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Osteoporosis Knowledge among Future Healthcare Practitioners: Findings from a Malaysian Public University

Mohamed Hassan Elnaem¹, Shazia Qasim Jamshed¹, Ramadan Mohamed Elkalmi², Muhammad Farhan Baharuddin¹, Muhammad Afif Johari¹, Nur Ashikin Binti Ab Aziz¹, Siti Farhanah Binti Ahmad Sabri¹, Nur Akmal Binti Ismail¹

¹Department of Pharmacy, Practice, Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang, ²Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi Mara, Puncak Alam, Selangor, Malaysia

ABSTRACT

Background and Objectives: Students in relevant health-care academic programs are the future professionals who should play an active role in increasing community awareness regarding chronic diseases such as osteoporosis. This research aimed to evaluate the knowledge of osteoporosis, one of the growing health-care burdens in Malaysia, among students belong to three different health occupations programs in a Malaysian University. **Methods:** A cross-sectional study design was conducted to assess the level of knowledge on osteoporosis and to explore the potential association between the study program and osteoporosis-related knowledge among medicine, pharmacy, and allied health sciences students in a Malaysian University. A total of 348 students were approached. The data were collected using validated revised Osteoporosis Knowledge Test questionnaire. **Results:** The results showed variability in knowledge score between students belonging to different study programs. allied health sciences students have the highest overall total score (median = 20) and nutrition score (median = 16), but for exercise score, both students in allied health sciences and medicine programs shared a similar median score (median = 11.5). More than half of the respondents showed adequate knowledge on osteoporosis. The students from allied health sciences exhibited more knowledge on osteoporosis compared to students in other study programs. Among the Kulliyah of Pharmacy respondents, the majority did not manage to answer correctly on the whole scale. This was evident by total percentage of 69.91% of the respondents scored below than median score. **Conclusion:** There is a considerable gap of knowledge regarding osteoporosis among students in various health occupations academic programs. Pharmacy students particularly need focused learning related to exercise and nutrition in preventing osteoporosis during their academic program.

KEYWORDS: Health occupations, Malaysia, osteoporosis, students

INTRODUCTION

Osteoporosis is a skeletal disease that can compromise the bone mineral density, deteriorate the bone fragility leading to increasing the risk of bone fractures.^[1,2] Osteoporosis-related bone fractures are frequently affecting hip, spine, and wrist. Bone fractures are one of the leading causes of morbidity which leads to a decrease in quality of life.^[3]

Osteoporosis statistics showed an estimated 8.9 million fractures occurred each year globally with the silent

Address for correspondence: Dr. Mohamed Hassan Elnaem, Department of Pharmacy Practice, Kulliyah of Pharmacy, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, 25200 Kuantan, Pahang, Malaysia.
E-mail: drmelnaem@gmail.com

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pattern of this chronic bone disease that patient may not experience any pain till the first fracture occur.^[4]

The results of Asian osteoporosis study have revealed that a chronic bone disease is prevalent in many Asian countries and this prevalence is expected to be higher in the aged population.^[5] Females also tend to suffer faster bone loss following menopause than males.^[6] According to one estimation, 13%–18% women aged 50-year-old and above have osteoporosis, and the numbers rise to 70% of people that are above 80-year-old.^[7,8] With an upsurge in elderly population, osteoporosis-related fractures expected to become a major health problem in Malaysia. Interestingly, the rate of hip fracture rates increased from 0.73 to 0.9/1000 persons over 50-year-old, and the female-to-male ratio of hip fractures increased from 1.3:1 in 1989 to 2.5:1 in 1997.^[9]

The overall cost in terms of money spending in regards to osteoporotic patients is also on the rise, for example, in the United States, the direct and indirect cost for the care of osteoporosis is reported to be 12–18 billion/year.^[10] All of these statistics prevalence and cost treatment facts are showing that osteoporosis is a growing serious issue that needs to be focused on.

