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ORIGINAL RESEARCH

Prevalence of low back pain among peasant farmers in a rural community in South South Nigeria

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ABSTRACT

Introduction: This study was undertaken to assess the prevalence and predominant causes of low back pain (LBP) among peasant farmers in Ebubu community in South-south Nigeria.

Methods: This was a community based cross-sectional study of 310 consenting, adult, full-time farmers, recruited using a two-stage cluster sampling scheme developed by WHO. Specially trained community health extension workers interviewed participants using a pre-tested questionnaire designed by the authors to solicit information on defined LBP. Socio-demographic characteristics were also obtained. A clinical history was recorded, including: duration of LBP and mode of onset, pain severity, knowledge of LBP causes and care-seeking practices. Participants' BMI were calculated. Data were entered into Microsoft Excel and analyzed using the Statistical Package for Social Sciences v15 (www.spss.com).

Results: Of the 310 apparently healthy farmers (age range 18–58 years [mean 36.71±8.98]; 132 males) sampled, 208 had LBP (67.10%). Low back pain was more prevalent in the 31-40 years age group (49.04%), females (50.96%), those who were non-obese (68.95%) or tall (73.2%) and those who had practiced farming for a long duration. Severe LBP was significantly ($p<0.05$) linked to aging (51–60 years group), low BMI and those above average height (1.60 m).

Conclusion: This study indicates that LBP is a prevalent health problem among rural peasant farmers. It was more prevalent in the middle-aged groups, and among females, the non-obese and tall individuals, and those who had been farming for a long duration. Severe LBP was linked to aging, high BMI and those above average height.

Key words: farmers, low back pain, South-south Nigeria.

Introduction

Low back pain (LBP) has been reported as an important cause of morbidity in the general population and in many occupational groups, including farmers[1]. Low back pain is the most common cause of disability in developed nations[2] and also the commonest musculoskeletal disorder affecting those practicing farming[3,4], a physically demanding occupation. In the South-south region of Nigeria the physical demands of farming are particularly high, because farmlands are in dense rain forest which must be cleared and the soil prepared prior to planting. Farming processes such as applying fertilizer or manure, weed removal and harvesting, processing and marketing are performed manually and involve bending or squatting and manual lifting. These activities cause repetitive strain of the back muscles, predisposing to LBP. In the developed world, most of these activities are mechanized.

The range of infirmity and morbidity associated with LBP is extensive. For many individuals, LBP is self-limiting, resolving without specific treatment. For others, however, back pain is recurrent or chronic, causing significant pain that interferes with employment and reduces quality of life. Occasionally acute back pain is an indication of serious medical illness such as infection, malignancy, or other systemic disease[2].

Considerable disability, such as may be caused by LBP, significantly restricts normal activity and occupation, including farming[5]. The economic, societal and public health effects of LBP are considerable, incurring billions of dollars in medical expenditure each year[6]. For example, in the USA the total costs of LBP exceed $100 billion annually[7]. Two-thirds of these costs are indirect, due to lost wages and reduced productivity. This economic and social burden is of particular concern in poorer nations, such as those in Africa where limited healthcare funds are directed towards epidemics such as malaria, HIV and AIDS. The effect of LBP on the family is considerable due to losses in work output and reduced earning capacity.

The major occupational risk factors associated with LBP have been identified as poor/awkward work postures, bending, lifting and physical strenuous work[8]. Other reported risk factors of LBP include high body mass index (BMI), smoking, older age, being female, sedentary work, low educational attainment, job dissatisfaction and psychological factors such as somatisation disorder, anxiety and depression[7].

Studies in developed countries have shown a 12 month prevalence rate of LBP among farmers to be 37% in Ireland[4], 37% in the USA[9] and 47% in Sweden[10]. The few studies conducted in developing countries have reported much higher rates of 72.4% in Nigeria[11], 64% in China[12] and 56.2% in Thailand[13].

No study reporting the prevalence of LBP in parts of the South-south geopolitical zone of Nigeria was found in the literature, despite the predominance of rural subsistence farming populations in the area. The closest study was carried out in the South-west geopolitical zone of Nigeria[11].

