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A Study to Assess the Knowledge Among Kuwait Working Women Regarding Traditional Wear Leading to Osteoporosis and Its Effect in Physical Ability

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ABSTRACT

BACKGROUND: Osteoporosis is a major public health concern, particularly among women, as it increases the risk of fractures and impacts mobility and quality of life. Cultural and lifestyle factors, such as clothing that limits sun exposure and reduced physical activity, may influence osteoporosis risk and knowledge levels. This study aimed to assess osteoporosis knowledge and its impact on physical ability among working women wearing the burqa, using the Osteoporosis Knowledge Assessment Tool (OKAT) as the primary outcome measure.

METHODS: A cross-sectional study was conducted among 200 working women aged 25–55 years who wear the burqa. Participants were recruited from hospitals, offices, schools, and other workplaces, and data were collected using: 1. OKAT to assess osteoporosis knowledge. 2. A Physical Activity and Functional Limitation Questionnaire to evaluate mobility and lifestyle habits, Demographic variables, BMI, and physical activity levels were recorded. Statistical analysis included descriptive statistics, chi-square tests, and regression analysis to determine associations between osteoporosis knowledge and other factors.

RESULTS: The mean OKAT score was 9.43, indicating low to moderate osteoporosis knowledge. 58% of participants had low knowledge, 33% had moderate knowledge, and only 9% had high knowledge about osteoporosis. Educational level significantly influenced osteoporosis knowledge. PhD holders scored highest (18.6), while non-graduates had the lowest scores (6.55). Occupation was also a significant factor, with teachers (14.65) and medical professionals (10.99) scoring higher than office workers (7.09) and unskilled workers (4.71). 75.5% of participants reported not engaging in regular exercise, a key risk factor for osteoporosis. 47% were overweight (BMI 25–29.9 kg/m²), and 4% were obese (BMI ≥30 kg/m²).Lower osteoporosis knowledge was associated with less engagement in preventive behaviours, such as physical activity and a calcium-rich diet.

CONCLUSION: The study highlights significant gaps in osteoporosis knowledge among working women who wear the burqa, particularly among those with lower educational attainment and in non-working individuals. These findings underscore the need for targeted educational interventions to raise awareness and promote preventive behaviours, such as regular physical activity, to mitigate the risk of osteoporosis in this population.

KEYWORDS: Osteoporosis, Knowledge assessment, Physical ability, Working women, Burqa, Education, Physical activity, BMI, Public health.

INTRODUCTION

Osteoporosis, as defined by the World Health Organization (WHO), is a condition where bone mineral density (BMD) is 2.5 standard deviations or more below the average value for young, healthy women .[1] According to the World Health Organization (WHO), osteoporosis is a significant public health concern, particularly in women, due to hormonal changes associated with menopause and other gender-specific risk factors.

It is characterized by reduced bone mass and deterioration of bone microarchitecture, leading to increased bone fragility and a heightened risk of fractures, even from minor trauma.[2]

As a systemic degenerative skeletal disorder, osteoporosis significantly compromises bone strength due to both diminished bone mass and structural deterioration. This chronic metabolic bone disease is comparable to diabetes and hypertension in prevalence and impact.[3,4] Clinically, osteoporosis becomes most significant when it results in fractures, commonly occurring in the distal radius, proximal humerus, pelvis, proximal femur, and vertebral bodies.[5]

Globally, it is estimated that over one-third of women will experience at least one fragility fracture during their lifetime.[1] With approximately 200 million people affected worldwide, osteoporosis is a major health and socioeconomic challenge.[6-8] Epidemiological studies show it is one of the most common chronic conditions, affecting every third postmenopausal woman and a significant proportion of individuals over 70 years of age.[9]

Osteoporosis is often asymptomatic, with the skeletal system deteriorating painlessly due to progressive loss of bone mass. A key indicator of disease progression is usually the occurrence of an osteoporotic fracture.[10,11] Osteoporosis can be broadly classified into two types: primary and secondary osteoporosis.[12]

Primary osteoporosis includes idiopathic and involutional forms. Idiopathic osteoporosis occurs in children and adolescents, leading to fractures. Its causes are thought to involve endocrine abnormalities, vitamin D deficiency, infectious agents, immunological disorders, and genetic factors.[13-17] Involutional osteoporosis, the most common form, is closely associated with aging. It occurs when bone metabolism becomes disrupted, accelerating the onset of osteopenia.[18,19]

Involutional osteoporosis is further divided into two types:

- **Postmenopausal osteoporosis** (Type I): Caused by estrogen deficiency, it primarily affects spongy bone.[20,21]
- **Senile osteoporosis** (Type II): Results from age-related loss of both cortical and spongy bone mass.[22-24]

Primary osteoporosis most commonly affects postmenopausal women (~25%) and, to a lesser extent, elderly men.[25] Key factors contributing to primary osteoporosis include genetics, hormonal balance, diet, physical activity, and health care during growth and development.[26-29]

Secondary osteoporosis, on the other hand, arises from factors other than natural aging or menopause.[30] It may be caused by certain medications, including glucocorticosteroids, anti-epileptic drugs, heparin, thyroid hormones, aluminum-containing gastric suppressants, sedatives, oral anticoagulants, antituberculosis drugs, chemotherapeutics, tetracyclines, and diuretics.[31,32] Among these, chronic glucocorticosteroid use is the leading cause of iatrogenic secondary osteoporosis.[33,34] Secondary

osteoporosis can also be triggered by conditions such as hyperthyroidism, hyperparathyroidism, rheumatic diseases, diabetes, and malabsorption syndrome.[35-38]

Age is the most significant risk factor for osteoporotic fractures. Approximately 90% of all fractures occur in individuals over 60 years of age.[39-42] With an aging global population, it is crucial to implement preventive measures and raise awareness of osteoporosis risk factors to mitigate its impact.

