



A STUDY TO ASSESS THE EFFECTIVENESS OF STRUCTURE TEACHING PROGRAMME ON KNOWLEDGE REGARDING CALCIUM DEFICIENCY DISORDERS AMONG POSTMENOPAUSAL WOMEN IN A SELECTED AREA OF MEHSANA CITY, GUJARAT

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Abstract: This study assessed the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding calcium deficiency disorders among postmenopausal women in Mehsana City. A quasi-experimental pre-test and post-test design was adopted. The baseline knowledge of participants was assessed before implementing the STP. Post-test evaluation was conducted to measure knowledge gain after the intervention. The mean knowledge score in the experimental group increased from 9.90 ± 5.24 to 16.50 ± 2.62 . The calculated t-value (5.87) was statistically significant at the 0.05 level. In contrast, the control group showed no significant improvement in knowledge scores. The findings demonstrated that the STP effectively enhanced awareness regarding calcium deficiency disorders. Most participants improved from poor or average knowledge levels to good knowledge levels after the intervention. The study highlights the importance of educational programmes in promoting bone health among postmenopausal women.

I. INTRODUCTION

Menopause is a natural biological transition marking the end of a woman's reproductive phase, typically occurring between 45 and 55 years of age. The postmenopausal decline in estrogen levels adversely affects bone health, increasing the risk of calcium deficiency, osteoporosis, and fractures. These changes can significantly impact mobility, independence, and quality of life. Structured educational interventions can promote awareness, encourage adequate calcium intake, and support the prevention of long-term bone-related complications.¹

The STRAW+10 classification describes menopause as a progressive transition from perimenopause to postmenopause, characterized by hormonal changes and cessation of menstruation. Estrogen deficiency during this period contributes to bone loss, increased cardiovascular risk, and symptoms that can significantly affect women's health and quality of life.²

Indian women experience natural menopause at an average age of 46–47 years, approximately 4–5 years earlier than women in many developed countries, increasing the duration of postmenopausal health risks such as osteoporosis and cardiovascular disease.³

Postmenopausal estrogen deficiency disrupts bone remodeling and calcium metabolism, accelerating bone loss and significantly increasing the risk of osteoporosis and fragility fractures.⁴ Calcium is essential for maintaining bone strength, muscle contraction, nerve transmission, and normal blood clotting. Adequate calcium intake is particularly important in postmenopausal women to reduce osteoporosis risk and support overall health.⁵ Calcium homeostasis is regulated by parathyroid hormone, vitamin D, and calcitonin to maintain normal serum calcium levels and support bone health. In postmenopausal women, estrogen deficiency disrupts this balance, leading to increased bone loss and a higher risk of osteoporosis.⁶

Postmenopausal estrogen deficiency impairs vitamin D activation and calcium absorption, accelerating bone mineral density loss and increasing osteoporosis and fracture risk.⁷ Postmenopausal estrogen deficiency accelerates bone resorption, causing rapid loss of bone mineral density and deterioration of bone microarchitecture, particularly in trabecular bone. Combined with calcium and vitamin D deficiency, it increases bone fragility and substantially elevates the risk of osteoporosis and fractures.⁸ Postmenopausal estrogen deficiency, coupled with inadequate calcium absorption and intake, promotes bone loss, reduces bone mineral density, and increases the risk of osteoporosis and fragility fractures.⁹ Healthy lifestyle practices, including adequate calcium and vitamin D intake, regular weight-bearing exercise, and avoidance of smoking and excessive alcohol, help preserve bone health and reduce osteoporosis risk in postmenopausal women.¹⁰ Socioeconomic and cultural factors can limit calcium intake, vitamin D status, and access to preventive care, thereby increasing the risk of osteoporosis and bone loss in postmenopausal women.¹¹

This study aims to evaluate the effectiveness of a structured teaching program on improving the knowledge of COPD patients regarding pulmonary rehabilitation at Lions Hospital, Mehsana District, Gujarat.

II. MATERIAL AND METHODS

2.1 Study Design

A pre-experimental one-group pre-test post-test research design was adopted to evaluate the effectiveness of a structured teaching programme on knowledge regarding calcium deficiency disorder among post menopausal women in selected area of Mehsana District, Gujarat.

2.2 Study Setting

The study was conducted at residential area, Mehsana District, Gujarat, a tertiary care hospital that provides services to both rural and semi-urban populations.

2.3 Study Population and Sample

The study population comprised post-menopausal women residing in the selected areas of Mehsana city. A total sample size of 60 post-menopausal women was considered appropriate for this study.

2.4 Inclusion and Exclusion Criteria

Post-menopausal women aged 45 years and above 48 years, who are willing to participate and available during the period of data collection were included in study clients who were critically ill, had cognitive impairment or were unable to comprehend the teaching programme were excluded.

