RESEARCH PAPER

A Study to Assess the Effectiveness of Planned Teaching Programme on Knowledge Regarding Prevention of Renal Calculi Among Overweight Patients Admitted in SRM MCH & RC

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ABSTRACT

A research to analyze the efficiency of planned education program on information related prevention of renal calculi among overweight patients admitted to SRM MCH & RC. Renal calculi are hard deposits of minerals and salts that occur within the kidney. It's a frequent urological illness that causes crystal agglomerations in the urinary tract.

Methods: The research approach was quantitative. This study used a pre-experimental, one-group pretest-and-post-test research design. The sample size was 41 selected patients using a non-probability convenience sampling technique. A structured questionnaire was utilized to measure the pre- and post-test levels of knowledge about renal calculi prevention in overweight patients. The pretest was conducted on the day of admission, the intervention was provided on the same day, and the post-test was acquired on the fourth day using the same structured questionnaire.

Results: The results show that in the pretest, among overweight patients, 23 (56.10%) had moderate knowledge and 18 (43.90%) had inadequate knowledge; in the post-test, after the intervention, 35 (85.37%) had adequate knowledge and 6 (14.63%) had moderate knowledge. The intervention was effective, with a mean knowledge score of 4.95 ± 2.51 at the pretest and 11.85 ± 1.54 in the post-test. The mean difference score was 6.90. The paired 't' test value of $t = 16.598$ was statistically significant at $p < 0.001$, indicating that a planned teaching program on renal calculi prevention for overweight patients was effective in improving post-test knowledge scores. The analysis showed that the demographic variable type of family ($p < 0.001$) and clinical variable BMI ($p < 0.05$) had statistically significant association with post-test efficiency in preventing renal calculi among overweight individuals.

Conclusion: The study statistically shown that overweight patients' awareness of renal calculi prevention enhanced following planned training.

Keywords: Renal calculi, overweight patients, BMI.

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INTRODUCTION

BACKGROUND OF THE STUDY

Renal stone epidemiology varies globally and is influenced by geography, socioeconomic status, and climate. Furthermore, age, gender, race, and diet influence the disease's prevalence and incidence. Obesity, overweight, diabetes, hypertension, gout, fatty liver disease, stroke, and metabolic syndrome are all risk factors for renal calculi. People between the ages of 30 and 60 are most likely to get kidney stones, which affect men more frequently than women. Renal colic, or severe discomfort produced by a renal calculi, is believed to affect 10-12% of men and 3-5% of women.Obesity is defined as a BMI more than or equal to 30, whilst overweight is defined as a BMI greater than 25. **(WHO 2024)**. Since 1990, the global adult overweight rate has more than doubled, while adolescent overweight has quadrupled. In 2022, 2.5 billion adults (18 and up) were overweight. Of these, 890 million were overweight or obese. In 2022, 43% of adults aged 18 and up were overweight, with 16% living with obesity.In Saudi Arabia, the peak age of presentation ranges from 22 to 44 years. Despite the rising incidence and underreporting of kidney stones, they are recurring once they form. The likelihood of recurrence is as high as 50% within the next five years **(Osama Y. Safdar et al., 2021).**

The prevalence of stone illness is likewise increasing globally.The lifetime risk of kidney stones is 6% for women and 12% for males.At 5 years, patients with untreated stones face a 30-40% risk of producing another stone. Because all epidemiological statistics reveal an increase in incidence and prevalence rates, the prevention and medical management of urolithiasis demand additional attention.

NEED FOR THE STUDY

Renal calculi (kidney stones) represent considerable health risks for overweight patients, with obesity being identified as a major risk factor for stone formation, recurrence, and treatment difficulties. Elevated BMI affects urine composition, increasing the likelihood of calculi formation. Overweight patients experience increased surgical risks, stressing the importance of individualized treatment options. Exploring the relationship between body composition and kidney stone outcomes is critical for improving management and preventing recurrence. **(Ganpule, A. P.; Vijayakumar et al., 2019).**The highest incidence of kidney stone is in 30-45 years of age group and the incidence declines after the age of 50 years of age. 50 Percent of the people have the reoccurrence of the kidney stone. Kidney stone is one of the oldest recorded disorder of human and one of the major health cause. Now a day's large numbers of peoples are affected with this disease all over the world.Kidney stones are a major cause of morbidity, affecting between 1 and 15% of the world population. Calcium oxalate, calcium phosphate, uric acid, struvite, and mixed stones are the most prevalent forms of kidney stones, accounting for 70 to 80% of the total **(Leila Moftakhar et al., 2022).**This suggests that the intended training curriculum is beneficial in boosting knowledge about food awareness and lowering the risk of renal stones.Renal calculi (kidney stones) are becoming increasingly common worldwide as a result of lifestyle choices, dietary habits, and comorbidities such as obesity. Many overweight people are unaware of the importance of diet, hydration, and lifestyle in preventing kidney stones. A concerted teaching program could bridge the knowledge gap and enable patients to take preventative measures. Planned teaching programs are evidence-based strategies that have been proved to increase knowledge and induce behavioral change. This study has the potential to improve risk factor management in overweight patients by increasing awareness of preventive measures such as nutrition, hydration, and physical activity.Based on their findings, the researchers advocated for increased public education about urolithiasis and associated risk factors, highlighting the importance of disease prevention and treatment options via medical campaigns and social media.