Cultural and lifestyle factors can influence both the prevalence of osteoporosis and the level of knowledge about the condition. Among women who wear the burqa, there may be additional considerations such as reduced sun exposure leading to Vitamin D deficiency, a key risk factor for osteoporosis. Furthermore, cultural or social practices might limit awareness about osteoporosis and its management, which could adversely affect physical functioning and independence.

Raising awareness about osteoporosis risk factors and prevention is crucial, as significant knowledge gaps persist among the general public and healthcare stakeholders [43-45].[43-45] For instance, a nationwide study in Switzerland revealed that 20% of patients had medical conditions or were on medications that increased their osteoporosis risk. Additionally, 3.5% of patients had experienced fragility fractures, 7.3% were receiving osteoporosis treatment, and 53.9% did not use calcium or vitamin D supplements. Notably, only 38.5% of respondents in a prior awareness survey recognized osteoporosis as a chronic illness.[46]

Similar patterns were observed in regional studies. In Jordan, a study on premenopausal and postmenopausal women reported low knowledge levels, with average scores of 50.9 and 51.3 out of 100, respectively.[47] In Egypt, another study found limited awareness of osteoporosis and its associated fracture risks among women, as well as insufficient knowledge of calcium- and vitamin D-rich diets. Interestingly, women without osteoporosis demonstrated greater awareness.[48]

In Saudi Arabia, a 2016 study assessed public knowledge of osteoporosis among Saudi men and women. It found that 44% of females and 58% of males had satisfactory knowledge of the disease, with individuals over 51 years old scoring higher than those aged 15–35.[49] Two additional studies in Riyadh revealed that Saudi women were not adequately adopting osteoporosis prevention measures.[46,50] Another study by Amarnath et al.[1] at the Security Forces Hospital (SFH) in Riyadh reported a mean awareness score of 66% among patients. While participants showed better knowledge about symptoms and fracture risks compared to preventive factors such as diet and physical activity, significant differences were noted between younger and older females (>40 years old), with younger females scoring lower on the Osteoporosis Knowledge Assessment Tool (OKAT).

Given the importance of awareness for adopting proper preventive and treatment strategies, and the limited data on osteoporosis awareness in kuwait, the current study was conducted to assess the general population's knowledge in this area. The study aimed to evaluate the current situation, examine the impact of cultural factors on awareness levels, and provide healthcare leaders with valuable insights for planning effective public awareness campaigns about osteoporosis.

Despite the significant burden of osteoporosis, there is limited research exploring the level of knowledge about this condition and its impact on physical ability in specific subgroups such as working women who wear the traditional wear (Burqa) in accordance with cultural or religious beliefs related to hijab.

Early detection and education about osteoporosis are essential to prevent fractures, maintain bone health, and preserve mobility. This is particularly critical for women, who are at a higher risk of developing osteoporosis due to factors such as hormonal changes, pregnancy, and breastfeeding, which can affect bone density over time. Increased awareness and knowledge about osteoporosis can empower women to

adopt preventive strategies, such as dietary modifications, physical activity, and regular screenings, to mitigate the condition's impact.

Cultural and lifestyle factors play a pivotal role in shaping the risk and prevalence of osteoporosis as well as the level of awareness about it. Among women who wear the traditional garment, additional considerations related to reduced exposure to sunlight may exacerbate the risk of Vitamin D deficiency—a key factor in bone health. Vitamin D facilitates calcium absorption, and its deficiency can lead to weakened bones, heightening the risk of osteoporosis and fractures. Furthermore, the traditional attire of the burqa, which covers most of the body**,** may also restrict participation in certain forms of physical activity, such as outdoor exercise or weight-bearing activities, which are essential for maintaining bone strength.

In addition to these physiological factors, cultural and social practices may act as barriers to health education and awareness. Women wearing the traditional garment may face challenges accessing osteoporosis-related information due to societal norms, lack of targeted health campaigns, or stigmas around seeking medical advice. These barriers can lead to misconceptions about osteoporosis prevention, diagnosis, and treatment, potentially resulting in delayed interventions. For instance, the absence of visible symptoms in the early stages of the disease may cause some women to underestimate its seriousness until significant physical limitations or fractures occur.

