Physiological Biology

# Exploring the effects of sleep quality improvement on oxidative stress in female college students at VNSC: A mixed methods approach.

Reeda Amanee, VNSC
Syeda Shayori Jamil, Academia

## Abstract

Oxidative stress, characterized by an imbalance between reactive oxygen species (ROS) and the body's antioxidant defenses, is a well-established contributor to cellular damage and chronic diseases. Oxidative stress can damage cells, proteins, and DNA, contributing to aging. This condition has been linked to various lifestyle factors, including diet, physical activity, and sleep quality. Sleep quality is increasingly recognized as a critical determinant of oxidative stress levels. Sleep is essential in maintaining physiological homeostasis, including regulating oxidative stress. Poor sleep quality can disrupt this balance, leading to increased production of ROS and diminished antioxidant capacity. Among various populations, female college students are particularly vulnerable to sleep deprivation, which increases their risk of chronic illnesses linked to oxidative stress. Female teenagers, in particular, undergo an abundance of hormonal issues, which include hormonal changes, circadian rhythm shifts, and psychological factors ( stress, anxiety, and mood disorders). The research aims to explore the connection between oxidative stress biomarkers and sleep latency in female students, focusing on those at VNSC. The findings from this study could contribute valuable data to the limited body of research and provide scientists with a new perspective on oxidative damage.

## I. Introduction

Recent studies on oxidative stress have identified an association between the Oxidative Balance Score (OBS) and sleep quality. Specifically, the studies investigate how dietary and lifestyle factors, as reflected by the OBS, influence sleep quality, mainly focusing on sleep disorders and sleep duration. **[1]** Emerging research indicates a mutual relationship between sleep and oxidative stress. Lack of sleep worsens oxidative damage by producing more reactive oxygen species (ROS). A 2024 review article further elaborates on this interplay, explaining how important sleep is for preserving mental and physical health. It underscores the potential benefits of antioxidants, which decrease oxidative stress and inflammation, improve sleep quality, and stabilize