2.5 Research Tool

Data were collected using a validated structured knowledge questionnaire consisting of 25 multiple-choice items covering various aspect of calcium deficiency, including age, Gender, religion, marital status, education status, occupation, monthly family income, previous knowledge

2.6 Intervention

The intervention consisted of a structured teaching programme designed to improve knowledge regarding calcium deficiency disorders among post-menopausal women. The session was conducted using posters, charts, visual aids, and simple demonstrations to enhance understanding and interactive discussion focusing on Importance of calcium for post-menopausal women, Dietary sources of calcium, Role of vitamin D and sunlight exposure, Lifestyle modifications such as exercise, weight-bearing activities, and fall prevention.

2.7 Data Collection Procedure

On the first day, a pre-test was conducted to assess the baseline knowledge of post menopausal clients using the structured knowledge questionnaire. Following the pre-test, the structured teaching programme was administered to all participants. A post-test was conducted on the seventh day using the same questionnaire to assess the effectiveness of the intervention.

2.8 Ethical Considerations

Ethical clearance was obtained from the concerned institutional authority. Written informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity of the participants were maintained throughout the study.

2.9 Statistical Analysis

The collected data were coded and analysed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe the sample characteristics and knowledge scores. Inferential statistics, including the paired t-test and chisquare test, were used to determine the effectiveness of the structured teaching programme and the association between pre-test knowledge scores and selected socio-demographic variables. A p-value of less than 0.05 was considered statistically significant.

III. METHODOLOGY

The present study adopted a pre-experimental, one-group pre-test post-test design to evaluate the effectiveness of a structured teaching program on knowledge regarding calcium deficiency among postmenopausal women. The study was conducted at residential area, Mehsana District, Gujarat, which serves as a tertiary care centre catering to and rural populations. A total of 60 clients diagnosed with post - Menopausal were selected using purposive sampling based on predefined inclusion and exclusion criteria. To assess the baseline and post-intervention knowledge, a structured knowledge questionnaire consisting of 25 items covering various aspects of pulmonary rehabilitation was employed.

IV. RESULT AND DISCUSSION

Table 4.1: Distribution and Comparison of Pre-test and Post-test Knowledge Scores regarding Calcium Deficiency Disorder among Postmenopausal Women

Level of Knowledge	Experimental Group (n = 30)		Control Group (n = 30)	
	Pre-test F(%)	Post-test F (%)	Pre-test F (%)	Post-test F (%)
Poor (0–10)	16 (53.33%)	0 (0%)	13 (43.33%)	12 (40%)
Average (11–20)	14(46.67%)	27 (90%)	17 (56.67%)	18 (60%)
Good (21–30)	0 (0%)	3 (10%)	0 (0%)	0 (0%)
Total	30 (100%)	30 (100%)	30 (100%)	30 (100%)

Table 4.1 shows that the experimental group had a marked improvement in knowledge regarding calcium deficiency disorder after the structured teaching programme. In the pre-test, 53.33% had poor knowledge and none had good knowledge, whereas in the post-test, no participants remained in the poor category, 90% had average knowledge, and 10% had good knowledge. In contrast, the control group showed minimal change, with poor knowledge decreasing only from 43.33% to 40%, and no participants achieving good knowledge. These findings indicate that the structured teaching programme was effective in improving knowledge among postmenopausal women.

Table 4.2: Comparison of Pre-test and Post-test Knowledge Scores among Experimental and Control Groups

Group	Test	Mean	SD	Mean Difference	Calculate d t-value	Table t-value	Level of Significance
Experimental Group	Pre-test	9.90	5.24	6.60	5.87	2.05	Significant at p < 0.05
	Post-test	16.50	2.62				
Control Group	Pre-test	10.98	5.09	0.32	0.48	2.05	Not Significant
	Post-test	11.30	4.85				

Table 4.2 shows that the experimental group had a significant increase in mean knowledge score from 9.90 (SD = 5.24) in the pre-test to 16.50 (SD = 2.62) in the post-test, with a mean difference of 6.60. The calculated t-value (5.87) was significant at $p < 0.05$. In contrast, the control group showed only a slight increase from 10.98 (SD = 5.09) to 11.30 (SD = 4.85), with a mean difference of 0.32 and a non-significant t-value (0.48). These findings indicate that the structured teaching programme was effective in improving knowledge regarding calcium deficiency disorder among postmenopausal women.

Table 4.3: Comparison of Post-Test Knowledge Scores Regarding Calcium Deficiency Disorder Among Postmenopausal Women Between Experimental and Control Groups

Group	Sample Size (n)	Mean	Standard Deviation (SD)	Mean Difference	Table t- value	Significance
Experimental Group	30	16.50	2.62	5.20	3.78	Significant
Control Group	30	11.30	4.85			

The table shows a comparison of post-test knowledge scores between the experimental and control groups. The experimental group had a higher mean score (16.50 ± 2.62) than the control group (11.30 ± 4.85), with a mean difference of 5.20. The calculated t-value (3.78) was significant at $p < 0.05$, indicating a statistically significant difference between the groups. These findings demonstrate that the structured teaching programme effectively improved knowledge regarding calcium deficiency disorder among postmenopausal women.

Table 4.4: Association between Post-test Knowledge Scores and Selected Demographic Variables among Postmenopausal Women (Experimental Group)

Demographic Variable	df	Calculated χ^2 Value	Table χ^2 Value	Level of Significance
Age	2	5.21	5.99	Not Significant
Religion	1	0.85	3.84	Not Significant
Marital Status	3	7.12	7.81	Not Significant
Educational Status	3	9.45	7.81	Significant
Occupation	3	6.02	7.81	Not Significant
Monthly Family Income	3	8.67	7.81	Significant
Type of Family	2	3.95	5.99	Not Significant
Dietary Pattern	1	0.00	3.84	Not Significant
Source of Health Information	3	10.32	7.81	Significant

The table shows that educational status ($\chi^2 = 9.45$), monthly family income ($\chi^2 = 8.67$), and source of health information ($\chi^2 = 10.32$) had a significant association with post-test knowledge scores ($p < 0.05$). However, age, religion, marital status, occupation, type of family, and dietary pattern showed no significant association. These findings indicate that the structured teaching programme effectively improved knowledge among postmenopausal women, with education, income, and information source influencing the level of knowledge gain.

Table 4.5: Association between Post-test Knowledge Scores and Selected Demographic Variables among Postmenopausal Women (Control Group)

Demographic Variable	df	Calculated χ^2 Value	Table χ^2 Value	Level of Significance
Age	2	2.84	5.99	Not Significant
Religion	1	0.92	3.84	Not Significant
Marital Status	3	4.26	7.81	Not Significant
Educational Status	3	5.38	7.81	Not Significant
Occupation	3	3.95	7.81	Not Significant
Monthly Family Income	3	4.72	7.81	Not Significant
Type of Family	2	2.61	5.99	Not Significant
Dietary Pattern	1	0.00	3.84	Not Significant
Source of Health Information	3	5.96	7.81	Not Significant

Table 4.5 shows that none of the selected demographic variables had a statistically significant association with post-test knowledge scores in the control group ($p > 0.05$). Knowledge levels remained similar across all demographic categories, indicating no significant improvement. These findings suggest that demographic factors did not influence knowledge scores and support that the improvement observed in the experimental group was due to the structured teaching programme.

V. DISCUSSION

The present study was conducted to assess the effectiveness of a structured teaching programme on knowledge regarding calcium deficiency disorder among 60 postmenopausal women, including 30 in the experimental group and 30 in the control group in selected areas of Mehsana city.¹²

The findings revealed that the highest percentage (36.7%) of participants in the experimental group were above 60 years, while in the control group the highest percentage (26.7%) were in the age group of 50–54 and 55–59 years. The majority of participants in both groups belonged to the Hindu religion (96.7%) and were married (53.3%). Regarding education, the highest percentage had primary education (36.7% in experimental and 40% in control group).¹³

In terms of occupation, the highest percentage (60%) in the experimental group were skilled workers, whereas in the control group the highest percentage (70%) were homemakers. Most participants belonged to the monthly income group of ₹20,001–30,000 (33.3% experimental and 40% control), and the highest percentage lived in nuclear families (46.7%) in the experimental group and joint families (46.7%) in the control group.¹⁴

All participants (100%) followed a vegetarian diet. The highest percentage of participants in the experimental group received health information from mass media (30%), while in the control group it was mainly from health workers (50%). In the pre-test, the highest percentage of participants had poor knowledge (53.3% experimental and 43.3% control), whereas after the structured teaching programme, the

highest percentage (90%) in the experimental group improved to average knowledge and 10% achieved good knowledge, while in the control group the highest percentage (60%) remained at average level with no significant improvement.¹⁵

The mean knowledge score in the experimental group increased from 9.90 ± 5.24 to 16.50 ± 2.62 with a statistically significant difference ($t = 5.87, p < 0.05$), whereas the control group showed only a slight and non-significant improvement. A significant association was found between post-test knowledge and variables such as educational status, monthly 85 income, and source of health information, while other variables showed no significant association. Overall, the findings clearly indicate that the structured teaching programme was effective in improving knowledge regarding calcium deficiency disorder among postmenopausal women.¹⁶

VI. CONCLUSION

The study demonstrated that the structured teaching programme was effective in improving knowledge regarding calcium deficiency disorders among postmenopausal women. Significant associations were found between post-test knowledge and educational status, monthly family income, and source of health information, while other demographic variables showed no significant association. The findings support the use of structured educational interventions to enhance awareness and knowledge of calcium deficiency among postmenopausal women.

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VIII. CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this research article.

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