Despite the widespread prevalence of osteoporosis and its profound impact on physical function and independence, there is limited research focusing on specific subgroups such as working women who wear the burqa. This population often represents a unique intersection of risk factors, balancing the demands of professional life with cultural and health challenges. However, existing studies seldom address the knowledge levels and attitudes of women in this subgroup, particularly in the context of their physical abilities. Understanding their knowledge about osteoporosis, the barriers they face in prevention and management, and how the condition impacts their physical functioning is essential for developing effective, culturally sensitive interventions.

By identifying gaps in awareness and their influence on physical health, this study seeks to provide insights that can inform targeted health education programs, promote early preventive measures, and ultimately improve quality of life for this vulnerable population.

Need for the Study:

The lack of awareness about osteoporosis is a well-documented challenge, especially in women who may face additional barriers due to cultural practices or limited access to health education. Working women wearing the traditional garment represent a unique population that may encounter factors such as restricted physical activity, limited sun exposure, and potential dietary deficiencies, which heighten their risk of developing osteoporosis. These barriers may also lead to misconceptions about the condition, resulting in delayed preventive actions and interventions.

Given that osteoporosis significantly impacts physical ability, including mobility, balance, and independence, it is essential to understand the relationship between knowledge levels and functional outcomes in this population. Identifying gaps in awareness can pave the way for tailored health education programs to mitigate risks and improve outcomes. This study, therefore, aims to assess the knowledge of osteoporosis and its effect on physical ability among working women wearing the burqa, providing insights into specific health education needs.

AIM AND OBJECTIVES OF THE STUDY

Aim of the Study:

The study aims to assess the knowledge about osteoporosis and its effect on physical ability among Kuwait working women wearing the traditional wear, using the Osteoporosis Knowledge Assessment Tool (OKAT) as the primary outcome measure.

Objectives of the Study:

1. To evaluate the level of knowledge about osteoporosis among working women wearing the traditional wear using the Osteoporosis Knowledge Assessment Tool.
2. To assess the self-reported impact of osteoporosis on physical ability in this population.
3. To identify potential correlations between osteoporosis knowledge and physical ability among working women wearing the traditional wear.
4. To explore barriers to osteoporosis awareness and prevention specific to this population, including cultural, environmental, and social factors.

METHODOLOGY

Study Design: This study was a cross-sectional, observational study aimed at assessing the knowledge of osteoporosis and its impact on physical ability among working women of Kuwait who wear the burqa. The study employed a survey-based approach using validated tool to gather data on osteoporosis knowledge and its association with functional limitations.

Study Population: The target population included working women who wear the burqa, aged 25– 55 years, from various professional backgrounds, including office workers, teachers, healthcare workers, and retail employees. Participants were recruited from hospitals, educational institutions, corporate offices, and local community centres.

Sampling Technique: A convenience sampling method was used to recruit participants from workplaces, health centres, and social organizations where women wearing the burqa are employed. Inclusion Criteria: 1. Women aged 25–55 years. 2. Wearing the burqa as part of regular attire. 3. Engaged in any form of professional work (full-time or part-time). 15 4. Willing to provide informed consent for participation. Exclusion Criteria: 1. Women with a diagnosed musculoskeletal disorder affecting mobility. 2. Pregnant or lactating women. 3. Those with a history of fractures or osteoporosis treatment. 4. Women who do not regularly wear the burqa.

Data Collection Procedure: The data collection process was conducted systematically in three distinct phases to ensure accuracy, reliability, and adherence to ethical guidelines. These phases include the Pre-Data Collection Phase (Preparatory Phase), Data Collection Phase (Survey Administration), and Post-Data Collection Phase (Data Verification and Entry). Each phase is designed to facilitate smooth execution, minimize bias, and maintain data integrity.

Phase 1: Pre-Data Collection (Preparatory Phase): Before the commencement of data collection, several essential steps were undertaken to ensure the study's effectiveness and ethical compliance. First, ethical approval was obtained from the Institutional Ethics Committee (IEC) to ensure that the study adheres to ethical research principles. Simultaneously, permissions were sought from organizations and institutions where the study participants were recruited, including workplaces, hospitals, and educational institutions. This step ensures that participants can engage in the study without external constraints. Additionally, all necessary study materials, including participant information sheets, consent forms, and

questionnaires, were prepared in multiple languages to accommodate linguistic diversity among participants.

Phase 2: Data Collection (Survey Administration Phase): The actual data collection phase began after all preparatory steps are completed. Participants were approached at their workplaces, hospitals, and community centers, where researchers were introduced themselves, explain the study's purpose, and provide the Participant Information Sheet detailing the objectives, risks, and benefits of participation. Participants were given time to read the information and ask any questions before proceeding. Once a participant agrees to take part in the study, they were asked to sign an Informed Consent Form (ICF) before proceeding with the survey. For participants with low literacy levels, the consent form was read aloud, and verbal consent was obtained in addition to a signature or thumbprint. Participants were reassured that their responses will be kept confidential and anonymous to ensure honest participation. Data was collected using The Osteoporosis Knowledge Assessment Tool (OKAT). The OKAT is a 20-item questionnaire assessing participants' knowledge of osteoporosis, its risk factors, prevention strategies, and treatment options. Each response was scored as correct (1 point) or incorrect (0 points), and total scores were classified osteoporosis knowledge as low (<10), moderate (10–15), or high (>15). The survey was self-administered or interviewer-assisted, depending on participant preference. In the self-administered format, participants completed the questionnaire privately, with researchers available for clarification. In the interviewerassisted format, a trained research assistant read out the questions and record responses for participants who require assistance due to literacy or language barriers. The surveys were available in English, Arabic, and local languages to ensure accessibility for all participants. The total time required for survey completion, including the consent process, was approximately 20–30 minutes per participant. Upon completing the questionnaire, participants were thanked for their time and reassured that their data will be used solely for research purposes.

