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### Nurse led education programme on prevention of renal calculi among patients admitted in medical ward

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#### Abstract

**Background:** People between 30 to 60 years of age most commonly affect with kidney stone in which it affects more commonly in men than women. It is estimated that renal colic, severe pain caused by a renal calculi affects 10-20% of men, and 3-5% of women. 12% of the population in India is expected to have urinary stones, out of which 50% may end up with loss of kidneys or renal damage. Among all types of stones recurrent stone formation is a common problem which acts as an important part of medical care of patients with stone disease. The researcher takes interest in this study as he had come across a large number of renal calculi patients while he was working as a staff nurse in emergency department and in general ward, as well as he also had his personal experience of his uncle who suffered from renal calculi which is not detected earlier and they were not aware of the condition and delayed treatment lead him to several complication.

**Aim:** The aim of the current study was to examine the effectiveness of Planned Teaching Programme on Knowledge Regarding Prevention of Renal Calculi among Patients admitted in Medical Ward, Rajiv Gandhi Government General Hospital, and Chennai-03.

**Design:** A pre experimental design was used

**Setting:** The study was conducted at the medical ward at Rajiv Gandhi Government General Hospital, and Chennai-03.

**Sample:** A convenience sample of 60 adult patients

**Tools:** Semi-structured Demographic Sheet and knowledge questionnaires

**Results:** Overall knowledge score, in pretest *Patients are* having 10.62 score and in posttest they are having 18.80 score, so the difference is 8.18. This difference is large and statistically significant difference Statistical significance was calculated by using student's paired 't' test.

**Keywords:** Renal calculi, recurrent, medical word

#### Introduction

Renal calculi are commonly known as kidney stones which affects excretory and secretary function of the urinary system. The urinary system is a group of organs that consist of two kidneys and two ureters with single bladder and urethra. The main function of this system is filtering the blood stream and excretes out the unwanted fluids and other chemical substance through the urine [1]. Urine is liquid it contains excess mineral and vitamins with waste product of metabolism. It also maintains homeostasis with acid base balance and electrolyte balance of blood. Any occlusion in the pathway of obstructs the urine output and rather affects the entire system [2].

The formation of kidney stone is termed as renal calculi more commonly known as kidney stones. In medical condition the terminology of having urinary calculi is termed as nephrolithiasis or urolithiasis where the root word "Lith" meaning "a stone". People who live in hot climates and become dehydrated faster are risk for renal calculi due to the loss of more fluids from the body.

Renal calculi lodge within the urinary system produce common symptoms like blood in the urine and pain in the abdomen, flank, renal colic that radiates from the lumbar region to the pubic region, sweating, nausea and vomiting [3].

It occurs in 1 in 20 people at some time in their life. Stones are formed in the urinary tract when the excreted concentration of substances such as calcium oxalate, calcium phosphate and uric acid are increased [4]. This is referred to as super saturation and depends on the amount of substance, certain factors favour the formation of stone including infection, urinary stasis and period of immobility.

Among the urologic disorder, kidney stones are one of the most painful, which are not a product of modern life and also unfortunately, among disorder of urinary tract, kidney stones are one of the most common disorder. Globally a large number of people are suffering from urinary stone problem [5]. Kidney stones are solid crystals that are formed from dissolved minerals in urine can be caused by both environmental and metabolic problems. In economically

developed countries almost 70% of all renal stones are observed to be calcium oxalate and phosphate stones<sup>[6]</sup>. People between 30 to 60 years of age most commonly affect with kidney stone in which it affects more commonly in men than women<sup>[7]</sup>. It is estimated that renal colic, severe pain caused by a renal calculi affects 10-20% of men, and 3-5% of women. 12% of the population in India is expected to have urinary stones, out of which 50% may end up with loss of kidneys or renal damage. Among all types of stones recurrent stone formation is a common problem which acts as an important part of medical care of patients with stone disease<sup>[8]</sup>.

