14a	3.21	0.05*

Table 3: *ANOVA for comparison of energy expenditure and distance across the specialties.*
Key: SD: Standard deviation; WT: Weight; HT: Height; Kcal: Energy Expenditure
**-significant at 0.05 α-level.*
a and b: Mode mean with the same subscript are not significantly different and mean mode with different superscripts are significantly different. P level is set at 0.05.

Activities physiotherapists performed while been injured

It was reported that maintaining a position for a prolonged period of time (18%), working when physically fatigued (15%), Bending or twisting and performing manual therapy techniques, transferring of patients (11%) led to low back pain. Also, physiotherapists believed that bending or twisting was the highest possible cause of reoccurrence of LBP closely followed by maintaining a position for a prolonged period of time, performing repetitive task, working when physically fatigued, transferring a patient and lifting.

Association between history of low back pain and occupational activities.

It was observed that there were significant associations between all occupational activities studied viz bending or twisting, maintaining a position for a prolonged period of time, performing manual therapy technique, performing repetitive task, transferring of patient, working when physically fatigued and history of low back pain ($p < 0.05$) (Table 4).

Variables		Yes (%)	No (%)	x^2	p-value
Apply modalities	Yes	2 (6%)	31 (96%)		
	No	0	12	0.761a	0.383
Bending or twisting	Yes	12 (36%)	21 (64%)		
	No	0	12	5.950	0.015
Lifting	Yes	5 (15%)	21 (64%)	2.045	0.153
	No	0	12		
Maintaining a position for long time	Yes	16 (48%)	17 (52%)		
	No	0	12	9.028	0.003
Performing manual therapy technique	Yes	12 (36%)	21 (64%)	5.950	0.015
	No	0			
Performing repetitive task	Yes	10 (30%)	23 (70%)	4.675	0.003
	No	0			
Slipping, tripping or falling	Yes	3 (9%)	30 (91%)		
	No	0		1.169	0.280
Transferring of patient	Yes	10 (30%)	23 (70%)	4.675	0.031
	No	0			
Working in awkward position	Yes	5 (15%)	28 (85%)		
	No	0		2.045	0.153
Working when physically fatigued	Yes	13 (39%)	20 (61%)		
	No	0		6.648	0.010

Table 4: *Chi square test of association between history of low back pain and occupational activities.*
*Key: *: Significant at 0.05 α-level.*

Correlation between occupational activities and energy expenditure.

There was significant relationship between working in awkward position and energy expenditure (0.047) (Table 5).

Variable	R	p
Apply modalities	0.069	0.582
Bending or twisting	0.096	0.441
Lifting	-0.013	0.914
Maintaining a position for long time	0.089	0.477
Performing manual therapy technique	-0.058	0.644
Performing repetitive task	0.085	0.495
Slipping, tripping or falling	0.113	0.363
Transferring of patient	0.054	0.662
Working in awkward position	0.247	0.047
Working when physically fatigued	0.184	0.140

Table 5: *Spearman rank Correlation between occupational activities and energy expenditure.*
**: Significant at 0.05 α-level.*

Discussion

It was observed in this study that 73.7% of physiotherapists have experienced low back pain within 18 months below. This high percentage of LBP has been observed in previous studies among hospital workers and physiotherapists [1,2]. Louw., *et al*. [24] described LBP as one of the most prevalent musculoskeletal condition and common cause of disability. Adegoke., *et al*. [25] revealed prevalence of WRMDs among physiotherapists in Nigeria is high. Studies have demonstrated that LBP rates vary substantially by industry, occupation and by job within given industries or facilities [26,27]. Low Back Pain being the most common musculoskeletal problem in the workplace [1,28], is a major cause of work-related disability. Which is associated with major costs in terms of health resource usage, worker disability and absenteeism [29]. Many studies have explored LBP in relation to specific work sectors and found a high level of LBP and related disability among health service workers [30]. Nurses and physiotherapists are more at risk and low back pain was attributed to repetitive lifting, prolonged standing, working in a very awkward position [31], also poor working environment and sitting [3].

There were significant association between occupational activities and low back pain, this means there were association between bending or twisting, maintaining a position for a period of time, performing repetitive tasks, transferring of patients and history of low back pain. This may be due to the fact that the practice of physical therapy requires the performance of various physically demanding activities related to the delivery of patient care [32,33] such activities including lifting, bending, twisting, performing manual therapy and having to maintain awkward positions were known to be occupational activities performed by physiotherapists. These activities when done for a prolonged period of time may result in LBP. Assisting with activities on the exercise mat, transferring and lifting of patients and using cumbersome equipment can also result in low back pain [33]. In a cross-sectional study designed by Marras., *et al*. [30] to explore the relationship between low back pain and spinal loading during lifting of patients by physiotherapists. Nelson and Hughes [34] in a cross-sectional design reported that most bending, twisting, and reaching motions required by some occupations trigger LBP through sudden strain of soft tissues, possibly caught in a condition or posture which was similar to this study that LBP was highly caused or triggered by muscle strain. As explained by Adegoke., *et al*. [35] that activities such as performing manual therapy techniques; transferring patients and maintaining a position for a prolonged period are responsible for some physiotherapists sustaining low back pain after work. Lamprecht [35] highlighted working in the same position for long periods, working in static postures with flexion or rotation; continuing to work while injured and performing manual therapy techniques as the activities that commonly lead to low back pain. Identification the causes of work related injuries in physical therapy as staying in the same position for a long time and continuing to work when fatigued [36] also reported patients transfer; repeated movement, lifting heavy equipment, patient; and working when physically fatigued as causative factors. Adegoke., *et al*. [35] showed that performing repetitive tasks, bending and twisting are the activities that aggravated existing injuries. This was in correlation with the submission of Salik and Ozcan [37] who identified three activities that aggravate the symptoms of already existing work-related musculoskeletal disorders among physical therapists and physical therapist assistants as staying in the same position for a long time, lifting and transferring patients.

In this study physiotherapists in orthopaedics expended more energy and covered more distance than neurology. This finding may be because physiotherapists in orthopaedic unit have to move from one treatment room to another, wheeling and carrying modalities from station to station to mention a few. Also, the bulk of physiotherapy conditions fall into orthopaedics. Physiotherapists in neurology unit expended more energy and cover more distance than those in paediatrics. This observation may be because mostly in the paediatrics section or department, physiotherapists do not have to move up and down to execute their treatment. It was observed that there was no significant difference in the energy expended and distance covered in Nigerian Hospitals. Physiotherapists in the different hospitals had similar workload. Average values however showed that physiotherapists workload differs in the hospitals because differences in the population of the outpatients and inpatients that are attended to. There was no significant association between history of LBP and energy expenditure but there was significant relationship between energy expenditure and maintaining awkward position. This observation suggests that it is not the workload of the physiotherapists that may be responsible for low back pain but the positions taken during work and in repetition and frequency of the procedures.

Conclusion

It was concluded that occupational activities rather than energy expenditure were associated with history of low back pain among physiotherapists.

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