

Assessment of knowledge, attitude and practice (KAP) of osteoporosis and its predictors among university students: cross sectional study, UAE

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ABSTRACT

Background: Osteoporosis is a chronic disease and its clinical consequences which take place are detected late, it progresses silently and its signs and symptoms are mostly discovered after a fracture has already occurred. **Aim:** to evaluate the knowledge, attitude and practice (KAP) of university students towards osteoporosis, and identify the set of key demographic and socio-economic factors that jointly influence the KAP of osteoporosis in the United Arab Emirates (UAE). **Design and Setting:** This was a descriptive cross sectional study conducted amongst a random sample of medical and nonmedical students from Ajman university, united Arab Emirates (UAE). The study was carried out by a self-administered questionnaire. It was composed of demographic, knowledge, attitude and practice information on osteoporosis. **Results:** A total of 400 subjects participated in the study, and completed the whole questionnaire. Among these participants, 50 % were male, 90.5% were single, 17% had UAE nationality, and 10.8% complained about a bone disease. The average KAP score was 69% with a 95% confidence interval (CI) [68%, 71%]. This meant that on an awareness scale of 0 to 100, the participants scored the average of 69 points in KAP towards osteoporosis. The results of the statistical modeling showed that the gender is a strong determinant of knowledge, attitude and practice of osteoporosis among university students. **Conclusion:** This study showed a satisfactory level of knowledge, attitude, and practice regarding osteoporosis. There was a poor scoring for some individual KAP items. It has been important to organize educational program to properly address these items that were under scored.

Keywords: Osteoporosis, knowledge, attitude, practice, medical students.

Introduction

Osteoporosis can be defined as a systematic continuous progressive skeletal disease that results in low bone mass, and deterioration of the small structures of the bones, which makes the bones fragile and more prone to fractures [1]. Classification

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system of Osteoporosis has been mainly based on measuring the bone mineral density. Those whose bone mineral density score fell between 1- 2 SD below the mean have been classified as having low bone mass or osteopenia, a condition in which the bone loss is not too severe to classify the individual as an osteoporosis patient [2]. The highest prevalence of fractures was found in Europe, followed by Western Pacific (Japan, New Zealand and Australia), and countries of South East Asia (India, Pakistan, Nepal, Afghanistan, Maldives, Bangladesh, and Bhutan) [3]. It has been anticipated that by the year 2050, there would be around 6.3 million hip fractures over the world [4]. Osteoporosis is relevantly expensive to screen for, diagnose and to be treated. Moreover, surgical procedures have been even more budget consuming in cases where complications occurred. As a result, the patients and their family members had to make certain lifestyle adjustments because of the osteoporosis financial and

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psychological influences^[5]. Genetic factors control around 80% of the bone tissue mass, bone remodeling and osteoporotic bone fractures. Having a positive family history of hip fractures after the age of fifty years boosts the risk of getting fractured^[6]. Females are considerably at higher risk of osteoporosis than males. This was explained by the fact that women have smaller bones^[7]. Previous fracture history, as per mentioned by^[8], indicated that females who have had a fragile bone tissue or a fracture are at greater risk of upcoming fractures regardless of their bone mineral density. Adults, who have experienced a fracture, have more than 50% higher risk to get another fracture in different skeleton areas^[9]. Smoking causes lower bone healing rates, higher risk for fractures, and lower bone tissue formation rate. In addition, smoking decreases the bone tissue mineralization in areas like forearms, hip and heels. Weight represents another modifiable osteoporosis risk factor. If the body mass index is less than 19, this indicates a low bone mineral density^[7]. Health education can decrease the fear of the unknown future. If a person is equipped with knowledge about osteoporosis, he will be able to make proper choices and changes regarding his health related behaviors^[10]. The most effective method to prevent this disease has been taking the correct steps during childhood and adolescence. One of the key areas in controlling osteoporosis is examining and evaluating students' knowledge, beliefs and behaviors about osteoporosis. As a result, many osteoporosis studies have been focused on this aspect. A study conducted on the assessment of knowledge, attitude and behavior regarding osteoporosis in Iran found that 15 to 30% of participants didn't know what osteoporosis is^[11]. Another study assessed patients' knowledge of osteoporosis showed that only 31.2% of participants had very good knowledge towards osteoporosis, moreover low proportion of the participants (17.4%) were able to identify that thin women are at greater risk of osteoporosis^[12]. Similar response was observed in Indian study among fifty premenopausal women and fifty postmenopausal women, where the study participants scored an average level of knowledge about osteoporosis^[13]. Another study among female adolescents aged 15–18 years in one secondary school in Egypt, reported the lack of awareness about the concept of osteoporosis^[14].

