A Survey on Knowledge, Attitude and Practice of Osteoporosis among working women in Bangladesh

A Dissertation submitted to the Department of Pharmacy, East West University, Bangladesh, in partial fulfillment of the requirements for the Degree of Bachelor of Pharmacy

Submitted by

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Declaration by the Research Candidate

I, Mahmud Hossain Hasib, ID: 2013-3-70-068, hereby declare that the dissertation entitled "**A Survey on knowledge, attitude and practice of osteoporosis among working women in Bangladesh**" submitted by me to the Department of Pharmacy, East West University and in the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy, under the supervision and guidance of Abdullah Al Faysal and Nafisa Tanjia, Senior Lecturer, Department of Pharmacy, East West University, Dhaka.

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Certificate by the Supervisor

This is to certify that the thesis entitled "**A Survey on knowledge, attitude and practice of osteoporosis among working women in Bangladesh**" submitted to the Department of Pharmacy , East West University for the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a record of original and genuine research work carried out by Mahmud Hossain Hasib, ID: 2013-3-70-068 during the period of his research in the Department of Pharmacy, East West University, under the supervision and guidance of me.

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This is to certify that the thesis entitled "**A Survey on knowledge, attitude and practice of osteoporosis among working women in Bangladesh**" submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a record of original and genuine research work carried out by Mahmud Hossain Hasib , ID: 2013-3-70-068 during the period of his research in the Department of Pharmacy, East West University, under the supervision and guidance of me.

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Dedication

This research work is dedicated to my beloved parents, honorable faculties and loving friends.

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List of Abbreviations

BMD	**Bone Mineral Density**
NF	**Nuclear Factor**
DEXA	**Dual Energy X-ray Absorptiometry**
ET	**Estrogen Therapy**
HT	**Hormone Therapy**
PTH	**Para Thyroid Hormone**
OR	**Odds Ratio**
OP	**Osteoporosis**
CI	**Confidence Interval**
wbBP	**whole body Bone percentage**
WBV	**Whole Body Vibration**
T1DM	**Type 1 Diabetes Mellitus**
FSH	**Follicle Stimulating Hormone**
TSH	**Thyroid Stimulating Hormone**
IGF-1	**Insulin-like Growth Factor-1**
GH	**Growth Hormone**
SHBG	**Sex Hormone Binding Globulin**
IGFBP3	**Insulin-like Growth Factor Binding Protein-3**
CA	**Celiac Autoimmunity**

BMI	**Body Mass Index**
OST	**Osteoporosis Self-Assessment Tool**
LS	**Lumbar Spine**
ROC	**Receiver Operating Characteristic**
BUA	**Broadband Ultrasound Attenuation**
BMC	**Bone Mineral Content**
IHFC	**Improving Hip Fracture Care**
NHFD	**National Hip Fracture Database**
AOM	**Anti-Osteoporosis Medication**
PPI	**Proton Pump Inhibitor**

CHAPTER ONE

INTRODUCTION

Introduction

1.1Osteoporosis:

Osteoporosis is a skeletal disease characterized by low bone mineral density and micro-architectural deterioration of bone tissue, with a consequence increase of bone fragility and susceptibility to fracture. It is a major public health tissue affecting a large portion of the population >50 years of age. It leads a huge burden through the increased morbidity and mortality associated with fragility fracture (Bradney et al., 2000).

The word osteoporosis‖ was first introduced in France and Germany which literally means "porous bones". It occurs when bones lose an excessive amount of their protein and mineral content, particularly calcium. Over time, bone mass and therefore bone strength, is decreased. As a result, bones become fragile and break easily. Even a sneeze or a sudden movement may be enough to break a bone in someone with severe osteoporosis.

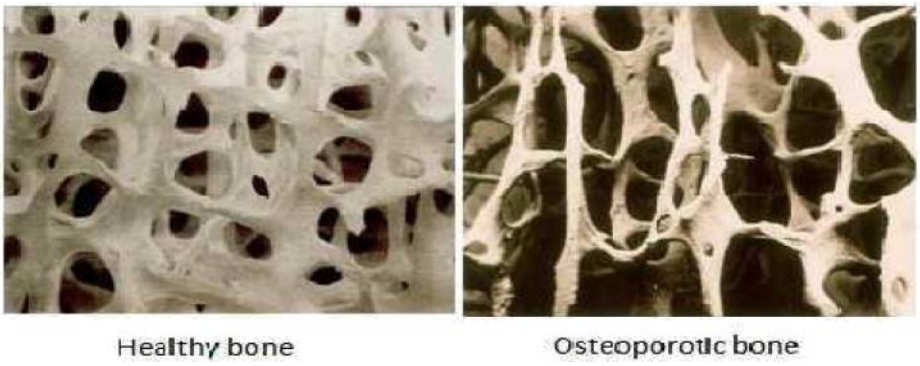

Figure1.1: Condition of Bone in Osteoporosis (Den Uyl *et al.,* 2011).

The definition of osteoporosis has historically been difficult. A definition based on bone mass density (BMD) might not encompass all the risk factors of fracture. Whereas a fracture based definition will not enable the identification of osteoporosis (Den Uyl *et al.*,2011).

Osteoporosis is a serious public health problem. Fractures, which are often the first sign of the disease, can affect any bone, but the most common locations are the hip, spine and wrist. Breaks in the hip and spine are of special concern because they almost always require hospitalization and major surgery and may lead to other serious consequences, including permanent disability and even death.

To understand osteoporosis, it is helpful to understand the basics of bone formation. Bone is a living tissue that is constantly being renewed in a two-stage process (resorption and formation) that occurs throughout the life. In the resorption stage, old bone is broken down and removed by cells called osteoclasts. In the formation stage, cells called osteoblasts build new bone to replace the old. The bone remodeling process is completed in 4–6 months. It takes place mostly in a non-targeted manner to remove old bone and involves resorption of bone by peripheral blood-derived multinucleated osteoclasts, followed by bone formation by osteoblasts (Aviña -Zubieta et al., 2008).

During childhood and early adulthood, more bone is produced than removed, reaching its maximum mass and strength by the mid-30s. After that, bone is lost at a faster pace than it is formed, so the amount of bone in the skeleton begins to slowly decline. Most cases of osteoporosis occur as an acceleration of this normal aging process, which is referred to as primary osteoporosis. The condition also can be caused by other disease problems or prolonged use of certain medications that result in bone loss. If so, this is called secondary osteoporosis.Osteoporosis occurs most often in older people and in women after menopause. It affects nearly half of men and women over the age of 75. Women are about five times more likely than men to develop the disease. They have smaller, thinner bones than men and they lose bone mass more rapidly after menopause (usually around age50).

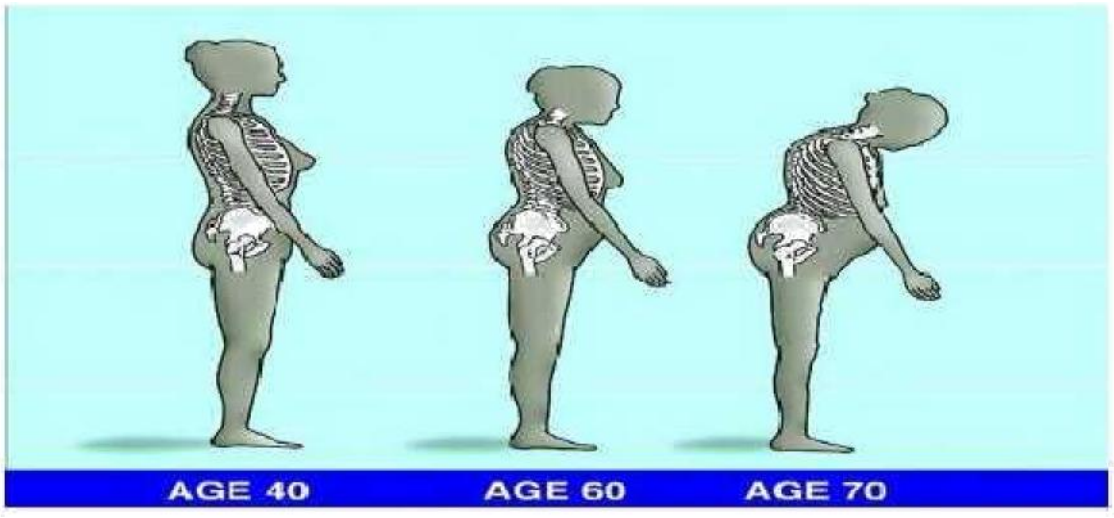

Figure1.2: Osteoporosis Effects with Increasing Age (Chung et al., 2012).

When they stop menopause, women can lose about 20% of their bone-mass. By age 65 or 70, men and women lose bone-mass at the same rate. As an increasing number of men reach an older age, there is more awareness that osteoporosis is an important health issue for them as well. In fact, a 2003 report noted that one in every eight men over age 50 will suffer a hip fracture as a result of osteoporosis (Gonzalez-Gay, Gonzalez-Juanatey and Martin, 2005).

1.2 Causes of Osteoporosis:

During childhood and adolescence, the bones within the skeleton are actively growing. By one‘s early 20‘s, growth and development of bone is complete. This phase of bone development represents the attainment of —peak bone mass‖. It essentially is a time when bones are at their ‗strongest‘ level. The peak bone mass that is achieved, varies from one individual to the next and primarily reflects what has occurred during growth and development in childhood and adolescence. It is also influenced by genetic factors as well. Hence an individual who has had adequate intake of vitamin D, Calcium, plenty of exercise and not been subjected to any sex hormone deficiencies (interruption of menstrual period) during childhood and puberty will likely achieve a high peak bone

mass as compared to the individual who has not had favorable circumstances for bone development during childhood and adolescents (Kiel *et al.*, 2001).

A number of factors increase the risk of developing osteoporosis both primary and secondary types. They include:

a) Age: Failure to attain adequate peak bone mass in early 20‘s.Osteoporosis is more likely as people grow older and their bones lose tissue.

b) Gender: Women are smaller and start out with less bone. They also lose bone tissue more rapidly as they age. While women commonly lose 30-50% of their bone mass over their lifetime, men lose only 20-33%.

c) Race: Caucasian and Asian women are most at risk for the disease, but African American and Hispanic women can get it too.

d) Figure Type: Women with small bones and those who are thin are more liable to have osteoporosis.

e) Early Menopause: Women who stop menstruating early because of heredity, surgery or lots of physical exercise may lose large amounts of bone tissue early in life. Conditions such as anorexia and bulimia also may lead to early menopause and osteoporosis.

f) Hormone Deficiency State: Late menarche, premature menopause, testosterone deficiencies in men can lead to osteoporosis.

g) Lifestyle: People who smoke or drink coffee too much, take excessive caffeine (>5/6 cups daily) or do not have enough exercise have an increased chance of osteoporosis.

h) Diet: Those who do not get enough calcium or protein may be more likely to have osteoporosis. That is why people who constantly diet are more prone to the disease. Moreover, Vitamin D deficiency can also lead to osteoporosis.

i) Genetics: Research in Europe reported in 2003 that variations of a gene on chromosome 20 might make some postmenopausal women more likely to have osteoporosis. Studies were continuing on how to identify the gene and use information from the research to prevent osteoporosis in carriers.

j) Medical Conditions: Certain medical illnesses also effect bone and can lead to the development of osteoporosis, often independent of peak bone mass. Below is a list of

medical conditions which have been associated with the development of osteoporosis.

- Chronic illness e.g. chronic liver disease, chronic renal failure
- Thyroid disease, particularly hyperthyroidism or excessive thyroxin replacement.
- Cushing‘s Syndrome or Disease: Corticosteroid therapy

for greater than 2 months, any dose of glucocorticoid to the elderly >65 year old)

- Rheumatoid Arthritis
- Organ transplant recipients
- Treatments for certain malignancies e.g. breast cancer, prostate cancer.

(Mussolino, Madans and Gillum, 2003)

1.3 Signs and Symptoms:

Osteoporosis is often called the silent disease‖ because bone loss occurs without symptoms. People often do not know they have the disease until a bone breaks frequently in a minor fall that would not normally cause a fracture (Lips and Schoor, 2005).

Fractures are the most dangerous aspect of osteoporosis. Debilitating acute and chronic pain in the elderly is often attributed to fractures from osteoporosis and can lead to further disability and early mortality. These fractures may also be asymptomatic. The most common osteoporotic fractures are of the wrist, spine, shoulder and hip. The fractures can cause severe back pain, but sometimes go unnoticed either way, the vertebrae collapse down on themselves, and the person actually loses height. The hunch back appearance of many elderly women, sometimes called "dowager's hump or "widow's hump, is due to this effect of osteoporosis on the vertebrae (Popescu et al., 2014).

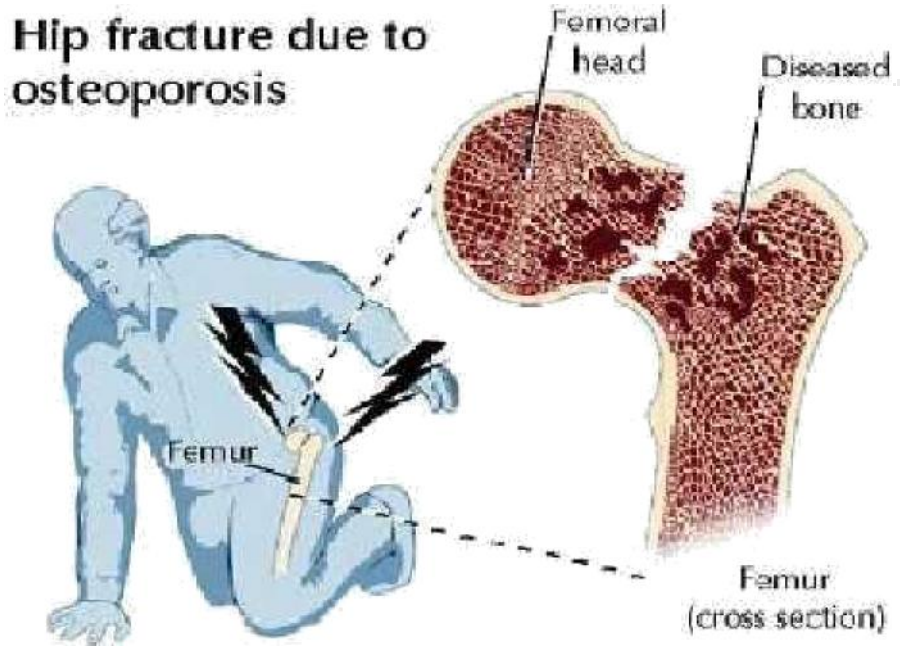

Figure1.3: Hip Fracture Due to Osteoporosis (Dolan et al., 2006).

As fractures are the common cause of osteoporosis in both male and female falling risks are also associated with fractures as well as with osteoporosis. The increased risk of falling associated with aging leads to fractures of the wrist, spine, and hip. The risk of falling, in turn, is increased by impaired eyesight due to any cause (e.g. glaucoma, macular degeneration), balance disorder, movement disorders (e.g. Parkinson's disease), dementia, and sarcopenia (age-related loss of skeletal muscle). Collapse (transient loss of postural tone with or without loss of consciousness) leads to a significant risk of falls; causes of syncope are manifold, but may include cardiac arrhythmias (irregular heart beat)), vasovagal syncope, orthostatic hypotension (abnormal drop in blood pressure on standing up), and seizures. These are all the secondary symptoms as these can indirectly lead to osteoporosis (Kriska and Bennett, 1992).

1.4 Diagnosis:

Before making a diagnosis of osteoporosis, the doctor usually takes a complete medical history, conducts a physical exam and orders X-rays, as well as blood and urine tests, to

rule out other diseases that cause loss of bone-mass. The doctor also may recommend a bone density test. This is the only way to know for certain if osteoporosis is present. It also can show how far the disease has progressed. Several diagnostic tools are available to measure bone density (Fisher et al., 2013).

The ordinary X-ray is one, though it is the least accurate for early detection of osteoporosis, because it does not reveal bone loss until the disease is advanced and most of the damage has already been done. In past years osteoporosis was diagnosed by plain X-ray which may have shown bone tissue to be less dense on X-ray or the presence of crush fractures (Peters et al., 2009)

- Computed tomography scans (CTscans) and machines called densitometers, which are designed specifically to measure bone density. The CT scan, which takes a large number of X- rays of the same spot from different angles, is an accurate test, but uses higher levels of radiation than other methods (Saraví, 2013).

- The most accurate and advanced of the densitometers uses a technique called DEXA (dual energy X-ray absorptiometry). Today the diagnosis of osteoporosis is guided by measurement of the amount of mineral in bone (mainly calcium) by a special X- ray technique called a Dual Energy X-ray Absorptiometry scan (DEXA scan. When osteoporosis is indicated by DEXA the diagnosis really relies on an increased risk of having a future fracture determined by a mathematical formula rather than a disease diagnosis (Popescu et al., 2014).

This is important as over 50 per cent of older women who in fact have an osteoporotic fracture seen on plain X-ray in fact have normal bone density on DEXA Scan.Therefore, screening older women (over 70 years of age) for osteoporosis requires a plain X-ray of the spine to identify fractures, ideally combined with a DEXA scan (Weeks and Beck, 2008).

1.4.1.DEXA (Dual Energy X-ray Absorptiometry):

A Dual Energy X-ray Absorptiometry scan (DEXA scan) is a specialized X-ray technique, which specifically measures bone mineral density (bone mineral content) and provides the most accurate way currently available to diagnose osteoporosis. It is a specialized X-ray and is not painful. It is used:

- To confirm the diagnosis of osteoporosis.
- To estimate severity of bone loss.
- To determine whether the patient is responding to treatment.

It is a fast scan, has high resolution, is easily reproducible and has lower radiation dose compared to other methods.Usually only the lumbar spine (lower back) and proximal femur (hip region) are measured. The DEXA result will be reported as a T score. T scores are complicated statistical scores that help define on DEXA study the condition of an individual‘s bones.When a DEXA study is performed, the bone mineral density is measured and compared to the bone mineral density of twenty year olds of the same sex. Twenty year-olds are used for comparison as they have the greatest peak bone mass.

Table1.1: Relation between t-score value and bone density (Weeks and Beck, 2010)

Dexa BMD values	Definition
T score >-1.0 SD	Normal bone mineral density
T score between -1.0 and -2.5 SD	Osteopenia
T score smaller or equal to -2.5 SD	Osteoporosis
T Score smaller or equal to -2.5 SD with 1 or more fragility Fracture	Severe Osteoporosis

A T- score which is positive or only minus one standard deviation (up to one step below normal) from the normal bone mineral density of a 20-year-old is regarded as being a normal bone mineral density, for the site that it is measured at. If the T Score is minus 1.0 to minus 2.5 standard deviations (between 1 and 2½ steps) below the normal bone mineral density of a 20-year-old, this indicates the presence of osteopaenia. Osteopenia is diagnosed when there is reduced mineral content in bone, but not as low as to be considered osteoporosis. Osteopenia is not osteoporosis. It represents a stage when the bones have lost some bone mineral strength and are weak but not as weak as in osteoporosis (Sugi et al., 2012). Before the occurrence of osteoporosis if the T score is greater than minus 2.5 standard deviations (greater than 2½ steps) below the normal bone mineral density of a 20-year-old, this indicates the presence of osteoporosis.

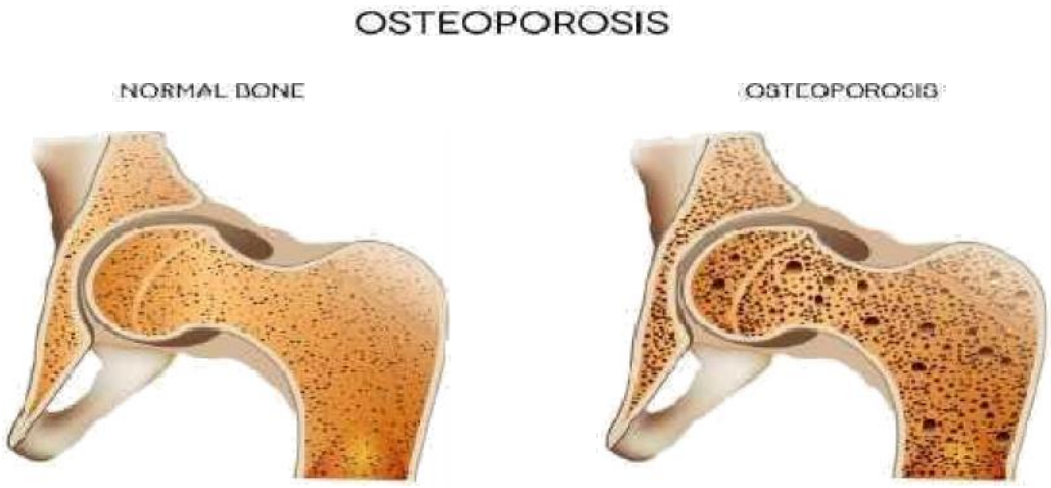

Figure1.4: Difference between Normal Bone &Osteoporosis Bone (Sugi *et al.*, 2012)

1.5 Treatment:

As osteoporosis is generally categorized in two types, the treatment pattern is also different for these two.For primary osteoporosis treatment basically depends on medications.Alendronate and Calcitonin are the two drugs that have been approved by the food and drug administration. For people with secondary osteoporosis, treatment may focus on curing the underlying disease. Medications used to treat osteoporosis fall into two major groups, anti-resoptive medications slow down the work of the bone removing cells (osteoclast). Bone formation medications increase the work of the bone building cells (Osteoblast) (Weeks and Beck, 2010).

