

A Pre Experimental Study To Assess Effectiveness Of Planned Teaching Programme On Knowledge Regarding Renal Calculi Among Adults In Selected Areas Of Pune City

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ABSTRACT

Introduction: Renal calculi, commonly known as kidney stones, are among the most painful urological disorders, mainly affecting adults aged 30–60 years, with men being more susceptible than women. These solid crystalline formations occur due to the precipitation of minerals in urine, primarily calcium oxalate and calcium phosphate. Multiple factors contribute to their formation, including a sedentary lifestyle, dehydration, mineral-rich water, diets high in animal proteins and oxalates, urinary tract infections, obesity, and other metabolic conditions. **Purpose:** The purpose of the study is to assess effectiveness of planned teaching programme on knowledge regarding renal calculi among adults in selected areas of Pune city. **Material and methods:** A quantitative pre- experimental one-group pre-test post-test design was adopted among 120 adults from selected areas of Pune city, chosen using a non-probability convenience sampling method. The tool's reliability was 0.811, and its validity was confirmed by expert review. Data were analysed using descriptive and inferential statistics, including mean, standard deviation, and chi-square tests. **Results:** Pre-test findings showed that 56.67% of participants had average knowledge, while only 3.33% had excellent knowledge. After the planned teaching programme, 65% achieved excellent knowledge, and only 10% remained average, indicating a marked improvement. **Conclusion:** The study concluded that the Planned Teaching Programme was highly effective in improving awareness and understanding of renal calculi. Continuous educational efforts can enhance health literacy, promote preventive practices, and contribute to better health outcomes.

KEYWORDS: (assess, effectiveness, planned teaching Programme, knowledge, renal calculi, adults)..

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INTRODUCTION

About 15% of people have renal calculi, often known as kidney stones, which are mostly made of calcium minerals such calcium oxalate. These stones can cause excruciating discomfort, hematuria, and blockage of the urinary system when urine gets supersaturated with minerals and crystals form. While a single stone episode rarely leads to kidney failure, recurrent stones may damage the kidney's tubular cells, potentially causing long-term functional loss.¹

As people age, their risk of developing kidney stones increases. particularly among men over 80, though an alarming rise is seen in children and female teenagers. Conditions like obesity, diabetes, and hypertension also elevate risk. In Pune, kidney stones impose a significant healthcare burden, frequently leading to urine as one ages, kidney stone risk rises. 2

Men over eighty years old have the most incidence. Children and teenagers' growing incidence is accelerating more than the overall population's. Among the pediatric age range, female teenagers have the highest incidence of nephrolithiasis—not unlike adults. Nephrolithiasis is least common in Black and Hispanic people. This reflects socioeconomic elements, healthcare availability, food choices, not genetic variation tract infections, obstructive uropathy, and sometimes chronic kidney disease.³ Despite the prevalence, public knowledge about kidney stones—their causes, symptoms, and prevention—is limited, often delaying diagnosis and treatment. Educational programs have proven effective in raising awareness and improving health literacy. This study's objective is to assess how a structured instructional program affects adults who visit Pune city hospitals' understanding of renal calculi, with the goal of reducing the incidence and complications of kidney stones through informed prevention and timely management.⁴

NEED OF STUDY

In the United States (US), the total incidence of urinary stones increased from 3.8% to 8.8% between 1970 and 2010. The percentage has been continuously increasing since it was last noted at 10.1% in 2016. At roughly 2:1, Men are more likely than women to develop stones, while women are experiencing a rise in the condition at a faster rate. Recurrence rates for individuals with a history of kidney stones are about 50% at 10 years of age. The Southern and South Central regions of the United States sometimes referred to as the "stone belt," have historically had higher rates of urinary stones. The scorching temperatures and comparative dehydration in these areas are probably to blame for this.⁵

Fist-sized organs, the kidneys regulate the body's liquid and chemicals levels. Most people have the kidneys on both sides of the spine, behind the intestines, pancreas, stomach, and liver. Healthy kidneys draw waste products from the blood and expel them as urine. They control the amounts of sodium, potassium, and calcium in the blood. The bladder, ureters, and kidneys make up your urinary tract. The urinary tract is responsible for producing, moving, and storing urine in the body. The kidneys create urine from water and waste materials. After the urine travels via the ureters, it is stored in the bladder. The body releases pee through the urethra. Kidney stones can occur in the kidney. The ureter can receive kidney stones. The ureters are tubes that run from the urinary tract to the bladder. The term "ureteral stone" describes a stone that leaves the kidney and lodges in the ureter.⁶