Since osteoporosis is a silent disease, it requires a preprepared plan for prevention. Primary preventive measures which include early detection of the risk factors, teaching and guiding the people whom at risk on how to prevent the disease and giving treatment at a proper and suitable time will help in reducing mortality and morbidity rate and the cost.^[11,12] Most of the osteoporosis risk factors, for example, lack physical movement are modifiable; hence, more campaigns to increase awareness of the disease and its consequences can play a role in primary prevention initiatives.^[13]

Prevention of osteoporosis is paramount and can be achieved by focusing on improving knowledge toward risk factors and lifestyle changes which may help to reduce the incidence rates.^[14] Based on this, a successful prevention program can be developed by ensuring the adequate knowledge and understanding of target population toward the disease. Intervention strategies targeting individuals at college age is a good step in developing prevention as they are old and wise enough to be making the behavioral choices which then can affect the lifestyle such as intake of calcium, physical activity, smoking, and alcohol consumption.^[15] Health belief models pointed out that knowledge related to specific illness and its related prevention strategies will likely help the people to exhibit appropriate behavior.^[16]

Lifestyle changes at a younger age are believed to have a favorable impact on osteoporosis and other chronic

diseases. Initiatives for promoting bone mineralization during adolescence and conserving the high peak bone mass were shown to reduce the risk of acquiring osteoporosis.^[17] The rationale behind the focus on improving osteoporosis-pertinent knowledge is supported by considering the association between low bone mass and knowledge on dietary, exercise and lifestyles that are most likely have a role in osteoporosis development.^[15]

In a study conducted among young women in Thailand, the results recommend that the design of interventions to have an impact in improving preventive behaviors should integrate increasing knowledge of risks for osteoporosis as well as enhance self-efficacy for preventive behaviors.^[18] These results were supported by the findings of one research targeted teenage Arab females that showed inappropriate lifestyle choices despite demonstrating a good level of osteoporosis knowledge.^[19] One study among the USA nursing students showed low to moderate level of knowledge regarding osteoporosis.^[20] The same results reported from a study conducted among Jordanian nursing school students who have reported poor knowledge on osteoporosis-related community initiatives.^[21]

Designing and implementing of health education programs could improve the osteoporosis knowledge among individuals at risk.^[22] It can be said that assuring the proper level of knowledge on osteoporosis may play a crucial role in deterring the rate of incidence of the disease later on. Assessment of the knowledge of college students, particularly those in healthcare-related fields regarding osteoporosis is substantial. They will play a role in dissemination of osteoporosis-related knowledge as a part of their future health education responsibilities. This research seeks to evaluate the knowledge of osteoporosis among students belong to three different health sciences programs of International Islamic University Malaysia (IIUM). In addition, it will help to assess the curriculum of osteoporosis in various study programs in IIUM through the reflected level of knowledge and understanding demonstrated by students from three major healthcare-related programs in the medical campus of IIUM.

METHODS

Study design

A cross-sectional study design was employed to evaluate the level of knowledge on osteoporosis and the association between the study program and osteoporosis-related knowledge among students in various health sciences programs in IIUM. The data were collected through validated revised Osteoporosis Knowledge Test (OKT) questionnaire.^[23] This study

has been carried out among students of medicine (final year students), Allied Health Sciences (final year physiotherapy and dietetics students), and pharmacy (third and last year students). The questionnaires were distributed and collected during the first semester of the academic year 2015/2016. A total of 348 students were approached. Distribution of participants in each Kulliyah was 26, 106, and 216, for Allied Health Sciences, medicine, and pharmacy, respectively. The inclusion of final year students of each program, for example, Allied Health Science and medicine and pharmacy, in addition to the prefinal year students of pharmacy program were done to assure that all targeted participants have been already exposed to osteoporosis-related learning activities.

Survey instrument

The questionnaire consisted of 32 questions, divided into the total scale, exercise, and nutrition subscales. The first 11 questions used Likert-scale, while the rest of items required a choice of single answer from multiple answers provided.

Study procedure

The necessary approval to conduct the study obtained from all the involved Kulliyahs. Before starting the data collection, a representative from each Kulliyah was briefed on the study's objectives and details related to the execution of the survey. Each questionnaire has the "consent of participation" attached. Those who agreed headed to taking part in the study and requested to sign the consent forms before answering the survey. After a week, questionnaires were collected back.

