# Assessment of knowledge, Health Belief, and Self Efficacy for Patients with Osteoporosis

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**Abstract**

**Background:** Osteoporosis (**OP**) is a crippling condition that often results in premature mortality and significant morbidity that is manifested in the form of fractures, bone deformity, impairments quality-of-life**. Aim of the Study:** to assess Knowledge, health belief, and self-efficacy for patients with osteoporosis. **Design:** A descriptive exploratory design was used in this study**. Setting:** The study was carried at outpatient osteoporosis clinics in Shebin Alkawm Teaching Hospital. **Sample:** Purposive sample of 100 adult patients from both gender were be required in this study. **Study tools:** The data for this study were collected by using three tools: **Tool I** structured interviewing questionnaire to gather data about patient's socio-demographic characteristics, medical history of the patients and their knowledge about osteoporosis. **Tool II:** Osteoporosis health belief scale. **Tool III:** Osteoporosis self-efficacy scale. **Results**: there were highly statistical significance difference between total knowledge and total health belief. Also' there were statistical significant difference between total self-efficacy and total health belief as P value (0.000, 0.025) respectively. In addition to that there were no statistical significant difference between total knowledge and total self-efficacy as P value 0.830. **Conclusion**: less than three quarters of the studied patients had total unsatisfactory level of knowledge about osteoporosis, also less than three quarter of them had moderate health belief regarding osteoporosis. Additionally, more than half of them had low self-efficacy. **Recommendations:** Continuous health education programs about osteoporosis prevention are necessary to encourage health life style and healthy habits among patients with osteoporosis.

**Key words:** osteoporosis, knowledge, health belief, self- efficacy, Nursing

## Introduction:

Osteoporosis **(OP)** is a serious health problem and is called the silent disease of the current century. However osteoporosis is a preventable and curable disease. An important principle in preventing this disease is understanding the mindset, lifestyle, and daily habits of individuals to improve their quality and effectiveness. Therefore, the teaching of preventive behaviors as a simple and effective method has a great influence on prevention, promotion, and maintenance of health. In order to achieve such a goal, understanding the factors affecting the change of behavior will make it easier to achieve it. The most important goals of global health are increasing the number of trained women in the field of osteoporosis **(Hosseini, et al., 2017).**

Patient information is a key component of effective self-management and specifically in relation to osteoporosis and fracture prevention, and to improve outcomes including health-directed behaviors, social integration and support. Osteoporosis knowledge was tested in different international studies. Most of these studies found a lack of knowledge and awareness regarding osteoporosis, accompanied by deprived application and less self-efficacy or confidence towards exercise and calcium intake, which determined as preventative behaviors **(Bastani, 2016).**

***Health belief model*** (HBM) is one of the earliest, and most widely used conceptual models and is the first model which used behavioral science theories to solve the health problems. This model is more focused on the

prevention of diseases and demonstrates the relationship between beliefs and behaviors. As the model succeeds in explaining the effect of various psychosocial factors on behaviors, in particular, predicting which factors affect people's compliance with medical advice, For example, some exercise measures taken through HBM can improve self-efficacy, reduce subjective and objective obstacles, and to promote the physical activity of osteoporotic patients **(Sun et al., 2016).**

Self-efficacy is an individual's trust in being able to do self-care activities to achieve desirable results. It is an essential prerequisite for behavior which can affect the life and health behaviors. High self-efficacy for patient with osteoporosis has been associated with increased energy, better sleep, decreased pain and discomfort, increased satisfaction with life and better overall health **(Gallaghe**, **2015, Mohmoud, et al., 2015).**

Nurses should take urgent steps through motivation and to create awareness about osteoporosis by health education about encouraging intake well-balanced diet with adequate vitamin D, calcium, and protein intake; regular physical activity and reduction of a sedentary lifestyle; and healthy lifestyle habits such as smoking cessation, non-excessive consumption of alcohol and caffeine, maintaining a healthy body weight, and identifying environmental hazards through falls risk assessments **(Yedavally-Yellayi, et al., 2019).**

