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Effectiveness of a Video-Assisted Teaching Programme on Knowledge Regarding Osteoporosis Among Teachers

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ABSTRACT

Osteoporosis has been described as a silent disease due to loss of bone without any symptoms until it results in fractures [1]. Worldwide, more than 8.9 million osteoporotic fractures occur per year [2]. It affects both genders widely, requiring public awareness that may help reduce the prevalence and make effective prevention. An adequate calcium-rich diet, regular vitamin D availability, regular weight-bearing exercises, and avoidance of smoking/alcohol can help control the risk of osteoporosis to some extent. This needs regular education and awareness among people who are at risk of developing osteoporosis. This study mainly aims to assess the pre-test and post-test knowledge scores, with the help of a video-assisted teaching programme among school teachers.

Quantitative pre-experimental, pre-test, post-test study design was used for a sample of 40 teachers, selected via simple random sampling from a selected school in Lucknow city, Uttar Pradesh. The mean score was 15.08 in the pre-test (5% had adequate knowledge, 85% had moderate knowledge & 10% had inadequate knowledge) and 20 in the post-test (57.5% had adequate knowledge, 42.5% had moderate knowledge & none of them had inadequate knowledge), thus shows video assisted teaching programme as an effective intervention in improving knowledge level ($t=15.24$, $p<0.05$). There was a significant association was found between pre-test knowledge with gender, and prior knowledge regarding osteoporosis, but no association was found with age group, menopausal status (in case of females), family type, religion, monthly income, dietary pattern, any history of orthopedic diseases, and family history of osteoporosis.

KEYWORDS: Effectiveness, Osteoporosis, Video-Assisted Teaching Programme, Knowledge, Teachers.

INTRODUCTION

Osteoporosis is a debilitating bone condition due to the loss of mineral, leading to brittle bones and high susceptibility to fractures; hence, it is one of the major health issues of concern in the world, which can only be addressed with initial treatment. Although about 80 percent of the victims of osteoporosis are

women, it is owing to the growing male longevity that denotes the increasing scope of osteoporosis in men [3]. Old age naturally causes rapid loss of bones, and the highest bone mass increases are usually obtained between the ages of 20-30 years, after which bone mass decreases in the late 30s in women and the early 40s in men [4]. The burden of Osteoporosis is huge globally, accounting for more than 8.9 million fracture occurrences daily all around the world, representing one fracture in every three seconds [5]. It is estimated that 25 million people are affected in India, and the age of osteoporotic fracture incidence is younger in the Indian population than those in the West, which can be largely blamed on vitamin D deficiency in the country [6].

A recent North Delhi study showed not only a high prevalence of 64.91% among the females and 62.63% among the males but also a dramatic rise as compared to the past national numbers of estimation [7]. According to the results of the National Health and Nutrition Examination Survey 2017-2018, 43.1% of adults aged 50 years and older living in the US had low bone mass, with women being more prevalent than men [8]. International studies have shown that the loss of lives due to low bone mass density rose by 111.16% since the year 1990 to 2019, with India assuming the maximum disease burden of 25.59% of all global disability-adjusted life-years due to a fracture [9].

Osteoporosis, one of the leading diseases that causes bone destruction. Poor calcium intake, absence of physical exercise, and sedentary lifestyle are all modifiable by education and lifestyle interventions as risk factors [10]. The overall objective of the study is to determine whether a Video-Assisted Teaching Programme can be successful in educating the school teachers (population) in the city of Lucknow about osteoporosis, since they are an important key for the transfer of the community health education and prevention interventions to the younger ones.

PROBLEM STATEMENT

"A study to assess the effectiveness of a video-assisted teaching Programme on knowledge regarding osteoporosis among teachers of selected schools in Lucknow, (U.P.)"

OBJECTIVES

- To assess the pre-test knowledge score regarding Osteoporosis among school teachers.
- To assess the post-test knowledge score regarding Osteoporosis among school teachers.
- To evaluate the effectiveness of the Video Assisted Teaching Programme on knowledge regarding Osteoporosis among school teachers.
- To find out the association between pre-test knowledge score with their selected demographic variables.

HYPOTHESIS

H_1 – There will be a significant effect of the Video Assisted Teaching Programme on knowledge regarding Osteoporosis among teachers in a selected school of Lucknow, (U.P.).

H_2 - There will be a significant association between pre-test knowledge score with their selected demographic variables.

