



Research Article

Correlation between Characteristics and Knowledge about Osteoporosis in Patients with Fragility Fractures at Saiful Anwar General Hospital

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ABSTRACT

Osteoporosis is a global health issue. Fragility fractures, which occur due to minor trauma, are one of the serious consequences of osteoporosis. Aims: This study investigates the correlation between demographic characteristics and the level of knowledge about osteoporosis in patients with fragility fractures. This research used a descriptive design with a cross-sectional approach. The data was gathered through validated and reliable questionnaires. Respondents were patients with fragility fractures treated at Dr. Saiful Anwar General Hospital, Malang. Data analysis was performed using statistical tests to evaluate the correlation between age, gender, and knowledge about osteoporosis. The analysis revealed significant gender differences in osteoporosis knowledge (p-value = 0.037) but no substantial age-related disparities (p-value = 0.194). There were no significant differences in nutritional status based on gender (p-value = 0.881) or age (p-value = 0.521). Similarly, medication adherence showed no significant variance by gender (p-value = 0.883) or age (p-value = 0.589). Lastly, the understanding of osteoporosis did not significantly differ by gender (p-value = 0.467) or age (p-value = 0.782). In conclusion, the study reveals a significant gender disparity in osteoporosis knowledge, highlighting the need for tailored educational interventions and physician initiatives to ensure equitable awareness across diverse demographic groups.



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INTRODUCTION

Osteoporosis is a prevalent disease in the community marked by reduced bone mass and structure, resulting in heightened vulnerability to fractures (Dunnewind et al., 2017). Osteoporosis is a major global public health concern, impacting 25% of women and 16% of men aged 65 and beyond. In 2009, there were 200 million people worldwide with osteoporosis (Limbong & Syahrul, 2015). According to the 2013 Asia Pacific Regional Audit on Epidemiology, Costs, and Burden of Osteoporosis, osteoporosis among women between the ages of fifty and eighty was 23%. For those aged 70-80 years, it was 53%. By 2050, it is estimated that 6.3 million people worldwide will suffer hip fractures annually, with over half occurring in Asia (Mithal et al., 2014).

Osteoporosis affects roughly 3.6 million elderly individuals in Indonesia, which accounts for 19.7% of the elderly population. By 2020, the number of elderly individuals in Indonesia is projected to increase from 18 million in 2005 to 33 million. Additionally, the average life expectancy is expected to be around 70 years. Approximately 30% of women who are 50 years old are believed to have osteoporosis, while it is projected that 37-54% of them are likely to have osteopenia (Prabawani, 2017). Additionally, about 54% of these women are at risk of experiencing fracture problems. The prevalence of osteoporosis carries significant future consequences for society and government, encompassing medical, social, and financial ramifications. People living with Osteoporosis often experience fractures in the spine, hip, and femur. The mortality rate from fractures is estimated at 20%, with 50% of survivors suffering physical disabilities (Limpaphayom et al., 2001).

Fragility fractures occur from low-impact

forces that would not typically cause fractures in normal bones. They most frequently occur in the spines, hips, proximal humerus, forearm, and wrist. According to the fracture's position and the patient's features, fractures can manifest as either acute injuries or part of a chronic process. These fractures can significantly impair the patient's life (Oostwaard, 2018; Varacallo & Fox, 2014). This study aims to investigate the correlation between demographic characteristics and the level of knowledge about osteoporosis in patients with fragility fractures.

METHODS

This study employed a cross-sectional analytic research design. Data collection involved gathering basic patient information and radiological data. Primary data included patient identity, medical history, nutrition, activity levels, lifestyle, and general knowledge about fragility fractures. Radiological examinations involved Bone Mineral Density (BMD) assessments. The study population comprised patients diagnosed with proximal femur fragility fractures at Saiful Anwar General Hospital (RSSA) from January 2023 to December 2023 by collecting data from questionnaires completed by patients diagnosed with proximal femur fragility fractures within the specified timeframe.

