

Original Article

Risk Factors, Health Beliefs and Preventive Behaviours of Osteoporosis among Women of a Selected Community of Assam

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ABSTRACT

Background: Osteoporosis is a slowly progressive disease and becoming public health problem in Asian countries. A descriptive study was undertaken among women of a selected community of Assam, with the objectives of assessing risk factors, health beliefs and preventive behaviours of osteoporosis among women.

Methods: A non-experimental survey approach was adopted. 185 subjects were selected by using purposive sampling technique. Predesigned and validated tools were used i.e. structured interview schedule was used for demographic variables, risk factors of osteoporosis and preventive behaviours of osteoporosis and Modified OHBS was used for assessing health beliefs of osteoporosis. SPSS statistics version 17 (2008, SPSS Inc, Chicago, Illinois, USA) software is used for statistical analysis.

Results: 61% of women had mild risk of osteoporosis. The most predominant risk factors among women were consumption of tea or coffee (89%), smoking or consumption of smokeless tobacco (81%). They had highest level of perception towards health motivation (75%) and lowest level of perception towards barriers of preventive behaviours (48%). Most frequently practiced positive behaviours were consumption of calcium rich food, performance of physical activities and exposure to sunlight and most frequent negative behaviours were consumption of tea or coffee and smoking and smokeless tobacco. Significant correlation between health beliefs with preventive behaviours was found. Significant association found between risk status of osteoporosis with selected socio-demographic variables.

Conclusion: Based on their health beliefs women were practicing preventive behaviors. So awareness of women about risk factors and ways of prevention is very much essential to increase the practice of preventive behaviours.

Keywords: health beliefs, osteoporosis, preventive behaviors, risk factors

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Introduction:

Osteoporosis is a global health problem and prevalence of osteoporosis is rapidly increasing worldwide.¹ According to International Osteoporosis foundation (IOF) report 2016², worldwide more than 200 million people are suffering from osteoporosis, 1 in 3 women over the age of 50 years and 1 in 5 men will experience osteoporotic fracture in their lifetime. Osteoporosis is considered as silent disease as it does not give any clue until it has reached advance stage.³ Up to the age of 30, the peak bone mass density increases, there is gradual decrease in bone mass with advancement of age.⁴ Osteoporosis involves several modifiable and non-modifiable risk factors. The modifiable risk factors include lack of physical activity, smoking, consumption of smokeless tobacco, alcohol and caffeinated beverages, low body mass index, imbalanced diet etc.

In India, Prevalence of osteoporosis is 24.6% in men and 42.5% in women above 50 years of age.⁵ The international osteoporosis foundation² suggests screening of women after age of 65 years. However, changing of lifestyle in young people (dieting, smoking and lack of exercise) has made them vulnerable to osteoporosis. Further in India, there is higher prevalence of other risk factors such as low socioeconomic strata, low calcium in the diet, vitamin D deficiency, low education level, premature menopause, multiparty resulting in higher risk of osteoporosis.⁶

In Assam, most of the people consume caffeinated beverages and smokeless tobacco which are very common modifiable risk factors of osteoporosis. Global Adult Tobacco Survey (GATS)⁷ 2016-2017 of North-Eastern States, reported that 62.9% among men and 32.9% women and 48.2% of all adults of Assam either smoke tobacco or consuming smokeless tobacco. Consumption of tobacco in India is highest

in the six north-eastern states of Mizoram, Manipur, Nagaland, Assam, Meghalaya and Tripura.⁸ The investigator notices that smoking, consumption of smokeless tobacco; caffeinated beverages are very common among people of Assam which are common risk factors of osteoporosis.

According to Global calcium intake report in India⁹, people consume less than 400 mg of calcium per day which is increasing the risk of osteoporosis.

A study conducted among a group of population of Guwahati, Assam by Baruah T, Bora C¹⁰ founded that 36% of women were suffering from osteoporosis out of which 16% were at the age group of 50-59 years. Among male 8% of them were sufferings from osteoporosis.

People those are residing at urban area and those come for regular check-up, they are aware about the disease .But those who are residing at rural area they are not aware about it and they neglect minor problems that occur at early stage of osteoporosis. So, investigator wanted to conduct the study at rural setting.

