Comparative Study of Impact of Food Habits and Life Style in Normal Healthy and Osteoporosed Population of Dhanbad Town

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Abstract

Introduction
Osteoporosis is a bone related condition in which there are structural changes in the lattice work of bone, it becomes porous and weak and bone fractures or there is risk of fractures. Certain modifiable factors like inadequate calcium intake in diet, sedentary life style, taking high dose of alcohol, smoking also play important roles in developing osteoporosis which are controllable.
Aims and objectives: A comparative study was done to know impact of food habits and lifestyle of normal healthy people and osteoporosed people.
Material and methods: Two hundred subjects of Dhanbad town whose age range was in between 30 to 70 years, were selected for the study, out of which one hundred were normal healthy respondents and another one hundred osteoporosed respondents of both sexes. The study was conducted through BMD machine based on T score as per WHO criteria.
A fixed set of questionnaires regarding their calcium rich diets, physical activities and exercise habit, alcohol intake, smoking, were asked to all the respondents groups and recorded in the data sheet and the and results were analyzed.
Results: Percentage of non-vegetarians were very high both in normal persons and osteoporosed respondents. In osteoporosed group 60% males respondents and 66% females respondents were not taking calcium rich diet. 86 % males and 62 % females in normal healthy respondent groups were found doing aerobic exercise on daily basis or on most of the days. while in osteoporosed groups respondent 70% males and same 70% females were of sedentary habit. None of the females respondents both in normal and osteoporosed groups, were indulged in alcohol intake. In osteoporosed respondents , only 8% males were taking alcohol on daily basis. None of the females respondents, were smokers in either group. In osteoporosed male respondents, only 8% were smokers on regular daily basis.
Conclusion: There is definite impacts of food habits, and life style on osteoporosis. Adequate amount of calcium rich diet intake and role of exercise play an important role on good health while inadequate amount of calcium rich diet and sedentary life style is definitely related to osteoporosis.

Keywords: Bone Mineral Density(BMD), Osteoporosis, T- score, WHO,

1.Introduction

Osteoporosis is a bone related and age related disease that affects many millions of people around the world. There is thinning and weakening of the bones in this disease that may lead to fractures of the bones even with minimum force. Osteoporosis is also called **Silent disease or silent killer disease** as it slowly makes the bone brittle and leads to fracture in which aged individual may die due to its complications. According to WHO, Osteoporosis is the second most common disease in the world coming next to the Cardiovascular disease. It is a major public health threat as it is related with high incidence of fracture.
There are several risk factors contributing to the disease. Some of these are non modifiable e.g. Gene (genetics), race, gender, age; while some risk factors like Behavioral and Environmental are modifiable.[1.]

Food habits and lifestyle of an individual have impact on causation of osteoporosis. **The important modifiable or influence-able risk factors** are ; **Dietary causes- lack of calcium rich diet, excessive use of alcohol, excessive cigarette smoking and sedentary life style**.

Reiner Bartl, Bertha Frisch; 2009, [2]are of the opinion that Peak bone mass is an investment for a healthier life. The period of growth before the 30 years provide the maximal opportunities for building the peak bone mass, 60-80 % of which is determined by genetic factors, the remaining 20-40 % by other determinants such as nutrition and exercise.

In a study by EMC Lau, J Woo, Hong Kong concluded that the main risk factors for osteoporotic fracture in the Hong Kong Chinese population include a low dietary calcium intake, an inactive lifestyle, smoking, and frequent falls.[3]

Heary RP. 2000, Studied about calcium, dairy products and concluded : Higher calcium intakes have been related to higher bone mass in children, young adults, and post –menopausal women in 64 of 86 observational epidemiological studies.[4]
In an another meta analysis by Kanis JA etal 1997; concluded that smoking was associated with a significant increased risk of any fracture compared with non- smokers.[5]
In an article by Jeanie Lerche Davis WebMD Feature ,reviewed by Brunilda Nazario, MD:[6]:Calcium is an essential nutrient for healthy bones, and alcohol is its enemy. "Alcohol has multiple effects on calcium," says Primal Kaur, MD, an osteoporosis specialist at Temple University Health System in Philadelphia. "The bones deteriorate because not enough calcium is getting into bones -- and the body is leaching it away from bones."

Economic Burden of osteoporosis:-

Fractures related to osteoporosis are a major public health problem in all developed countries, and are estimated to affect up to **30% of women** and **12 % of men** at some time at their life.

Osteoporosis causes huge economic burden to individual as well as on the Health care of the country.

Gullberg B, Johnell O, Kanis JA,[7] have projected that by 2050, the worldwide incidence of hip fracture in men is projected to increase by 310% in women and 240% in men. The estimated number of hip fractures worldwide will rise from 1.66 million in 1990 to 6.26 million in 2050.

Methods for measuring Bone Mineral Density (BMD)

Measuring the bone density is the only important tool in the early diagnosis of osteoporosis.

The cheaper and portable tool, BMD machine, which is based on ultrasound method was used to know the t score of the patients. It has been approved by the Food and Drug Administration of the United States as a technique for the screening and monitoring of treatment effects in osteoporotic patients.

