

Role of CT Scan in Imaging Patients With Urinary Bladder Hematuria

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Abstract: A descriptive study was conducted in Zain Al-Abidin and Al-Hussein Al-Turki Hospital-based cross-sectional, and the main objective is to determine the accuracy of computed tomography examination in the case of hematuria in hemorrhaging. This study was conducted on 50 patients, the age group between 20-75 years, including males and females, in the period of November 2022 to March 2023. All patients suffering from urinary bladder hematuria who were referred for CT scans at the Radiology department. Haematuria is a medical term utilised to describe the presence of blood in the urine, which could indicate an underlying medical condition and is an alarming symptom. It is imperative to identify the cause of haematuria by undergoing various tests to ensure the appropriate treatment. Haematuria is categorised into two types: gross haematuria, where blood is visible to the naked eye, and microscopic haematuria, where blood is only detectable under a microscope. The total number of patients were (50) including females (31) and males (19), and their age was ranged from (20_75 to) years. All patients were investigated by CT SCAN to evaluate the ability of this device in the diagnosis of bladder hematuria. In our study on 50 patients with hematuria in the bladder, where they were divided according to the most common diseases of hematuria and the less common diseases of hematuria, it was found that this disease affects females (31) more than males (19), and this is not consistent with previous studies that It showed that the percentage of males is more than females because of prostate enlargement, urinary tract infections, bladder infections, kidney infections, bladder or kidney stones, bladder or kidney trauma, and some medications. It was found that this disease affects the average age from 40-49 years, and this study It was consistent with previous research and studies that proved to infect the Middle Ages due to an enlarged prostate gland and a urinary tract infection.

Keywords: Urinary Tract Infection, Hematuria, Blood Cells, CT SCAN, Radiology.

INTRODUCTION

Hematuria is a clinical syndrome that may or may not present with other signs or symptoms. The presence of erythrocytes in 2 or 3 consecutive urine samples, taken at intervals ranging from 1 to 12 weeks [Kaplan, D. *et al.*, 2019], is indicative of hematuria. The classification of hematuria is dependent on the diagnostic method used [Papadakis, M. A. *et al.*, 2021].

Microscopic haematuria is a common occurrence in the first two decades of life and has a multitude of causes, although the majority of these are benign or idiopathic, which implies that it is not a major renal disease [Kirkpatrick, W. G. *et al.*, 2010]

It is crucial not to overlook persistent or significant blood in the urine, even if you suspect it might be linked to menstruation. Seeking advice from a healthcare professional will aid in identifying the root cause and guaranteeing suitable management if essential [Partin, A. W. *et al.*, 2021].

During the last half of the 20th century, very important changes have taken place in the field of genitourinary imaging, which have culminated at

the dawn of the 21st century with little use of intravenous urography (IVU) [Saleem, M. O. *et al.*, 2022]. IVU is a projectional imaging technique in which overlapping structures can obscure significant findings. Compared to it, the multidetector technology of computed tomography (CT) allows obtaining fine sections of the entire urinary tract in a single apnea. For most historical IVU indications, CT is now the technique of choice. We find multiple examples in the medical literature that tell us about the decrease in the use of the IVU: thus, at the Montefiore Center in New York, 323 IVUs were performed in 1999 and only 17 in 2006. Similarly, at the Hospital of Brigham, no urography has been performed since the year 2000. [McAninch, J. W. *et al.*, 2013; Stern, S. D. C; Hashmi, M. S. *et al.*, 2022]

Despite the acceptance of CT in multiple pathologies, we detected, in our environment, a sometimes-notable resistance from many clinicians to use the new imaging methods, which is why we have decided to review the current state of imaging in this article. In adult urological pathology with a special focus on the contributions and advantages of studying these entities using CT [Grossfeld, G.

D. et al., 2001; Grossfeld, G. D. et al., 2001].

PATIENTS AND METHODS

Study Design

Patient CT has become the leading imaging technique used for urinary diseases. Ct is widely used as the imaging method of choice in the diagnosis of urinary diseases and urinary bladder hematuria pathologies. This study included 50 patients (male, 19 & 31 female) according to the distribution of ages in (Figure 1). All patients in this study were referred to the radiology department from the in Zain Al-Abidin and Al-Hussein Al-Turki Hospital-and The study included all patients above (20-75) years of age, including males and females with urinary bladder hematuria who were referred for a CT scan at Al-Hussein and Al-Turki Hospital. It is a public/government hospital with a CT scan facility [Siemens]. It receives referred patients from all referral hospitals, as well as patients from various hospitals in Karbala and its surrounding regions. Referred for examination those who have clinical features such as Pain in your side or back or blood in your urine (hematuria), which may be associated with a urinary tract disorder.

CT images from (20-75) years with suspected urinary diseases (hematuria) diseases were selected to generate a 3D reconstructed model for 3D printing. The 17 CT scan was performed on a 64-slice scanner (Siemens) with a slice thickness of 0.6-2 mm and a rotation time of 0.75 seconds. All consented patients with urinary diseases referred for CT scans were consecutively included in the study. A total of 50 cases of CT scans from October 2022 to December 2023 that fulfilled the study criterion were studied.

Inclusion criteria

Patients with age between 20 to 75 years old with a history of urinary diseases, plus urinary hematuria diseases imaging findings, were studied.

Exclusion criteria

We have excluded people younger than 20 years old, as well as those older than 75, because the

hospital was not intended for children, and we also excluded pregnant women due to the effect of radiation on pregnancy.

Ethical issues

Ethical clearance to conduct the study was obtained from the medical and Permission to conduct the study at Al-Hussein Al-Turki Hospital. The oral consent of 20 participants was gotten in this study. The information recorded in the questionnaire and clinical forms was used only for the study and not otherwise.

