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Low back pain in Mozambican adolescents

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Abstract Recent literature shows that the prevalence of low back pain (LBP) in adolescents living in Western countries approaches that of adults 18–55 years of age. Moreover, epidemiological studies have also shown that the frequency of different rheumatic disorders in developing countries is similar to that found in Western industrialized regions. The purpose of this study was to ascertain the prevalence of LBP and to explore some risk factors among adolescents living in different zones of Mozambique. A previously validated questionnaire was distributed to schoolchildren of grades 6 and 7 living in three different residential/social regions of the country. Two hundred four (204) children participated in the survey. Median age was 13 years (age range 11–16 years) and 46% were boys. Several episodes of LBP interfering with usual activities during the previous year were reported by 13.5% of the sample. Living in the wealthier urban center (as compared with the peripheral regions) and walking >30 min per day to and from school were associated with an increased risk of LBP (OR 3.1, 95% CI 0.99–9.48, and OR 4.8, 95% CI 1.61–14.28, respectively).

Keywords Low back pain · Adolescents · Africa · Risk factors · Epidemiology

Introduction

Temporal variability as well as geographical and racial differences in the prevalence of some rheumatic diseases have been shown [1]. The epidemiology of rheumatic disorders in African countries has been reviewed by Adebajo and Davis [3] and Adebajo [2] who highlighted the difficulties in carrying out these studies. These authors stated that "It is now clear that...non-articular back...pain occurs among Africans, but medical attention is less frequently sought... This may, in part, relate to socio-cultural lifestyle and the lack of health insurance and compensation schemes..." [2].

Concerning the problem of low back pain (LBP) specifically two studies, one performed in Lomé (Togo) [15] and the other in Kinshasa (Congo Democratic Republic, formerly Zaire) [9], showed that the prevalence of degenerative spinal disorders was almost as common as in Western countries. All the above-mentioned studies concerned adult populations. During the past decade several surveys [4, 5, 6, 8, 18, 21] in different Western countries have shown prevalence rates of LBP among school children to be higher than previously thought, and similar to that found in adults.

Recently, investigators have focused on musculoskeletal disorders in African children. A recent retrospective study reported that 1.5% (or 434) of the 29,620 patients younger than 16 years admitted to two Togolese hospitals suffered from musculoskeletal disorders. The most frequent disorders were osteomyelitis and limb deformities. Spinal "degenerative" disorders were uncommon: 38 subjects were diagnosed as having Scheuermann's disease (17 of them presenting with thoracic kyphosis) and 6 other patients presented with radiculalgia [16]. A survey about LBP performed in Algiers included a subgroup of 592 males and 562 females aged 15–19 years. Low back pain was defined as pain in the lumbar area at least 1 day during the previous 30 days. Among these older adolescent subjects the self reported prevalence of LBP in the prior 30 days was 2.2% among boys and 2.85% among girls [7].

It has been shown that socio-economic status is an important determinant of fitness in Mozambique, especially because of its influence on body size, composition, and on physical activity. Particularly, children from lower socio-economic regions performed significantly better in endurance runs [17].

The purpose of the present study was to ascertain the prevalence of LBP in young adolescents living in varying circumstances in a non-industrialized country, and to explore LBP risk factors in these groups. Based on the physical differences cited above, our hypothesis was that young adolescents with lifestyles similar to those of children in Western industrialized societies would have similar risk factors and prevalence of LBP, whereas young adolescents living in difficult material conditions would be less likely to report it.

Materials and methods

This study was a survey of children attending the intermediate schools of the Maputo district in Mozambique. While Maputo is a city in a non-industrialized country, there is socio-economic and environmental heterogeneity. It has three residential/social regions. Regions were as follows: region 1 is an urban center similar to that in an industrialized country, i.e., concrete buildings served by electricity and water systems; region 2 surrounds the first zone and is composed primarily of houses made of reed (the Caniço). It is not served by any urban services, and had high population density; region 3 is an outer peripheral zone similar to region 2 in residential construction and absence of urban services. It differs from region 2 in that it includes a mixture of people who work in the town and people who work on the land, and has a lower population density.

Region of residence was used as the surrogate for socio-economic status (SES) and lifestyle. A stratified sample of students in intermediate schools representing the three regions was identified. Children in grades 6 and 7 (age 11–16 years) were surveyed.

The characteristics of the surveyed subjects have been described in more detail elsewhere [17].