The incidences of urinary stones have a significant impact on diet. The incidence have been steadily increasing, paralleling the rise in other disease with the so-called western diet<sup>[9]</sup>. The risk of stone formation in men and women is highly increased by being obese; higher body mass index and experiencing weight gain. In the development of urinary stones, diet and fluid intake are the important factors. There is a change in average diet, when the income increases as per capita, with an increase in saturated and unsaturated fatty acid<sup>[10]</sup>. The recently diagnosed higher risk for stone formation includes an increase in animal protein and sugar, and decrease in dietary fibre, vegetable protein and unrefined carbohydrates.

### **Need for the study**

Globally, kidney stone disease prevalence and recurrence rates are increasing with limited options of effective drugs. Urolithiasis affects about 12% of the world population at some stage in their life time<sup>[11]</sup>. It affects all ages, sexes and races but occurs more frequently in men than in women within the age of 20-49years. The relapsing rate of secondary stone formation is estimated to be 10-23% per year, 50% in 5-10years, and 75% in 20 years of patient. However life time recurrence rate is higher in males, although the incidence of nephrolithiasis is growing among females<sup>[12]</sup>.

In Asia about 1%-19.1% of the population suffer from urolithiasis 5%-19.1% of the west Asia, south population from Korea and japan.1%-8% of population from part of East Asia and North Asian countries<sup>[13]</sup>. Recurrence rate ranges from 21%-53% after 3-5 years. In India approximately 5-7 million population suffer from stone disease and at least 7-10 per 1000 of Indian population needs hospitalization due to kidney stone<sup>[14]</sup>.

In Industrialized countries 10-12% of population affected by renal calculi. The average life time risk of stone formation has been reported in the range of 5-10%<sup>[15]</sup>. The incidence of kidney stone is globally increasing with an estimated prevalence ranging up to 15% during life time; approximately 7% of women and 13% of men will develop a kidney stone. Stone prevalence in calcium oxalate 75%-90% is the most frequent component of calculi, followed by uric acid 5%-10%, calcium phosphate 6%-13% struvite stone 2%-15% cystine 0.5%-1%. The incidence of urolithiasis reaches its peak in population aged over 30 years<sup>[16]</sup>.

### **Aim of the study**

The aim of the current study was to examine the effectiveness of Planned Teaching Programme on

Knowledge Regarding Prevention of Renal Calculi among Patients admitted in Medical Ward, Rajiv Gandhi Government General Hospital, and Chennai-03.

### **Research Hypothesis**

**H1:** There will be significant difference between the pre-test and post-test level of knowledge regarding prevention of renal calculi among patients admitted in medical ward.

**H2:** There will be significant association between the posttest levels of knowledge regarding prevention of renal calculi with their selected demographic variables

### **Methods**

**Design:** Pre experimental design in one group pretest and posttest design.

**Setting:** The study was conducted at Rajiv Gandhi Government General Hospital, Chennai-03

**Sample:** A convenience sample of 60 adult patients in medical ward was selected. Patients who met the study inclusion criteria were recruited to participate in the study. Inclusion criteria included (1) Patients above 30 years of age (2) Patients who are willing to participate in the study (3) Patients who know to read and write the Tamil and English language. Exclusive criteria included. (1) Patients with abnormal renal parameters. (2) Patients with sensory impairment

**Sample Size Calculation:** Accepting the Type I error is equal to 0.05% and expecting absolute precision is equal to 5% with a power of (1- $\beta$ ) 80%, a sample size of 60 patients was calculated. This also includes additional subjects, expecting 20% of them to be drop outs during the study period.