INCLUSION CRITERIA

- Teachers working in a selected school at Lucknow, U.P. and selected by a simple random sampling technique.

- Teachers who are willing to participate in the study and are available during data collection.

EXCLUSION CRITERIA

- Teachers working in other schools in Lucknow, U.P., and non–teaching staff.
- Teachers who are not willing to participate in the study and not available during data collection.

RESEARCH METHODOLOGY

The study employed a quantitative one-group pre-test post-test research design, with the main aim to assess the knowledge levels regarding osteoporosis and their association with selected demographic variables [11]. A pilot study was conducted among 10% of the sample to ensure the feasibility and reliability of the tool at St. Anthony's Inter College, Lucknow [12]. In the pre-test, 75% of the sample showed moderate knowledge while 25% had inadequate knowledge (mean score 15.25 and SD 3.594). In the post-test, 100% of the sample demonstrated adequate knowledge (mean score 20 and SD of 2.708). The reliability of the tool was evaluated by Karl Pearson's coefficient of correlation formula (r value = 0.96214) [13], and it has been validated by 9 experts. Thus, the study was found feasible employing time, economic expenses, and the tool was used for the main study [14].

After obtaining formal written permission from the administrative authority and approval from the ethical committee, a simple random sampling technique, the lottery method, was used to select a sample of 40 school teachers at Maharaja Agrasen Public School, Lucknow. In-depth information regarding the study was given to the subjects, and written consent was obtained from them; also assured anonymity and confidentiality during the complete study [15]. Video-assisted teaching was the independent variable in the study, and the dependent variable was knowledge regarding osteoporosis. Demographic variables such as age, gender, family type, income, religion, dietary pattern, knowledge regarding osteoporosis, and history of osteoporosis or any other orthopedic disease were also collected. A self-structured knowledge questionnaire consists of 30 questions, carries 1 mark for each, and was used for collecting data regarding knowledge on osteoporosis. This study's conceptual framework is derived from Ernestine Widenbach's Helping Art of Clinical Nursing Theory (1969).

DATA ANALYSIS AND INTERPRETATION

The collected data were systematically organized in a master sheet and analyzed by using descriptive and inferential statistics.

1. Demographic Characteristics of Participants

From the study participants, 32.5% belong to the age group of 24-30 years, and the majority of them were females (80%), out of which 90.6% are of reproductive age. The majority (55%) of them are from joint families, and belong to the Hindu religion (72.5%); most of them (45%) have a monthly income of Rs. 21,000-30,000/-, and 72.5% of them had a choice of non-vegetarian food. 95% of participants do not have a history of any orthopedic disease, and 75% have no family history of osteoporosis. Only 37.5% had previous knowledge regarding osteoporosis, especially from the internet (40%).

N=40

DEMOGRAPHIC VARIABLES	CATEGORY	FREQUENCY	PERCENTAGE
1. Age in years	24-30 years	13	32.5%
	31- 40 years	12	30%
	41-50 years	10	25%

	51 years and above	05	12.5%
2. Gender	Male Female Others	08 32 00	20% 80% 0%
In the case of a female, has menopause been attained?	Yes No	03 29	9.4% 90.6%
3. Family type	Extended family Joint family Nuclear family	0 22 18	0% 55% 45%
4. Religion	Christian Hindu Muslim Sikh Others	02 29 02 04 03	5% 72.5% 5% 10% 7.5%
5. Monthly income	Below Rs. 20,000/- Rs.21,000-30,000/- Rs.31,000-40,000/- Rs.41,000 and above	07 08 12 13	17.5% 20% 30% 32.5%
6. Dietary pattern	Non - Vegetarian Eggetarian Vegetarian	29 04 07	72.5% 10% 17.5%
7. Any history of orthopedic disease?	Yes No	02 38	5% 95%
8. Any family history of osteoporosis?	Yes No	10 30	25% 75%
9. Previous knowledge regarding osteoporosis	Yes No	15 25	37.5% 62.5%
If yes, how was the knowledge obtained	Books Workshops/ seminar Internet Others	05 04 06 00	33.33% 26.67% 40% 0%

Table 1: Demographic Characteristics of Participants

2. Pre-test knowledge score

The pre-test knowledge score of participants regarding osteoporosis was categorised into adequate level (score 20-30), moderate level (score 11-20), and inadequate level (score 0-10); it was mostly moderate level (85%). 10% had inadequate knowledge, and only 5% had adequate knowledge. The mean pre-test score was 15.08, and the SD was 3.45.

