JOURNAL OF BEHAVIORAL HEALTH, 2020
VOL 9, NO. 2, PAGE 1 – 5

RESEARCH ARTICLE

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Habitual physical activity and prevalence of lower limb musculoskeletal disorders in middle aged and older women

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ABSTRACT

Background to the Study: Lower Limb Musculoskeletal Disorders (LLMSDs) have been found to be a common cause of disability. Evidence shows that Physical Activity (PA) reduces symptoms of LLMSDs and has been suggested to be useful in the management of LLMSDs. This study was conducted to investigate habitual PA level and prevalence of LLMSDs in middle aged and older women in Ibadan North Local Government Area of Oyo State, Nigeria.

Methodology: This is a cross-sectional survey study in which a non-random sampling technique was used to recruit participants who were mostly workers in Oyo state Secretariat, University College Hospital and University of Ibadan. The International Physical Activity Questionnaire (IPAQ) and the Standardized Nordic Musculoskeletal Questionnaire (SNMQ) were used to evaluate habitual PA level and prevalence of LLMSDs respectively. Descriptive and inferential statistics were used to summarize and analyse the data.

Results: Participants were 303 women, age range 45-77 years, mean 53.4±7.6 years. Most 261 (86.1%) were married, had tertiary education 274 (90.4%) and 85 (28.1%) were in the middle income category. Majority 282 (93.1%) reported LLMSDs with the knee (38.6%) being the most frequently reported site. Moderate level of habitual PA were reported by 116 (38.3%) of participants while those with low PA level reported the highest proportion of LLMSDs 118 (41.8%).

Conclusion: Middle aged and older women in this study engaged mostly in moderate level of habitual PA, those with low PA had most reports of LLMSDs and the knee was the most frequently reported site of LLMSDs.

ARTICLE HISTORY

Received May 15, 2020
Accepted June 20, 2020
Published June 30, 2020

KEYWORDS

Lower limb; musculoskeletal disorders; middle aged women; physical activity

Introduction

The World Health Organization [1] defines physical activity as any bodily movement produced by skeletal muscles that require energy expenditure. It is a necessary precursor to healthy living and it is vital in keeping the musculoskeletal system in proper functioning [2]. Regular physical activity can improve health and help prevent many of the diseases and conditions that are major causes of death and disability for women around the world. Older women are associated with sedentary lifestyle and experience changes in their musculoskeletal system such as muscle atrophy and muscle weakness [3].

Exercise and other forms of physical activity help to provide a number of specific physiologic and psychosocial benefits and improved quality of life [4,5]. According to Loretta [5], physical activity in older age is influenced by physiological (e.g. hereditary or genetic predisposition), psychosocial (e.g. motivation and stress tolerance), and environmental (e.g. knowledge and belief) factors.

Musculoskeletal disorders (MSDs) refers to a broad range of conditions that can affect any part of musculoskeletal system, including the muscles, bones, nerves, joints and spinal discs along with the supporting blood vessels, connective tissues such as tendons, ligaments and cartilages [2]. These conditions produce symptoms of pain, ache or discomfort which may be acute, chronic, focal or diffuse in the affected body part [2, 3]. Musculoskeletal disorders are very common and can affect any age group, but tend to be more prevalent and more likely to occur in the older age group. They are the most common causes of severe long-term pain and physical disability, affecting hundreds of millions of people across the world [6].

Lower limb musculoskeletal disorders (LLMSDs) are injuries or disorders that affect the musculoskeletal system of lower limbs. LLMSDs have been associated with environmental and personal factors [7]. Among personal factors, gender and obesity were said to be significant factors for musculoskeletal disorders particularly for ankle or foot symptoms [7, 2]. Also, environmental factors such as physical job demands and physical isometric loads are linked with LLMSDs [7].