It is the commonest used modality of measuring bone density as by Kraemer DF, [8].

The World Health Organization has defined the following categories based on bone density. It is expressed as standardized score called T-score, a number value that results from comparing ones bone density to optimal bone density. It is recorded on a piece of paper.

- Normal bone: T-score values greater than > -1 (Minus one)
- Low Bone Mass(Osteopenia): T-score values < -1 but $> -2 \cdot 5$
- Osteoporosis: T-score values less than $< -2 \cdot 5$
- (Osteoporosis is stated statistically as $2 \cdot 5$ standard deviations below the average.)

2. Aims and objectives

The life style and food habits play important roles for the bone health. Calcium rich diet, regular use of alcohol, smoking, physical exercise and activities play a vital role for the bone health.

Considering the above important modifiable factors, the **research study of Dhanbad Town** was selected to assess the impact of the food habits and life style in normal females and males, osteoporosed females and males based on T-score of the BMD test. The results of normal people and those of osteoporosed population was noted and compared.

The aims and objectives of the research was to :-

To assess the impact of food habits and lifestyle in normal healthy people and osteoporosed people. The research area was Dhanbad town of Jharkhand.

3. Hypothesis

The hypothesis was assumed on the basis of probable significant difference between the life style and food habits of normal person and osteoporosed person of Dhanbad town.

Good healthy life style is related to good food habits, intake of calcium rich balanced diet, exercise, no smoking, no alcohol.

Poor health life style leads to Osteoporosis and it is related to poor food habits, low intake calcium diet, sedentary habit and indulgence to alcohol, smoking.

4. Methodology

Followings were the details of the methodology for the research study:-

Sample- 200 subjects were selected for the study.

Sample area- all the subjects were selected from Dhanbad town.

Sample distribution- out of 200 samples, 100 were normal healthy subjects whose Bone Mineral Density (BMD) test result was within normal range, whose T-score values greater than > -1 (Minus one) and another 100 subjects whose BMD test result was showing osteoporosis (T-score values less than $< -2 \cdot 5$).

In normal healthy subjects (100), 50 subjects were males and another 50 subjects were females.

In osteoporosed subjects (100), 50 subjects were osteoporosed males and another 50 subjects were osteoporosed females.

Inclusion criteria:-

All the subjects were selected between the age range from 30 years to 75 years, mentally normal, belonging to Dhanbad town and living regularly for at least 10 years.

Exclusion Criteria:-

Subjects suffering from chronic diseases like cancer, hepatitis B, AIDS, Diabetes, appetite related disease, were not included for the research study.

Tools used for the research study:-

Personal Data Sheet was prepared, BMD machine was used to record of Bone Mineral Density Test(BMD) bases on t-score. The research was conducted on interview basis on a fixed set of questionnaires.

The study was conducted on a several different camps and occasions in the Out Patient Door (OPD) of **Central Hospital Dhanbad between the period 2014 to 2015** with permission to the concerned department.

QUESTIONNAIRES:-

All the respondents were asked a fixed set of questionnaires regarding their calcium rich food habits, alcohol use, smoking, life style and its frequency in a week

The answers of all the above **questionnaires** were **entered** in the data to analyze the association of life style, food habits of calcium rich diet, indulgence to alcohol, habit of smoking in causation of osteoporosis or their direct or indirect impact with good health and osteoporosis.

The answers of questionnaires were entered in the specified tables of the data sheet.
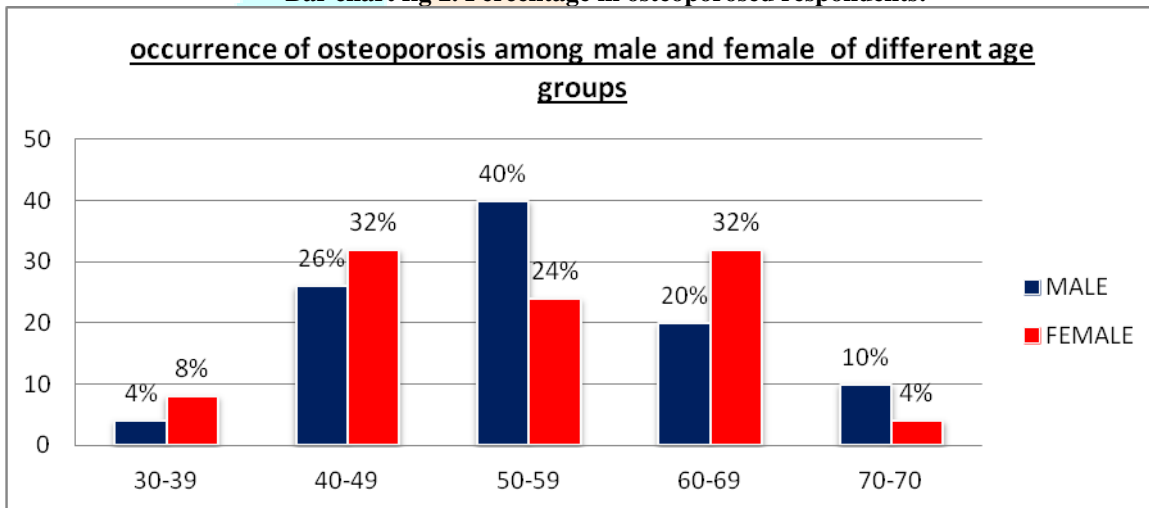
5. Results