N=40

Level of knowledge	Frequency	Percentage	Mean	SD
Adequate	2	5%		
Moderate	34	85%	15.08	3.45
Inadequate	4	10%		

Table 2: Pre-test knowledge score

3. Post-test knowledge score

After the administration of the video-assisted teaching strategy, a post-test was administered. 57.5% of the participants showed adequate knowledge, 42.5% of them demonstrated moderate knowledge, and none of them had inadequate knowledge. The mean post-test score was 20 with SD 3.15.

N=40

Level of knowledge	Frequency	Percentage	Mean	SD
Adequate	23	57.5%		
Moderate	17	42.5%	20	3.15
Inadequate		0%		

Table 3: Post-test knowledge score

4. Comparison between pre-test and post-test and effectiveness of video-assisted teaching Programme

The tool consists of 30 structured questionnaires that were used to test the knowledge. Mean of post-test (20) was higher than the mean of pre-test (15.08), and the paired t-test score was 15.25 (p-value <0.05). Since the value of the t-test is more than the table value, it is statistically proven that the teaching strategy was effective in improving the knowledge regarding osteoporosis among school teachers.

N=40

Level of knowledge	Mean	Mean Percentage	SD	Paired t-test	p-value
Pre-test	15.08	49.83%	3.45	15.25	<0.05
Post-test	20	63.58%	3.15		

Table 4: Comparison between pre-test and post-test

5. Association between demographic variables with the pre-test knowledge score

The study found that, there is no significant association between age, menopause attained (in case of female), family type, religion, monthly income, dietary pattern, history of orthopaedic diseases and family history of Osteoporosis with pre-test knowledge score; but there is significant association between gender as well as previous knowledge regarding osteoporosis with the pre-test knowledge score.

N=40

Demographic Variables	Knowledge level			Chi-square	df	P-value	Significance
	Adequate	Moderate	Inadequate				
1. Age in years a) 24- 30 years	0	13	0				

b) 31- 40 years	1	8	3	8.80	6	>0.05	**NS**
c) 41-50 years	0	9	1				
d) 51 years and above	1	4	0				
2. Gender							
a) Male	2	6	0				
b) Female	0	28	4	9.12	4	<0.05	**S**
c) Others	0	0	0				
In the case of a female, has menopause been attained?							
a) Yes	0	3	0	0.473	2	>0.05	**NS**
b) No	4	25	0				
3. Family type							
a) Extended family	0	0	0	1.73	4	>0.05	**NS**
b) Joint family	2	18	2				
c) Nuclear family	2	16	0				
4. Religion							
a) Christian	0	2	0				
b) Hindu	2	24	3				
c) Muslim	0	1	1	4.711	8	>0.05	**NS**
d) Sikh	0	3	1				
e) Others	0	3	0				
5. Monthly income							
a) Below Rs. 20,000/	0	7	0				
b) Rs. 21,000-30,000/	1	6	1	3.675	6	>0.05	**NS**
c) Rs. 31,000-40,000/	0	10	2				
d) Rs. 41,000 or above	1	11	1				
6. Dietary pattern							
a) Non-Vegetarian	2	23	4				
b) Eggetarian	0	4	0	2.677	4	>0.05	**NS**
c) Vegetarian	0	7	0				
7. Any history of orthopedic disease?	1	1	0				
a) Yes	1	34	3	9.023	2	<0.05	**S**
b) No							
8. Family history of osteoporosis	1	8	1				
a) Yes	1	26	3	0.706	2	>0.05	**NS**
b) No							
9. Do you have any previous knowledge regarding osteoporosis?	2	12	1				
a) Yes	0	22	3	3.671	2	>0.05	**NS**
b) No							

If yes, how was the knowledge obtained	1	4	0				
a) Books	0	4	0	0.855	6	>0.05	
b) Workshops/ seminar	1	5	0				**NS**
c) Internet	0	0	0				
d) Others							

Table 5: Association between demographic variables with the pre-test knowledge score.
(S: Significant) (NS: Non-Significant)

DISCUSSION AND CONCLUSION

This study mainly aimed to assess the knowledge among school teachers and the effectiveness of video-assisted teaching regarding osteoporosis. A self-structured knowledge questionnaire, with a reliability of 0.96214, was used for collecting data. A total of 40 samples were selected by a simple random sampling method for data collection. Pre-test knowledge, post-test knowledge, difference between pre and post-test, and association of demographic variables with the pre-test knowledge score were assessed.