Technique and protocol

Patient's position: supine with their arms above their head, scout from diaphragm to iliac crests.

Scan extent: from mid-liver to iliac crests.

scan direction: cranio-caudal. Respiration: breath-hold. Slice thickness: 5 mm. Reconstruction: 1 mm. kernel: smooth.

screening window: soft tissue w volume of CM: 60-100 ml (1 ml per 1 kg)

Pre-CM (native) drink 1000 cc water pre-Exam. /15-30 min. Post CM (three or four phases):

- Corticomedullary phase (40-50 s)/ also in CA bladder → Full bladder.
- Nephrographic phase (80-90 s) Excretory phase (3-4 min.)
- Delay phase (7-10 min) to recon. VR, MIP of ureter and bladder.

Statistical analysis

The data was entered into an Excel program and then into a spss (statistical packages for social sciences. Version 25) for order to make simple measurements such as percentage, frequency, and range (maximum with minimum values), the type of statistics used is descriptive statistics, and in this study, the total number of patients were (50), included females (31) and male (19), and their age was ranged from (20_75 to) years. All patients were investigated by CT scan to evaluate the ability of this device in the diagnosing of bladder hematuria.

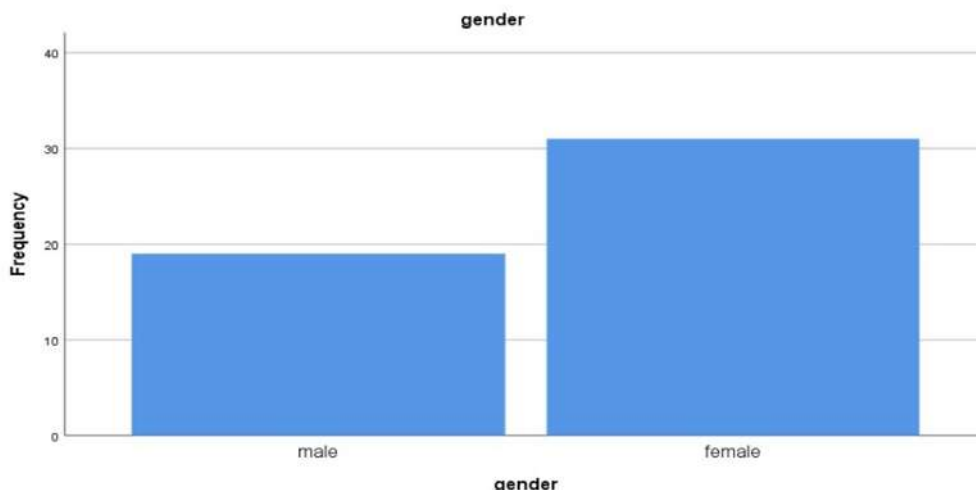


Fig 1: The results show a high prevalence rate of bladder hematuria in males, 19 (38.0%) followed by 31(62.0%) in females respectively.

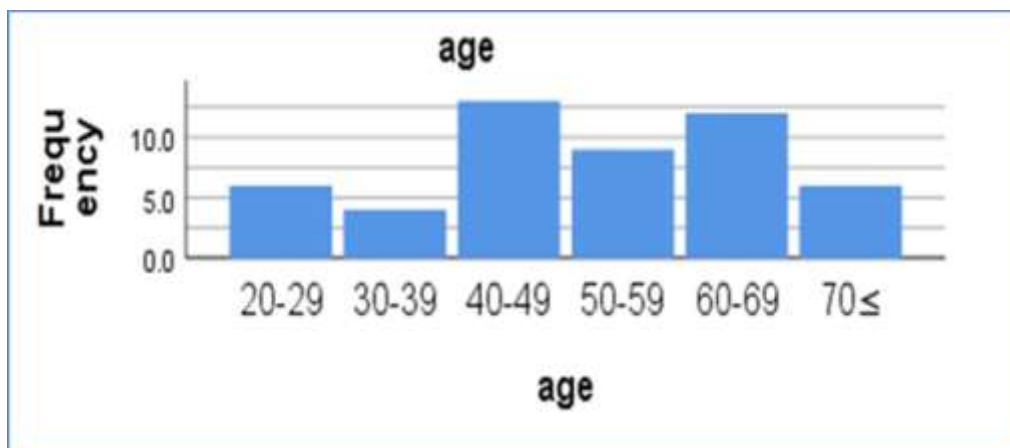


Fig 2- Age of the patient divide into six groups

Fig 2: the results show that the age of the patient is divide into six groups, and it shows that the high prevalence rate in the age group was 40-49 years (26.0%) followed by 12 (24.0%) in age 60-69 years respectively. 18.0% of patients were of the age group of 50-59 years, 12.0% of patients were of the age group of 20-29 years, 8.0% of patients

were of the age group 30-39 years, 12.0% of patients were of the age group 70≤years. A CT scan can diagnosis as much as possible bladder hematuria in middle-aged patients and older patients, and this is consistent with the research of previous studies that show that it occurs in the elderly more than others.