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Prevalence is the proportion of a population who have (or had) a specific characteristics in a given period of time. An estimated prevalence rate of 41.1% of musculoskeletal pain in the lower limbs was reported among female teachers in Brazil [8]. Urwin et al, [9] stated that musculoskeletal pain increases with age, and is more common in women, individuals from lower socioeconomic groups and psychologically stressed population. In Nigeria, a study by Tinubu et al, [10] shows that work-related musculoskeletal disorders of the knees among nurses in Ibadan have an estimated prevalence rate of 22.4%. Work-related knee osteoarthritis is more often linked with female workers than male workers [11,12].

Participants and methods

This was a cross-sectional survey of habitual physical activity and prevalence of lower limb musculoskeletal disorders among middle aged and older women recruited from University College Hospital, University of Ibadan, selected places of worship, selected public primary and secondary schools and Oyo state Secretariat, Agodi, Ibadan, Oyo State. Ethical approval was sought and obtained from the University of Ibadan/ University College Hospital (UI/UCH) Health Research Ethics Committee before the commencement of this study. The approval of the authorities of the various secondary schools was also sought and obtained. The study involved a multi-stage sampling technique. A non-random sampling technique was used in recruiting participants who were workers in Oyo state Secretariat, University College Hospital and University of Ibadan. Residents in the communities were also included. Random sampling technique was used to select place of worship, public primary and secondary schools at every count of three of their total number. A letter of transmittal containing a brief description of the study and its significance along with a consent form was distributed to the participants to seek their informed consent. Copies of questionnaires were administered to the participants by the researcher and were collected on the same day.

Instruments

A bio-data form

A self-developed 10-item bio-data form was used to obtain information on the socio-demographic characteristics of the participants such as occupation, age, tribe, educational level and income.

The International Physical Activity Questionnaire (IPAQ)

Which was developed by Pate et al, [13] was used to rate habitual PA level of the participants. The IPAQ short form was used in this study. It has 7 items and 4 domains which include leisure time activity, domestic and gardening activity, work related activity and transport related activity. It is a generic scale and it asks questions about three specific types of activities undertaken in the domains. The specific types of activities to be assessed include walking, moderate-intensity and vigorous-intensity activities. It has a reliability of 0.80 and a criterion validity of 0.30 [13]. This instrument evaluates PA in terms of energy requirements defined in metabolic equivalent of tasks per minute (MET-min). It consists of seven items with four domains, including leisure time activity, domestic and gardening activity, work-related activity, and transport related activity. PA was categorized into vigorous with a minimum of 1,500 MET-min/week, moderate with at least 600 MET-min/week and low if activity was lower than 600 MET-min/week. Computation of PA was done by multiplying the number of minutes and frequency of days by a specific code for activity [13], which included duration in minutes and frequency in days of walking, moderate, and vigorous intensity activities. The sum of intensities was then calculated to estimate total PA in MET-min/week.

Standardized Nordic Musculoskeletal Questionnaire (SNMQ) (Kourinka et al, [14]

The SNMQ was used to analyze musculoskeletal symptoms. The prevalence of LLMSDs was evaluated in different areas of the body including hips/thigh/buttocks, knees and ankle/feet. . The reliability of this questionnaire has been proved [14] and it has been used in several studies in different countries including Nigeria [15-17] and in other countries [18,19].

Assessment of Obesity

Assessment of obesity was done by rating the BMI as an index of overall obesity. BMI was defined as the ratio of weight in kilograms and square of height in metres (kg/m^2). Weight and height were measured using standardised means. BMI was categorised as underweight (<18.5kg/m^2), normal weight (18.5 - 24.99 kg/m^2), overweight (25.0-29.99 kg/m^2), and obese (30.0 kg/m^2) [20].

Data Analysis

Descriptive statistics of means and standard deviations were used for continuous variables. Percentages were used to summarize some socio-demographic data, describe prevalence of disorders reported on different segments of the lower limb, limitation in activities of daily living caused by LLMSDs and the prevalence LLMSDs of participants according to different habitual PA levels. Chi-square was used to determine the association with habitual PA level and LLMSDs, also overall adiposity of participants and LLMSDs. Level of significance was set at P=0.05.

