

The Risk of Urinary Tract Disease among Vegetarian and Non-Vegetarian Patients in Tertiary Care Hospital of Kashmir: A prospective study

Mohammad Kaif

Assistant Professor, Department of Allied Health Sciences, Gulzar Institute of Professional Studies, Khanna Amanpreet Kaur

Assistant Professor, Department of Allied Health Sciences, Gulzar Institute of Professional Studies, Khanna Mubashir Ali Malla

Assistant Professor, Department of Allied Health Sciences, Gulzar Institute of Professional Studies, Khanna

Abstract - This study aimed to investigate the risk of urinary tract diseases among vegetarian and non-vegetarian patients from a tertiary care hospital. Data was collected from the radiology department of the hospital, specifically from sonography reports of patients with indications of urinary tract diseases. The study included 209 patients, and their demographic and dietary factors were analysed to assess the impact on urinary tract disease risk. The study found a significant difference in urinary tract disease risk between genders, with females demonstrating a lower risk compared to males. Furthermore, the study examined the association between dietary patterns and prevalence. It was observed that a low intake of animal protein and vegetables appeared to balance the risk of urinary tract diseases. Conversely, a high intake of non-vegetarian food was strongly associated with urinary tract disease incidence. The study highlights the need for dietary guidelines specific to urinary tract health, which could aid in the prevention and management of urinary tract diseases. Future research should further investigate the underlying mechanisms and long-term benefits of vegetarian diets in mitigating urinary tract disease risk. The study has important implications for both healthcare providers and individuals

Keywords: Urinary Tract Disease, Tertiary Hospital, Vegetarian, Non-Vegetarian and Sonography

I. INTRODUCTION

The urinary tract system is composed of the bladder, ureters, and kidneys, an essential organ system for waste product filtering and excretion as well as maintaining systemic homeostasis. All elements of the system must cooperate in the proper sequence for appropriate excretion.⁽¹⁾The kidney and urinary system aid in removing the liquid waste product urea from the body and maintaining healthy levels of potassium, salt and water in the body. The kidneys remove urine, which contains urea along with water and other waste materials, from the bloodstream.⁽²⁾Male and female kidneys typically weigh between 150 and 200 g and 120 to 135 g, respectively. The kidneys have a bean-like form with medial and lateral concavities. In addition to secreting hormones like erythropoietin and calcitriol, the kidneys perform a number of other tasks, such as eliminating waste products like urea and ammonia.⁽³⁾The ureter, transports urine from the kidneys in the abdomen to the bladder in the pelvis. The ureter's upper portion is found in the belly, while its lower portion is found in the pelvic region.⁽⁴⁾Bladder: Typically located on the pelvic floor, the urine bladder is a muscular, hollow, pear-shaped, elastic organ. The ureters provide it with pee.⁽⁵⁾Shape: When empty, the bladder is tetrahedral in shape and ovoid in shape. It is a hollow, inflated pelvic viscus.⁽⁶⁾The kidneys, ureters, and bladder can all be seen in images created by a renal ultrasonography, which is a painless, secure, and efficient test. Multiple types of renal masses exist. Imaging can be used to diagnose any form of obstruction and inflammation in urinary tract disorders or kidneys that aren't working.⁽⁷⁾

II. URINARY TRACT DISEASES AND DIET

Chronic kidney disease (CKD) and urinary tract disorder are both highly prevalent and steadily on the rise. A renal-friendly diet may aid in preventing additional kidney damage.⁽⁸⁾In the US, chronic kidney disease (CKD) affects over 37 million adults, although it frequently goes misdiagnosed since the early stages lack distinguishable symptoms. Chronic kidney disease interferes with the physiological biological processes of the body.⁽⁹⁾

A common medical disorder called nephrolithiasis—also known as renal calculi or kidney stones—are influenced by a variety of environmental factors, including food. As a result, nutrition has changed into a key component of nephrolithiasis treatment. Eating habits have a substantial impact on the formation and development of kidney stones.⁽¹⁰⁾