## Significance of the study :

Osteoporosis (OP) is a progressive and disabling disease with an increasing incidence worldwide. According to recent statistics from the I**nternational osteoporosis foundation (IOF**) (2022) worldwide 1 in 3 women over the age of 50 years and 1 in 5 men will experience osteoporotic fractures in their lifetime, there are approximately 9 million fractures per year because of osteoporosis. In Egypt, based on previous studies, the prevalence of OP was 28.4% in women, furthermore, the prevalence of OP in postmenopausal women in rural areas of Upper Egypt was higher reaching 47.8% **(Hammam, 2018)**. Therefore assessment of knowledge, health belief and self-efficacy for patients with osteoporosis is very important**.**

## Aim of the Study:

This study aimed to assess Knowledge, health belief, and self- efficacy for patients with osteoporosis through:

1. Assessment of patients' level of knowledge regarding osteoporosis.
2. Assessment of patients' health beliefs regarding osteoporosis.
3. Assessment of self-efficacy for patients with osteoporosis.

### Research Questions

1. What was patients' level of knowledge regarding osteoporosis?
2. What were patients' health beliefs regarding osteoporosis?
3. What was self- efficacy for patients with osteoporosis?

### Subjects and Methods

Subjects and Methods of the present study were portrayed under the four main designs as follows:

I- Technical design.
II- Operational design.
III- Administrative design.
IV- Statistical design.

### I- Technical design

### Research design:

A descriptive design was used in this study. Exploratory is the initial research in to hypothetical or theoretical idea. This is where a research has an idea or has observed something and seeks to understand more about it that will lead to future studies **(Bincy**, **2017**).

### Research Setting*:*

The current study conducted at outpatient osteoporosis clinics in Shebin Alkawm Teaching Hospital.

**Subjects:**

Convenience sample of 100 adult patients from both gender were be recruited based on Epi Info 7 program for sample size calculation and if 50% of patients have good knowledge with margin of error =5% and at 95% confidence level, throw the following criteria.

**Inclusion criteria:**

Adult patients from both genders, able to comprehend instructions and agree to participate in this study).

**Exclusion criteria:**

Patients with end stage chronic illness, patients with mentally, psychiatric illness, and patients having disturbance in consciousness.

**Tools for data collection:**

**The data for this study were collected by using three tools:**

**Tool I: patient structured interviewing questionnaire:** it includes the following three parts:

**Part I: socio-demographic data;** it concerned with assessing socio demographic data for patients with osteoporosis (age, gender, level of education, marital status, occupation, the nature of the work, residence, the nature of residence, monthly income). It consisted of nine questions.

**Part II:** This part concerned with assessing **medical data** (past medical history, past surgical history, medical family history, and current medical history for the patient). It consisted of nine yes or no questions as following; The past medical and surgical history consisted as following (suffering from chronic illness**,** suffering from past fracture& its type, and history of surgical procedures & kind of surgery).

Then the medical history of the family consisted of one question asked about (Is there a family member who has bone disorders?) after that the current medical history include for MCQ questions as following; (main chief complain, current fragility measure (DXA), vitamin D ratio, body mass index BMI)

**Part III: patients' knowledge about osteoporosis**

This part was designed by investigator after reviewing recent and relevant literature **(Dudda, et al., 2017, Sobeih, and Abd Elwahed, 2018) .** It was used to assess level of patients' knowledge regarding osteoporosis. It included forty-six true and false questions. It was subdivided into definition of osteoporosis (two questions), Causes and risk factors (thirteen), Female risk factors (three), Symptoms (two), diagnosis (three), treatment (four), Precautions during treatment (three), complications (three), and preventions (thirteen).