With the increased prevalence of osteoporosis in Gulf countries, it has been important to assess the osteoporosis knowledge, attitude and practice among the university students to discover the areas where students had gaps or insufficient information about the disease and health related practices, and implement an in-depth osteoporosis education during early college years. Thus, this study aimed to assess the knowledge, attitude and practice of osteoporosis among university students, and identify the set of key demographic and socio-economic factors that jointly influence the KAP of osteoporosis in the United Arab Emirates (UAE).

Methods

Study design/ setting

A cross-sectional study design was used to determine the knowledge, attitude and practice (KAP) of university students towards osteoporosis. The survey was carried out in Ajman University (AU) in UAE in 2015.

Study participants/population

This study included both nationals and non-nationals from different majors and study years. Admission and Registration Department of Ajman University provided the necessary information on students' Name, University ID number, major, Age, gender, nationality and contact numbers that have been updated regularly. Data collection took place between 1st May 2015 and 1st July 2015.

Sampling

The directory of Admission and Registration Department of Ajman University was used as a sampling frame. This directory was considered as a pre-existing frame, officially recognized, listing information on students' Name, University ID number, major, Age, gender, nationality and contact numbers that have been updated regularly. From excel sheet of the sampling frame of Ajman university, 200 students from faculty of pharmacy and 200 from faculty of dentistry were enrolled in this study. "Simple random sample selection" was the method followed for the sampling. In this method, the individuals were selected randomly, and not more than once to avoid bias that could negatively affect the validity of the results.

Sample Size

The prevalence rate was expected to be around 20%. The alpha level was set to 5% so that there was a 95% confidence interval. The precision (D) of the 95% confidence interval was fixed to be 5%, so that the width of the 95% CI would be at maximum of 10%. According to the assumptions above, the minimum required sample size was $n = 352$ participants if a non-response rate was assumed around 30%. The final chosen sample size was 400 students.

Measurement Instruments

A self-administered questionnaire was used as a tool to collect the data from the participants. The questionnaire was consisted of two sections; demographic information and twenty questions covering knowledge, attitude and practice towards osteoporosis.

Validation and Pre-testing of Questionnaire

Before the study, the questionnaire was validated by subject experts for its content and relevance. Furthermore, it was field-tested several times on a pilot sample of 50 students to clarify any ambiguities, and determine the reliability of the questionnaire.

Table 1. Frequency table for demographic and socio-economic characteristics

| Demographic | n (%) |
|--------------------------------|-------------|
| Age | (17 -38) |
| Mean age ± S.D | (21.9±2.8) |
| Gender: | |
| Male | 200 (50%) |
| Female | 200 (50%) |
| Major: | |
| Pharmacy | 203 (50.8%) |
| Dentistry | 197 (49.3%) |
| Study Level: | |
| First Years | 101 (25.3%) |
| Final Years | 299 (74.8%) |
| Nationality: | |
| UAE Local | 68 (17%) |
| Non UAE Local | 332 (83%) |
| Marital status: | |
| Single | 362 (90.5%) |
| Married | 38 (9.5%) |
| Complain about a bone disease: | |
| Yes | 43 (10.8%) |
| No | 357(89.3%) |

Ethical Principles

The study was approved by University Research Ethical Committees, and an approval letter was obtained to allow the researcher to distribute and collect the questionnaires among AU students. The participation of the students in this study was entirely voluntary and without compensation. Before data collection, the purpose of the survey was explained, and they were also informed that the completion and submission of the questioner would be taken on their consent, and all the students signed the informed consents.

Statistical Analysis

The data was analyzed using the SPSS software version 23. The qualitative variables were summarized using frequencies and percentages, while the quantitative variables were summarized using mean ± Standard Deviation (±SD). Unpaired Student t-tests and their non-parametric versions were used to test the average differences in quantitative variables across groups. KAP score was created to measure the knowledge, attitude and practice of the students towards osteoporosis. The score was defined as the proportion of questions for which the answers were correct. The score ranged from 0% to 100%, and might be used as good approximation of the overall KAP. To investigate the association between KAP of the students towards osteoporosis and other significant risk factors, the derived score was used as the dependent variable in regression models. In this model, the KAP score was considered as a quantitative variable, and simple and multiple linear regressions were fitted. A p value < 0.05 was chosen as the criteria to make decisions regarding statistical significance.

Results

Demographic and socio-economic characteristics

A total of 400 subjects participated in the study and completed the whole questionnaire. Among these participants, 50 % were male, 90.5% were single, 17% had UAE nationality, and 10.8% complained about a bone disease. Regarding the major, 50.8% were pharmacy students, and 49.3% were dentistry students. Over 70% of the participants belonged to the first year’s grade. For more details, see Table 1.

Knowledge, Attitude and Practice towards osteoporosis: Analysis of overall KAP scores

The average KAP score was 69% with a 95% confidence interval (CI) [68%, 71%]. This meant that on an awareness scale of 0 to 100, the participants scored an average of 69 points in KAP towards osteoporosis, and it could be claimed that the overall level of KAP was satisfactory for osteoporosis (see Figure 1).