Awareness about osteoporosis, its risk factors and the ways of prevention play a pivotal role in prevention of the disease and for early detection. Due to lack of awareness among general population, practice of preventive behaviours is very rare. If people are aware about the disease they may change their lifestyle, high risk group can take calcium supplementation. Practice of preventive behaviours depend not only on awareness but also on their perception about the disease, chance of its occurrence, its seriousness, benefits and barriers of the preventive behaviours. Therefore this study focused on assessing the risk factors, health beliefs and preventive behaviours of osteoporosis among women of a selected community with the following objectives-

1. To assess risk factors of osteoporosis among women and to determine the risk status based on risk factors of osteoporosis among women.
3. To assess health beliefs of osteoporosis among women.
4. To assess preventive behaviours of osteoporosis among women.
5. To find out relationship between health beliefs and preventive behaviours of Osteoporosis among women.
6. To find out association between risks status of osteoporosis with selected demographic variables.

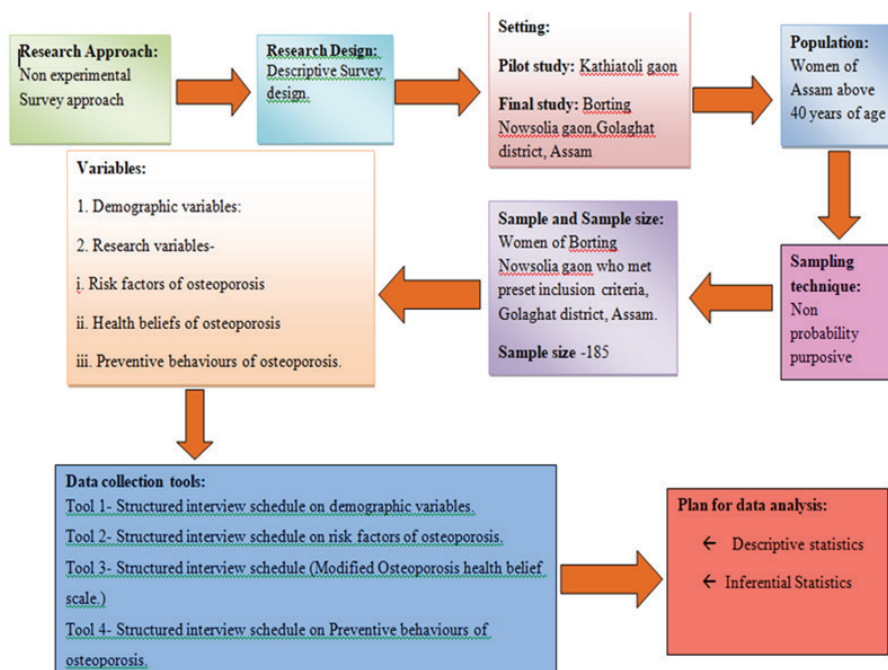
Conceptual framework of the present study is based on Health Belief Model by Irwin M Rosenstock (1974).¹¹

Assam. 185 participants were selected by purposive sampling technique. Women above 40 years of age, who understand Assamese and willing to participate, were included and women who were mentally challenged and pregnant at the time of data collection were excluded from the study. Prior to data collection ethics committee clearance and formal administrative permission was taken from concerned authorities. Data were collected from 16th October, 2019 to 30th November, 2019.

Several tools were used to collect information i.e. Structured interview schedule for demographic variables, risk factors of osteoporosis and preventive behavior of osteoporosis and Modified osteoporosis health belief scale. Structured interview schedule on socio demographic characteristics include 2 parts. Part IA consists of 8 items regarding socio demographic characteristics of study participants and Part IB consists of 3 questions regarding disease and medication related information of the participants.