1.5.1. Anti-resoptive Medication: Bisphosphonates, calcitonin, denosumab, estrogen and estrogen agonists/antagonists are antiresorptive medicines. They slow the bone loss that occurs in the breakdown part of the remodeling cycle. When people first start taking these medicines, they stop losing bone as quickly as before, but still make new bone at the same pace. Therefore, bone density may increase. The goal of treatment with antiresorptive medicines is to prevent bone loss and lower the risk of breaking bones.

1.5.2. Anabolic Drugs: Teriparatide , a form of parathyroid hormone, increases the rate of bone formation and is in a distinct category of osteoporosis medicines called anabolic drugs. This is currently the only osteoporosis medicine approved by the FDA that rebuilds bone. The goal of treatment with teriparatide is to build bone and lower the risk of breaking bones. Each individual drug is different. Patients health conditions and the way of taking medication will influence the decision about which drug to use. Some people respond better to one drug than another, or may have side effects on one drug and not another. Cost may be another consideration. Provincial and private drug plans may not cover the cost of all available osteoporosis medications. All of these factors will need to be considered before making final decision. The following brief descriptions of drug treatment options may help to choose the appropriate drugs.

1.5.3. Bisphosphonates: Bisphosphonates are the most common family of drugs used to treat osteoporosis. They are part of the group of osteoporosis medications known as antiresorptives. Four bisphosphonates are currently used for osteoporosis in Bangladesh. They are-

- Alendronate Sodium
- Risedronate Sodium or Risedronate Sodium with Calcium Carbonate
- IbandronateSodium
- Zoledronic Acid

These are most effective and preferred bisphosphonates because they reduce the risk of fractures in all bones (hip, spine and other areas). Bisphosphonates bind to the surfaces of the bones and slow down the bone resorbing action of the osteoclasts. This alters the balance between the osteoclasts and the osteoblasts such that bone loss is usually stopped and bone strength is improved.

- **Alendronate Sodium:** Alendronate is approved for the prevention and treatment of osteoporosis in postmenopausal women and for the treatment of osteoporosis in men. It also is approved for the treatment of glucocorticoid induced osteoporosis in men and women as a result of long-term use of steroid medicines (examples are prednisone and cortisone). Alendronate reduces bone loss, increases bone density and reduces the risk of spine, hip and other broken bones by about 50 percent over two to four years. For prevention, alendronate is taken daily as a 5 mg tablet or weekly as a 35 mg tablet. For treatment, it is taken daily as a 10 mg tablet or weekly as a 70 mg tablet with or without vitamin D3.
- **Risedronate Sodium or Risedronate Sodium with Calcium Carbonate:**

  Risedronate (actonel) is approved for the prevention and treatment of osteoporosis in postmenopausal women and for the treatment of osteoporosis in men. It also is approved for the prevention and treatment of glucocorticoid-induced osteoporosis in men and women as a result of long-term use of steroid medicines (examples are prednisone

and cortisone).Risedronate (Atelvia) is approved for the treatment of osteoporosis in postmenopausal women. Risedronate slows bone loss, increases bone density and reduces the risk of spine and non-spine fractures by 35 to 45 percent over three years. For both prevention and treatment, risedronate is taken daily as a 5mg tablet, weekly as a 35mg tablet that is available with or without separate calcium carbonate tablets, twice monthly as a 75 mg tablet (on two consecutive days) or monthly as a 150 mg tablet.

- **Ibandronate Sodium:** Ibandronate is approved for the prevention and treatment of osteoporosis in postmenopausal women. Ibandronate reduces the incidence of spine fractures by about 50 percent over three years. For both prevention and treatment, ibandronate is taken once monthly as a 150 mg tablet. For treatment, it is also available as an intravenous (IV) injection of 3 mg given every three months
- **Zoledronic Acid:** Zoledronic acid is approved for the prevention and treatment of osteoporosis in postmenopausal women. It is also approved to increase bone mass in men with osteoporosis and for the prevention of new clinical fractures in patients who have recently had a low-trauma hip fracture. In 2009, it was approved for the prevention and treatment of glucocorticoid-induced osteoporosis in men and women as a result of long-term use of steroid medicines (examples are prednisone and cortisone).

1.5.4 Calcitonin-Salmon: Calcitonin is a synthetic hormone for the treatment of osteoporosis in postmenopausal women who are at least five years beyond menopause.The naturally occurring hormone is involved in calcium regulation and bone metabolism. Calcitonin slows bone loss and increases bone density in the spine. It reduces the risk of spine fractures but has not been shown to decrease the risk of non-spine fractures. Calcitonin is available as a nasal spray (200 IU daily) or an injection (dosage varies). An oral form of the drug is also being tested in clinical trials.

1.5.5 Estrogen Therapy (ET) and Hormone Therapy (HT): Estrogen therapy (ET) and estrogen with progesterone hormone therapy (HT) are approved for the prevention of osteoporosis in postmenopausal women. ET and HT reduce bone loss, increase bone density in both the spine and hip, and reduce the risk of hip, spine and other fractures in postmenopausal women. ET and HT also relieve menopausal symptoms. ET and HT are commonly available as a tablet or skin (transdermal) patch and in other forms. Estrogen and hormone medicines come in a wide variety of doses.

1.5.6 Teriparatide Parathyroid Hormone (PTH): Teriparatide, a type of parathyroid hormone, is approved for the treatment of osteoporosis in postmenopausal women and in men who are at high risk of breaking a broken bone. It is also approved for the treatment of osteoporosis in men and women who are at high risk of breaking a bone as a result of taking steroid medicines for a long time. This medicine rebuilds bone and significantly increases bone mineral density, especially in the spine. In clinical studies of postmenopausal women using teriparatide, fractures were reduced in the spine and throughout the skeleton. In men, bone density increased, but the study was too small and not long enough to determine whether fractures decreased. Good candidates for teriparatide include those who have had an osteoporosis related fracture and those with very low bone density (T-scores lower than -3.0). Teriparatide is also an option for patients who continue to lose bone density or break a bone during treatment with other osteoporosis medicines. Teriparatide is self-administered as a daily injection from a pre-loaded pen containing a one-month supply of medicine. It can be taken for a maximum of two years. At the end of two years, to retain the benefits of treatment with teriparatide, most experts recommend that patients start an anti-resorptive medicine.

1.5.7 Glucosamine and Chondroitin: With osteoporosis, bones can become so weak that they break, usually in the hips and spine. One risk factor for osteoporosis is taking corticosteroids, which are anti-inflammatory medications. People who take them are more susceptible to developing osteoporosis. Sometimes, glucosamine and chondroitin can replace the use of corticosteroids or non steroidal anti-inflammatory drugs, which can lessen the risk for osteoporosis. This is because Glucosamine, a natural substance, is a

sugar protein that might help develop new cartilage, which is located on bones. It might also strengthen and protect joints. Chondroitin occurs naturally from sugar chains and can help joint flexibility by lubricating and cushioning joints. When used together, glucosamine and chondroitin might maintain joint health, making movement easier for people with reduced flexibility.

1.5.8 Calcitriol: Calcitriol is a type of vitamin D. Vitamin D is used in the processes which look after the growth and maintenance of bones. Calcitriol also helps calcium to be absorbed more effectively from the intestines. Calcium is necessary for proper growth and maintenance of bones. Calcitriol is used to treat post-menopausal osteoporosis or osteodystrophy in people who have certain types of kidney problems (Gonzalez-Gay, Gonzalez-Juanatey and Martin, 2005).

1.6 Regular Diet to Prevent Osteoporosis:

Osteoporosis is a very common disease and so people should be very careful about their diet for the prevention of this disease. But it is also important to know that a bone-healthy diet may not help to rebuild bones if it is due to age-related bone loss, but it can slow bone loss. However, younger people who are diagnosed with osteoporosis as a result of a medical condition or a period of extended bed rest may be able to regain bone mass with a program that includes osteoporosis-friendly nutrition (Zaki, 2014).

a) **Taking recommended daily dose of calcium:** Calcium is key to maintaining healthy bones. Dietary supplements is an option, but it is best to try to get calcium through the daily foods if possible. Adults should aim for 1,000 milligrams (mg) of calcium per day, but over age 50, males need 1,200 mg of calcium every day, and females 1,300 mg after menopause. However, there is no need to overdo it. According to one study, getting more calcium than is recommended doesn‘t have much benefit. In fact, the researchers found that there was an increased risk of hip fracture at the highest intake level, though they say further research needs to be done. Good food sources of calcium include:

   - low-fat dairy products such as skim milk or ricotta cheese

- Canned sardines in oil with bones
- Calcium fortified juices and other foods.
- Dark, leafy green vegetables.

b) Getting the recommended daily amount of vitamin D: Vitamin D helps the body to use the calcium that has already taken. The best source of vitamin D is natural sunlight — 15 minutes in the sun without sunscreen is all needed each day. However, people who should not be exposed to direct sunlight, such as skin cancer patients, can get vitamin D from supplements. Aim for about 400 to 800 IU a day (some doctors recommend higher doses). There are few foods with vitamin D, though some cereals and juices come fortified with the vitamin. Other choices include:

- Salmon, tuna, mackerel, sardines
- Egg yolk
- Fortified dairy products such as milk

(Weeks and Beck, 2010)

c) Eating fresh produce: The bone health relies on a varied diet containing many different vitamins and minerals. Aim to eat a rainbow of colors when it comes to fruits and vegetables. As an additional benefit, a study of 171 adults showed that those whose diets were more alkaline, which can be achieved by eating more fruits and vegetables, retained more calcium.

d) Moderate alcohol consumption: Alcohol can interfere with the body‘s ability to absorb calcium, so it's best to keep the consumption to a minimum.

e) Cut out caffeine and carbonated beverages: Caffeinated drinks and Sodas both have a negative impact on the bone health.

f) Cut back on salt: Eating salty foods causes the body to lose more calcium.

(Turner and Robling, 2003).

1.7 Exercise:

Physical activity helps the body stay healthy which enables it to work properly. Regular weight bearing exercise (where the weight of our bodies is taken by our bones) such as jogging, aerobics, dancing and walking are all great ways to help your bones grow stronger. Exercise helps to ensure strong bone development in young people and can also delay the rate at which bone density is reduced from our late 20s onwards. Those with osteoporosis may need to be careful of vigorous high-impact exercise but it is important to stay active as this can help to maintain balance and coordination, so reducing the risk of falling (Zaki, 2014).

1.8 Osteoporosis &Young People:

People under the age of 30 are the group most able to make a difference to their bone strength. Yet our survey demonstrates that they have the least understanding of the steps they could be taking to reduce their chance of developing osteoporosis in later life.

More than half (56%) of young people do not know that exercise can help to reduce the risk of osteoporosis.Almost half (49%) of young people do not know that there are steps that can be taken to reduce the risk of developing osteoporosis. 1 in 3 do not know about the role that diet can play in minimizing risk.32% of young people know nothing about the prevalence of osteoporosis.27% of young people do not know what the risk factors are for osteoporosis. 21% of young people do not know what osteoporosis is.

Whilst teaching about bone health is included in the National Curriculum for 8 and 9 year olds, it is not included in the curriculum for older children. Incorporating bone health in all educational objectives that include exercise, diet and healthy lifestyles would help to raise awareness in young people. The National Osteoporosis Society is keen to work with the UK government and the devolved administrations to develop educational materials to this end (Sirola et al., 2008).

1.9 Raising Awareness of Osteoporosis:

As the only UK-wide charity dedicated to improving the diagnosis, treatment and prevention of osteoporosis, raising awareness of the disease and the steps people can take to improve their bone health is crucial to the work of the National Osteoporosis Society. Encouragingly, the powerful effect that government-led public health campaigns have had is also demonstrated by our survey. When asked about diet, people were aware of the benefits of eating oily fish and 5 portions of fruit and vegetables, and drinking plenty of water. A public health campaign about osteoporosis, coupled with greater efforts to inform people about how they can help keep their bones healthy would have a significant impact on the general public‘s understanding of the disease (Peters et al., 2009).

CHAPTER TWO

LITERATURE REVIEW

Literature Review

2.1 Exploration of Osteoporosis Knowledge and Perception among Young Women in Quetta, Pakistan.

Maria and Noman conducted a research on osteoporosis problem in Pakistan. This survey was conducted to assess the knowledge that Women have been the most susceptible group of this silent disease therefore they need primary preventive steps such as health education of which one of the steps is to assess their knowledge according to which the content of their health education program is made. The study intended to investigate knowledge regarding osteoporosis among female students of university in Quetta, Pakistan.A cross-sectional study was undertaken with 162 female students of University of Baluchistan, Quetta. Knowledge was assessed by using a pre-validated self-administered questionnaire containing 20 disease related questions. Convenience sampling technique was used for data collection. Descriptive analysis was used to demonstrate the characteristics of the study population. Inferential statistics (Mann-Whitney U test and Kruskal Wallis tests, $p< 0.05$) were used to assess the significance among study variables.162 female students were recruited into the study, 153 (81.5%) were single and science students 123(75.9%) with the majority of age group of less than 24 years. Mean age of the study participants was 21.91 ± 1.74 years. 134(82.7%) have not been previously diagnosed of bone related problem or osteoporosis. Mean score of knowledge was 13.01± 2.9. Department and living status were significantly associated with knowledge scores. The study concluded that females had better understand of the disease, osteoporosis, but they need to know about the treatment for this disease in Pakistan and it is also necessary for them to know more about some specific risk factors (Noman et al., 2015).

2.2 The Association between Vitamin D Receptor FokI Gene Polymorphism and Osteoporosis in Postmenopausal Women: A Meta-Analysis.

Jihong and Zhang conducted a research on quantitatively summarize the evidence for VDR FokI gene polymorphism and osteoporosis risk in postmenopausal women. Case-control studies containing available genotype frequencies of F/f were chosen, and Odds ratio (OR) with 95% confidence interval (CI) was used to assess the strength of this revelance.In the case-control studies 2199 osteoporosis cases were included and 2231 controls were identified. Overall meta-analysis indicated that individuals with the homozygous ff genotype had increased risk of osteoporosis(Recessive model: OR=1.551, 95% CI: 1.035~2.325p=0.034). In the stratified analysis, individuals with the ff genotype in the Recessive model had increased risk of osteoporosis in Asian subjects (OR=2.644, 95% CI: 1.583~4.419, p= 0.000), but not in Caucasian subjects (OR= 1.288, 95%CI: 0.783~2.118, p = 0.318) and Mixed subjects (OR= 0.885, 95%CI: 0.686~1.141, p =0.346). A symmetric funnel plot, the Begg- test (P=0.094) suggested that lack of publication bias. The studies conducted in each of the defined number of osteoporosis—had no effect of the FokI polymorphism on osteoporosis except for the ff versus Ff+FF genotype comparison for osteoporosis subgroup.The result of this survey meta-analysis suggests that VDR Fok I genotype is associated with increased risk of osteoporosis in Asian but not in caucasian. To draw comprehensive and true conclusions, further prospective studies with larger numbers of participants worldwide are needed to examine associations between VDR Fok I polymorphism and osteoporosis (Zhang,2015).

2.3 A New Predictive Index for Osteoporosis in Men under 70 Years of Age: An Index to Identify Male Candidates for Osteoporosis Screening by Bone Mineral Density.

Lee Oh Kim conducted a research on bone mineral density (BMD) screening guidelines for osteoporosis in men. The aim of the study was to set up a predictive index for the

osteoporosis (PIO) in men under 70 years of age and present the optimal cutoff value of it, so that clinicians might use it to identify male candidates who benefit from taking the BMD screening.The study population consisted of Adult men under 70 years old who met certain criteria were included. With the determined significant predictors for osteoporosis, a new index was created that presumably best predicts the osteoporosis and compared the predictability of it to other variables. Lastly, the optimal cutoff value of the PIO was calculated.The result of the survey was fairly well and thus can be used with its cutoff point to identify men under 70 years of age who need BMD screening. A total of 359 men were included. Age, weight, and current smoking status turned out to be significant predictors for osteoporosis. The PIO was as follows: [age(years) + 10 (for current smoker)]/weight(kg). Compared to other variables, the PIO showed the greatest predictive performance with the optimal cutoff point being 0.87 at which sensitivity and specificity were 71.9% and 70.0%, respectively (Kim,2014).

2.4 Whole Body Bone Tissue and Cardiovascular Risk in Rheumatoid Arthritis.

Claudiu conducted a research on aiming to evaluate the connection between the estimated cardiovascular risk (CVR) and the loss of bone tissue in Rheumatoid Arthritis (RA) patients. Atherosclerosis and osteoporosis share an age-independent bidirectional correlation. Rheumatoid Arthritis (RA) represents a risk factor for both conditions.The study has a prospective cross-sectional design and it includes female in-patients with RA or without autoimmune diseases; bone tissue was measured using whole body dual X-ray absorptiometry (wbDXA); CVR was estimated using SCORE charts and PROCAM applications.The study population consisted of 75 RA women and 66 normal women of similar age. The wbDXA bone indices correlate significantly, negatively, and age-independently with the estimated CVR. The whole body bone percent (wbBP) was a significant predictor of estimated CVR, explaining 26% of SCORE variation along with low density lipoprotein ($P< 0.001$) and 49.7% of PROCAM variation along with glycemia and menopause duration ($P< 0.001$). Although obese patients had less bone

relative to body composition (wbBP), in terms of quantity their bone content was significantly higher than that of non-obese patients.The research concluding that female patients with RA and female patients with cardiovascular morbidity have a lower whole body bone percent. Obese female individuals have higher whole body bone mass than non-obese patients (Claudiu, 2014).

2.5 Effects of Whole Body Vibration and Resistance Training on Bone Mineral Density and Anthropometry in Obese Postmenopausal Women.

Erfan Zaki conducted a research on aiming to evaluate the impact of two exercise programs, whole body vibration and resistance training on bone mineral density (BMD) and anthropometry in obese postmenopausal women. Eighty Egyptian obese postmenopausal women were enrolled in this study; their age ranged from 50 to 68 years. Their body mass index ranged (30–36 kg/m2). The exercise prescription consisted of whole body vibration (WBV) and resistance training. Bone mineral density (BMD) and anthropometrical parameters were measured at the beginning and at the end of the study. Changes from baseline to eight months in BMD and anthropometric parameters were investigated. The study suggests that both types of exercise modalities had a similar positive effect on BMD at all sites in obese postmenopausal women. Significant association was noted between physical activity and anthropometric variables and BMD measures at all sites (Zaki, 2014).

2.6 A Study of Bone Mineral Density and Its Determinants in Type 1 Diabetes Mellitus.

The study was conducted by Bhagwat and Joshi proving that Type 1 diabetes mellitus (T1DM) has been inconsistently associated with low bone mineral density (BMD) and increased fracture risk. 86 consecutive T1DM cases and 140 unrelated age and sex

matched healthy non-diabetic controls were included in the study. After history and examination, BMD and body composition were assessed by dual energy X-ray absorptiometry (DEXA). Serum samples were analyzed for calcium, phosphorus, albumin, creatinine, alkaline phosphatase, 25 (OH) vitamin D3, intact para thyroid hormone (PTH) levels (both cases and controls) and HbA1c, anti-microsomal and IgA tissue transglutaminase antibodies, cortisol, follicle stimulating hormone (FSH), testosterone, sex hormone binding globulin (SHBG), tetraiodothyronine (T4), thyroid stimulating hormone (TSH), growth hormone (GH), insulin-like growth factor-1 (IGF-1), and insulin-like growth factor binding protein 3 (IGFBP3) (cases only). T1DM cases had a lower BMD as compared to controls at both total body (TB) and lumbar spine (LS) ($P< 0.05$). Patients with celiac autoimmunity (CA) had significantly, lower BMD as compared to age, sex, and body mass index (BMI) matched T1DM controls. Linear regression analysis showed that low BMD in T1DM patients was associated with poor glycaemic control, lower IGF-1 levels, less physical activity (in total population as well as in male and female subgroups), and lower body fat percentage (in females) and higher alkaline phosphatase level (in males) ($P< 0.05$) (Joshi et al., 2013).

2.7 Osteoporosis Self-Assessment Tool Performance in a Large Sample of Postmenopausal Women of Mendoza, Argentina.

Fernando D.Saraví, conducted the study on Osteoporosis Self-Assessment Tool Performance on postmenopausal women. The Osteoporosis Self-Assessment Tool (OST) is a clinical instrument designed to select patients at risk of osteoporosis, who would benefit from a bone mineral density measurement. The OST only takes into account the age and weight of the subject. It was developed for Asian women and later validated for European and North American white women. The performance of the OST in a sample of 4343 women from Greater Mendoza, a large metropolitan area of Argentina, was assessed. Dual X-ray absorptiometry (DXA) scans of lumbar spine and hip were obtained. Patients were classified as either osteoporotic (N = 1830) or non-osteoporotic (n = 2513) according to their lowest T-score at any site. Osteoporotic patients had lower

OST scores (P< 0.0001). A receiver operating characteristic (ROC) curve showed an area under the curve of 71% (P< 0.0001), with a sensitivity of 83.7% and a specificity of 44% for a cut-off value of 2. Positive predictive value was 52% and negative predictive value was 79%. The odds ratio for the diagnosis of osteoporosis was 4.06 (CI95 3.51 to 4.71; P< 0.0001). It is concluded that the OST is useful for selecting postmenopausal women for DXA testing in the studied population (Saraví, 2013).