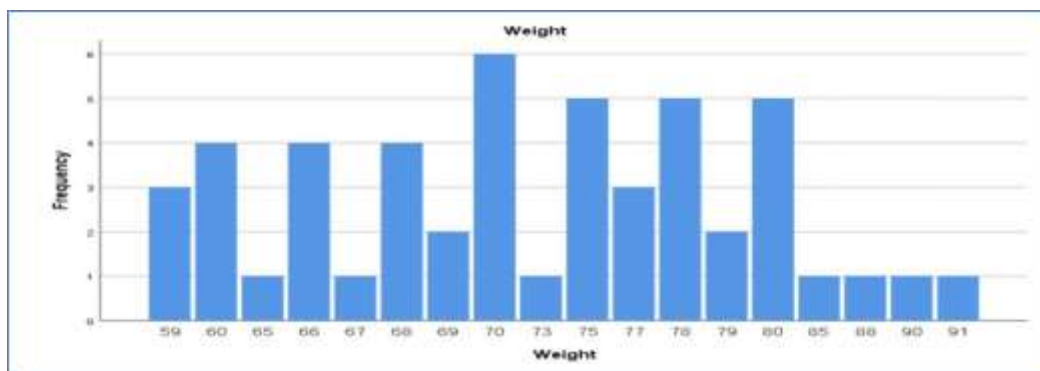


Fig 3: shows that the high prevalence rate in weight 70kg, 6 (12.0%) followed by 80kg,78kg,75kg,5 (10.0%) respectively.68kg,66kg,60kg 4 (8.0%).77kg,59kg 3 (6.0%).69kg 2 (4.0%).91,90,88,85,73,65 1 (2.0%).

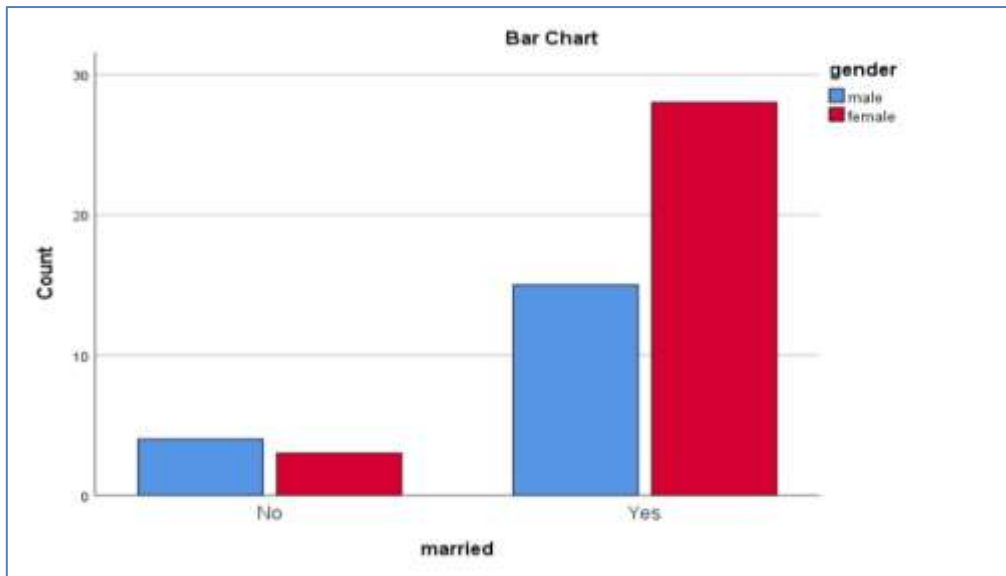


Fig 4: shows that 15 males were married, 28 females were married, and four males and three females were not married

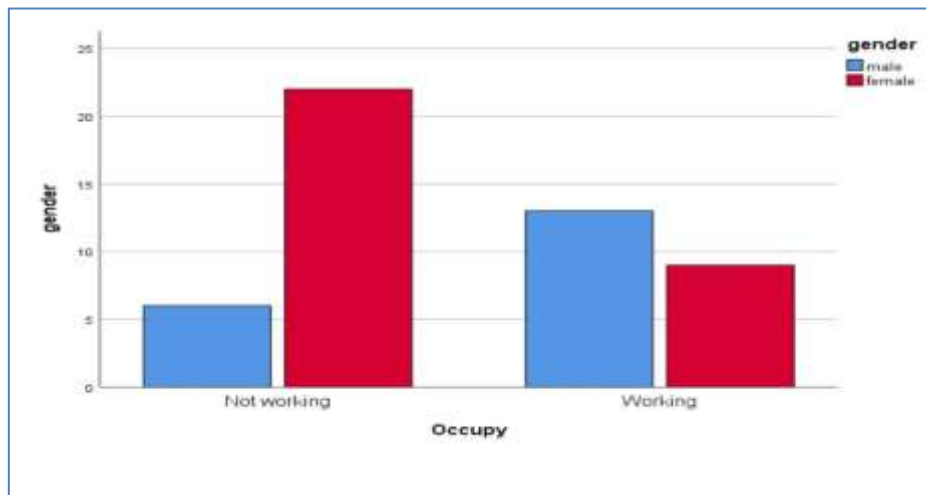


Fig 5: shows that the males working 13, females working 9, males six, and females 22 not working

