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Knowledge enhancement through structured teaching: a study on risk factors and prevention of renal calculi among attenders in selected wards, PES hospital, Kuppam

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Abstract:
Background and aims*: Renal calculi, or kidney stones, are solid deposits that form in the kidneys when certain chemicals in the urine become concentrated and crystallize. This condition is common and can lead to severe pain, urinary blockages, and long-term kidney damage. In India, the incidence of kidney stones is rising, attributed to changing lifestyles, poor dietary habits, dehydration, and genetic factors. Awareness of the risk factors and preventive measures for renal calculi is crucial, particularly in developing countries like India. This study aims to assess the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding the risk factors and prevention of renal calculi among patient attendants in the selected wards of PES Hospital, Kuppam.*
Material and Methods:
A total of 100 patient attendants who met the inclusion criteria were selected using a non-probability purposive sampling technique. Data were collected through a structured questionnaire assessing knowledge regarding the risk factors and prevention of renal calculi.
Results:
The pre-test results showed that 40.0% (40 attendants) had inadequate knowledge, 35.0% (35 attendants) had moderate knowledge, and 25.0% (25 attendants) had adequate knowledge. Post-test results revealed improvements, with 48.0% (48 attendants) scoring moderate knowledge, 32.0% (32 attendants) scoring adequate knowledge, and 20.0% (20 attendants) scoring inadequate knowledge.
Conclusion:
The findings suggest that the Structured Teaching Programme was effective in enhancing the knowledge of patient attendants regarding the risk factors and prevention of renal calculi. There is a need for continued educational efforts to raise awareness about kidney stones and their prevention, especially in regions with high incidences.

Keywords: *Renal calculi, Risk factors, Prevention, Structured Teaching Programme, Patient knowledge.*

1. INTRODUCTION:

Renal calculi, or kidney stones, are solid deposits formed in the kidneys due to the crystallization of minerals and salts in the urine. These stones cause severe pain, urinary obstruction, and potential kidney damage. Risk factors include dehydration, dietary habits, metabolic disorders, and genetic predisposition. The most common types of stones are

calcium oxalate, calcium phosphate, struvite, uric acid, and cystine stones. Preventive measures like hydration, dietary changes, and medical management can reduce the risk.

Complications of renal calculi include urinary tract obstruction, infections, and kidney damage, with larger stones requiring surgical intervention. Despite advances in treatment, understanding stone formation and improving prevention strategies remain a challenge. Current research focuses on the molecular and genetic factors involved in stone formation to develop better therapies.

2. Need for the Study:
Renal calculi are a global health concern, affecting approximately 10-15% of people. The prevalence varies by region, with higher rates in developed countries due to dietary and lifestyle factors. In India, the incidence has risen due to dietary habits, urbanization, and lifestyle changes. High temperatures and dehydration further increase the risk. The prevalence is higher in urban areas, and regions like Chittoor and Kuppam in Andhra Pradesh have higher rates, with an estimated 12-15% of the population affected. This study aims to assess the prevalence, risk factors, and prevention strategies for kidney stones in India, focusing on Kuppam.

3. Objectives of the Study:
- To assess the pre-test and post-test knowledge of risk factors and prevention of renal calculi among attenders in selected wards.
- To compare the pre-test and post-test knowledge scores regarding risk factors and prevention of renal calculi.
- To determine the association between pre-test knowledge levels and demographic variables.

4. Materials and Methods:
Research Approach:
A quantitative approach was used to assess the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding the risk factors and prevention of renal calculi among patient attenders in selected wards of PES Hospital, Kuppam, Andhra Pradesh.

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

Population: Patient attenders in selected wards of PES Hospital, Kuppam, Andhra Pradesh.

Sample Size: 100 participants, determined based on power analysis.

Sampling Technique: Non-probability purposive sampling.

Inclusion Criteria: Attenders who understand Telugu, Tamil, or English, and are male or female of any age.

Exclusion Criteria: Attenders who were unwilling to participate.

Research Variables:
- **Dependent Variable:** Knowledge regarding risk factors and prevention of renal calculi.
- **Independent Variable:** Structured Teaching Programme on renal calculi prevention.