Phase 3: Post-Data Collection (Data Verification and Entry Phase): Once data collection is completed, responses underwent verification and validation to ensure completeness and accuracy. Each completed questionnaire was carefully reviewed for missing responses, inconsistent answers, or incomplete sections. Surveys with major missing data were excluded from the analysis, while minor gaps may be followed up with participants if possible. After verification, responses were entered into Microsoft Excel and SPSS (Statistical Package for the Social Sciences) v.25 for analysis. The data entry process involved double-checking entries to minimize errors and ensuring that numerical codes are assigned correctly (e.g., correct answers in the OKAT was coded as "1," incorrect answers as "0"). Logical checks were conducted to identify discrepancies or outliers. To maintain data confidentiality, all personal identifiers were removed before analysis, and hard copies of the questionnaires were stored securely in locked cabinets. Digital data was password-protected and accessible only to the research team. Once all data are cleaned and verified, statistical analysis began to derive meaningful insights from the findings. This structured and detailed data collection process ensures validity, reliability, and ethical compliance. The inclusion of language translation, interviewer assistance, and rigorous verification helped maintain data integrity and maximize participant engagement. The study's findings were contributed valuable insights into osteoporosis knowledge and its impact on physical ability among working women wearing the burqa, informing future public health interventions.

Table 1: Summary of Data Collection Steps:

STEP	PROCESS
1. Ethical Approval & Permissions	Obtain approval from IEC and workplace authorities.
2. Recruitment	Approach participants, explain study, and check eligibility.
3. Informed Consent	Provide consent form, clarify doubts, obtain signature.
4. Questionnaire Administration	Self-administered or interviewer-assisted survey.
5. Data Verification	Check responses for completeness and accuracy.
6. Data Entry	Input data into SPSS/Excel, assign scores.
7. Data Cleaning	Identify and correct errors before analysis.

STATISTICAL ANALYSIS

Demographic variables (age, occupation, education, BMI) were summarized using mean ± SD for continuous variables and percentages for categorical data. OKAT scores were categorized as low (<10), moderate (10–15), and high (>15). Data analysis was conducted using SPSS v.25, with a p-value < 0.05 considered statistically significant.

RESULTS

Demographic Characteristics of Participants: A total of 200 working women wearing the burqa participated in the study. The participants were between the ages of 25 and 55 years, with a mean age of 38.53 years. The study population represented a diverse range of educational backgrounds, occupations, marital statuses, and BMI categories.

Educational Level Distribution: Among the participants, 83 women (41.5%) were non-graduates, making up the largest proportion, followed by 72 women (36%) with a bachelor's degree. A total of 34 women (17%) had completed a master's degree, while 11 participants (5.5%) held a PhD. This distribution highlights a significant proportion of the sample with lower educational qualifications, which could have implications for osteoporosis awareness levels.

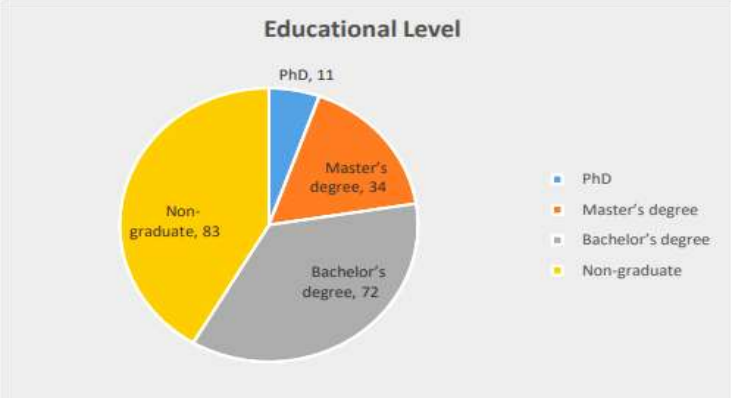

Figure 1: Distribution of Participants based on education

Occupational Categories: Regarding professional backgrounds, 71 participants (35.5%) were medical professionals, forming the largest occupational group. 67 participants (33.5%) were office workers, followed by 34 teachers (17%) and 28 unskilled workers (14%).