AIM

A study was conducted to test the efficiency of a planned education course on knowledge of renal calculi prevention among overweight patients admitted to SRM MCH & RC.

OBJECTIVES

The study aims to evaluate overweight patients' knowledge of renal calculi prevention before and after a scheduled instruction program.The goal is to link the post-test effectiveness of preventing renal calculi in overweight patients to their demographics.

HYPOTHESIS

There will be a substantial difference between pretest and post-test knowledge scores for preventing renal calculi among overweight patients.There will be a substantial connection between overweight patients' awareness of preventing renal calculi and their demographic characteristics.

DELIMITATION & ASSUMPTION

The study is delimited to a period of data collection.Providing information on preventing renal calculi can improve knowledge among overweight patients.Patients will have prior knowledge on preventing renal calculi.to administer the intended training program, adults may need to learn more about the risk factors and prevention of renal calculus.

REVIEW OF LITERATURE

The review of literature is an important phase in the research process. It is a thorough and methodical review of previous recent publications relevant to the current research study. Before moving on to a new topic of study, researchers must first examine their existing knowledge.This contributes to the study's progression. A thorough assessment of the literature gives a solid foundation for developing new understanding. The investigator conducted an exhaustive examination of the literature to lay the groundwork for the investigation to proceed under the following area.Studies on the prevalence and risk factors of renal calculi.Studies on how to prevent renal calculi in overweight persons. Studies on a teaching program focused on the prevention of renal calculi in overweight people.

METHODOLOGY

The research study's technique is described as the process used to collect information in order to answer a question or assess a research problem. It comprises factors such as research design, study environment, population and sample, sample size, sample technique, and sample selection criteria, scoring interpretation, data gathering procedure, and data analysis.

RESEARCH APPROACH,DESIGN,VARIABLES,SETTING ,POPULATION

This study used a pre-experimental, one-group pretest-and-post-test research design.The dependent variable is knowledge on how to prevent renal calculi in overweight people.The independent variable planned teaching programme,Demographic variables included age, gender, marital status, educational qualification, occupation, family monthly income, family type, languages spoken, and area of residence.Clinical variables included Blood pressure, body weight, height, BMI, diet and previous information on renal calculi.The study was conducted at SRM General Hospital, Kattangulathur, Chennai.The study's population is made up entirely of overweight patients.All overweight patients in SRM General Hospital in Kattangulathur, Chennai.The study's target population consisted of overweight patients with BMIs ranging from 25 to 25.9 kg/m2. Samples were admitted to SRM General Hospital, Kattangulathur for at least three days and met the inclusion criteria.

SAMPLE SIZE,TECHNIQUE AND CALCULATION

The sample included all overweight patients hospitalized to SRM General Hospital in Kattangulathur, Chennai.The study has a sample size of 41 overweight patients.The samples were selected using a non-probability convenient sampling technique.

$$N = \frac{Z^2 P(1-P)}{d^2}$$

Here,

N – Sample Size

P – Proportion (prevalence of stress)

d – Effect size (6%)

Z – 1.96 (Statistic value of 95% confidence)

Hence, $N = (1.96)2\ (0.12)(1\text{-}0.12)\ (0.1)2 = 3.842(0.12)(0.88)\ (0.01) = 0.406\ 0.01 = 40.6 = 41$(approx.)

DATA COLLECTION PROCEDURE

The data collecting period was one week. IEC was gathered, and the instrument was validated by two nursing professionals. Prior institutional ethical considerations were gathered. The first day, overweight patients were identified by measuring their height, weight, and BMI, and informed agreement was obtained. Patients with BMIs ranging from 25 to 29.9 and admitted for three days were chosen as samples. The pretest was completed on the same day utilizing a Structured Questionnaire for renal calculi prevention. The teaching intervention was then provided over 10 minutes using flashcards.The flash card information was well-organized as a lesson plan, including sections

on introduction, definition, causes, risk factors, signs and symptoms, and preventive measures. Overweight patients clarified their doubts and a post-test was administered on the fourth day using the same Structured Questionnaires to measure knowledge of renal calculi prevention.