Pre-test knowledge score regarding Osteoporosis among school teachers.

The data from the current study indicate that among the teachers, only 5% demonstrated adequate knowledge, 85% had moderate knowledge, and 10% exhibited inadequate knowledge regarding osteoporosis. The mean score for the pre-test was 15.08, with a standard deviation of 3.45. These results are supported by another study (Arya S., Roy M. et al. (2019)) conducted to evaluate how the implementation of a structured teaching programme improved the knowledge levels about menopausal osteoporosis among women in peri-menopausal status in a selected community area of Kollam, Kerala. Only 3.33 percent had good knowledge, 45 percent showed moderate knowledge, and 51.67 percent had poor knowledge in their study. The mean knowledge score (4.72) and standard deviation (4.01) indicate a high proportion of people who lacked knowledge about Osteoporosis in the population sampled [16].

These findings collectively highlight the need for targeted educational interventions to address and improve knowledge levels regarding osteoporosis, regardless of category.

Post-test knowledge score regarding Osteoporosis among school teachers.

A sharp increase as portrayed by the participants in the post-test; i.e., 57.5% of the participants showed adequate knowledge, 42.5% of them demonstrated moderate knowledge, and none of them had inadequate knowledge. The mean score after the test rose to 20 (SD = 3.15), and the t-value was calculated as 15.25, which showed that the given improvement was statistically significant. Notably, the post-test that is devoid of teachers who lack proper knowledge in the post-test reflects the effectiveness of the programme in enhancing overall knowledge of participating teachers.

These findings align with a descriptive study by Lata H, Kaur S (2023), in assessing the effectiveness of a planned teaching programme on menopause-related processes and prevention among premenopausal women in selected areas at Chamba, Himachal Pradesh. They found that the pretest mean score was 14.86±4.36, and the post-test mean score increased to 20.05±5.14, resulting in a mean difference of 5.18. The paired t-test indicated statistical significance (t value=6.773, p=0.001) [17]. This proves the enhancements in knowledge levels after the implementation of the education intervention, thus showcasing the effectiveness of the video-assisted teaching programme.

Effectiveness of video-assisted teaching programme on knowledge regarding Osteoporosis.

In this study, the pre-test mean knowledge score was 15.08 with a SD of 3.45, while the post-test phase

demonstrated a substantial improvement, with the overall mean knowledge score reaching 20 with a SD of 3.15. This difference is supported by a highly significant t-value of 15.25 ($p < 0.05$), providing clear statistical evidence of a significant difference in knowledge levels before and after the intervention, and thus the first hypothesis has been clearly proven.

Similar results are found in a study by Kokilapriya (2016), which assessed the effectiveness of a video-assisted teaching programme on osteoporosis knowledge among menopausal women. The study revealed that the pre-test mean was 7.4 (SD 2.86), and the post-test mean surged to 17.9 (SD 4.11). This improvement, reflected in an unpaid t- t-value of 10.11 and $p < 0.001$, strongly supports the effectiveness of the teaching programme [18]. In conclusion, both studies successfully demonstrated the effectiveness of the video-assisted teaching programme in enhancing knowledge regarding osteoporosis.

Association between pre-test knowledge score with their selected demographic variables.

Another objective of this study was to find the association of pre-test knowledge score with various demographic variables. In this context, no significant association was found between pre-test knowledge score and age group, menopausal status (in case of females), family type, religion, monthly income, dietary pattern, any history of orthopedic diseases, and family history of osteoporosis. However, a striking significant association was identified for gender and prior knowledge regarding osteoporosis when compared with the pre-test knowledge score, which supports acceptance of the second hypothesis.

These data lines parallel with the findings from another study, conducted by Kulal R. and Handa S (2017), where the effectiveness of a structured teaching Programme on knowledge regarding osteoporosis and its management among menopausal women was assessed. Notably, a significant association emerged between demographic variables such as education and prior information about osteoporosis with the pre-test knowledge score at a 0.05 level of significance. Conversely, other demographic variables, including age and history of bone or joint problems, did not demonstrate a statistical association with the level of knowledge regarding osteoporosis and its management [19].