Table 2 shows the distribution of KAP score according to demographic and socio-economic status. The table also provides the 95% confidence interval for the estimates along with p-values. These p-values were provided from the results of the unpaired sample t test for testing the assumption that the average KAP score was the same between the groups. The female students scored relatively higher than the male students in KAP towards osteoporosis. Their average KAP score was 74% compared to 65% in nonmedical. However, there was no significant association between KAP score and other demographic and socio-economic factors. For more details, comparing the two scores according to the demographic and socio-economic factors, see table 3.

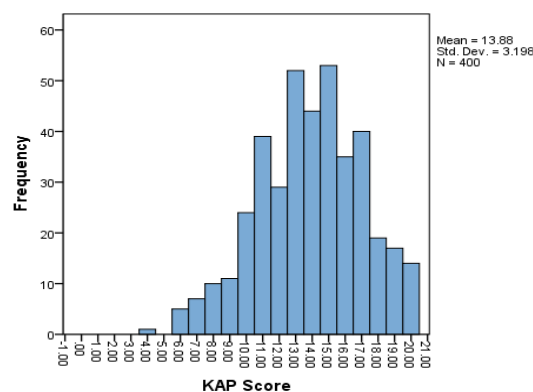


Figure 1. Histogram of KAP score

Table 2. Knowledge, attitude and practice score by demographic and socio-economic variables.

| Demographic Variables | Knowledge, attitude and practice (KAP) score | | | P. value |
|-----------------------|--|--------|----|----------|
| | Mean (in %) | 95% CI | | |
| Gender | | | | < 0.001 |
| Female | 74.12 | 72 | 76 | |
| Male | 64.65 | 62 | 67 | |
| Study level | | | | 0.812 |
| First Years | 69.1 | 66 | 72 | |
| Last Years | 69.5 | 68 | 71 | |
| Major | | | | 0.097 |
| Dentistry | 68 | 66 | 70 | |
| Pharmacy | 71 | 69 | 73 | |
| Nationality | | | | 0.149 |
| Emirati | 67 | 63 | 71 | |

| | | | | |
|-----------------------|----|----|----|-------|
| Non Emirati | 70 | 68 | 72 | |
| Marital status | | | | 0.106 |
| Single | 70 | 68 | 71 | |
| Married | 65 | 59 | 72 | |
| Monthly income | | | | 0.283 |
| Below 10000 DHS | 68 | 64 | 71 | |
| Above 10000 DHS | 70 | 68 | 72 | |

Knowledge, Attitude and Practice towards osteoporosis score: Analysis of individual questions

Table 3 presents the results of each of the questions related to knowledge, attitude and practice of osteoporosis among the participants.

Table 3: Frequency table for Knowledge, attitude and practice items

| Items in questionnaire | Yes n. (%) | No n. (%) |
|--|-------------|--------------|
| 1. Have you heard about osteoporosis? | 384 (96%) | 16 (4%) |
| 2. Can you define osteoporosis? | 182 (45.5%) | 218 (54.5%) |
| 3. Do you know future osteoporosis risk? | 300 (75%) | 100 (25%) |
| 4. Is osteoporosis a serious disease as heart disease & breast cancer? | 353 (88.3%) | 47 (11.75%) |
| 5. Fracture of bone is osteoporosis signs & symptoms | 301 (75.3%) | 99 (24.75%) |
| 6. Humped spine is osteoporosis signs & symptoms | 289 (72.3%) | 111 (27.75%) |
| 7. Loss of height is osteoporosis signs & symptoms | 190 (47.5%) | 210 (52.5%) |
| 8. Back pain is osteoporosis signs & symptoms | 322 (80.5%) | 78 (19.5%) |
| 9. Being a female is osteoporosis risk factor | 225 (56.3%) | 175 (43.75%) |
| 10. Old age is osteoporosis risk factor | 359 (89.8%) | 41 (10.25%) |
| 11. Cigarette smoking is osteoporosis risk factor | 215 (53.8%) | 185 (46.25%) |
| 12. Family history is osteoporosis risk factor | 270 (67.5%) | 130 (32.5%) |
| 13. Lack of activity is osteoporosis risk factor | 304 (76%) | 96 (24%) |
| 14. Low calcium intake is osteoporosis risk factor | 387 (96.8%) | 13 (3.25%) |
| 15. Early menopause is osteoporosis risk factor | 225 (56.3%) | 175 (43.75%) |
| 16. High salt diet is osteoporosis risk factor | 185 (46.3%) | 215 (53.75%) |
| 17. Previous fracture is osteoporosis risk factor | 207 (51.8%) | 193 (48.25%) |
| 18. Regular exercise can protect against osteoporosis? | 354 (88.5%) | 46 (11.5%) |
| 19. Eating calcium rich foods protect against osteoporosis? | 389 (97.3%) | 11 (2.75%) |
| 20. Smoking cessation protect against osteoporosis? | 269 (67.3%) | 131 (32.75%) |

Factors influencing the KAP score

Table 4 displays the results of the simple linear regression model applied to each demographic and socio-economic variable,

separately. The table shows the results for knowledge, attitude, and practice (KAP) scores. The coefficients (B) in this table showed the magnitude of the association, and their corresponding p-values indicated whether the association was statistically significant or not.

