

Level of Knowledge and Risk of Osteoporosis and Their Association Among Working Women Living in Klang Valley, Malaysia

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Abstract

Background: Osteoporosis is a skeletal disorder that affects millions of people every year by causing reduced bone density and micro-architectural deterioration of the bone tissue. Women have a high risk of developing osteoporosis and well-developed knowledge and risk assessment were important in reducing the risk of developing osteoporosis through osteoprotective behaviour. The objective of this study was to find out the knowledge and risk of osteoporosis among working women living in Klang valley, and the association between the sociodemographic background of the participants with their knowledge and risk of osteoporosis.

Method: A cross-sectional analytical study was conducted among working women of University Tunku Abdul Rahman, Sungai Long campus who are living in Klang Valley via an online self-administrated questionnaire. A total of 158 respondents participated in this study. Validated Malaysian Osteoporosis Knowledge Tools (MKOT) were used to assess the knowledge on osteoporosis and the Osteoporosis Self-Assessment Test for Asians (OSTA) tool was used for risk assessment. The Statistical Package for Social Science (SPSS) version 22 was used to analyse the data.

Results: The findings indicated that there was a moderate level of knowledge among the participants with overall knowledge scores of (Mean= 58.23, and SD=17.86). The level of risk of osteoporosis among the participants was low risk with an OSTA score of (M=4.59, and SD=3.131). There was a significant association between knowledge of osteoporosis and income level and occupation of the participants ($p < 0.05$): higher income level, healthcare-related occupation, and academic staff are higher knowledge of osteoporosis. The risk of osteoporosis varied significantly with the age of the participants ($p < 0.05$) and there was a negative correlation between knowledge and risk of osteoporosis among the study population ($r = -0.229$, $p = 0.007$).

Conclusion: In this study, the study participants possess a moderate level of overall knowledge of osteoporosis and a low risk of developing osteoporosis. The current findings underline the importance of developing osteoporosis prevention health promotion programmes emphasised knowledge and risk of osteoporosis to increase the awareness and lower the chance of developing osteoporosis among Malaysian women.

Keywords: Knowledge, Risk, Osteoporosis, Working women, Malaysia

1. Introduction

Osteoporosis is a major health problem, especially in elderly populations and postmenopausal women, and is associated with fragility fractures at the hip, spine, and wrist. Osteoporotic hip fracture contributes to both morbidity and mortality and it has been estimated

that the cases will rise from 1.7 million in 1990 to 6.3 million that by 2050 and half of hip fractures will occur in developing countries especially in Asia [1, 2].

In Malaysia, the prevalence of osteoporosis is 24.1% [3] and there was an alarming forecast on hip fracture incidence rates in Malaysia would

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have increased by 2050 due to increasing total number of hip fractures [4]. Due to the asymptomatic nature of osteoporosis, women who have osteoporosis are often unaware about an increased risk of sustaining a fracture. Therefore, prevention measures and screening that aid in early detection were the most cost-effective ways to reduce the number of hospital admissions due to osteoporotic fractures [4]. Therefore, this study focused on osteoporosis screening targeted at primary and secondary prevention using an osteoporosis risk assessment tool.

According to the Department of Statistics Malaysia [5], the female workforce in Malaysia has a broad age group and, estimated 35% of the local female workforce is above the age of 40 and had a substantial risk for osteoporosis because of the onset of menopause. This study observed the sedentary lifestyle of working women would predispose them to the risk of osteoporosis. Commencing prevention practices from a younger age can slow down the process of developing osteoporosis. Hence, this study will provide us with insight about the possibility of this often overlooked group getting osteoporosis [5].

The study objectives were to determine the knowledge level and risk level of osteoporosis and to find out the association between the knowledge and risk of osteoporosis among the women living in Klang Valley.

2. Materials and Methods

A cross-sectional analytic study was conducted on women between the ages 18 and above working at UTAR who are currently living in Klang Valley; located situated in the middle of the west coast of Peninsular Malaysia [6]. Working women were chosen as the target population in our studies due to the higher risk of osteoporosis among them. The study was conducted online and the convenience sampling method was used.

The questionnaire was adopted from the Malaysian Osteoporosis Knowledge Tool (MOKT) of the study [7]. The permission had been granted by the author of the study. There

was a total of 30 questions to assess the general knowledge, sign, and symptoms, as well as the risk factors of osteoporosis. The responses for each question were "True", "False" and "I don't know". 1 point was awarded for each correct answer, whereas no mark was granted for false or "I don't know. The overall Cronbach's alpha value of the questionnaire was 0.82. Knowledge level on Osteoporosis is classified according to the study by Chan et al. [8]. A knowledge level of less than 50% is poor knowledge, 51-69% Moderate, and more than 70% High. The questionnaire consisted of 4 sections: Sociodemographic Information of participants, Medical History, MOKT knowledge questions, and self-reported weight and age will be obtained for the OSTA assessment of risk. The information sheet and consent sheet were obtained from the participants [8].