2.8 Active Referral Intervention following Fragility Fractures Leads to Enhanced Osteoporosis Follow-Up Care.

Sheridan, Sugi and many other conducted a research on Fragility Fractures Leads to Enhanced Osteoporosis Follow-Up Care. One major urban academic medical center, patients aged 50 years and older with fragility fractures were identified and scheduled or assisted in referral into osteoporosis medical management appointments. The efficacy of an active intervention program was evaluated at overcoming the logistical barriers and improving proper osteoporosis follow-up for persons who have sustained a fragility fracture. Of 681 patients treated for defined fractures, 168 were eligible and consented for the study of fragility fractures. Of those enrolled, 91 (54.2%) had appropriate osteoporosis follow-up on initial interview, and overall 120 (71.4%) had successful osteoporosis follow-up following our active intervention. Seventy patients (41.7%) were deemed to have no osteoporosis follow-up, and, of these, 48 were successfully referred to a scheduling coordinator. The scheduling coordinator was able to contact 37 (77%) patients to schedule proper follow-up, and, of these, 29 (78.4%) confirmed receiving an appropriate follow-up appointment. Active intervention and assisted scheduling for patients with recent fragility fractures improved the self-reported rate of osteoporosis follow-up from 54.2% to 71.4% (Sugi et al., 2012).

2.9 Osteoporosis Knowledge of Students in Relevant Healthcare Academic Programs.

To test for adequate osteoporosis education, a study was conducted to measure osteoporosis knowledge in 206 students in relevant healthcare academic programs, such as nursing, pharmacy, physical therapy, and dietetics. The study showed that differences existed in osteoporosis knowledge in general between the programs and between different years of students in the same programs. There were also discrepancies in specific areas of osteoporosis knowledge between the classes of students, and the average scores of correctly answered items were only as high as 24.40 (76.3%) out of 32 items on osteoporosis knowledge. This study shows that students have osteoporosis knowledge and that it is not completely inadequate; however, osteoporosis knowledge could still be more sufficient, and results demonstrate the need to increase osteoporosis education in the curriculum for these healthcare academic programs to increase osteoporosis knowledge and better prepare graduates and professionals to treat individuals with the diseases (Nguyenand Wang, 2012).

2.10 Association between Body Mass Index and Bone Mineral Density in Patients Referred for Dual-Energy X-Ray Absorptiometry Scan in Ajman, UAE.

Body Mass Index (BMI) is a good indicator for measurements of Bone Mineral Density (BMD) which measures the density of minerals present in the bones using a special scan. This study was conducted to assess the association between BMI and status of BMD among 101 individuals who underwent Dual-Energy X-ray Absorptiometry (DEXA) scan. 39 subjects had normal and 62 had low bone mineral density. BMD was low in 82.4% of people with normal BMI, 78.1% among overweight, and 44.2% among obese. There was a statistically significant association between these two variables ($P < .001$). Low BMD was recorded in 59.1% of females and 76.9% of males. Association between

advancing age and lower BMI is an important risk factor in the occurrence of low BMD (Fawzy et al., 2011).

2.11 Calcium and Vitamin D Supplementation in Men.

Calcium and vitamin D supplements reverse secondary hyperparathyroidism and are widely prescribed to prevent osteoporotic fractures, with proven anti fracture efficacy when targeted to individuals with documented insufficiencies. Men who should particularly be considered for calcium and vitamin D supplements include elderly or institutionalized individuals, patients with documented osteoporosis on anti resorptive or anabolic medication, and individuals receiving glucocorticoids. Benefits are most apparent when a daily dose of 1000–1200 mg calcium is complemented with 800 IU vitamin D. Compliance is the key to optimizing clinical efficacy. While (conventionally dosed) vitamin D has not been associated with safety concerns, recent meta-analytic data have provided evidence to suggest that calcium supplements (without co-administered vitamin D) may potentially be associated with cardiovascular risks (Gielen et al.,2011)

2.12 The Relationship between Physical Activity and Bone during Adolescence Differs according to Sex and Biological Maturity.

Belinda R. Beck, Benjamin K. Weeks conducted a research on examining the relationships between bone mass, physical activity, and maturational status in healthy adolescent boys and girls. In this survey Ninety-nine early high-school (Year 9) students were recruited. Physical activity and other lifestyle habits were recorded via questionnaire. Anthropometrics, muscle power, calcaneal broadband ultrasound attenuation (BUA), bone mineral content (BMC), and lean tissue mass were measured. Maturity was determined by Tanner stage and estimated age of peak height velocity (APHV). The result shows that Boys had greater APHV, weight, height, muscle power,

and dietary calcium than girls (P< .05). Boys exhibited greater femoral neck BMC and trochanteric BMC while girls had higher BUA and spine BMAD (P< .05). Physical activity and vertical jump predicted BMAD and BUA most strongly for boys whereas years from APHV were the strongest predictor for girls. The research concluded that Sex-specific relationships exist between physical activity, maturity and bone mass during adolescence (Beck&Weeks,2010).

2.13 Bone Loss Rate May Interact with Other Risk Factors for Fractures among Elderly Women: A 15-Year Population-Based Study.

The study was aiming to investigate fracture risk (FR) according to bone loss rate. A random sample of 1652 women aged 53.5 years was measured with dual X-ray absorptiometry in femoral neck in 1989 and 1994 and divided into tertiles of annual BL rate: high >0.84%, moderate 0.13%–0.84%, and low <0.13%. Low trauma energy fractures during following 10 years were recorded. There were no differences in FR between BL tertiles in Cox regression model. Factors predicting lower FR in Cox model were in high tertile: high T-score (HR 0.71; 95% CI 0.54–0.93, P = .012), no sister's fracture (HR 0.35; 0.19–0.64, P = .001), no mother's fracture (HR 0.52; 0.31–0.88, P =.015), in moderate tertile: high T-score (HR 0.69;0.53–0.91, P = .008) and good grip strength (HR 0.98; 0.97–0.99, P = .022). In low tertile there were no predictors for FR. BL predicted FR in women with mother's fracture in univariate and multivariate model (OR 2.6; 1.15–5.7, P = .021) but with sister's fracture this was observed only in multivariate model (OR 2.66; 1.09–6.7, P = .039). Accordingly, the risk factors for postmenopausal fractures, especially mother's fracture, may interact with BL. (Sirola et al, 2010)

Significance of the Study

Osteoporosis is a condition characterized by low bone densities and disordered bone micro-architecture. Complications of osteoporosis are a major health problem. The high costs related to morbidity and mortality from vertebral compression fractures and hip fractures have been well documented. Worldwide, these fractures constitute a major medical burden for the elderly and a public health burden for the community. Several studies have shown that the estimation of bone mineral density can predict future fracture risk among women (Cooper et al., 1992).

The international incidences of osteoporosis and the hip fracture syndrome are increasing at alarming rates. The estimated increases in rates of fracture over the next decade may also prove to be conservative, because of progressive increases in numbers of elderly people who will fall because of muscular degeneration, failing vision, postural hypotension, and loss of cognitive function resulting from the ever-increasing abuse of mixtures of drugs.(Faulkner et al., 2006) Changing patterns of hip fracture care, including extended use of hospital beds and of rehabilitation and nursing-home beds could lead to substantial and escalating annual costs in national health care budgets. Such a budget currently approximates 10 billion dollars in the United States alone (Gonzalez-Gay et al., 2005)

The latest report from the National Osteoporosis Society emphasizes the unnecessary suffering that women are experiencing. It makes painful reading. One woman in every four who fractures a hip never comes out of hospital — she dies there. This is a statistic provided by the UK-based National Osteoporosis Society. (Peters et al., 2009) The trouble is osteoporosis is the —silent disease‖ because there are no symptoms prior to a fracture. However, once a person has broken a bone, their risk of breaking another — a fragility fracture — increases significantly. Around 300,000 fragility fractures occur every year in the UK, often in the spine. After the first break, one in eight will break another bone within a year and a quarter within five years (Saraví, 2013)

Aim & Objective of the Study

- To know the patient/adult knowledge of osteoporosis in Bangladesh
- To find out the presence of risk factors associated with osteoporosis among them.
- To find out their habitual patterns that may influence the formation, early diagnosis and prevalence of osteoporosis.

CHAPTER THREE

METHODOLOGY

Methodology

3.1 Study Area

The data was collected from different areas of Bangladesh including all classes of people. But most of the collections are done in Dhaka city. The areas include in this study are Malibag, Bashabo, Khilgaon, Old Dhaka, Rampura , Some Rural areas include in this study are Barguna , Kalikabari , Barisal.

3.2 Total Number of Participants

- Data was collected from 200 working women.

3.3 Inclusion Criteria

- Only those who do work.
- Only Female.

3.4 Exclusion Criteria

- People who do not work
- Male person.

3.5 Procedure

- For collecting data, a questionnaire was prepared according to required information.
- The collected data were analyzed with the help of Microsoft Office Excel 2007 and filtered out accordingly for analysis.
- Some graphical representations were made from those analysis statuses.

CHAPTER FOUR

RESULT

Result

4.1 Marital Status of the Subject

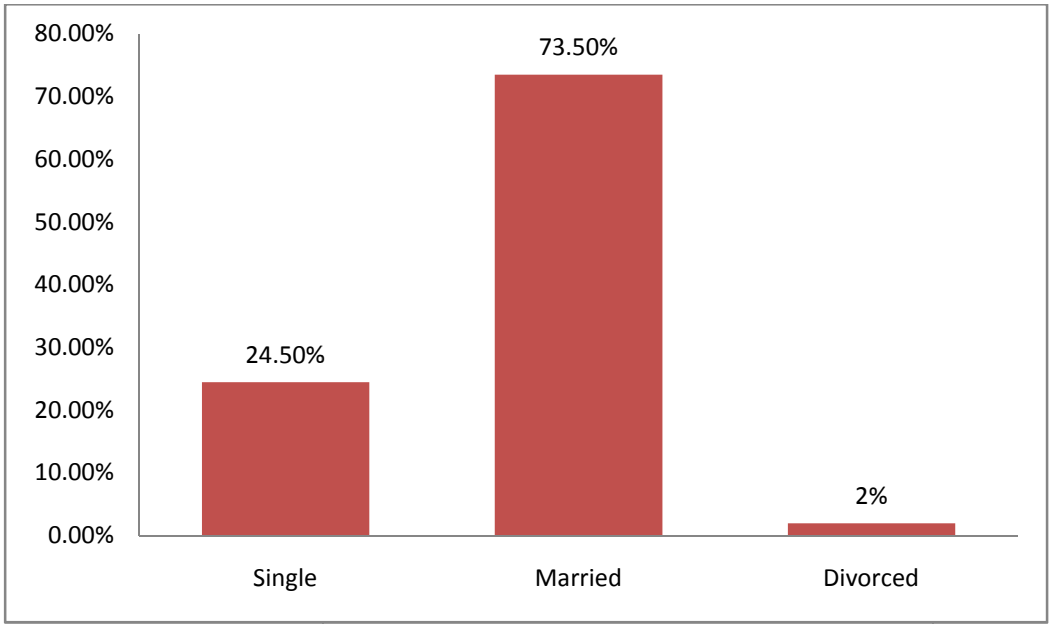

Fig4.1: Marital Status of the Subject

Among the population 24.50% are single, 73.50% are married and only 2% are divorced.

4.2 No. of Children of the Subject

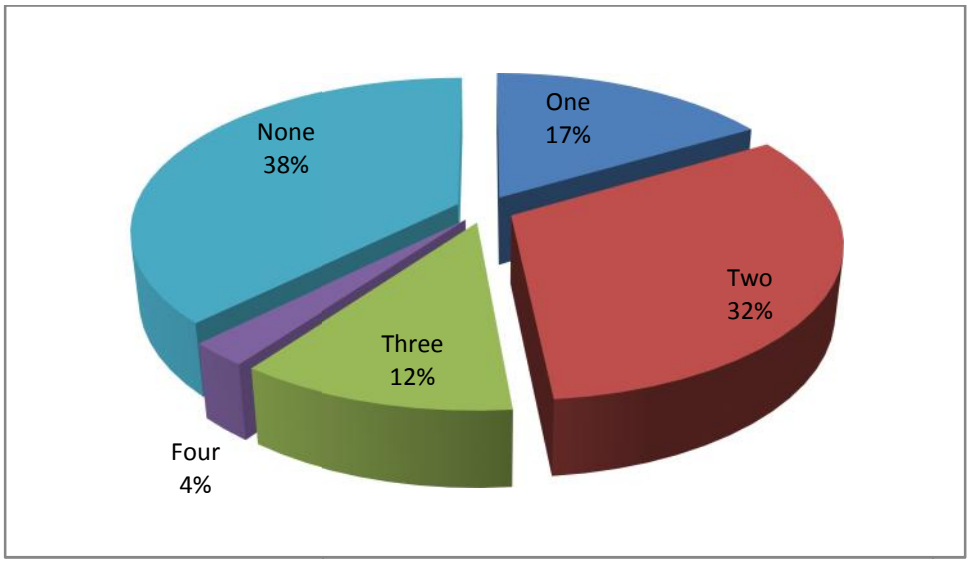

Fig4.2: No. of Children of the Subject

Among the population 38% had no children, 17% had one child, 32% had two, 12% had three and 4% had four children.

4.3 Education Level of the Subject

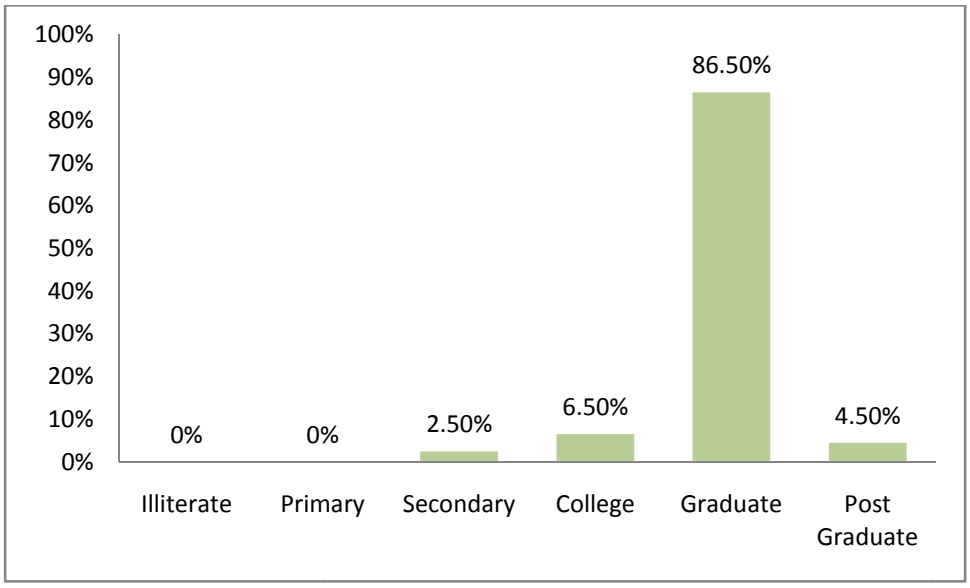

Fig4.3: Education Level of the Subject

Among the educated women 2.50% had completed secondary, 6.50% had completed college, 86.50% had completed graduation and 4.50% had completed post graduation.

4.4 Occupation of the Subject

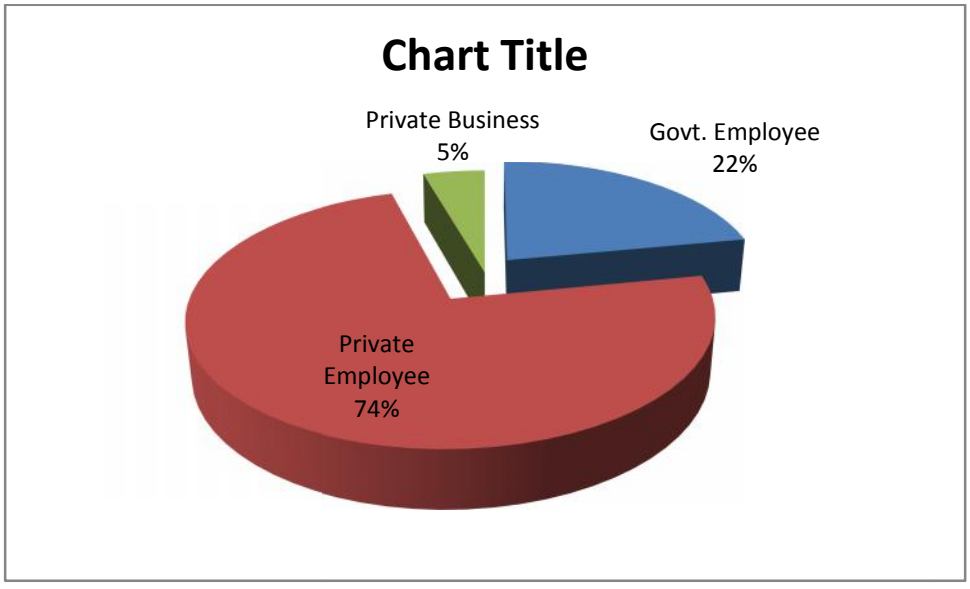

Fig4.4: Occupation of the Subject

Among the women most of the women (73%) were private employee, about 22% were govt. employee and about 5% had private business.

4.5 Living with family

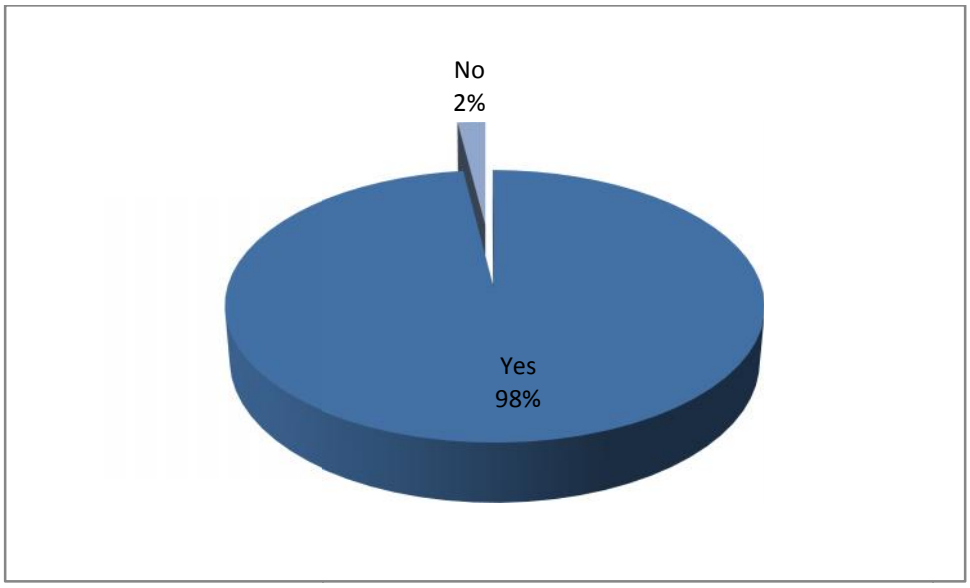

Fig4.5: Living with family

Majority of the participants were living with family (98%) and the rest of them (2%) were not living with family.

4.6 Knowledge about Osteoporosis

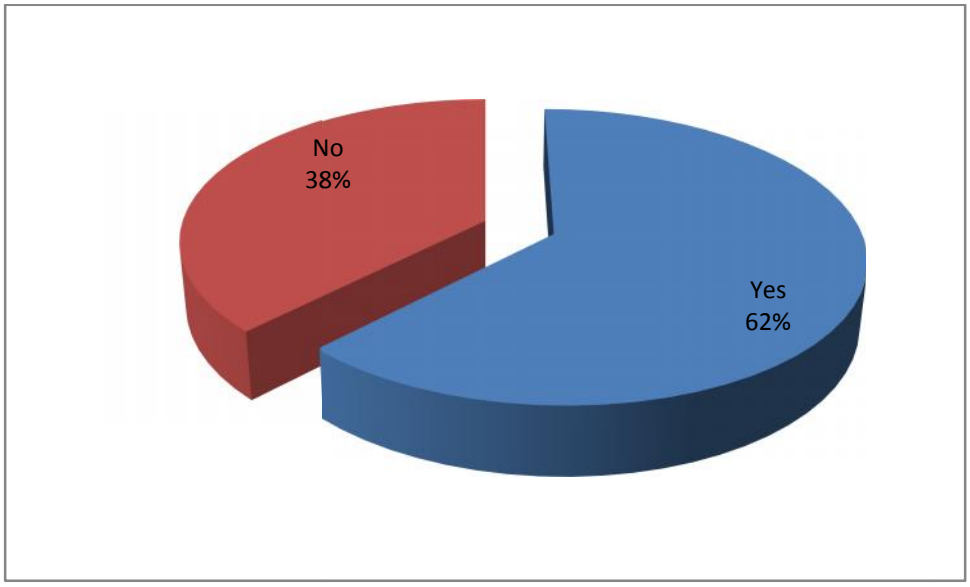

Fig4.6: Knowledge about Osteoporosis

Among 200 participants, about 62% knew about osteoporosis and about 38% didn't know.

4.7 Family History of Osteoporosis

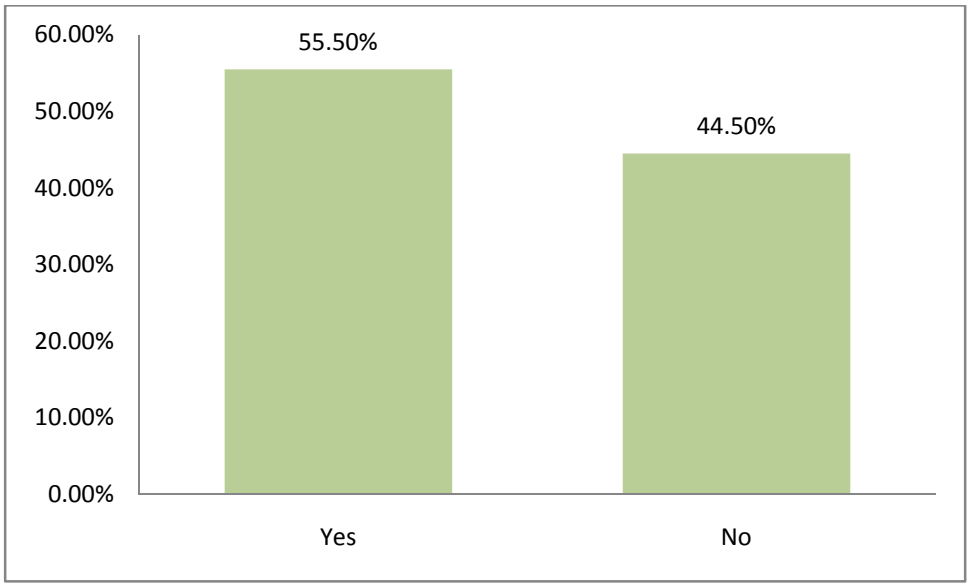

Fig4.7: Family History of Osteoporosis

About 55.5% of participants had a family history of osteoporosis and the rest 44.5% did not have that history.