Tool Development:
A structured knowledge questionnaire consisting of 30 multiple-choice questions. Section A covers demographic variables, and Section B assesses knowledge of risk factors and prevention strategies. The questionnaire was validated by experts, and reliability was established with a Cronbach's alpha of 0.879.

Ethical Clearance:
Ethical approval was obtained from the Institutional Research Committee and Institutional Human Ethics Committee, PESIMSR, Kuppam. Informed verbal and written consent was obtained from participants.

Data Collection Procedure:
Data were collected over a 4-week period (October 17, 2024 - November 15, 2024). After obtaining consent, baseline data were gathered through face-to-face interviews. A Structured Teaching Programme was administered in groups of 5-8 attenders for 45 minutes. A post-test was conducted one week later using the same questionnaire.

RESULTS: The data are organized and presented under the following:

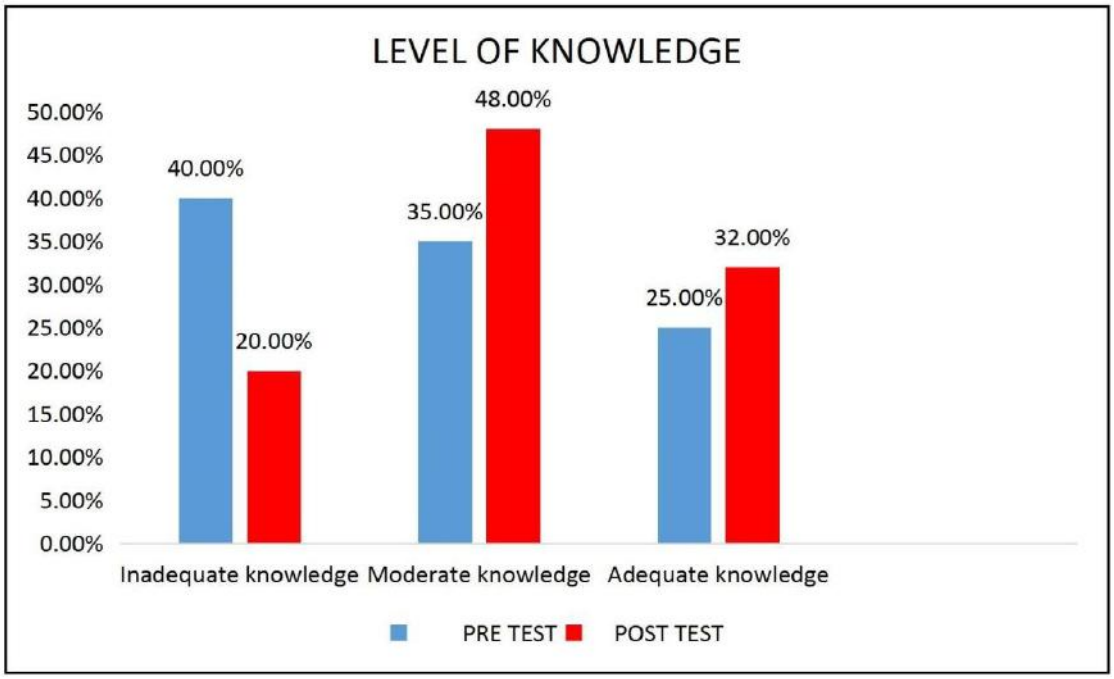
Section I - Frequency and percentage distribution of demographic variables on risk factors and its prevention of Renal Calculi among attenders.