The osteoporosis Self-Assessment Tool for Asians (OSTA) developed by World Health Organization was used to determine the risk level of osteoporosis among respondents [9]. OSTA score was a practical assessment tool for screening because it is affordable and efficient. The participants were required to self-report their weight and age. The OSTA scores were calculated using the formula: $0.2 [\text{weight (kg)} - \text{age (year)}]$. After calculating the OSTA score, the data were classified into 3 different categories based on the severity. Scores lower than -4 will be classified as high risk, scores between -4 and -1 fell into a medium level, and score greater than -1 were classified as low risk. OSTA had a sensitivity of 91% and a specificity of 45% [10]. Overall, the OSTA score showed high accuracy in assessing the risk of osteoporosis.

All the staffs members of UTAR were invited to participate in the study via sending email containing the google form link to questionnaires. The study obtained ethical approval from UTAR Scientific and Ethical Review Committee (SERC) and respondents' consent has been taken to participate in this study.

The data were analysed by using the software Statistical Package for the Social Sciences (SPSS) Version 22. Chi-Square test was used to analyse the significant relationship between

Table 1. Type of knowledge towards osteoporosis in each section with level of classification (N=158).

Type of knowledge	Mean, M% ± Standard deviation of the total score	Level of classification
General knowledge	67.5 (24.0)	Moderate
Sign and symptoms	58.9 (19.5)	Moderate
Risk factors	54.7 (21.6)	Moderate
Overall knowledge	58.2 (17.9)	Moderate

Table 2. Risk level based on OSTA score (N=139)

Risk level	Score range	Number, n (percentage, %)
Low level	>-1	135 (97.1)
Medium level	-1 to -4	4 (2.9)
High level	<-4	0 (0)

sociodemographic characteristics with the knowledge and risk level of osteoporosis. Pearson correlation test was used to find out the correlation between the knowledge of osteoporosis and the risk of developing it. The results that gave a p-value of less than 0.05 were considered significant and the null hypothesis was rejected.

3. Results

A total of 158 participants completed the questionnaires. For the OSTA risk level, 19 participants were excluded due to underlying risk factors such as a previous history of fracture, family history of osteoporosis, or underlying disease that interfere with bone metabolism and breastfeeding and 139 participants remained.

The majority of the participants were aged 36 to 55, 93 (58.9%), Chinese 74 (46.8%), Malaysian 150 (94.9%), tertiary educational level 145 (94.9%), and married 104 (65.8%). Most of the participants were middle-income level (62%) and non-healthcare professionals 134 (84.8%) and academic staff 91 (57.6%). The majority of the participants were in the range of healthy weight 57 (36.3%) and overweight 51 (32.5%), and the average BMI was 24.91 kg/m². Most working women were young age with pre-menopause 142 (89.9%), and an average of 51.31 years old among 16 participants who had gone through menopause. The average height was 160cm, the average weight was 60 kg, and the

average age of menarche was 13 years old.

3.1. Knowledge of Osteoporosis

Table 1, participants had the highest general knowledge of osteoporosis (67.5%), which is categorised into moderate levels. The knowledge of signs and symptoms and risk factors were also moderate with (58.9%) and (54.7%) respectively. The overall total score of osteoporosis was (58.2 %), which was also at a moderate level (Table 1).

3.2. Risk of osteoporosis

Regarding the risk of osteoporosis majority of the participant had low risk 135 (97.1%) and the remaining was moderate risk level 4 (2.9%) on osteoporosis (Table 2).

3.3. The association between sociodemographic backgrounds and knowledge of osteoporosis

Regarding the association between sociodemographic characteristics and knowledge of osteoporosis, factors such as income level per month, occupation, and job type were statistically significant with the knowledge level. Participants in higher income levels, T20 (compared to B40 and M40, p=0.004), healthcare professionals (compared to non-healthcare professionals, p<0.001), and academic staff (compared to administrative staff, p= 0.001) had higher knowledge levels on osteoporosis (Table 3).

Table 3. Association between sociodemographic characteristics and knowledge level (N=158).