III. MATERIALS AND METHODS

The study was a prospective study and was aimed in a tertiary care hospital of Kashmir duration of six months from October 2022 to March 2023. Data was collected from the radiology department, specifically from sonography reports of patients with indications of urinary tract diseases. A valid questionnaire was given to the patients; The questions asked were personal information, demographics, medical history, and nutrition. On the first page of questionnaire, the informed consent form was signed by each patient. The study included 209 patients, and their demographic and dietary factors were analysed to assess the impact on urinary tract disease risk. Subjects were categorized according to age group, sex and diet. Data was displayed in chart tables.

IV. RESULTS

Figures 1 and 1.1 reveal that of the 209 participants included in the analysis, 127 (60.76%) were men and 82 (39.23%) were women. Of the 209 patients, 149 (71.30%) lived in urban areas and 60 (28.70%) in rural areas.

GENDER DISTRIBUTION OF PATIENTS

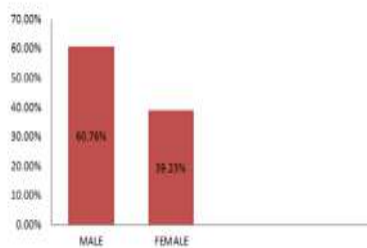


Fig 1

URBAN AND RURAL
Among 209 patients, 149(71.30%) were urban and 60(28.70%) were rural