Data analysis

The data were analyzed using IBM Statistical Package SPSS version 19.0 for Windows, and the level of significance set at 0.05. The Kruskal–Wallis test was performed to compare knowledge scores, and the median calculated. One point was given to correct answer, and zero point allocated to the wrong answer and lack of response (respondents who answered "Don't Know") for scoring purposes. The total score range from 0 to 32, with the highest scores obtained, indicate greater knowledge of osteoporosis. According to the median split method, a total score of 17 and above, an exercise score of 10 and above, and nutrition score of 14 and above were

considered to have adequate knowledge. The scoring and median split methods were used to evaluate respondents' knowledge of osteoporosis.

RESULTS

Table 1 shows the median scores of the OKT scale within each Kulliyah. There are three scales of the total knowledge score, nutrition score, and exercise score. The trend of scores showed Kulliyah of Allied Health Sciences (KAHS) scored the highest for all of the subscales followed by Kulliyah of Medicine (KOM) and Kulliyah of Pharmacy (KOP), respectively.

From Figure 1, it clearly showed that most of KAHS respondents scored above the median (73.08%) on the total score. On the Nutrition scale and Exercise scale, 61.54% of the KAHS respondents got above median score. Although in the whole scale, the percentage of KOM respondents who got above than median score is low (48.11%) on nutrition and exercise scale, the percentages were higher (53.77% and 65.09%), respectively. Among the KOP respondents, the majority of respondents did not manage to answer correctly on the whole scale. This reflected from the total percentage of 69.91% of the respondents scored below than median score. The same trend observed on the nutrition and exercise scale where 67.13% and 62.5% of KOP respondents scored below than median score.

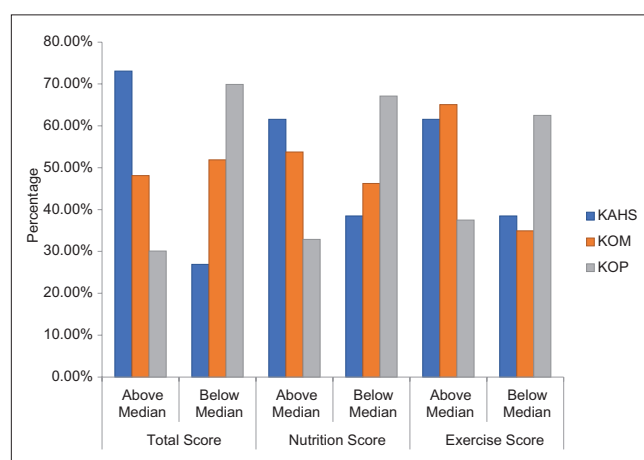


Figure 1: Percentage of students of each Kulliyah obtained above and below the median score

Table 1: Median scores of revised Osteoporosis Knowledge Test for each Kulliyah

	Total score (out of 32)	Nutrition score (out of 26)	Exercise score (out of 20)
Kulliyah of Pharmacy	16.00 (3.71)	13.00 (3.73)	10.00 (2.79)
Kulliyah of Medicine	17.00 (3.27)	15.00 (2.70)	11.50 (2.42)
Kulliyah of Allied Health Sciences	20.00 (3.73)	16.00 (3.34)	11.50 (2.70)
Total	17.00 (3.75)	14.00 (3.2)	10.00 (2.82)

The distribution of score more than the median score for total score, nutrition score, and exercise score viewed from Figures 2-4. KAHS showed the highest percentage