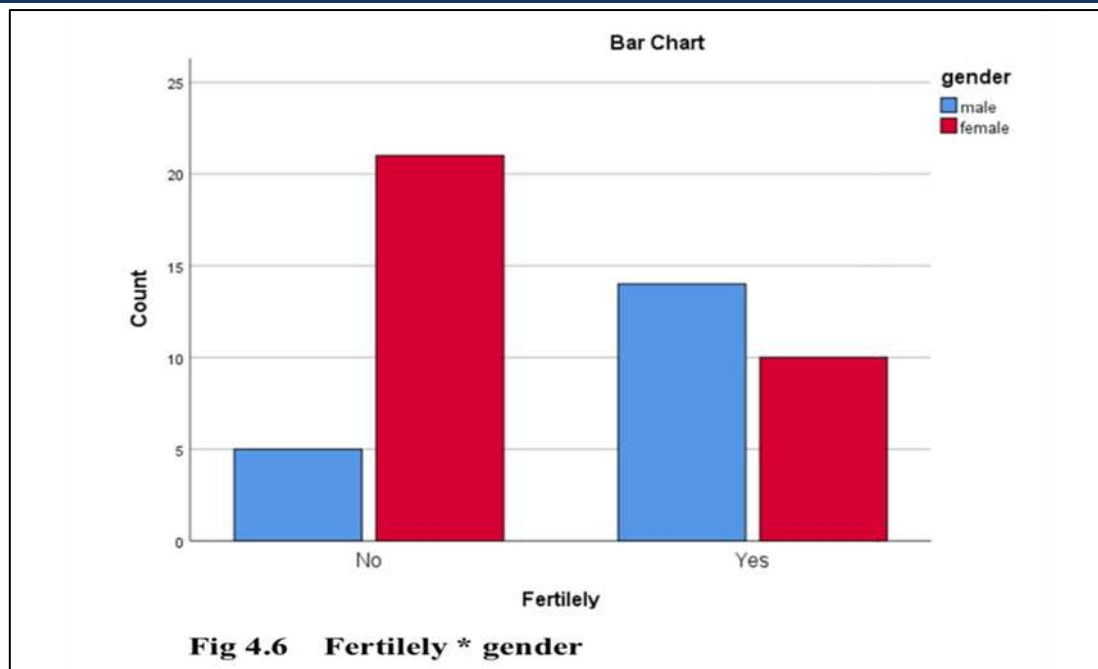


Fig 6: shows that the fertility of the male is 14 and the fertility of the female is 10, Where five male and 21 females is not fertile

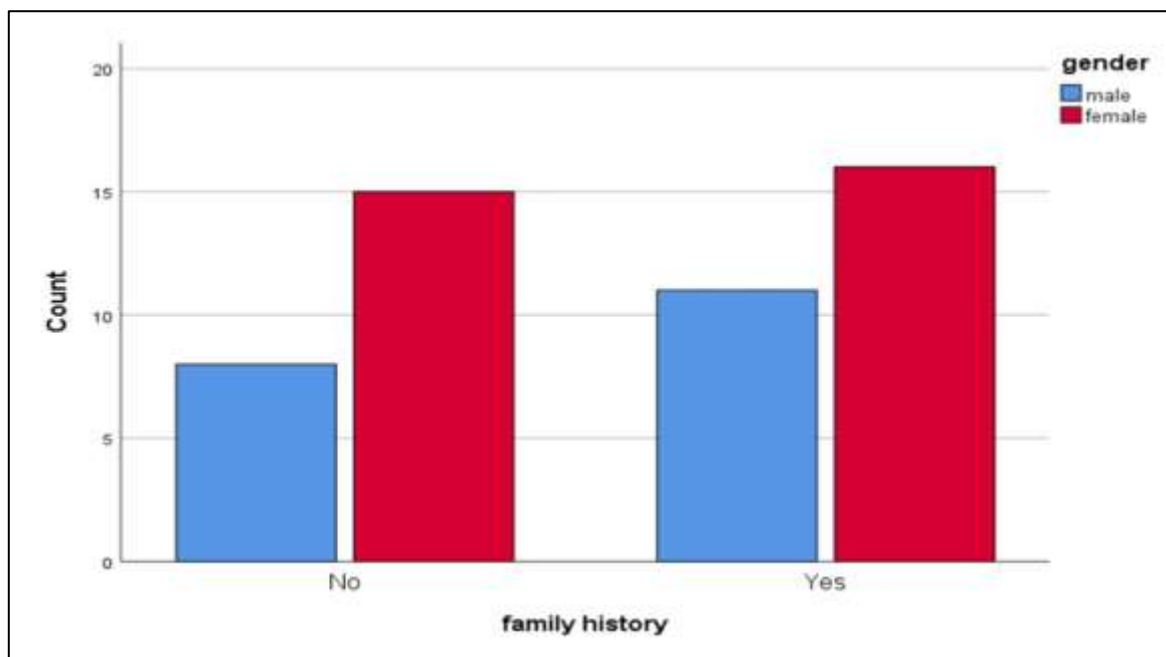


Fig 7: In our study, it was found that 16 females and 11 males have a family history of haematuria in the bladder

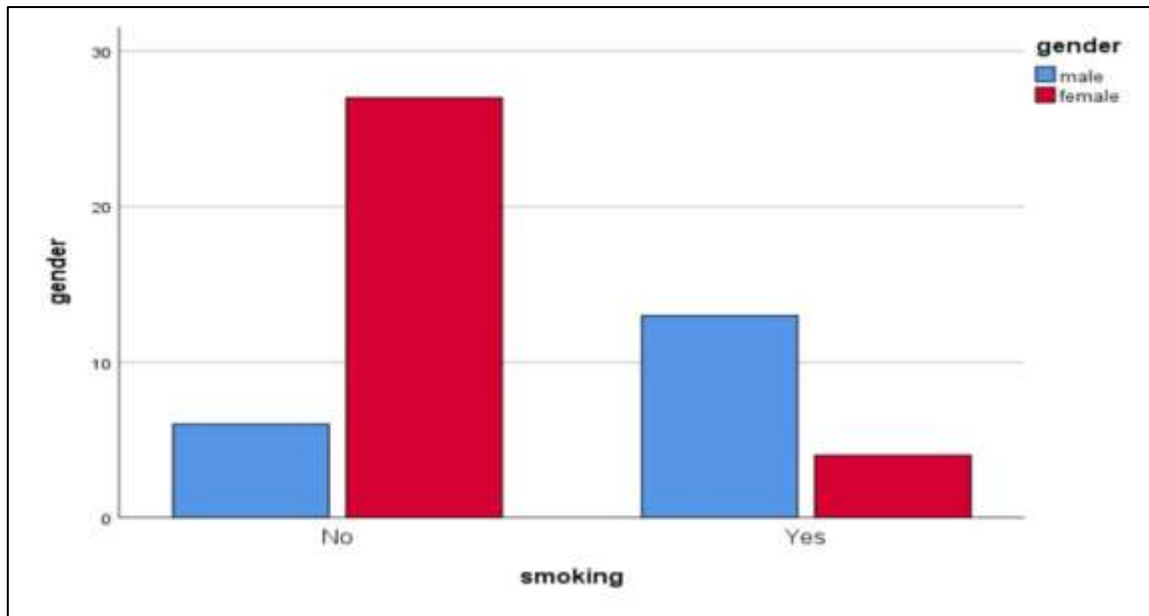


Fig 8: found in males (6) and females (27) is no smoking, males (13) and females (4) smoking