Although kidney stones are fairly common, most people don't have enough information about their causes, symptoms, prevention, or treatment options. Many remain unaware of the risk factors and simple steps they can take to prevent stones from forming. This gap in knowledge often results in late diagnosis and treatment, leading to more severe health issues and increased medical expenses. This study aims to assess and raise awareness through a planned educational initiative. Empowering individuals with the knowledge and skills to prevent and manage renal calculi effectively.

Aim of the Study-The aim of the study is to assess effectiveness of planned teaching programme on knowledge regarding renal calculi among adults in selected areas of Pune city.

METHODOLOGY

Objectives –

1. To assess knowledge regarding renal calculi before intervention among adults
2. To assess knowledge regarding renal calculi after intervention among
3. To assess the effectiveness of planned teaching programme on knowledge regarding renal calculi after intervention among adults.
4. To find the association with selected demographic variables.

Research Approach- Quantitative Approach

Research design: Pre experimental research design (one group pre-test post-test) was used.

Sample: Adults in selected areas.

Sample Size: Sample size will consist of 120 among adults.

Sampling technique: In the current study, samples were selected by Non probability convenient sampling technique.

Tool Description:

A. Demographic profile:

B. Self-structured questionnaire on assessing knowledge regarding renal calculi

Reliability: After applying Spearman-Brown's formula, the knowledge assessment tool yielded a reliability coefficient of 0.811. This value indicates strong reliability, as coefficients above 0.8 are generally considered statistically acceptable, demonstrating that the tool consistently produces stable and dependable results.

Pilot Study: A pilot research involving a sample of 20 individuals was carried out in the Bibewadi region between November 20 and November 28, 2024. The results indicated that the study is feasible for the final research phase.

RESULTS

SECTION-I

Section I: The sample's demographics.

Table.1 Demographic Profile. n=120

Demographic Variables	F	%
1. Age in years		
a. 18-30 years	37	30.83
b. 31-40 years	39	32.50
c. 41-50 years	25	20.83
d. 51-60 years	19	15.83
2. Gender		
a. Male	70	58.33
b. Female	50	41.67
c. Transgender	0	0.00
3. Religion		
a. Hindu	87	72.50

b. Christian	14	11.67
c. Muslim	19	15.83
d.Others	0	0.00
4. Marital Status		
a. Married	92	76.67
b. Unmarried	22	18.33
c. Divorcee / Separated	6	5.00
5.Educational Qualification		
a. No formal education	14	11.67
b. Primary School	8	6.67
c. Secondary School	24	20.00
d. Higher Secondary School	43	35.83
e. Graduation and above	31	25.83
6. Total Monthly Income		
a. <10,000	13	10.83
b. Rs. 10,000- Rs. 15000	11	9.17
c. Rs.15,000- Rs. 20,000	56	46.67
d. Rs. 20,000- Rs. 25,000	40	33.33
7. Diet		
a. Vegetarian	49	40.83
b. Non- vegetarian	35	29.17
c. Both	36	30.00

The demographic profile of the 120 participants reveals a diverse sample. The majority were aged between 31-40 years (32.50%) and 18-30 years (30.83%), with smaller groups in the 41-50 years (20.83%) and 51-60 years (15.83%) age ranges. Most participants were male (58.33%) and Hindu (72.50%), with a notable portion being married (76.67%) and having completed higher secondary education (35.83%). The income distribution showed that 46.67% earned between Rs. 15,000 and Rs. 20,000 per month, while 40.83% were vegetarian. The sample also included 41.67% females, 15.83% Muslims, and 11.67% Christians, reflecting a mix of educational and financial backgrounds.

SECTION II

SECTION II – Data related to level of knowledge regarding renal calculi among adults in selected areas of city.

Section II (A): Finding related to Pre-test level of knowledge regarding renal calculi before intervention among adults in selected areas of Pune city.