Characteristics	Knowledge level of osteoporosis, n (%)			Chi-square	
	Poor	Moderate	Good	Chi Square	p value
Age					
18-35	26 (48.1)	17 (31.5)	11 (20.4)	6.582 ^f	0.155
36-55	33 (35.3)	27 (29.0)	33 (35.5)		
>56	3 (27.3)	2 (18.2)	6 (54.5)		
Race					
Malay	21 (44.7)	13 (27.7)	13 (27.2)	3.300 ^f	0.789
Chinese	25 (33.8)	21 (28.4)	28 (37.8)		
Indian	13 (41.9)	10 (32.3)	8 (25.8)		
Others	3 (50.0)	2 (33.3)	1 (16.7)		
Nationality					
Malaysian	60 (40.0)	44 (29.3)	46 (30.7)	1.353 ^f	0.597
Non-Malaysian	2 (25.0)	2 (25.0)	4 (50.0)		
Educational level					
Secondary/Diploma	9 (69.2)	2 (15.4)	2 (15.4)	4.623 ^f	0.082
Tertiary (Degree, Master, PhD)	53 (36.6)	44 (30.3)	48 (33.1)		
Income level per month					
B40	22 (64.7)	7 (20.6)	5 (14.7)	15.062	0.004*
M40	34 (34.7)	32 (32.7)	32 (32.7)		
T20	6 (23.1)	7 (26.9)	13 (50.0)		
Occupation					
Healthcare professional	3 (12.5)	5 (20.8)	16 (66.7)	16.791	<0.001*
Non-Healthcare professional	59 (44.0)	41 (30.6)	34 (25.4)		
Job Type					
Academic staff	25 (27.5)	30 (33.0)	36 (39.6)	12.916	0.001*
Administrative staff	37 (55.2)	16 (23.9)	14 (20.9)		

*Level of significant at p <0.05. Assessed using chi-square among the group, ^f Fisher's Exact Test, B40, subjects with household income <RM 7640; M40, subjects with household income RM 7640–15,159; T20, subjects with household income >RM 15,160.

Table 4. Correlation between overall knowledge, general knowledge, signs and symptoms, risk factors for osteoporosis.

Variable		Overall knowledge	General knowledge	Signs and symptoms	Risk factors
Overall knowledge	p	-	<0.001	<0.001	<0.001
	r		0.701**	0.806**	0.917**
General knowledge	p	<0.001	-	<0.001	<0.001
	r	0.701**		0.479**	0.506**
Signs and symptoms	p	<0.001	<0.001	-	<0.001
	r	0.806**	0.479**		0.560**
Risk factors	p	<0.001	<0.001	<0.001	-
	r	0.917**	0.506**	0.560**	

Pearson correlation test was performed. **Level of significant at p <0.001. r = correlation coefficient.

Table 5. Association between sociodemographic characteristics and risk level of osteoporosis (n=139).

Characteristics	Risk of osteoporosis, n (%)		Chi-square	
	Low	Moderate	Chi Square	p value
Age				
18-35	47 (100.0)	0 (0.0)	21.307 ^f	<0.001*
36-55	83 (100.0)	0 (0.0)		
>56	5 (55.6)	4 (44.4)		
Race				
Malay	40 (100.0)	0 (0.0)	6.219 ^f	0.082
Chinese	67 (98.5)	1 (1.5)		
Indian	25 (89.3)	3 (10.7)		
Others	3 (100)	0 (0.0)		
Educational level			1.926 ^f	1.000
Secondary	1 (100)	0 (0)		
Diploma	10 (100)	0 (0)		
Tertiary (degree, master, PhD)	124 (96.9)	4 (3.1)		
Income level per month				
B40	32 (100)	0 (0.0)	1.320 ^f	0.615
M40	83 (96.5)	3 (3.5)		
T20	20 (95.2)	1 (4.8)		
BMI (kg/m²)			2.061 ^f	0.569
Underweight	8 (100)	0 (0)		
Healthy Weight	50 (94.3)	3 (5.7)		
Overweight	45 (97.8)	1 (2.2)		
Obesity	32 (100)	0 (0)		
Menopause age (years)			-	<0.001*
pre/perimenopausal	126 (100)	0 (0)		
post-menopause	9 (69.2)	4 (30.8)		

Level of significant at $p < 0.05$. Assessed using chi-square among the group, f Fisher's Exact Test, B40, subjects with household income <RM 7640; M40, subjects with household income RM 7640–15,159; T20, subjects with household income >RM 15,160.

Table 4, there were significant positive the correlation between the total knowledge score with overall knowledge of the questionnaire.