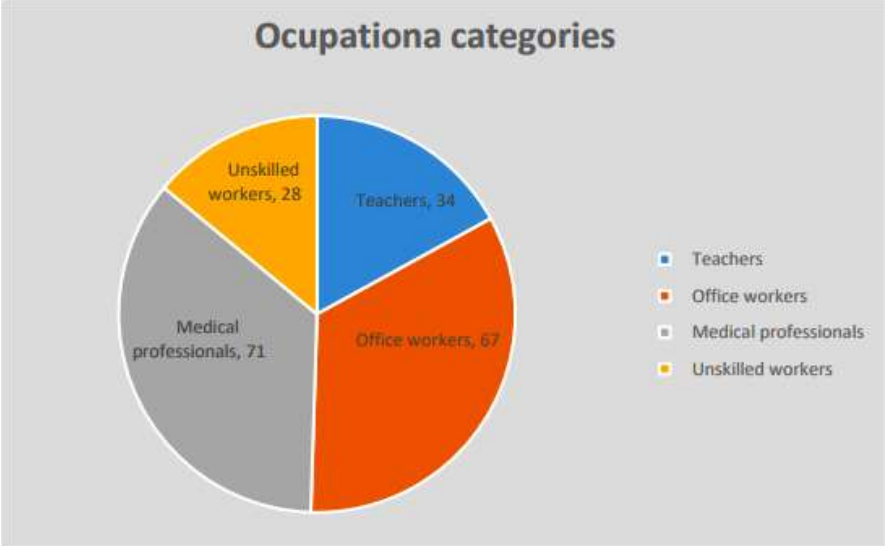

Figure 2: Distribution of Participants based on occupation

The occupational distribution reflects a broad range of work environments that may influence lifestyle factors related to osteoporosis prevention.

Marital Status: A majority of the participants, 155 women (77.5%), were married, while 45 participants (22.5%) were single. Marital status may play a role in health awareness and access to medical information, particularly through family and community interactions.

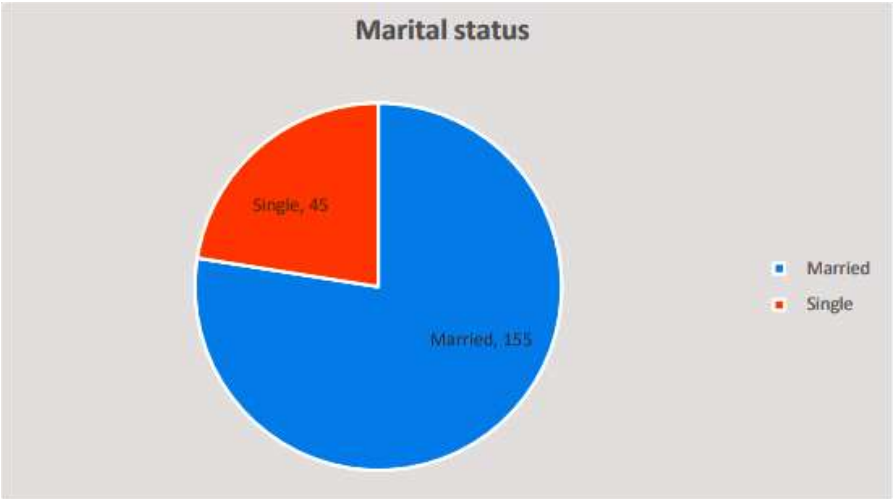

Figure 3: Distribution of Participants based on marital status

BMI Distribution: The mean BMI of the participants was 25.17 kg/m², indicating an overall tendency toward being overweight. The BMI distribution showed that 98 women (49%) had a BMI below 24.9 kg/m² (normal weight), while 94 participants (47%) fell into the overweight category (BMI 25–29.9 kg/m²). Additionally, 8 participants (4%) were classified as obese (BMI ≥30 kg/m²).

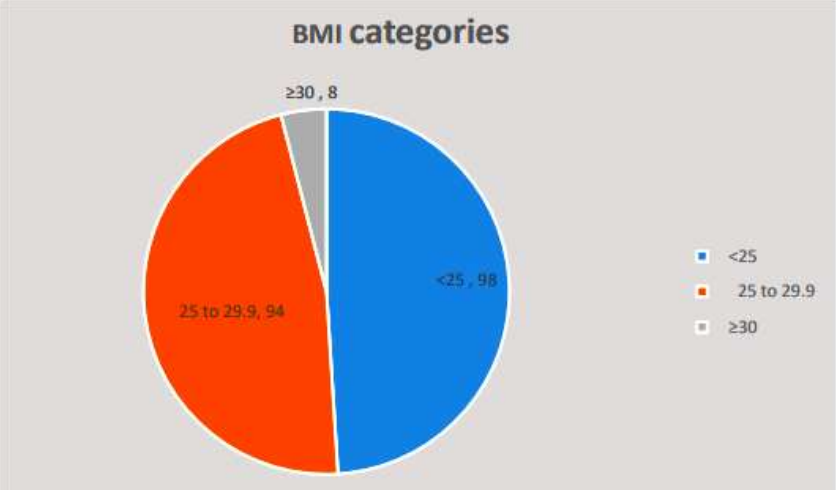

Figure 4: Distribution of Participants based on BMI

This data suggests that nearly half of the participants were overweight or obese, which is a potential risk factor for osteoporosis and other metabolic conditions.

Physical Activity Levels

A significant majority of the participants, 151 women (75.5%), reported not engaging in regular exercise, while only 49 participants (24.5%) reported regular exercise habits.