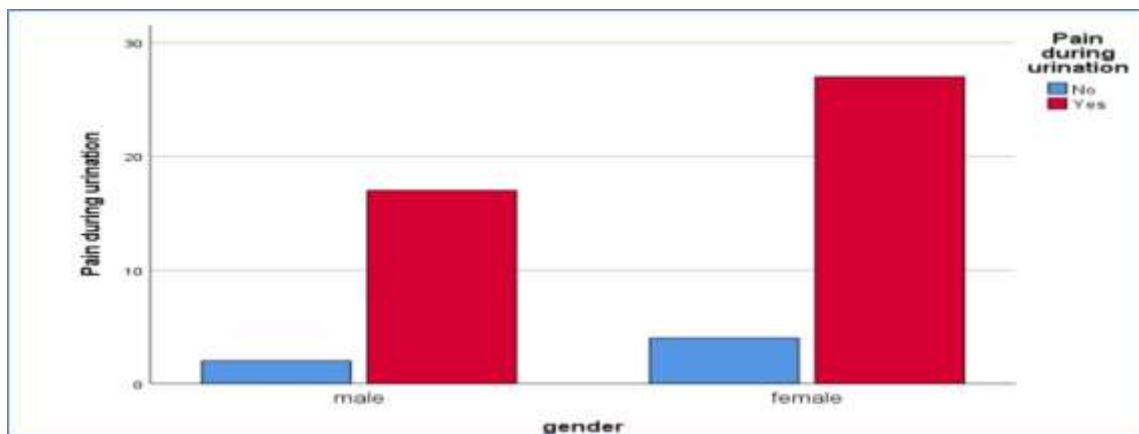


Fig 9: Relationship between pain during urination and hematuria in the bladder

Fig 9: In our study, it was found that there is no relationship between pain during urination and hematuria in the bladder; although there are males and females who had the mother, but it is possible to other diseases

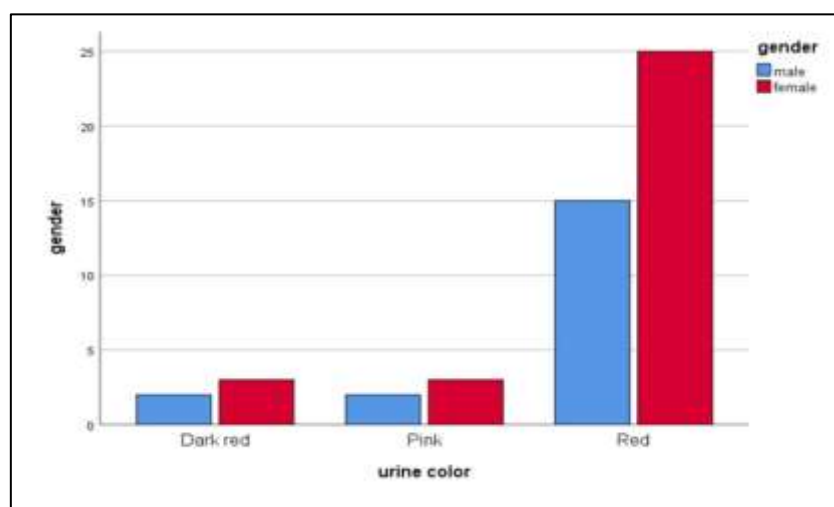


Fig10: urine color in males and females

Fig10: shows urine color in males (dark 2,2 pink, and red is 15. and shows urine color in females (3 dark red, three pink, and red 25). That means there is no relationship between urine color and gender.

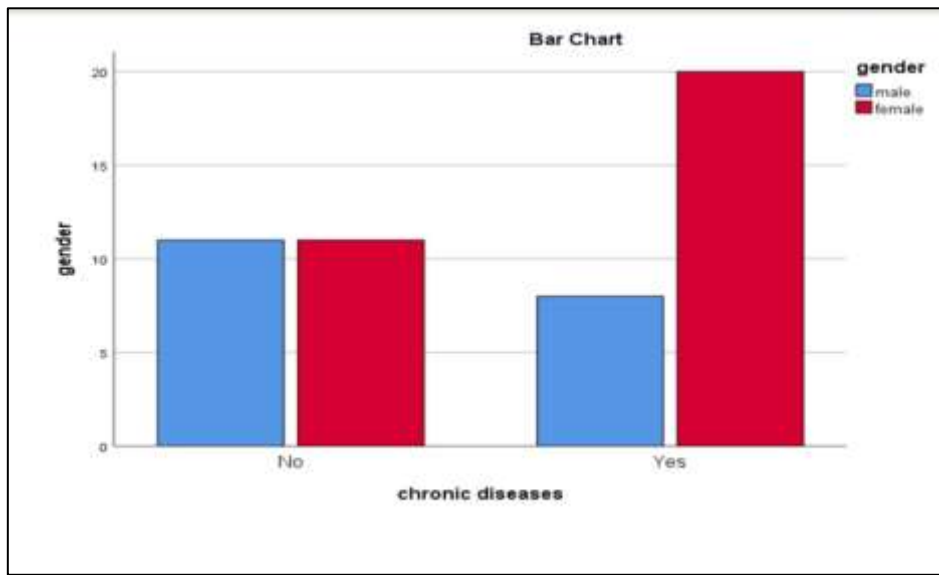


Fig 11: indication of chronic diseases

Fig 11: In our research, results have appeared that indicate that chronic diseases cause hematuria in the bladder; males (11) and females (11) have no chronic disease, males (8) and females (20) with chronic disease