### **Tools for data collection**

In section-A, The Socio demographic variables such as age, gender, educational status, marital status, family income, diet, type of family, marital status, occupational status. Section-B consist of clinical variables-The levels of hemoglobin, blood pressure, body weight, urine output, frequency of maturation, type of pain. Section-c: semi structured questionnaire related to knowledge regarding prevention of renal calculi. Semi Structured Questionnaire related to knowledge regarding prevention of renal calculi, which consists of 25 items and the answers were gathered by structured questionnaires<sup>[17]</sup>. The Scoring Procedure is consisting of level of knowledge-adequate knowledge: 76-100% (18.76-25.0), moderate knowledge: 51-75% (12.6-18.75) and inadequate knowledge: 0-50% (<12.5)

### **Pilot study**

A pilot study was conducted on 10% of the total sample (6 patients) to assess the clarity and the applicability of the used tools and to estimate the time needed to fill the questionnaires. The pilot sample was excluded from the final analysis.

### **Ethical Considerations**

An official permission was obtained from the Faculty of Nursing and hospital directors to conduct the study prior to

the initiation of data collection. During the initial interview, the purpose of the study and data collection procedure was explained to the participants. A written informed consent was obtained from the subjects who were willing to participate in the study. The participants were informed that participation in the study is voluntary and they can withdraw from the study at any time. The researchers assured all participants that any obtained information would be strictly confidential.

### Data Collection Procedure

The period of data collection from 02.02.2019 to 04.03.2019 before starting the study, the researcher obtained the formal permission to conduct the study from the Principal, College of Nursing, Ethical Committee, and the Director of internal medicine. During this time of data collection, the investigator introduced himself to the selected group of medical ward patients. The study was explained and obtained the informed written consent from the patient. The sample selection procedure was done by using convenient sampling technique. After, that pre-test was conducted by semi-structured questionnaires. Pre-test knowledge was assessed. After conducting the pre-test, the planned teaching programme regarding prevention of renal calculi given to clients through the laptop and booklets. The duration of the teaching was 45 minutes, two times daily with 12 hours interval the same teaching programme given to the client for three consecutive days, and the post-test was conducted using the same question on the 7<sup>th</sup> day of data collection

period. Each day 3-4 patients were assessed during the data collection period. The investigator maintains the good rapport with the patients and clarifies the doubts. The researcher finished the data collection procedure successfully.

## Results

### Characteristics of the study sample

Regarding Age, Maximum 38.33% of the patients belong to age group of 51-60 years. Most of the patients (53%) of patients were female. Educational qualification: 31.66% of patients were primary school, 26.67% of patients were middle school, 20% of patients were illiterate, 5% of patients were intermediate, 5% of patients were graduate or post graduate. Most of the client family occupation 31.67% were skilled agricultural workers and 5% were unemployed. Income status of the client maximum 31.67% of patients have monthly income about (5000-10,000) and only 8% belong to (15,000-20,000) category. 66.77% of patients were joint family, 33.33% of patients were joint family. 95% of patients were married, 5% of patients were unmarried. Mostly (78.33%) patients known Tamil and 16.67% of patients known as both Tamil and English, 5% of patients known other languages. Regarding diet pattern, 86.67% of patients taking non vegetarian diet, 13.33% of patients taking vegetarian diet. About life style 63.33% of patients are sedentary workers, 26.67% of patients are moderate workers, 10% of patients are heavy workers. See Tab1.