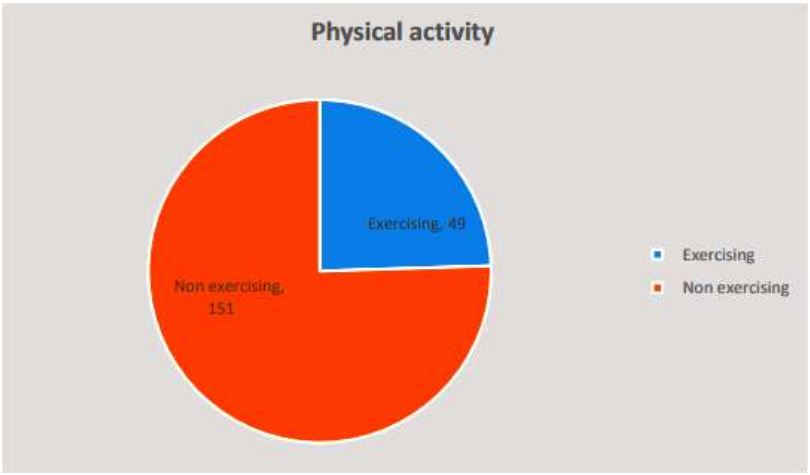

Figure 5: Distribution of participants

This lack of physical activity may contribute to decreased bone strength and an increased risk of osteoporosis, underscoring the importance of targeted awareness programs.

Table 2: General characteristics of the subject

Characteristics	Frequency	Percent
Educational Level		
PhD	11	5.5
Master's Degree	34	17
Bachelor's Degree	72	36

Non-graduate	83	41.5
Occupation		
Teachers	34	17
Office workers	67	33.5
Medical professionals	71	35.5
Unskilled Workers	28	14
BMI (Kg/m^2)		
<25	98	49
25 - 29.9	94	47
≥30	8	4
Marital status		
Married	155	77.5
Single	45	22.5
Physical Activity		
Exercising	49	24.5
Non Exercising	151	75.5

Only 18 participants (9%) demonstrated high knowledge (OKAT score >15). These results highlight a substantial gap in osteoporosis awareness among working women wearing the burqa, emphasizing the need for educational interventions. Educational Level and OKAT Score: A clear correlation was observed between educational attainment and osteoporosis knowledge. Participants with higher education levels scored significantly better on the OKAT. The mean OKAT scores across educational groups are shown in table 2.

Osteoporosis Knowledge Assessment (OKAT) Results

The mean osteoporosis knowledge assessment tool (OKAT) score among the participants was 9.43, indicating an overall low to moderate level of knowledge about osteoporosis. The distribution of knowledge levels revealed that 116 participants (58%) had low osteoporosis knowledge (OKAT score <10), while 66 participants (33%) had moderate knowledge (OKAT score 10–15). Only 18 participants (9%) demonstrated high knowledge (OKAT score >15). These results highlight a substantial gap in osteoporosis awareness among working women wearing the burqa, emphasizing the need for educational interventions.

Educational Level and OKAT Score:

A clear correlation was observed between educational attainment and osteoporosis knowledge. Participants with higher education levels scored significantly better on the OKAT. The mean OKAT scores across educational groups are shown in table 3.

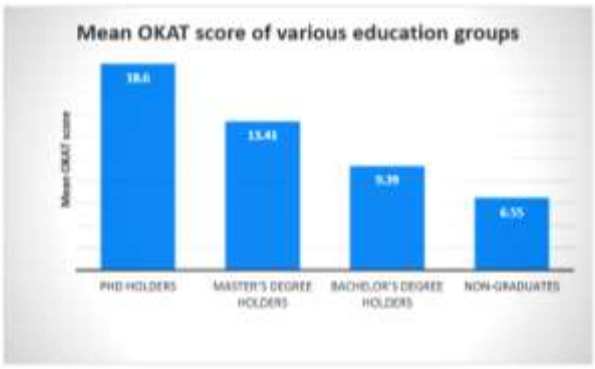

Figure 6: OKAT Score across educational groups

Table 3: OKAT score across educational groups

Sl. No.	Educational groups	Mean OKAT score
1	PhD Holders	18.6
2	Masters degree holder	13.41
3	Bachelor's degree holder	9.9
4	Non-graduates	6.55

These results indicate that participants with a PhD demonstrated the highest level of osteoporosis knowledge, while non-graduates had the lowest scores, suggesting a strong link between formal education and osteoporosis awareness.

Occupational categories and OKAT score:

Osteoporosis knowledge also varied across different professions. Teachers had the highest mean OKAT score (14.65), followed by medical professionals (10.99). Office workers had a significantly lower mean OKAT score of 7.09, while unskilled workers had the lowest mean OKAT score of 4.71. These findings suggest that professions involving health education and academia are associated with higher levels of osteoporosis awareness, whereas those in non-specialized or unskilled jobs may have less exposure to health-related information.