4.8 Maternal History of Osteoporosis

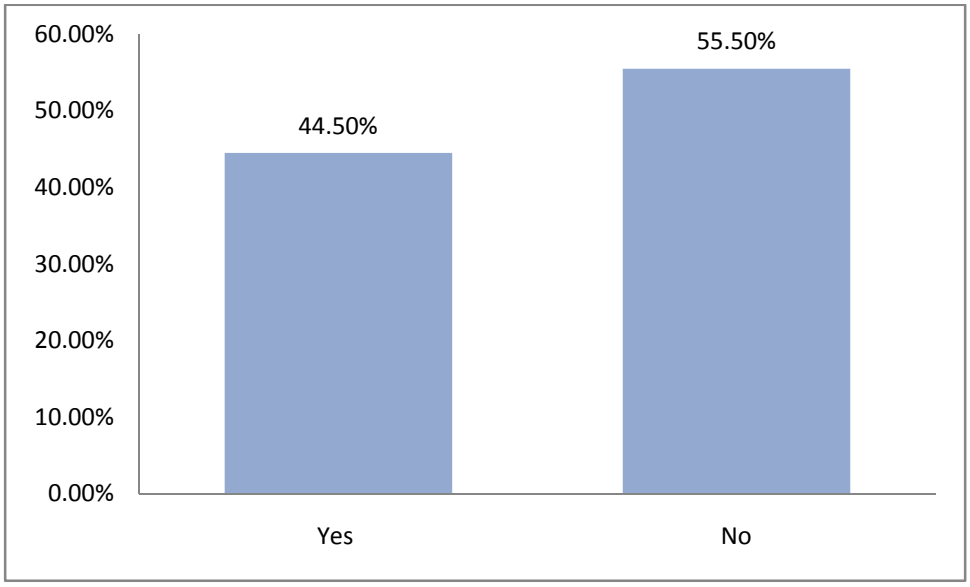

Fig4.8: Maternal History of Osteoporosis

About 44.5% of participants had a maternal history of osteoporosis and the rest 55.5% did not have that history.

4.9 Maternal History of Fracture

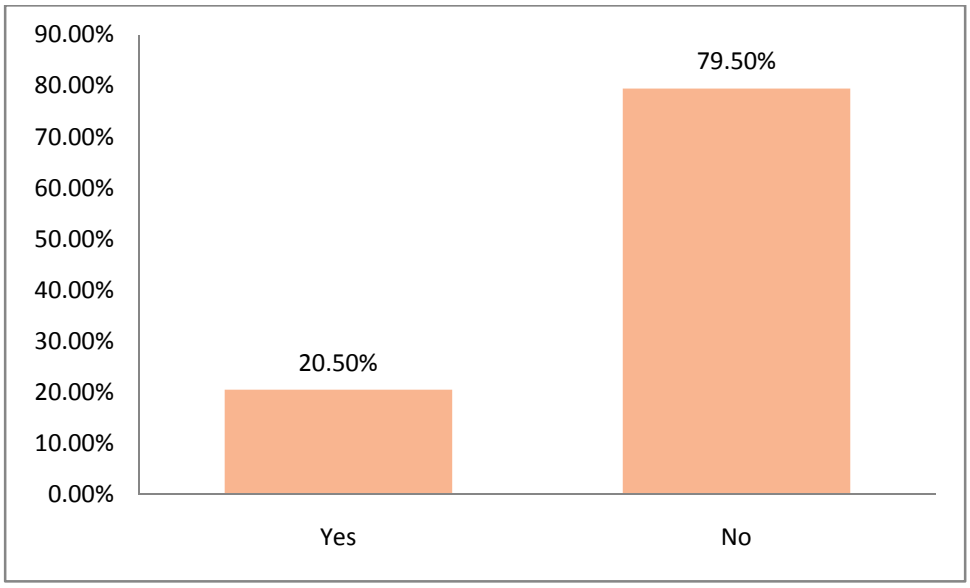

Fig4.9: Maternal History of Fracture

Among the participants, about 20.5% of participants had a maternal history of fracture and the rest 79.5% did not have that history.

4.10 Knowledge about Major Types of Osteoporosis

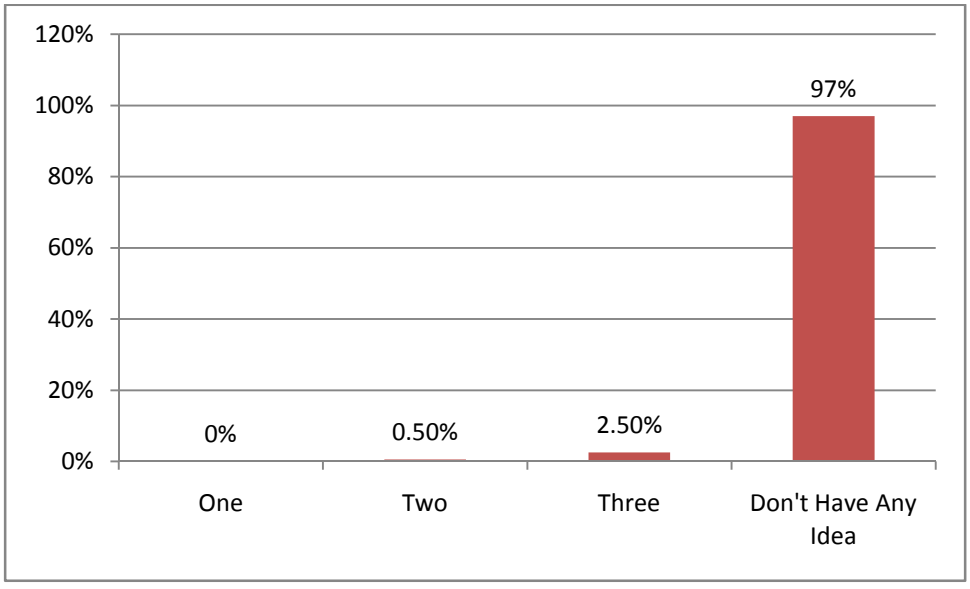

Fig4.10: Major Types of Osteoporosis

Among 200 of participants, 97% had no idea about the types of osteoporosis, 2.5% had type 3 osteoporosis, about 0.5% had type 2 and 0% had type 1 osteoporosis.

4.11 Diagnosed With Bone Problem

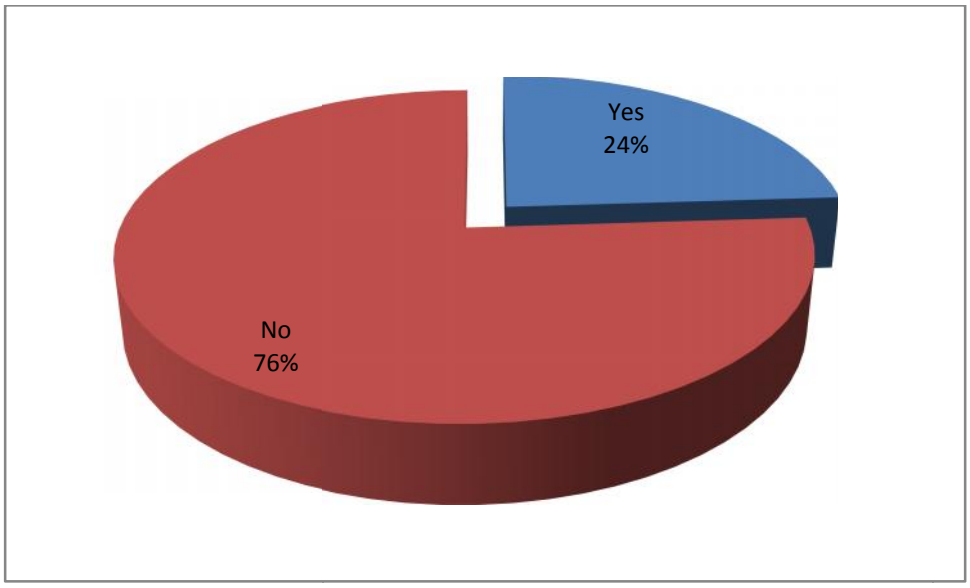

Fig4.11: Diagnosed with Bone Problem

Among 200 participants, about 24% had diagnosed with bone problem and rest 76% had not diagnosed yet.

4.12 Postmenopausal Graph

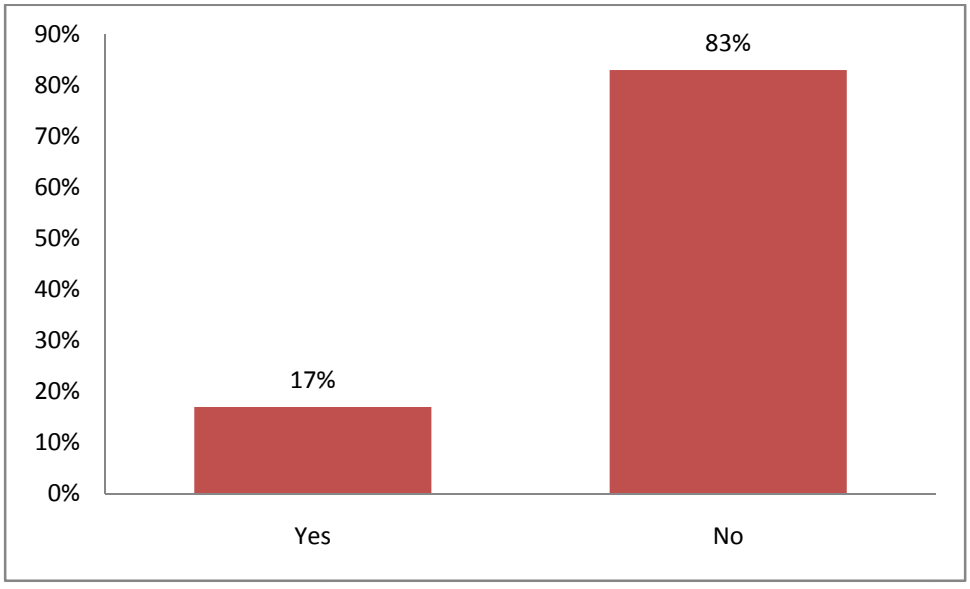

Fig4.12: Postmenopausal Number

Among the participants only 17% were postmenopausal and the 83% were not postmenopausal.

4.13 Years Since Menopause

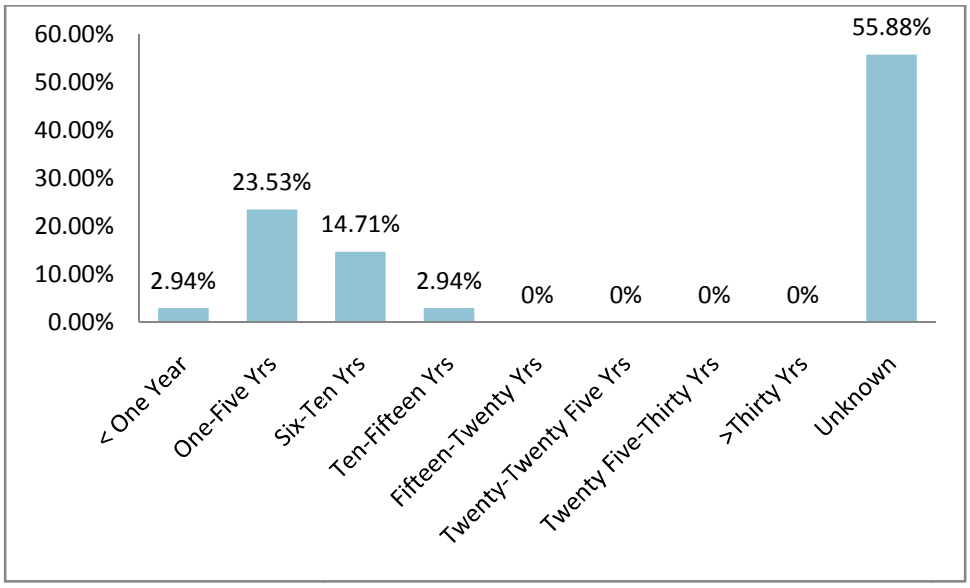

Fig4.13: Years since Menopause

Among the female participants only 2.94% were in menopausal condition from<1 year, 23.53% were in between one to five years, 14.71% from 6-10 years, 2.94% from 10-15 years and 55.88% did not know.

4.14 History of Fractures since Age 45

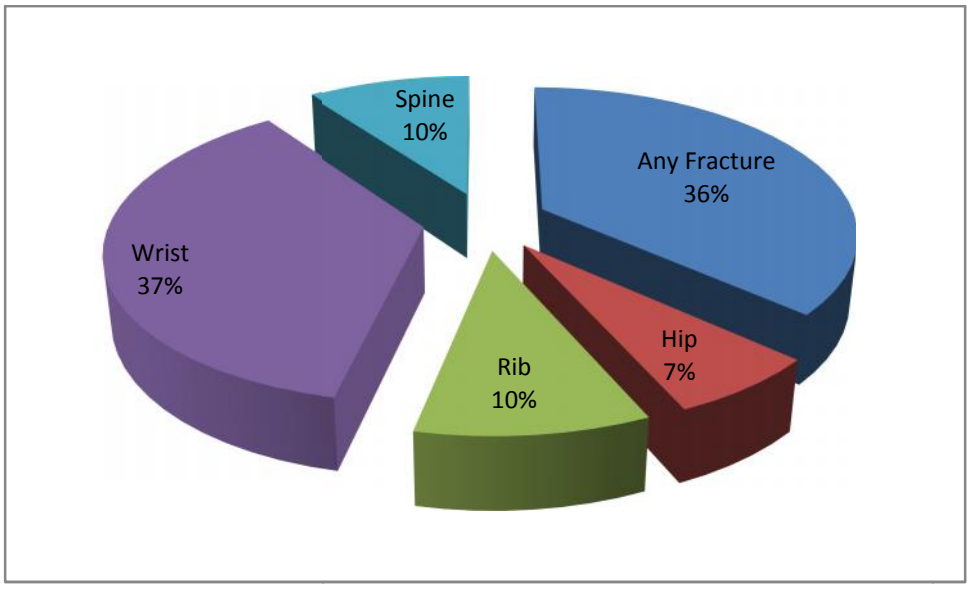

Fig4.14: Types of Fractures since Age 45

Among the participants, about 36% had any fracture since age 45, 7% had hip fracture, about 10% had rib fracture, 37% had wrist fracture and 10% had spinal fracture.

4.15 Habit of Smoking

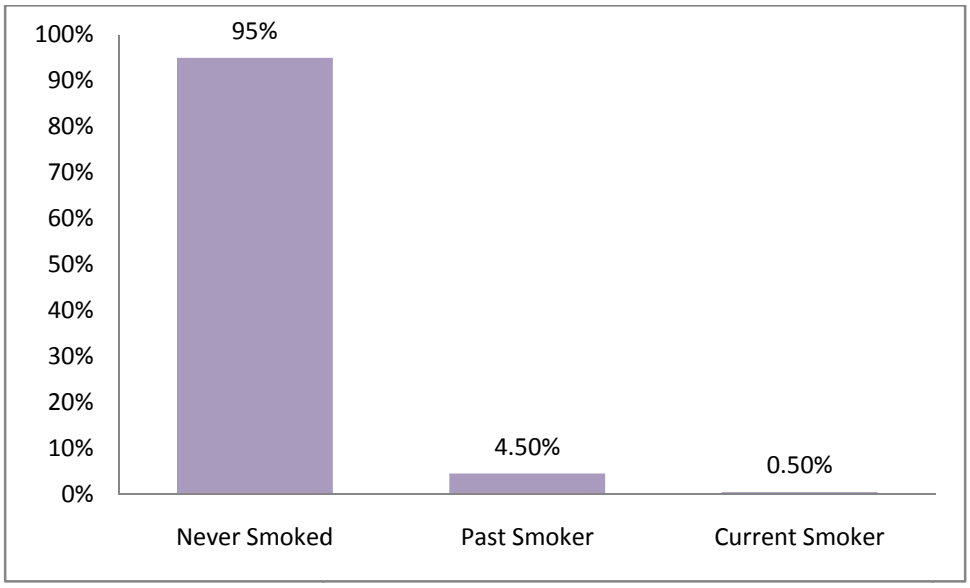

Fig4.15: Cigarette Smoking Graph

Among the participants 95% never smoked cigarette, 4.5% were past smoker and 0.5% were current smoker.

4.16 Percent of Patient Suffering from Osteoporosis

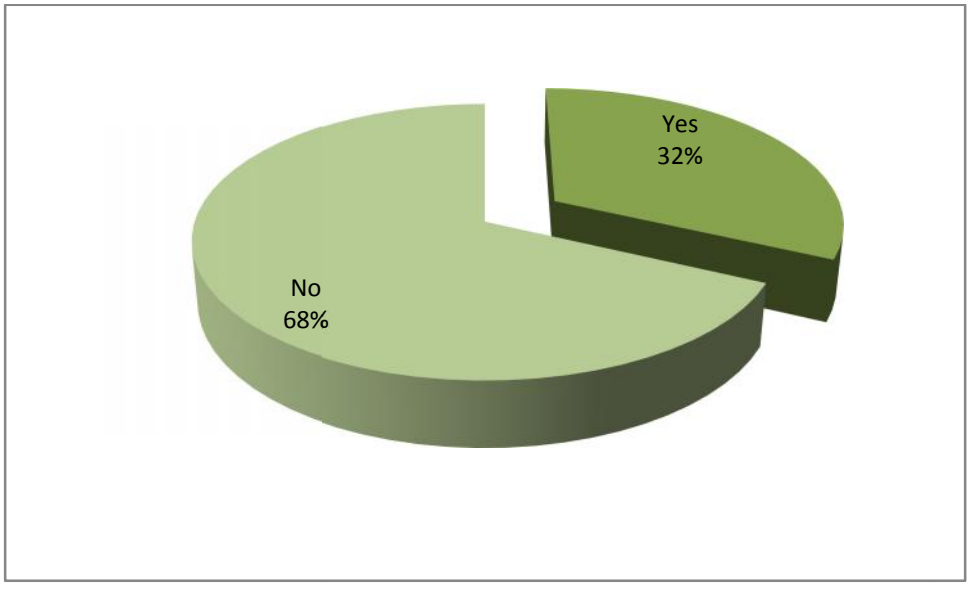

Fig4.16: Osteoporosis Suffering Graph

Among the 200 participants 68% were not suffering from osteoporosis and only 32% were suffering from osteoporosis.

4.17 Disease Duration Graph

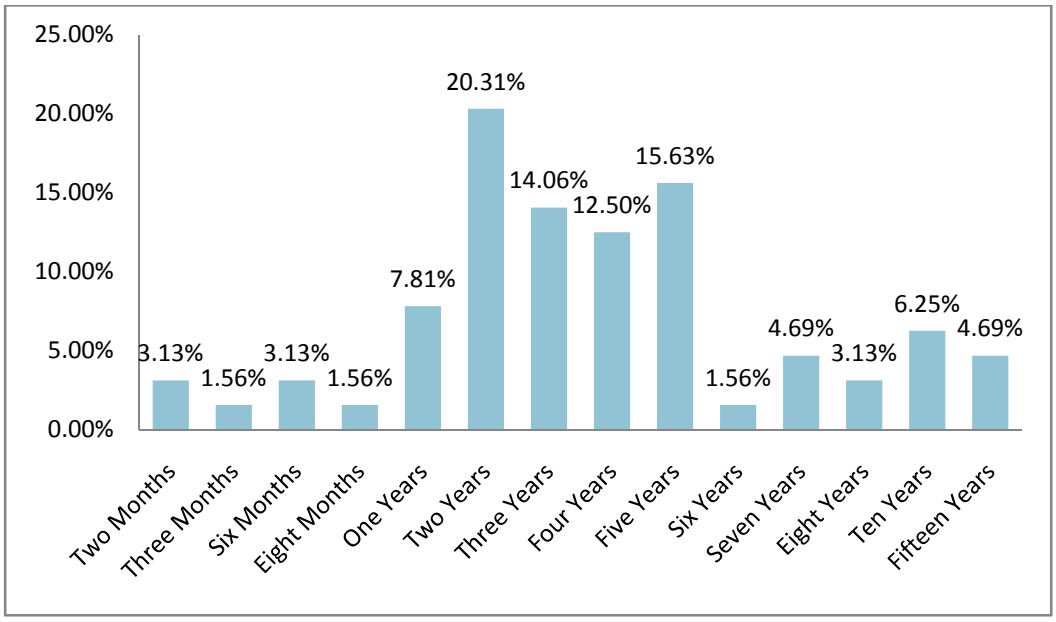

Fig4.17: Disease Duration Graph

Among the participants most of the women who suffered from osteoporosis were suffering from it about one to five years (almost 70%).