Results

Characteristics of Participants

Four hundred and twenty women participants were recruited for this study and questionnaires were hand distributed to them. Out of these, 60 were excluded due to improper and incomplete filling, 57 were not returned leaving 303 questionnaires that were properly and completely filled giving a response rate of 72%. These were then coded and analysed.

Participants' age ranged from 45 to 77 years, mean 53.4±7.6 years. Table 1 show the characteristics of participants wherein most were married 262 (86.1%), had tertiary education 274 (90.3%), were employed 283 (93.4%) and were in the low/middle income category 176 (58.1%).

Physical activity level and prevalence of lower limb musculoskeletal disorders in participants

Two hundred and eighty-two (93.1%) participants reported disorders in various aspects of the lower limb while 21 (6.9%) did not. The knee was observed to be the most prevalent site of LLMDs reported by the participants as shown in Table 1 and majority 116 (38.3%) reported moderate habitual physical

activity level. From Table 2 participants with habitual low PA level reported greatest proportion 118 (41.8%) of LLMSDs. Table 3 revealed that only LLMSDs at the knee was significantly associated with habitual physical activity of the participants. Furthermore, LLMSDs in the knee were responsible for limitation to work for highest proportion (24.1%) of participants in the study - Table 4.

Health Problems and Perceived health status of participants

Majority 173 (57.1) of participants reported no health problems while 168 (55.4%) perceived their health status as being good.

Association between lower limb musculoskeletal disorders and measures of adiposity

A Chi–square analysis of association between lower limb musculoskeletal disorders and BMI as an index of overall obesity revealed no significant association as shown in Table 5.

Table 1: Characteristics of participants in the Study (N=303).

Variables		n	%
Age group (years)	45-59	208	68.6
	60-74	94	31
	75-77	1	0.3
Marital Status	Married	261	86.1
	Not Married	42	40
Educational Status	Primary/Secondary	29	9.6
	Tertiary	274	90.4
Occupation	Employed	283	93.4
	Not employed	20	6.6
Personal Income	Low/Middle	176	58.1
	Moderate/High	127	41.9
BMI (kg/m²)	Underweight	92	30.4
	Normal	112	37
	Overweight	99	32.7
	Obese	0	0
Perceived Health Status	Very Good	111	36.6
	Good	168	55.4
	Fair	24	7.9
Health Problems	None	173	57.1
	Hypertension	51	16.8
	Obesity	24	7.9
	Arthritis	36	11.9
	Diabetes	19	6.3
Habitual Physical Activity	Low	104	34.3
	Moderate	116	38.3
	High	83	27.4
	None	21	6.9
Lower Limb Musculoskeletal Disorders	Hip/Thighs	81	26.7
	Knees	117	38.6
	Ankles/Feet	84	27.8

Key: n=frequency of occurrence; %= percentage, BMI= Body Mass Index.

Table 2: Habitual Physical Activity and Twelve–Month Prevalence of Lower Limb Musculoskeletal Disorders in Participants.

Phys Activity Level	Prevalence of LLMSDs			Overall Prevalence of LLMSDs n%
	Hip/Thigh n%	Knee n%	Ankle/Feet n%	
Low	31 (11.0)	54 (19.1)	33 (11.7)	118 (41.8)
Moderate	29 (10.3)	33 (11.7)	27 (9.6)	89 (31.6)
High	21 (7.4)	30 (10.6)	24 (8.5)	75 (26.6)
Total	81 (28.7)	117 (41.5)	84 (29.8)	282 (100)

Key: n=frequency; %=percentage.

Table 3: Chi Square association between twelve-Month LLMSDs and Habitual Physical Activity of Participants (N=303).

