

# Association of Serum Levels of Vitamin D with Blood Pressure Status in Northern Iranian Population: The PERSIAN Guilan Cohort Study (PGCS)

This article was published in the following Dove Press journal:  
*International Journal of General Medicine*

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**Background:** Evidence in the last decades has indicated an association between vitamin D and cardiovascular risk factors including blood pressure. The present study aimed to determine whether serum 25-hydroxyvitamin D is independently associated with blood pressure in a large population-based study.

**Methods:** The study was based on subjects from PERSIAN Guilan Cohort Study (PGCS), a prospective, population-based cohort study in Guilan, Iran. In 9520 men and women, aged 35–70 years, serum 25-hydroxyvitamin D, systolic and diastolic blood pressure were measured. Multiple logistic and linear regression analyses were conducted with adjustments for demographic factors (age and gender), anthropometric characteristics (waist circumference and body mass index), lifestyle variables (physical activity, alcohol, and smoking consumption), and renal function (serum creatinine).

**Results:** Fully adjusted linear regression analyses revealed a weak but statistically significant negative association between serum 25-hydroxyvitamin D levels and systolic blood pressure ( $\beta = -0.02$ , 95% CI=  $-0.052$  to  $-0.0001$ , P-value=0.04), whereas vitamin D status was not significantly associated with diastolic blood pressure ( $\beta = -0.01$ , 95% CI=  $-0.026$  to  $0.009$ , P-value=0.3). Serum 25-hydroxyvitamin D status showed no significant association with the presence of hypertension (OR 1.09, 95% CI=0.94 to 1.25 for the lowest (25OHD <12 ng/mL) versus the highest (25OHD  $\geq 20$  ng/mL) category).

**Conclusion:** Lower serum vitamin 25 (OH) D levels were associated with higher systolic blood pressure; however, it was not associated with diastolic blood pressure and presence of hypertension.

**Keywords:** vitamin D, blood pressure, Guilan cohort study, Iran

## Introduction

Vitamin D deficiency is prevalent in the Islamic Republic of Iran.<sup>1</sup> Vitamin D has been known to maintaining bone health and mineral homeostasis for many decades, but recent research has shown that vitamin D receptors are present on a wide range of tissues, including the myocardium and the endothelium, proposing a much wider variety of physiological functions for vitamin.<sup>2–4</sup>

Clinical and epidemiological evidence in the last decades has indicated an association between vitamin D and cardiovascular risk factors including blood pressure.<sup>5,6</sup> Evidence demonstrates that vitamin D may regulate blood pressure by direct vascular effect via vitamin D receptors on endothelial cells,<sup>7</sup> and regulating the renin-angiotensin system via effects on the juxtaglomerular apparatus.<sup>8,9</sup>

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