Inclusion criteria included patients diagnosed with proximal femur fragility fractures, those who provided informed consent, those willing to undergo examinations, and those who had completed a BMD assessment. Exclusion criteria involved patients who did not agree to the informed consent, those unwilling or unable to undergo examinations, and those who could not be contacted for follow-up. Participants were selected using a non-random sampling technique, purposive sampling.

An instrument was developed by the researcher to collect data from the participants. The



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questionnaire consisted of 3 parts, 15 questions for knowledge, 7 questions for nutritional status, and 8 questions to explore medication information. The questionnaire has undergone validity and reliability tests with Cronbach's $\alpha > 0.6$.

The collected data underwent editing, coding, and tabulation and were then organized and processed using computer assistance. This study performed a crosstab analysis for the variables of age and gender to general knowledge, nutritional status, and medication consumption of the patients. Univariate statistical analysis was conducted to provide an overview of participant characteristics data in this study. Further analysis was conducted to find correlations between variables with chi-square, considering that the type of data collected was categorical.

The research team obtained ethical approval from the ethics committee of RSSA. It sought permission from RSSA to review medical records of patients with pathological hip fractures from November 2023 to April 2024. Informed consent forms were distributed to patients to determine their willingness to undergo BMD examinations. This study was approved by the ethical committee of medical research at Dr. Saiful Anwar General Hospital with number 400/089/K.3/102.7/2024.

RESULTS

The study's participants were divided into two groups: males and females. The male group comprised 38.2% of the respondents, while the female group comprised 61.8%. Age distribution was 20.6% (50-60 years), 26.5% (61-70 years), 32.4% (71-80 years), and 20.6% (over 80 years). BMD tests showed 94.1% had scores below -2.5, indicating osteoporosis per WHO criteria, while 5.88% had osteopenia. Most respondents were women aged 71-80 years, predominantly with osteoporosis.

Gender and Knowledge

Table 1 shows that the majority of males had excellent general knowledge, while women's knowledge is generally poor. Statistical testing yielded a p-value of 0.037, indicating a significant difference between gender and patients' general knowledge about osteoporosis.

Age and Knowledge

Knowledge of all participants from various age ranges is quite good, except for those aged 61-70. They have a majority of poor knowledge (44.4%). Although the results are not much different, the statistical test (p-value = 0.194) suggests no significant age-related difference in general knowledge about osteoporosis.

Age and Nutritional Status

Almost all age categories have very good nutritional status, except for ages 50-60 and >80 (Table 2). The statistical test (p-value = 0.521) suggests no significant difference in nutritional status based on age.

Gender and Medication

Most males and females have less good medication adherence, with a higher percentage in males (36.4%) followed by females (33.3%). Despite these differences, a statistical test yields a p-value of 0.883, indicating no significant difference in medication adherence between genders.

Age and Medication

Table 3 shows that among patients aged 50-60 and 70-80, most have good medication adherence. While in patients aged 61-70 have very good medication and patients aged >80 less good. The statistical test (p-value = 0.589) suggests no significant difference in medication adherence among age groups.



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Gender and Knowledge about Osteoporosis on the Incidence of Fragility Fractures

Generally, males and females have fairly good and good knowledge about osteoporosis (Table 4). The statistical test (p -value = 0.467) suggests no significant difference in understanding between genders.

Age and Knowledge about Osteoporosis on the Incidence of Fragility Fractures

Table 4 shows that among all aged groups, most have fairly good and good knowledge. The statistical test (p -value = 0.782) suggests no significant difference in understanding based on age.