❖ **Scoring system:**

Answers were calculated as following:

The correct answer scored (1 grade), & the incorrect answer scored (zero). The total grade was (46 grades). The total level of patients' knowledge score categorized as following:

- More than or equal 60% or (≥28 grade) was considered satisfactory level of knowledge.
- Less 60% (<28 grade) was consider unsatisfactory level of knowledge.

**Tool II: Osteoporosis Health Belief Scale (OHBS)**

This scale was used for assessing health beliefs of patients with osteoporosis adapted from **Kim, et al., (1991).** It was consisted of seven subtitles (perceived susceptibility of osteoporosis, perceived severity of osteoporosis, perceived benefits of exercise, perceived benefits of calcium taking, perceived barriers to exercise, perceived barriers to calcium taking, and motivation to perform preventive behaviors).

❖ **Scoring system:**

Scoring system of osteoporosis health belief scale was categorized according to patients response;(strongly agree=5, agree=4, neutral=3 disagree=2degree, and strongly disagree =1 degree). The range of scores 6 to 30, with a possible total range for seven subtitles from 42 to 210. Higher scores meaning higher perceived susceptibility, seriousness, benefits from exercise, benefits from calcium, barriers to exercise, barriers to calcium, and health motivation.

The total score was categorized based on statistical approach as following:

- Low health belief from 25% to <50% (from ≈ 53 to < 105 degree).
- Moderate health belief from 50% to <75% (from 105 to < 158 degree).
- High health belief ≥ 75% (≥ 158 degree).

**Tool III Osteoporosis Self-Efficacy Scale (OSES):**

This scale used to assess self- efficacy of patients with osteoporosis, adapted from **Horan**, **et al., (1998).** It was consisted of two parts with 12 statements (self-Efficacy regarding practicing exercises, self-Efficacy regarding regular calcium intake)

❖ **Scoring system:**

Each item begins with stem, how confidant is you that you can, the responses of patients regarding their self-efficacy were at 3 level Likert scale from (1= not at all confidant, 2= moderate confidant, & 3= completely confidant). The self-efficacy scores was ranged between12 & 36 degree with a better score indicating high self-efficacy and low self-efficacy was associated with worse score.

The total score was categorized based on statistical approach as following:

- Low self-efficacy from 25% to < 50% (from 9 to< 18 degree).
- Moderate self-efficacy from 50% to < 75% (from 18 to < 27 degree).
- High self-efficacy ≥ 75% ( ≥ 27 degree)

**II- Operational design:**

The Operational design includes; preparatory phase, content validity and reliability, pilot study, field work and ethical considerations.

**A-Preparatory phase:**

It includes reviewing current and past, national and international related literature and theoretical knowledge of various aspect of study using books, articles, websites, and magazines in order to be acquainted with various aspect of research problem and to develop the acquired tools for data collection.

**B- Tools validity and reliability:**

**Tools validity:**

The developed study tools were examined by panel of five medical surgical nursing experts. Every Jury member was informed about the aim of the study. The Jury reviewed the tools for clarity, relevance, comprehensiveness & simplicity and there were minor modifications. These modifications were done and final form was developed, which were in the form of omission or addition of some questions or rephrasing some statements.

**C-Tool reliability:**

**Alpha Chronbach Test was** used to measure the internal consistency of the tool used in current study, also to identify the extent to which the items of the tools measured the same concept and correlated with each other. The value of Corn Bach's Alpha for knowledge was (0.84), health beliefs was (0.81) and for self –efficacy was (0.79).

**Pilot study:**

A pilot study was carried out on 10 patients (10% of the study subjects) to test applicability, feasibility, practicality of the tools and time to fill the study tools. Data obtained from the pilot study was analyzed and minor

modifications were done. Study subjects included in the pilot were in the main study sample as simple changes were needed which didn't effect on data obtained.