PLAN FOR DATA ANALYSIS

Descriptive Statistics - The demographic data and level of knowledge about renal calculi prevention among overweight individuals were analyzed using frequency and percentage distributions. The knowledge of how to prevent renal calculi among overweight patients was assessed using mean and standard deviation.**Inferential Statistics -** A paired "t" test was employed to evaluate the effectiveness of a planned education program on renal calculi prevention among overweight individuals.Chi-square was performed to determine the relationship between post-test knowledge of renal calculi prevention among overweight patients and selected demographic characteristics.

DATA ANALYSIS AND INTERPRETATION

This chapter consists of analysis and interpretation.Statistical analysis is used by researchers to analyze quantitative data. Statistical analysis allows the investigator to more easily establish, describe, comprehend, and communicate numerical findings.

Assessment of demographic and clinical factors among overweight patients admitted to SRM MC & RC.

Table 1: Frequency and percentage distribution of demographic variables and clinical variables of the overweight patients. N=41

Demographic Variables	Frequency	Percentage
Age in years		
31 – 40	10	24.4
41 – 50	11	26.8
51 – 60	11	26.8
Above 60 years	9	22.0
Gender		
Male	12	29.3
Female	29	70.7
Educational qualification		
Illiterate	6	14.6
Primary education	17	41.5
Secondary education	10	24.4
Graduate	8	19.5
Occupation		
Government job	3	7.3
Private sector	15	36.6
Unemployed	6	14.6
Others	17	41.5
Monthly income of the family		
Below 5,000	2	4.9
5,001 – 10,000	13	31.7
10,001 – 15,000	13	31.7
15,001 – 20,000	13	31.7
Type of family		
Joint family	10	24.4
Nuclear family	31	65.6
Marital status		
Married	38	92.7
Unmarried	2	4.9
Widow/Widower	1	2.4
Divorced	-	-
Diet		
Vegetarian	9	22.0
Non-vegetarian	32	78.0
Area of residence		
Rural	26	63.4
Urban	15	36.6
Clinical Variables	**Frequency**	**Percentage**
Blood pressure in mmHg		
Below 110/80 mmHg	1	2.4
120/80 – 130/90 mmHg	13	31.7
140/80 – 150/100 mmHg	25	61.0
Above 160/110 mmHg	2	4.9
Body weight in kilogram		
Less than 49 kgs	-	-
50 – 70 kgs	21	51.2
71 – 90 kgs	19	46.3
Above 90 kgs	1	2.4
Height in cm		
Below 149 cm	4	9.8
150 – 160 cm	19	46.3
160 – 170 cm	18	43.9
Above 170 cm	-	-

Demographic Variables	Frequency	Percentage
BMI		
Below 18.5	-	-
18.5 – 25	1	2.4
25 – 29.9	40	97.6
30 and above	-	-
Previous information on renal calculi		
Yes	13	31.7
No	28	68.3

IF yes, from where did the knowledge gained?

The knowledge was gained from 5(23.07%)-books,1(7.69%)-internet, 7(53.84%)-family history and 2(15.38%)-colleagues.

INTERPRETATION

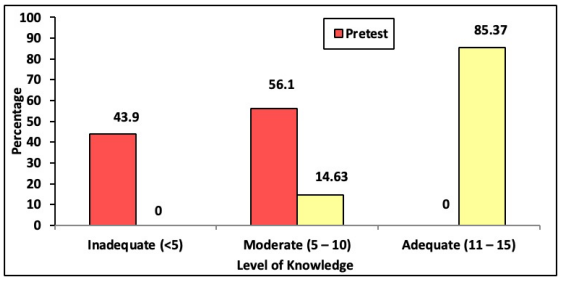
The demographic variables shows that most of the overweight patients, 11(26.8%) were aged between 41 – 50 and 51 – 60 years, 29(70.7%) were female, 17(41.5%) had primary education, 17(41.5%) were doing other type of occupation, 13(31.7%) had monthly income of 5,001-10,000, 10,001-15,000 and 15,001-20,000 respectively, 31(65.6%) belonged to nuclear family, 38(92.7%) were married, 32(78%) were non-vegetarian and 26(63.4%) were residing in rural area. The clinical variables shows that most of the overweight patients, 25(61%) had blood pressure in the range of 140/80 – 150/100 mmHg, 21(51.2%) were weighing between 50 – 70 kgs, 19(46.3%) were in the height range of 150 – 160 cm, 40(97.6%) were in BMI range of 25 – 29.9 and 28(68.3%) had no previous information on renal calculi.