**Table 1:** Shows the demographic information of Patients those who are participated for the following study

<b>Demographic variables</b>		<b>No. of patients</b>	<b>%</b>
Age	30-40 years	6	10.00%
	41-50 years	20	33.34%
	51-60 years	23	38.33%
	Above 60 years	11	18.33%
Gender	Male	28	46.67%
	Female	32	53.33%
Educational qualification	Professionals	0	0.00%
	Graduate or postgraduate	3	5.00%
	Intermediate	3	5.00%
	High school	7	11.67%
	Middle school	16	26.67%
	Primary school	19	31.66%
	Illiterate	12	20.00%
	Legislators, senior officials & managers	0	0.00%
Occupation	Professionals	0	0.00%
	Technicians and associate professionals	0	0.00%
	Clerks	4	6.67%
	Skilled workers, shop & market scale workers	8	13.33%
	Skilled agricultural & fishery worker	19	31.67%
	Craft & related trade workers	6	10.00%
	Plant & machine operators & assemblers	5	8.33%
	Elementary occupation	15	25.00%
	Unemployed	3	5.00%
	Below Rs.5,000	20	33.33%
Monthly income of the family	Rs.5,001-10,000	25	41.67%
	Rs.10,001-15,000	10	16.67%
	Rs.15,001-20,000	5	8.33%
	Above Rs.20,001	0	0.00%
	Joint family	20	33.33%
Type of family	Nuclear family	40	66.67%
	Married	57	95.00%
	Un Married	0	0.00%
Marital status	Widow/Widower	3	5.00%

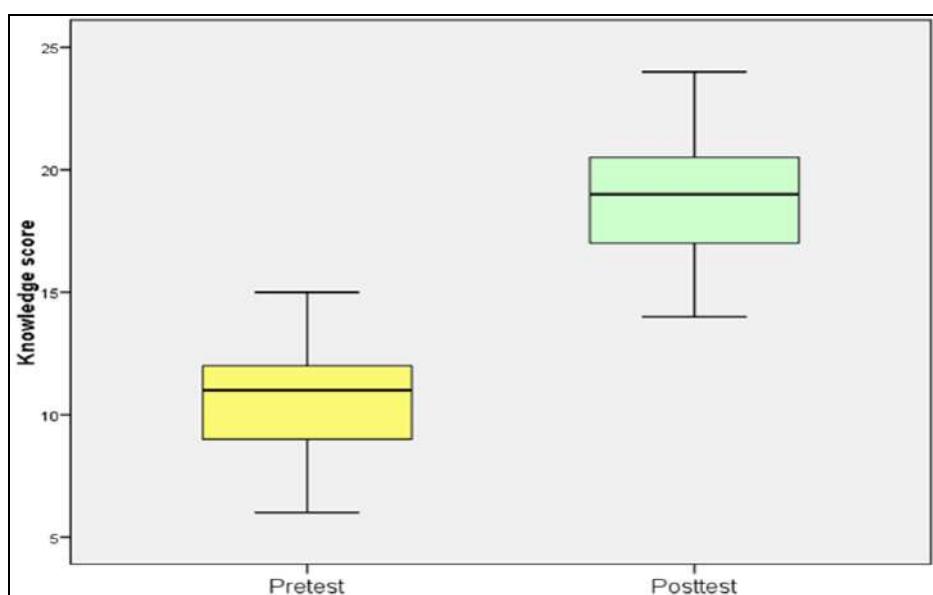
	Divorced	0	0.00%
Languages known	Tamil	47	78.33%
	English	0	0.00%
	Both Tamil and English	10	16.67%
	Other language	3	5.00%
Diet	Vegetarian	8	13.33%
	Non Vegetarian	52	86.67%
Life style	Sedentary	38	63.33%
	Moderate	16	26.67%
	Heavy worker	6	10.00%

**Table 2:** Clinical Variables

Clinical variables	No. of patients	%
Level of Hemoglobin in grams	Below 12.5gms/dl	31
	12.6-13.5gms/dl	19
	13.6-17.5gms/dl	10
	Above 17.6gms/dl	0
Blood pressure in mmHg	Below 110/80mmHg	10
	120/80-130/90mmHg	30
	140/80-150/100mmHg	17
	Above 160/110mmHg	3
Body weight in kilogram	Less than 50kgs	7
	50-70kgs	38
	71-90kgs	14
	Above 90	1
Urine output in ml/24hrs	Below 490ml	4
	500-1000ml	34
	1100-1600ml	18
	Above 1700ml	4
Frequency of micturition	Less frequent to urinate	7
	More frequent to urinate	28
	Urgent need to urinate	25
	No urge to urinate	0
Type of pain	No pain	0
	Severe pain	23
	Sharp pain	25
	Radiating pain	12

**Table 2:** Predicts that majority 51.67% of patients level of hemoglobin in grams is below 12.5 gms/dl, 50% of patients blood pressure is between 120/80-130/90mm of Hg, 63.33% of patients body weight is between 50-70kgs, 56.66% of

patients urine output is 500-1000ml, 46.66% of patients frequency of maturation more frequent to urinate, 41.67% of patients type of pain is sharp pain.