N=100

1	DEMOGRAPHIC VARIABLES OF RENAL CALCULI	FREQUENCY (f)	PERCENTA GE (%)
1	**AGE**		
	> 30 Years	54	54.0%
	≤ 30 Years	46	46.0%
2	**GENDER**		
	(a) Male	48	48.0%
	(b) Female	52	52.0%
3	**MARITAL STATUS**		
	(a) Single	31	31.0%
	(b) Married	59	59.0%
	(c) Divorced	5	5.0%
	(d)widowed	5	5.0%
4	**EDUCATION LEVEL**		
	(a) Less than high school	34	34.0%
	(b) High school diploma	37	37.0%
	(c) Bachelor's degree	26	26.0%
	(d) Master's degree	3	3.0%
5	**EMPLOYMENT STATUS**		
	(a) Employed full-time	31	31.0%
	(b) Employed part-time	36	36.0%
	(c) Unemployed	10	10.0%
	(d) Retried	1	1.0%
	(e) Student	13	13.0%
	(f) Homemaker	9	9.0%
6	**ANNUAL INCOME**		
	(a) Less than ₹ 25,000	43	43.0%
	(b) ₹ 26,000 - ₹ 49,000	34	34.0%
	(c) ₹ 50,000 - ₹ 74,000	5	5.0%
	(d) ₹ 75,000 - ₹ 99,000	3	3.0%
	(e) Prefer not to answer	15	15.0%
7	**AREA OF RESIDENCE**		
	(a) Rural	59	59.0%
	(b) Urban	26	26.0%
	(c) Semi Urban	15	15.0%
8	**RELIGION**		
	(a) Hindu	52	52.0%
	(b) Christian	38	38.0%
	(c) Muslim	10	10.0%
9	**DIETARY PATTERN**		
	(a) Vegetarian	13	13.0%
	(b) Non- Vegetarian	87	87.0%

The majority of the attenders (54%) were below 30 years of age. In terms of gender, 52% were females and 48% were males. Regarding marital status, most were married (59%), followed by unmarried (31%), while 5% were widowed and another 5% divorced. Educationally, 37% had completed high school, 34% had education less than high school, 26% held a bachelor's degree, and only 3% had a master's degree. With respect to employment status, 36% were employed part-time, 31% full-time, 13% were students, 10% unemployed, 9% homemakers, and 1% retired. When it came to annual income, 43% earned less than ₹25,000, 34% earned between ₹26,000–₹49,000, 15% preferred not to disclose, 5% earned between ₹50,000–₹74,000, and 3% between ₹75,000–₹99,000. The majority (59%) resided in rural areas, 26% in urban areas, and 15% in semi-urban areas. In terms of religion, 52% were Hindus, 38% Christians, and 10% Muslims. Lastly, the dietary pattern showed that 87% were non-vegetarians, while 13% were vegetarians.

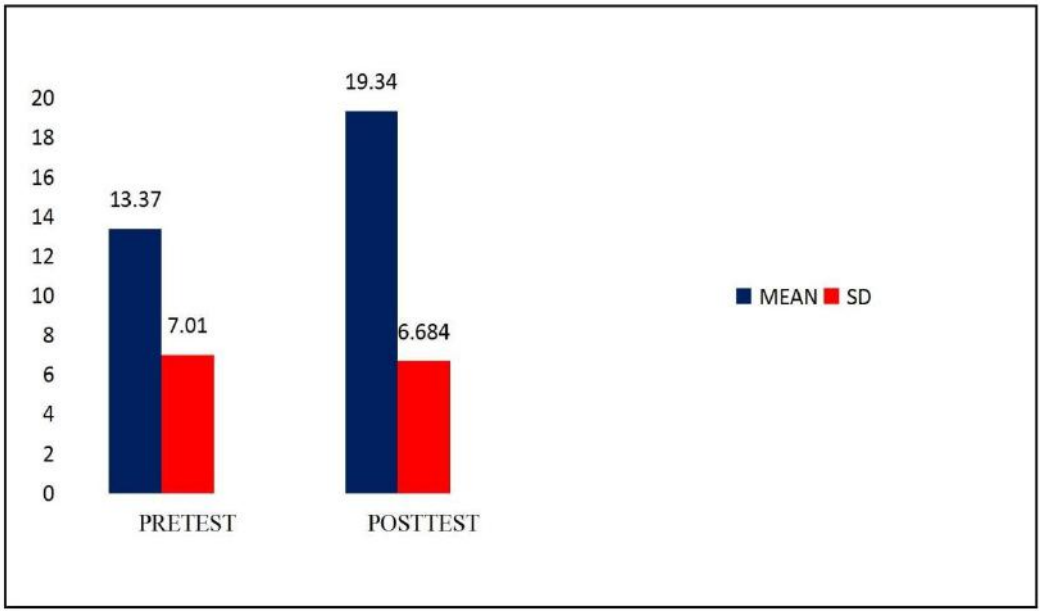
- **Section II –**Frequency and percentage distribution pre-test and post-test level of knowledge on risk factors and its prevention of Renal Calculi among attenders.