4.18 Concerned About Getting Osteoporosis

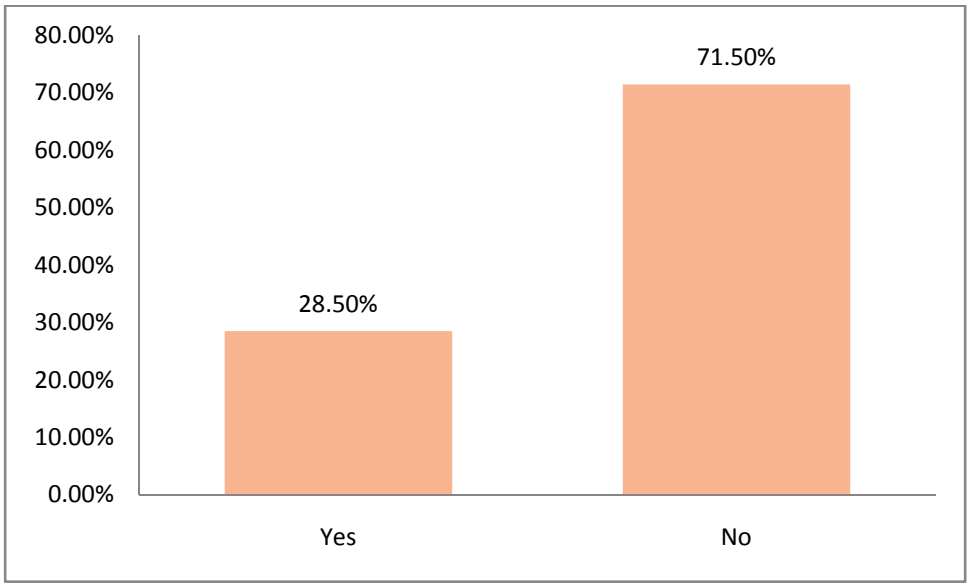

Fig4.18: Concerned About Getting Osteoporosis

It was seen in our study that among the participants 28.5% were concerned about osteoporosis and 71.5% are not concerned about osteoporosis.

4.19 Types of Osteoporosis Study Subject Have

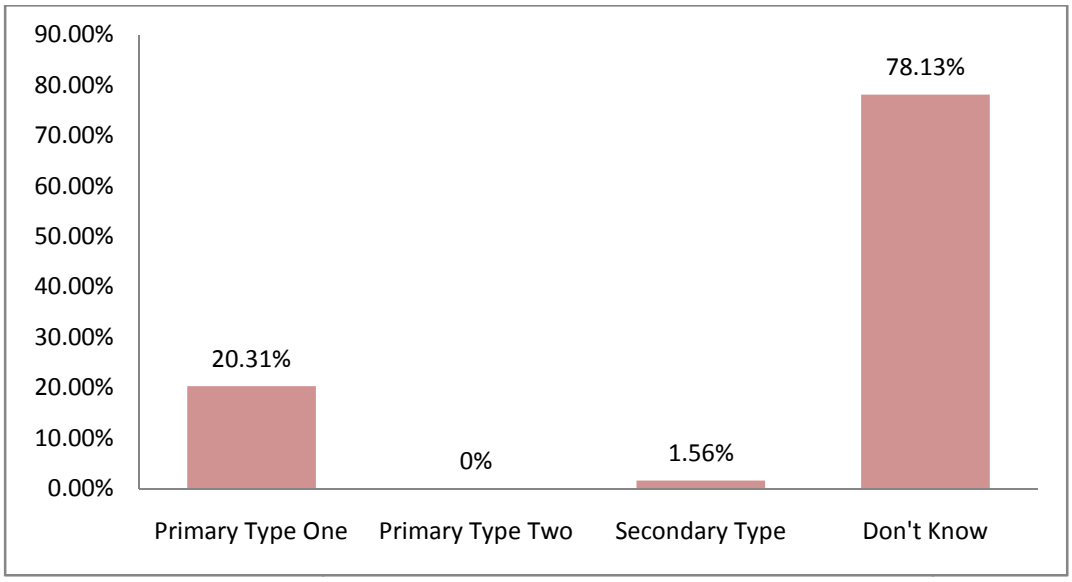

Fig4.19: Types of Osteoporosis Have

Among the participants 78.13% don‘t know about the types of osteoporosis they are suffering from.

4.20 Knowledge about Main Factor That Influence Bone Density

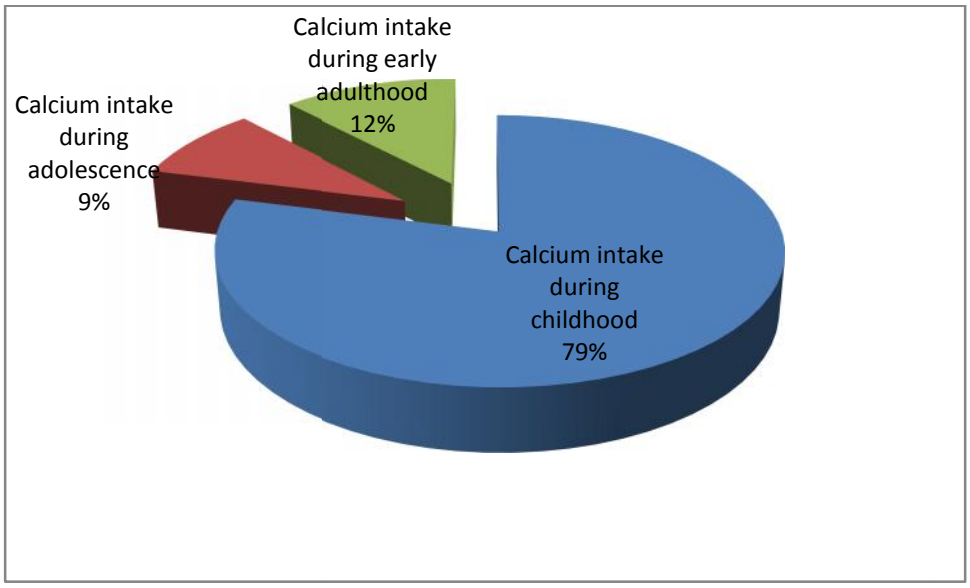

Fig4.20: Main Factor That Influence Bone Density

Among the participants most of them around 79% thought calcium intake during childhood is the main factor that influence bone density.

4.21 Chances of Having Osteoporosis Believed by the Subjects

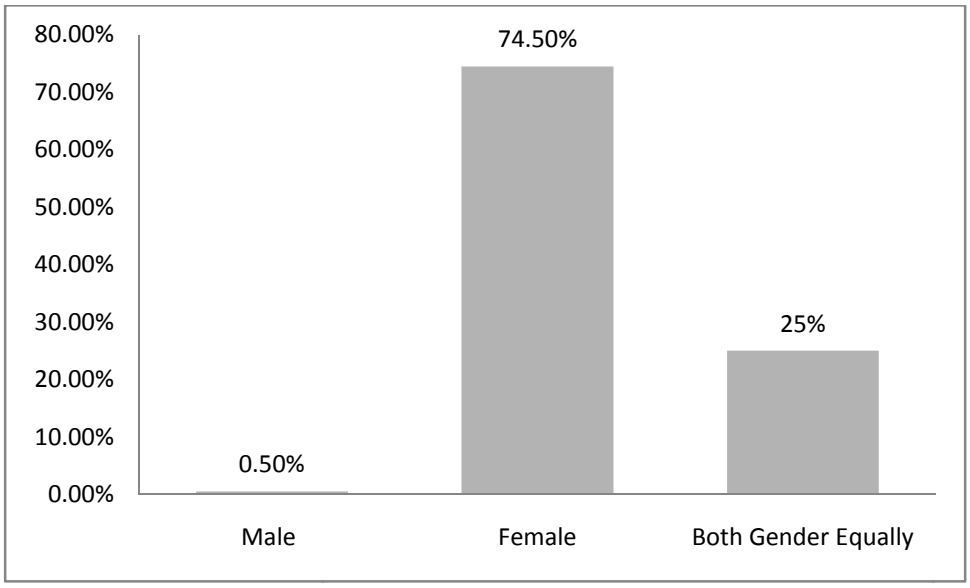

Fig4.21: Chances of Having Osteoporosis Believed by the Subjects

Among the population 74.5% believed that osteoporosis is more prone to female and 25% believed it is more prone to both genders equally.

4.22 Sources of Knowledge about Osteoporosis

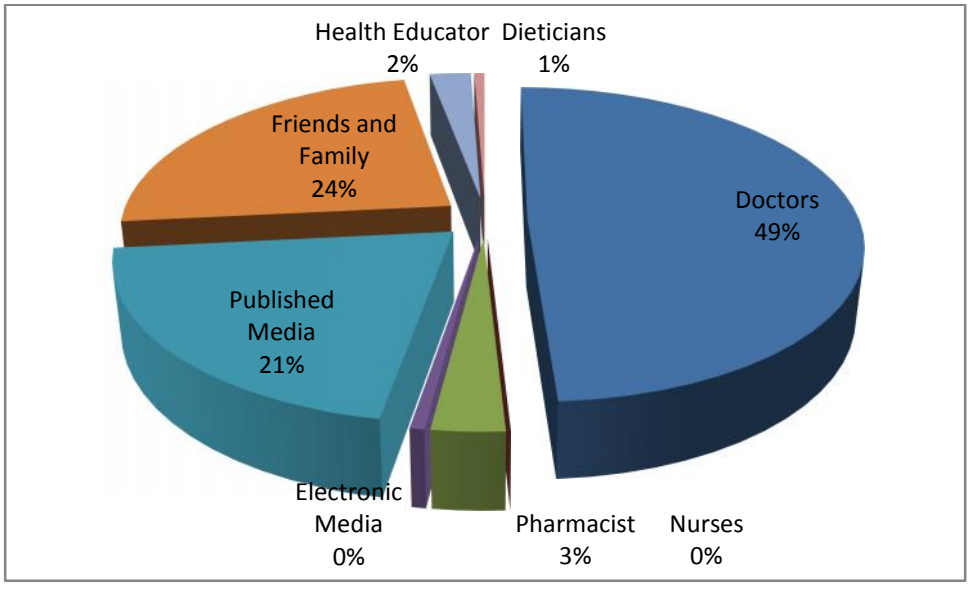

Fig4.22: Knowledge about Sources of Osteoporosis

Among the participants 49% had known about osteoporosis from doctors, 24% from friends and family, 21% from published media, 3% from pharmacist and so on.

4.23 Knowledge about bones are living tissue that need physical activity to be healthy and happy

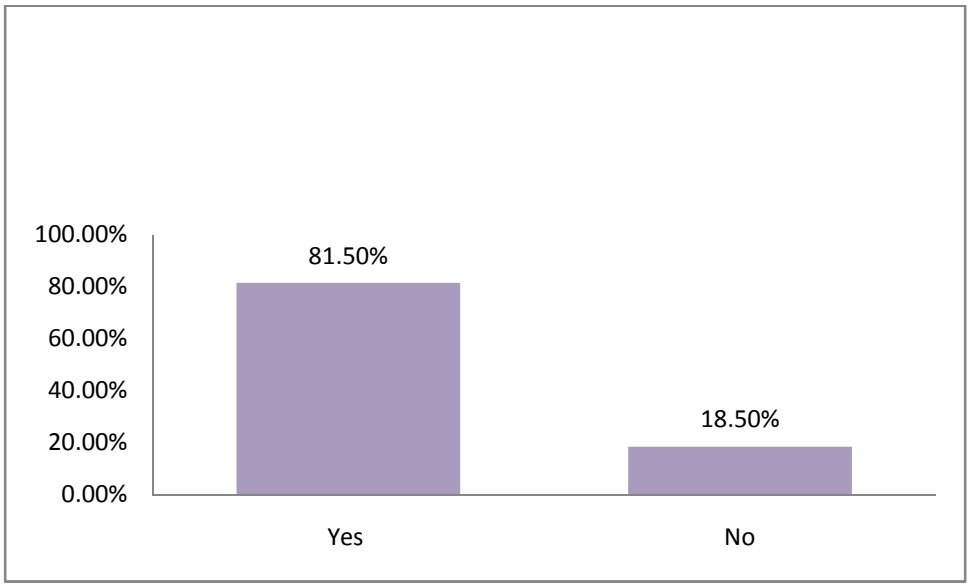

Fig4.23: Knowledge about bones are living tissue that need physical activity to be healthy and happy

Among the participants about 81.5% had this knowledge and 18.5% hadn't.

4.24 Knowledge about regular physical activity helps one's body use calcium more efficiently

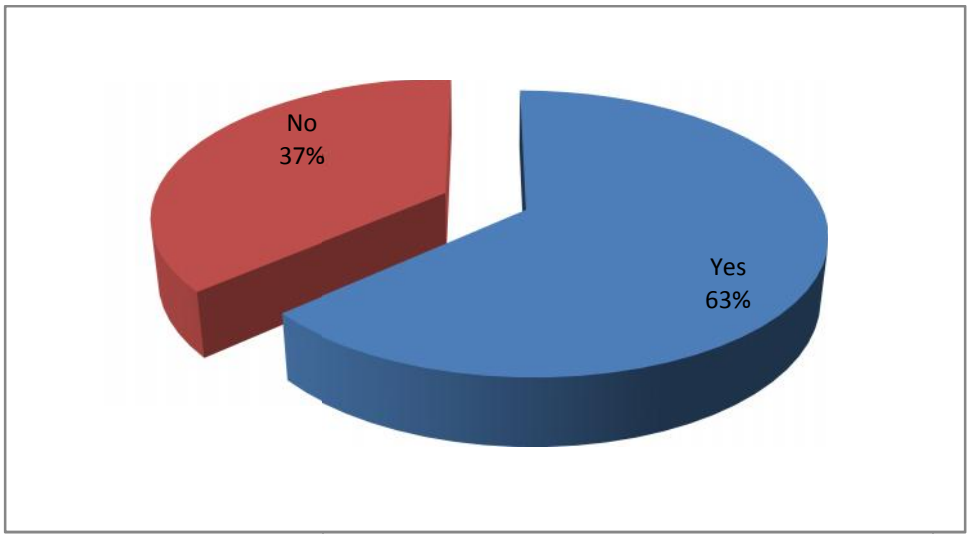

Fig4.24: Knowledge about regular physical activity helps one's body use calcium more efficiently

Among the participants about 64% had this knowledge and 37% hadn't.

4.25 Knowledge about physical activity can help keep from losing muscle when one's dieting

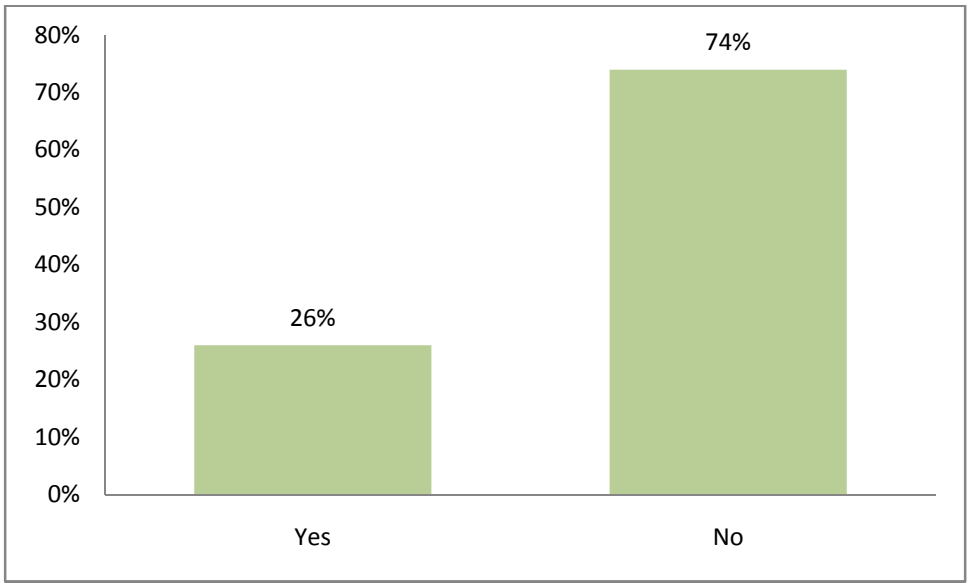

Fig4.25: Knowledge about physical activity can help keep from losing muscle when one's dieting

Among the participants about 26% had this knowledge and 74% hadn't.

4.26 Knowledge about that it is difficult to get calcium from vegetable alone

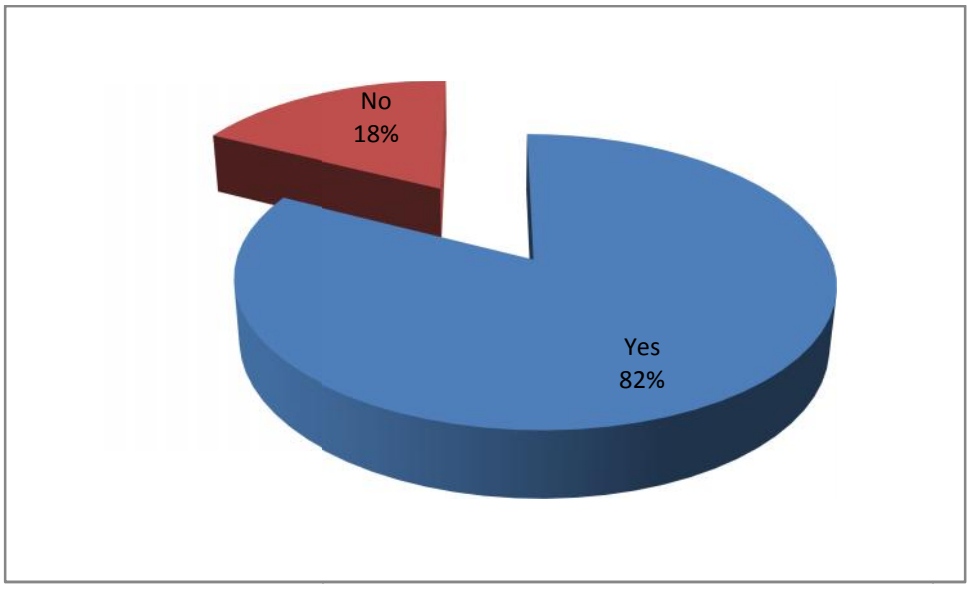

Fig4.26: Knowledge about that it is difficult to get calcium from vegetable alone

Among the participants about 82% had this knowledge and 18% hadn't.

4.27 Knowledge about adolescents need more calcium than age 6 child

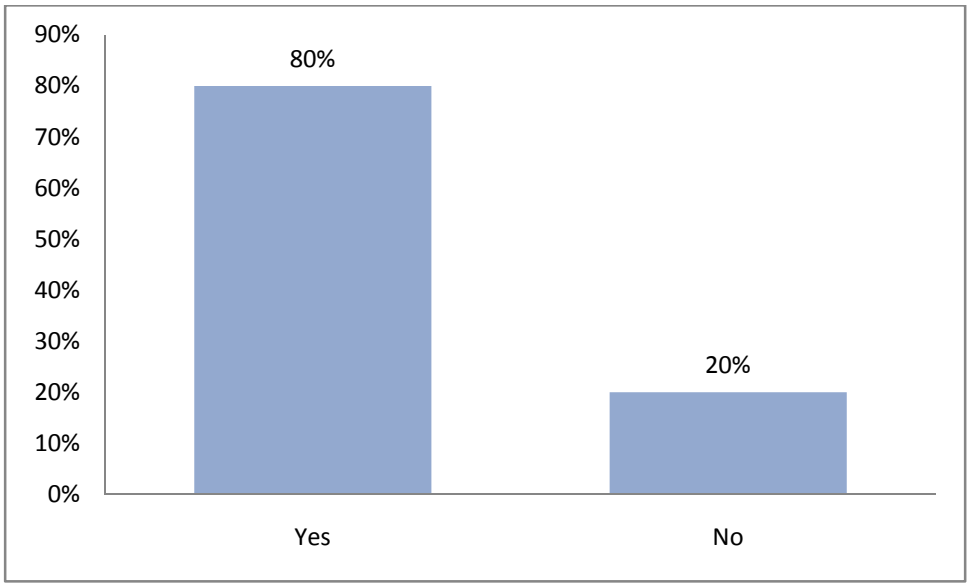

Fig4.27: Knowledge about adolescents needs more calcium than age 6 child

Among the participants about 80% had this knowledge and 20% hadn't.

4.28 Knowledge about drinking too much cola beverage can be harmful for bones

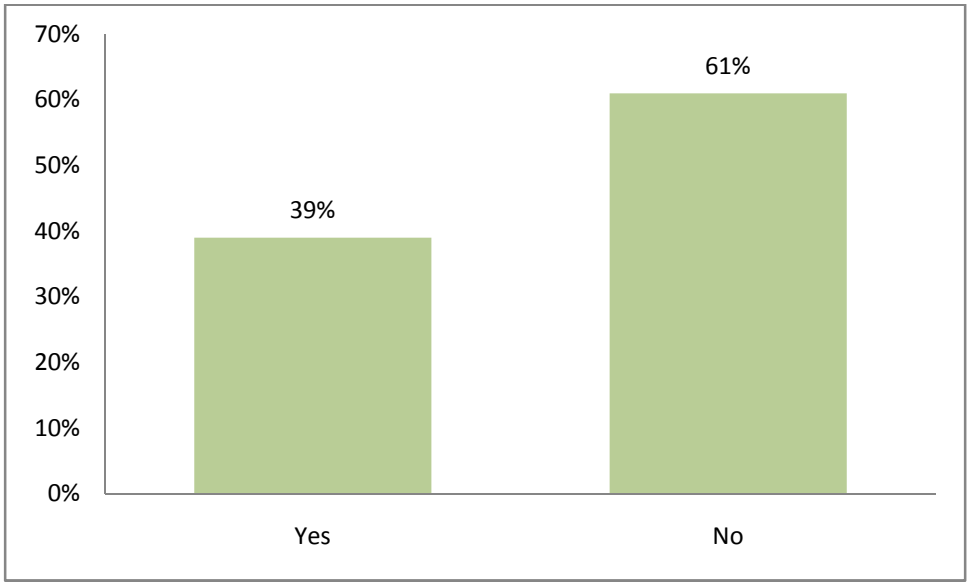

Fig4.28: Knowledge about drinking too much cola beverage can be harmful for bones

Among the participants about 39% had this knowledge and 61% hadn't.

