Illuminating the dark side--vitamin D status in different localities of Karachi.

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Vitamin D deficiency (VDD) is a global public health issue and is on the rise in Pakistani population. In a study, Pakistani immigrants in Norway had alarmingly low levels of 25-hydroxy D (25[OH]D) (< 24.9 nmol/L).1 Seventy eight per cent of the hospital staff in Lucknow India were found vitamin D deficient.2 Similarly, in a study conducted in Lahore, Pakistan VDD was observed in 81% of the pre-menopausal women.3 A recent report from an adult ambulatory care setting in Karachi revealed 62% severe VDD.4 In one of our studies on healthy volunteers, low serum 25[OH]D was found in 94.3% of the females and 88.6% of the males.5

Sunlight exposure is an important determinant of serum 25[OH]D levels. At an individual level, factors associated with low sunlight exposure include conservative clothing practices, use of sunscreens, darker skin tone, physical barriers such as glass windows of cars and offices, and house bound individuals who may have little exposure to sunlight. In addition to the individual level factors, household level factors may also influence sunlight exposure. A study on Saudi Arabian women showed severe VDD in apartment dwellers as compared to those women living in villas with more exposure to sunlight.6 The aim of the present study was to study the association between place of residence and 25[OH]D levels of individuals.

Data of those who had 25[OH]D levels assessed (n = 19073) at the Aga Khan University (AKU), Clinical Laboratory, Karachi, from January 2007 to June 2008 were reviewed. Those samples from areas outside Karachi were excluded. Samples received from November to February were included in the winter season and summer months were from March to June. The residential addresses were categorized into ten neighbourhoods with distinct housing structure attributes and localities. A high frequency of VDD in all the studied localities of an urban city warrant dietary vitamin D supplementation and food fortification.

### ABSTRACT

This study was conducted to determine the association between place of residence (grouped into neighbourhoods), and 25-hydroxy D (25[OH]D) levels of individuals of Karachi. Addresses of 4788 individuals tested for 25[OH]D at the clinical laboratory of the Aga Khan University (AKU), Karachi, from January 2007 to June 2008 were reviewed. The neighbourhoods were categorized into ten, based on locality attributes. A high overall prevalence (74%) of vitamin D deficiency (VDD) was observed. There was a significant difference (p-value < 0.01) between mean log 25[OH]D levels amongst neighbourhoods grouped according to distinct housing structure attributes and localities. A high frequency of VDD in all the studied localities of an urban city warrant dietary vitamin D supplementation and food fortification.

### Key Words:


Table I: Vitamin D status in individuals residing in Karachi, Pakistan (n = 4788).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age groups (years)</th>
<th>n</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
<th>Group V</th>
<th>Group VI</th>
<th>Group VII</th>
<th>Group VIII</th>
<th>Group IX</th>
<th>Group X</th>
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<tbody>
<tr>
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<td>1393</td>
<td>44.4</td>
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<td>59.7</td>
<td>67.7</td>
<td>64.6</td>
<td>63.4</td>
<td>67.3</td>
<td>74.8</td>
<td>74</td>
<td>66.4</td>
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<tr>
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<td>&gt; 50</td>
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<td>45.9</td>
<td>39.1</td>
<td>77.3</td>
<td>73.4</td>
<td>64.6</td>
<td>63.4</td>
<td>72.4</td>
<td>76.2</td>
<td>72</td>
<td>73.4</td>
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<tr>
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<td>38.1</td>
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<td>64.6</td>
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<td>76.2</td>
<td>72</td>
<td>73.4</td>
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<tr>
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<td>2128</td>
<td>54.1</td>
<td>42.9</td>
<td>64.1</td>
<td>67.3</td>
<td>64.6</td>
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<tr>
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<td>2128</td>
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<td>1.14a</td>
<td>1.08b</td>
<td>1.1ab</td>
<td>1.08b</td>
<td>1.06b</td>
<td>1.07b</td>
<td>1.11ab</td>
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<tr>
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</table>


Vitamin D deficiency was observed in 73.7% subjects, insufficiency in 13.8% and 12.5% were identified to have sufficient levels. Statistically significant difference between mean log 25(OH)D of participants residing in different neighbourhoods of Karachi was observed (p < 0.01). Post Hoc test results reflected that lowest mean log 25(OH)D levels were observed in residents of Landhi, Malir and Korangi (Table I).

Average sunshine in Karachi is 304 hours/month during summer and 280 hours/month during winter. It is unclear why the prevalence of VDD was so high in all the ten localities despite stark differences in sunlight exposure related to the housing style of these neighbourhoods. Mean log serum 25(OH)D levels were highest in Clifton, Defence and PIB. Postpartition PIB colony was developed as the first planned residential colony for the immigrants built in a manner to provide basic living amenities with proper ventilation and sunlight. PIB Colony is a middle class neighbourhood and mostly has 150-square-yard houses having paved backyards. Whereas, Clifton has been a posh residential place since long. While, Defence Housing Authority is a relatively newer neighbourhood with all the modern amenities and the residents mostly belong to the upper echelon of the society.

Trends towards increased indoor living and the growing popularity of apartments in Karachi may be the cause of VDD through reduced exposure to sunlight. Other prevailing risk factors that may be attributed to the role of government are weak social and economic infra-structure in certain areas and insufficient intake of healthy food by a major portion of the population. Educational intervention is needed to improve awareness about the importance of dietary intake of vitamin D and calcium along with housing structures of each locality. The need to develop and validate sunlight exposure questionnaires to accurately capture vitamin D status also exists.

REFERENCES