Table 1. Crosstab Tabulation of Gender, Age, and Knowledge

Description			Knowledge				Total
			Poor	Fairly Good	Good	Very Good	
Gender	Male	Count	1	5	1	6	13
		% within Gender	7.7%	38.5%	7.7%	46.2%	100.0%
		% within Knowledge	12.5%	62.5%	12.5%	60.0%	38.2%
	Female	Count	7	3	7	4	21
		% within Gender	33.3%	14.3%	33.3%	19.0%	100.0%
		% within Knowledge	87.5%	37.5%	87.5%	40.0%	61.8%
Total	Count		8	8	8	10	34
	% within Gender		23.5%	23.5%	23.5%	29.4%	100.0%
	% within Knowledge		100.0%	100.0%	100.0%	100.0%	100.0%
Age	50-60	Count	1	2	0	4	7
		% within Age	14.3%	28.6%	.0%	57.1%	100.0%
		% within Knowledge	12.5%	25.0%	.0%	40.0%	20.6%
	61-70	Count	4	0	3	2	9
		% within Age	44.4%	.0%	33.3%	22.2%	100.0%
		% within Knowledge	50.0%	.0%	37.5%	20.0%	26.5%
	71-80	Count	2	4	4	1	11
		% within Age	18.2%	36.4%	36.4%	9.1%	100.0%
		% within Knowledge	25.0%	50.0%	50.0%	10.0%	32.4%
	>80	Count	1	2	1	3	7
		% within Age	14.3%	28.6%	14.3%	42.9%	100.0%
		% within Knowledge	12.5%	25.0%	12.5%	30.0%	20.6%
Total	Count		8	8	8	10	34
	% within Age		23.5%	23.5%	23.5%	29.4%	100.0%
	% within Knowledge		100.0%	100.0%	100.0%	100.0%	100.0%



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Table 2. Crosstab Tabulation of Gender, Age, and Nutritional Status

Description			Nutritional Status				Total
			Poor	Fairly Good	Good	Very Good	
Gender	Male	Count	1	3	3	6	13
		% within Gender	7.7%	23.1%	23.1%	46.2%	100.0%
		% within Nutritional Status	33.3%	37.5%	30.0%	46.2%	38.2%
	Female	Count	2	5	7	7	21
		% within Gender	9.5%	23.8%	33.3%	33.3%	100.0%
		% within Nutritional Status	66.7%	62.5%	70.0%	53.8%	61.8%
Total	Count		3	8	10	13	34
	% within Gender		8.8%	23.5%	29.4%	38.2%	100.0%
	% within Nutritional Status		100.0%	100.0%	100.0%	100.0%	100.0%
Age	50-60	Count	1	3	1	2	7
		% within Age	14.3%	42.9%	14.3%	28.6%	100.0%
		% within Nutritional Status	33.3%	37.5%	10.0%	15.4%	20.6%
	61-70	Count	1	1	3	4	9
		% within Age	11.1%	11.1%	33.3%	44.4%	100.0%
		% within Nutritional Status	33.3%	12.5%	30.0%	30.8%	26.5%
	71-80	Count	0	1	4	6	11
		% within Age	.0%	9.1%	36.4%	54.5%	100.0%
		% within Nutritional Status	.0%	12.5%	40.0%	46.2%	32.4%
	>80	Count	1	3	2	1	7
		% within Age	14.3%	42.9%	28.6%	14.3%	100.0%
		% within Nutritional Status	33.3%	37.5%	20.0%	7.7%	20.6%
Total	Count		3	8	10	13	34
	% within Age		8.8%	23.5%	29.4%	38.2%	100.0%
	% within Nutritional Status		100.0%	100.0%	100.0%	100.0%	100.0%



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Table 3. Crosstab Tabulation of Gender, Age, and Medication