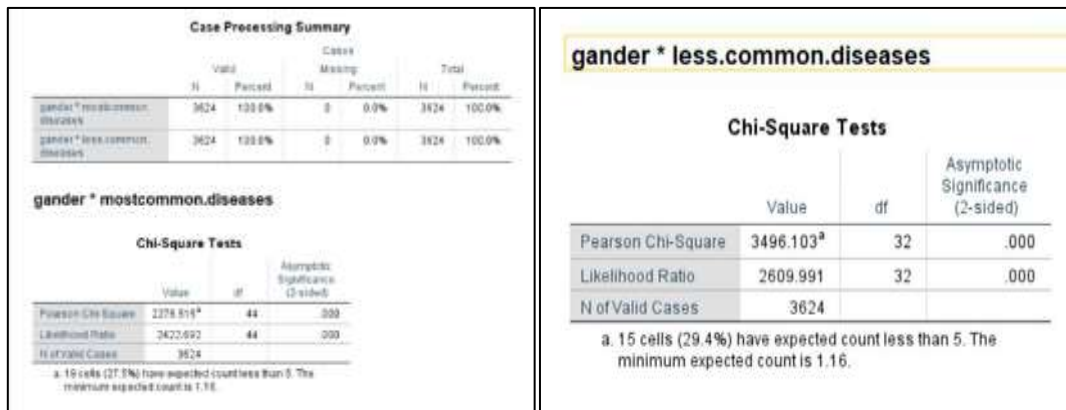


Table 1: A_ gander at the most common disea B_ Gander fewer common diseases [Coll, D. M. et al., 2002]

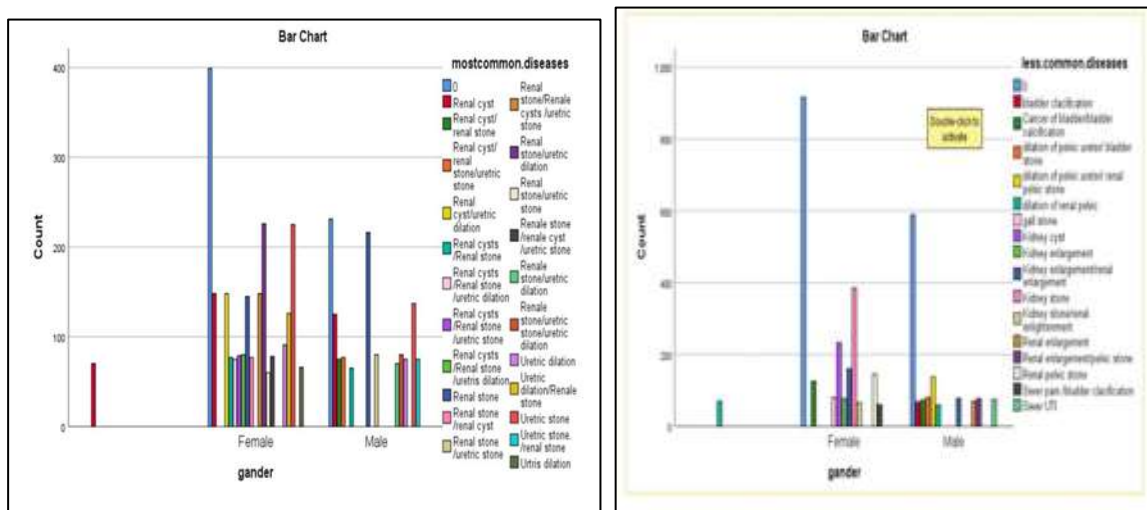


Table 2: A_ gander most common disease B_ age less common disease[Coll, D. M. et al., 2002]

age * mostcommon.diseases				age * less.common.diseases			
Chi-Square Tests				Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)		df	Asymptotic Significance (2-sided)	
Pearson Chi-Square	34354.939 ^a	374	.000	Pearson Chi-Square	23451.085 ^a	272	.000
Likelihood Ratio	13659.756	374	.000	Likelihood Ratio	10126.335	272	.000
N of Valid Cases	3624			N of Valid Cases	3624		

a. 225 cells (54.3%) have expected count less than 5. The minimum expected count is 1.11.

a. 163 cells (53.3%) have expected count less than 5. The minimum expected count is 1.11.