Table 4. Simple linear regression model applied to each demographic and socio-economic separately.

Knowledge and attitude and practice (KAP) of osteoporosis

| | Un-standardized Coefficients | | Standardized Coefficients | P.val | 95 % Confidence Interval for B | |
|--|------------------------------|------------|---------------------------|---------|--------------------------------|-------------|
| | B | Std. Error | Beta | | Lower Bound | Upper Bound |
| Major (Ref. Male) | | | | | | |
| Female | 9.47 | 1.53 | 0.297 | < 0.001 | 6.46 | 12.48 |
| Study level (Ref. final Years) | | | | | | |
| First Years | -0.439 | 1.84 | -0.012 | 0.812 | -4.06 | 3.18 |
| Gender (Ref. Dentistry) | | | | | | |
| Pharmacy | 2.65 | 1.59 | 0.083 | 0.097 | -0.480 | 5.79 |
| Nationality (Ref. non Emirati) | | | | | | |
| Emirati | -3.07 | 2.13 | -0.072 | 0.149 | -7.25 | 1.11 |
| Marital status (Ref. married) | | | | | | |
| Single | 4.41 | 2.59 | 0.081 | 0.106 | -0.938 | 9.76 |
| Age | -0.020 | 0.289 | -0.003 | 0.946 | -0.587 | 0.547 |
| Monthly income (Ref. above 10000 DHS) | | | | | | |
| Below 10000 DHS | -2.08 | 1.94 | -0.054 | 0.283 | -5.89 | 1.73 |

To select the set of factors that jointly influenced knowledge, attitude and practice of osteoporosis, the stepwise procedure was applied to the multiple linear regression model. The results of this procedure showed that gender only was associated with knowledge, attitude, and practice of osteoporosis.

Discussion

Osteoporosis is a global health problem, which has an impact not only on patients, but on the overall healthcare system increasing the burden on health care services. The present study was designed to assess the KAP of Ajman University students towards the concept of osteoporosis, signs/symptoms, risk factors and preventive measures, and investigate a set of key demographic and socio-economic factors that jointly influenced the KAP of osteoporosis. This study showed a satisfactory level of knowledge, attitude and practice regarding osteoporosis. A similar response was observed by one American study conducted among 792 males and females' college students, who reported poor knowledge regarding the risks of osteoporosis in white women, the risks that came with the removal of ovaries, and the benefits which were given to big-boned individuals^[15]. Previous studies have likewise obtained results consistent with this view^[14, 16]. Similar findings were reported by another study among 302 young women in southeastern state university in USA, in which only 50% could correctly identify 6 out of the 16 osteoporosis risk factors, and the mean risk factor knowledge score was 9.41 out of 20^[17]. Another study carried out among 817 college students showed that US college students had a higher perception of getting osteoporosis and its seriousness, than did the Chinese students. Furthermore, US students had more awareness on the

benefits of exercise and calcium intake than Chinese students^[18]. Moreover, in one Taiwanese study among young adult women aged between 30–45 years, the participants believed that osteoporosis is not serious, and that taking preventative measures would not be beneficial^[19]. Further study among 86 participants from the University of Colombo, and 100 participants from the University of Kelaniya reported the modest level of knowledge about osteoporosis; however, the knowledge on risk factors and preventive practices was poor^[20].

A good proportion of participants showed good KAP regarding all the 20 items except seven items. One of these items was related to the definition of osteoporosis, and the rest of items were related to the osteoporosis risk factors such as: loss of height, being a female, cigarette smoking, early menopause, high salt diet, and previous fracture. An efficient educational and awareness programs regarding osteoporosis might be very useful to properly address some of these items that were under scored. Female students performed relatively well compared to Male students in knowledge, attitude and practice towards osteoporosis. The average KAP score was 74% for female students compared to 65% for male students. There was no difference in KAP score according to the study level, gender, nationality, marital status and monthly income.

Conclusion

This study showed a satisfactory level of knowledge, attitude and practice regarding osteoporosis. There was a poor scoring for some individual KAP items. These results suggested the need to implement proper health education programs to raise the awareness on osteoporosis, motivate healthy practices about osteoporosis, and screen for the early signs and symptom of osteoporosis.

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