

## RESEARCH ARTICLE

## Blood Pressure, Total Cholesterol, and Triglycerides Associated with Cardiovascular Risk Score in Low 25-Hydroxy Vitamin D Level among Online Motorcycle Drivers, Jakarta, Indonesia

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### Abstract

Low 25-hydroxy vitamin D is associated with many chronic diseases, such as coronary heart disease. Online motorcycle drivers spend prolonged hours on the road and may face many stressors and occupational hazards that can create the development of cardiovascular disease. This study aims to determine factors contributing to cardiovascular risk among online motorcycle drivers. This study was an observational analytic with a cross-sectional design. Data were collected in September 2022 with consecutive random sampling methods for 114 subjects at Universitas Trisakti Jakarta. The ages of the subjects ranged from 25 to 62 years. Cardiovascular risk was assessed based on the Jakarta Cardiovascular Risk Score (JAKVAS). The data collection included physical examination and blood biochemistry (lipid profile, fasting blood glucose, and 25(OH)D). The data were analyzed using a chi-square test with  $p < 0.05$ . The majority of subjects were male 83 (72.8%). On blood pressure examination, mean systolic blood pressure was  $128.9 \pm 16.7$  mmHg, and diastolic blood pressure was  $86.7 \pm 11.9$  mmHg. The mean cardiovascular risk was  $4.4 \pm 2.8$ , and 52.6% had a high-risk score. All subjects had low 25(OH)D serum levels, with mean 25(OH)D serum levels of  $18 \pm 5.7$  ranging between 6.9 and 29.8. Among online motorcycle drivers, there was a significant association between blood pressure, total cholesterol, and triglyceride with cardiovascular risk scores in low 25-hydroxy vitamin D levels. Blood pressure, total cholesterol, and triglyceride could affect cardiovascular health in low 25-hydroxy vitamin D levels among online motorcycle drivers.

**Keywords:** 25-hydroxy vitamin D, blood pressure, Jakarta Cardiovascular Risk Score, lipid profile, online motorcycle drivers

### Introduction

Vitamin D plays a significant role in supporting overall health. Vitamin D deficiency is a widespread health issue that affects the world. The global prevalence of deficiency serum 25(OH)D was 15.7% between 2000 and 2022.<sup>1</sup> Unexpectedly, Indonesia, as a tropical country, has a high prevalence of vitamin D deficiency. Pulungan et al.<sup>2</sup> and Poh et al.,<sup>3</sup> showed that vitamin D deficiency in Indonesia was 44.6% and 94.4%, respectively. Insufficient exposure to sunlight and low intake of vitamin D are two leading causes of vitamin D deficiency, and it can contribute to an increased risk of chronic disease, such as cardiovascular disease, cancer, diabetes mellitus, etc.<sup>4</sup>

Coronary heart disease (CHD) or coronary artery disease (CAD) is the most common cardiovascular dysfunction disease, and its

prevalence is approximately 5–8% worldwide.<sup>5</sup> In Indonesia, the Basic Health Research data 2018 showed that 1.5% of Indonesians suffered from CHD, with death reaching 12.9%.<sup>6</sup> Siadat et al.<sup>7</sup> showed an association of 25(OH)D serum deficiency and coronary artery disease with cardiovascular risk factors. Its risk rises to 5.8 times (1.77–18.94) higher than in people with an average 25(OH)D serum level. Measurement of serum 25(OH)D levels has not been widely carried out in Indonesia, especially for online motorcycle drivers (*ojek* online) who are exposed to sunlight every day. Online motorcycle driving is a job that is now in great demand by the people of Indonesia, and there are still not many published studies on this job. Drivers spend prolonged hours on the road and may face many stressors and occupational hazards that can develop cardiovascular risk factors.<sup>8</sup> Drivers with high-risk cardiovascular disease had a higher

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