Table 3: A_age most common disease

Table 3: B_age less common disease

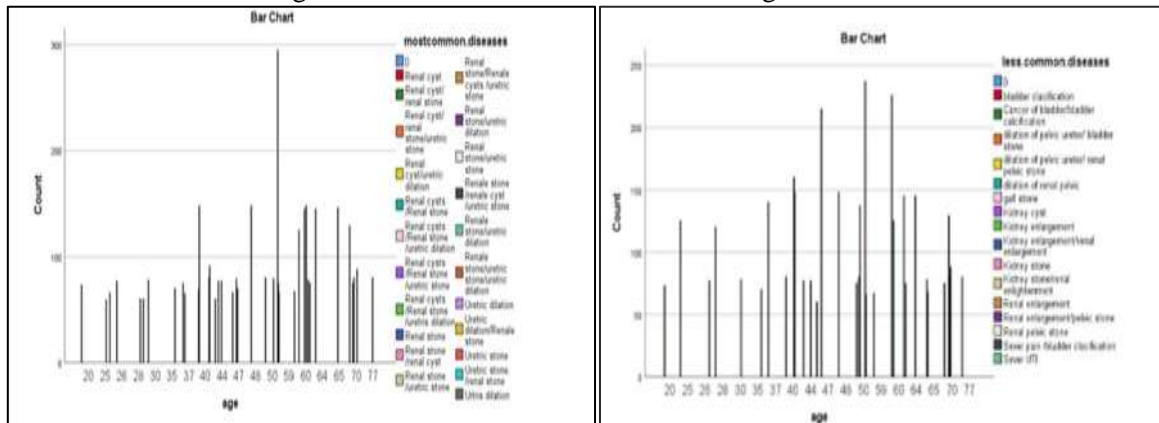


Table 4: age most common

Crosstabs						
Case Processing Summary						
	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
smoking * mostcommon.diseases	3624	100.0%	0	0.0%	3624	100.0%
smoking * less.common.diseases	3624	100.0%	0	0.0%	3624	100.0%

smoking * mostcommon.diseases			
Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1364.965 ^a	22	.000
Likelihood Ratio	1798.822	22	.000
N of Valid Cases	3624		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.51.

Table 5: smoking most common diseases

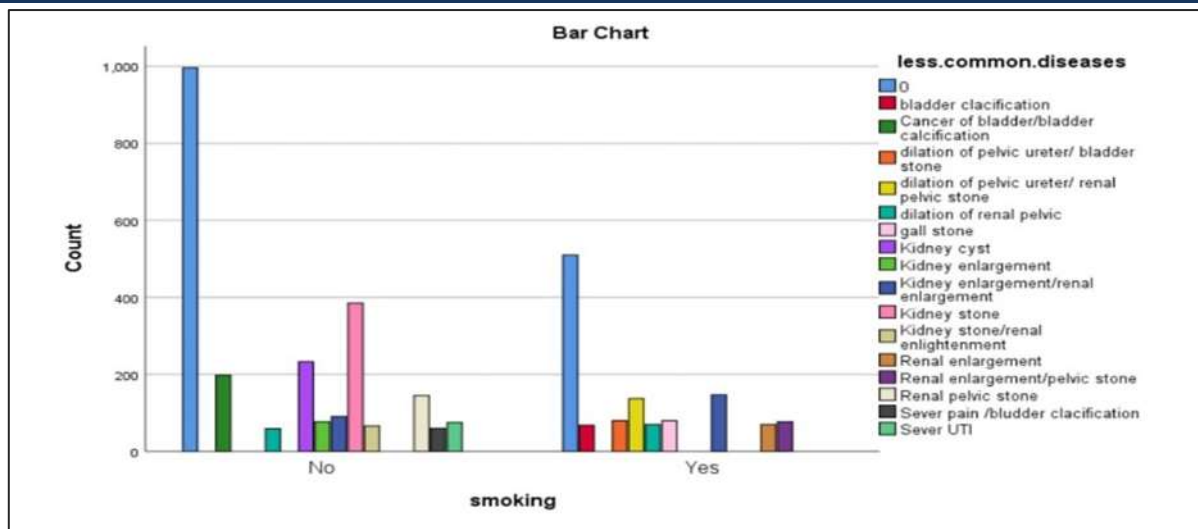


Table 6: Smoking fewer common diseases From Table 4.15 Figure 4.15

It was noted in our study, which was divided into two parts, the most common diseases for hematuria and the less common diseases for hematuria, that there is a relationship between smoking and

hematuria in the bladder, as it was found that 13 males and four females were infected with it, and it was compatible with previous medical studies and research. [Schramek, P. et al., 1989].

