A study to assess the effectiveness of information education and communication on knowledge regarding osteoporosis and its contributing factors, among menopausal women at selected community area, Bangalore, Karnataka

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ABSTRACT

Context- Osteoporosis is a major public health threat worldwide. Studies have reported that Asian women have higher predisposition for osteoporosis than their Caucasian counterparts. Thus, though the exact prevalence is not known in India, one in four women older than 50 yr is believed to suffer from osteoporosis.. In a study on women over 40 yr of age, we found that the rate of decline in bone mineral density ranged from 4 to 5.7 per cent from pre- to postmenopausal stage. The people especially menopausal women should have adequate knowledge regarding osteoporosis and its contributing factors.

Aim- To assess the level of knowledge, evaluate the effectiveness of IEC & determine the association between pretest- posttest level of knowledge on osteoporosis and its contributing factors among menopausal women and selected demographic variables.

Methods- a pre experimental study was conducted among 60 menopausal women using Non Probability Convenient Sampling technique in Leggere primary health centre, Bangalore. Data was collected using self administered structured knowledge questioners.

Statistical Analysis- Descriptive and inferential statistics were used. In order to establish the reliability of the tool, split- half method was used. The tool was administered to 6 subjects and the test was first divided into two equivalent halves and correlation of the half test was found by using Karl Pearson's co- efficient formula and reliability was estimated using Spearman's Brown Prophecy formula. The reliability of the tool was 0.9267. Hence, the tool was found highly reliable for the data collection. The level of significance was set at 0.05 levels to test the significance of difference. Frequency and percentage was used to analyse the demographic variables. Knowledge of the community women was analysed in terms of frequency, percentage, mean and standard deviation. Further statistical significance of the effectiveness of information education and communication was analyzed by paired "t" test. Association between knowledge of community women and demographic variable was assessed by Chi-square test.

Result- The overall pre-test knowledge score among menopausal women, majority 40(66.7) of the menopausal women had inadequate knowledge, 20(33.3) had moderate knowledge and none had adequate knowledge. Whereas in the overall post- test knowledge score, none had inadequate knowledge, 18(30.0%) had moderate knowledge and 42(70.0%)The overall mean knowledge level obtained following information education and communication program was 24.32 (81.1%) in post-test which was found to be higher than the overall mean knowledge level 14.22(47.4%) in the pre-test. The mean enhancement between pre-test and post-test was 10.10 (33.7%) and the obtained paired 't' value was 40.16. It was found to be statistically significant at the level of $P<0.05$. There was a statistically significant association between post-test knowledge and selected variables with respect to socio demographic variables was accepted for age group, family income/month, dietary pattern, age at menopause. Hence H_2 was accepted. However, there was no significant association between post-test knowledge and education level, marital status, occupation, history of previous illness. Hence, H_2 was rejected for the above selected variables.

Conclusion- Hence the research hypothesis H_1 stated that there was a significant association between pre-test knowledge and selected variables with respect to age group, type of sexual minority, educational status, occupation and current residential status and There was a statistically significant association between post-test knowledge and

selected variables with respect to socio demographic variables was accepted for age group, family income/month, dietary pattern, age at menopause. Hence H_2 was accepted. However, there was no significant association between post-test knowledge and education level, marital status, occupation, history of previous illness. Hence, H_2 was rejected for the above selected variables .The study showed that there was less knowledge regarding osteoporosis and its contributing factors and the IEC program on was effective in improving the knowledge of menopausal women.

Key Words: Effectiveness, Information, education and communication, Osteoporosis, Menopausal women.