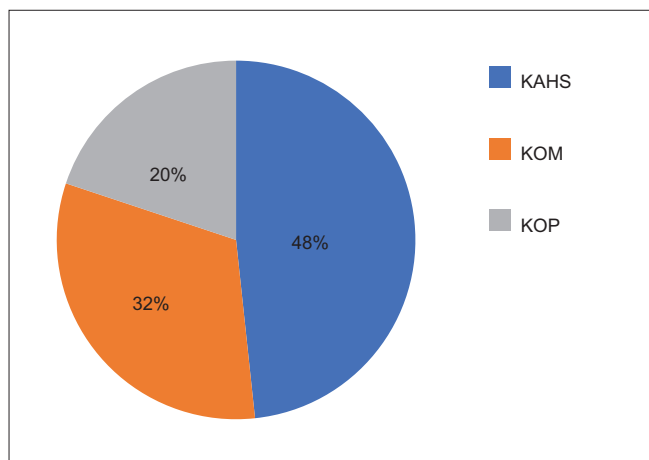


Figure 2: Distribution of total score above median among different Kulliyah

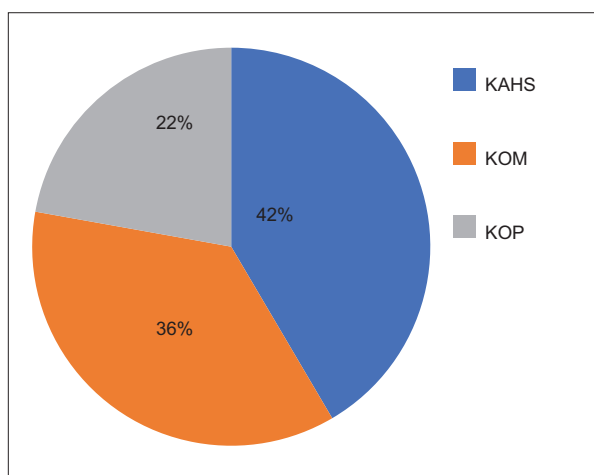


Figure 3: Distribution of nutrition score above median among different Kulliyah

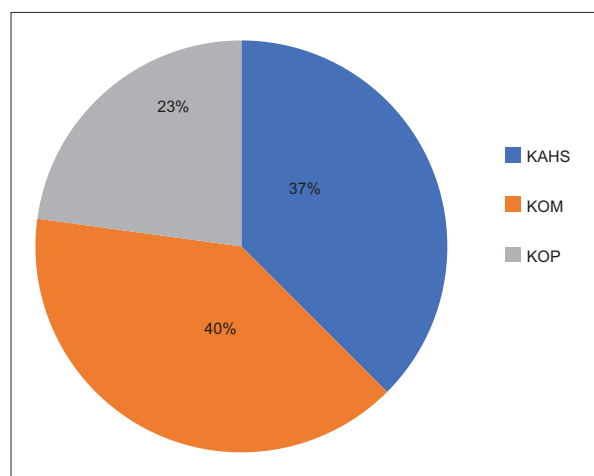


Figure 4: Distribution of exercise score above median among different Kulliyah

of total and Nutrition scores. KOM showed the largest percentage of Exercise score achievement. KOP had the lowest percentage of all scores.

Based on the data presented in Table 2 regarding the distribution of total, nutrition, and exercise scores among all respondents, the percentage of respondents who have adequate knowledge (50.6%) are almost the same with those have inadequate knowledge (49.4%). Distribution of the nutrition score among all respondents showed that 56% of respondents have adequate knowledge. While regarding exercise Score, the highest percentage of sufficient knowledge of the three scores was achieved at 62.1%, while those who have inadequate knowledge were only 37.9%. Interestingly, no significant difference ($P < 0.05$) was observed across all the groups for the median knowledge score.

DISCUSSION

It is evident that the scores obtained by different study disciplines vary apparently, higher percentages of KAHS students (only physiotherapy and dietetic students) achieved total score more than the median score followed by KOM followed by the students of KOP. The result is similar to one US study that used the same questionnaire in which the senior dietetics students scored the highest.^[24] On the other hand, this result is to some extent different from the findings of another Canadian study which reported that pharmacists and dieticians scored the highest of overall scores.^[6] The possible explanation could be the existence of knowledge gap among health-care professionals who are working with individuals at risk of osteoporosis or having a fracture. The knowledge difference between our study participants could attribute to the variation in the scores obtained. This reflects the importance of developing educational programs that suit different healthcare-related specialties for better patient outcomes.