The above fig and table showed the pre-test and post – test knowledge scores of attenders. In pre-test Majority 40(40.0%) of the Attenders had inadequate knowledge scores, 35(35.0%) of the Attenders had moderate knowledge scores, and 25(25.0%) of the Attenders had adequate knowledge scores. In Post–test Majority 48(48.0%) of the Attenders had Moderate knowledge scores, 32 (32.0%) of the Attenders had Adequate knowledge scores and 20(20.0%) of the Attenders had Inadequate knowledge.

- **Section III –**Comparison of pre-test and post-test mean ,sd ,"t" and p-value knowledge scores on risk factors and its prevention of Renal Calculi among attenders.

KNOWLEDGE SCORE OF ATTENDERS	**MEAN**	**SD**	**p- VALUE**	**"t"VALUE**
PRETEST	13.37	7.010	<0.001	10.210
POSTTEST	19.34	6.684		



The above figure Showed the comparisons of calculated paired t test values of mean SD and "t" and p-values of pre -test and post- test knowledge scores on attenders reveals that the post –test mean score were 19.34 with a SD of 6.684 and pre-test mean 13.37 with a SD of 7.010 the "t" value 10.210 was and p value were significant at the level of <0.005 so the research hypothesis **RH1 is accepted**. This shows effectiveness of structured teaching programme on risk factors and its prevention of Renal Calculi among Attenders.

- **Section IV**-Association of pre-test knowledge scores on risk factors and its prevention of renal calculi among attenders with their selected demographic variables.

SI NO	**DEMOGRAPHIC VARIABLES OF ATTENDERS**	**KNOWLEDGE SCORE**						**CHI SQUARE**	**P-VALUE**	**RESULT**
		inadequate		**moderate**		**adequate**				
		F	**P**	**F**	**P**	**F**	**P**			
1	**AGE** >30 Years	14	25.9	25	46.3	15	27.8			
	≤ 30 Years	26	56.6	10	21.7	10	21.7			
	TOTAL	40	40.0	35	35.0	25	25.0	10.455	0.005	S
2	**GENDER** (a) Male	13	27.1	21	43.8	14	29.2			
	(b)Female	27	51.9	14	26.9	11	21.2			
	TOTAL	40	40.0	35	35.0	25	25.0	6.510	0.039	S
3	**MARITAL STATUS** (a) Single	15	48.4	8	25.8	8	25.8			
	(b) Married	24	40.7	22	37.3	13	22.0		0.431	
	(c) Divorced	1	20.0	2	40.0	2	40.0			
	(d) Widowed	0	0.0	3	60.0	2	40.0			
	TOTAL	40	40.0	35	35.0	25	25.0	5.933		NS
4	**EDUCATION**	9	26.5	15	44.1	10	29.4	8.576	0.199	NS