Subjects and methods:

The study was based on Non experimental descriptive survey approach. It was undertaken in a selected community of



Schematic presentation of research methodology

Structured interview schedule was developed to collect data regarding risk factors of osteoporosis from the study subjects which consists of 19 items from different areas such as demographic area, dietary habits, family history, lifestyle, physical activity, history of co morbid diseases, history of previous fall and fracture, history of medication. The score against every item is 1. Participants were classified into 3 groups on the basis of score. If the participants score

- 13-19 : High risk for having osteoporosis (Above 66%)
- 7-12: Moderate risk for having osteoporosis (33%-66%)
- 1-6: Mild risk for having osteoporosis. (Below 33%)

Osteoporosis health belief scale (OHBS) was modified as per suggestion of guide and experts. OHBS was developed by Kim KK et al, 1991¹² to measure health beliefs related to osteoporosis. The original tool consists of total 42 items in following subscale: Susceptibility, seriousness, benefits of exercise, benefits of calcium, barriers of exercise, and barriers of calcium and health motivation. Investigator has done some modification by reducing the number of items to 22 by removing the items that has similar meaning and made 3 point scale for the level of agreement (Agree/uncertain/disagree). Maximum obtainable score was 66 and minimum was 22. Structured interview schedule on preventive behaviours of osteoporosis consists of 11 items on preventive behaviours of osteoporosis. The tools were validated by experts. The reliability of the structured interview schedule for demographic variables, risk factors of osteoporosis and preventive behaviors of osteoporosis and modified osteoporosis health belief scale were established by using inter-rater method ($r=1$), KR 20($r=.85$), Cronbach alpha (0.85) and Cronbach alpha(0.8) respectively.

So the tools were considered reliable. Informed consent was obtained from every participant prior to interview and anonymity, confidentiality was maintained. SPSS statistics version 17 (2008, SPSS Inc, Chicago, Illinois, USA) software was used for statistical analysis. Frequency and percentage distribution is computed for describing the socio-demographic characteristics, assessment of risk factors and risk status of osteoporosis, assessing health beliefs of osteoporosis and assessing the preventive behaviours of osteoporosis. Correlation coefficient is calculated to find out the relationship between health beliefs and preventive behaviours of osteoporosis. Chi square test is calculated to find out the association between risk statuses with selected demographic variables

Results:

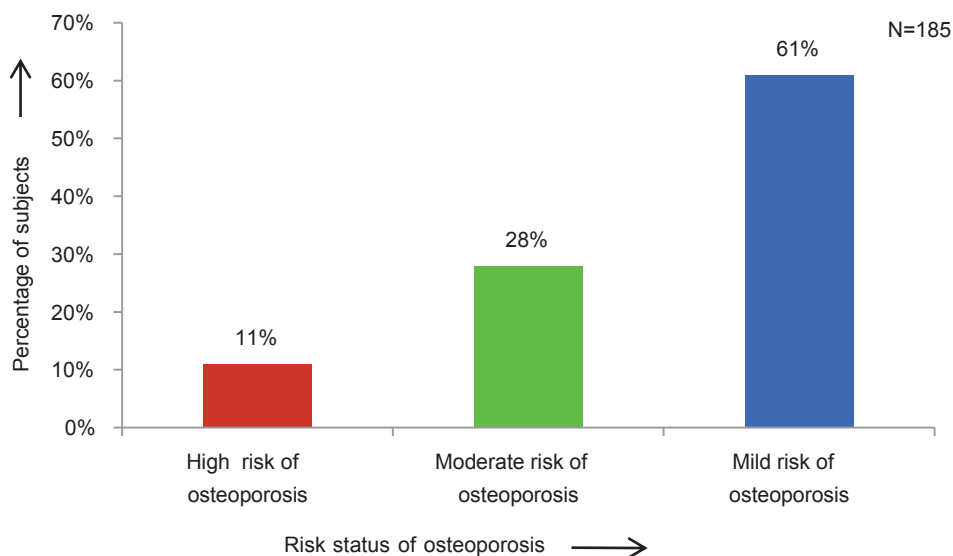
Out of 185 participants, 44% were under age group of 40-49 years. Educational qualification of 44% women was up to secondary, 45% of women had 2 children while majority (69%) of women had BMI 19-24.9kg/m² and 36% of women had family history of osteoporosis (Table 1). Majority (61%) of the women had mild risk of osteoporosis and only 11% had high risk of osteoporosis. (Fig 1)

Majority (89%) of the subjects had the risk factor of consumption of tea or coffee followed by exposure to smoking or smokeless tobacco (81%), attainment of menopause (65%) and lack of taking calcium supplementation (56%). It is found that the least common risk factors were history of arthritis (3%), consumption of medication for thyroid disorder (3%) and none of the subjects had risk due to lack of consumption of green and leafy vegetables and due to lack of exposure to sun and lack of performance of physical activities. (Fig 2)