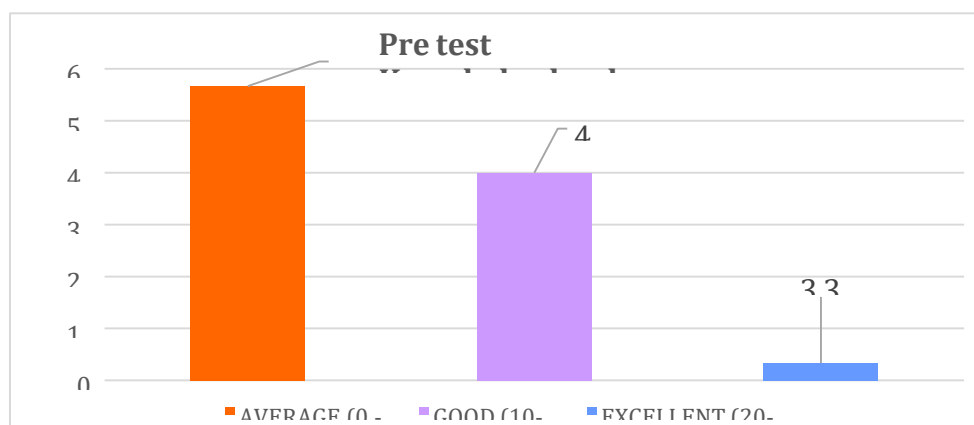


Fig 1 Pretest Knowledge level regarding renal calculi

The bar graph illustrates the distribution of participants' knowledge levels during the pre-test. It shows that the majority of participants (56.67%) had an average level of knowledge, scoring between 0 and 9. A considerable proportion, 40%, demonstrated a good level of knowledge, scoring between 10 and 19. Only a small percentage (3.33%) of participants achieved an excellent level of knowledge, with scores ranging from 20 to 24. This data indicates that before the intervention, most participants possessed only a moderate understanding of the subject, while very few had in-depth knowledge. The results suggest a clear need for educational initiatives or information booklets to enhance participants' knowledge levels.

Section II (B): Finding related to Post-test level of knowledge regarding renal calculi before intervention among adults in selected areas of Pune city.

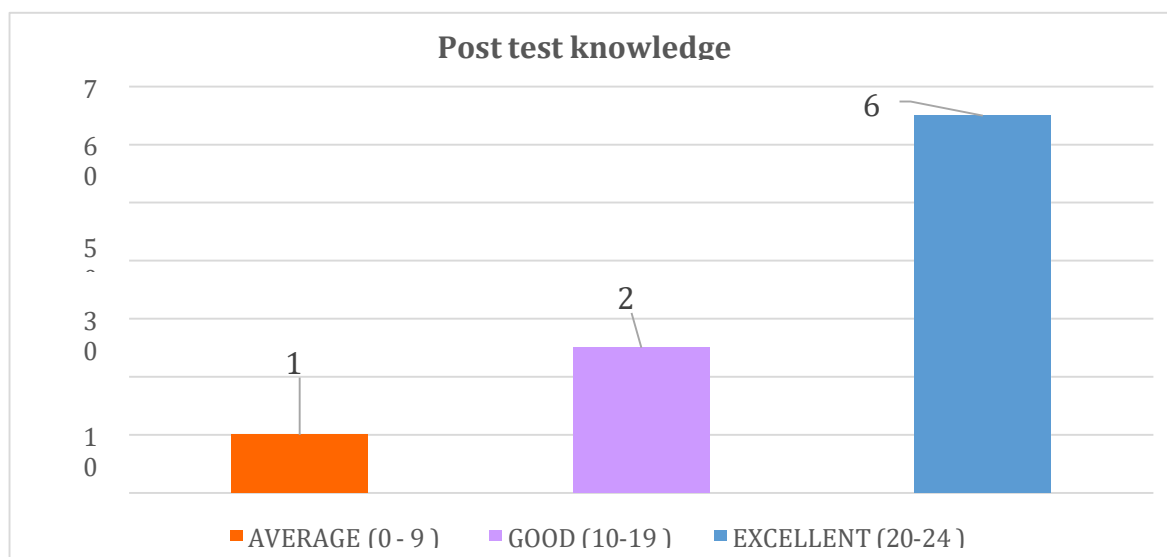


Fig 2 Post-test knowledge level regarding renal calculi

The bar graph presents the distribution of participants' knowledge levels after the intervention (post-test). It reveals that a majority of participants (65%) attained an excellent level of knowledge, scoring between 20 and 24. About 25% of participants demonstrated a good level of knowledge, scoring between 10 and 19, while only 10% remained at an average level, with scores between 0 and 9. This indicates a significant improvement in participants' knowledge levels following the educational intervention. The marked increase in the percentage of participants with excellent knowledge and the decline in those with average scores suggest that the intervention—such as the information booklet or teaching program—was highly effective in enhancing knowledge and awareness among the participants.