The results were analyzed as per the data collected by the BMD machine and personal interview as per questionnaires and depicted in the bar chart, pie chart figures shown below.
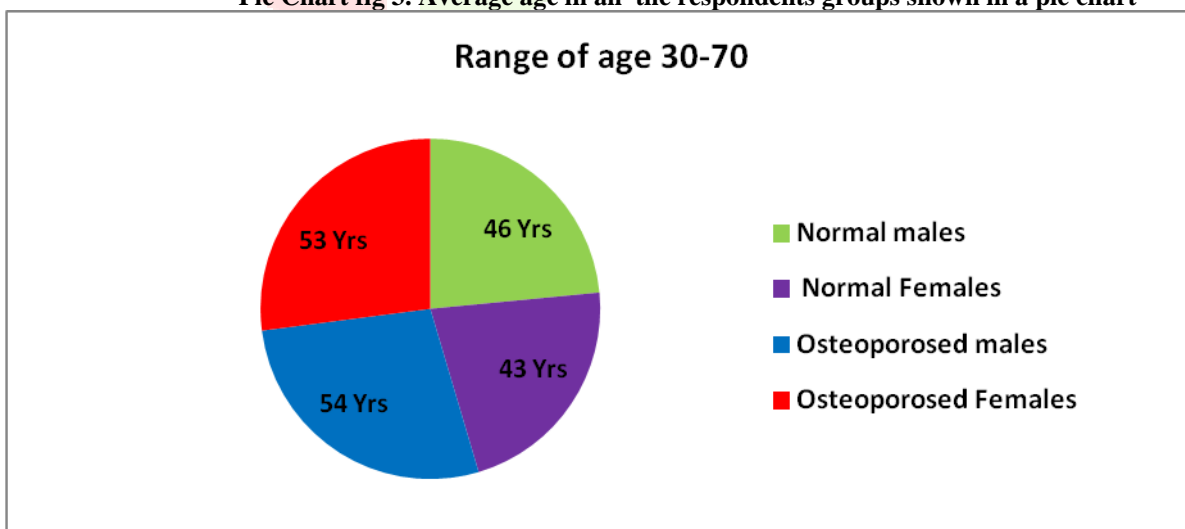
Bar chart fig 1.showing age group percentage in normal respondents:
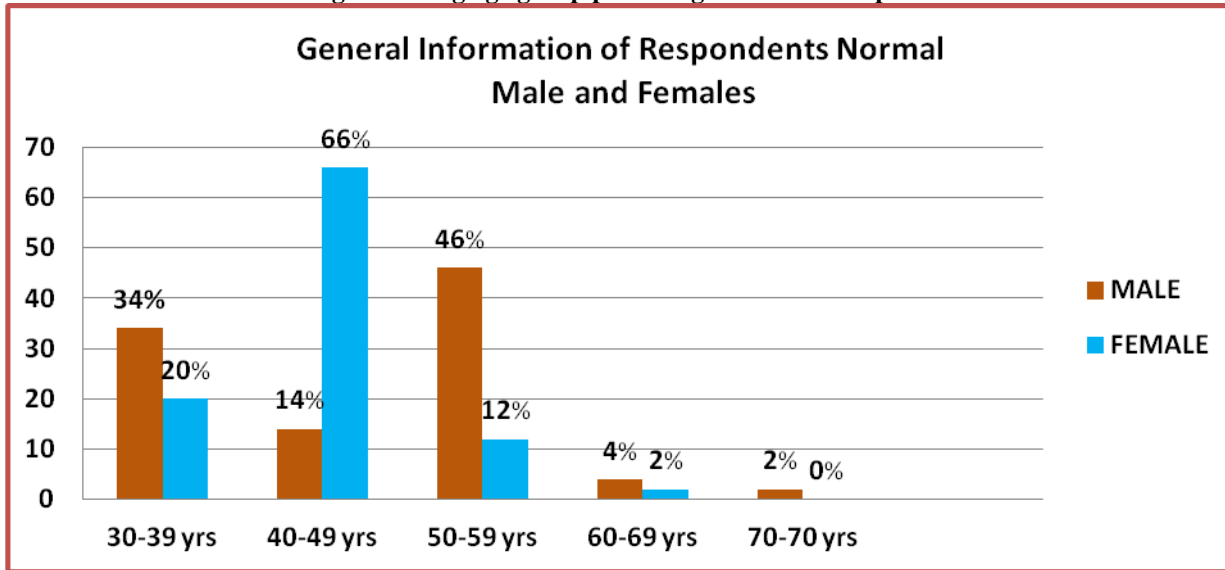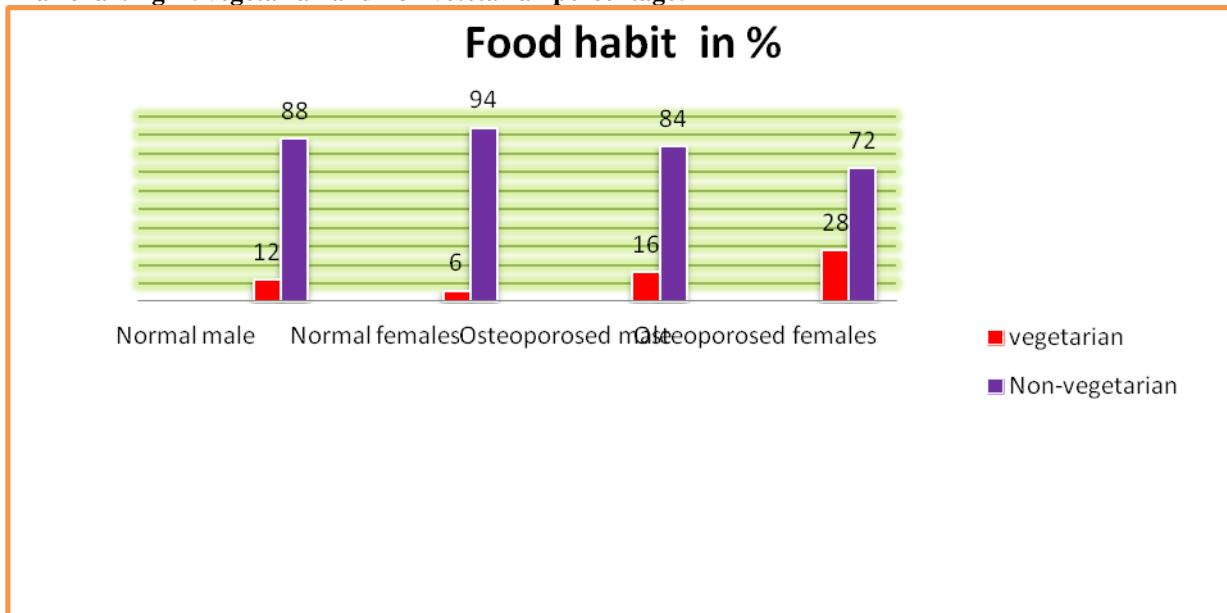