Mean percentage of osteoporosis health beliefs subscale scores regarding

Table 1: Frequency and percentage distribution of socio-demographic characteristics of women. N=185

Sl.no	Socio-demographic characteristics	Frequency	Percentage
1.	Age		
	40-49 Years	81	44
	50-59 Years	58	31
	60 Years or above	46	25
2.	Education level		
	Illiterate	6	3
	Primary	42	23
	Secondary	81	44
	Higher Secondary or above	56	30
3.	Number of child		
	Nil	22	12
	1 Child	45	24
	2 Child	83	45
	More than 2 Child	35	19
4.	BMI		
	<18.5kg/m ²	40	21
	18.5-24.9kg/m ²	127	69
	25 kg/m ²	18	10
5.	Family history of osteoporosis		
	Yes	66	36
	No	119	64

**Figure 1:** Bar diagram showing mean percentage distribution of subjects according to risk status of osteoporosis.

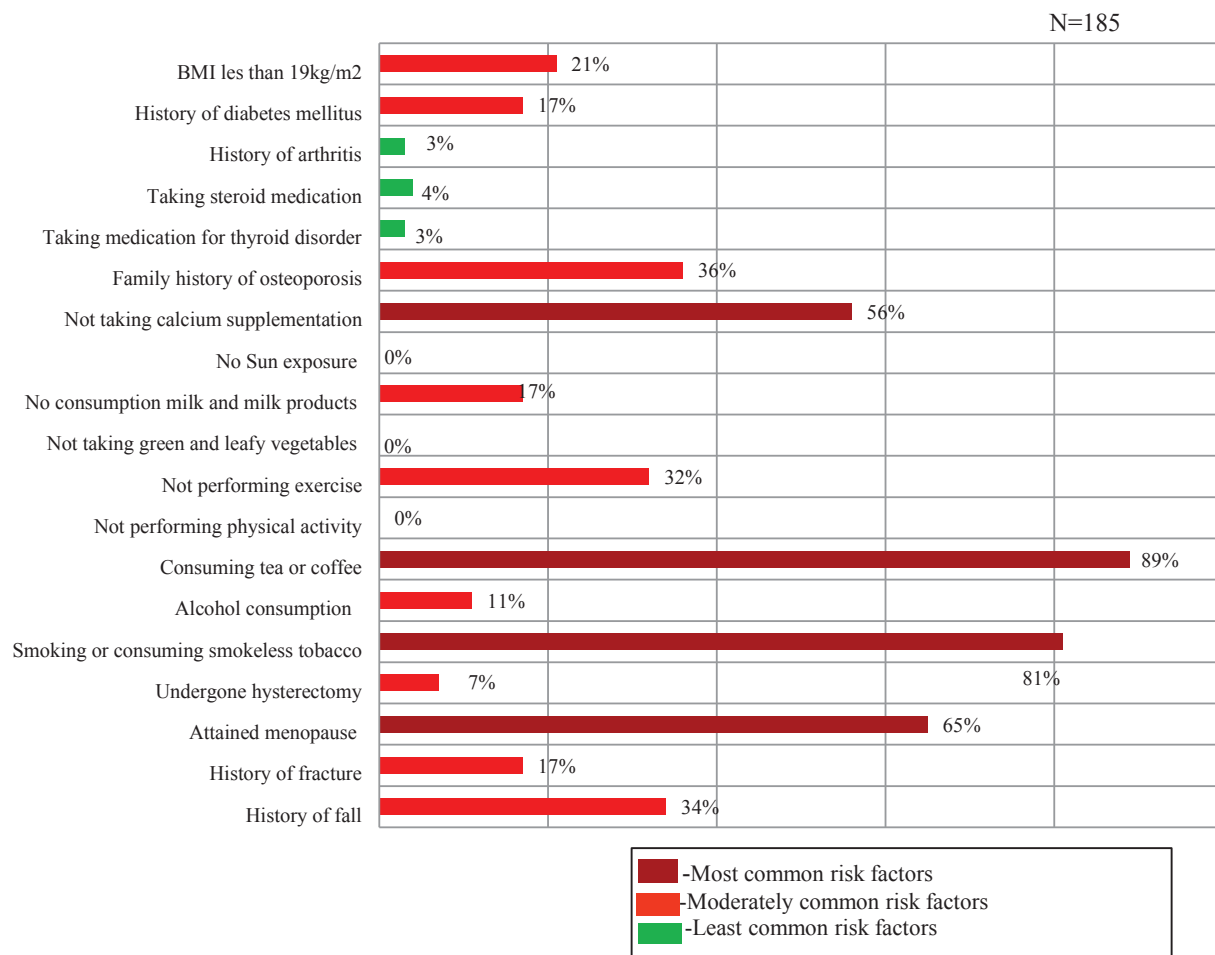


Figure 2: Bar diagram showing percentage distribution of risk factors of osteoporosis among women.

osteoporosis among women was assessed. Lowest level (48%) of participant's perception was demonstrated in the field of barriers of calcium intake and performance of exercise and highest level (75%) of perception was demonstrated in the health motivation. (Fig 3)

Among the positive behaviors, in case of calcium rich food intake, it was found that 100% of them consume vegetable, 70% consume milk, (68%) of them take fish at least 3 times per week. Similarly, majority (95%) of them were found performing household activities on regular basis, (62%) performing

exercise at least 3 times per week. Majority (78%) of them had exposure to sunlight at least 3 times per day. (Fig 4 A) Regarding negative behaviors towards osteoporosis, it was found that among them very few (11%) women were consuming alcohol while most of them (89%) consumed tea or coffee and (80%) of them were smoking or exposed to smokeless tobacco at least 3 times per day. (Fig 4 B)

There is significant relationship between health beliefs with preventive behaviors of osteoporosis. There is positive correlation between preventive behaviors

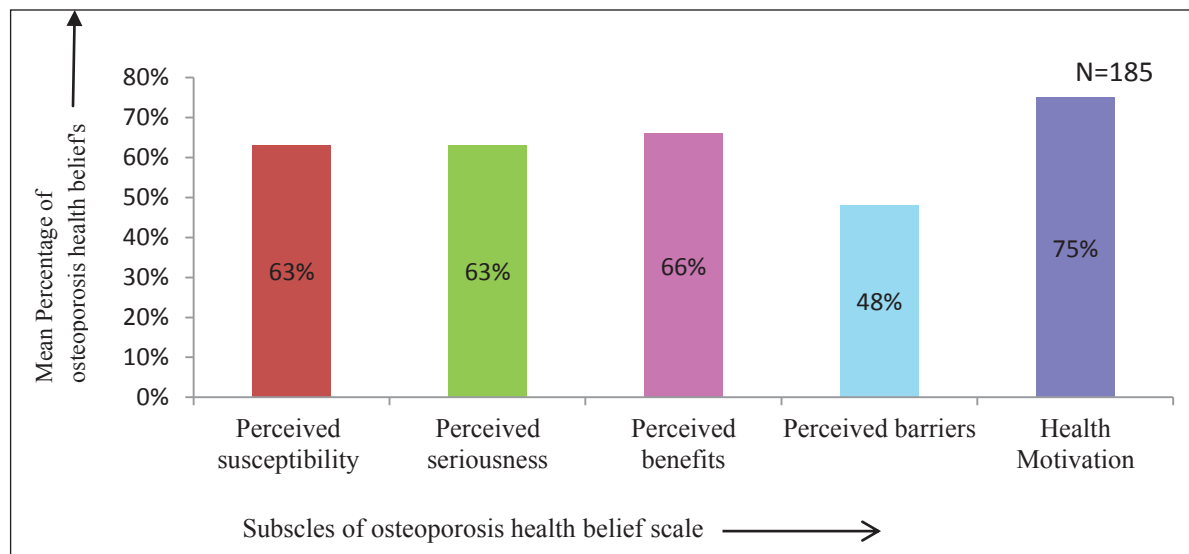


Figure 3: Bar diagram showing mean percentage of osteoporosis health beliefs subscale scores regarding osteoporosis among women.