The present study was therefore undertaken to determine the prevalence and predisposing factors of LBP among peasant farmers in a rural community (Ebubu Eleme) in South-south Nigeria. It is hoped that the study findings will assist in raising public awareness and understanding of the causes of LBP in this region.

Methods

Setting

This study was conducted among the inhabitants of Ebubu farm settlement, established for Nigerians who were repatriated from the Equatorial Guinea. The inhabitants are mainly farmers with some traders, artisans, school teachers, clergymen and civil servants who work in the local government council headquarters in Eleme. The farmers in Ebubu were chosen for this study because they were homogeneous with regard to lifestyle, cultural norms, and

farming type. This community is approximately 60 km from Port Harcourt, the capital of the oil-rich Rivers State of Nigeria. Ebubu is basically rural, with no electricity, pipe-borne water or health facilities. It has a population of approximately 10 000 people.

Study design and participant selection

This was a community based cross-sectional study of 310 consenting adult (18–58 years) full-time farmers.

Exclusion criteria: Excluded from the present study were those who were no longer active in farming, had other health conditions that may interfere with the present study results (such as renal failure, symptomatic heart disease, spinal injuries or surgery), were involved in other occupations that may predispose to LBP (such as masons or automobile mechanics) and were below the age of 18 years.

Sample size

The study was designed to detect a 5% difference in the prevalence of LBP, with an α error of 5%, acceptable β error of 20% (statistical power of 80%). Using the prevalence of 72.4% in a study by Fabunmi[11], the determined minimum sample size was 307, which was approximated to 310.

Sampling method

A commonly used two-stage cluster sampling scheme, the '30x7' sampling was used in this study. This method was developed by WHO with the aim of calculating the prevalence of immunized children within $\pm$10 percentage points of the true proportion, with 95% confidence. That is, if the true prevalence was 40%, one would expect an estimate between 30% and 50% when using the 30x7 method. This sampling scheme is thought to be sufficient for most sampling of community health factors and has been adopted for other purposes such as rapid needs assessments with no (or only slight) modification[14].

In this study, based on 2006 Nigerian population census tract data[15], 112 clusters in the community were delineated, and from these 31 clusters were randomly selected. House addresses within the clusters were utilized to create a new sampling frame from which 10 random addresses were selected for each. These addresses represented a cluster from which data regarding LBP were collected. In all, 310 houses were sampled. From each of the 310 houses, a farmer within the age group 18–58 years was selected by balloting.

Data collection

Four community health extension workers were recruited as research assistants and trained for 2 weeks for the purposes of this study. Before interviewing participants, the objectives of study were explained by the research assistants, who also obtained participants' consent. Participants were reassured the data would be used for research purposes only.

A pre-tested questionnaire designed by the authors specifically for this research was used to solicit information on LBP, which was defined as an ache, pain or discomfort in the area between the 12th ribs and gluteal folds[1] (a shaded area on a body diagram was shown to the subjects). Subjects were asked if they had experienced LBP in the preceding 12 months. Data on socio-demographic characteristics and individual factors such as sex, age and duration of farming were also obtained. All questionnaires were scrutinized and mistakes corrected by the researchers.

Clinical assessment

A clinical history was recorded, consisting of the following: mode of onset and duration of symptoms, knowledge of causes of LBP, and care-seeking practices. The severity of LBP was classified 'mild', 'moderate' or 'severe' using the method described by Alcouffe et al[16] (LBP without radiation to the knee = mild; LBP radiating above the knee = moderate; LBP radiating below the knee = severe).

Participants were weighed in kilograms using a calibrated and validated Hanson bathroom scale (Terraillon UK Ltd;

Hempstead, Hertfordshire, UK); and height was measured in meters using a Leicester height measuring stadiometer (Seca Ltd; Birmingham, UK). Participants' BMI was calculated and classified as 'desirable weight' (<25), 'overweight' (25-30) or 'obese' (>30). To assess the effect of height on LBP, heights were dichotomized into above and below average (average Nigerian height was set at 1.60 m[17]).