Description			Medication					Total
			Poor	Less Good	Fairly Good	Good	Very Good	
Gender Male	Count		2	4	1	3	3	13
	% within Gender		15.4%	30.8%	7.7%	23.1%	23.1%	100.0%
	% within Medication		66.7%	36.4%	33.3%	33.3%	37.5%	38.2%
	Count	Female	1	7	2	6	5	21
	% within Gender		4.8%	33.3%	9.5%	28.6%	23.8%	100.0%
	% within Medication		33.3%	63.6%	66.7%	66.7%	62.5%	61.8%
Total	Count		3	11	3	9	8	34
	% within Gender		8.8%	32.4%	8.8%	26.5%	23.5%	100.0%
	% within Medication		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Age	Count	50-60	1	2	0	3	1	7
	% within Age		14.3%	28.6%	.0%	42.9%	14.3%	100.0%
	% within Medication		33.3%	18.2%	.0%	33.3%	12.5%	20.6%
	Count	61-70	1	2	1	1	4	9
	% within Age		11.1%	22.2%	11.1%	11.1%	44.4%	100.0%
	% within Medication		33.3%	18.2%	33.3%	11.1%	50.0%	26.5%
	Count	71-80	1	3	2	4	1	11
	% within Age		9.1%	27.3%	18.2%	36.4%	9.1%	100.0%
	% within Medication		33.3%	27.3%	66.7%	44.4%	12.5%	32.4%
	Count	>80	0	4	0	1	2	7
	% within Age		.0%	57.1%	.0%	14.3%	28.6%	100.0%
	% within Medication		.0%	36.4%	.0%	11.1%	25.0%	20.6%
Total	Count		3	11	3	9	8	34
	% within Age		8.8%	32.4%	8.8%	26.5%	23.5%	100.0%
	% within Medication		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%



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Table 4. Crosstab Tabulation of Gender, Age, and Knowledge about Osteoporosis on the Incidence of Fragility Fractures

Description			Knowledge about Osteoporosis				Total
			Poor	Fairly Good	Good	Very Good	
Gender	Male	Count	0	6	5	2	13
		% within Gender	.0%	46.2%	38.5%	15.4%	100.0%
		% within Knowledge	.0%	42.9%	33.3%	66.7%	38.2%
	Female	Count	2	8	10	1	21
		% within Gender	9.5%	38.1%	47.6%	4.8%	100.0%
		% within Knowledge	100.0%	57.1%	66.7%	33.3%	61.8%
Total		Count	2	14	15	3	34
		% within Gender	5.9%	41.2%	44.1%	8.8%	100.0%
		% within Knowledge	100.0%	100.0%	100.0%	100.0%	100.0%
Age	50-60	Count	0	3	4	0	7
		% within Age	.0%	42.9%	57.1%	.0%	100.0%
		% within Knowledge	.0%	21.4%	26.7%	.0%	20.6%
	61-70	Count	1	2	5	1	9
		% within Age	11.1%	22.2%	55.6%	11.1%	100.0%
		% within Knowledge	50.0%	14.3%	33.3%	33.3%	26.5%
	71-80	Count	0	6	4	1	11
		% within Age	.0%	54.5%	36.4%	9.1%	100.0%
		% within Knowledge	.0%	42.9%	26.7%	33.3%	32.4%
	>80	Count	1	3	2	1	7
		% within Age	14.3%	42.9%	28.6%	14.3%	100.0%
		% within Knowledge	50.0%	21.4%	13.3%	33.3%	20.6%
Total		Count	2	14	15	3	34
		% within Age	5.9%	41.2%	44.1%	8.8%	100.0%
		% within Knowledge	100.0%	100.0%	100.0%	100.0%	100.0%



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DISCUSSION

A prior study in Tulikup Village, Gianyar, revealed that women comprised the majority of osteoporosis cases, accounting for 55.7%, with men at 44.3%. When categorized by age, the pre-elderly group (45-59 years) had 22.2% of patients, the elderly group (60-74 years) had 54.3%, and the post-elderly group (≥ 75 years) had 23.5%. This study offers a detailed insight into osteoporosis distribution, emphasizing gender and age disparities in the village community (Juwita, 2018). In a separate study in Bali, among 40 women with osteoporosis, most were over 50 years old (80%). Age was significantly associated with pathological bone fractures in menopausal women ($p < 0.05$). However, factors like BMI, parental history of fractures, and tobacco smoking didn't show a significant association with pathological bone fractures in menopausal women in this study (Wenang et al., 2022).

