Prevalence and of vitamin D deficiency and associated factors in Turkey

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Background

Enormous evidence suggests that vitamin D deficiency could be linked to several chronic diseases, including cardiovascular disease, diabetes, obesity, depression and cancer. Serum 25-hydroxyvitamin D (25(OH)D) is considered to be the best indicator of overall Vit-D status of an individual. 25(OH)D concentration provides the evaluation of Vit-D. There is a debate regarding the optimal 25(OH)D level. WHO defined Vit-D insufficiency as 25(OH)D level <20 ng/mL in 2003 (1). In 2008, there are studies reporting optimal 25(OH)D levels as near 30 ng/mL (2,3).

Objective

The purpose of this study was to examine the prevalence and correlates of vitamin D deficiency in adult Turkish population.

Materials & Methods

We used data from a population-based, cross-sectional ‘Turkish Diabetes, Hypertension, Obesity and Endocrine Disease Epidemiology Survey’ (TURDEP-II); including 9,560 adult Turkish people (mean [SD] age: 45.3 ±15.4 yrs., 64% women). The study was conducted in 540 urban/rural centers from Jan to June 2010.

Serum 25(OH)D concentration was measured by HPLC (ClinRep, Germany), other parameters were measured by E170 autoanalyzer Roche, Germany.).

Serum levels of 25(OH)D according to demographic features and lifestyle factors in women and men are depicted in Table 1.

Vit-D deficiency was defined as 25(OH)D concentration ≤20 ng/mL (≤50 nmol/L). The prevalence of vit.D deficiency was 93%, higher in women than in men.

Results

As it is illustrated in Figure 1, serum 25(OH)D was inversely correlated with PTH (r=-0.122, p<0.001).

Fig. 1. Scatter plot of 25(OH)D and PTH

Distribution of 25(OH)D levels by age groups in (A) women and (B) men participants of the TURDEP-II is shown in Figure 2.

Fig. 2A. Women

Serum 25(OH)D levels (controlled for age, gender, region, living environment, BMI, waist, and season) correlated with fish, cheese, and sunflower oil consumption; serum creatinine, LDL-cholesterol, HDL-cholesterol, FT4, vit.B12, folicates, IGF1, IGFBP3 and eGFR.

Fig. 2B. Men

Multiple logistic regression model with Z scores showed in Table 2. Accordingly, male gender, increase in total chole, HDL-cholesterol, and IGF1 positively associated; but eGFR (18.6 mL/min) and PTH (22.7 pg/mL) inversely associated with vitamin D (>20 ng/mL).

Table 1. Serum 25(OH)D levels in women and men of the TURDEP-II population

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Women</th>
<th>Men</th>
<th>p between groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (kg/m²)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>21.4</td>
<td>24.1</td>
<td>≤0.050</td>
</tr>
<tr>
<td>Obese</td>
<td>27.8</td>
<td>29.4</td>
<td>p=0.265</td>
</tr>
<tr>
<td>W/Ht (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>158</td>
<td>161</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Obese</td>
<td>172</td>
<td>175</td>
<td>p=0.011</td>
</tr>
<tr>
<td>Blood glucose (mg/dL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>93</td>
<td>97</td>
<td>0.417</td>
</tr>
<tr>
<td>Obese</td>
<td>109</td>
<td>113</td>
<td>p=0.002</td>
</tr>
<tr>
<td>Triglycerides (mg/dL)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>152</td>
<td>150</td>
<td>≥0.050</td>
</tr>
<tr>
<td>Obese</td>
<td>170</td>
<td>175</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>HDL-cholesterol (mg/dL)</td>
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</tr>
<tr>
<td>Normal</td>
<td>58</td>
<td>60</td>
<td>0.014</td>
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<tr>
<td>Obese</td>
<td>64</td>
<td>65</td>
<td>p=0.003</td>
</tr>
<tr>
<td>LDL-cholesterol (mg/dL)</td>
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<td></td>
</tr>
<tr>
<td>Normal</td>
<td>103</td>
<td>107</td>
<td>0.013</td>
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<tr>
<td>Obese</td>
<td>117</td>
<td>119</td>
<td>p=0.001</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
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<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0.76</td>
<td>0.76</td>
<td>≥0.050</td>
</tr>
<tr>
<td>Obese</td>
<td>0.85</td>
<td>0.85</td>
<td>p=0.002</td>
</tr>
<tr>
<td>LogPTH (l)/cm²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0.26</td>
<td>0.26</td>
<td>≥0.050</td>
</tr>
<tr>
<td>Obese</td>
<td>0.31</td>
<td>0.31</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Log25(OH)D (ng/mL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>32</td>
<td>34</td>
<td>≥0.050</td>
</tr>
<tr>
<td>Obese</td>
<td>36</td>
<td>37</td>
<td>p=0.002</td>
</tr>
</tbody>
</table>

Discussion

The prevalence of Vit-D deficiency is common in the adult population of Turkey. Lifestyle and general health factors are related with having reasonable 25(OH)D levels.

The impact of Vit-D deficiency on general health and on chronic disease management needs to be further evaluated.

References: