

# A Study to Assess the Effectiveness of Planned Teaching Program on Knowledge Regarding Modifiable Risk Factors and Prevention of Renal Calculi Among Selected Rural Community of Dehradun

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## ABSTRACT

To ensure good health: eat lightly, breathe deeply, live moderately, cultivate cheerfulness, and maintain an interest in life. Renal calculus is stone like body composed of urinary salts bound together by a colloid matrix of organic materials. It consists of a nucleus around with concentric layers of urinary salts are deposited. The cause of renal stone is hyper excretion of relatively insoluble urinary constituents, physiological changes in urine PH, environmental and dietary factors. Depending on causes they are classified as calcium phosphate, calcium oxalate, uric acid, cystine and struvite.

The aim of the study was to assess the effectiveness of planned teaching program on knowledge regarding modifiable risk factors and prevention of renal calculi. A pre-experimental one group post test design was used for the study. A total 70 men and women of rural community from Dudhli village of Dehradun, Uttarakhand were selected through convenience non-probability sampling technique. The data was collected through self-structured questionnaire on modifiable risk factors and prevention of renal calculi. The tool was developed in two parts, the part first deal with the 8 questions of demographic variables and the part two consist of 33 knowledge questions on modifiable risk factors and prevention of renal calculi. Results show that out 70 samples, majority of subjects 39(55.7%) was having inadequate knowledge, 31(44.3%) had moderate knowledge and no one have adequate knowledge. Pre-test mean score was 16.07 with 3.82 SD. After administering planned teaching program 25 (35.7%) had adequate knowledge, 41 (58.6%) had moderate knowledge and 04 (5.7%) had inadequate knowledge. The post-test mean score was 23.65 with 4.17 SD with a mean difference of 7.58 as evident from paired 't' value of 11.579 at 69 df at 0.05 level of significance. The chi square depicts that there is no significant association between knowledge of rural community regarding modifiable risk factors and prevention of renal calculi with selected demographic variables. The study was concluded that planned teaching program was effective in increasing the knowledge regarding modifiable risk factors and prevention of renal calculi among selected rural community. On the basis of the findings, it is recommended that such type of teaching program should be conducted on time to time for all rural communities who are at higher risk for renal calculi so that they can practice preventive approaches.

**Keywords:** Renal calculi, planned teaching program, modifiable risk factor, Rural.

## INTRODUCTION

Kidneys are the pair of excretory organs situated on the posterior abdominal wall, one each side of the vertebral column behind the peritoneum. The functions of kidney is regulation of blood volume, blood pressure and blood glucose level, maintenance of blood PH, production of hormones, excretion of metabolic wastes products, excess salts and water

Renal Calculi, one of the most painful of the urological disorders, have beset humans per century. Scientists have found evidence of Renal Calculi in a seven-thousand-year-old Egyptian mummy. Unfortunately, Renal Calculi are one of the most common disorders of urinary tract. Each year, people make almost three million visits to healthcare providers and more than half of million people go to emergency rooms for Renal Calculi problems stones that cause lasting symptoms or other complications may be treated by various techniques, most of which do not involve major surgery. Also, research advances have led to a better understanding of the many factors that promote stone formation and thus better treatments for preventing stones.

From variety of studies and commentaries it was recognized that Renal Calculi more common throughout the world. About 5 in 1000 persons are affected with stones of the upper renal urinary tract (Kidney) more common than stones in the bladder. The average age of onset is during thirties. Men are affected with calcium stones more often than woman. Recurrences are common and identification of the chemical compositions of stone can help in identifying risk factors.

## MATERIALS & METHODS

The research design refers to the overall strategy the researcher chooses to integrate the different component of the study in a logical way to ensure that it will effectively explain the research problem, it includes the blue print for the collection, measurement and analysis of data.

In the present study, pre-experimental one group pre-test, post-test design was selected

to assess the effectiveness of planned teaching program modifiable risk factors and prevention of renal calculi among the selective rural community of Dehradun.

### Pre-experimental, one group, pre-test, post-test design.

| GROUP                                      | DAY-1 | DAY-1 | DAY-7 |
|--|-------|-------|-------|
| Male or Female of selected rural community | 01    | X     | 02    |

01= Pre-test, assessed the existing knowledge of rural community of selected area of Dehradun regarding renal calculi by administering self-structured knowledge questionnaire.

X= Intervention (Planned Teaching Program)

02= Post-test, assessed post-test knowledge of rural community of selected area of Dehradun regarding renal calculi by administering self-structured knowledge questionnaire

### Sample Size:

The sample size in this study is 70 villagers of rural community of selected area Dudhli at Dehradun.

### Sampling Technique:

Sampling technique refers to the technique or method of selecting portion of the population or sample to represent the entire population.

Non- probability convenient sampling technique was used for selecting the samples.

## RESULT

The data collected was organized and presented under following sections:

**Section 1:** Description of the Socio demographic variables of the subjects.

**Section 2:** Finding related to knowledge score

Table- 1: Distribution of respondent according to Age N=70

| Age (in years) | Frequency | Percentage (%) |
|----------------|-----------|----------------|
| 18 – 33        | 38        | 54.3%          |
| 34 – 49        | 19        | 27.2%          |
| 50 – 65        | 12        | 17.1%          |
| 66 and above   | 1         | 1.4%           |
| Total          | 70        | 100 %          |

Table 1 shows the distribution of respondent according to age. The data revealed that 38 (54.3%) were in the age group of 18-33 years followed by 19 (27.2%) were in the

age group of 34-49 years, 12 (17.1%) were in the age group of 50-65 and only 1 (1.4%) belongs to 66 year and above.