Participants were also educated on work ergonomics and the use of nearby health facilities.

Statistical analysis

Data from the questionnaires were transferred into Microsoft Excel for analysis using the Statistical Package for Social Sciences v15 (**www.spss.com**). The results were presented as frequency tables, means, percentages, χ^2 and odds ratio using 95% confidence interval and $p<0.05$.

Ethics approval

The study protocol was approved by the ethics committee of the Rivers State Ministry of Health (MH/PHC/101/T/22).

Results

The sample consisted of 310 apparently healthy adult farmers (age range 18–58 years [mean 36.71±8.98]; 132 males), and 280 had LBP (67.10%). Low back pain was more prevalent in the 31–40 years age group (49.04%), and least in the subjects in the 51–60 years group (7.70%). The association of age with LBP was statistically significant (p <0.001).There was also a significant association between sex and LBP (p=0.001) with the prevalence higher among females (50.96%). Most subjects (39.9%) had attained primary education level and the association of educational level with LBP was not statistically significant (p=0.59; Table 1). Participants' duration of farming practice spanned 5 to 38 years (mean 17.02±9.43). Low back pain was most prevalent in those who had practiced farming for 5 to 10 years (20.19%). There was a significant association between years of farming practice and LBP (p<0.001; Table 2).

Height was significantly associated with LBP (p<0.001): the majority of subjects with LBP (73.2%) were less than 1.6 m in height (RR=1.213, 95% CI=1.008-1.489; Table 3). A large percentage of subjects (82.21%) were of desirable weight, and the association between BMI and LBP was not statistically significant (p=0.164). Those with desirable weight were more likely to have LBP (RR=1.155, 95% CI= 0.935-1.497; Table 4).

Severe LBP was linked to aging (41–60 years age group), high BMI and those with above average (1.60 m) height. The association between these factors and LBP was statistically significant (p<0.05; Table 5).

Discussion

The prevalence of LBP among the rural farming population studied was 67.1%, which is lower than findings from Iju-Odo, South West Nigeria (72.4%)[11] but higher than that findings from Igbo Ora, South West Nigeria (40%)[18], and also among farmers in developed countries such as Finland, USA, Ireland and Sweden[4,9,10]. The Ebubu, Igbo Ora and Iju-Odo farmers are of the same racial group and use similar farming techniques; therefore, the prevalence variation could be attributed to a lack of uniformity in the descriptions of LBP by the researchers, sampling techniques or sample size. This may also be attributed to personal factors related to work, such as high work stress, low job satisfaction, financial constraints, health-related problems, low social class and worries about the future, all of which have been linked with LBP in a previous study[19]. The prevalence variation may also be due to the differences in the study populations, farming methods or the relative presence of physical, psychosocial and individual risk factors for LBP[6,8].

Table 1: Socio-demographic characteristics of participants

Characteristic	LBP – *n* (%)		Total *N* (%) *N*=310	$\chi 2$	*P*-value
	Yes *n*=208	No *n*=102			
Age					
<30	32 (15.38)	70 (68.63)	102 (32.90)	89.76	<0.001
31-40	102 (49.04)	21 (20.59)	123 (39.68)		
41-50	58 (27.88)	6 (5.88)	64 (20.65)		
51-60	16 (7.70)	5 (4.90)	21 (6.77)		
Sex					
Male	102 (49.04)	30 (29.41)	132 (42.58)	10.78	0.001
Female	106 (50.96)	72 (70.59)	178 (57.42)		
Education					
Nil	71 (34.13)	34 (33.33)	105 (33.87)	1.96	0.59
Primary	83 (39.90)	47 (46.08)	130 (41.94)		
Secondary	45 (21.63)	16 (15.69)	61 (19.68)		
Tertiary	9 (4.33)	5 (4.90)	14 (4.52)		

LBP, Low back pain.