Body Region	Physical activity Level				χ^2	P-value
	Total	Low n (%)	Moderate n (%)	High n (%)		
Hip/ thighs	81(26.7)	31(29.8)	29 (25.0)	21(25.3)	0.77	0.682
Knees	117(38.6)	54(51.9)	33(28.4)	30(36.1)	13.04	0.001
Ankles/ feet	84(27.7)	33(31.7)	27(23.3)	24(28.7)	2.04	0.361
		104	116	83		

Key: n=frequency; %=percentage

Table 4: Twelve-Month Limitation to Work due to LLMSDs in the participants (N=303).

Body Region	Frequency	Percentage
	n	%
Hip/thighs	52	17.2
Knees	73	24.1
Ankles/feet	56	18.5

Key: n=frequency; %=percentage

Table 5: Association between LLMSDs and BMI of Participants (N=303).

LLMSDs	Body Mass Index			χ2	P
	Underweight	Normal	Overweight		
Hip/Thigh	16 (19.6)	35 (43.2)	30 (37.0)	0.052	5.91
Knee	24 (20.5)	51 (43.6)	42 (35.9)	0.001	8.96
Ankle/Feet	22 (26.2)	37 (44.0)	25 (29.8)	0.28	2.55

Key: n=frequency; %=percentage.

Discussion

Characteristics of participants

This study investigated the habitual physical activity and prevalence of lower limb musculoskeletal disorders in middle age and older women in Ibadan north local government area of Oyo state. Most of the participants were married. Also, most had tertiary education this is probably because most of the participants were government workers and they needed to possess post-secondary school certificates before employment.

Habitual Physical activity level of participants

This study revealed that majority of participants reported involvement in habitual moderate physical activity. The result of this study is similar to that of Gwen et al, [21] and Ogwumike et al, [22] and Ogwumike et al, [23] in which middle aged women were observed to be mostly involved in moderate habitual physical activity level probably because even though they were in the middle-aged category they were still in the active workforce [24].

Habitual Physical activity level and Prevalence of lower limb musculoskeletal disorders in participants

Greatest proportion of participants in this study reported the knee as the most prevalent site of LLMSDs. In fact knee problems have been widely known to be common among women in mid-age and older categories [8-10,16,25]. It is noteworthy that during this phase of life, the depleting level of the hormone estrogen is responsible for musculoskeletal problems in middle age and older women [26,17]. This is because the female sex hormone, plays a prominent role in maintaining the integrity of the musculoskeletal system hence, a decrease in this hormone

as associated with the menopause transition may lead to impaired muscle function [27] resulting in musculoskeletal changes such as osteoporosis, muscle atrophy and muscle weakness [26].

Health Problems and Perceived health status of participants

In this study, many of the participants reported having no health problems and most participants perceived their health as good this may not be out of place because of their involvement in moderate habitual physical activity level. Indeed, participation in moderate to high physical activity level has been reported to reduce the risk of developing many chronic illnesses such as coronary heart disease, stroke, obesity and musculoskeletal conditions [28]. It is however not unusual that some participants reported having specific health problems such as hypertension, diabetes and arthritis as the development of these chronic illnesses usually accompany advancing age [29].

Association between lower limb musculoskeletal disorders and measures of adiposity

From this study, there was no significant association between lower limb musculoskeletal disorders and body mass index as a measure of overall obesity. This is probably because least proportion of participants was in the overweight category. In addition, they were also in the labour force and were relatively moderately active. The observation in this study is in contrast to those carried out by Stolt et al, [7] and Ardalan et al, [2] in which personal factors such as obesity was found to be associated with lower limb musculoskeletal disorders particularly those of ankles/feet.

Conclusion

Middle aged and older women in this study engaged mostly in moderate level of habitual physical activity. Those with habitual low physical activity had more reports of lower limb musculoskeletal disorders with the knee 117 (38.6%) being the most frequently reported site of lower limb musculoskeletal disorders.

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