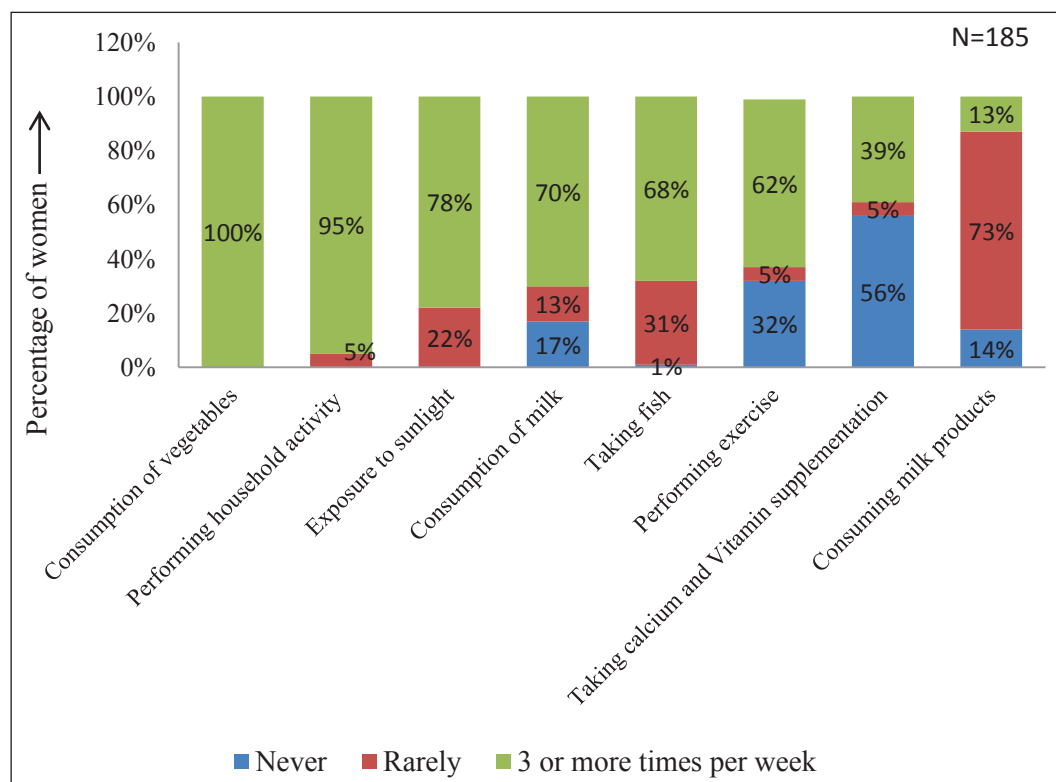


Figure 4A: Component bar diagram showing percentage distribution of positive behaviour of osteoporosis among women.

of osteoporosis with following sub scales of osteoporosis health beliefs scale i.e. perceived susceptibility, perceived seriousness, perceived benefits and health motivation and negative correlation between preventive behaviors of osteoporosis with perceived barriers of preventive practices. (Table 2)

Analysis also showed that significant association was found between risk status of osteoporosis among women and their selected socio-demographic characteristics like age, education level, number of child, family history of osteoporosis and body mass index. (Table 3)