Bar chart fig 2. Percentage in osteoporosed respondents:

Pie Chart fig 3. Average age in all the respondents groups shown in a pie chart

**Bar chart fig 4. vegetarian and non vetetarian percentage:**

The percentage of vegetarians were higher in normal healthy respondents whose T score was within normal range. In non -vegetarian respondents with normal T scores, percentage of females was higher.

In the osteoporosed groups, 16% males and 28 %females were vegetarians and 84 % males and 72% females were non-vegetarians. **Thus in osteoporosed vegetarian groups respondents, percentage of females was higher than males. In osteoporosed non-vegetarian groups, percentage of males were higher than females.**

Bar chart fig 5. Percentage of vetetarian and non- vetetarians in males and females:
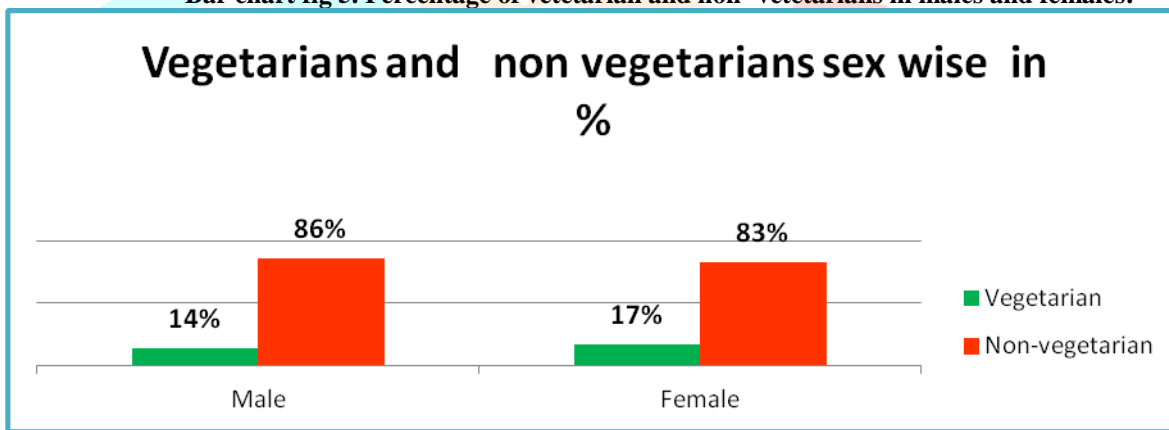

Both in normal and osteoporosed males respondents groups(N=100), 14% males were vegetarians and 86 % were non-vegetarians. While in females groups of normal and osteoporosed respondents,(N=100), 17 % were vegetarians and 83 % were non-vegetarians**.**