SECTION III

Section III: finding related to effectiveness of planned teaching Programme on knowledge regarding renal calculi after intervention among adults in selected areas of Pune city.

Table No.2 - related to assess effectiveness of planned teaching programme on knowledge regarding renal calculi after intervention among adults in selected areas of Pune city.

Planned teaching Programme Effectiveness	Mean	SD	DF	T test calculated value	P value	Remark
Pre test	9.45	4.09	119	16.2724	0.00001	Significant
Post test	18.68	4.68	119			

The findings from Table No. 2 assess the effectiveness of the planned teaching program on knowledge regarding renal calculi among adults in selected areas of Pune city. The pre-test had a mean score of 9.45 with a standard deviation of 4.09, while the post-test mean score significantly increased to 18.68, with a standard deviation of 4.68. The t-test calculated value of 16.2724 and a p-value of 0.00001 indicate that the difference between pre-test and post-test scores is statistically significant. This suggests that the planned teaching program was effective in significantly improving participants' knowledge about renal calculi.

SECTION IV

Section IV: finding related to an association with selected demographic variables.

The analysis of demographic variables in relation to knowledge improvement following the teaching program revealed no significant differences. The chi-square tests for age, gender, religion, marital status, education, income, and diet all resulted in p-

values greater than 0.05, indicating that none of these factors significantly influenced participants' knowledge of renal calculi. Specifically, age ($p = 0.907$), gender ($p = 0.750$), religion ($p = 0.787$), marital status ($p = 0.268$), education ($p = 0.871$), income ($p = 0.743$), and diet ($p = 0.826$) did not show any significant impact on the effectiveness of the teaching program. Therefore, demographic characteristics did not appear to affect the participants' knowledge improvement.

DISCUSSION

When comparing the current study to previous research, similarities and differences emerge. The study by Himanshu Soni (2023), which assessed a structured teaching program among factory workers, However, the target populations differ: while the current study targeted a general adult population in urban Pune, Soni's study focused on an occupational group at higher risk due to dehydration and strenuous work. Both studies reported significant improvements in knowledge post- intervention, highlighting the effectiveness of structured education. Notably, Soni's focus on

workplace-specific preventive strategies may offer more targeted benefits for high-risk groups, emphasizing the importance of tailoring health education to specific populations and contexts.⁷ Similarly, the study by Kaushal Patidar and Kamlesh Patidar (2019) also aligns with the current research in employing a pre-experimental design to enhance knowledge about renal calculi. However, their study concentrated on dietary awareness as a preventive measure among residents of Mehsana City. Both studies showed significant knowledge gains post-intervention; however, the dietary focus provided participants with actionable steps relevant to their daily habits, potentially offering a more practical application compared to the broader approach of the current study. These findings suggest that while broad educational programs are effective in raising general awareness, specialized content addressing specific preventive behaviors, such as diet modification, might enhance the practical utility of such interventions.⁸

Overall, this study reinforces the value of structured educational interventions in improving knowledge about renal calculi, a critical step towards fostering preventive health behaviours. Future research should consider integrating targeted content tailored to specific populations, incorporating long-term follow-up to assess knowledge retention and behavioural changes, and comparing different educational approaches to optimize program effectiveness.

CONCLUSION

In conclusion, the study highlights the effectiveness of a structured teaching program in significantly improving knowledge about renal calculi among adults in selected areas of Pune city. The pre-test results revealed limited awareness, while the post-test demonstrated a notable increase in knowledge, confirming the success of the educational intervention. Despite this improvement, no significant relationship was found between participants' knowledge and demographic variables such as age, gender, marital status, education level, or religion. These findings suggest that the planned teaching program is universally beneficial, enhancing awareness regardless of demographic factors, making it a valuable tool for promoting health education on renal calculi. Additional information Disclosures

Human subjects: Authors have confirmed that human participants involved in this study.

Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue.

Conflicts of interest: The authors declare that they have no involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

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