CONCISE REPORT

An excess of widespread pain among South Asians: are low levels of vitamin D implicated?

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Background: Anecdotal reports from rheumatologists in the United Kingdom suggest that patients from South Asian backgrounds are more likely to report widespread body pain.

Objective: To confirm the presence of an excess of widespread pain in South Asians, and to evaluate the relationship of their symptoms with levels of 25-OH vitamin D.

Methods: Two population studies involving over 3135 subjects were carried out in the North West and Midlands areas of England.

Results: The first study confirmed an excess of widespread pain among South Asians (OR=1.6, 95% CI 1.3 to 2.1). The second smaller study conducted only among young women also showed a similar excess of widespread pain among South Asians (OR=1.8, 95% CI 0.7 to 4.7) and found that low levels of 25-OH vitamin D (<10 ng/ml) were more common among those with widespread pain (OR=3.5, 95% CI 0.4 to 31.0).

Conclusions: Owing to the small numbers, the relationship between 25-OH vitamin D and widespread pain must be considered preliminary and requires further investigation. However, it may be one potentially treatable cause of widespread pain.

Based on anecdotal evidence, rheumatologists in the United Kingdom report that widespread pain is more common among clinic patients of South Asian origin. The first population based study, in the United Kingdom, to examine the prevalence of pain among different ethnic groups showed that although there was little difference in the reports of regional pain syndromes, chronic widespread pain was indeed in excess among people of South Asian origin.¹

One possible biological explanation for an excess of such symptoms is vitamin D insufficiency. Although osteomalacia is the most widely recognised musculoskeletal consequence of vitamin D insufficiency, non-specific musculoskeletal pain is a frequently recognised clinical presentation.² Risk factors for hypovitaminosis D include older age, female sex, a vegetarian diet, and low levels of sunlight exposure.^{3–5} In line with these factors, several studies have demonstrated that people of South Asian origin are at higher risk of hypovitaminosis D and frank osteomalacia than white people.^{3–7} As an example, one study of Indo-Asian patients at an outpatient clinic in the United Kingdom reported a prevalence of hypovitaminosis D of 78%.⁸

The aims of the current study were, firstly, to confirm that people in the United Kingdom of South Asian origin were more likely to report widespread pain and, secondly, to determine, among people of South Asian origin whether

vitamin D insufficiency has an important role in explaining any such increased prevalence.

METHODS

Data for this analysis were derived from two population based cross sectional surveys (A and B) which compared subjects of South Asian (Indian, Pakistani, and Bangladeshi) origin with white Europeans living in England (table 1).

Survey A was a population based cross sectional survey of musculoskeletal pain among people aged 18–75 years. The sample was obtained from the age-sex register of 13 general practices in parts of England with relatively high densities of people of South Asian origin, specifically in the northwest towns Bolton, Oldham, Ashton, and Tameside, and the city of Birmingham in the West Midlands.

All registered patients from the 13 study practices were mailed a questionnaire in English, with a note in other South Asian languages (Urdu, Punjabi, Bengali, and Gujarati) offering a version of the questionnaire in those languages. The questionnaire assessed pain using blank body manikins. This allowed us to determine whether respondents met the definition for widespread pain, as used in the American College of Rheumatology criteria for fibromyalgia—that is, subjects were required, during the past month, to have had contralateral body quadrant pain and axial skeleton pain.⁹ Subjects were also invited to identify their ethnic group according to the classification used in the United Kingdom 2001 census. Non-responders received a postcard reminder 2 weeks after the initial mailing, and a further questionnaire 2 weeks later. If there was still no response, a contact visit by a local community worker, who was both culturally and linguistically familiar with that subject's ethnic background, was made to assist in completing the questionnaire.

Survey B was a screening survey of bone mass in women aged 18–36 years living in the Greater Manchester area. As in survey A, women of Pakistani, Gujarati, and white European origin were recruited from primary care registers. Women were mailed a letter inviting participation and those who responded were asked to attend to complete a detailed questionnaire which included a blank body manikin (to assess the occurrence of widespread pain), a blood test for assessment of 25-OH vitamin D, and bone density scanning. Non-responders received a postcard reminder 2 weeks after the initial mailing, and in the case of South Asians if there was still no response a contact visit by a link worker was made. Serum 25-OH vitamin D was quantified by ultraviolet absorbance on high pressure liquid chromatography (HPLC) after solvent extraction and separation using Ceppak C18 cartridges and straight phase HPLC.

Statistical analysis

Analysis of the relationship between pain and ethnic status, and among subjects of South Asian origin between widespread pain and 25-OH vitamin D status was by logistic regression, with the association summarised by odds ratios

Table 1 Prevalence of ACR defined widespread pain in the two studies

	South Asian		White Europeans	
	No	(%)	No	(%)
<i>Study A</i>				
Widespread pain positive	270	(14)	110	(12)
Widespread pain negative	1659	(85)	810	(87)
Missing	16	(1)	12	(1)
Total	1945	(100)	932	(100)
OR (95% CI)	1.20	(0.95 to 1.52)	1	
Adjusted OR (95% CI)*	1.61	(1.26 to 2.08)	1	
<i>Study B</i>				
Widespread pain positive	13	(9)	7	(6)
Widespread pain negative	119	(87)	110	(91)
Missing	5	(4)	4	(3)
Total	137	(100.00)	121	(100)
OR (95% CI)	1.72	(0.66 to 4.46)	1	
Adjusted OR (95% CI)†	1.78	(0.67 to 4.71)	1	

*Adjusted for age and sex; †adjusted for age.