**Field work:**

- The current study was conducted on three phases: The assessment, planning and implementation phases.
- In the **assessment and planning phase** the sample of the study was recruited according to the inclusion criteria.
- Testing validity of proposed tools using face and content validity added to testing reliability.
- It was concerned with construction and preparation of different data collection tools, this in addition to managerial arrangement to carry out the study, where the researcher prepared formal requests to the directors of Shebin Alkawm Teaching Hospital.
- The researcher interviewed individually the patients who agreed to participate in the study.
- The purpose of the study was explained to each patient to gain his / her consent and cooperation before participation, they were informed about their rights to withdraw from the study at any time and the data collected from them will be just for research and kept confidentially.
- **Implementation phase:** was carried out after the assessment phase. The data were collected from patient with osteoporosis in the selected setting. The involved 100 patient were informed individually about the purpose and nature of the study.
- The actual fieldwork started and completed within Six months from the beginning of February 2022 to the end of July 2022.
- The researcher were available two days per week, four to five patients per week were interviewed.
- The tools for data collection were filled in by the researcher for illiterate patients, while educated patients filled it by themselves.
- The time needed for completing the three tools was about 30-45 minutes. each tool needed about 10-15 minutes.

**III- Administrative design**

An official permission to carry out the study was obtained by submission of a formal letter issued from the Dean of Faculty of Nursing, Ain Shams University to the director of Shebin Alkawm Teaching Hospital to collect the necessary data for current study after a brief explanation of the purpose of the study and its expected outcomes.

**Ethical considerations:**

Ethical approval was obtained from ethical committee of faculty of nursing, Ain Shams University (29/11/2021)before starting the study. In addition, oral consents were obtained from each participant who agreed to share in this study after explanation of the purpose and nature of the study.

The participant was assured that anonymity and confidentiality and the right to withdraw from the study at any time without any rational would be guaranteed. Ethics, values, cultural background and believes were respected.

**IV. Statistical Design**

The collected data were organized, coded and statistically analyzed using appropriate Statistical tests. The statistical analysis of data was performed using the statistical Package for Social Studies (SPSS), version 20.0 (SPSS Inc.., Chicago, Illinois, USA). Quantitative data were expressed as means and standard deviations. Qualitative data were expressed as frequency and percentage. The following tests were used: correlation coefficient test and paired (t) test of significance was used to compare proportions between two qualitative parameters.

**Significance of results:**

Significance of results was classified according to p-value for correlation coefficient, the following level was used:

- P-value $\leq 0.05$ was considered significant.
- P value $< 0.01$ was considered a highly significant.
- P-value $> 0.05$ was considered insignificant.

**Results:**

**Table (1):** showed that**, 45%** of studied patients their age ranged from **30-40** years old with mean **39.9 ± 9.3** and **82%** of them were female, and **43%** had secondary level of education. Also, this table demonstrated that **67%** of studied patients were married**, 62%** had work, **35.4%**of the working group had work required a mental effort. Additionally, this table revealed that **64%** of studied patient live at rural residence which **61%** of them had bad ventilation and exposure to sunlight, and **50%** of them had not enough monthly income for the treatment expenses.

**Table (2):** demonstrates that **34%** of studied patients exposes to fracture from lesser bruise, **55%** of them had sever Vitamin-D deficiency**,** and **51%** of studied patients were obese.

**Table (3):** illustrates that **70%, 73%, 75% %** of studied patients had Unsatisfactory knowledge regarding complications, prevention, symptoms of osteoporosis. And **80%, 81%** of them had Unsatisfactory knowledge regarding osteoporosis Causes & risk, and Precautions during treatment.

**Figure (1):** demonstrate that **73%** of studied patients had total Unsatisfactory Knowledge regarding osteoporosis.

**Table (4):** demonstrates that **73%** of studied patients had moderate total osteoporosis health belief.

**Table (5):** illustrates that **55%** of studied patients had low total osteoporosis self-efficacy.

**Table (6):** reveals that there were positive and highly statistical correlation between total knowledge and total health belief. Also' there were negative week but statistically significant correlation between total self-efficacy and total health belief. In addition to that there were weak negative almost statistically significant correlation between total knowledge and total self-efficacy. as P value (0.00036, 0.02576, 0.83010) respectively.