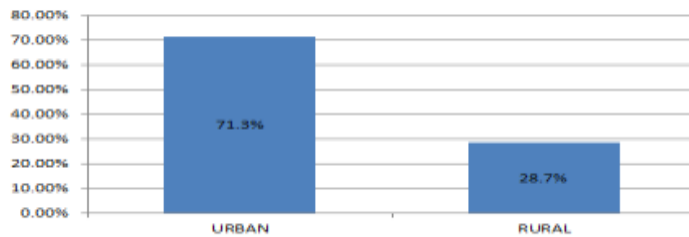


Fig 1.1

GENDER AND AGE DISTRIBUTION OF PATIENTS OF URINARY TRACT DISORDER

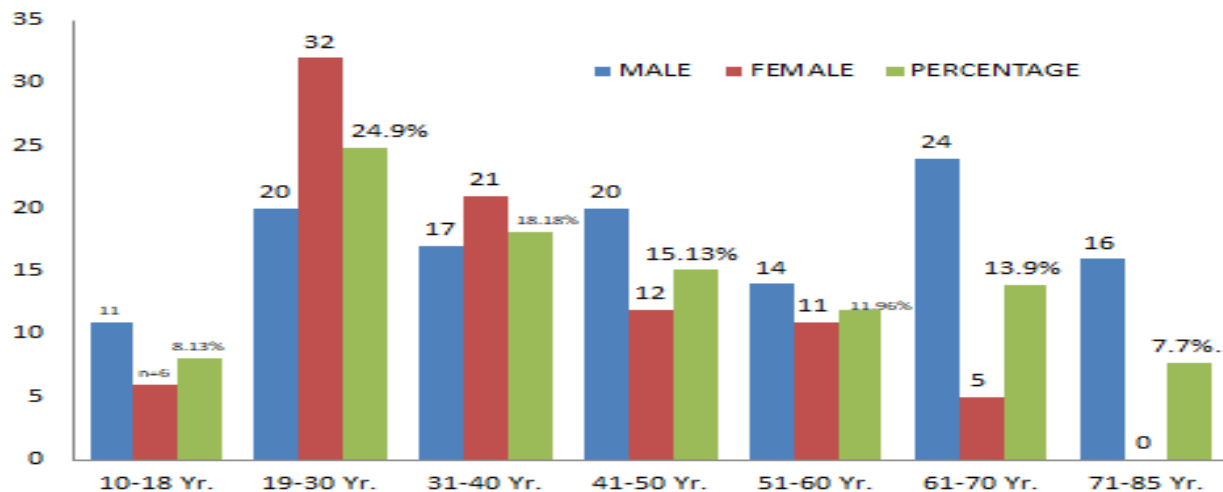


TABLE 1: PATIENTS DIAGNOSED DURING USG SCAN OF URINARY TRACT DISORDER

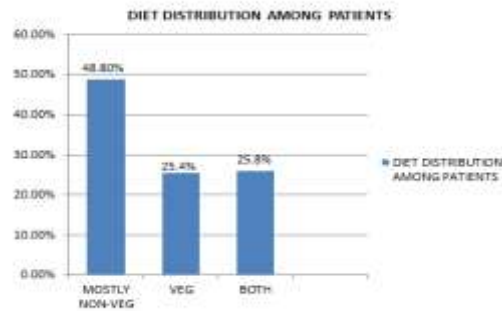
DIAGNOSIS	NO OF PATIENTS (n=209)	MALE	FEMALE	PERCENTAGES
NORMAL	68	26	42	32.53%
Pts. DIAGNOSED WITH SINGLE DISEASE	89	54	35	42.58%
Pts. Diagnosed with multiple diseases	52	47	5	24.88%
TOTAL	209	127	82	M= (60.76%) F= (39.23%)

TABLE 2: DIET DISTRIBUTION OF PATIENTS

DIET	NO OF PATIENTS (n=209)	MALE	FEMALE	PERCENTAGE
MOSTLY NON VEG	102	66	36	48.80%
VEG	53	42	11	25.36%
BOTH	54	18	36	25.84%
TOTAL	209	126	83	

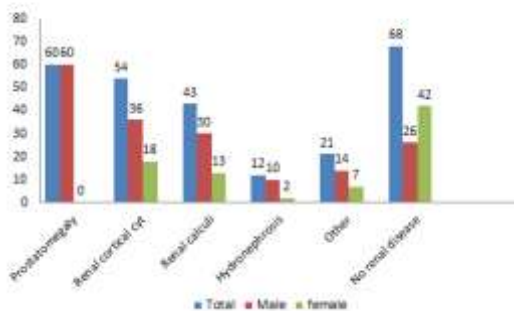
TABLE 2: DIET DISTRIBUTION OF PATIENTS

DIET	NO OF PATIENTS (n=209)	MALE	FEMALE	PERCENTAGE
MOSTLY NON VEG	102	66	36	48.80%
VEG	53	42	11	25.36%
BOTH	54	18	36	25.84%
TOTAL	209	126	83	

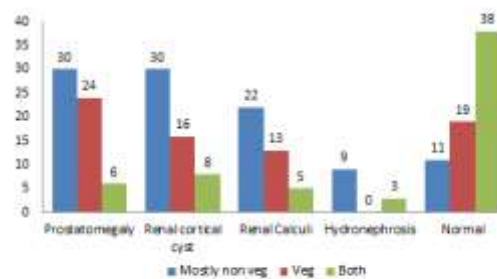


Prostatomegaly, Renal cortical cyst, Renal calculi, and Hydronephrosis were the most prevalent results overall and were only co-related to diet.

COMMON FINDINGS



DIET DISTRIBUTION OF PATIENTS



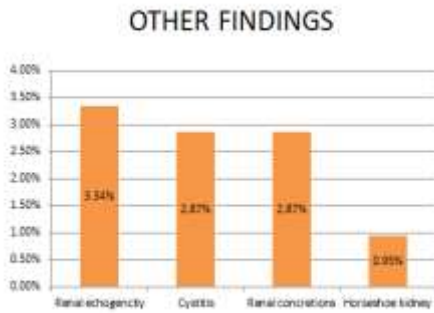


Fig 3.1

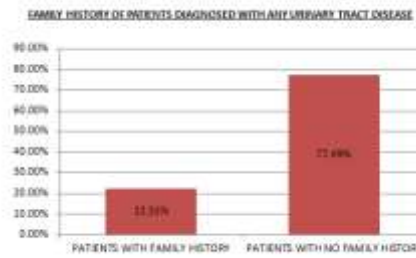


Fig 3.2

The above findings were the very common diagnosis among the patients; other findings were also diagnosed but were found rare as mentioned in figure 3.1