(ORs) and 95% confidence intervals (CIs). Widespread pain was the dependent variable in each model. All analyses were conducted using STATA.¹⁰

Both studies received ethical approval from the relevant local research ethics committees.

RESULTS

In survey A, from a sample of 3596 South Asians and 1509 white Europeans, 1945 South Asians and 932 white Europeans were recruited. Compared with the white Europeans, a lower proportion of the South Asian participants were female (49% v 59%) and they were younger (median age 36 years v 50 years). The prevalence of widespread pain was slightly higher in the South Asians (14%) than in the Europeans (12%). However, given that a higher percentage of the South Asians were male and of younger age and hence at low risk of widespread pain, once adjustment had been made for the age and sex differences between the groups, the excess in South Asians was greater and statistically significant (OR = 1.6, 95% CI 1.3 to 2.1).

In (screening) survey B, 137 South Asians (median age 29 years) and 121 white Europeans (median age 31 years) were recruited. Once again, the prevalence of widespread pain was greater in the South Asians (9%) than in the Europeans (6%), with a similar increase in the odds of reporting widespread pain among South Asians (OR = 1.8, 95% CI 0.7 to 4.7), although because of the smaller sample size, this did not reach statistical significance.

Among the participants in study B, 105 white Europeans and 114 South Asians agreed to provide a blood sample for determining levels of 25 OH-vitamin D. These were found to be significantly lower in South Asians (median (interquartile range (IQR)) 7.2 (5.2 to 10.6) v 25.5 (17.3 to 32.1) ng/ml; $p < 0.0005$). Of the South Asian and European subjects, 81/114 (71%) and 10/105 (10%), respectively, had levels of 25-OH vitamin D below 10 ng/ml. Interestingly 7/8 (88%) South Asian women with pain had low levels of vitamin D in comparison with 71 (70%) of those without, although the small numbers of those with widespread pain resulted in wide confidence intervals (OR = 3.5, 95% CI 0.4 to 31.0) (table 2). The relationships remained unchanged when data were adjusted for seasonality (data not shown).

DISCUSSION

This study has confirmed, firstly, that widespread pain is more common among people of South Asian origin in the

Table 2 Association between total serum 25 OH-vitamin D and widespread pain in South Asian women from Study B

	OH-vitamin D			
	≤ 10 ng/ml		> 10 ng/ml	
	No	(%)	No	(%)
Widespread pain positive	7	(9)	1	(3)
Widespread pain negative	71	(88)	30	(91)
Missing	3	(4)	2	(6)
Total	81	(100)	33	(100)
OR (95% CI)	3.5	(0.4 to 31.0)	1.0	(Reference group)

United Kingdom. Secondly, it has shown that low levels of 25-OH vitamin D are common even among young Asian women. Thirdly, the data showing that almost all Asian women with widespread pain had low levels of vitamin D suggests that low vitamin D may explain the increased occurrence of widespread pain in South Asians.

These results thus supported the initial hypothesis that low levels of vitamin D were associated with widespread pain. The major limiting factor in regard to the third conclusion is that study B identified only a very small number, among a sample of young women, with widespread pain. Although the association with widespread pain appeared to be strong, the confidence interval was very wide and did not exclude a null effect. Further it is evident, given the high proportion of young women of South Asian origin with low levels of 25-OH vitamin D, who did not have widespread pain that the former is not a sufficient cause of symptoms. Secondly, participation rates were relatively low, as has been common in population studies of South Asians, and may have led to a bias in our estimates of prevalence of both pain and low vitamin D. The prevalence of widespread pain among South Asian and white Europeans was, nevertheless, similar to that found in a previous study.¹

The finding of an association between low levels of 25-OH vitamin D and chronic widespread pain could be a result of participation bias but this does not seem likely. Finally, there is a lack of consensus about what represents a low level of 25-OH vitamin D.¹¹ In this study we used local criteria, but the main conclusion of an association between chronic widespread pain and low levels of vitamin D remains true even with minor changes in definition.

Could the results of an association between widespread pain and low levels of 25-OH vitamin D be confounded? For example, psychological distress, which is an established risk factor for widespread pain,¹² may be associated with a lifestyle that results in low levels of sun exposure or poor intake of vitamin D from diet. Similarly, low levels of 25-OH vitamin D may be a marker for low socioeconomic status. In order for low socioeconomic status to confound the observed relationship it would have to be a risk factor for widespread pain. Studies conducted to date have not provided evidence that low socioeconomic status is a risk factor for widespread pain.¹³ However both these hypotheses will require testing in future studies.

Recent studies have demonstrated a high prevalence of hypovitaminosis D among clinic patients with non-specific musculoskeletal pain in the United States.¹⁴ Among asylum seekers in Switzerland, vitamin D deficiency was associated with diagnoses of somatoform disorder, chronic back pain,

and multiple unexplained symptoms, but symptoms improved on treatment of low calcium and cholecalciferol.¹⁵

In summary, among South Asians the report of widespread pain is more common than among white Europeans. This study has demonstrated that while low levels of 25-OH vitamin D are common among South Asian women, rates are even higher among those reporting widespread pain. The findings from the current study, for the reasons stated above, should be considered preliminary. Future, larger, studies will be necessary to quantify accurately the magnitude of the relationship. However, for a condition that is persistent and difficult to treat this may be one treatable cause which needs to be investigated further.

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