

# Evaluation of a Osteoporosis Self-Assessment Tool (OSAT) for Screening in Community-Dwelling Elderly Women

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## Introduction

Osteopenia and osteoporosis are common in the elderly and are characterized by a decrease in bone mineral density (BMD). In South Korea, the prevalence of these age-related diseases has been rising due to the rapid aging of the population. However, in practice, these vulnerable patients often do not visit hospitals regularly, and due to a lack of awareness about the disease, diagnosis and treatment are not properly carried out. Therefore, it is recommended to effectively screen these at-risk individuals for osteoporosis and provide appropriate evaluation and treatment. Among the various screening tools, the Osteoporosis Self-Assessment Tool (OSAT) is a simple and easily implementable method. This study aims to assess the effectiveness of using a mobile application for OSAT in diagnosing osteoporosis.

## Methods

This study was conducted on women aged 65 years or older residing in the community who were capable of using an Android smartphone and a mobile application without difficulty. A self-developed mobile application was used to calculate the OSAT score (OST score =  $0.2 \times (\text{body weight} - \text{age})$ ; cut-off values:  $>-1$  (low risk),  $-4$  to  $-1$  (medium risk), and  $<-4$  (high risk)). The participants were categorized into risk groups based on their OSAT scores, and each group underwent osteoporosis-related evaluations, including the Osteoporosis Assessment Questionnaire (OPAQ) and FRAX assessment.

Additionally, Dual-Energy X-ray Absorptiometry (DXA) scans were performed in a hospital to measure the BMD of the lumbar spine, femoral neck, and total hip. Osteopenia was defined as a T-score between  $-1.0$  and  $-2.5$ , while osteoporosis was defined as a T-score of  $-2.5$  or lower. For statistical analysis, One-way ANOVA was used for continuous variables, and Chi-square tests were used for categorical variables. Correlation analysis was used between OSAT values and variables.

## Results

Table 1. Basal demographics of participants according to the results of OSAT

F (n=66)	Low risk (10)	Intermediate (36)	High risk (20)	P-value
Age	67.00 (2.31)	71.14 (3.83)	78.95 (5.11)	<0.001
Weight	70.07 (5.13)	59.97 (5.69)	50.60 (5.34)	<0.001
Height	159.00 (3.65)	155.59 (3.75)	152.87 (4.17)	<0.001
BMI	27.67 (1.83)	24.78 (2.51)	21.68 (2.50)	<0.001
HTN	4 (40.0%)	18 (50.0%)	6 (30.0%)	0.344
Dyslipidemia	7 (70.0%)	23 (63.9%)	7 (35.0%)	0.157
Diabetes	2 (20.0%)	6 (16.7%)	5 (25.0%)	0.855
OPAQ_Phy	125.58 (15.05)	126.49 (11.82)	125.74 (11.10)	0.964
OPAQ_Emo	82.91 (11.79)	79.90 (13.50)	78.45 (11.61)	0.666
OPAQ_Pain	87.00 (17.83)	80.28 (21.24)	82.25 (18.88)	0.644
FRAX_major	6.18 (2.79)	7.58 (3.29)	8.51 (4.84)	0.283
FRAX_hip	1.21 (1.19)	2.24 (1.79)	3.30 (2.63)	0.027
T-score, Lumbar	-0.38 (1.08)	-1.18 (1.09)	-1.41 (1.52)	0.098
T-score, Hip neck	-1.17 (0.61)	-1.58 (0.91)	-2.12 (0.88)	0.013
T-score, Hip total	-0.36 (0.71)	-0.69 (0.91)	-1.46 (1.00)	0.003

BMI, Body Mass Index; HTN, Hypertension; OPAQ, Osteoporosis Assessment Questionnaire; FRAX, Fracture Risk Assessment Tool

- Significant differences were found in hip fracture probability and hip BMD among groups.
- OSAT scores correlated with hip fracture risk and BMD at lumbar spine and hip.
- No participants in the low-risk OSAT group ( $> -1$ ) had osteoporosis.

Table 2. Correlation Between FRAX, Bone Mineral Density, and OSAT

	1	2	3	4	5	6
1. OSAT	1	-0.218	-0.355 <sup>b</sup>	0.243 <sup>a</sup>	0.404 <sup>b</sup>	0.435 <sup>b</sup>
2. FRAX_major		1	0.960 <sup>b</sup>	-0.476 <sup>b</sup>	-0.799 <sup>b</sup>	-0.717 <sup>b</sup>
3. FRAX_hip			1	-0.514 <sup>b</sup>	-0.848 <sup>b</sup>	-0.777 <sup>b</sup>
4. T-score (lumbar)				1	0.606 <sup>b</sup>	0.611 <sup>b</sup>
5. T-score (hip neck)					1	0.909 <sup>b</sup>
6. T-score (Total hip)						1

FRAX, Fracture Risk Assessment Tool; OSAT, Osteoporosis Self-Assessment Tool

a:  $p < 0.05$ , b:  $P < 0.01$

Table 3. Osteoporosis Diagnosis According to the OSAT Risk Group

OSAT	Normal	Osteopenia	Osteoporosis	Total
Low	4 (40%)	6 (60%)	0 (0%)	10
Intermediate	8 (22.2%)	20 (55.6%)	8 (22.2%)	36
High	2(10%)	10 (50%)	8 (40%)	20

OSAT, Osteoporosis Self-Assessment Tool

## Conclusions

OSAT is a simple and easily measurable tool that can be effectively utilized via a mobile application. The collected OSAT data demonstrated that individuals in the high-risk group exhibited lower BMD and a higher risk of hip fractures. These findings suggest that OSAT-based screening in community settings deserves greater attention in clinical practice.