INTRODUCTION

According to recent statistics from the International Osteoporosis Foundation, worldwide, 1 in 3 women over the age of 50 years and 1 in 5 men will experience osteoporotic fractures in their lifetime. Every fracture is a sign of another impending one. Osteoporosis has no clinical manifestations until there is a fracture. Fractures cause important morbidity; in men, in particular, they can cause mortality. Moreover, osteoporosis results in a decreased quality of life increased disability-adjusted life span, and big financial burden to health insurance systems of countries that are responsible for the care of such patients. With an early diagnosis of this disease before fractures occur and by assessing the bone mineral density and with early treatment, osteoporosis can be prevented. Therefore, increasing awareness among doctors, which, in turn, facilitates increased awareness of the normal populace, will be effective in preventing this epidemic.

Because of Osteoporosis the number of hip fracture may increase three fold by the year 2040. Thus any reduction in osteoporosis among educated women may have large impact on health care expenditure. The majorities of young women are not consuming the recommended daily amount of calcium and is lacking sufficient osteo- protective exercise for building healthy bones. Health care providers and educational institutions either have missed opportunities to educate women about osteoporosis or such information has not been received and retained.

A cross sectional study was conducted between October1st, 2015 until May 1st, 2016 in the Hawler Teaching Hospitals in Erbil city of Kurdistan region/ Iraq. The aim of this study to assess the knowledge of women regarding risk factors and prevention of osteoporosis, to find out the women's practice for osteoporosis prevention and determine the association between their level of knowledge and practice with their Socio demographic characteristics. Study was conduct on 220 women who visited hospital because of different health problem and seeking treatment for their complains. Data were collected through interview with them. The Results revealed that the majority of samples were between age group 20-34 years. They had fair to poor knowledge regarding risk factors and prevention methods for osteoporosis and mass media was the main source of information regarding that (85.4 %). The study concluded that the Kurdish women have not enough and correct knowledge regarding osteoporosis and its prevention as well as have poor practice for its prevention. Further studies are needed to find out the barriers of preventive osteoporosis practice among Kurdish women.[19]

A descriptive survey was conducted in Dharwad dist; the study aim was to assess knowledge regarding post-menopausal osteoporosis among peri menopausal women at selected area of Byahatti PHC, Dharwad dist, Karnataka. In this study totally 30 perimenopausal women were selected by probability simple random sampling technique. The knowledge was assessed by using structured knowledge Questionnaire. The study results reveal that, majority of subjects 21 (70%) had an average knowledge and remaining 09(30%) had poor knowledge regarding post-menopausal osteoporosis. There was no association found between knowledge scores and their selected demographic variables. The study findings concluded that Overall knowledge scores regarding postmenopausal osteoporosis among perimenopausal women was average and there is a need of health educational programmes to improve their knowledge and take necessary steps to prevent and adequately manage post-menopausal osteoporosis.[20]

HYPOTHESES
H_1: There will be significant improvement in the level of knowledge on osteoporosis among community menopausal women after the information education and communication then before.
H_2: There will be significant association between post-test level of knowledge on osteoporosis and its contributing factors and selected socio demographic variable of menopausal women at community area.

MATERIAL AND METHODS

Quantitative research approach was used. Pre experimental design (one group pre-test and post-test design) was adopted to carry out the present study.\
Setting of the study:

Research setting is the physical location and condition in which data collection takes place. This study was conducted in Leggere primary health centre, Bangalore. It was **5 km** distant from Sarvodaya College of nursing.

Population:
The term population refers to the entire aggregate or totality of all subjects or numbers that confirm to a set of specifications. In this present study, target population consisted of community women and accessible population consisted of community women of selected community, Bangalore.

Sample:
Sample consists of the subject of the population selected to participate in a research study. In this present study, the sample consisted of 60 community women from selected community area, Bangalore.

Sampling technique:
Sampling refers to the process of selecting the portion of population to represent the entire population. In the present study, Non Probability Convenient Sampling technique was adopted to select 60 samples.

Description of the tool:
Section A: Demographic data
The first part of the tool consisted of 10 items of obtaining information about the selected background factors such as age, educational level, family income, marital status, occupation, dietary pattern, and age at menopause, history of previous illness, history of fracture and source of information. The sample were requested to mark as (✓) for the data.