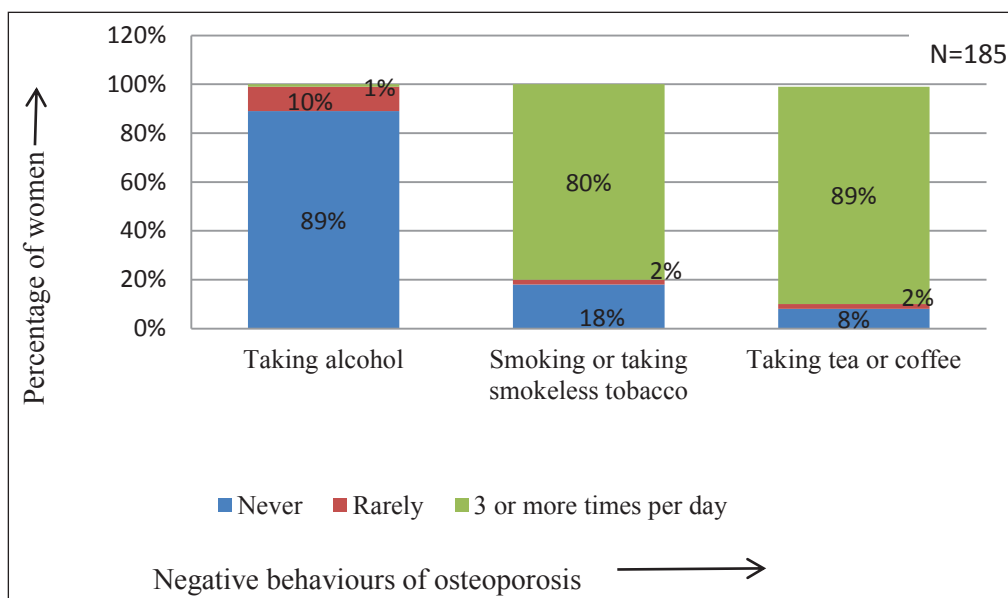


Figure 4B: Component bar diagram showing percentage distribution of negative behaviour of osteoporosis among women.

Table 2: Correlation between health beliefs of osteoporosis with preventive behaviours among women.

N=185

S I Variables no	Preventive Behaviour of osteoporosis 'r' value	Inference
Health beliefs about osteoporosis		
a. Overall health belief scale score.	0.76	Significant
b. Perceived Susceptibility	0.7	Significant
c. Perceived Seriousness	0.73	Significant
d. Perceived Benefits	0.77	Significant
e. Perceived Barriers	-0.88	Significant
f. Health Motivation	0.69	Significant

Table 3: Association of risk status with selected demographic variables.

N=185

SI no	Selected demographic variables	Risk status of osteoporosis			χ^2	df	Tabulated value	Inference
		Mild risk	Moderate risk	High risk				
1.	Age				30.8	4	9.49	*Significant
	40-49 years	63	16	2				
	50-59 years	35	18	5				
	60 years and above	15	19	12				
2.	Education level				19.6	6	12.59	*Significant
	Illiterate	2	3	1				
	Primary	17	16	9				
	Secondary	50	23	8				
3.	Number of child				40.64	6	12.59	*Significant
	Nil	10	7	5				
	1	40	3	2				
	2	54	25	4				
4.	Family history of Osteoporosis				29.02	2	5.99	*Significant
	Yes	24	28	14				
	No	89	25	5				
5.	Body mass Index				32.64	4	9.49	*Significant
	<18.5kg/m ²	13	14	13				
	18.5-24.9kg/m ²	89	33	5				
	25 kg/m ² and above	11	6	1				

Discussion:

First objective of the study is to assess the risk factors of osteoporosis among women of selected community; along with assessing the risk status among them. As it is not possible to perform BMD test for confirmation, the risk factors of the study present study are considered as potential risk factors. As per the non modifiable risk factors i.e. age and sex, all the study subjects are at risk of

osteoporosis as they were all women above 40 years of age. Present study shows that consumption of tea or coffee is the most common risk factor of osteoporosis found among women. Consistent with our finding Hyassat D, Alyan T et al¹³ also found that intake of coffee was one of common factors that increased risk of osteoporosis. Our study findings reveal that smoking is one of the common risk factor for osteoporosis which is

supported by findings of several studies.¹⁴⁻¹⁷ According to the studies Vaishya R et al¹⁸ and El-Heis MA et al¹⁹ smoking was not significantly associated with osteoporosis. This difference may be due difference of setting because consumption of smokeless tobacco and smoking is very common among northeastern states.

The genetic factor is more important factor in development of osteoporosis than the combination of other factors i.e; dietary, lifestyle, hormonal and environmental.¹⁶ We found that 36% of subjects have family history of osteoporosis which was less common than smoking and consumption of tea or coffee. Consistent with our finding, findings of studies Hyassat D, Alyan T et al¹³ and Oance RT¹⁴ showed that positive family history of osteoporosis is one of the important risk factor. But reporting of family history is less common which may be due to the fact that their first degree relatives might be suffered from osteoporosis without being diagnosed or subjects might not remember accurately.