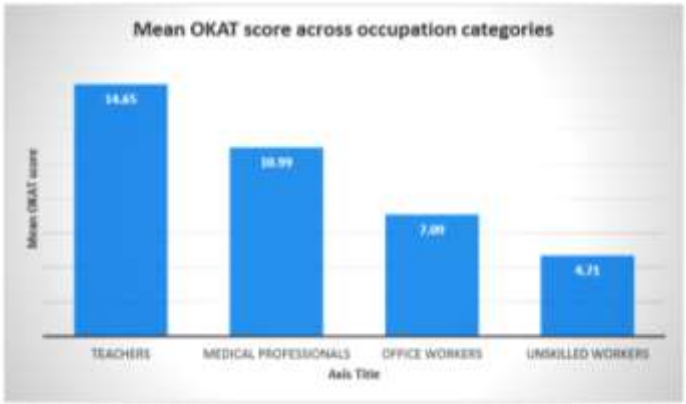

Figure 7: OKAT score across occupation categories

Table 4: OKAT scores across Occupational Categories

Sl. No.	Occupation	Mean OKAT Score
1	Teachers	14.65
2	Medical Professionals	10.99
3	Office workers	7.09
4	Unskilled Workers	4.71

The study included 200 working women wearing the burqa, with a mean age of 38.53 years. A large proportion (41.5%) of participants were non-graduates, and only 5.5% held a PhD. Medical professionals (35.5%) were the largest occupational group, followed by office workers (33.5%). A majority of participants (77.5%) were married. Almost half (47%) of the participants were overweight, and 4% were obese. 75.5% of participants did not engage in regular physical activity, which is a risk factor for osteoporosis. The mean OKAT score was 9.43, indicating low to moderate osteoporosis knowledge. 58% of participants had low osteoporosis knowledge, while only 9% had high knowledge. Higher educational levels were associated with better osteoporosis knowledge, with PhD holders scoring the highest (18.6) and non-graduates scoring the lowest (6.55). Teachers and medical professionals had the highest OKAT scores, while office workers and unskilled workers had the lowest.

These findings highlight significant gaps in osteoporosis knowledge and preventive behaviours, particularly among women with lower educational backgrounds and those in non-health-related professions. The high prevalence of physical inactivity and overweight BMI categories further emphasizes the need for targeted health education programs to promote osteoporosis prevention among this population.

DISCUSSION

The present study assessed osteoporosis knowledge and related factors among 200 working women who wear the burqa. The findings revealed significant gaps in awareness and highlighted associations between educational attainment, occupation, and osteoporosis knowledge levels.

Osteoporosis Knowledge Levels:

The mean Osteoporosis Knowledge Assessment Tool (OKAT) score in this study was 9.43, indicating low to moderate knowledge among participants. This aligns with a study conducted among postmenopausal women in India, which reported limited awareness about osteoporosis and its risk factors.[51] Similarly, research from Jordan found that while certain aspects of osteoporosis were well-known, there were notable deficiencies in comprehensive understanding.[52]

Educational Level and Osteoporosis Knowledge:

A positive correlation between educational attainment and osteoporosis knowledge was evident. Participants with higher education levels, such as PhD holders, had a mean OKAT score of 18.6, while non-graduates scored 6.[53] This trend is consistent with findings from a study in Saudi Arabia, which reported that higher educational levels were associated with better knowledge and preventive practices regarding osteoporosis.[54]

Conversely, a study among postmenopausal women in India found that even among educated women, there was a significant lack of knowledge about osteoporosis, suggesting that education alone may not be sufficient to ensure awareness.[55]

Occupation and Osteoporosis Knowledge:

Occupational background influenced osteoporosis knowledge, with teachers and medical professionals scoring higher on the OKAT compared to office and unskilled workers. This finding is supported by research indicating that individuals in health-related professions or those with access to health information are more likely to have better knowledge about osteoporosis.[54] However, a study from Pakistan reported that even among women with access to health information, there was a lack of adequate knowledge and preventive behavior regarding osteoporosis, highlighting the need for targeted education across all occupational groups.[56]

Physical Activity and Osteoporosis Knowledge:

A significant majority of participants (75.5%) reported not engaging in regular exercise, which is concerning given the role of physical activity in osteoporosis prevention. This is consistent with findings from a study in Saudi Arabia, where many women did not engage in regular physical activity, citing barriers such as lack of time and motivation.[54] In contrast, a study in the United States found that while knowledge about osteoporosis was moderate, it did not necessarily translate into preventive behaviours such as regular exercise, suggesting a gap between awareness and action.[57]

Body Mass Index (BMI) and Osteoporosis Risk:

The mean BMI of participants was 25.17 kg/m², with 47% classified as overweight and 4% as obese. While higher BMI has been traditionally viewed as protective against osteoporosis due to increased bone density, recent studies suggest that obesity may be associated with poor bone quality and increased fracture risk.[54] This underscores the importance of considering both BMI and other risk factors in osteoporosis prevention strategies.

Marital Status and Osteoporosis Knowledge:

The majority of participants (77.5%) were married. While marital status was not directly assessed in relation to osteoporosis knowledge in this study, other research has indicated that social support systems, which can be influenced by marital status, play a role in health behaviours and knowledge dissemination.[54] Further research is needed to explore this association in more detail.