Table 2: Frequency and percentage distribution of pretest and post-test level of knowledge regarding prevention of renal calculi among overweight patients.

N = 41

Level of Knowledge	Pretest		Post Test	
	Frequency	Percentage	Frequency	Percentage
Inadequate (<5)	18	43.90	0	0
Moderate (5 – 10)	23	56.10	6	14.63
Adequate (11 – 15)	0	0	35	85.37

The table 2 shows that in the pretest, among overweight patients, 23(56.10%) had moderate knowledge and 18(43.90%) had inadequate knowledge and in the post-test, after the intervention, 35(85.37%) had adequate knowledge and 6(14.63%) had moderate level of knowledge.



Percentage distribution of pretest and post-test level of knowledge regarding prevention of renal calculi among overweight patients

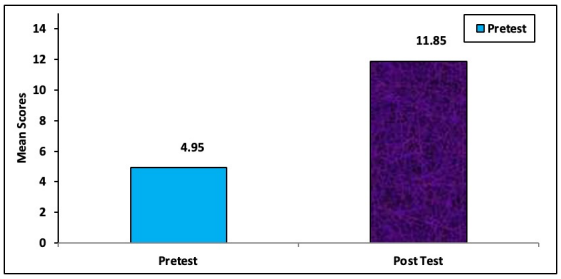
Table 3: Comparison of pretest and post-test scores of knowledge regarding prevention of renal calculi among overweight patients.

N = 41

Knowledge	Mean	S.D	Mean Difference	Paired "t" & p-Value
Pretest	4.95	2.51	**6.90**	**t= 16.598 p=0.0001, S*** **
Post-test	11.85	1.54		

***p<0.001, S - Significant

The table 3 shows that the pretest mean score of knowledge was 4.95±2.51 and the post-test mean score of knowledge 11.85±1.54. The mean difference score was 6.90. The calculated paired 't' test value of t= 16.598 was statistically significant at p<0.001 level which infers that planned teaching programme on knowledge regarding prevention of renal calculi administered among the overweight patients was found to be effective in improving the post test knowledge scores.



Correlation of pretest and post-test scores of knowledge regarding prevention of renal calculi among overweight patients

Table 4: Association of post-test level of knowledge regarding prevention of renal calculi among overweight patients with their selected demographic variables.

Demographic Variables	Frequency	Knowledge Chi-Square & p-value
Age in years		**χ^2=0.701 d.f=3 p=0.873 N.S**
31 – 40	10	
41 – 50	11	
51 – 60	11	
Above 60 years	9	
Gender		**χ^2=0.056 d.f=1 p=0.813 N.S**
Male	12	
Female	29	
Educational qualification		**χ^2=3.707 d.f=3 p=0.295 N.S**
Illiterate	6	
Primary education	17	
Secondary education	10	
Graduate	8	
Occupation		**χ^2=2.012 d.f=3 p=0.570 N.S**
Government job	3	
Private sector	15	
Unemployed	6	
Others	17	
Monthly income of the family		**χ^2=3.747 d.f=3 p=0.290 N.S**
Below 5,000	2	
5,001 – 10,000	13	
10,001 – 15,000	13	
15,001 – 20,000	13	
Type of family		**χ^2=13.242 d.f=1 p=0.0001 S*** **
Joint family	10	
Nuclear family	31	
Marital status		**χ^2=0.555 d.f=2 p=0.758 N.S**
Married	38	
Unmarried	2	
Widow/Widower	1	
Divorced	-	
Diet		**χ^2=3.228 d.f=1 p=0.072 N.S**
Vegetarian	9	
Non-vegetarian	32	
Area of residence		**χ^2=1.202 d.f=1 p=0.273 N.S**
Rural	26	
Urban	15	
Clinical Variables	**Frequency**	**Knowledge Chi-Square & p-value**
Blood pressure in mmHg		**χ^2=4.104 d.f=3 p=0.250 N.S**
Below 110/80 mmHg	1	
120/80 – 130/90 mmHg	13	
140/80 – 150/100 mmHg	25	
Above 160/110 mmHg	2	
Body weight in kilogram		**χ^2=2.922 d.f=2 p=0.232 N.S**
Less than 49 kgs	-	
50 – 70 kgs	21	
71 – 90 kgs	19	
Above 90 kgs	1	
Height in cm		**χ^2=1.491 d.f=2 p=0.474 N.S**
Below 149 cm	4	
150 – 160 cm	19	
160 – 170 cm	18	
Above 170 cm	-	
BMI		**χ^2=5.979 d.f=1 p=0.014 S***
Below 18.5	-	
18.5 – 25	1	
25 – 29.9	40	
30 and above	-	
Previous information on renal calculi		**χ^2=0.734 d.f=1 p=0.391 N.S**
Yes	13	

No	28	

The table 4 shows that the demographic variable type of family (χ^2=13.242, p=0001) and clinical variable BMI (χ^2=5.979, p=014) had shown statistically significant association with post-test level of knowledge regarding prevention of renal calculi among overweight patients at p<0.001 and p<0.05 level.