Table 1 Characteristics of children participating in the survey (*n*=204)

Median age (years; range)	13 (11–16)
Male (%)	46
Play regular sports (%)	40
Walk >30 min to school each way (%)	58
Dwelling region	
Center (%)	50
Caniço (%)	20
Periphery (%)	30
Ever had any back pain (%)	58
History of low back pain	
Had several episodes (%)	
In lifetime (%)	28
In previous year (%)	13.5
In previous month (%)	12
History of radiating pain (%)	8
Saw MD or folk healer (%)	4

The children completed a self-administered questionnaire adapted from that of Balagué et al. [6] translated into Portuguese. The questionnaire ascertained demographic characteristics, usual physical activity, selected environmental characteristics, self-reported history, and location of back pain at different moments of their lives (Table 1). The extent to which it interfered with daily activities, frequency, and duration of usual sports and time spent walking to and from school was also noted. Test–retest reliability of the Portuguese version of the questionnaire was established in a preliminary study. We report here on data from questions whose reliability coefficients were 0.7 or better.

Statistical analysis

For purposes of statistical analysis, ordinal variables were categorized. The relationships of potential risk factors and self-reported LBP were explored by contingency table methods. Children were considered to have LBP if they reported having had several episodes which interfered with usual activities. Independent variables examined included age, sex, school district, frequent sports activity, time spent watching TV, and time spent walking to and from school. The simultaneous contributions of several variables to reporting LBP were estimated by multiple logistic regression. Alpha was set at 0.05.

Results

All 204 children present on the day of the survey participated (85% of 240 eligible). Their median age was 13 years (age range 11–16 years); 46% were boys. Fifty percent of the participants were students in the urban, 20% in the suburban, and 30% in the semi-rural areas. Lifetime prevalence of relapsing LBP was 28%, and 13.5% reported having had LBP several times in the previous year (Table 1).

The geographical distribution of ages is described in Table 2. Children aged 11–12 and 15–16 years were concentrated in the urban district. Specifically, all the children in the younger age group lived in the urban district,

Table 2 Association of age and district

Age (years)				
District	11–12	13–14	15–16	All ages
Suburban	0	35	6	41
Urban	32	49	21	102
Rural	0	60	0	60
All districts	32	144	27	203

Table 3 Children's characteristics, district, usual activity, and reported low back pain

Characteristic	Number	Low back pain (%)	*p* value
Region			
Center	101	21	0.008
Caniço	41	7	
Periphery	59	5	
Time walking to school			
>30 min	83	19	<0.01
≤30 min	118	6	
Age (years)			
11–12	32	25	0.001
13–14	143	8	
15–16	26	31	
Sex			
Male	92	11	0.33
Female	109	16	
Playing sports			
Never	70	14	0.48
<2 times/week	52	17	
≥2 times/week	79	10	
Time watching TV daily			
≤1 h	55	11	0.52
>1 h	146	14	

and only 6 children in the older age group were not in the urban district.

Female gender, time spent watching TV, and playing sports showed trends but were not significantly associated with reporting LBP. Age, attending school in the urban center, and walking >30 min to school each day were associated with history of LBP (p=0.001, p=0.008, and p<0.01 respectively; Table 3).

Because of the similarities in age, sex, sports activity, time spent walking to school, and prevalence of LBP, the suburban and semi-rural geographic districts were combined for a dichotomous contrast in the logistic regression. In Table 4 we describe the results of the analysis restricted to children aged 13–14 years.

In logistic regression, female gender, time watching TV, and usual sports activity were not significantly associated with reported LBP.

Due to the geographical distribution of the three age groups, multiple logistic regression was performed for all

Table 4 Characteristics, district, usual activities, and reported low back pain in children age 13–14 years (n=144)

Characteristic	Number	Low back pain (%)	*p* value[a]
Region			
Center	49	14	0.045
Suburban/periphery	95	4	
Time walking to school			
>30 min	85	12	<0.02
≤30 min	59	2	
Sex			
Male	65	3	0.11
Female	79	12	
Playing sports			
<2 times/week	93	10	0.18
≥2 times/week	51	4	
Time watching TV daily			
≤1 h	95	8	0.75
>1 h	49	6	

[a]Two-tailed Fisher's exact test

Table 5 Results of multiple logistic regression in all children. Characteristics associated with reporting several episodes of low back pain. *OR* odds ratio

Characteristic	Adjusted OR	95% CI	*p* value
Urban area school	3.07	0.99– 9.48	0.051
Age 13–14 years	0.34	0.13– 0.93	0.036
Walking >30 min to school	4.76	1.61–14.28	0.005

Sex, time spent watching TV, and usual sports activity were not significant factors in multivariate analysis

Table 6 Results of multiple logistic regression in 13- to 14-year olds. Characteristics associated with reporting several episodes of low back pain interfering with activities

Characteristic	Adjusted OR	95% CI	*p* value
Urban area school	5.6	1.47–21.36	0.012
Walk >30 min	11.4	1.35–95.48	0.025

Sex, time spent watching TV, and usual sports activity were not significant predictors in multivariate analysis

the subjects (Table 5) as well as limited to children aged 13–14 years (Table 6). The associations of attending school in the urban center and walking >30 min to school remained significant in multiple logistic regression for the whole sample (p=0.051 and p=0.005; Table 5) as well as in the 13- to 14-year age group (p=0.012 and p=0.025; Table 6).