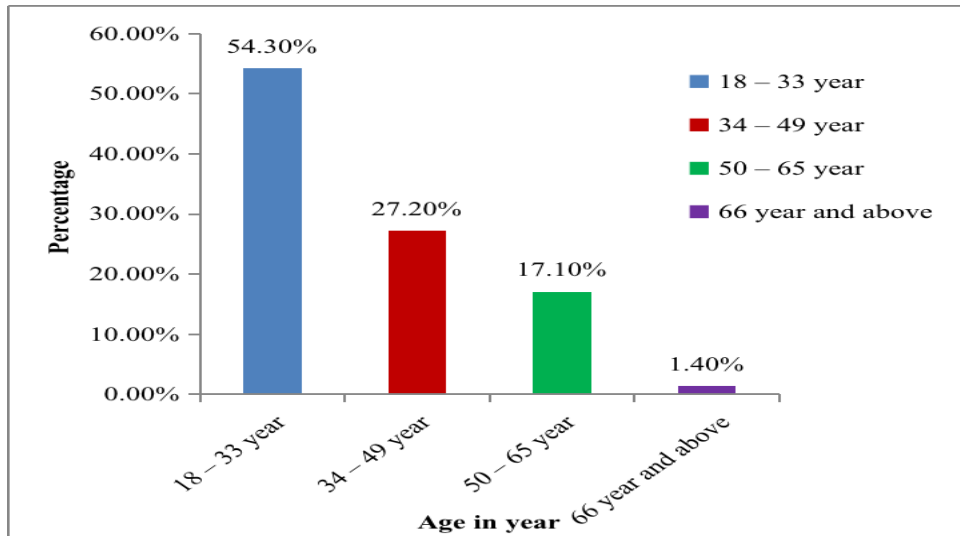


Figure – 1: Distribution of subjects by age

Table-2: Distribution of respondent according to Gender N=70

| Gender | Frequency | Percentage (%) |
|--------|-----------|----------------|
| Male   | 29        | 41.4%          |
| Female | 41        | 58.6%          |
| Total  | 70        | 100 %          |

Table 2 shows the distribution of respondent according to gender. The data revealed that 41 (58.6%) were female and 29 (41.4%) were male.

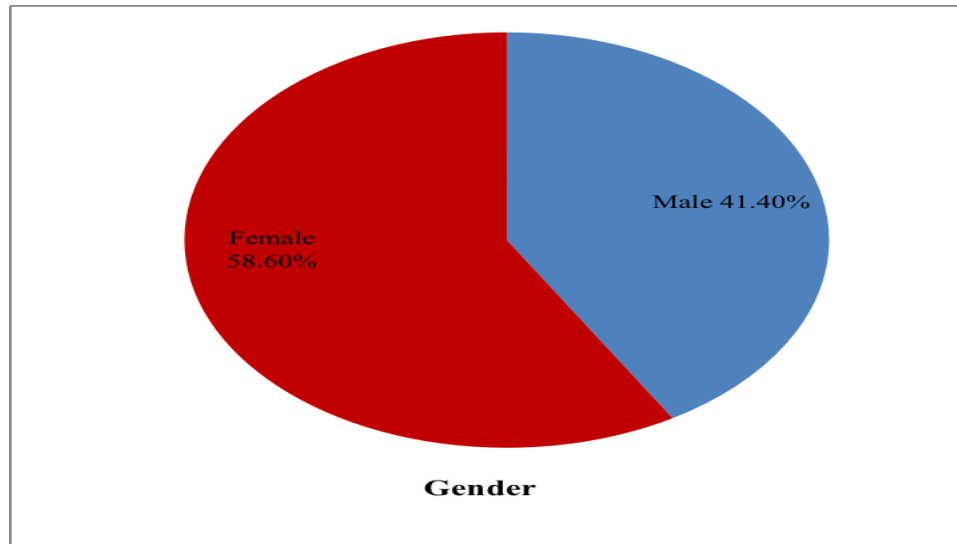


Figure – 2: Distribution of subjects by gender

Table- 3: Distribution of respondent according to Education N=70

| Education                 | Frequency | Percentage (%) |
|---------------------------|-----------|----------------|
| Primary Education         | 4         | 5.7%           |
| High school               | 25        | 35.7%          |
| Intermediate              | 19        | 27.1%          |
| Graduation/ post graduate | 22        | 31.5%          |
| Total                     | 70        | 100 %          |

Table 3 depicts that among the rural population 25 (35.7%) of them had high school, 22 (31.5%) were graduation/ post

graduation, 19 (27.1%) having intermediate and 4 (5.7%) were having primary education.

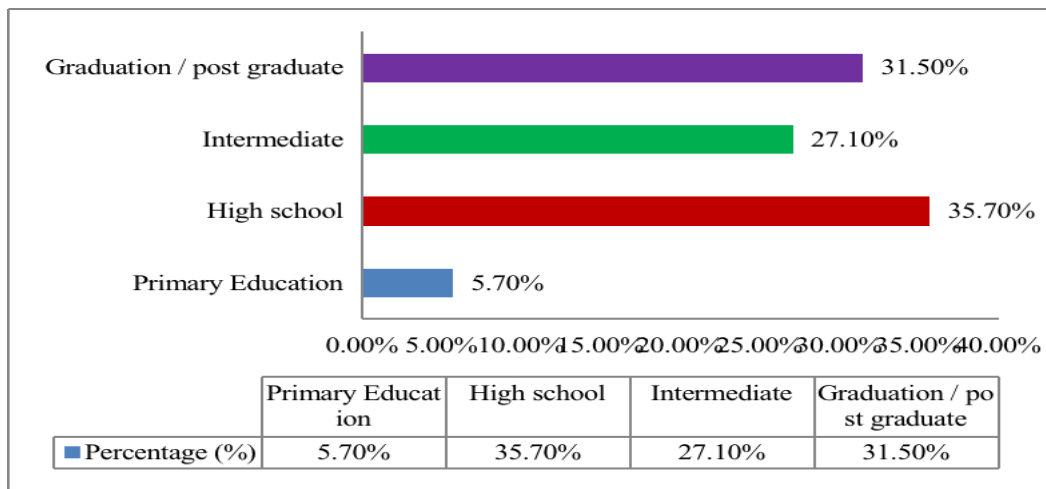


Figure- 3: Distribution of subjects by Education

Table- 4: Distribution of respondent according to Occupation N=70

| Occupation | Frequency | Percentage (%) |
|------------|-----------|----------------|
| Students   | 23        | 32.8%          |
| Employed   | 13        | 18.6%          |
| Unemployed | 14        | 20%            |
| House wife | 20        | 28.6%          |
| Total      | 70        | 100 %          |

The table 4 reveals that the 23 (32.8%) respondent were students, followed by 20 (28.6%) were housewife, 14 (20%) were unemployed and 13 (18.6%) were employee.

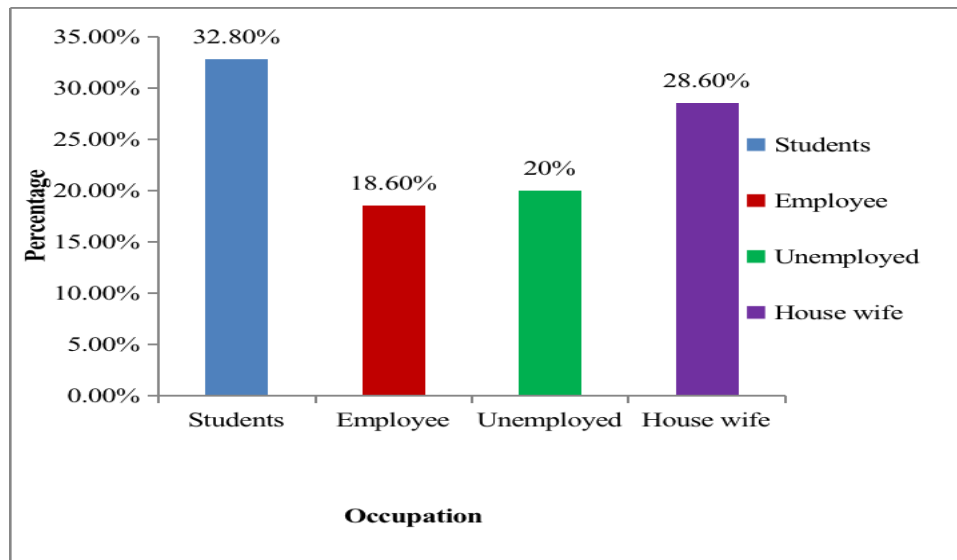


Figure – 4: Distribution of Subject by Occupation

Table- 5: Distribution of respondent according to Religion N=70

| Religion | Frequency | Percentage (%) |
|----------|-----------|----------------|
| Hindu    | 67        | 95.7%          |
| Muslim   | 0         | 0%             |
| Sikh     | 3         | 4.3%           |
| Other    | 0         | 0%             |
| Total    | 70        | 100 %          |

Table 5 shows that majority 67 (95.7%) respondent belongs to Hindu religion and 3 (4.3%) were Sikh.

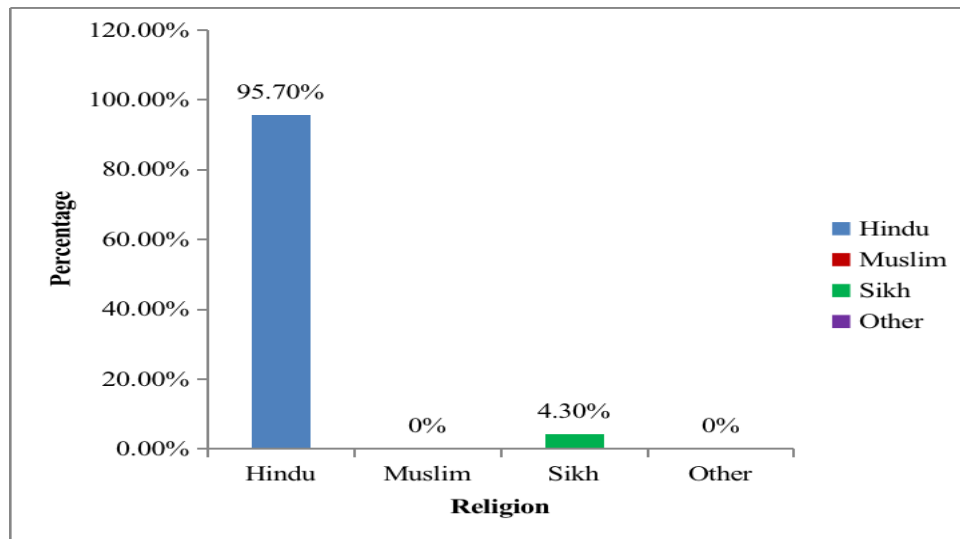


Figure- 5: Distribution of Subject by Religion

Table- 6: Distribution of respondent according to food habit N=70

| Food habit     | Frequency | Percentage (%) |
|----------------|-----------|----------------|
| Vegetarian     | 36        | 51.4%          |
| Non vegetarian | 34        | 48.6%          |
| Total          | 70        | 100 %          |

The table 6 shows that the 36 (51.4%) respondents were vegetarian and 34 (48.6%) of them were non vegetarian.

