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## RELATIONSHIP BETWEEN SERUM TESTOSTERONE AND OSTEOPOROSIS IN OLDER MEN: A CROSS-SECTIONAL STUDY

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### ABSTRACT

*Introduction: Low testosterone levels in older men cause a decrease in bone mass density. Osteoporosis is divided into primary and secondary types: the former occurs without known risk factors, whereas risk factors have been identified for the latter. The causes of secondary osteoporosis in older men include hypogonadism (i.e., decreased levels of the hormone testosterone). The Singh index is an affordable and straightforward method of determining bone mass density at a fracture site. The current study investigated the relationship between serum testosterone levels and the severity of osteoporosis (according to the Singh index) in older men.*

*Materials and Methods: This cross-sectional study was conducted at Wahidin Sudirohusodo hospital, Makassar, Indonesia. with participants comprised of men aged greater than 50 years. The Singh index is divided into six grades ranging from 1 (severe osteoporosis) to 6 (normal bone density). Anteroposterior pelvic X-ray was conducted to determine bone density. Testosterone serum levels were examined by an ELISA method (enzyme-linked immunosorbent assay).*

*Results: The average testosterone level was  $117.88 \pm 110.22$  ng/dL. The highest osteoporosis score was Singh index grade 3 (definitive osteoporosis), which was recorded for 14 patients (26%;  $p < 0.001$ ). There was a significant correlation between serum testosterone levels and the severity of osteoporosis according to Singh index grade among older men ( $p$ -value  $< 0.001$ ).*

*Conclusions: Decreased serum testosterone levels in elderly men were significantly related to the severity of osteoporosis according to the Singh index grade. The Singh index could therefore be a useful screening method for the assessment of osteoporosis.*

**KEYWORDS:** cross-sectional study; osteoporosis; Singh index; testosterone.

### INTRODUCTION

Osteoporosis is a major public-health issue worldwide [Sozen *et al.*, 2017]. While traditionally viewed primarily as a disease of postmenopausal

women, osteoporosis in men represents a growing, yet frequently underdiagnosed and undertreated, clinical challenge. Both men and women may begin to experience bone loss around the age of 50

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