In a previous systematic review involving 40 studies, the meta-analysis reported a global prevalence of osteoporosis among older people at 21.7%. Through subgroup analysis, it was found that the occurrence of osteoporosis varied across different regions. In Asia, the prevalence was the highest at 24.3%, followed by Europe at 16.7% and the United States at 11.5% (Salari et al., 2021). In China, the prevalence of osteoporosis among those aged 50 and above doubled from 8% in 2006 to 16.96% in 2015. In the Middle East, the prevalence of this condition is 24.4%, with Saudi Arabia having the highest rate at 32.7% and Kuwait having the lowest at 15.1%. Increased life expectancy in Middle Eastern countries has increased osteoporosis prevalence and its complications (Irani et al., 2013; Zamani et al., 2018). Improving patient education on osteoporosis by healthcare providers is essential, given its significant impact on the health and quality of life of the

elderly. Many healthcare professionals lack adequate knowledge about osteoporosis, leading to suboptimal patient care. Understanding preventive factors is crucial for population-level osteoporosis prevention, involving individuals in knowledge-based prevention efforts (Borgström et al., 2020).

There's no significant difference between age and general osteoporosis knowledge in this study. Older individuals may have higher knowledge due to direct experience or observation of its effects. Education also plays a crucial role; those with higher education tend to have better access to health information. Cultural and environmental factors influence osteoporosis knowledge, too. Targeted health education programs can raise awareness, but disparities in access must be addressed. Individual perception of risk and awareness of osteoporosis prevention also affect knowledge levels. Considering various factors like age, education, culture, access to information, and risk perception is vital in understanding knowledge gaps in osteoporosis (Jo et al., 2018; Kaihlanen et al., 2019; Zajacova & Lawrence, 2018).

Biological differences between genders affect nutritional requirements and body metabolism. Decreased estrogen in menopause increases osteoporosis risk in women, while declining testosterone in aging men can impact bone health. Factors like diet, physical activity, and lifestyle prevent osteoporosis and maintain optimal nutrition (Martiniakova et al., 2022). Age is a major risk factor for osteoporosis due to decreasing bone density over time. However, managing osteoporosis risk involves more than just age; healthy eating, regular physical activity, and proper health education are vital for bone health at all ages. While this study didn't find age-based differences in nutritional status, it underscores the importance of addressing other factors impacting bone health and promoting



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awareness about nutrition and healthy lifestyles for osteoporosis prevention (Albrecht et al., 2022).

While the study found no significant differences, factors like patient preferences, treatment response, and biological differences may affect medication intake between genders. Hormonal disparities can influence drug reactions, and social factors may impact patient decisions on medication. Although no significant age-related differences in medication intake were noted, it underscores the importance of osteoporosis risk awareness across all ages. Regardless of age, medication-based prevention and management may be crucial, especially for high-risk individuals like older people or those with a history of fragility fractures (Jehle-kunz et al., 2022; Sözen et al., 2017).

This study is relatively new in Malang, East Java, with the possibility that the results can be used as epidemiological data at Saiful Anwar General Hospital. However, there is a study limitation related to sample size and age range. The future studies have a chance to continue or develop with more variables, which might lead to the external validity being achieved.

CONCLUSION

According to the study's results, a notable disparity exists in general knowledge concerning osteoporosis between genders. However, no significant distinction was observed in other aspects, such as medication adherence, nutritional status, or age-related variations in understanding osteoporosis. These insights underscore the urgency of tailored educational interventions and physician initiatives to facilitate the knowledge gap and ensure equitable awareness and understanding of osteoporosis across diverse demographic groups.

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