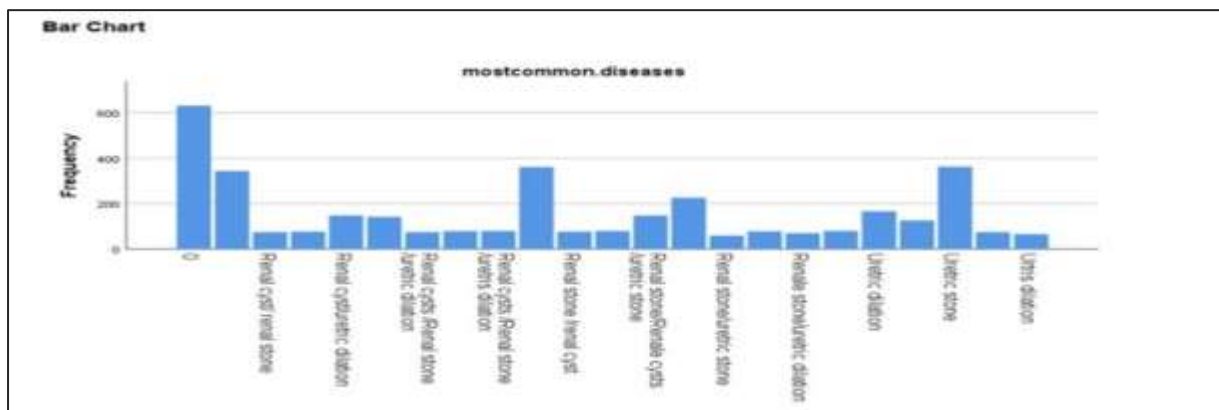


Table 7: Frequency of most common diseases

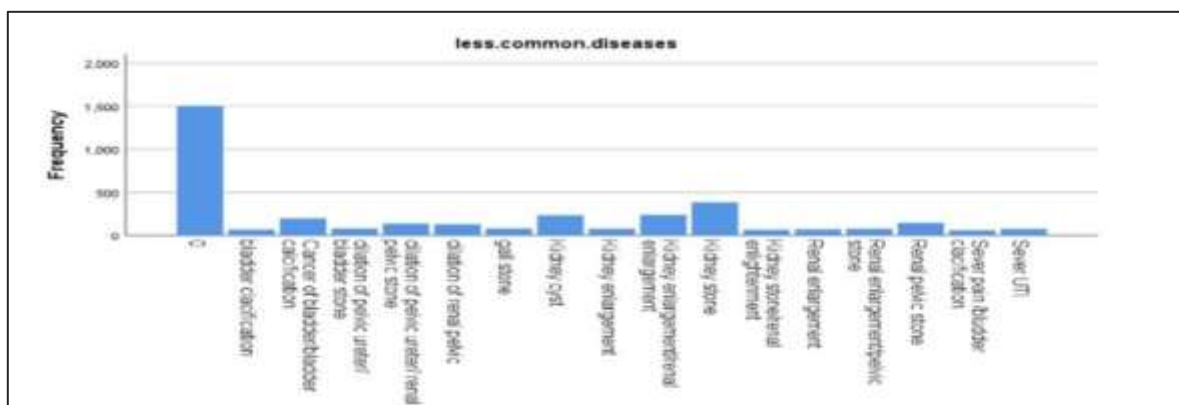


Table 8: Frequency of fewer common diseases.

DISCUSSION

The study was conducted of 50 patients with bladder hematuria; it was observed that females (31) were more affected by this condition than

males (19). These results differ from previous studies, which demonstrate that the male population is more commonly affected due to causes such as prostate enlargement, urinary tract

infections, kidney infections, bladder infections, bladder or kidney stones, bladder or kidney trauma, and certain medications. [RCR, 2022]

The findings indicate that patient age is classified into six groups. The findings indicate that the 40-49 age group had the highest prevalence rate (26.0%), trailed by 24.0% in the 60-69 age

group. 18.0% of patients belonged to the 50-59 age group, 12.0% belonged to the 20-29 age group, 8.0% belonged to the 30-39 age group, and 12.0% belonged to the 70 years and older age group.

A CT scan can diagnose bladder hematuria as accurately as possible in middle-aged and older patients, which aligns with previous research indicating greater prevalence in older individuals.

Our study of 50 patients with bladder hematuria found no correlation between the patient's weight and the incidence of hematuria. This study aligns with previous research, which showed no significant difference in the odds ratio for hematuria between normal subjects and those with the condition. [RANZCR, 2018] The following variables were observed and studied

This study aligns with previous research, which showed no significant difference in the odds ratio for hematuria between normal subjects and those with the condition. [RANZCR, 2018] The following variables were observed and studied of 50 patients with bladder hematuria found that a higher percentage of married females were likely to develop the condition, which is inconsistent with previous research indicating greater prevalence among males. [RCR, 2022] Technical terms will be introduced in full when first used, and the writing will maintain a clear, objective style, using the passive voice and avoiding biased language. The study conforms to standard academic structure and includes pertinent information in concise, simple sentences with logical connections between them. Finally, citations will adhere to standard formatting guidelines to ensure they are clear and consistent throughout the paper. In our study of 50 patients presenting with hematuria in the bladder, it was observed that physical occupation may be a contributing factor, and this finding aligns with previous research that has established a link between hematuria and intense physical activity, including high-intensity interval training. This finding is consistent with previous studies. [From, P. et al., 1989]

We assessed the diagnosis based on findings from Table 4.6, which shows that the fertility of the male is 14 and the fertility of the female is 10, Where five male and 21 females is not fertile. That means there is a relationship between fertility and gender.

From Fig 7, it was found that 16 females and 11 males have a family history of haematuria in the bladder, and this is consistent with previous studies and research that have proven this. Idiopathic hematuria can run in families and is called familial idiopathic hematuria. When there is not family history of kidney failure and other medical tests are negative [EAU, 2018]

Fig 8 was observed. It was noted that there is a relationship between smoking and hematuria in the bladder, where it was found that 13 males and four females were infected, and it was compatible with previous medical studies and research. And this occurs because. Smoking irritates the bladder and can make IC symptoms worse. Incontinence (leaking urine) and Overactive Bladder (OAB). Smoking bothers the bladder and can cause frequent urination. It can also cause coughing spasms that can lead to urine leakage with blood. [Mariani, A. J. et al., 1989]

fig 9. study, it was found that there is no relationship between pain during urination and hematuria in the bladder; although there are males and females who had the mother, but it is possible to other diseases. These results were consistent with previous medical research, and pain may occur due to Infection of the bladder, kidney, prostate, or urethra.

Inflammation of the bladder, urethra, prostate, or kidney (glomerulonephritis) Injury to the bladder or kidney. Kidney [Schramek, P. et al., 1989]

The following variables were researched: the color of urine appeared red, dark red, or pink, and it corresponded to previous research and studies that showed this. [Madaio, M. P. et al., 1990]

In our research, results have appeared that indicate that chronic diseases cause hematuria in the bladder and may be consistent with previous research and studies that have proven this. Inherited diseases: Several different diseases that run-in families can cause hematuria. These include polycystic kidney disease, Alport syndrome, inherited nephritis, certain types of hemophilia, and sickle cell disease. Mineral imbalances in the

urine: High levels of calcium in the urine can cause hematuria. [McIvor, J. et al., 1982]

CONCLUSION

The paper suggests that CT urography is of great importance in the diagnosis when correlated with detecting bladder cancer in patients with hematuria; clinical and laboratory test findings of the patients examined were female more than men. According to the results, the disease was gender.

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