4.29 Knowledge about drinking too much coffee can be harmful for bones

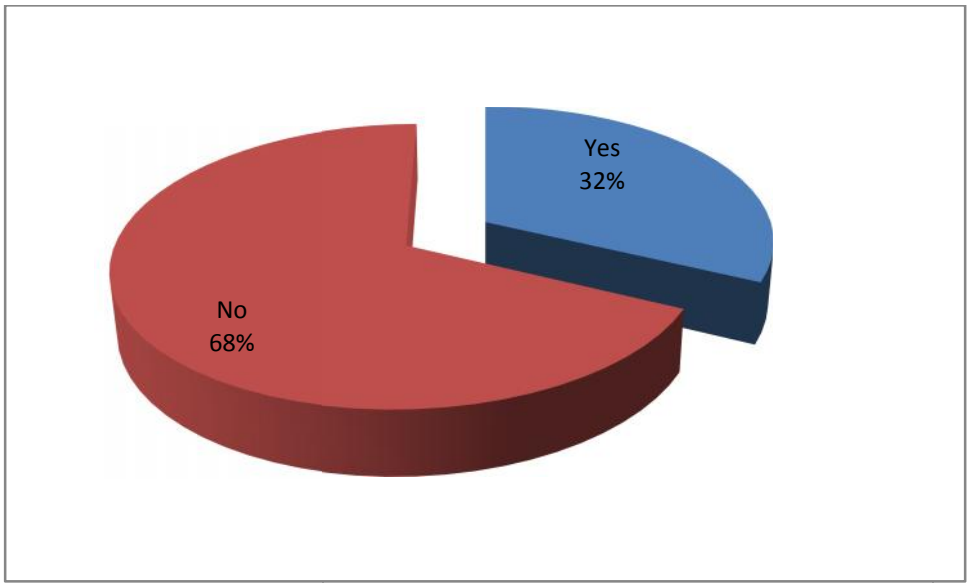

Fig4.29: Knowledge about drinking too much coffee can be harmful for bones

Among the participants about 32% had this knowledge and 68% hadn't.

4.30 Knowledge about cigarette smoking can lead to OP

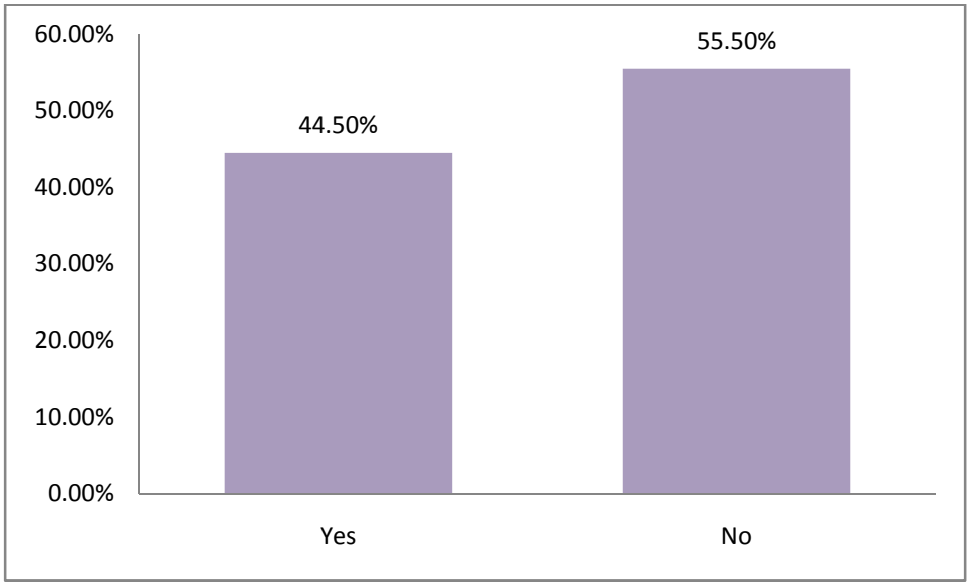

Fig4.30: Knowledge about cigarette smoking can lead to OP

Among the participants about 44.5% had this knowledge and 55.5% hadn't.

4.31 Knowledge about osteoporosis is preventable disease

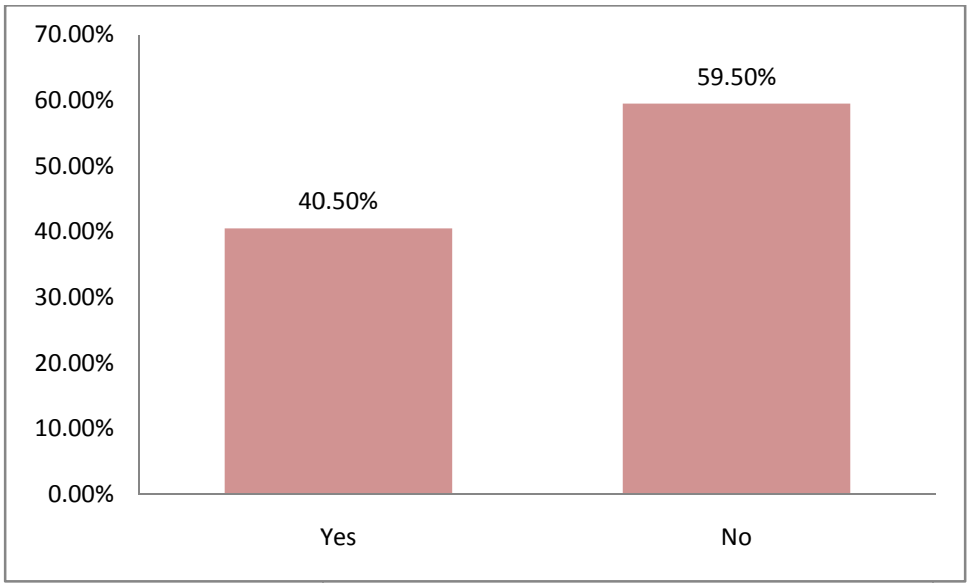

Fig4.31: Knowledge about osteoporosis is preventable disease

Among the participants about 40.5% had this knowledge and 59.5% hadn't.

4.32 Knowledge about the Risk Factors of Osteoporosis

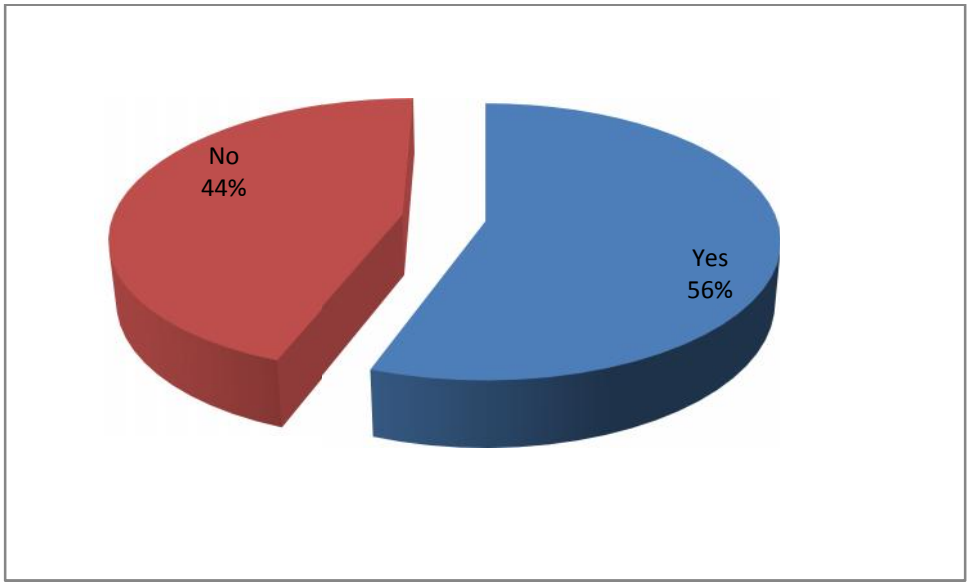

Fig4.32: Knowledge about the Risk Factors of Osteoporosis

Among the participants about 56% had the knowledge about the risk factors of osteoporosis and 44% hadn't.

4.32.1 Knowledge about Uncontrollable risk factor

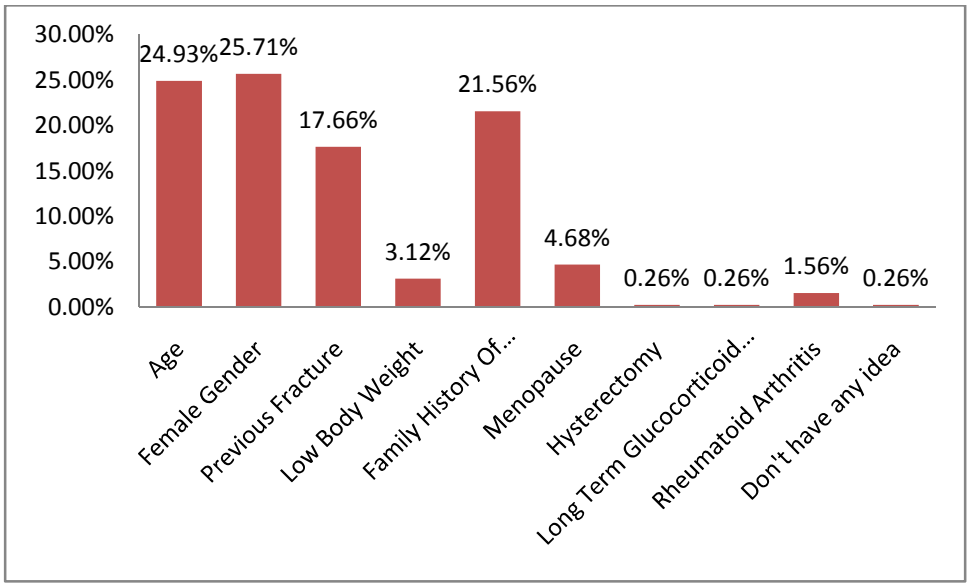

Fig4.32.1: Knowledge about Uncontrollable risk factor

In this survey it was seen that among the uncontrollable risk factors most of the patients had selected age and female gender as the uncontrollable risk factor among all the others.

4.32.2 Knowledge about disorders that effect the skeleton

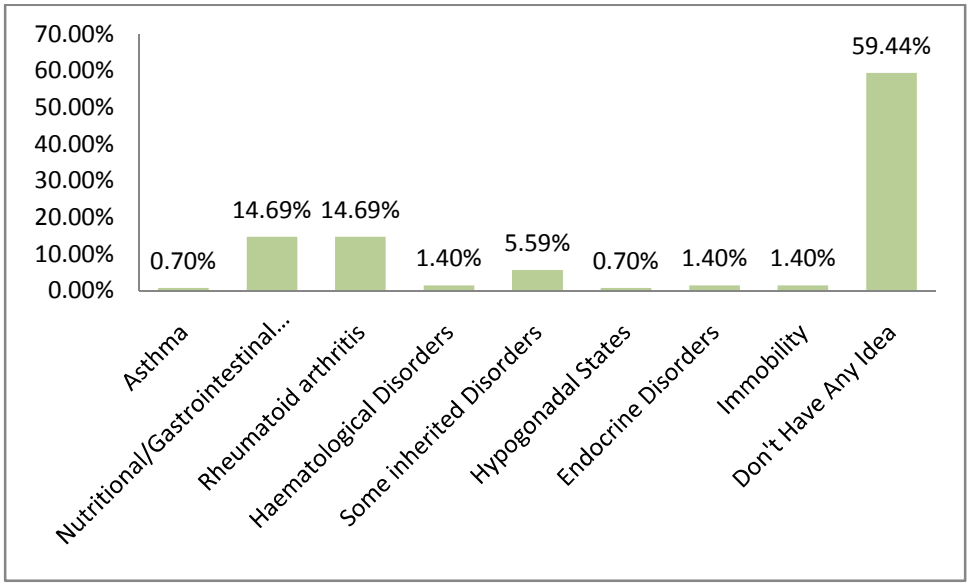

Fig4.32.2: Knowledge about disorders that effect the skeleton

Among the populations most of them round 59.44% did not have any idea about the disorders that affect the skeleton.

4.32.3 Knowledge about medical treatment affecting bone health

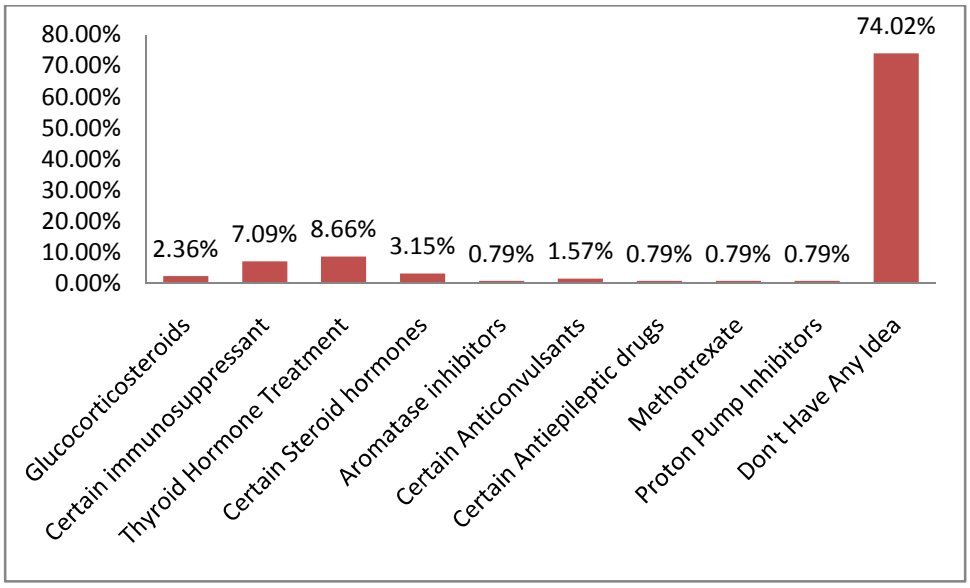

Fig4.32.3: Knowledge about medical treatment affecting bone health

It was seen that most of the patients (74.02%) did not have any idea about the medical treatment that can affect the bone health.

4.32.4 Knowledge about controllable risk factor

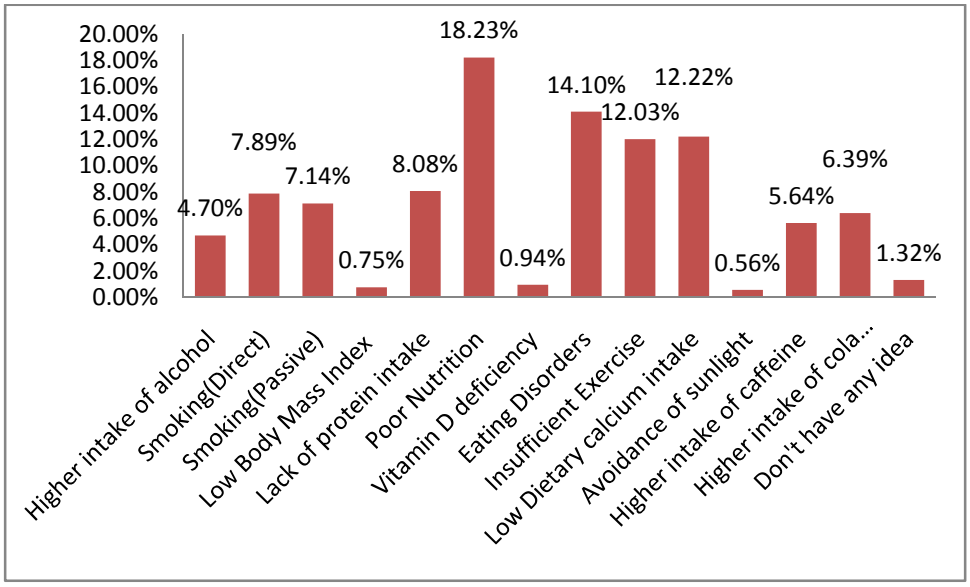

Fig4.32.4: Knowledge about controllable risk factor

Among all the patients 18.23% thought that poor nutrition is the controllable risk factor for osteoporosis, 14.10% thought eating disorder, 12.22% thought low dietary calcium intake and 1.32% didn't have any idea about the controllable risk factor.

4.33 Knowledge about osteoporosis sign and symptoms

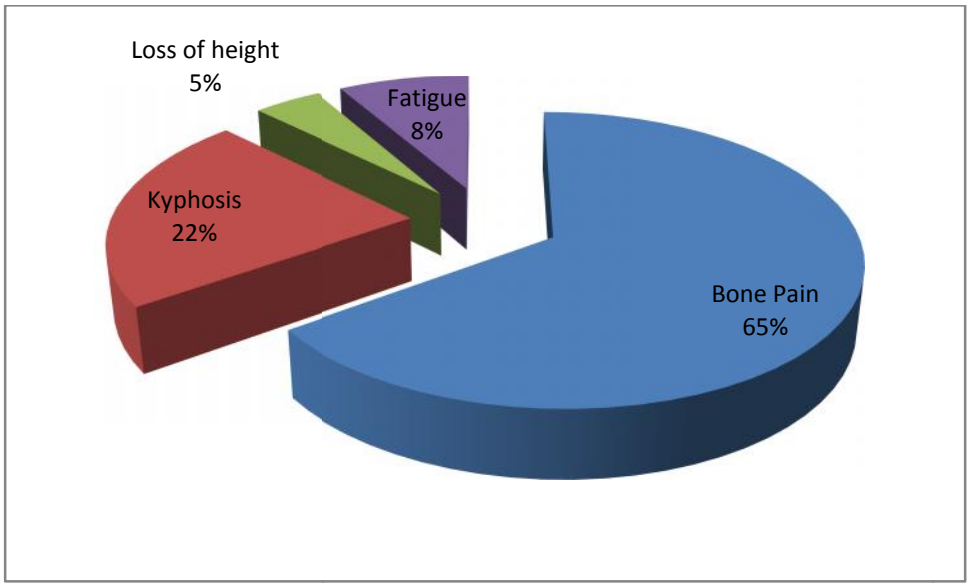

Fig4.33: Knowledge about osteoporosis sign and symptoms

Among the populations 65% picked up bone pain as the sign and symptoms of osteoporosis, about 22% picked up kyphosis and the rest picked up loss of height (5%) and fatigue (8%).

4.34 Knowledge about complications of osteoporosis

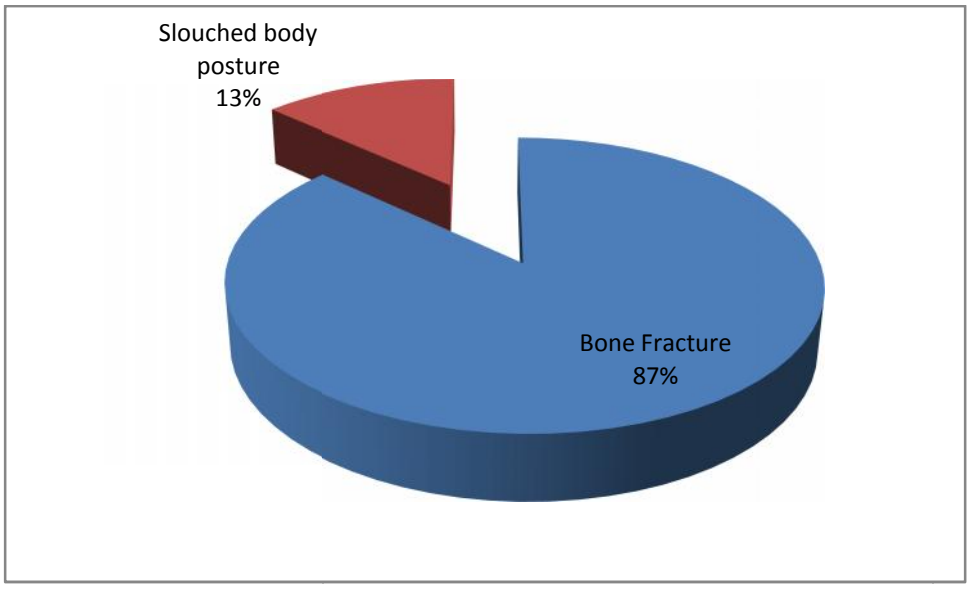

Fig4.34: Knowledge about complications of osteoporosis

Among the populations 87% thought bone pain as the major complication of osteoporosis.