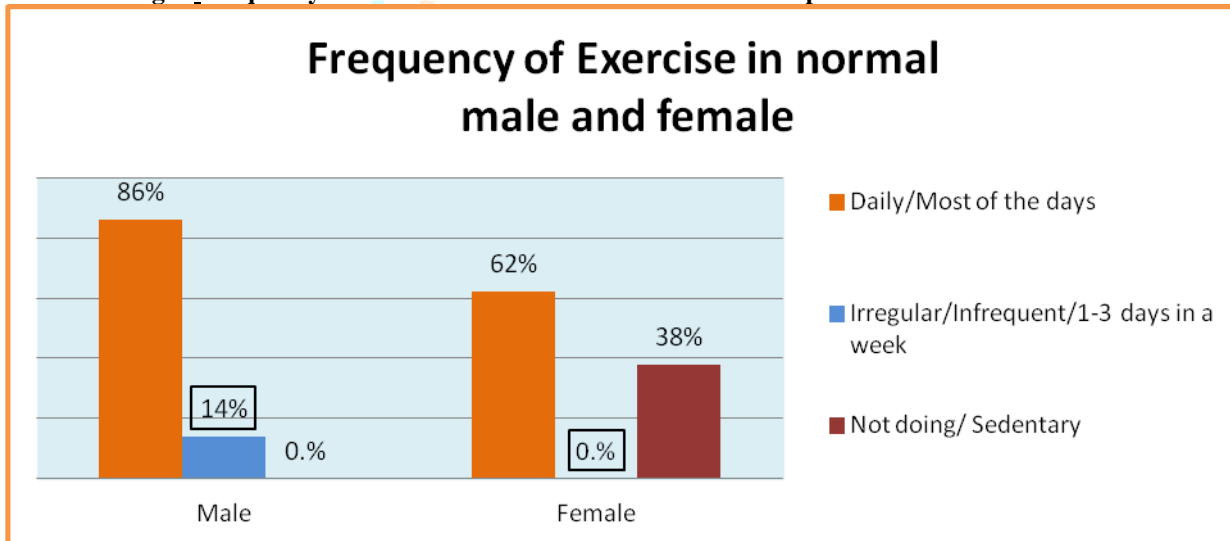 **Thus the percentage of non-vegetarians was very high, slightly more in males than females.**