Section B: Knowledge questionnaire
The second part of the tool consisted of 30 knowledge items. Each question has 4 responses with which 1 correct response and 3 distracters. Score 1 was given for correct response in a single question and score 0 was given for wrong response. The total number of responses were 30, giving rise to maximum score of 30.

The knowledge level has been arbitrarily divided into three categories based on the scores.
   Adequate knowledge – (Above 75%)
   Moderate adequate knowledge – (51- 75%)
   Inadequate knowledge- (less than or equal to 50%)

Reliability of the tool
In order to establish the reliability of the tool, split- half method was used. The tool was administered to 6 subjects and the test was first divided into two equivalent halves and correlation of the half test was found by using Karl Pearson's co- efficient formula and reliability was estimated using Spearman's Brown Prophecy formula.
The reliability of the tool was 0.9267. Hence, the tool was found highly reliable for the data collection.

Data collection process
The data collection period was scheduled from 20/12/2018 to 25/01/2019. Before the data collection the investigator obtained the formal permission from the Medical Officer, Primary health centre, Leggere, Bangalore to conduct the study. After a brief introduction of self, the investigator and the menopausal women were seated in a quiet place facing each other. The purpose of the study was explained to the community menopausal women and confidentially was assured. After the pre-test, IEC was administered on the same days to the participants. On seventh day post-test was given using the same questionnaire to evaluate the effectiveness of information education and communication.

Plan for data analysis:
        The data was analysed on the basis of objectives and hypothesis of the study. The collected data through administration of questionnaire was analysed by descriptive and inferential statistics, which are necessary to provide substantial summary of results. The analysed data has been organized and presented in the form of tables, diagrams and graphs. Data was analyzed by using:

➢ The level of significance was set at 0.05 levels to test the significance of difference.
➢ Frequency and percentage was used to analyse the demographic variables.
➢ Knowledge of the community women was analysed in terms of frequency, percentage, mean and standard deviation.
➢ Further statistical significance of the effectiveness of information education and communication was analyzed by paired "t" test.

➤ Association between knowledge of community women and demographic variable was assessed by Chi-square test.

RESULT

Table 1.Depicts frequency and percentage distribution of Demographic Characteristics of menopausal women **,**the overall pre-test knowledge score among menopausal women, majority 40(66.7) of the menopausal women had inadequate knowledge, 20(33.3) had moderate knowledge and none had adequate knowledge. Whereas in the overall post- test knowledge score, none had inadequate knowledge, 18(30.0%) had moderate knowledge and 42(70.0%).

Table no.1 describes the demographic characteristics of the samples, to educational status, marital status, employement & family income

Characteristics	Category	Respondents	
		Number	Percent
Age group (years)	45-49	14	23.3
	50-54	35	58.3
	55-56	11	18.4
Educational level	Up to SSLC	50	83.3
	PUC	10	16.7
Marital status	Married	56	93.3
	Widow	4	6.7
Occupation	Employed	21	35.0
	Unemployed	17	28.3
	Semi-skilled workers	22	36.7
Family income/month	<Rs.5000	13	21.7
	Rs.5001-10000	30	50.0
	Rs.10001-15000	17	28.3
Total		60	100.0

 Table no.2 depicts Classification of Respondents by Related Characteristics such as diet pattern ,age of community women at menopause among 60 (100%), history of previous illness such as suffering with diabetes mellitus, Hypothyroidism/Hyperthyroidism, 8 Hypertension/ Hypotension, previous source of information regarding osteoporosis.