4.35 Thinking of inactivity can prevent the disease

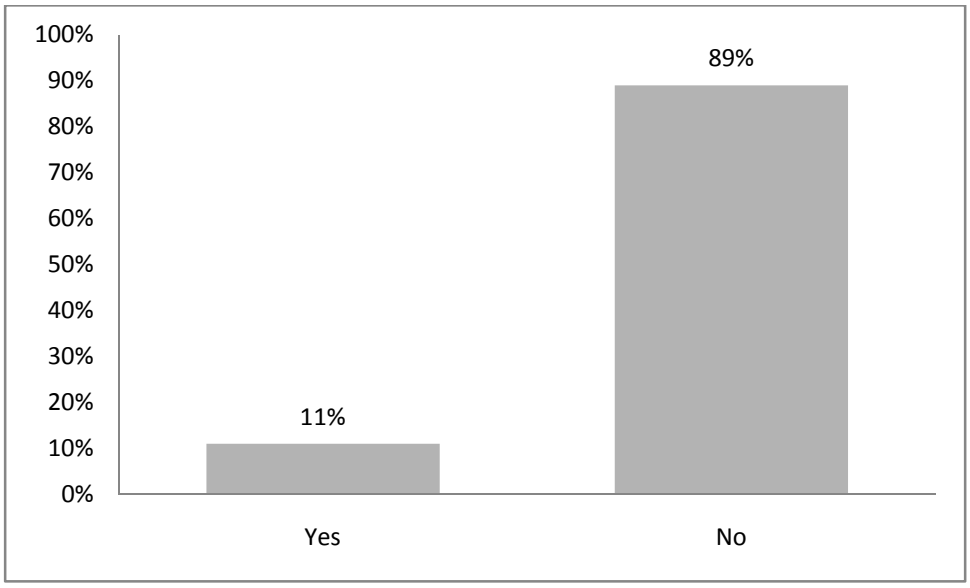

Fig4.35: Thinking of inactivity can prevent the disease

Among the population 89% thought inactivity can't prevent osteoporosis.

4.36 Thinking of shopping can be an exercise for OP

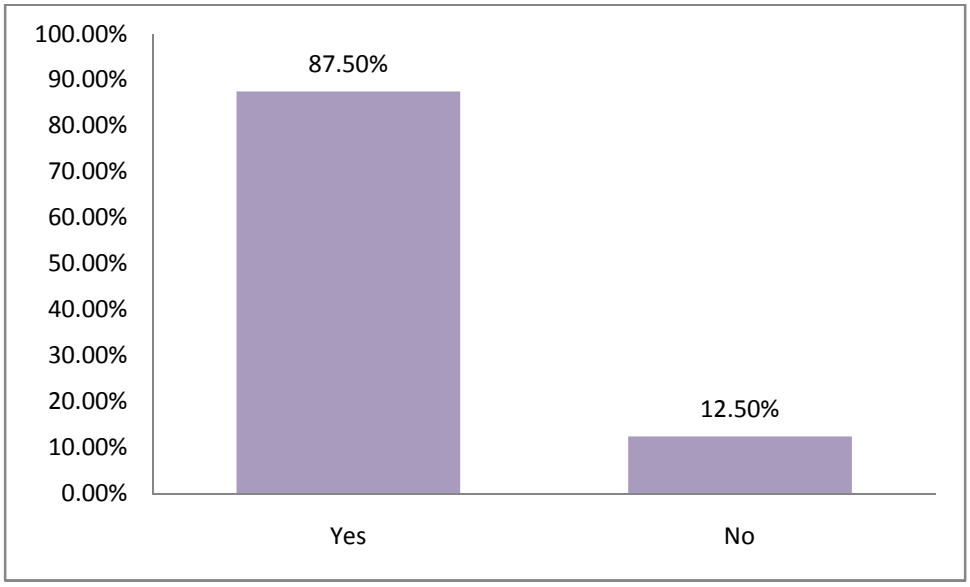

Fig4.36: Thinking of shopping can be an exercise for OP

Among the women 87.5% marked shopping as an exercise for osteoporosis.

4.37 Knowledge about tools that can prevent Osteoporosis

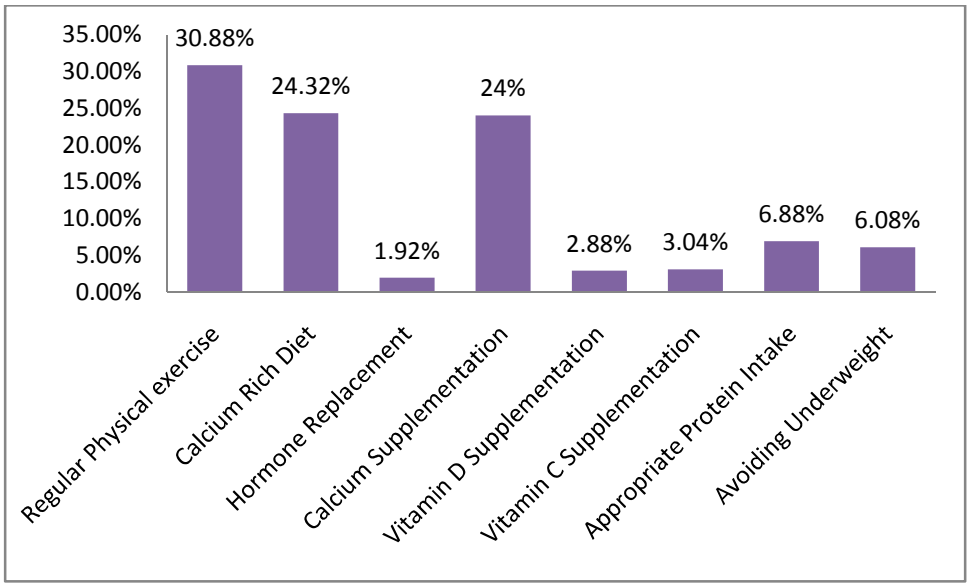

Fig4.37: Knowledge about tools that can prevent Osteoporosis

Among the population 30.88% thought that regular physical exercise is the main tool that can prevent osteoporosis, about 24% thought the calcium supplement as tool.

4.38.1 Preventive measure of direct exposure to sunlight for more than 30 minutes a week

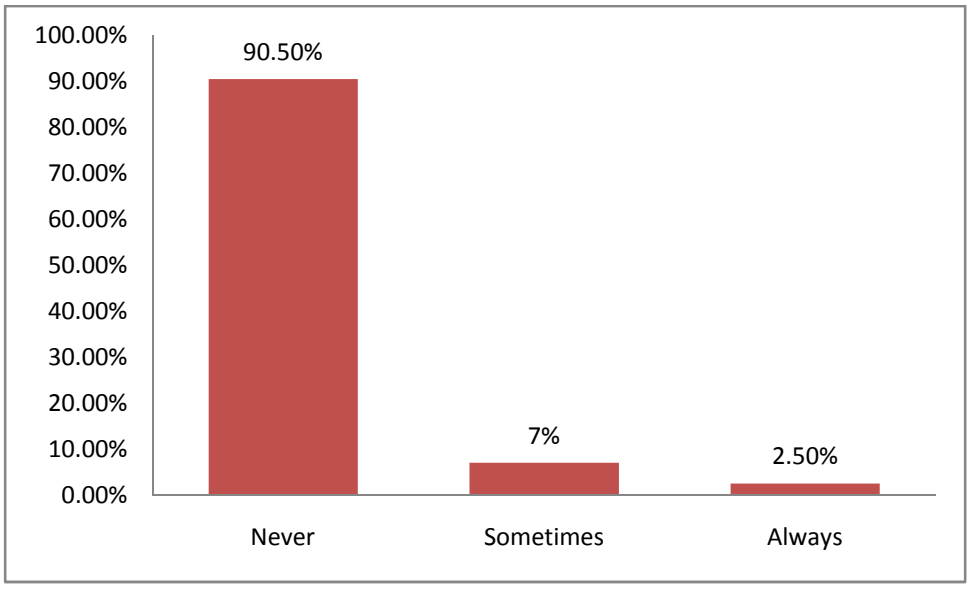

Fig4.38.1: Preventive measure of direct exposure to sunlight for more than 30 minutes a week

Most of the participants about 90.5% never took this preventive measure.

4.38.2 Preventive measure of Reading materials about OP

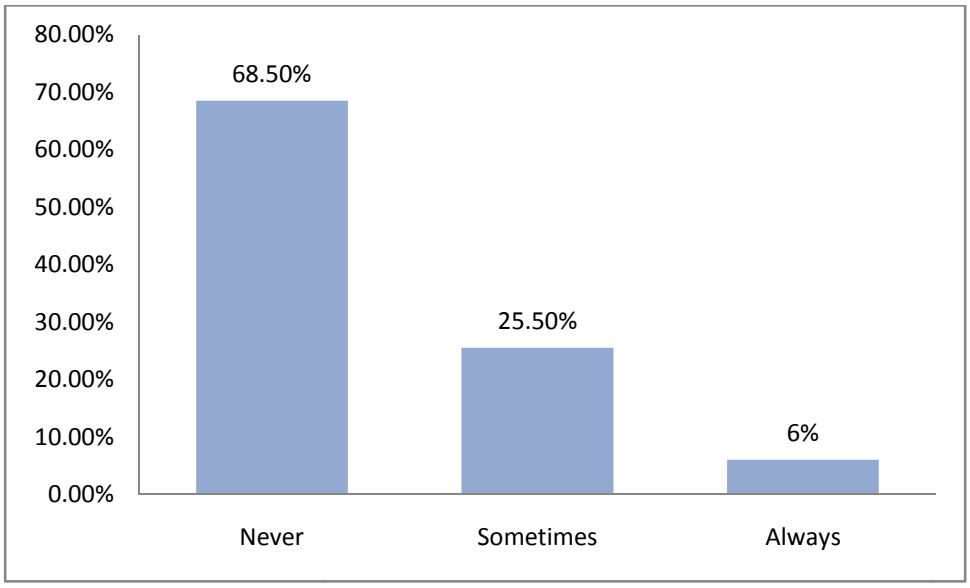

Fig4.38.2: Preventive measure of Reading materials about OP

Most of the participants about 68.5% never took this preventive measure.

4.38.3 Preventive measure of checking bone mass density

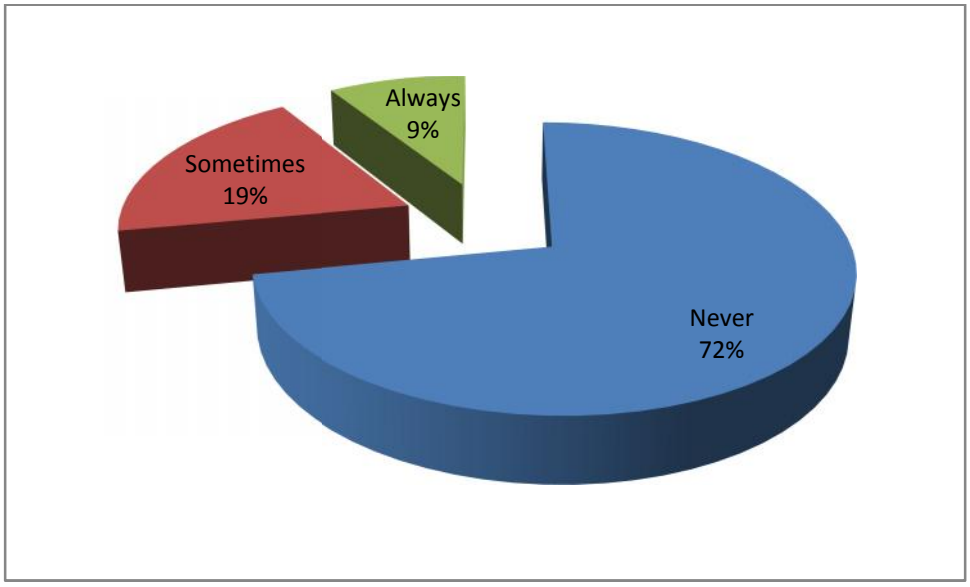

Fig4.38.3: Preventive measure of checking bone mass density

Most of the participants about 72% never took this preventive measure.

4.38.4 Preventive measure of Adequate calcium consumption (>1200mg/day)

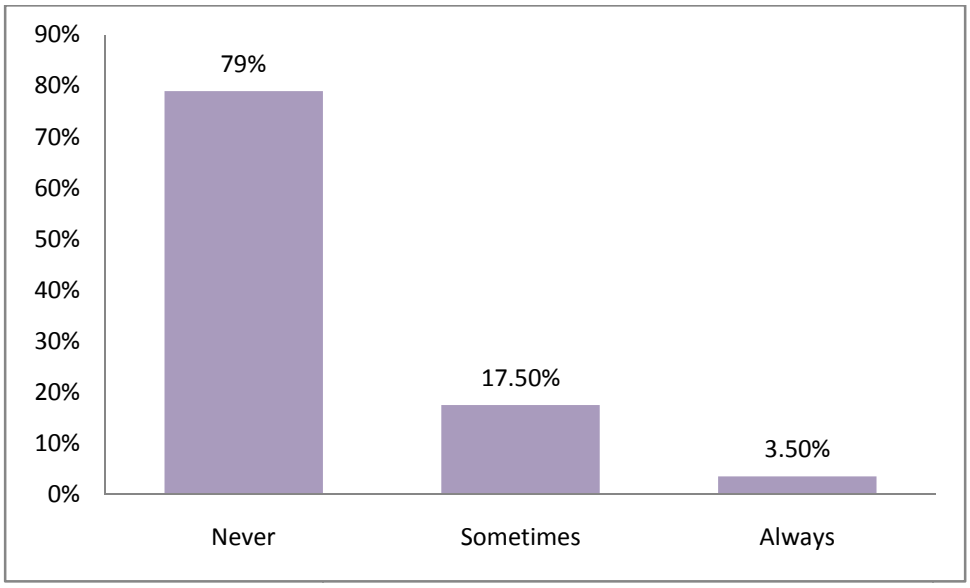

Fig4.38.4: Preventive measure of Adequate calcium consumption (>1200mg/day)

Most of the participants about 79% never took this preventive measure.

4.38.5 Preventive measure of adequate osteoporosis exercise (>90minutes /week)

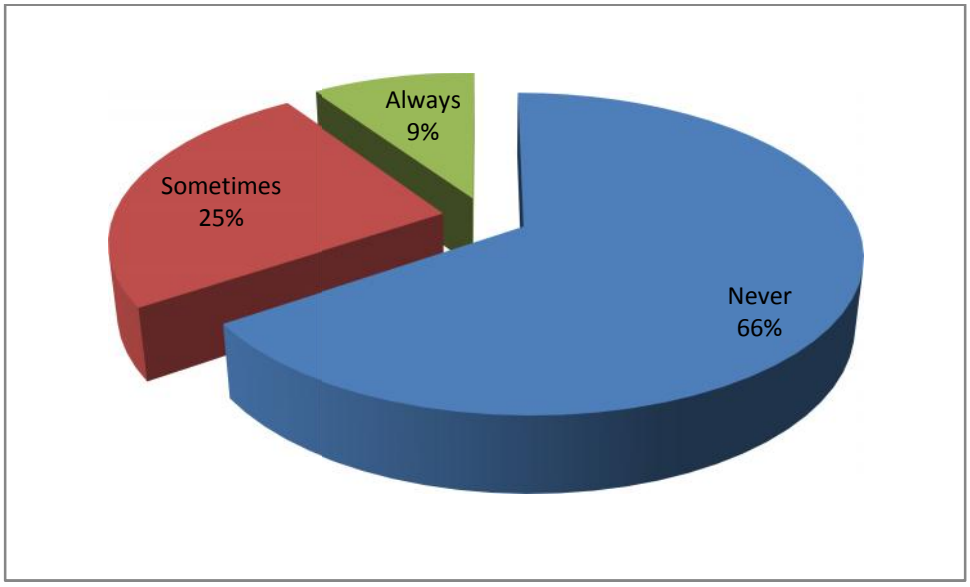

Fig4.38.5: Preventive measure of adequate osteoporosis exercise (>90minutes /week)

Most of the participants about 66% never took this preventive measure.

4.38.6 Preventive measure of ensuring appropriate intake of protein

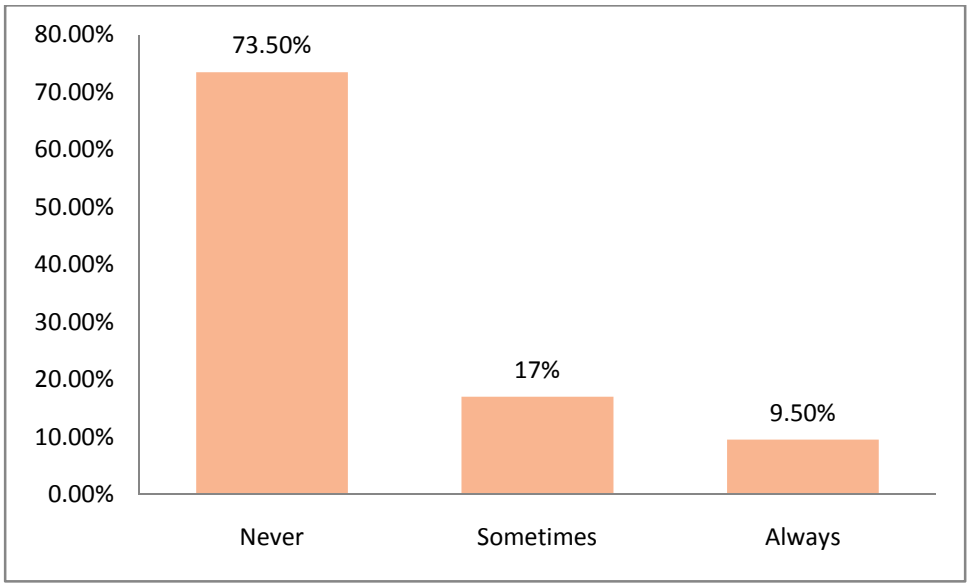

Fig4.38.6: Preventive measure of ensuring appropriate intake of protein

Most of the participants about 73.5% never took this preventive measure.

4.38.7 Preventive measure of appropriate supply of vit C

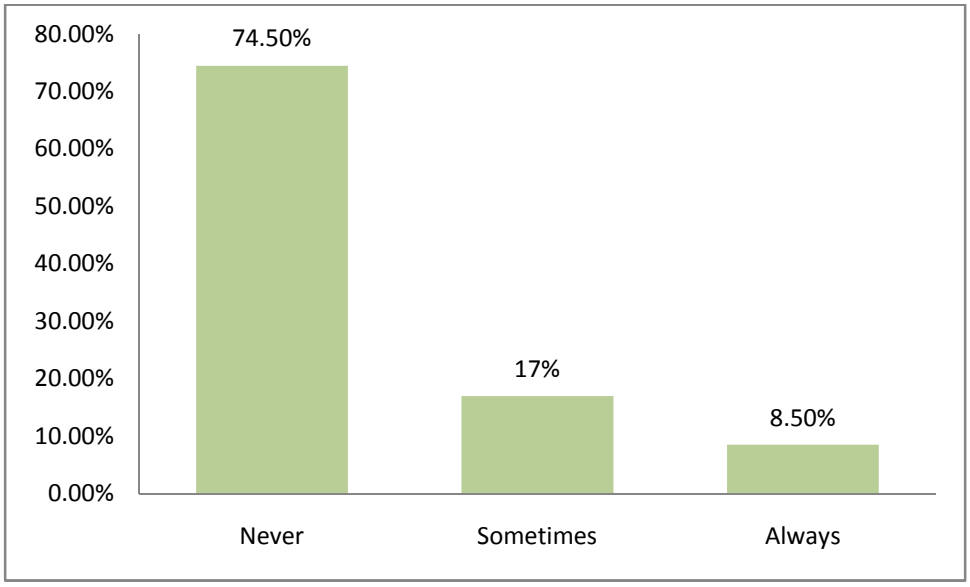

Fig4.38.7: Preventive measure of appropriate supply of vit C

Most of the participants about 74.5% never took this preventive measure.

4.38.8 Preventive measure of appropriate supply of Vit D

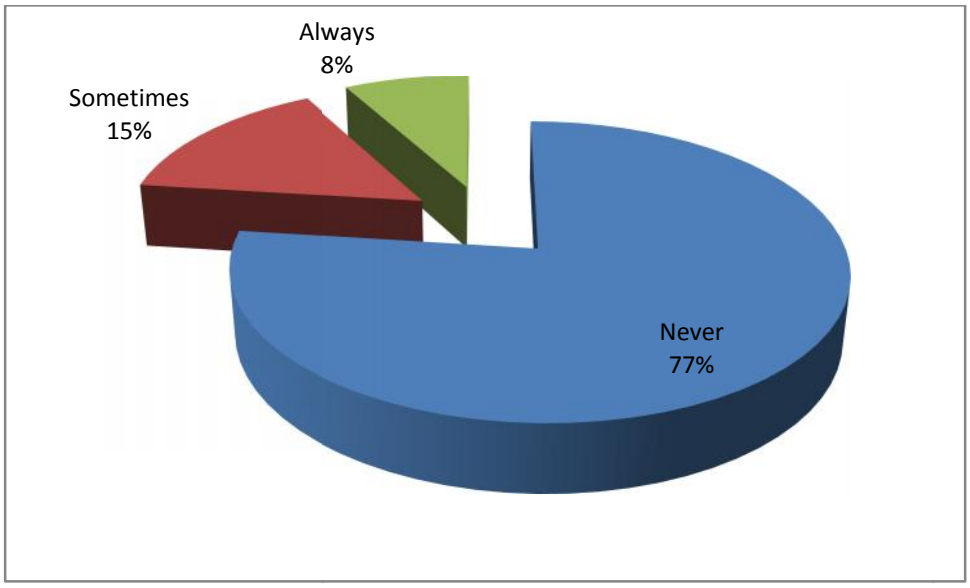

Fig4.38.8: Preventive measure of appropriate supply of Vit D

Most of the participants about 77% never took this preventive measure.