Bar chart fig 6: showing calcium rich diet in normal group respondents:
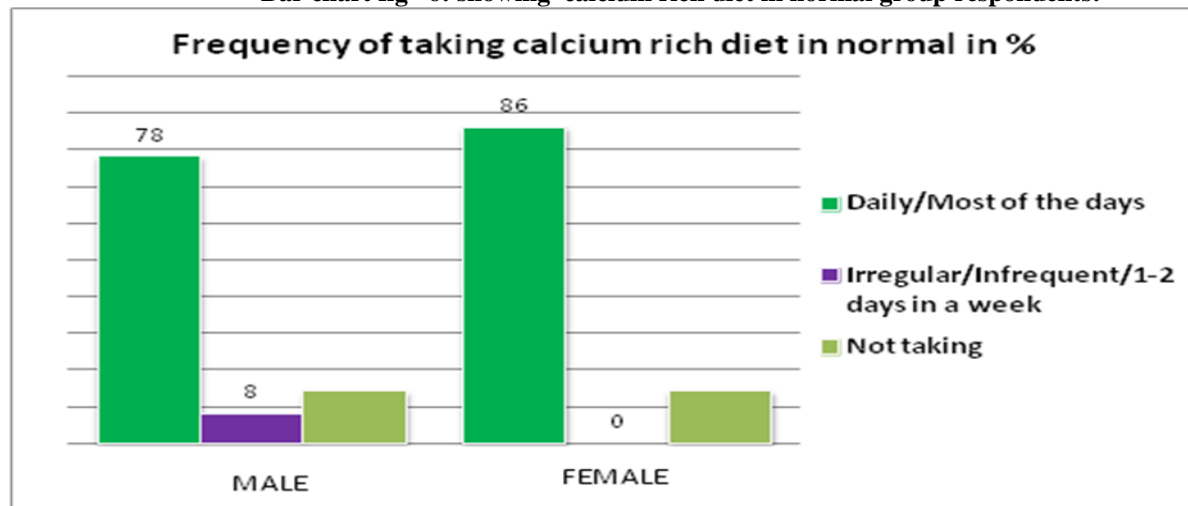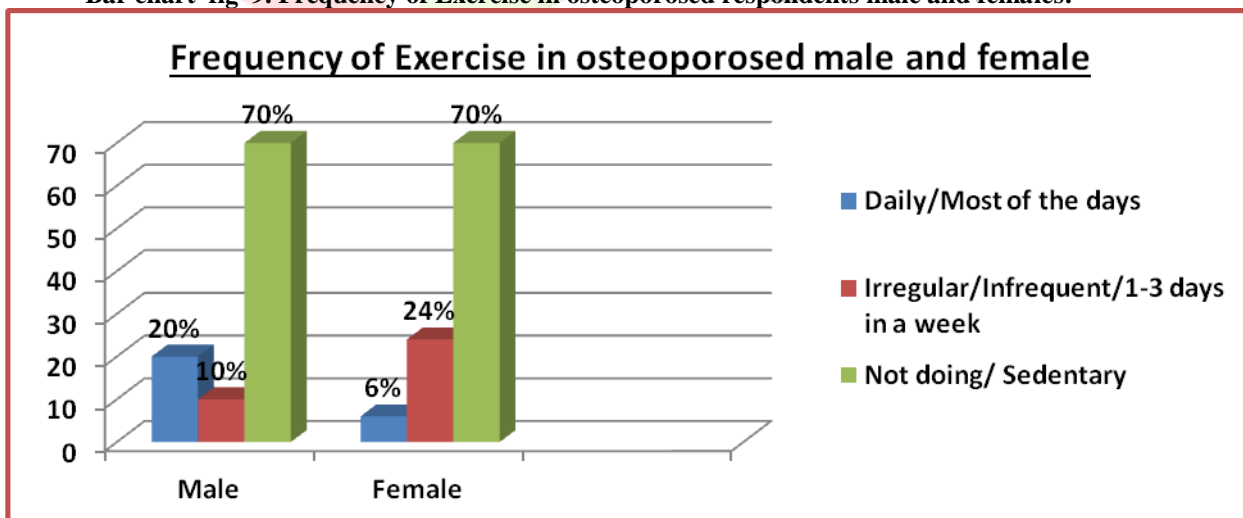
Bar chart fig 7: Frequency of taking calcium rich diet in osteoporosed males and females respondents:
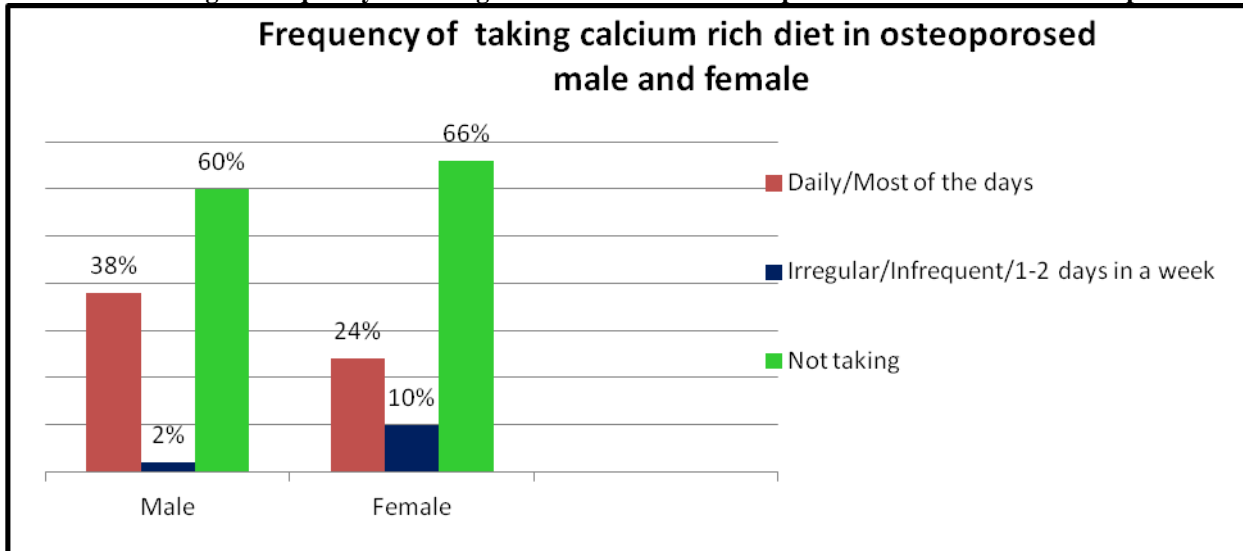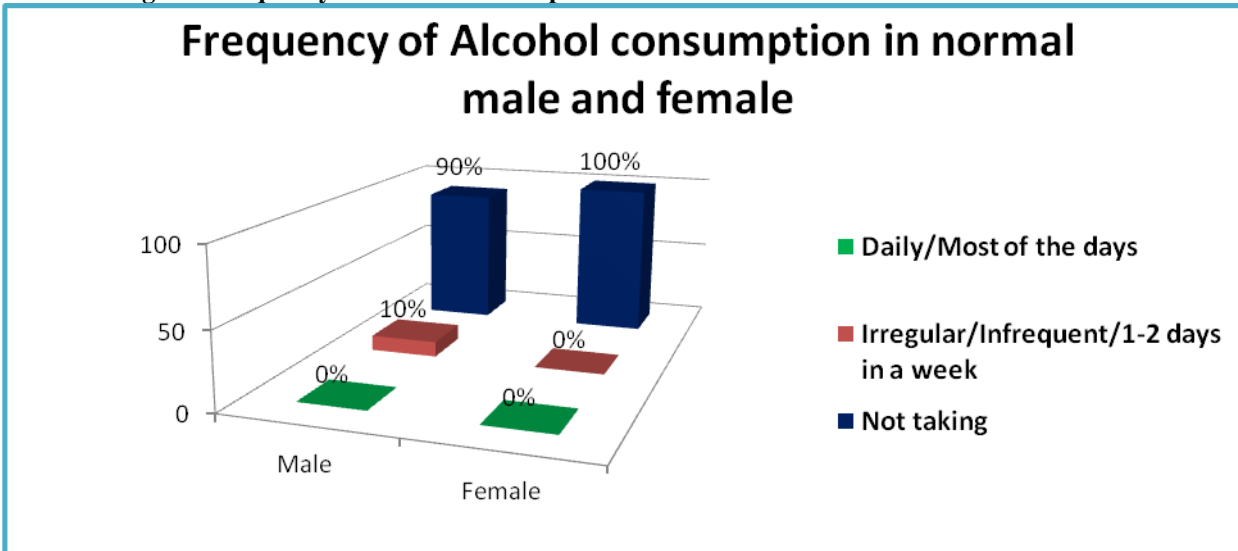