DISCUSSION

This chapter deals with the discussion of the results of the data analysis based on the objectives of the study. The aim of the study to assess the effectiveness of planned teaching programme on knowledge regarding prevention of renal calculi among overweight patients admitted in SRM MCH & RC.

The analysis revealed that most of the overweight patients, 11(26.8%) were aged between 41 – 50 and 51 – 60 years, 29(70.7%) were female, 17(41.5%) had primary education, 17(41.5%) were doing other type of occupation, 13(31.7%) had monthly income of 5,001-10,000, 10,001-15,000 and 15,001-20,000 respectively, 31(65.6%) belonged to nuclear family, 38(92.7%) were married, 32(78%) were non-vegetarian and 26(63.4%) were residing in rural area, 25(61%) had blood pressure in the range of 140/80 – 150/100 mmHg, 21(51.2%) were weighing between 50 – 70 kgs, 19(46.3%) were in the height range of 150 – 160 cm, 40(97.6%) were in BMI range of 25 – 29.9 and 28(68.3%) had no previous information on renal calculi.

The first objective -The analysis showed that in the pretest, among overweight patients, 23(56.10%) had moderate knowledge and 18(43.90%) had inadequate knowledge and in the post test, after the intervention, 35(85.37%) had adequate knowledge and 6(14.63%) had moderate level of knowledge.**Anita Sharma, (2024):** Conducted a study to evaluate the effectiveness of a planned teaching program on knowledge regarding modifiable risk factors and prevention of renal calculi among a rural community in Dehradun. The study showed a significant improvement in knowledge levels, with post-test scores indicating increased awareness of preventive measures, such as adequate hydration and dietary modifications.

The second objective - The findings revealed that the pretest mean score of knowledge was 4.95±2.51 and the posttest mean score of knowledge 11.85±1.54. The mean difference score was 6.90. The calculated paired 't' test value of t= 16.598 was statistically significant at p<0.001 level which infers that planned teaching programme on knowledge regarding prevention of renal calculi administered among the overweight patients was found to be effective in improving the post-test knowledge scores.The pre-test knowledge scores indicated that participants had inadequate knowledge regarding renal calculi prevention. Following the planned teaching program, there was a significant improvement in knowledge scores among the participants. The study reported a statistically significant difference in the pre-test and post-test knowledge scores ($p < 0.05$).Hence the research hypothesis H_1 that stated earlier "There will be significant difference between the pretest and posttest knowledge scores regarding prevention of renal calculi among overweight patient" was accepted.

The third objective - The analysis revealed that the demographic variable type of family **(χ^2=13.242, p=0001)** at p<0.001 level and the clinical variable BMI **(χ^2=5.979, p=014)** at p<0.05 level had shown statistically significant association with post-test effectiveness regarding prevention of renal calculi among overweight patients.The study found that demographic factors such as age, education level, and sources of information influenced baseline knowledge scores. Post-test results revealed a significant improvement in knowledge after structured teaching programs, indicating the effectiveness of education in addressing gaps in awareness and preventive measures.Hence the research hypothesis H_2 that stated earlier "There will be significant association of knowledge on prevention of renal calculi among overweight patient with their demographic variables" was accepted for the demographic variables –type of family(p<0.001) and clinical variables – BMI (p<0.05) .

CONCLUSION

The current study evaluated the efficacy of a structured education programme on knowledge of renal calculi prevention among overweight individuals. The study concluded that the Planned Teaching Programme, when provided to overweight

patients, was beneficial in enhancing their ability to prevent renal calculi. Based on these findings, it was determined that the Planned Teaching Programme may be deemed an effective teaching method to improve the knowledge among overweight patients and can be incorporated and implemented in the hospital.

The scientists advocate communicating information regarding the effectiveness of change agents who can be involved in health care activities.To allow for generalization, a comparable study can be undertaken with big samples.A study can be conducted in a variety of contexts. A comparative study might be undertaken on overweight patients living in rural and urban areas.

The study's findings can be shared with student nurses and public health professionals through journals and literature.Encourage greater research into the awareness and impact of health education programs on the prevention of renal calculi among overweight patients.

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