In another study, findings, conducted by Bhatti Z., Laghari M., ET al. (2024), which aimed to assess osteoporosis-related knowledge and its influencing factors among TB patients. They included TB patients with 18 years or above and those with compromised bone health. The study found that, out of 337 patients, 129(38.28 %) had good osteoporosis knowledge and 208(61.72 %) had poor knowledge. The demographic factors, such as male gender, economic status (low-income), residential area (rural), and education status (without formal education or ≤12 years of education were associated with low knowledge level [20].

In conclusion, the study identified that post-test knowledge level is increased from pre-test, the video-assisted teaching strategy was successful in improving the knowledge level, and a significant association was found between pre-test knowledge scores and selected demographic variables such as gender and previous knowledge regarding osteoporosis.

MAJOR FINDINGS OF STUDY:

Findings related to demographic characteristics:

- 32.5% of them belong to the age group of 24-30 years
- The majority of them were females (80%) and from joint families (55%)
- Most of them belong to the Hindu religion (72.5%)
- Most of them (45%) have a monthly income Rs. 21,000-30,000/-
- 72.5% of them had a choice of non-vegetarian food.

- Participants don't have a history of any orthopedic disease (95%)
- The majority of them have no family history of osteoporosis (75%)
- 37.5% had previous knowledge regarding osteoporosis, especially from the internet (40%).

Findings related to Pre-Test Knowledge level and association with demographic variables

In the pre-test, most of the participants had moderate knowledge (85%), 10% had inadequate and only 5% had an adequate knowledge level regarding osteoporosis. The mean pre-test score was 15.08, and the SD was 3.45. There was significant association between pre-test knowledge scores and selected demographic variables such as gender and previous knowledge regarding osteoporosis, where as no significant association was found between pre-test and other demographic variables (age group, menopausal status (in case of females), family type, religion, monthly income, dietary pattern, any history of orthopedic diseases and family history of osteoporosis).

Findings related to Post-Test Knowledge level.

The study revealed, 57.5% of the participants showed adequate knowledge, 42.5% of them demonstrated moderate, and none of them had inadequate knowledge in the post-test. The mean post-test score was 20 with SD 3.15.

IMPLICATIONS OF THE STUDY

Nursing implications of the study would be discussed under Nursing practice, Nursing education, Nursing administration, and Nursing research.

Nursing practice

The findings of the study will help:

- Nurses to play a vital role in helping the patients by increasing their knowledge regarding osteoporosis, especially with the help of the video-assisted teaching method.
- Nurses to counsel the patient regarding osteoporosis that can make better prevention of it.
- Nursing personnel in a community setup to reinforce the importance of osteoporosis and its prevention to patients, family members, and other health care team members.
- Nursing personnel to update knowledge and ability to identify the needs of the patients

Nursing education

- This can be used by the nursing educators for in-service education to increase the knowledge regarding osteoporosis.
- Nursing educators can educate the nursing professionals about osteoporosis and the effectiveness of the Video-Assisted Teaching Programme.
- Nursing students can use this knowledge for the health education of patients regarding osteoporosis.

Nursing administration

- The nurse administrator can use these findings for an in-service education Programme.
- Nurse administrators can use these cost-effective teaching materials –video-assisted method- for future educational Programme.

Nursing research

- The findings of the present study can be utilised as a reference material by the researchers for further research on the related topics.

LIMITATIONS

- The sample was delimited to teachers at selected schools.
- The sample size was small, so the generalization of findings is limited.
- The data collection tools used in this investigation were prepared for this particular purpose and used for the first time.
- Time constraints limited the study to conducting at a large scale.

RECOMMENDATIONS

- A similar study can be replicated in different populations and settings.
- A similar study can be conducted on a large sample for the generalization of findings.
- A similar study can be conducted with other teaching interventions.
- Administration can utilise similar interventions for public awareness.

CONCLUSION

The knowledge gap on osteoporosis, as shown by most of the teachers, necessitates further research in various contexts. The work will highlight the importance of education in providing ordinary people with the knowledge they require to avoid osteoporosis. We can also encourage people with our knowledge that prevention strategies should be taken at an early stage, and proper maintenance of bone health is important, especially during the youthful years. Besides aiding in personal well-being, this treatment plan acts as a preventive measure to reduce the damage of the disease of osteoporosis in the future. This work of research thus highlights the significance of educating osteoporosis among people with the purpose of shedding light on what osteoporosis is all about and why every person should know about it. The arming of both men and women with the knowledge about the relevance of bone health, the use of the right supplements, and the prevention of this non-discriminatory condition of the body can also help to prevent the terrible consequences of osteoporosis.

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