	LEVEL (a) Less than high school									
	(b) High school diploma	14	37.8	12	32.4	11	29.7			
	(c) Bachelor's degree	16	61.5	7	26.9	3	11.5			
	(d) Master's degree	1	33.3	1	33.3	1	33.3			
	TOTAL	40	40.0	35	35.0	25	25.0			
5	**EMPLOYME NT STATUS**									
	(a) Employed									
	full-time	16	51.6	10	32.3	5	16.1	13.703	0.187	NS
	(b) Employed part-time	9	25.0	15	41.7	12	33.3			
	(c) Unemployed	6	60.0	4	40.0	0	0.0			
	(d) Retried	0	0.0	1	100.0	0	0.0			
	(e) Student	6	46.25	3	23.1	4	30.8			
	(f) Homemaker	3	33.3	2	22.2	4	44.4			
	TOTAL	40	40.0	35	35.0	25	25.0			
6	**ANNUAL INCOME** (a) Less than ₹ 25,000	21	48.8	10	23.3	12	27.9	8.430	0.393	NS
	(b) ₹ 26,000 - ₹ 49,000	13	38.2	15	44.1	6	17.6			
	(c) ₹ 50,000 - ₹ 74,000	1	20.0	3	60.0	1	20.0			
	(d) ₹ 75,000 - ₹ 99,000	0	0.0	2	66.7	1	33.3			
	(e) Prefer not to answer	5	33.3	5	33.3	5	33.3			
	TOTAL	40	40.0	35	35.0	25	25.0			
7	**AREA OF RESIDENCE** (a) Rural	25	42.4	23	39.0	11	18.6	5.949	0.203	NS
	(b) Urban	7	26.9	9	34.6	10	38.5			
	(c) Semi Urban	8	53.3	3	20.0	4	26.7			
	TOTAL	40	40.0	35	35.0	25	25.0			
8	**RELIGION** (a) Hindu	24	46.2	16	30.8	12	23.1	8.294	0.081	NS
	(b) Christian	16	42.1	14	36.8	8	21.1			
	(c) Muslim	0	0.0	5	50.0	5	50.0			
	TOTAL	40	40.0	35	35.0	25	25.0			
9	**DIETARY PATTERN** (a) Vegetarian	5	38.5	2	15.4	6	46.2	4.326	0.115	NS
	(b) Non-Vegetarian	35	40.2	33	37.9	19	21.8			
	TOTAL	40	40.0	35	35.0	25	25.0			

The above table Describes association of pre-test knowledge scores on risk factors and its prevention of renal calculi among attenders with their selected demographic variables. The result shows significant on Age (0.005) and Gender (0.039) hence **RH2 is accepted**.

Discussion:

The first objective of the study was to assess the pre-test and post-test level of knowledge regarding risk factors and its prevention of Renal Calculi among attenders in selected wards**.** In pre-test results reveals that Majority 40(40.0%) of the Attenders had inadequate knowledge scores, 35(35.0%) of the Attenders had moderate knowledge scores, and 25(25.0%) of the Attenders had adequate knowledge scores. In Post–test results reveals that Majority 48(48.0%) of the Attenders had Moderate knowledge scores, 32 (32.0%) of the Attenders had Adequate knowledge scores and 20(20.0%) of the Attenders had Inadequate knowledge.

The second objective of the study is to compare the mean scores of pre-test and posttest level of knowledge regarding risk factors and its prevention of Renal Calculi among attenders in selected wards. The comparisons of calculated paired t test values of mean SD and "t" and p-values of pre -test and post- test knowledge scores on attenders reveals that the post –test mean score were 19.34 with a SD of 6.684 and pre-test mean 13.37 with a SD of 7.010 the "t" value 10.210 was and p value were significant at the level of <0.005 so the research hypothesis **RH1 is accepted**. This shows effectiveness of structured teaching programme on risk factors and its prevention of Renal Calculi among Attenders.

The third objective of the study was to find out the associate the Pre Test level of knowledge regarding risk factors and its prevention of Renal Calculi among attenders in selected wards with their selected demographic variable. The association of pre-test knowledge scores on risk factors and its prevention of renal calculi among attenders with their selected demographic variables. The result shows significant on Age (0.005) and Gender (0.039) hence **RH2 is accepted**.

Conclusion:

The overall percentage and mean knowledge scores on risk factors and its prevention on renal calculi among attenders in post-test was higher than the pre-test. The association of pre-test knowledge with demographic variables such as age and gender was statistically significant, suggesting that these factors may influence the level of knowledge regarding renal calculi. So it can concluded that the structured teaching program was effective in enhancing the knowledge of the attenders on the prevention and risk factors of renal calculi, highlighting the importance of educational interventions in improving public health awareness, particularly in regions like Kuppam, A.P. The findings suggest that continued efforts to educate individuals about renal calculi prevention could contribute to better health outcomes and reduce the incidence of the condition in the population.

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