The findings of this study are in line with existing literature that highlights gaps in osteoporosis knowledge among women, particularly in relation to educational attainment and occupation. However, some studies have reported higher levels of awareness, suggesting that cultural, regional, and socioeconomic factors may influence knowledge levels.[51]

Additionally, while this study found a positive correlation between education and knowledge, other research has indicated that education alone may not be sufficient to ensure adequate awareness, pointing to the need for targeted interventions.[56]

The findings of this study emphasize the urgent need for osteoporosis education and prevention strategies, particularly for women who may face cultural and occupational barriers to accessing health information. By implementing community, workplace, and healthcare-driven interventions, osteoporosis awareness can be significantly improved, reducing long-term fracture risk and improving overall bone health outcomes in this population.

STUDY LIMITATIONS

This study provides valuable insights into osteoporosis knowledge and its relationship with educational attainment, occupation, and physical activity among working women wearing the burqa. However, certain limitations should be acknowledged:

1. Cross-Sectional Design: This study used a cross-sectional approach, which captures data at a single point in time. While associations between osteoporosis knowledge and demographic factors were identified, causality cannot be established. A longitudinal study would be needed to assess whether increased osteoporosis knowledge leads to better preventive behaviours over time.
2. Self-Reported Data: The study relied on self-reported questionnaires for both osteoporosis knowledge (OKAT) and physical activity levels. This may introduce recall bias, as participants might overestimate or underestimate their knowledge and behaviours. Objective measures, such as bone mineral density (BMD) scans or accelerometer-based activity tracking, would provide more precise data.
3. Potential Selection Bias: The study used a convenience sampling method, meaning participants were recruited from specific workplaces, hospitals, and institutions where they were available. This may introduce selection bias, as the sample might not fully represent all working women who wear the burqa, particularly those from rural areas or different socioeconomic backgrounds.
4. Language and Literacy Barriers: Although the questionnaire was available in multiple languages, participants with low literacy levels might have struggled with comprehension, potentially affecting their responses. Future studies could incorporate verbal interviews or pictorial representations to improve accessibility for participants with low education levels.

CONCLUSION

This study highlights significant gaps in osteoporosis knowledge among working women wearing the burqa, particularly those with lower education levels and in non-health professions. The findings emphasize the need for targeted osteoporosis education programs, workplace health initiatives, and culturally appropriate interventions to promote physical activity and early screening. Future research should explore longitudinal trends, Vitamin D levels, and the impact of educational interventions on osteoporosis prevention strategies.

STUDY IMPLICATIONS

1. Medical professionals, including doctors, nurses, and physiotherapists, can use these findings to enhance patient education programs. Given the low osteoporosis knowledge levels (mean OKAT score: 9.43) found in this study, healthcare providers should focus on delivering more accessible and culturally sensitive osteoporosis education to women, especially those with lower educational backgrounds or working in non-health sectors.
2. Personalized education based on the patient's literacy level and lifestyle should be emphasized to ensure effective communication about osteoporosis prevention, dietary modifications, and weight-bearing exercises.
3. The study highlights a high percentage of overweight (47%) and physically inactive (75.5%) participants, both of which are risk factors for osteoporosis.
5. Healthcare professionals should prioritize early screening for osteoporosis risk factors, including Vitamin D deficiency, particularly among women who wear clothing that limits sun exposure.
6. Routine bone mineral density (BMD) screening and Vitamin D level assessments should be integrated into regular health check-ups for high-risk groups, particularly those with low physical activity and inadequate sun exposure.

7. Gynaecologists, endocrinologists, and general practitioners should integrate osteoporosis screening and prevention strategies into routine women's health check-ups, particularly during pregnancy, menopause, and post menopause when bone loss is accelerated.[41]
8. Encouraging lifestyle changes such as calcium-rich diets, regular exercise, and safe sun exposure should be an essential part of consultations.
9. The study findings suggest low osteoporosis awareness among working women who wear the burqa, which may be linked to cultural and environmental factors.
10. Public health officials should design culturally appropriate health campaigns, ensuring that osteoporosis prevention messages reach women who may have limited access to mainstream health information due to dress codes, social norms, or workplace restrictions.

RECOMMENDATIONS FOR FUTURE RESEARCH

Longitudinal Studies on Behavioural Change:

Since this study provides cross-sectional data, further research is needed to assess whether educational interventions lead to improved osteoporosis knowledge and preventive behaviours over time. Future studies should explore how cultural clothing influences Vitamin D deficiency and osteoporosis risk in the long term.

Investigation of Vitamin D Deficiency and Sun Exposure in Women Wearing the Burqa:

This study did not assess Vitamin D levels, but the association between full body covering attire and osteoporosis risk is well-documented. Future research should focus on biochemical assessments of Vitamin D levels among women who wear the burqa, exploring how supplementation, dietary changes, and sun exposure can be optimized.

Evaluating the Effectiveness of Health Interventions:

Future studies should investigate the effectiveness of different osteoporosis education programs (e.g., hospital-based counselling, digital health education, workplace seminars) in improving knowledge and reducing osteoporosis risk factors among at-risk women.

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