Table no.2 depicts Classification of Respondents by Related Characteristics

N=60

Characteristics	Category	Respondents	
		Number	Percent
Dietary pattern	Vegetarian	29	48.3
	Non vegetarian	31	51.7
Age at menopause (years)	45-48	22	36.7
	49-52	38	63.3
History of previous illness	Diabetes mellitus	31	51.7
	Hypothyroidism/ Hyperthyroidism	14	23.3
	Hypertension/ Hypotension	8	13.3
	None	7	11.7

Know & Source about osteoporosis	No	22	36.7
	Family/Friends/relatives/ Neighbors	9	15.0
	Health professional	29	48.3
Total		60	100.0

Table -3& **Table- 4** observed that in the general information regarding osteoporosis during pre-test, mean knowledge is found and the standard deviation. In the aspect of Etiology and Contributing factors, Signs, symptoms and Complications, Diagnostic evaluation and Management mean knowledge ,Preventive measures So the combined mean of knowledge and standard deviation.

Table – 3: Overall and Aspect wise Pre test Knowledge Scores Respondents on Osteoporosis and its contributing factors

Classification of Respondent Pre test Knowledge level on Osteoporosis and its contributing factors

Knowledge Level	Category	Respondents	
		Number	Percent
Inadequate	≤ 50 % Score	40	66.7
Moderate	51-75 % Score	20	33.3
Adequate	> 75 % Score	0	0.0
Total		60	100.0

Table -4. Aspect wise Pre test Mean Knowledge scores of Respondents on Osteoporosis and its contributing factors

N=60

No.	Knowledge Aspects	Statements	Max. Score	Knowledge Scores			
				Mean	SD	Mean(%)	SD(%)
I	General information	5	5	3.77	0.8	75.3	15.6
II	Incidence	2	2	1.27	0.7	63.3	37.5
III	Etiology and Contributing factors	6	6	2.27	1.1	37.8	18.7
IV	Signs, symptoms and Complications	5	5	1.93	1.3	38.7	26.5
V	Diagnostic evaluation and Management	5	5	2.18	0.5	43.7	10.0
VI	Preventive measures	7	7	2.80	1.1	40.0	16.2
	Combined	30	30	14.22	2.5	47.4	8.2

Table -5- Aspect wise Post test Mean Knowledge scores of Respondents on Osteoporosis and its contributing factors

N=60

No.	Knowledge Aspects	Stateme	Max.	Knowledge Scores

		nts	Score	Mean	SD	Mean(%)	SD(%)
I	General information	5	5	4.57	0.5	1.72	9.9
II	Incidence	2	2	1.72	0.5	85.8	22.5
III	Etiology and Contributing factors	6	6	4.73	0.9	78.9	14.6
IV	Signs, symptoms and Complications	5	5	3.72	0.5	74.3	10.5
V	Diagnostic evaluation and Management	5	5	4.05	0.8	81.0	16.9
VI	Preventive measures	7	7	5.53	1.2	79.0	17.2
	Combined	30	30	24.32	2.3	81.1	7.5

Table – 6: Over all Pre test and Post test Mean Knowledge scores on Osteoporosis and its contributing factors

N=60

Aspects	Max. Score	Knowledge Scores				Paired 't' Test
		Mean	SD	Mean (%)	SD (%)	
Pre test	30	14.22	2.5	47.4	8.2	40.16*
Post test	30	24.32	2.3	81.1	7.5	
Enhancement	30	10.10	2.0	33.7	6.5	

* Significant at 5% level,   t (0.05, 59 df) = 1.96

Table -7. Effectiveness of effects of information, education on knowledge regarding osteoporosis. Aspect wise Mean Pre test and Post test Knowledge scores on Osteoporosis and its contributing factors

N = 60

No.	Knowledge Aspects	Respondents Knowledge (%)						Paired 't' Test
		Pre test		Post test		Enhancement		
		Mean	SD	Mean	SD	Mean	SD	
I	General information	75.3	15.6	91.3	9.9	16.0	19.3	6.42*
II	Incidence	63.3	37.5	85.8	22.5	22.5	24.9	7.00*
III	Etiology and Contributing factors	37.8	18.7	78.9	14.6	41.1	11.6	27.44*
IV	Signs, symptoms and Complications	38.7	26.5	74.3	10.5	35.7	21.6	12.80*
V	Diagnostic evaluation and Management	43.7	10.0	81.0	16.9	37.3	17.7	16.32*
VI	Preventive measures	40.0	16.2	79.0	17.2	39.0	15.6	19.36*
	Combined	47.4	8.2	81.1	7.5	33.7	6.5	40.16*