Discussion

Comparing epidemiological data from different areas is a difficult task. Several explanations, including artifacts of ascertainment of differences, have been highlighted in a recent review [1]. A relevant study comparing chronic LBP in adults from six different culture groups (American, Colombian, Italian, Japanese, Mexican, and New Zealander) reported that there are "important cross-cultural differences in chronic low back pain patients' self-perceived level of dysfunction..." [19].

The present study found low prevalence of LBP among young adolescents from the traditional rural periphery, whereas those from the urban center reported LBP in rates similar to those observed in Western industrialized countries. These results extend the body of knowledge on socio-economic factors and LBP to include young adolescents in developing countries. Furthermore, the results are in agreement with Volinn's [22] review of the literature on national differences in LBP in adults, wherein there is a lower point prevalence of LBP in low-income countries compared with high-income ones. In the low income countries, the rural areas' inhabitants had the lowest prevalence whilst urban area populations and particularly workers in enclosed workshops reported much higher rates [22]. The methodological difficulties were highlighted and some explanations for the results, including differences in subjects' characteristics such as age, comorbidities, and exercise habits, were suggested in this article [22] and in the accompanying comment by Deyo [11].

Our cross-sectional design only allows to explore associations between variables and not to establish any causal relationship. Children living in region 1 (urban center) were taller and heavier with a higher percentage of fat. From the standpoint of physical activity, these subjects were less active than their counterparts from the poorer regions due to the fact that the latter spend more time in outdoor games and survival activities. Since survival activities in Africa include heavy tasks, such as pounding, carrying water, and agriculture, the overall energy expenditure is much higher in the poor areas [17]. Moreover, it has been shown that this school-age population in Maputo's poor areas presents higher fitness levels than the privileged ones from the same town. In this study, a more sedentary lifestyle was associated with an increase in self-reported LBP.

Usual physical activity was not associated with self-reported LBP, with the exception of time spent walking to and from school. Surprisingly, walking >30 min each day to and from school was a risk factor for self-report of LBP. This remained true controlling for district of residence. In our previous study [6] this factor was not found to be associated with LBP. It is not clear if the finding in Mozambican children is attributable to walking or to unmeasured factors; thus, further research is needed to clarify the association.

The possible role of comorbidities was not studied by us. This may be a fruitful area for future research.

A study among adults and children working in the carpet-weaving industry in India showed that backache was more common among workers (n=200) than among controls (n=60). The actual figures for point prevalence were 27 vs 10% [10].

According to Volinn [22] and Deyo [11] other possible explanations may be differences in pain threshold, access to modern medicine, subjects' constitution, culture, and exposure to stress factors.

The present study found differences in children in one metropolitan area of a developing country based on district of residence, a surrogate for socio-cultural and environmental factors. These findings are consistent with the socio-cultural/environmental hypothesis to explain cross-national differences in prevalence of back pain in young adolescents. Relevant studies in adults can add strength to the socio-cultural/environmental hypothesis. Hameed and Gibson [12] studied the prevalence of several musculoskeletal disorders among Pakistani adults living in England and Pakistan. Subjects living in England showed clear evidence of "cultural continuity." The prevalence of LBP was higher in England (2.6%) than in Pakistan (1%). The authors suggested a role of "some aspect of living or working conditions in the West," like the weather invoked by the surveyed subjects themselves [12], to explain the geographical differences in LBP. The finding is in agreement with Volinn [22]. The relationships were not simple, however, for among those persons living in Pakistan LBP was more common in the poor compared with the affluent; thus, the cultural hypothesis suggested by Deyo [11] does not entirely explain the results of Hameed and Gibson [12].

The role of cultural beliefs and practices has also been highlighted among Australian Aboriginals [13]. The role of pain perception was suggested to explain the low prevalence of chronic widespread pain and shoulder disorders among the adult Pima Indians compared with Caucasian populations [14].

These factors may also play a role in Western societies. Skovron et al. found significantly different prevalences of LBP between French-speaking and Flemish-speaking subjects in Belgium [20].