**Fig 1:** Box Plot Compares the Patients' knowledge score before and after the administration of Planned Teaching Programme.

**Table 3:** Effectiveness and Generalization of Knowledge Gain Score

	<b>Max score</b>	<b>Mean score</b>	<b>Mean Difference of knowledge gain score with 95% Confidence interval</b>	<b>Percentage of knowledge gain score with 95% Confidence interval</b>
Pretest	25	10.62	8.18(7.34-9.02)	32.72% (29.36%-36.08%)
Posttest	25	18.80		

Table 4.11 shows the effectiveness of planned teaching programme on knowledge regarding prevention of renal calculi among patients admitted in medical ward.

### Discussion

During pre-test score of knowledge regarding prevention of renal calculi among patients admitted in medical ward. They are having maximum score in the domain Knowledge on Introduction (58.50%). they are having minimum score in the domain (Causes) (39.03%) Overall percentage of knowledge score is (42.48%) Pre-test level of knowledge score regarding prevention of renal calculi among patients admitted in medical ward before administration of planned teaching programme should that 80.0% of the Patients are having inadequate level of knowledge score, 20.0% of the Patients are having moderate knowledge score and none of the Patients are having adequate level of knowledge score. The results of the present study finding was also similar to the study conducted by J. Farm *et al* (2017) which aim to assess the knowledge and practice regarding renal calculi among patients and reported that majority (43.33%) of patients had low knowledge scores about the disorder and (33.33%) were having moderate knowledge [18]. Singh. S *et al* (2018) carried out a descriptive approach to assess the effectiveness of planned teaching programme on knowledge regarding prevention of renal calculi. The study revealed that the pre-test knowledge mean score value was 5.65 [19]. S Shambhavi, *et al.* (2014) conducted a descriptive survey approach, to assess the knowledge of renal calculi among patients admitted in urology ward at Madurai. The results revealed that, 80% had poor knowledge, and 3% has good knowledge regarding renal calculi. In general, it was observed that the patients are having inadequate knowledge regarding prevention of renal calculi, which suggests that there is a need for special attention on imparting knowledge on prevention of renal calculi to the patients [20].

### Post-test level of knowledge regarding prevention of renal calculi.

During post-test score of knowledge regarding prevention of the renal calculi among patients admitted in medical ward. They are having maximum score in the domain Knowledge on Marriage (80.83%) They are having minimum score in the domain Preventive measures (70.67%) Overall percentage of knowledge score is 75.85%. Post-test level of knowledge score regarding prevention of renal calculi among patients admitted in medical ward after administration of planned teaching programme. In general, none of the Patients are having inadequate level of knowledge score, 28.3% of the Patients are having moderate knowledge score and 71.7% of the Patients are having Adequate level of knowledge score.

Overall knowledge score, in pretest Patients are having 10.62 score and in posttest they are having 18.80 score, so the difference is 8.18. This difference is large and statistically significant difference Statistical significance

was calculated by using student's paired 't' test.