Table 2: Distribution of total, nutrition, and exercise scores among all respondents

	Frequency (%)
Total score	
Adequate	176 (50.6)
Inadequate	172 (49.4)
Nutrition score	
Adequate	195 (56.0)
Inadequate	153 (44.0)
Exercise score	
Adequate	216 (62.1)
Inadequate	132 (37.9)
Total	348 (100.0)

Next, the majority of the students of KAHS scored higher than the median score for both nutrition and exercise subscales. This is due to the facts that KAHS students have a greater focus on physiotherapy and dietetics courses. They have been exposed to a core of nutrition and exercise in their syllabus; hence, they were expected to score higher than KOM and KOP in those subscales. Physiotherapy students particularly have been exposed to the knowledge of health-related physical fitness in their curriculum.^[25] Meanwhile, dietetics students study diet extensively in their academic program compared to other programs.^[24] However, KOM students managed to get higher percentages of students who score more than the median score in exercise subscale exceeding the percentage of the students of KAHS. This study is not in line with a previous study which suggested that medical students have insufficient knowledge of on exercise as a preventive measure of osteoporosis,^[26] as medical students were aware only of the definition of the disease, but their understanding of the complications and preventive measures such as exercise were inadequate.

In another study conducted among college students in both US and China, the results showed that students from those two different countries were sharing poor perceptions regarding osteoporosis as a chronic disease burden.^[15] We believe that our students may have the same pattern of perceptions toward osteoporosis. Approximately, one-half of our study respondents categorized as having inadequate knowledge on osteoporosis as a total score; while the other scores for nutrition and exercise were slightly higher. These findings may indicate inadequate osteoporosis education offered to IIUM students in certain Kulliyah or at least lack of designing the proper tools for integration the received clinical education with its related and realistic perceptions. It may also highlight the need for considering innovative clinical, educational strategies regarding chronic diseases in general, to help to get students more aware of preventive measures, consequences, and seriousness of such diseases.

One UK study suggested that targeted education programs directed to the teenage population can be considered to start combating osteoporosis at earlier stages. Those programs may have a role in improving overall knowledge and help to affect health beliefs in an appropriate way fitted with this age group.^[27] In the current study, it is suggested that our healthcare-related students, provided getting the proper level of knowledge and perceptions from their academic programs, can play a role in those community-based preventive education programs expected to enhance patient knowledge and could have a positive impact on health-related behaviors.^[28] In a study of the Arab Eastern Mediterranean Region, inadequate

osteoporosis knowledge reported among Syrian nursing students, and therefore, emphasized to reconstruct the nursing curricula and integrate components of osteoporosis and highlighting the need for public health education.^[29] In our study, similar findings obtained for pharmacy students. Finally, implementation of the experience-based educational program in pharmacy schools in which students measured their bone density and asked to prepare a simulated health class can help to improve knowledge and awareness of osteoporosis prevention.^[30]

Limitations

One of the limitations was the convenience sampling. This study conducted in one campus of the public university. Therefore, the results of this study not necessarily represent the knowledge in osteoporosis for students enrolled in similar programs at other universities. The small sample size followed by the absence of uniform distribution of responses among different Kulliyahs are also among this study limitations. Besides that, this study was accessed only on three courses which are KOP, KOM, and KAHS (dietetics and physiotherapy). Therefore, it may not represent the knowledge in other healthcare-based students such as nursing.

CONCLUSION

Based on the differences between students from a variety of healthcare-related programs regarding their level of knowledge of osteoporosis and its proper preventive measures, we can prove the significant relationship between the type of study programs and knowledge of osteoporosis. There is a gap of knowledge regarding osteoporosis among health occupations students in general. Pharmacy students mainly should be targeted with more focused education related to the role of exercise and nutrition in preventing osteoporosis within their academic curriculum. Innovative clinical education strategies are needed to improve osteoporosis knowledge and enhance health-related beliefs.

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This study was approved by the Department of Pharmacy Practice, IIUM.

Conflicts of interest

There are no conflicts of interest.

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