Table 2: Distribution of participants according to years of farming practice

Age (years)	LBP – *n* (%)		Total *N* (%) *N*=310	χ^2	*P*-value
	Yes *n*=208	No *n*=102			
5-10	42 (20.19)	64 (62.75)	106 (34.19)	59.05	<0.001
11-15	38 (18.27)	10 (9.80)	48 (15.48)		
16-20	40 (19.23)	5 (4.90)	45 (14.52)		
21-25	39 (18.75)	7 (6.86)	46 (14.84)		
26-30	23 (11.06)	6 (5.88)	29 (9.35)		
31-35	18 (8.65)	5 (4.90)	23 (7.42)		
>35	8 (3.85)	5 (4.90)	13 (4.19)		

LBP, Low back pain.

Table 3: Distribution of participants according to height

Height (m)	LBP – *n* (%)		Total *N* (%) *N*=310	χ^2	*P*-value
	Yes *n*=208	No *n*=102			
1.46-1.50	10 (4.81)	7 (6.86)	17 (5.48)	15.02	0.02
1.51-1.55	65 (31.25)	21 (20.59)	86 (27.74)		
1.56-1.60	75 (36.06)	33 (32.35)	108 (32.61)		
1.61-1.65	35 (16.83)	16 (15.69)	51 (16.45)		
1.66-1.70	6 (2.88)	9 (8.82)	15 (4.84)		
1.71-1.75	12 (5.77)	7 (6.86)	19 (6.13)		
1.76-1.80	5 (2.40)	9 (8.82)	14 (4.52)		

LBP, Low back pain.

Table 4: Distribution of the participants according to BMI

Weight (BMI)	LBP – *n* (%)		Total *N* (%) *N*=310	χ^2	*P*-value
	Yes *n*=208	No *n*=102			
Desirable (<25)	171 (82.21)	77 (75.49)	248 (80.0)	2.49	0.64
Overweight (25-30)	25 (12.02)	19 (18.63)	44 (14.19)		
Obese (>30)	12 (5.77)	6 (5.90)	18 (5.81)		

LBP, Low back pain.

Table 5: Personal characteristics and intensity of participants' low back pain

Characteristic	LBP intensity – *n* (%)			Total *N* (%) *N*=208	χ^2	*P*-value
	Mild *n*=139	Moderate *n*=53	Severe *n*=16			
Age (years)						
< 30	23 (16.55)	7 (13.21)	2 (12.5)	32 (15.38)	*13.51	0.04
31-40	75 (53.96)	23 (43.40)	4 (25.0)	102 (49.04		
41-50	35 (25.18)	18 (33.96)	5 (31.25)	58 (27.88)		
51-60	6 (4.3)	5 (9.43)	5 (31.25)	16 (7.69)		
Sex						
Male	68 (48.92)	25 (47.17)	9 (56.25)	102 (49.04)	0.48	0.82
Female	71 (51.08)	28 (52.83)	7 (43.75)	106 (50.96)		
BMI						
Desirable (<25)	121 (87.05)	42 (79.26)	8 (50.00)	171 (82.21)	13.90	0.001
Overweight (25-30)	14 (10.07)	9 (16.98)	2 (12.5)	25 (12.02)		
Obese (>30)	4 (2.88)	2 (3.77)	6 (37.5)	37 (17.79)		
Height (m)						
≤ 1.60	106 (76.26)	39 (73.58)	5 (31.25)	150 (72.12)	14.53	<0.001
> 1.60	33 (23.74)	14 (26.42)	11 (68.75)	58 (27.88)		

LBP, Low back pain.
* Yate's correction applied.

The prevalence difference from studies in developed countries may be due to different modalities of farming practice. Rural farming activities in Nigeria require considerable physical effort which may predispose to LBP[18]. However, farming practice in developed countries is more mechanized, which is less physically demanding. Intercultural differences have also been hypothesized to account for LBP in differing geographic locations[20].