* Significant at 5% level,   t (0.05, 59 d f) = 1.96

Table –8 Classification of Respondents on Pre test and Post test Knowledge level on Osteoporosis and its contributing factors

Knowledge Level	Category	Classification of Respondents				χ^2 Value
		Pre test		Post test		
		N	%	N	%	
Inadequate	≤ 50 % Score	40	66.7	0	0.0	82.10*

Moderate	51-75 % Score	20	33.3	18	30.0	
Adequate	> 75 % Score	0	0.0	42	70.0	
Total		60	100.0	60	100.0	

* Significant at 5% level, $\chi^2 (0.05, 2df) = 5.991$

Table – 9: Association between Demographic variables with Post test Knowledge level on Osteoporosis and its contributing factors, Association between Demographic variables and Post test Knowledge level on Osteoporosis and its contributing factors

n=60

Demographic Variables	Category	Sample	Knowledge Level				χ^2 Value	P Value
			Moderate		Adequate			
			N	%	N	%		
Age group (years)	45-49	14	5	35.7	9	64.3	8.90*	P<0.05 (5.991)
	50-54	35	6	17.1	29	82.9		
	55-56	11	7	63.6	4	36.4		
Educational level	Up to SSLC	50	16	32.0	34	68.0	0.57 NS	P>0.05 (3.841)
	PUC	10	2	20.0	8	80.0		
Marital status	Married	56	17	30.4	39	69.6	0.05 NS	P>0.05 (3.841)
	Widow	4	1	25.0	3	75.0		
Occupation	Employed	21	8	38.1	13	61.9	1.21 NS	P>0.05 (5.991)
	Unemployed	17	5	29.4	12	70.6		
	Semi-skilled	22	5	22.7	17	77.3		
Family income/month	<Rs.5000	13	9	69.2	4	30.8	14.40*	P<0.05 (5.991)
	Rs.5001-10000	30	8	26.7	22	73.3		
	Rs.10001-15000	17	1	5.9	16	94.1		
Dietary pattern	Vegetarian	29	5	17.2	24	82.8	4.35*	P<0.05 (3.841)
	Non vegetarian	31	13	41.9	18	58.1		
Age at menopause (years)	45-48	22	3	13.6	19	86.4	4.43*	P<0.05 (3.841)
	49-52	38	15	39.5	23	60.5		
History of previous illness	Diabetes mellitus	31	10	32.3	21	67.7	4.27 NS	P<0.05 (7.815)
	Hypothyroidism/ Hyperthyroidism	14	5	35.7	9	64.3		
	Hypertension/ Hypotension	8	0	0.0	8	100.0		
	None	7	3	42.9	4	57.1		
History of illness	Yes	17	2	11.8	15	88.2	3.86*	P<0.05 (3.841)
	No	43	16	37.2	27	62.8		
Know &about osteoporosis	Yes	38	10		28		0.67 NS	P>0.05 (3.841)
	No	22	8	36.4	14	63.6		
Source of information	Family/Friends/ Relatives/Neighbors	9	2	22.2	7	77.8	0.76 NS	P>0.05 (5.991)
	Health professional	29	8	27.6	21	72.4		
	No	22	8	36.4	14	63.6		
Combined		60	18	30.0	42	70.0		