The above findings were supported by study conducted to assess the effectiveness of planned teaching on knowledge regarding prevention of renal calculi among the general populations at Maharashtra by Singh's, *et al.*(2018) the study findings reported that 73% had adequate knowledge and 17% patients had inadequate knowledge<sup>21</sup>. Kevin kim *et al*, (2017) carried out a prospective, cross sectional study on compliance of the recurrent renal stone former with current practice guidelines. The study finding reveals that 70% of the respondents were aware of the current guidelines and only 43% applied their knowledge in clinical practice [22]. The study findings suggest that planned teaching programme is found effective in improving knowledge of the patients. It is also evident that planned teaching programme is effective in empowering patients with adequate knowledge and helps them in prevention of renal calculi.

Singh. S *et al.* (2018) carried out a descriptive evaluator approach on study to assess the effectiveness of planned teaching programme on knowledge regarding prevention of renal calculi. The study reveals that there is a significant difference between pre and posttest knowledge score among patients [23]. It is believed that planned teaching programme was effective method of improving the knowledge of patients regarding prevention of renal calculi.

The analysis revealed that there was significant difference between levels of knowledge who received planned teaching programme. Hence accepting the hypothesis H<sub>1</sub> stated that there is significant difference between the mean pretest and posttest knowledge regarding prevention of renal calculi among patients admitted in medical ward who received the planned teaching programme.

### Association between the post-test levels of knowledge regarding the prevention of renal calculi with their selected demographic variables.

Post-test level of knowledge score of the present study is associated with demographic variables such as age, gender, high income and joint family Statistical significance was calculated using chi square test. H<sub>2</sub> There is a significant association between the post-test knowledge score and their selected demographic variables. During post-test score of knowledge regarding prevention of the renal calculi among patients admitted in medical ward. They are having maximum score in the domain Knowledge on Marriage (80.83%) They are having minimum score in the domain Preventive measures (70.67%) Overall percentage of knowledge score is 75.85%.

The study findings were showed that there is significant association between age, gender, monthly family income, joint family [24]. Ayush lohiy A. *et al.* (2019) carried out a cross sectional study on population-based estimate of urinary stones from ballabgarh, northern India. The study concluded that majority of the patients were in the age group of 20 to 40 years. Thus, the study concludes that high

burden of urinary stones is common in working age population in northern India at the community level. The analysis revealed that there was significant association between the knowledge regarding prevention of renal calculi among patients with demographic variables<sup>25</sup>. Hence H<sub>2</sub>was accepted. The present study results highlighted the effectiveness of planned teaching programme on prevention of renal calculi among medical ward patients. It is also evident that planned teaching programme is effective in empowering patients with adequate knowledge and helping them in prevention of renal calculi.

### **Limitations of the Study**

This study is limited to patients admitted in medical ward Rajiv Gandhi Government General Hospital, Chennai.

1. The study is limited up 4 weeks of period
2. Medical ward patients who are all come under the inclusion criteria.

### **Conclusion**

Nurses must have holistic knowledge regarding prevention of renal calculi. Nurses play a vital role of prevention aspects. The present study had been supported by a series of other studies which confirmed that the knowledge on prevention of renal calculi. Data analysis and result was found that planned teaching programme on prevention of renal calculi was an effective method for providing adequate knowledge to the patient.

### **Recommendations**

On the basis of the findings of the study, it is recommended that

1. A similar study can be replicated on larger sample with a control group.
2. A similar study can be replicated for patients with specific type of renal calculi
3. A comparative study can be conducted to identify the differences in knowledge and practice of behaviour among patients with renal calculi in the rural and urban settings.

### **Implications**

#### **Nursing practice**

- This study is conducted among patients to assess the level of knowledge regarding prevention of renal calculi. The study findings can be utilized to educate the patients regarding prevention of recurrence of renal calculi.
- Ongoing In-service education programme should be designed and implemented at medical wards to improve nurse's knowledge and practices on the basis of nurse's preventive aspects.
- A standardized clinical nursing protocol and guidelines about prevention of renal calculi could be made available in each medical ward.

#### **Nursing Research**

- There is growing need for furnishing nursing research in all the areas of prevention. The nurse researcher especially needs to enhance their quest for knowledge.

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