**Table (7):** shows that there were no statistically significant difference between age and total Knowledge, Self-efficacy, and health Belief as P value equal to (0.41723, 0.24238, 0.55942) respectively.

**Part 1: Social and Demographic Data**

**Table (1):** Frequency distribution of studied patients according to their socio demographic characteristics (n 100).

| Age | Frequency | Percentage |
|---|---|---|
| From 18 to less than 30 years | 13 | 13% |
| From 30 to less than 40 years | 45 | 45% |
| From 40 to less than 60 years | 42 | 42% |
| Mean ± SD age (39.9 ± 9.3) | | |
| Gender | | |
| Male | 18 | 18% |
| Female | 82 | 82% |
| Level of education | | |
| Don't read, don't write | 12 | 12% |
| Read and write | 6 | 6% |
| Primary level of education | 5 | 5% |
| Secondary level of education | 43 | 43% |
| High level of education | 34 | 34% |
| Marital status | | |
| Unmarried | 33 | 33% |
| Married | 67 | 67% |
| Occupational status | | |
| no working | 38 | 38% |
| Working | 62 | 62% |
| The nature of the work (n=62) | | |
| Requires a muscular effort | 23 | 37.1% |
| Requires mental effort | 22 | 35.4% |
| Requires both muscular and mental efforts | 17 | 27.4% |
| Residence | | |
| Rural | 64 | 64% |
| Urban | 36 | 36% |
| The nature of housing | | |
| Good ventilation and exposure to sunlight | 39 | 39% |
| low ventilation and exposure to sunlight | 61 | |
| Monthly income is sufficient for treatment expenses | | |
| Enough for treatment cost | 50 | 50% |

**Table (2):** Distribution of studied patients according to their current medical history**:** (n=100)

| Current medical history | Frequency | Percentage |
|---|---|---|
| **Chief complain** | | |
| A- Pain all over the body. | 18 | 18% |
| B- Difficulty in doing work. | 19 | 19% |
| C- Curvature of the back. | 4 | 4% |
| D- Exposure to low trauma fracture. | **34** | **34%** |
| E- Other.(loss of teeth,….) | 54 | 54% |
| **The current fragility measure DXA** | | |
| A- very low | **54** | **54%** |
| B- High rick | 46 | 46% |
| **Vitamin D ratio** | | |
| A-Sever deficiency <10 ng/ml | **55** | **55%** |
| B-Moderate deficiency 10-29 ng/ml | 35 | 35% |
| C-Normal 29- 100 ng/ml | 10 | 10% |
| **Body mass Index (BMI)** | | |
| A-Normal weight (18,5-24,9 kg/m2) | 27 | 27% |
| B-Over weight (25- 29,9 kg/m2) | **22** | **22%** |
| C-Obese (≥30 kg/m2) | **51** | **51%** |

**Table (3):** Total Satisfactory and Unsatisfactory level of studied patients regarding knowledge about osteoporosis: (n=100).

| Items regarding knowledge about osteoporosis | Unsatisfactory | Satisfactory |
|---|---|---|
| Definition of osteoporosis | 58% | 42% |
| Causes and risk factors that can lead to osteoporosis | **80%** | 20% |
| Female risk factors | 61% | 39% |
| Symptoms of bone fragility | **75%** | 25% |
| Diagnosis of osteoporosis | 65% | 35% |
| Methods of treating bone fragility | **79%** | 21% |
| Precautions during treatment | **81%** | 19% |
| Complications of osteoporosis | **70%** | 30% |
| Prevention of osteoporosis | **73%** | 27% |