* Significant at 5% Level, NS: Non-significant

The above table 9 shows the association between pre test knowledge scores with the selected demographic variables. The association between knowledge level and age group reveals that the chi square value 8.90 was greater than the table value. This infers that there was a significant associated between age group and knowledge level at 0.05 level of significance. In the type of education level, chi square value 0.57 was less than the table value. This infers that there was no significant association between type of education level and knowledge level at 0.05 level of significance. With regard to marital status, chi square value 0.05 was less than the table value. This infers that there was no significant association between marital status and knowledge level at 0.05 level of significance. In relation to occupation, chi square value1 .21 was greater than the table value. This infers that there was no significant association between occupation and knowledge level at 0.05 level of significance. In concern to family income / month, chi square value 14.40 was less than the table value. This infers that there was a significant association between family income / month and knowledge level at 0.05 level of significance. In regard to dietary

pattern, chi square value 4.35 was greater than the table value. This infers that there was a significant association between dietary pattern and knowledge level at 0.05 level of significance.

In relation to age at menopause, chi square value 4.43 was less than the table value. This infers that there was a significant associated between area of residence and knowledge level at 0.05 level of significance. Hence the hypothesis H_2 which was stated that there will be significant association between knowledge regarding osteoporosis among community menopausal women and selected socio demographic variables was accepted for age group, family income/month, dietary pattern, age at menopause. And hypothesis H_2 was rejected for education level, marital status, occupation, history of previous illness.

DISCUSSION

In this section, 60 menopausal women were selected for research study from laggere community area Bangalore. Findings related to demographic variables were discussed as follows: In relation to age the majority 35 (58.3%) were in the age group of 50-54 years, followed by 14 (23.3%) in the group of 45-49years, 11 (18.4%) belonged to the age group of 55-56 years. With regard to educational status, 50 (83.3%) of the community women were educated up to secondary level, 10 (16.7%) have PUC in the study group. With respect to marital status, among 60 (100%) community women, 56(93.3%) women were married, 4(6.7%) were widows. In relation to occupation aspect of community women among 60 (100%), majorities 22 (36.7%) were semi-skilled worker and 21 (35.0%) were employed, 17(28.3%) of the community women were unemployed. With the relation to family income per month among 60(100%) of community women, 13(21.7%) were less than Rs. 5000, 30(50.0%) between Rs.5001-10000, and 17(28.3) were Rs.10001-15000.Regarding diet pattern wise among 60(100%) majority 31(51.7%) respondents are non-vegetarian and 29(48.3%) respondents are having vegetarian. In relation to age of community women at menopause among 60 (100%), 38(63.3%) were between49-52, and 22(36.7%) were 45-48.With the relation of history of previous illness present among 60(100%) community women shown that among them majority of women 31 (51.7) are suffering with diabetes mellitus, 14(23.3) are suffering with Hypothyroidism/Hyperthyroidism, 8(13.3%) are suffering with Hypertension/ Hypotension and only 7(11.7%) are not have any health issues. It is also reveals that among all participants 22(36.7%) didn't have any previous source of information regarding osteoporosis but remaining 9(15.0%) participants are having previous source of information about the topic from Family/Friends/relatives/Neighbors and majority women having previous source of information health professional.

The overall pre-test mean knowledge score obtained by the women was 14.22(47.4%) with the standard deviation of 2.5 (8.2%)., which showed that the community menopausal women had inadequate knowledge regarding osteoporosis and its contributing factor.

The third objective was to determine the association between post-test level of knowledge on osteoporosis and its contributing factors among menopausal women and selected demographic variables.

The association between knowledge level and age group reveals that the chi square value 8.90 was greater than the table value. This infers that there was a significant associated between age group and knowledge level at 0.05 level of significance.

- In the type of education level, chi square value 0.57 was less than the table value. This infers that there was no significant association between type of education level and knowledge level at 0.05 level of significance.
- With regard to marital status, chi square value 0.05 was less than the table value. This infers that there was no significant association between marital status and knowledge level at 0.05 level of significance.
- In relation to occupation, chi square value1 .21 was greater than the table value. This infers that there was no significant association between occupation and knowledge level at 0.05 level of significance.
- In concern to family income / month, chi square value 14.40 was less than the table value. This infers that there was a significant association between family income / month and knowledge level at 0.05 level of significance.
- In regard to dietary pattern, chi square value 4.35 was greater than the table value. This infers that there was a significant association between dietary pattern and knowledge level at 0.05 level of significance.
- In relation to age at menopause, chi square value 4.43 was less than the table value. This infers that there was a significant associated between area of residence and knowledge level at 0.05 level of significance..