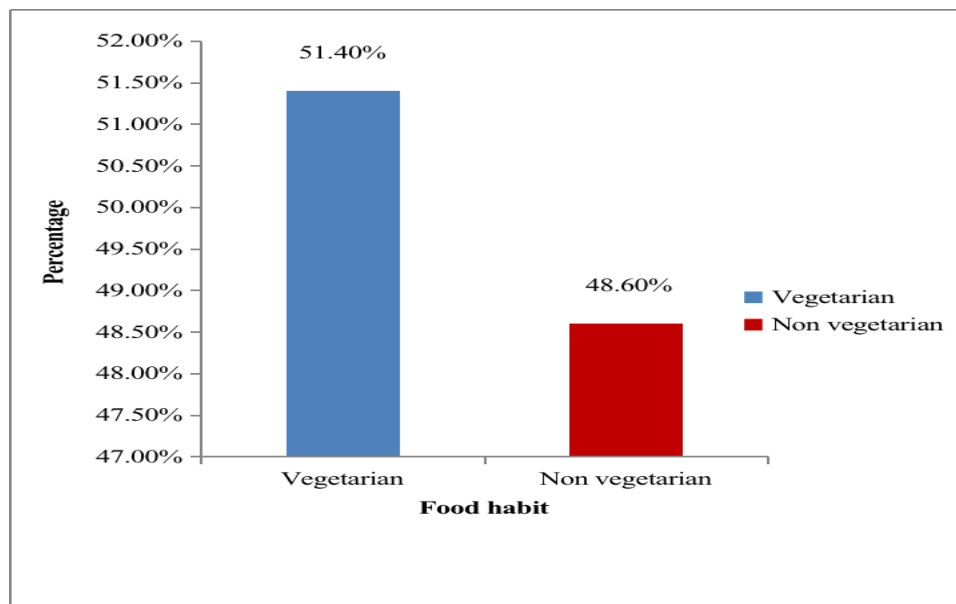


Figure – 6: Distribution of Subject by food habit

Table- 7: Distribution of respondent according to habitat N=70

| Habitat       | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| Village       | 56        | 80%            |
| Town          | 11        | 15.7%          |
| Tribe         | 01        | 1.4%           |
| High altitude | 02        | 2.9%           |
| Total         | 70        | 100 %          |

The table 7 shows that the majority 56 (80%) respondent were living in village, 11 (15.7%) were in town, 2 (2.9%) were in high altitude and only 1 (1.4%) in tribe area.

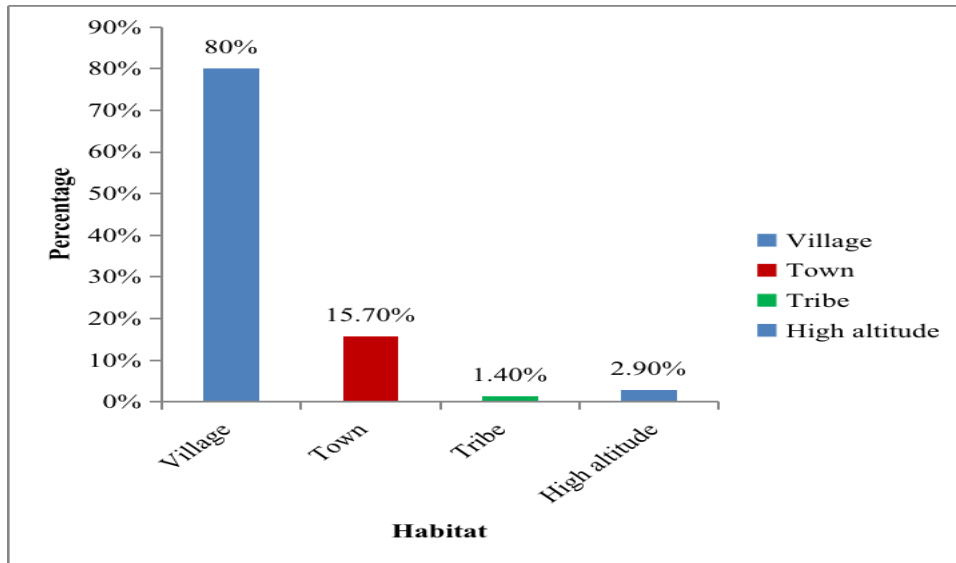


Figure – 7: Distribution of Subject by habitat

Table- 8: Distribution of respondent according to water intake N=70

| Water intake                  | Frequency | Percentage (%) |
|-------------------------------|-----------|----------------|
| 5-6 glasses of water per day  | 23        | 32.9%          |
| 3-4 glasses of water per day  | 12        | 17.1%          |
| 8-10 glasses of water per day | 30        | 42.9%          |
| 2-3 glasses of water per day  | 05        | 7.1%           |
| Total                         | 70        | 100 %          |

The table 8 depicts that the water intake of the respondents shows that 30 (42.9%) respondents were drinking 8-10 glass, 23 (32.9%) respondents were drinking 5-6

glass, 12 (17.1%) respondent were drinking 3-4 glass and 5 (7.1 %) were drinking 2-3 glass of water per day.