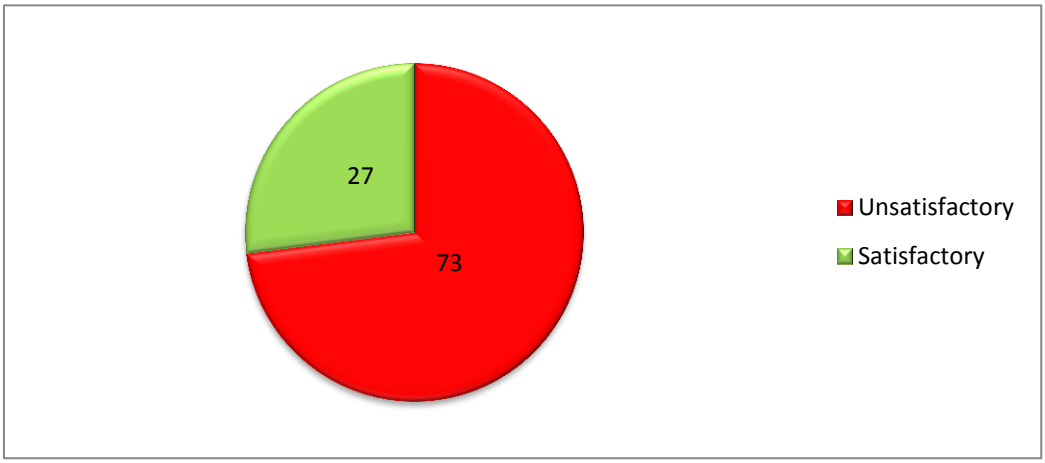


**Figure (1):** Total satisfactory and unsatisfactory knowledge.

**Table (4):** Distribution of studied patients according to osteoporosis health belief (n=100).

| | NO | Low | Moderate | High |
|---|---|---|---|---|
| A-Perceived susceptibility | 24% | **73%** | 3% | 0% |
| B- Perceived severity | 9% | 40% | **49%** | 2% |
| C- Perceived benefits of exercises to avoid osteoporosis. | 0% | 7% | **57%** | 36% |
| D-Taking in enough calcium | 0% | 0% | **66%** | 34% |
| E-Barrier of exercises | 0% | 38% | **62%** | 0% |
| F-Barriers of calcium intake | 1% | **72%** | 27% | 0% |
| G-Motivation to perform preventive behaviors | 0% | 5% | **85%** | 10% |
| Total Osteoporosis Health Belief Scale | 0% | 27% | **73%** | 0% |

**Table (5):** Distribution of the studied patients according to osteoporosis Self-efficacy among studied patients (n=100).

| **Items of osteoporosis self-efficacy** | **NO** | **Low** | **Moderate** | **High** |
|---|---|---|---|---|
| **confident are you that you can exercise** | **66%** | 18% | 5% | 11% |
| **confident are you that you can eat calcium regularly** | 29% | 25% | **40%** | 6% |
| **Total measure of self-efficacy of osteoporosis** | 28% | **55%** | 13% | 4% |

**Table (6):** Correlation of the present study variables regarding total knowledge, self-efficacy and health belief among studied patients.

| | | Knowledge | Self-efficacy | Health Belief |
|---|---|---|---|---|
| Knowledge | Pearson Correlation Coefficient | 1 | -0.02 | 0.35 |
| | P Value | | 0.83010 | 0.00036 |
| Self-efficacy | Pearson Correlation Coefficient | | 1 | -0.22 |
| | P Value | | | 0.02576 |
| Health Belief | Pearson Correlation Coefficient | | | 1 |
| | P Value | | | |

**Table (7):** relation between age with total knowledge, self-efficacy and health belief among studied patients.

| | AGE | Mean(X) | ±SD | F | P Value |
|---|---|---|---|---|---|
| **Total osteoporosis knowledge** | **from 18-30 years** | 47.33 | 24.06 | 0.88 | 0.41723 |
| | **from 30 to 40 years** | 40.73 | 19.43 | | |
| | **from 40 to 60 years** | 39.44 | 16.28 | | |
| **Total osteoporosis self-efficacy** | **from 18-30 years** | 30.77 | 14.88 | 1.44 | 0.24238 |
| | **from 30 to 40 years** | 28.89 | 16.89 | | |
| | **from 40 to 60 years** | 35.71 | 21.92 | | |
| **Total osteoporosis health Belief** | **from 18-30 years** | 51.52 | 6.47 | 0.58 | 0.55942 |
| | **from 30 to 40 years** | 53.15 | 4.61 | | |
| | **from 40 to 60 years** | 52.33 | 5.43 | | |