3.4. The relation between sociodemographic background with the risk level on osteoporosis

Sociodemographic factors such as age and menopause age were statistically significant with the risk level of osteoporosis. It was observed that participants >56 years old (compared with age 18-35 and 36-55 years, $p < 0.001$) and who experienced menopause (compared with pre/perimenopausal women, $p < 0.001$) had a higher risk of osteoporosis. The sociodemographic factors like race, educational level, income level per month, and BMI were not statistically significant (Table 5).

4. Discussion and Conclusion

The study was aim to determine the level of knowledge and risk of osteoporosis among working women, which were unprecedented in Malaysia. Since the study population in this study was mostly mental labour and had a sedentary lifestyle, this study would indicate the association and correlation between them.

4.1. Knowledge of osteoporosis among the participants

The overall knowledge level on Osteoporosis among working women was moderate level, which was in line with a few recent studies in Malaysia. The female literacy rate of Malaysia was (95.76%) according to global data 2021 and the studies have shown that the female population

has a moderate level of health knowledge due to certain exposure to health promotion programmes [3, 8, 11]. But the studies conducted in middle east countries found that there was a low and inadequate amount of knowledge on osteoporosis [12]. The knowledge questions were subdivided into three parts, knowledge of signs and symptoms, knowledge of risk, and knowledge of prevention of osteoporosis. The participants have moderate knowledge of the risk and prevention of osteoporosis.

In this study, over 50% of the participants were able to relate lack of oestrogen (60.8%) and early menopause (54.4%) to increasing the likelihood of osteoporosis development similar to this study a study by Cheng et al. [13] found that 42.2% of their participants knew of early menopause as a risk factor. This was comparable to a Singaporean study that saw 69.7% of their participants agreeing with that risk factor [14]. In contrast, studies done in Vietnam, Egypt, and Pakistan had a lower awareness rate of lack of estrogen and early menopause as risk factors [15-17].

4.2. The risk of osteoporosis among the participants

In this study, the majority of participants were at a low-risk level of osteoporosis (97.1%) and (2.9%) were at a medium-risk level, none of the participants were at a high-risk level. The data were contrasted with a few studies in Malaysia [10, 18-20]. These studies demonstrated a high risk of osteoporosis because the studies were done in post-menopausal women. This could be explained that most of the participants in this study were younger and had not reached the age of menopause, the median age in this study was 38 years old. The osteoporotic patients were also excluded from this study due to inaccuracy in the calculation of the OSTA score.

4.3. The relation between sociodemographic background with knowledge of osteoporosis

In this study, the educational level of the female staff were high as 145 (91.8%) were in tertiary education, however, the educational status would not affect the knowledge level on

osteoporosis. In this study, the association between total income per month, occupation, and job type was statistically significant. This was in line with the study [8] stated that income level signified participants had access to more health screening and, were given more knowledge on their health [8]. Healthcare-related jobs would equip them with knowledge of the medical field, which helps them in answering the questions, this was supported by the MOKT study. Pharmacists (81.6±9.5%) had a higher score than the osteoporotic patient (69.0±13.9%) [7]. Academic staff were the professionals in lecturing the students, therefore were more competent and knowledgeable. In the view of the fact that understanding every part of knowledge was important in the holistic approach.

4.4. The relation between sociodemographic background with the risk level of osteoporosis

In this study, the age and weight were statistically significant to the risk of osteoporosis, this was supported by few studies [18, 20]. When the age increases, the risk of getting osteoporosis also increased [21]. The results revealed that weight and risk were strongly positively correlated, in connection with the findings by WHO, 1994, when the weight increases, the risk would decrease [9].

Menopause was statistically significant with the risk of osteoporosis and was considered as the risk factor of osteoporosis because of the decreasing level of estrogen, which in turn accelerates bone degradation [22]. The race, educational level, and income level per month were not statistically significant to the risk level of osteoporosis, which was contradicting the studies which was found that Chinese population were higher risk of osteoporosis compare to Malay and Indian [18, 20].

4.5. Limitations of the study

This study is a cross-sectional study and self-reported weight was collected and there might be variation with actual weight. The recall bias on the age of menarche and menopause among female respondents also contributed to the deviation in this study.

5. Conclusion

The study results reveal that the overall knowledge level of Osteoporosis among participants working women living in Klang Valley was moderate and most participants were at low risk of osteoporosis according to OSTA score. This study provides data to increase the awareness and prevention measures of osteoporosis. With the use of the OSTA score, further therapeutic and treatment could be focused on the high-risk patient, which would enlighten the socioeconomic burden in society.

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