V. DISCUSSIONS

Numerous studies have indicated that nutrition significantly affects the development of kidney stones or problems affecting the urinary system. Total meat consumption and a number of dietary parameters were linked to a higher chance of developing a kidney stone or other urinary tract diseases. The above findings further demonstrate that diet may be a significant modifiable factor in the prevention of urinary tract disease or the development of renal stones. A diet high in fruits and vegetables, moderate in low-fat dairy products, and low in animal proteins significantly lowers the risk of urinary tract illness or incident stone formation, according to prior studies^[11] However, recent research conducted by Pietro Manuel Ferraro et al. also supports the negative effects of diets heavy in animal/meat protein and poor in calcium but low in vegetable content is associated with the lowest incidence of urinary tract disease. They suggested conducting additional scientific research to determine the healthiest diet for various urinary tract diseases.^[12] An earlier study by Anne-Lise Kamper et al. reported that several experimental and observational human investigations revealed that consuming large amounts of protein or meat may accelerate the progression of chronic kidney disease and even result in urinary tract disease in healthy individuals. They proposed that while a supply of protein may be required but eating meat regularly over many years may increase the chance of developing chronic kidney disease, while eating fruits and vegetables may protect the kidneys. There are some random trials with observation periods longer than six months, and many of these were carried out on individuals with underlying conditions that predispose to CKD. Till more information is known, the study's conflicting findings prevent drawing any firm conclusions about the kidney-damaging effects of long-term high protein/meat consumption.^[13] In fact, dietary recommendations are the mainstay of treatment for nephrolithiasis prevention as well. Only a small amount of literature had proved the influence of fad diets on the urinary tract system.^[14] This study, which was a prospective, looked at the short-term impact of increasing the amount of animal protein in the diet on risk factors for the production of kidney stones and the urinary tract risk. The presented data confirm that diet composition significantly influences urinary risk factors. This prospective study found that vegetarian diets, compared to non-vegetarian diets, were linked to a decreased incidence of urinary tract illness, especially in women. Dietary habits seem to be an important risk factor for urinary tract diseases. The kidney stones were found more in patients who were consuming non-vegetarian diet more than 4 times a week. The study reports that a high protein intake increases the disease risk (W. G. ROBERTSON et al.). The current study demonstrates that, when other dietary variables were taken into account, a higher meat intake was linked to an increased incidence of kidney stones, while other prospective studies that primarily examined animal protein intake had shown conflicting results. (Thomas J. Littlejohns et al. 2019). The present study shows that a diet with high vegetables and a low meat intake reduces the urinary tract diseases. The participants with no renal disease in the study were 68(32%) and out of which 55% were following the vegetarian diet with low meat intake. The results agree that depleting high amount of vegetables with low intake of meat can be protective for the disease risk. However, taking this into account, the overall disease was found more common in the urban population that is 71.3%. Family history was strongly indicative of a genetic illness, according to a previous research by Florence Hubert et al. A favorable family history was also present in around one-third of the individuals with urinary calculi. Men who have family members who have the condition are a little bit more prone to it when they are younger. Further research is necessary since there may be variances between the side of the calculi and family members that have a history of sickness (Yadollah Ahmadi Asr Badr et al.). The current study is inconclusive and does not assess the impact of family history on the age at which urinary calculi develop or urinary tract illness and its relationship to patient and calculi features. Figure 3.2

VI. CONCLUSIONS

According to the statistics, a vegetarian diet seems to provide adequate nutrition and have a variety of favourable effects. One of the most important therapeutic strategies for preventing kidney stone recurrence is diet. In this study we analysed the impact of dietary

factors on the frequency and recurrence of urinary tract infections. Although a diet abundant in fruits, vegetables, and low-fat dairy products is linked to a lower risk of kidney stones, scientific studies now show the negative effects of a diet heavy in meat and animal protein. To identify the ideal diet for various kidney stone genotypes, further scientific research should be done. For the purpose of generalizing the findings and application, the study can be enlarged by involving additional participants.