Hence the hypothesis H_2 which was stated that there will be significant association between knowledge regarding osteoporosis among community menopausal women and selected socio demographic variables was accepted for age

group, family income/month, dietary pattern, age at menopause. And hypothesis H_2 was rejected for education level, marital status, occupation, history of previous illness.

➢ In the socio-demographic data, among 60 participants, the majority 35 (58.3%) were in the age group of 50-54 years the majority 50 (83.3%) of the community women were educated up to secondary level, majority 56(93.3%) of women were married, almost 22(36.7%) of the women were semi-skilled, majority 30(50.0%) of the women family income/month were 5001-10000, majority 31(51.7%) were respondants are non vegetarian, majority 38(63.3%) of the community women were got menopause at 49-52, majority 31(51.7%) of the women were suffering with diabetes mellitus, most 29(48.3%) of the women were having previous source of information from health professional.

➢ The knowledge regarding osteoporosis and its contributing factors was inadequate when assessed in the pre-test and was improved in the post-test.

➢ The structured teaching program was effective in improving knowledge of community women regarding osteoporosis and its contributing factors. Hence the research hypothesis H_1 was accepted.

➢ Statistically it was found that there was a significant association between post-test knowledge and selected variables with respect to for age group, family income/month, dietary pattern, age at menopause and non significant for education level, marital status, occupation, history of previous illness Hence, H_2 was accepted for the above selected variables.

Overall all experiences of conducting this study were very good learning experience. The community women were happy regarding IEC. This experience will help the investigator to take further research studies in the future.

CONCLUSION

In the socio-demographic data, among 60 participants, the majority 35 (58.3%) were in the age group of 50-54 years the majority 50 (83.3%) of the community women were educated up to secondary level, majority 56(93.3%) of women were married, almost 22(36.7%) of the women were semi-skilled, majority 30(50.0%) of the women family income/month were 5001-10000, majority 31(51.7%) were respondants are non vegetarian, majority 38(63.3%) of the community women were got menopause at 49-52, majority 31(51.7%) of the women were suffering with diabetes mellitus, most 29(48.3%) of the women were having previous source of information from health professional.

The knowledge regarding osteoporosis and its contributing factors among menopausal women was inadequate when assessed in the pre-test. And the knowledge level was improved in the post-test.

The overall pre-test mean knowledge score obtained by the women was 14.22(47.4%) with the standard deviation of 2.5 (8.2%) which showed that community menopausal women had inadequate knowledge regarding osteoporosis and its contributing factor.

The overall post-test mean knowledge score obtained by the sexual minorities was 24.32 (81.1%) with the standard deviation of 2.3 (7.5%) which showed which showed that community menopausal women had adequate knowledge regarding osteoporosis and its contributing factor.

The structured teaching program was effective in improving knowledge of community menopausal women regarding osteoporosis and its contributing factor. The overall mean knowledge level obtained by the community menopausal women following structured teaching program was 24.32 (81.1%) in post-test which was found to be higher than the overall knowledge level 14.22(47.4%) in the pre-test with an enhancement of 10.10 (33.7%). It was found to be statistically significant at the level of $P < 0.05$. Hence the research hypothesis H_1 stated that There will be significant improvement in the level of knowledge on osteoporosis among community menopausal women after the information education and communication then before STP at $p < 0.5$ level was accepted.Statistically it was found that there was a significant association between pre-test knowledge and selected variables with respect to age group, type of sexual minority, educational status, occupation and current residential status and non-significant with respect to marital status, religion, area of residence and history of substance abuse. Hence, H_2 was accepted for the above selected variables.

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