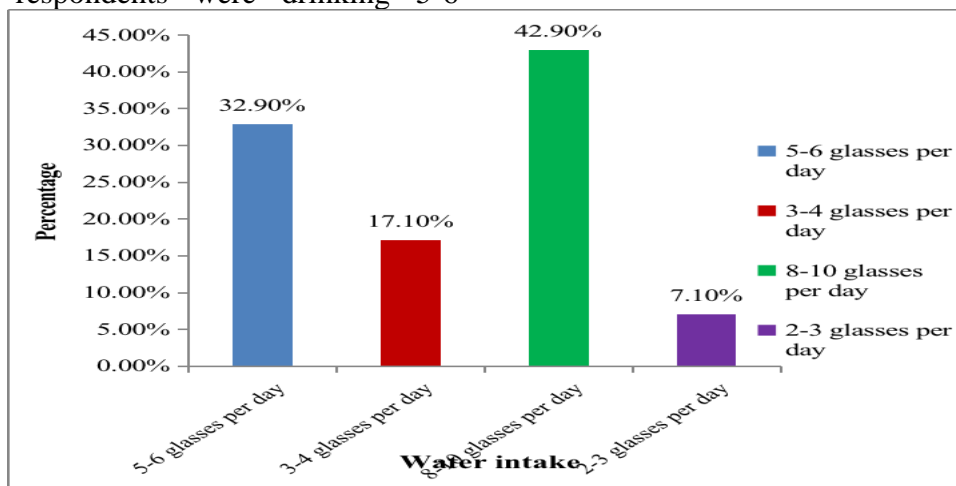


Figure- 8: Distribution of Subject by Water intake

## Section 2: Findings related to knowledge score

### Part - 1: Findings related to knowledge regarding modifiable risk factors and

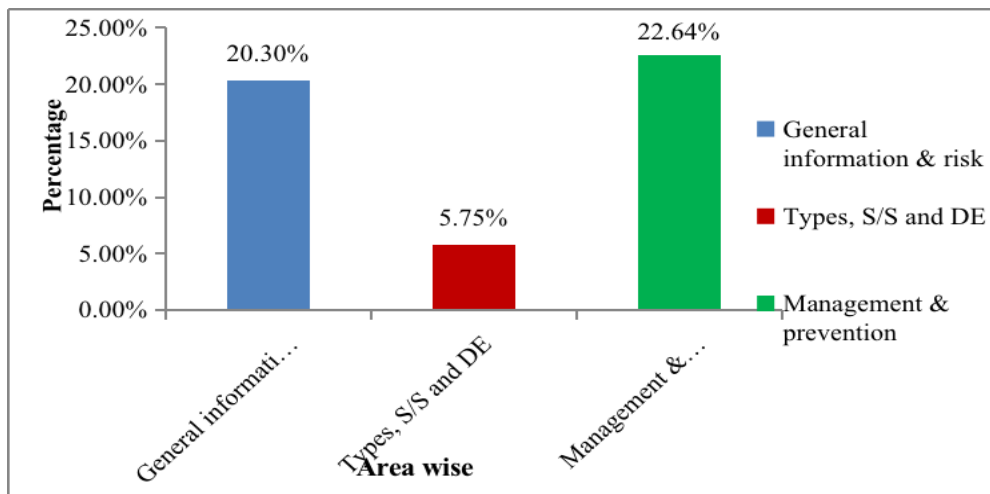
### prevention of renal calculi before planned teaching program

**Table 9: Finding related to pre-test knowledge score (N=70)**

| Part  | Area wise   | No of items | Mean  | Mean % | SD   |
|-------|---|-------------|-------|--------|------|
|       | General information and Modifiable risk factors of renal calculi  | 14          | 6.70  | 20.30% | 2.09 |
|       | Types, Sign & Symptoms and Diagnostic evaluation of renal calculi | 5           | 1.90  | 5.75%  | 1.13 |
|       | Management and prevention of renal calculi                        | 14          | 7.47  | 22.64% | 2.27 |
| Total |   | 33          | 16.07 | 48.70  | 3.82 |

Table 9 shows the overall & area wise pre-test knowledge score of rural community people regarding modifiable risk factors and prevention of renal calculi. 22.64% of respondents have knowledge on Management and prevention of renal calculi, followed by 20.30 % were have

General information and Modifiable risk factors of renal calculi and 5.75 % have Types, Sign & Symptoms and Diagnostic evaluation of renal calculi. The overall mean value is 16.07 having the mean percentage of 48.70% and SD 3.82.



**Figure- 9: Distribution of Subject by pre-test score**

**Part - 2: Findings related to knowledge regarding modifiable risk factors and prevention of renal calculi after planned teaching program.**

**Table 10: Finding related to post-test knowledge score (N=70)**

| Sl. No | Area wise   | No of items | Mean  | Mean % | SD    |
|--------|---|-------------|-------|--------|-------|
|        | General information and Modifiable risk factors of renal calculi  | 14          | 9.75  | 29.54  | 2.25  |
|        | Types, Sign & Symptoms and Diagnostic evaluation of renal calculi | 5           | 4.08  | 12.36  | 0.912 |
|        | Management and prevention of renal calculi                        | 14          | 9.81  | 29.70  | 1.96  |
| Total  |   | 33          | 23.65 | 71.67  | 4.17  |

Table 10 shows the overall & area wise post-test knowledge score of rural community people regarding modifiable risk factors and prevention of renal calculi. 29.70% of respondents have knowledge on Management and prevention of renal calculi, followed by 29.54% were have

General information and Modifiable risk factors of renal calculi and 12.36% have Types, Sign & Symptoms and Diagnostic evaluation of renal calculi. The overall mean value is 23.65 having the mean percentage of 71.67% and SD 4.17.



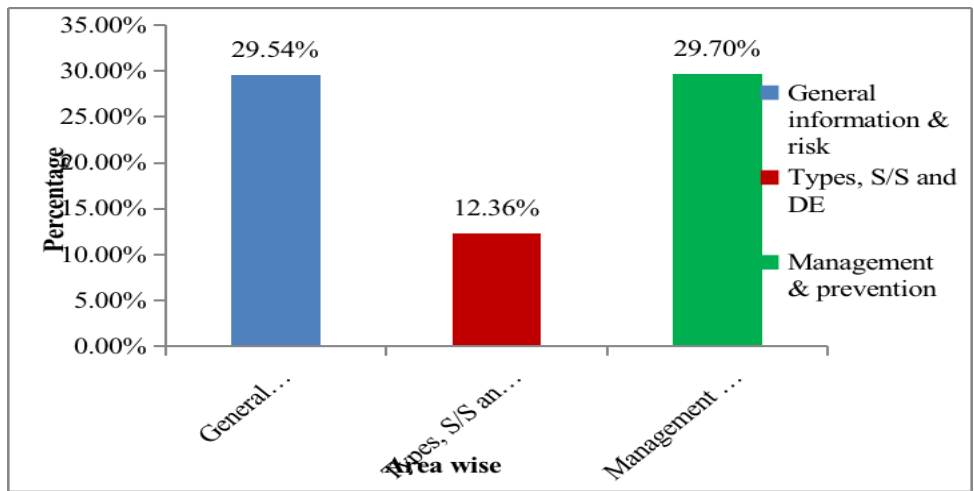


Figure- 10: Distribution of Subject by post-test score

**Part - 3: Findings related to knowledge level regarding modifiable risk factors and prevention of renal calculi after planned teaching program.**

Table 11: Finding related to Knowledge level (N=70)

| Sl. No | Area wise            | Score    | Pre-test |       | Post-test |       |
|--------|----------------------|----------|----------|-------|-----------|-------|
|        |                      |          | F        | %     | F         | %     |
|        | Inadequate knowledge | 1 to 16  | 39       | 55.7% | 04        | 5.7%  |
|        | Moderate knowledge   | 17 to 25 | 31       | 44.3% | 41        | 58.6% |
|        | Adequate knowledge   | 26 to 33 | 00       | 0%    | 25        | 35.7% |
| Total  |                      |          | 70       | 100%  | 70        | 100   |

Table 11 depicts that majority 39 (55.7%) of rural community people have inadequate knowledge and 31 (44.3%) were moderate knowledge before planned teaching program. After the intervention it was observed that 41 (58.6) were having

moderate knowledge 25 (35.7%) were adequate knowledge and remaining 4 (5.7%) of them have inadequate knowledge towards modifiable risk factors and prevention of renal calculi.