Current study assesses the health belief of women towards osteoporosis as important factors in influencing preventive behaviours among them. With regard to health belief, this study reveals that mean percentage of the scores are highest in the subscale of health motivation (75%) and lowest in the subscale of perceived barriers (48%). Whereas the study conducted by Al-Muraikhi H et al¹ revealed that lowest percentage of participant perception was demonstrated on perceived susceptibility (71.7%) while highest perception was demonstrated on perceived benefits of preventive behaviors (91%).

Our study demonstrate a high level of health motivation among the study subjects, 79% of women agree that keeping healthy is very important for them. This finding is supported by study findings by Edmonds

E et al²⁰ in which study subjects showed overall positive view towards health.

Regarding physical activity and exercise it is found that, all the study subjects are involved in domestic activity for at least 3 times a week but only 68% of them are performing exercises. Our finding is supported by various studies^{13,14,17,21} in which majority of subjects were involved in physical activities although they were not doing exercise on regular basis. All our study subjects are taking green and leafy vegetables at least 3 times a week although 17% of subjects are not taking milk or milk products on regular basis. Regarding calcium and vitamin D supplementation, our findings shows that 56% of subjects are not taking calcium and vitamin D supplementation. In agreement with our finding, several studies^{13,17,21} had reported that majority of the study participants were not taking calcium supplements on regular basis.

This study reveals significant relation of health belief with preventive behaviours of osteoporosis. Positive relation is present between preventive behaviours with different subscales of health beliefs i.e; perceived susceptibility, perceived seriousness, perceived benefits of preventive behaviours and health motivation. Negative relation present between perceived barriers of preventive behaviours with preventive behaviours. This finding is consistent with the findings of the study conducted by Chan CY et al.²²

Concerning the association of risk status with demographic variables result reveals that there is a significant association between age and risk status of osteoporosis. This finding is consistent with the findings of the study conducted by Haris S at al.²³

This study has limitation too firstly; the investigator assessed only the potential risk factors and risk status of osteoporosis

among women. Secondly, limited sample size restricts the generalization of findings.

Implications of the study

The study has important implications to nursing practice, nursing education, nursing administration and nursing research.

Nursing practice

Education and giving awareness to the public is the foundation to osteoporosis prevention and early detection before it is late. The nurse should make the public aware regarding the risk factors of osteoporosis through organizing health talk, drama etc.

Information about osteoporosis increases women's awareness and therefore influences their health beliefs. Nurse can conduct awareness programs to increase awareness among women about osteoporosis - risk factors, symptoms and ways of prevention.

Nursing Education

The nurse educator can use the findings of this study to understand and identify the risk factors of osteoporosis. Nurse educator can enrich the student nurses about risk factors, early detection and preventive practices of osteoporosis and to use this knowledge therapeutically.

Nursing Administration

The nurse administrators may utilize the results of this study to update the knowledge of the nursing staff so that they initiate measures to identify the risk factors and plan to implement the preventive measures. Timely recognition and implementing preventive measures can prevent the global burden of osteoporosis. Nurses can take part in organizing and supervising osteoporosis screening and health education programs among general population.

Nursing Research

The global problem of osteoporosis demands greater awareness to be created among the people. In order to prevent osteoporosis more research can be done on various aspects of osteoporosis such as lifestyle modification, early detection and knowledge of risk factors, beliefs and preventive behaviours. This study could be utilized as a reference for further research.

Recommendations

On the basis of findings, the following recommendations are offered for future research:

- Similar study can be replicated with larger population and different settings.
- Similar study can be conducted by case-control design focusing on risk factors.
- Similar study can be carried out in comparative design between urban and rural, male and female.
- Similar study can be conducted in view with organizing awareness program for the risk group.

Conclusion:

Based on the study findings of present study researcher had come to conclusion that majority of women have mild risk of osteoporosis with the common risk factors of consumption of tea or coffee, smoking and consumption of smokeless tobacco. Most of the women are involved in regular physical activities, consuming calcium rich diet and exposure to sunlight. Also it can be concluded that based on their health beliefs they are practicing preventive behaviors. So awareness of women about risk factors and ways of prevention is very much essential to increase the practice of preventive behaviors and ultimately it will help in prevention and early detection of osteoporosis among high risk group.

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Conflict of interest:

There has been no conflict of interest, financial or otherwise.