## Discussion:

Regarding to **age** of the studied patients the present study result showed that, less than half of studied patients their age range from less than half of studied patient between 30-40 years, with mean age (39,9 ± 9,3) years old**.** This result disagree with **Mohammed et al., (2018)** who carried out study in Egypt entitled "Knowledge and Self-Efficacy Regarding Osteoporosis Prevention among Multiparous Women Based on Health Belief Model" and found that, half of the studied women their age ranged from 30-35 years old.

As regard to **gender** of the studied patients, the current study result showed that, highly percentage of the studied patients were females**.** The present study result supported with **Ahmadieh et al., (2018)** who applied study entitled "Perception of Peri-Menopausal and Postmenopausal Lebanese Women on Osteoporosis" and mentioned that, all of the studied patients were females. The similarity in the results due to the fact that female risk for osteoporosis more than male **(Sözen, et al, 2017)**.

As regard to **educational** level of the studied patient the current study result demonstrated that, more than two fifths of them had moderate level of education**.** The present study agree with **Ahmed , et al., (2018)** who studied about " Staff Nurses' Performance Obstacles and Quality of Work Life at Banha University Hospital" they revealed that more than two thirds of them were graduates of technical institute of nursing . But this finding disagree with **Sobeih and Abd Elwahed , (2018)** who studied about "Knowledge and perception of women at risk for osteoporosis :educational intervention " and showed that around three-quarters of the studied females had diploma level of education.

As regard to **marital status** of the studied patients the present study result showed that, more than two thirds of them were married**.** The present study result goes in the same line with with **Mahmoud and Sabry, (2017)** who applied study entitled "Osteoporosis Risk Factors among Working Women" who revealed that the most of the participant was married.

As regard **occupation** of the studied patients the present study result showed that,

less than two thirds of them working, as regard to **nature of the work**, more than one fifth of them their work required a mental effort**.** The present study result in agree with **Elesawy, et al, 2021** who applied studied entitled " Effect of Educational Program regarding Prevention of Osteoporosis among Employees Women at South Valley University" and clarified that more than three quarters were office working. The present study result agree with **Abdulameer et al., (2019)** who applied study entitled " A comprehensive View of Knowledge and Osteoporosis Status Among Type 2 Diabetes Mellitus in Malaysia" and clarified that , highly percentage of the studied patients were not working.

As regard **past medical history** of the studied patients the current study result showed that, more than half of studied patient had past history of endocrine disorders also more than two fifths of them had digestive disorders**.**

The present study result contrasted with **Ishtaya et al., (2018)** who conducted study entitled " Osteoporosis Knowledge and Beliefs in Diabetic Patients: A cross Sectional Study from Palestine" and found that, two thirds of the studied patients were hypertensive

Regarding **current medical history** of the studied patients the current study result demonstrated that, more than one third of studied patients exposed to fracture from lesser bruise, more than half of them had very low fragility measure, also more than half of them had sever Vitamin-D deficiency**,** and half of them were obese. From the researchers' point of view this may associated with sedentary life and decrease exercises practice. This support with **Mahmoud., et al (2015)** who conducted study entitled " Effect of Educational Program on Compliance and Self Efficacy of Patients Undergoing Knee Replacement Operation" who mentioned that patients may had decrease physical activity which leads to increase body weigh.

The present study result supported with **Ahmadieh et al., (2018)** who and found that, highly percentage of the studied patients had vitamin D Deficiency. While the present study result contrasted with **Abdulameer et al., (2019)** who found that, two thirds of the studied patients obese(Obese (BMI >23kg/m2).