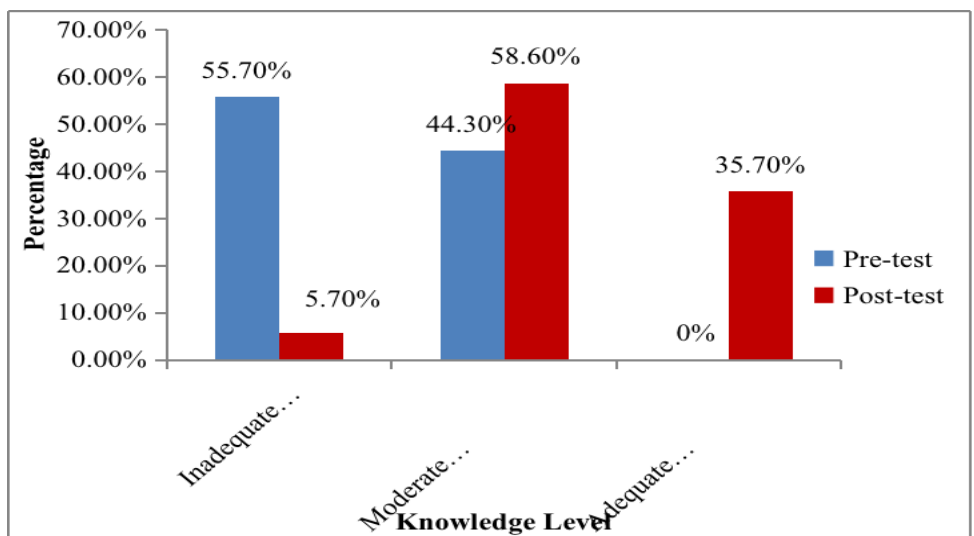


Figure 11: Knowledge level of the rural community regarding modifiable risk factors and prevention of renal calculi.

**Section 3: Findings related to compare the pre test and post test level of knowledge regarding modifiable risk factors and prevention of renal calculi.**

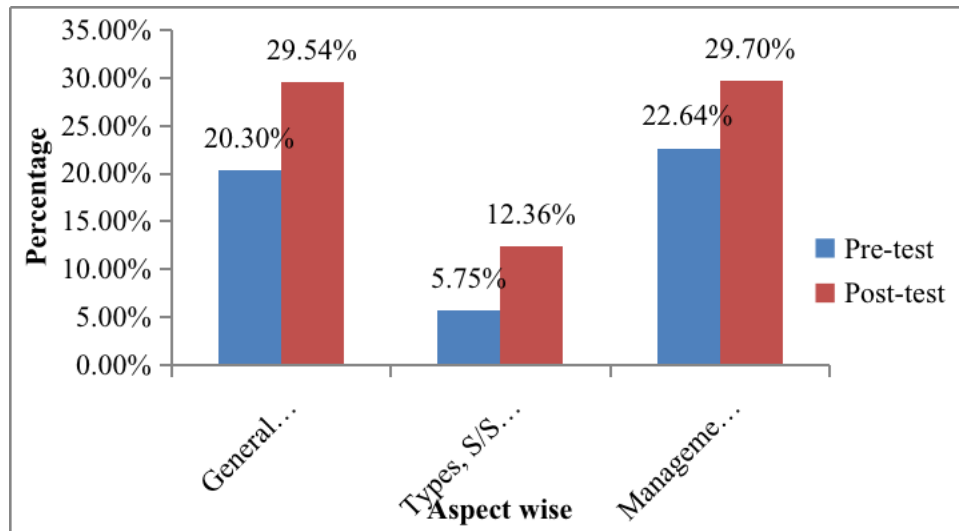


**Table 12: - Comparison of overall knowledge score (N=70)**

| Area of Knowledge   | Pre-test   |        | Post test  |        | Mean Enhancement % |
|---|------------|--------|------------|--------|--------------------|
|   | Mean score | Mean % | Mean score | Mean % |                    |
| General information and Modifiable risk factors of renal calculi  | 6.70       | 20.30  | 9.75       | 29.54  | 9.24               |
| Types, Sign & Symptoms and Diagnostic evaluation of renal calculi | 1.90       | 5.75   | 4.08       | 12.36  | 6.61               |
| Management and prevention of renal calculi                        | 7.47       | 22.64  | 9.81       | 29.70  | 7.06               |
| Over all  | 16.07      | 48.70  | 23.65      | 71.67  | 22.97              |

Table 12 shows the comparison between pre-test and post-test knowledge score of rural community people regarding modifiable risk factors and prevention of renal calculi. It was observed that 9.24% of enhancement in General information and Modifiable risk factors of renal calculi

followed by 7.06% in Management and prevention of renal calculi and 6.61% in Types, Sign & Symptoms and Diagnostic evaluation of renal calculi. The overall enhancement was 22.97 %, Hence, the research hypothesis H<sub>1</sub> is accepted and null hypothesis is rejected.