4.38.9 Preventive measure of doing reasonable physical activity

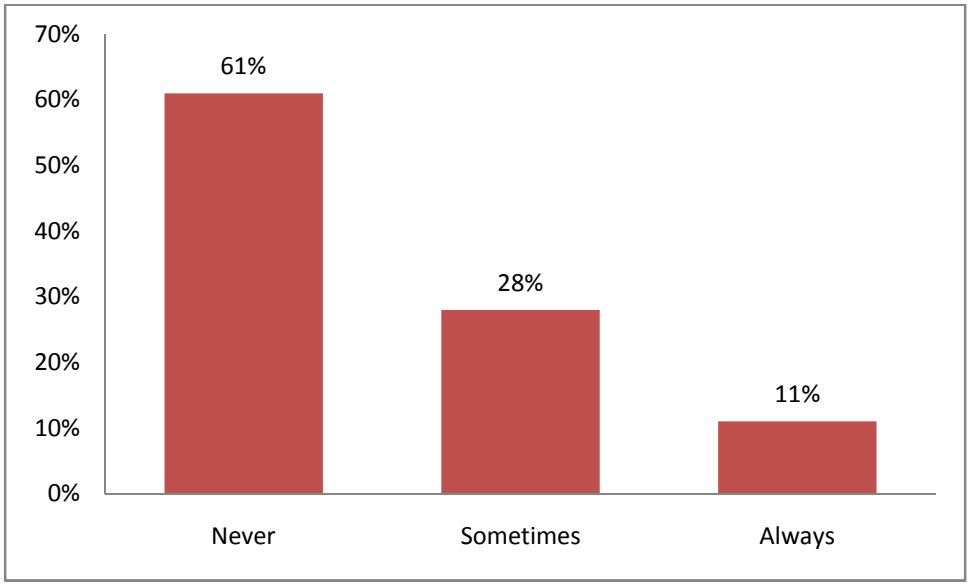

Fig4.38.9: Preventive measure of doing reasonable physical activity

Most of the participants about 61% never took this preventive measure.

4.39 Frequency of Discussion about Osteoporosis with Family

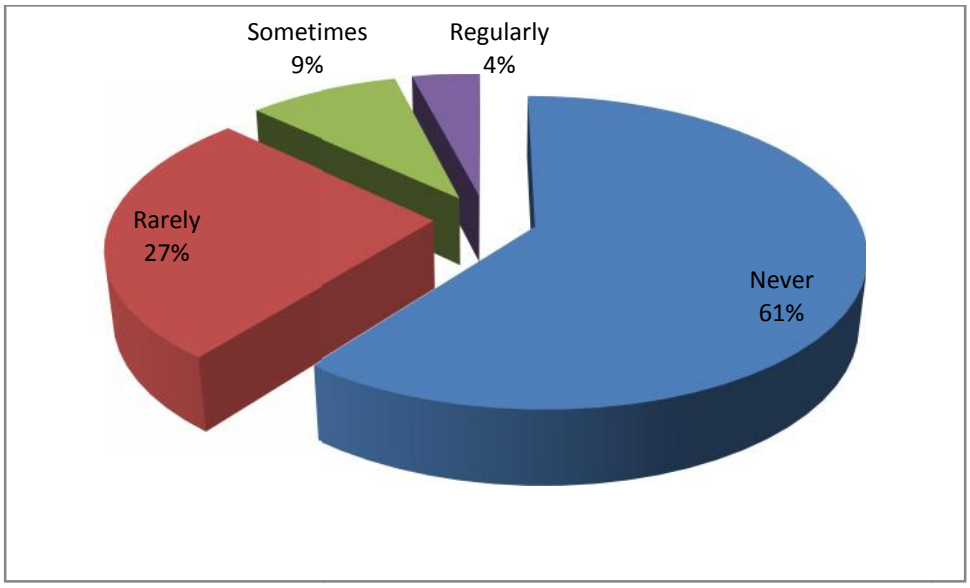

Fig4.39: Frequency of Discussion about Osteoporosis with Family

Among the populations majority of them around 61% never discussed, about 27% discussed rarely, about 9% discussed sometimes about osteoporosis with their families, only 2% discussed regularly.

4.40 Frequency of Discussion about Osteoporosis with healthcare professional

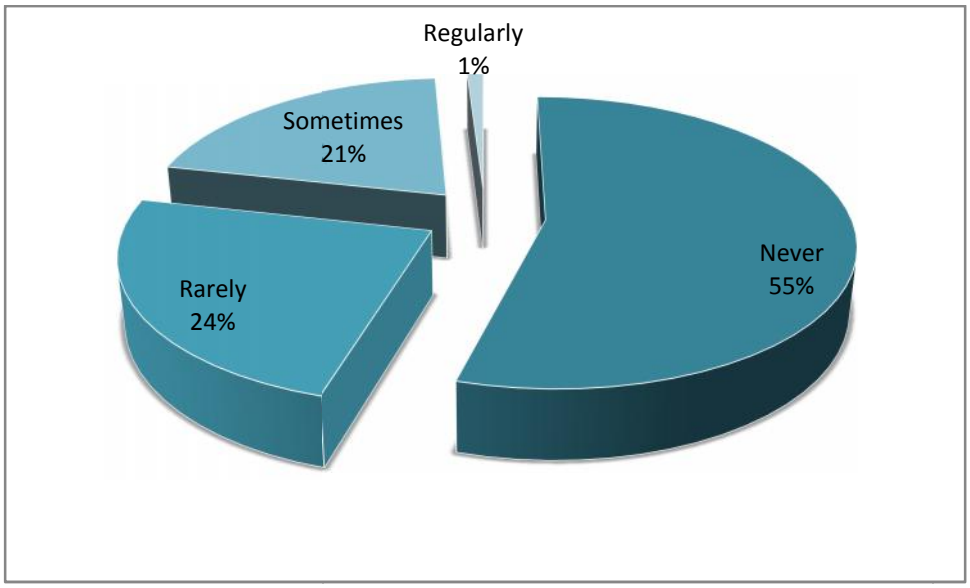

Fig4.40: Frequency of Discussion about Osteoporosis with healthcare professional

Among the populations majority of them around 55% never discussed about osteoporosis with their health care professionals, only 1% discussed regularly.

4.41 Knowledge about diagnosis of osteoporosis

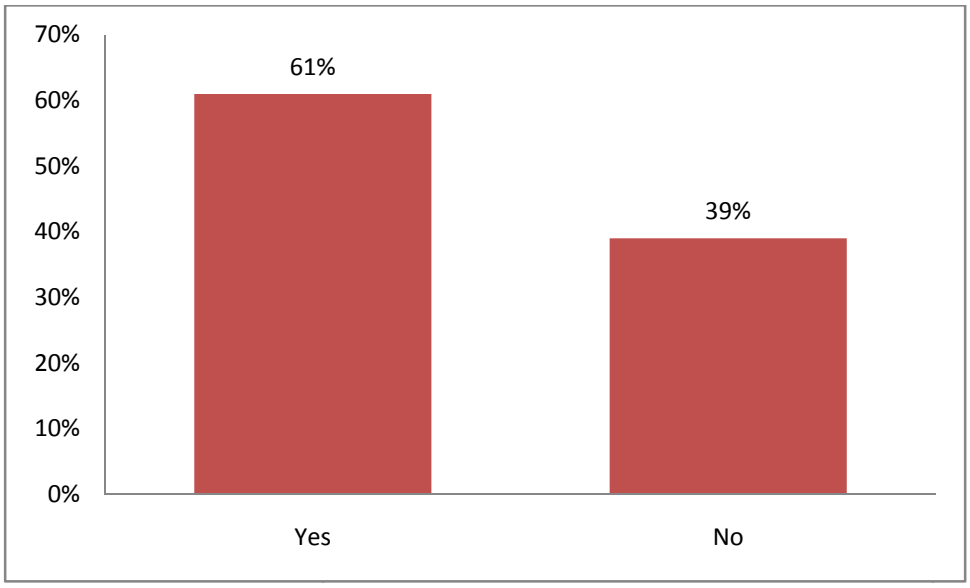

Fig4.41: Knowledge about diagnosis of osteoporosis

Among the populations 39% hadn't any knowledge about how osteoporosis can be diagnosed. About 61% had knowledge about diagnostic of osteoporosis.

4.42 Knowledge about diagnostic process of osteoporosis

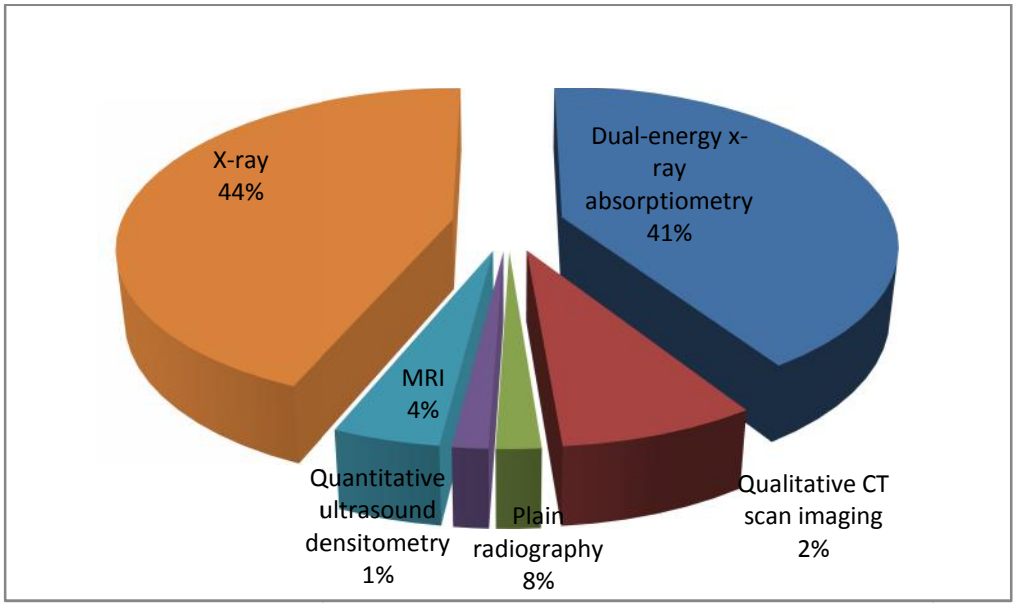

Fig4.42: Knowledge about diagnostic process of osteoporosis

Among the participants 44% selected X-ray and 41% selected dual energy X-ray absorptiometry as the diagnostic procedure of osteoporosis.

4.43 Percent of Populations Using Estrogen

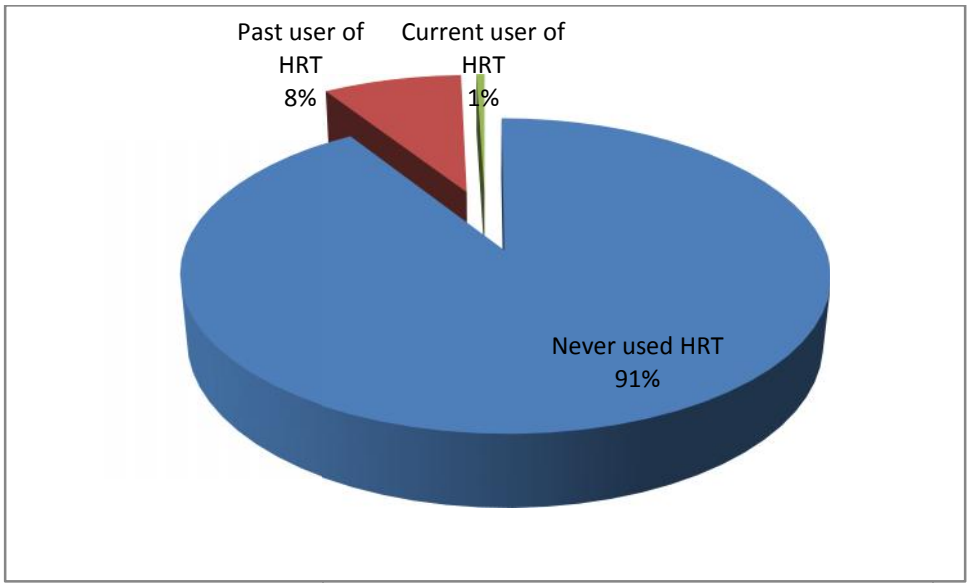

Fig4.43: HRT User

Among the populations 91% never used HRT, 8% were past users of HRT and only 1% is the current users of HRT.

4.44 Types of Medications Currently Used for Osteoporosis

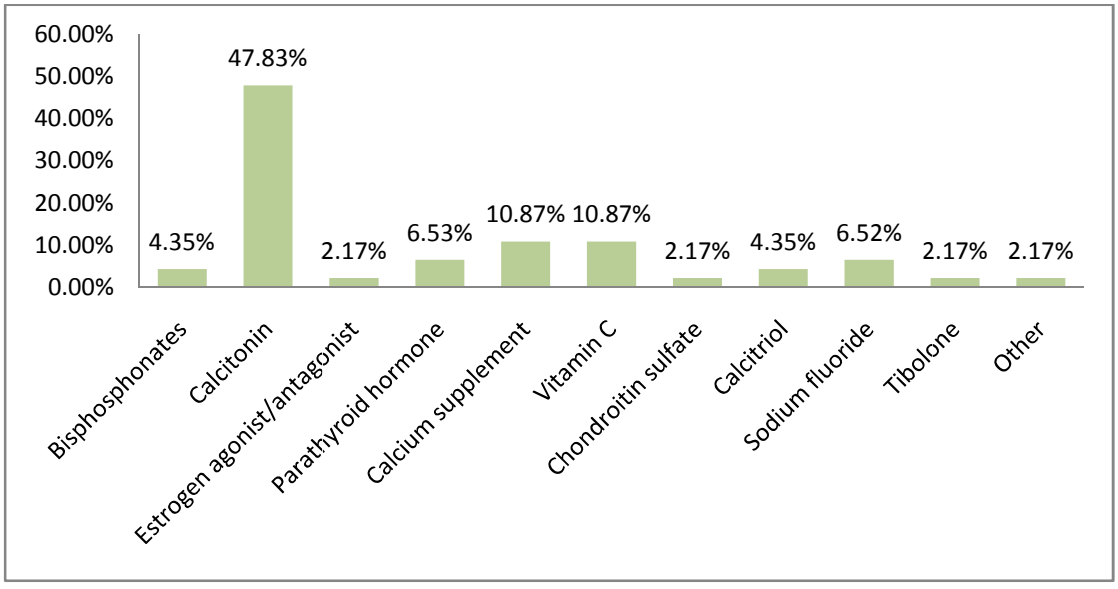

Fig4.44: Types of Medications Currently Used for Osteoporosis

Among the populations 47.83% were using calcitonin currently for osteoporosis, about 10.87% were using calcium supplements for osteoporosis and 4.35% were using bisphosphonates as osteoporosis medication.

4.45 Types of Medications Currently Used

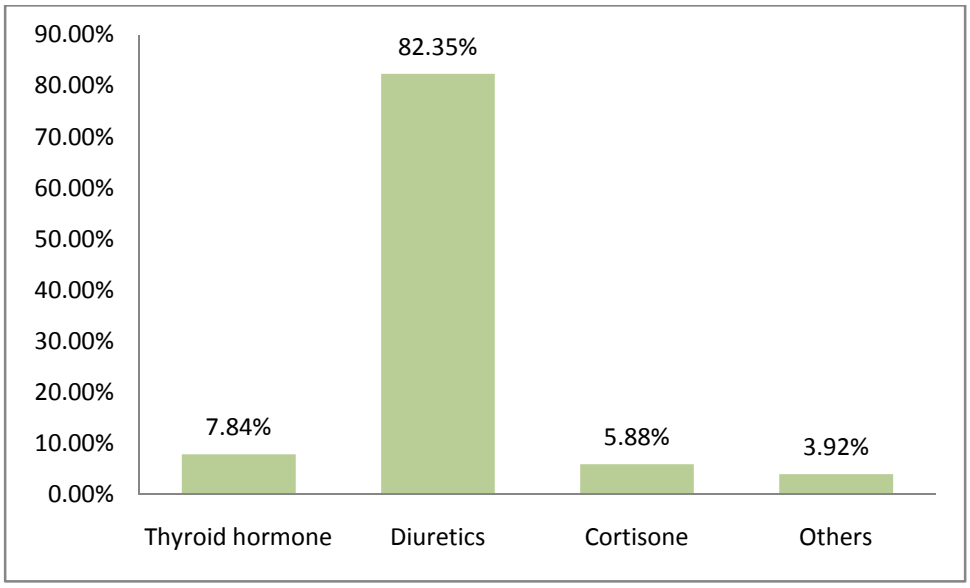

Fig4.45: Types of Medications Currently Used

Among the population 82.35% were using diuretics, about 7.84% were using thyroid hormone and about 5.88% were using cortisone.

CHAPTER FIVE

DISCUSSION

Discussion

Osteoporosis is the most common physiological disorder of elderly people mostly women in Bangladesh. Its incidence in Bangladesh has risen significantly and is expected to continue to rise sharply through the years. The basic level of osteoporosis knowledge of the population about diagnostic tools, screening, new approaches to prevention, early diagnosis, and treatment modalities is important for controlling osteoporosis particularly in elderly women. Fractures are major risk factors of osteoporosis. Early detection of fractures plays the leading role in reducing development rates of osteoporosis and improving the patient‘s prognosis. This study was performed on 200 working women. Among them majority (86.5%) completed graduation. Only few of them completed SSC (2.5%) , HSC (6.5%) and post graduation (4.5%).Most of them are private employee (73.5%) and 22% are govt. employee , only few of them (4.5%) do private business. .

Most of them are unaware of the basic knowledge of osteoporosis.38% of all the subjects said that they had no knowledge about osteoporosis even 97% did not know the types of osteoporosis, 44% people do not know the risk factors of osteoporosis, 61% do not know the diagnosis procedure and 74.02% do not know that some medical treatments can affect bone health.

Those who know about osteoporosis get their knowledge from various sources. The result of our study indicates that among the populations 49% get osteoporosis knowledge from doctors, 24% from friends and family, 21% from published media, 3% from pharmacists,2% from health educator and 1% from dieticians. This result signifies with the study result of Johnell which states that media is the main source of osteoporosis knowledge for the 57.69% of women in Majmaah city (Johnell et al., 2003).

Hip fractures are a major cause of morbidity and mortality in the older persons. The burden on healthcare providers is set to increase with improving life expectancy and an increasingly aging population. It is estimated that there will be a 100% projected increase in the number of hip fractures for Ireland by 2026. A greater number of subtrochanteric

hip fractures (10%) were reported in Ireland compared to the UK (6%)(Den Uyl et al., 2011). In our study 7% of patients had a history of hip fracture since age 45. It has known that half of hip fracture patients already had one or more fragility fractures like rib fracture, wrist fracture. To prevent hip fracture as well as osteoporosis calcium supplements and vitamin D combinations is a very effective one. It has been proved in the study result of (Sugi et al., 2012) which states that subjects who had used this combination have increased hip bone density 1.06% higher than the placebo users (Sugi et al., 2012). Our study result shows 15% of population is taking Vitamin D sometimes and 8% of population is taking regularly and 17.5% of population consume more than 1200 mg calcium sometimes and 3.5% consume always on a daily basis.

The most common medication that is used in osteoporosis is bisphosphonates and calcium supplements individually. A study was performed by Weeks and Beck among 2686 people (2037 men and 649 women) aged between 65-85 years and most of them around 54.9% use calcium supplements for osteoporosis (Weeks and Beck, 2010).

Moreover in another study of (Peters et al., 2009) bisphosphonates found as the most common useful medication for osteoporotic patients without increasing the risk of atrial fibrillation and flutter (Peters et al., 2009). This result signifies with our study result as 4.35% population using bisphosphonate, 10.87% population use calcium supplements and 47.83% use calcitonin for osteoporosis.

Physical activity helps maintain mobility, physical functioning, bone mineral density (BMD), muscle strength, balance and, therefore, may help prevent falls and fractures among the elderly. Moderate-to-vigorous physical activity is associated with a hip fracture and osteoporosis risk reduction of 45% and 38% respectively, among men and women (Farhat and Cauley, 2008). In our study 61% population had never done any physical activity for the prevention of osteoporosis, 28% do sometimes and 11% of study of population is always associated with the physical activity.

A study was performed by Chen, Wong et al. (2014) where the majority of participants were concerned about osteoporosis with 71% being either very or somewhat concerned about the disease. However in our study 28.5% participants are concerned about osteoporosis and 71.5% did not necessarily concern about it. (Chen et al., 2014).

Smoking is a major cause of hip fracture. It increases the lifetime risk by about half, from an estimated 12% to 19% in women up to the age of 85, and from 22% to 37% to the age of 90. Of all hip fractures, one in eight is attributable to smoking. The effect of smoking on bone mineral density increases cumulatively with age (Fournier et al., 1997). In our study 44.5% of populations think that cigarette smoking can lead to osteoporosis and 55.5% do not think it.

CHAPTER SIX

CONCLUSION

Conclusion

In conclusion, the results of present study revealed low levels of awareness regarding osteoporosis risk factors, early warning signs, its screening and therapeutic approaches among a relatively large sample of working women who are at a high risk. It had been found that the knowledge about osteoporosis is very low among the educated women also. They are even unaware about the term osteoporosis. The most known method of osteoporosis screening among participants was X-ray. Due to their educational lacking, unconsciously they remain inactive to reduce bone pain rather than practicing physical activities. These findings emphasis on raising awareness about osteoporosis among Bangladeshi working women as an effective way to overcome a challenging physiological disorder. Awareness would lead to early detection and reduce the stage of diagnosis, potentially identify the tools that can prevent osteoporosis. Accordingly, relevant educational programs to improve the knowledge level of women regarding osteoporosis are needed. Efforts should be made by government and non-governmental agencies to improve osteoporosis knowledge among them.

CHAPTER SEVEN

REFERANCE

REFERENCE

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