Bar chart fig 8: Frequency of Exercise in normal male and female respondents
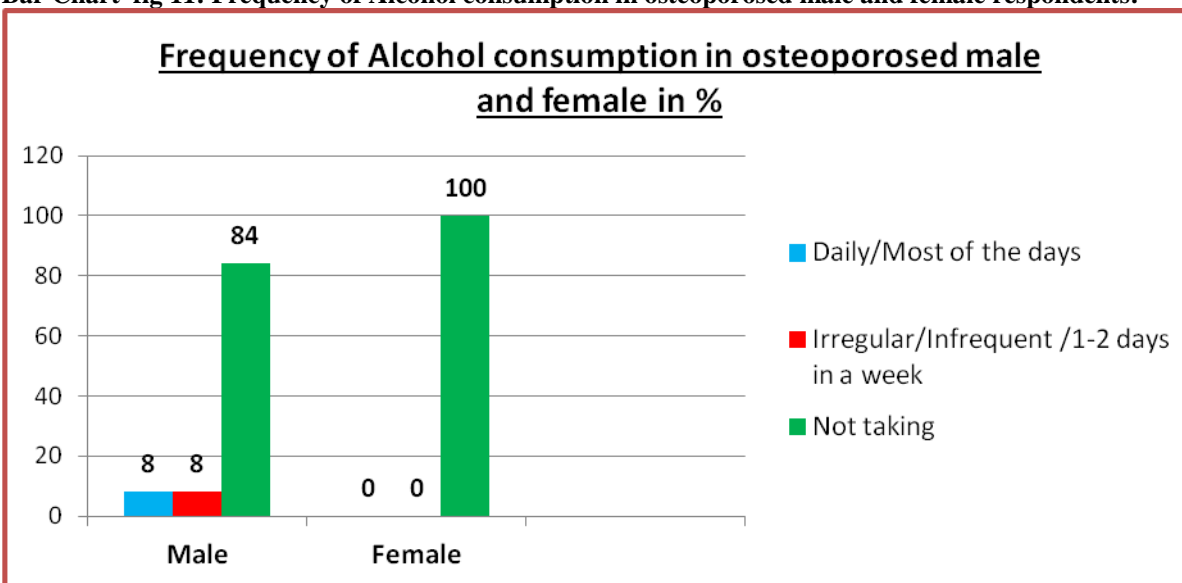

Bar chart fig 9. Frequency of Exercise in osteoporosed respondents male and females:

Bar chart fig 10: Frequency of Alcohol consumption in normal male and female

Bar Chart fig 11: Frequency of Alcohol consumption in osteoporosed male and female respondents:

Frequency of smoking in Normal male and female

Out of one hundred normal respondents , fifty males and fifty females, whose T score was within normal range,100% male and 100 % females were not smoking.

Frequency of Smoking in osteoporosed male and female

In osteoporosed respondents, fifty were males and fifty females, out of which only 8 % males were daily smokers and none of the females were daily smokers.

92% males and 100 percent females were non smokers.

6. Discussion

Role of Food habits- Vegetarian/Non vegetarian:

In the present study, it was observed that the percentage of osteoporosed non-vegetarians males respondents was higher than the osteoporosed non- vegetarians females.

In osteoporosed vegetarian respondents populations, percentage of females was higher than the males. Thus it is obvious from the study that osteoporosis is more prevalent amongst non-vegetarians in Dhanbad town population.

Meyer et al.[9] has concluded : An elevated risk of fracture was found in women with a high intake of protein from nondairy animal sources (meat, fish, and eggs) when calcium intake was low.

Feskanich et al. [10] indicated that the consumption of animal protein was associated with an increased risk of fracture. In contrast, no such association was found for the consumption of vegetable protein.

Zemel 1988, [11] has found that, given a constant calcium intake, a twofold increase in dietary protein high in sulfur amino acids (such as that found in animal products) produces a 50% increase in urinary calcium loss. In contrast, a diet rich in soy protein does not promote calcium loss.