**Figure 12:- Comparison of overall knowledge score**

#### Section 4: Effectiveness of planned teaching program on knowledge regarding modifiable risk factors and prevention of renal calculi

**Table 13: Effectiveness of PTP regarding modifiable risk factors and prevention of renal calculi (N=70)**

| Component   | Group     | Mean ±SD   | Mean difference | 't' value                  |
|---|-----------|------------|-----------------|----------------------------|
| General information and Modifiable risk factors of renal calculi  | Pre-test  | 6.70±2.09  | 3.05            | 8.009<br>df=69<br>P=0.000  |
|   | Post-test | 9.75±2.25  |                 |                            |
| Types, Sign & Symptoms and Diagnostic evaluation of renal calculi | Pre-test  | 1.90±1.13  | 2.18            | 11.304<br>df=69<br>P=0.000 |
|   | Post-test | 4.08±0.912 |                 |                            |
| Management and prevention of renal calculi                        | Pre-test  | 7.47±2.27  | 2.34            | 7.357<br>df=69<br>P=0.000  |
|   | Post-test | 9.81±1.96  |                 |                            |
| Over all  | Pre-test  | 16.07±3.82 | 7.58            | 11.579<br>df=69<br>P=0.000 |
|   | Post-test | 23.65±4.17 |                 |                            |

\*- Significant at 0.05 level

Table 13 represents the aspect wise mean of rural community regarding modifiable risk factors and prevention of renal calculi. The results showed the enhancement of

knowledge was highest in the aspect of General information and Modifiable risk factors of renal calculi 3.05 and lowest in Types, Sign & Symptoms and Diagnostic

evaluation of renal calculi 2.18 with an overall enhancement of 7.58.

The aspect wise 't' test value was observed and showed a significant in all the aspect of knowledge area. The combined 't' test value was significant i.e 11.579 at P<0.05 level. Which indicate planned teaching programme was effective.

**Section 5: Deals with association between selected demographic variables and pre-test level of knowledge regarding modifiable risk factors and prevention of renal calculi.**

**Table 14:- Association between pre-test knowledge levels of rural population with selected socio demographic variables. (N= 70)**

| Variable                    | Inadequate | Moderate | Df | Chi-square value | P value | Inference |
|-----------------------------|------------|----------|----|------------------|---------|-----------|
| <b>Age in year</b>          |            |          |    |                  |         |           |
| 18 – 33                     | 25         | 13       | 3  | 4.406            | 0.221   | NS        |
| 34 – 49                     | 8          | 11       |    |                  |         |           |
| 50 – 65                     | 6          | 6        |    |                  |         |           |
| 66 and above                | 0          | 1        |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |
| <b>Gender</b>               |            |          |    |                  |         |           |
| Male                        | 15         | 14       | 1  | 0.319            | 0.572   | NS        |
| Female                      | 24         | 17       |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |
| <b>Education</b>            |            |          |    |                  |         |           |
| Primary education           | 2          | 2        | 3  | 0.103            | 0.992   | NS        |
| High school                 | 14         | 11       |    |                  |         |           |
| Intermediate                | 11         | 8        |    |                  |         |           |
| Graduation/ Post graduation | 12         | 10       |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |
| <b>Occupation</b>           |            |          |    |                  |         |           |
| Students                    | 15         | 8        | 3  | 2.671            | 0.445   | NS        |
| Employed                    | 6          | 7        |    |                  |         |           |
| Unemployed                  | 9          | 5        |    |                  |         |           |
| House wife                  | 9          | 11       |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |
| <b>Religion</b>             |            |          |    |                  |         |           |
| Hindu                       | 38         | 29       | 1  | 0.636            | 0.425   | NS        |
| Sikh                        | 1          | 2        |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |
| <b>Food habit</b>           |            |          |    |                  |         |           |
| Vegetarian                  | 21         | 15       | 1  | 0.206            | 0.650   | NS        |
| Non-Vegetarian              | 18         | 16       |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |
| <b>Residency</b>            |            |          |    |                  |         |           |
| Village                     | 29         | 27       | 3  | 3.015            | 0.389   | NS        |
| Town                        | 7          | 4        |    |                  |         |           |
| Tribe                       | 1          | 0        |    |                  |         |           |
| High altitude               | 2          | 0        |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |
| <b>Water intake</b>         |            |          |    |                  |         |           |
| 5-6 glasses per day         | 12         | 11       | 3  | 0.806            | 0.848   | NS        |
| 3-4 glasses per day         | 8          | 4        |    |                  |         |           |
| 8-10 glasses per day        | 16         | 14       |    |                  |         |           |
| 2-3 glasses per day         | 3          | 2        |    |                  |         |           |
| Total                       | 39         | 31       |    |                  |         |           |

\*Significant at 0.05 level.

S = Significant, NS = Not – Significant

The table 14 shows chi – square value for Age ( $\chi^2 = 4.406$ ), Gender ( $\chi^2 = 0.319$ ), Education ( $\chi^2 = 0.103$ ), Occupation ( $\chi^2 = 2.671$ ), Religion ( $\chi^2 = 0.636$ ), Food habit ( $\chi^2 = 0.650$ ), Habitat ( $\chi^2 = 0.389$ ) and Water intake ( $\chi^2 = 0.806$ ). The obtained p value for these variable is more than  $p>0.05$  value, which indicates that there is no significant

association between Knowledge of rural community population regarding modifiable risk factors and prevention of renal calculi with selected socio-demographic variables. Hence, the research hypothesis H<sub>2</sub> is rejected and null hypothesis is accepted.

## DISCUSSION

### Discussion of demographic variables of the subject

In this study overall highest percentage in the demographic data including Age group 54.3% (18-33 years), Gender 58.6% (female), Education 35.7% (high school), Occupation 32.8% (students), Religion 95.7% (hindu), Food habit 51.4% (vegetarian), Habitat 80% (village), water intake per day 42.9% (8-10 glasses of water per day).