Concerning total knowledge of the studied patients the present study result demonstrated that, less than three quarters of them had total unsatisfactory level knowledge regarding osteoporosis. From the investigator point of view, the study patients' inadequate knowledge could be attributed to a lack of training programs, a lack of continuous education, and the fact that most health care providers did not routinely counsel osteoporosis patients or provide them with written information.

This finding in the same line with **Fernández-Ávila et al., (2019)** who applied study entitled "Low Rate of Densitometric Diagnosis and Treatment in Patients with Severe Osteoporosis in Colombia" and found that, the studied patients had little knowledge about osteoporosis. Additionally, agree with **Noor et al., (2021)** who applied study in Islamabad entitled " Evaluation of Disease Related Knowledge in Patients of Osteoporosis: An Observational Study" and found that, less than two thirds of patients had poor knowledge regarding osteoporosis.

Regarding **total health beliefs** of the studied patients the present study result revealed that, less than three quarters of studied patients had moderate health belief regarding to osteoporosis. These results may be related to the studied patients had low knowledge about osteoporosis.

From the researchers' point of view, this finding it could be attributed to the fact that most of the studied patients were educated and about half of them had the moderate education. Moreover, it highlights the importance of the evaluation of the different factors related to the prevention of osteoporosis, including osteoporosis education, eating habits, general health habits, and exercise.

The present study result contrasted with **Rundasa et al., (2022)** who applied study was conducted entitled "Knowledge, Health Belief, and Associated Factors Towards the Prevention of Osteoporosis among Post-menopausal Women in Metu Town, Southwest Ethiopia"

and found that, more than half of the studied patients had positive health beliefs.

Concerning **total self-efficiency** the present study result showed that, more than half of studied patients had low osteoporosis self-efficacy. Also was disagreed with **Elsyad & Ezzat, (2022)** studied 75 patients in Egypt entitled "Effect of Educational Guidelines on Knowledge and Self-Efficacy of Menopausal Women With Osteoporosis" and demonstrated that less than one fifth of the studied patients had strong levels of their total self-efficacy towards osteoporosis at pre-intervention

As regard **correlation** between total knowledge, health beliefs, and self-efficiency, it was found that, there were positive correlation between total knowledge and total health belief. Also' there were positive correlation difference between total self-efficacy and total health belief. In addition to that there were negative correlation difference between total knowledge and total self –efficacy. The present study result disagree with **Ahn & Oh, (2018)** who noted that, there was a statistical significant difference or relation between knowledge and Health behaviors, while no statistical significant difference or relation between self-efficacy and knowledge.

As regard **relations of age with** total knowledge, self-efficacy, and health Belief the present study result showed that no statistically significant between age with total Knowledge, Self-efficacy, and health Belief.

The current study result disagreement with **Khalil et al., (2020)** who applied study in Egypt entitled "Effect of Self-Management Program on Self-efficacy regarding Osteoporosis Risk among Diabetic Patients" and reported that, there was a significant statistical difference between self-efficacy and age.

Also the present study result contrasted with **Noor et al., (2021)** who mentioned that, there was statistically significant relation between knowledge and age, gender, marital status and education were analyzed (P<.001).

## Conclusion:

The current study findings can be concluded that, less than three quarters of the studied patients had total unsatisfactory level of knowledge about osteoporosis, also less than three quarter them had moderate health belief regarding osteoporosis. Additionally, more than half of them had low osteoporosis self-efficacy.

## Recommendations:

**Based on the current study finding the following recommendations were proposed:**

- Further study should be carried out on a larger sample for generalization of results.
- Continuous health education programs about osteoporosis prevention are necessary to encourage health life style and healthy habits among patients with osteoporosis.
- Illustrated booklet in Arabic language about osteoporosis must be available in outpatient clinics for patients to prevent potential osteoporosis complications.

**Financial support**

- Not funding was received.

**Conflict of interest**

- No

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