The high prevalence of LBP in the 31–40 and 41–50 year age groups is similar to the range of 25–54 years among Thai rice farmers[13]. However, opinions on the association of age with LBP are diverse[21], with Nigasu et al reporting no association[22], Bejia et al showing reducing prevalence[23], but Fabunmi et al[11] showing increasing prevalence with age. This diversity of opinion may have arisen from the wide range and variety of definitions of back pain influencing the measurement of study outcomes[24]. Increasing prevalence of LBP with age appears more plausible, considering the

prevalence of osteoarthritis, disc degeneration, osteoporosis and spinal stenosis in older populations, all of which may cause LBP[25]. It has also been postulated that once back pain occurs it is likely to be ongoing, so increasing prevalence with age is not surprising[26].

Community prevalence of LBP has implications for public health, especially the high LBP prevalence in the 31–50 years age group. Because this group forms the bulk of the work force, greater efforts should be made to address LPB in this group to avoid disability and resultant food scarcity in the area. The drop in LBP prevalence among farmers over 51 years in this study may reflect the low life expectancy in the study area and therefore small elderly population[27].

Low back pain was significantly more prevalent among females in this study, and this is consistent with reports that female sex increases the risk of LBP[19]. However other studies have found no such association[28]. Women are biologically predisposed to LBP due to risk factors such as pregnancy, young maternal age at first birth, duration of oral contraceptive use and use of estrogens during menopause, all of which result in hormonal changes responsible for a global laxity in the muscles and ligaments of the back, compromising the stability of the spine[29]. Socio-cultural factors also play some part in the high prevalence of LBP among female farmers. In some parts of Sub-Saharan Africa, women are primarily responsible for farming in order to produce food for their families. The combination of farming and other household work is capable of causing LBP[30].

In Nigeria, women comprise 60–90% of the agricultural labour-force, depending on the region, and may produce two-thirds of food crops[31]. In environments similar to the area of this study, 'sira' culture is practiced[32], where one daughter (usually the first) remains in her father's household and reproduces outside wedlock. In this culture widows may not remarry and must provide for their children, farming to fulfill this obligation. These female rural farmers are either self-employed or employed on 'task work' by a master. Because a day off work means income is lost, time maximization on the farm is part of the work culture. This subjects back muscles to repetitive strain, an important cause of LBP[33], and also explains the prevalence of LBP increasing with the years practicing farming in this study. A similar finding was reported among the peasant farmers in Iju-Odo, South West Nigeria[11].

Height below average was also found in this study to be significantly associated with LBP. Although positive and negative results have been reported in studies considering an association between height and LBP or sciatica[34], a proposed mechanism implicating height in lumbar pathology is that high lumbar disc height plays an important role in the etiology of low back pain[35]. Natarajan et al suggested that taller people have greater potential for instability under external loading, because higher discs are exposed to much higher risk of failure[36]. An anthropometric study also found that alterations to facet joints in patients with lumbar disc hernia were more evident in taller patients[37]. Considering the postural demands of peasant farming, height above average predisposes to developing LBP. The significant association of height with LBP in this study suggests greater public health efforts are warranted for specific LBP prevention strategies among tall farmers. This has a precedent in the provision of standing aids to tall Japanese cooks to minimize LBP[38].

The statistically significant association found between severity of LBP and age, height and BMI in this study corroborates some of the findings of Stranjalis et al, where the frequency and severity of LBP were significantly related to socio-demographic factors such as age and sex[39]. Sex, age, and kind of job presented a significant association with risk of LBP independently from other socioeconomic factors. Sex, in our study, contrary to previous study findings, was not significantly associated with the *severity* of LBP. However, differences in the characteristics of the sample populations may have been responsible for this. The severity of LBP in our study could be attributed to the degenerative effect of aging, higher discs which have potential for instability under external loading and the mechanical demands resulting from obesity.

Finally, information bias was an important limitation to the study results.

Conclusion

This study indicates that LBP was a common health problem among the Ebubu peasant farmers studied. It was more prevalent in the middle-age brackets, females, the non-obese, tall individuals and those with a long duration farming. Severe LBP was further linked to aging, the overweight/obese and those with height above average. The findings of this study suggest that primary prevention of LBP should be considered a priority due to the already constrained economic resources for overall health care. It is suggested that a policy of replacing subsistence farming with government-assisted mechanized and commercialized farming that reduces over dependence on manual labour can help to alleviate or eliminate this problem.

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