**Discussion related to effectiveness of the planned teaching program regarding modifiable risk factors and prevention of renal calculi.** The result shows that the effectiveness of planned teaching program by comparing the pre-test and post-test knowledge of the rural community. There was a difference between pre-test and post-test mean score. The pre-test mean was 16.07 with SD 3.82 and post-test mean was 23.65 with SD 4.17. The paired “t” test value was 11.579 at 0.05 significance level. So, the calculated value is greater than the tabulated value with the 69 degree of freedom, so it shows that there was a significant difference between the pre-test and post-test knowledge score. Hence the  $H_1$  hypothesis was accepted. The result of the study is supported by similar study conducted by Patidar K., Patidar K. Study revealed that the pre-test and post test mean percentage is 39.08% and 68.4% and difference is 29.32%. The calculated “t” value (25.77) was greater then the table value (1.98) at 0.05 level of significance. Therefore knowledge has been increased after intervention.

Thus; it was concluded that the planned teaching program was effective in increasing the knowledge of rural community regarding modifiable risk factors and prevention of renal calculi.

Discussion related to association between selected demographic variables and pre- test level of knowledge regarding modifiable risk factors and prevention of renal calculi. The Chi square was used to find out the association between the pre-test level of

knowledge and demographic variables. The result findings exhibited that obtained p value for these variables is more than p >0.05 value, which indicate that there is no significant association between knowledge of rural community regarding modifiable risk factor with selected socio-demographic variables. Hence; we can say that the socio-demographic variables of the rural community had no influence on their knowledge regarding modifiable risk factors and prevention of renal calculi.

## CONCLUSION

The finding shows that the planned teaching program was effective in improving the knowledge of rural community regarding modifiable risk factor and prevention of renal calculi. Hence to prevent the rural communities from disease like renal calculi, the curriculum needs to include more planned educational and awareness program related to renal disease and to achieve the ultimate objective of preventing rural community from harmful effects of renal calculi. The benefit of the study is, by participating in the study, the rural community would be aware of their existing knowledge regarding modifiable risk factor and prevention of renal calculi.

Mark Twain said, “The only way to keep your health is to eat what you don’t want, drink what you don’t like, and do what you’d rather not”. All rural communities should be aware of the modifiable risk factor and prevention of renal calculi, so to protect themselves from its health hazards and complication. They need to implement all the preventive points mentioned in this study to their daily life style, and spread this information to their surroundings to prevent from the disease of renal calculi.

### *Declaration by Authors*

**Ethical Approval:** Approved

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**Conflict of Interest:** The authors declare no conflict of interest.

## REFERENCES

1. Chaurasia B.D. Human Anatomy Regional and Applied Dissection and Clinical kidney and ureter. 4<sup>th</sup> ed. 2<sup>nd</sup> vol. New Delhi. Satish Kumar Jain publications; 2004. p. 295.
2. Gerard J. Derrickson B. Principals of anatomy and physiology. 11<sup>th</sup> ed. United States: John Wiley and sons; 2009. p. 993.
3. National kidney and urologic diseases information clearing hour (NKUDC). Available from: URL: kidney.nidak.nih.gov/kudiseases/pubs/stonesadults.44k
4. www.Renal and urology-news.com/nephrology/section/97
5. Ansari MS, Gupta NP, Hemal AK, Dogra PN, Seth A, Aron M, Singh TP. Spectrum of stone composition: structural analysis of 1050 upper urinary tract calculi from northern India. *Int J Urol.* 2005 Jan;12(1):12-6. doi: 10.1111/j.1442-2042.2004.00990.x. PMID: 15661049.
6. Polaski L. Ariene. et.al. Luckmann's core principles and practice of medical surgical nursing 1996; 1975-1980.
7. Gupta Pavan incidence of urolithiasis in north India journal of urology 2005 vol. 36: 357-361.
8. Basavanhappa B.T. Medical Surgical Nursing. 2<sup>nd</sup> ed. New Delhi: Jaypee Brothers; p 1026.
9. Prevalence and Incidence Statistics for Kidney Stones. *Cure Search* 2010 Sept Available from: URL: [http://www.curesearch.com/k/kidney\\_stones/stats.htm](http://www.curesearch.com/k/kidney_stones/stats.htm)
10. Renal calculi (kidney stones) concepts for Registered Nurse[online].2009[cited 2010 Dec 06] Available from: URL: <http://www.online-nursing-dot.com/renal-calculi.html>
11. Blangy S. 'The top five causes of kidney stones. *Urological Research.* 1989:387-389
12. Sandhya A, et.al. May-July1 (1). Kidney Stone Disease: Etiology and Evaluation. *International Journal of Applied Biology and Pharmaceutical Technology.* 2010 :175-181
13. Black.J.M.et.al Medical Surgical Nursing, 6th edition. Harcourt pvt. Ltd, India. 2001:821-829
14. Sanovide Ayurveda The complete Health Studio. Available from <http://www.sanovide.com/corporate.php>
15. Chaurasia B.D. Human Anatomy Regional and Applied Dissection and clinical kidney and ureter.4<sup>th</sup> ed 2<sup>nd</sup> vol. New Delhi, Satish Kumar Jain, Publication: 2004, p.295.
16. Gerard J, Derrickson B. Principles of anatomy & physiology, 11<sup>th</sup> ed. United States: John Wiley and sons; 2009, p -993.
17. Jayaram, SR. Prasad,SK Mitra; Evaluation of efficacy and safety of cystone syrup in lower ureteric calculi; *Indian Journal of Clinical practice.* 2007 Dec; vol 18. P.33.
18. Tanthanuch. M, Apiwatgaron, "Urinary tract stones in southern Thailand". *J. Med. Association, Thailand.* Jan 2005, Vol.88(1): 80-5.
19. Monthira T.*et.al.*, Urinary Tract Calculi in Southern Thailand. *Journal of Medical Association of Thai:* 2005, 88(1), 80-85.
20. Curhan G *et.al.* Beverage use and risk of kidney stone in women. *Ann Intern Med* April,1998; 128(7): 534-40
21. Stamper M. Research on diet soda and kidney function. *J Am Soc Nephrol* September 1998;28(4):25

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