Conclusion

In conclusion, the present study extends the body of research on LBP to include young adolescents in developing countries. The findings are consistent with a hypothesis of socio-cultural and environmental explanations for cross-national differences in prevalence of LBP. Moreover, studying young adolescents before they enter the work force allowed us to avoid the influence of workload, work perception, and constraints on self-reported LBP.

The possibility of a paradoxical effect of the Western medical, legal, and insurance systems leading to an increased reporting of LBP rather than reducing it [11] seems to be a real one. As Deyo has suggested [11] cross-sectional studies are more "hypothesis generating" than "hypothesis testing." Prospective studies specifically designed to clarify the relationships would be necessary for hypothesis testing. Nevertheless, this study and the weight of evidence in other studies provide persuasive data in support of the socio-cultural hypothesis for cross-national differences in LBP.

References

1. Abdel-Nasser AM, Rasker JJ, Valkenburg HA (1997) Epidemiological and clinical aspects relating to the variability of rheumatoid arthritis. Semin Arthritis Rheum 27:123–140
2. Adebajo A (1995) Epidemiology and community studies: Africa. Baillière's Clin Rheumatol 9:21–30
3. Adebajo A, Davis P (1994) Rheumatic diseases in African Blacks. Semin Arthritis Rheum 24:139–53
4. Balagué F, Dutoit G, Waldburger M (1988) Low back pain in schoolchildren: an epidemiological study. Scand J Rehabil Med 20:175–179
5. Balagué F, Nordin M, Skovron ML, Dutoit G, Yee A, Waldburger M (1994) Non-specific low-back pain among schoolchildren: a field survey with analysis of some associated factors. J Spinal Disord 7:374–379
6. Balagué F, Skovron ML, Nordin M, Dutoit G, Waldburger M (1995) Low back pain in schoolchildren. A study of familial and psychological factors. Spine 20:1265–1270
7. Bezzaoucha A (1992) Epidemiologie descriptive de la lombalgie à Alger. Rev Rhum Mal Ostéoartic 59:121–124
8. Burton AK, Clarke RD, McClune TD, Tillotson KM (1996) The natural history of low-back pain in adolescents. Spine 20:2323–2328
9. Bwanahali K, Dikilu K, Kilesi M, Kapita B (1992) Quelques aspects étiologiques des lombalgies chez les rhumatisants consultants a Kinshasa (Zaïre). Rev Rhum Mal Osteoartic 59: 253–257
10. Das P, Shukla K, Öry F (1992) An occupational health program for adults and children in the carpet weaving industry, Mirzapur, India: a case study in the informal sector. Soc Sci Med 35: 1293–1302
11. Deyo R (1997) Point of view. Spine 22:1754
12. Hameed K, Gibson T (1997) A comparison of the prevalence of rheumatoid arthritis and other rheumatic diseases amongst Pakistanis living in England and Pakistan. Br J Rheumatol 36:781–785
13. Honeyman PT, Jacobs EA (1996) Effects of culture on back pain in Australian Aboriginals. Spine 21:841–843
14. Jacobsson L, Nagi D, Pillemer S et al. (1996) Low prevalence of chronic widespread pain and shoulder disorders among the Pima Indians. J Rheumatol 23:907–909
15. Mijiyawa M, Koumouvi K, Segbena A et al. (1996) Pathologie rachidienne en consultation rhumatologique à Lomé (Togo). Ann Med Interne 147:397–401
16. Mijiyawa M, Oniankitan I, Attoh-Mensah K et al. (1999) Musculoskeletal conditions in children attending two Togolese hospitals. Rheumatology 38: 1010–1013
17. Prista A, Marques AT, Maia JAR (1997) Relationship between physical activity, socioeconomic status, and physical fitness of 8–15-year-old youth from Mozambique. Am J Hum Biol 9: 449–457
18. Salminen JJ, Erkintalo TM, Laine M, Pentti J (1995) Low-back pain in the young. A prospective three-year follow-up study of subjects with and without low-back pain. Spine 20:2101–2108
19. Sanders S, Brena S, Spier C, Beltrutti D, McConnell H, Quintero O (1992) Chronic low back pain patients around the world: cross-cultural similarities and differences. Clin J Pain 8:317–323
20. Skovron ML, Szpalski M, Nordin M, Melot C, Cukier D (1994) Sociocultural factors and back pain. A population-based study in Belgian adults. Spine 19:129–137
21. Taimela S, Kujala UM, Salminen JJ, Viljanen T (1997) The prevalence of low back pain among children and adolescents. Spine 22:1132–1136
22. Volinn E (1997) The epidemiology of low back pain in the rest of the world. A review of surveys in low- and middle-income countries. Spine 22:1747–1754