VII. REFERENCES

- [1]. Jones-Freeman, B., Chonwerawong, M., Marcelino, V. R., Deshpande, A. V., Forster, S. C., & Starkey, M. R. (2021). The microbiome and host mucosal interactions in urinary tract diseases. *Mucosal immunology*, 14(4), 779–792. <https://doi.org/10.1038/s41385-020-00372-5>
- [2]. <https://www.hopkinsmedicine.org/health/wellness-and-prevention/anatomy-of-the-urinary-system>
- [3]. Soriano RM, Penfold D, Leslie SW. *Anatomy, Abdomen and Pelvis, Kidneys*. [Updated 2022 Jul 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK482385>
- [4]. Knipe H, Chieng R, Hacking C, et al. Ureter. Reference article, Radiopaedia.org (Accessed on 02 Feb 2023) <https://doi.org/10.53347/rID-23183>
- [5]. Alice Ferng B.S.,MD, PhD <https://www.kenhub.com/en/library/anatomy/urinary-bladder>
- [6]. Hickling DR, Sun TT, Wu XR. *Anatomy and Physiology of the Urinary Tract: Relation to Host Defense and Microbial Infection*. *Microbiol Spectr*. 2015 Aug;3(4):10.1128/microbiolspec.UTI-001
- [7]. Wilson D. A. (1981). Ultrasonic scanning of the kidneys. *Annals of clinical and laboratory science*, 11(4), 367–376.
- [8]. Rysz J, Franczyk B, Ciałkowska-Rysz A, Gluba-Brzózka A. The Effect of Diet on the Survival of Patients with Chronic Kidney Disease. *Nutrients*. 2017 May 13;9(5):495. doi: 10.3390/nu9050495. PMID: 28505087; PMCID: PMC5452225.
- [9]. BW. Fluid Intake and Dietary Factors and the Risk of Incident Kidney Stones in UK Biobank: A Population-based Prospective Cohort Study. *Eur Urol Focus*. 2020 Jul 15;6(4):752-761.
- [10]. Trinchieri A. Diet and renal stone formation. *Minerva Med*. 2013 Feb;104(1):41-54. PMID: 23392537.
- [11]. Ferraro PM, Bargagli M, Trinchieri A, Gambaro G. Risk of Kidney Stones: Influence of Dietary Factors, Dietary Patterns, and Vegetarian-Vegan Diets. *Nutrients*. 2020 Mar 15;12(3):779. doi: 10.3390/nu12030779. PMID: 32183500; PMCID: PMC7146511. Naber, T., & Purohit, S. (2021). Chronic Kidney Disease: Role of Diet for a Reduction in the Severity of the Disease. *Nutrients*, 13(9), 3277. <https://doi.org/10.3390/nu13093277>
- [12]. Littlejohns TJ, Neal NL, Bradbury KE, Heers H, Allen NE, Turney
- [13]. Kamper AL, Strandgaard S. Long-Term Effects of High-Protein Diets on Renal Function. *Annu Rev Nutr*. 2017 Aug 21;37:347-369. doi: 10.1146/annurev-nutr-071714-034426. Epub 2017 Jun 21. PMID: 28637384
- [14]. Nouvenne A, Ticinesi A, Morelli I, Guida L, Borghi L, Meschi T. Fad diets and their effect on urinary stone formation. *Transl Androl Urol*. 2014 Sep;3(3):303-12. doi: 10.3978/j.issn.2223-4683.2014.06.01. PMID: 26816783; PMCID: PMC4708571