Role of Calcium rich diet:

In normal healthy groups of males and females respondents, it was observed that 78 % males and 86 % females were taking calcium rich diet mainly in form of milk on daily or most of the days of the week (more than three days in a week). [table 6]

Here the result shows that in normal healthy respondent, calcium rich diet takers females respondents were higher than the healthy males in Dhanbad town and in normal healthy respondents in males as well as females the percentage was very high than the non-takers calcium rich diet.

In normal healthy male and female respondents groups, 14% males and 14% females were not taking calcium rich diet on daily basis. The percentage of non-takers of calcium rich diet was equal in both healthy males and healthy females,

While in osteoporosed groups in males and females respondents, only 38 % males and 24 % females were taking calcium rich diet on daily basis or in most of the days of the week.

The percentage of daily calcium rich diet takers osteoporosed male respondents were more than the females counterpart. Here the cause of osteoporosis in these groups seems to be due to other life style contributory factors like sedentary habits, smoking etc.

In osteoporosed group 60% males respondents and 66% females respondents were not taking calcium rich diet. Here the result shows that in osteoporosed respondents, non-takers of calcium rich diet females respondents were marginally higher than the males.

The study shows that the percentage of milk or calcium rich diet takers were more than the non takers in healthy males and females respondents. The study also shows that in osteoporosed respondents, non-takers of calcium rich diets were more than the calcium takers.

Many studies show that low calcium intake appears to be associated with low bone mass, rapid bone loss, and high fracture rate as concluded in Osteoporosis overview, National Institute of Health,Bethesda, MD. 2000; [12] .

Heaney RP[13] has concluded that higher calcium intake have been related to higher bone mass in children, young adults and post menopausal women in 64 of 86 observational epidemiological studies,

Jane Higdon in summer 2005 research report [14] has concluded that inadequate calcium intake during childhood and adolescence can impair bone development and may prevent the attainment of optimal peak bone mass during early adulthood. In older adults inadequate calcium intake accelerates bone loss and likely contributes to the development of osteoporosis.

Thus it could be concluded that calcium rich diet has define role in maintaining good health of the normal bone. Those who did not take calcium diet on regular basis, suffered osteoporosis due to inadequate calcium intake.

This study proves that there is definite role of calcium rich diets in good bone health, and calcium rich diet prevents osteoporosis

Role of Exercise:
In the present study, in **normal male** group respondents, non was of **sedentary** habit, while in normal **females group,38 %** were found **not doing exercise** in any form, ie. **sedentary**.

In osteoporosis group, only 20% males and 6% females were **doing aerobic exercise** daily or in most of the days of the week..

70% males and same 70% females of osteoporosed groups respondents were of sedentary habit.

This study shows and confirms that sedentary habit also contributes in causation of osteoporosis.

J A Todd, R J Robinson [15] in their cross sectional studies have shown a positive correlation between bone mineral density (BMD) and exercise.

Peak bone mass usually occurs before the third decade [American College of Sports Medicine

2004, Lu et al. 1994.]. Peak bone mass is dependent primarily on genetic factors (70-80%), but it

is also considerably influenced by physical activity and dietary calcium intake during

adolescence (Mundy 1998).

Role of Alcohol consumption:
In normal male group non was taking alcohol on daily basis**. Only 10 % were taking alcohol** on infrequent basis and 90 % were not at all indulged in alcohol.

None of the females were taking alcohol, which concluded that females of this region were not at all indulged in consumption of alcohol habit.

In male osteoporosed respondent group, only 8% were taking alcohol on daily basis, 86 % were not indulged in alcohol consumption.

In osteoporosed female group, none of the female was taking alcohol.

Jeanie Lerche Davisand Brunilda Nazario their article [16] have reviewed that

heavy drinking is a health risk for many reasons, including the effects on bones.

Research shows that chronic heavy alcohol use, especially during adolescence and young adult years, can dramatically affect bone health and increase the risk of osteoporosis later in life.

Role of Smoking:
The data shows that in normal respondent subjects the percentage of smokers was nil. This modifiable factor non smoking might have influenced good quality of bone in general.

None of the females were found smoking in my study of Dhanbad population.

This seems to be a very important observation that the habit of smoking is very low and females do not smoke in Dhanbad town sample. This could have been probably due to awareness about health against smoking through the government, social workers and media. The less prevalence of smoking might have been also due to statutory warning of developing cancer and a new act of punishment law by the Government in the public places.

7. Conclusion

The findings in my study shows that there is definite impacts of food habits ,and life style on osteoporosis. Adequate amount of calcium rich diet intake and role of exercise play an important role on good health while inadequate amount of calcium rich diet and infrequent or sedentary life style is definitely related to osteoporosis as concluded in the present study also.

Low dose intake or infrequent intake of alcohol has no effect on osteoporosis. Very insignificant Smoking in this field doesn't seem to play conclusive role for causation of osteoporosis in Dhanbad town. The other non-modifiable factors might have been playing important role in causation of osteoporosis.

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