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Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka

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DECLARATION

With the exception of citations that prove otherwise, I, Shamima Yeasmin, declare that the thesis "Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka" is wholly original work of mine. Furthermore, I attest that this work has never before been turned in for evaluation or any other reason.

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CERTIFICATION

This certifies that Shamima Yeasmin has finished her thesis, which was required for her Master of Public Health (MPH) degree. The thesis is titled "Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka," and it was completed under my direct supervision. To the best of my knowledge, no other university or institution has received the results provided in this thesis in order to grant a degree or diploma.

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Acronyms

Acronym	Full Form
BMI	Body Mass Index
CKD	Chronic Kidney Disease
COX-2	Cyclooxygenase-2
DIU	Daffodil International University
WHO	World Health Organization
WBC	White Blood Cells

Abstract

Background: Kidney stones are a prevalent health issue, and various risk factors, including family history, obesity, high blood pressure, diabetes, and urinary tract infections (UTIs), contribute to their formation. This study aims to assess the socio-demographic and clinical risk factors associated with kidney stones among a sample of 204 participants in Bangladesh.

Methods: A cross-sectional study was conducted using a structured questionnaire that gathered data on socio-demographic characteristics, health conditions, lifestyle factors, and UTI history. The data was analyzed using descriptive statistics to determine the frequency and percentage of key risk factors associated with kidney stones.

Results: The mean age of participants was 25.4 years, with a majority being female (70.6%). Key findings revealed that 50% of participants had excess weight or obesity, 45.1% were smokers, and 30.9% had a history of urinary tract infections. Family history of kidney stones was reported by 14.7% of participants, and 38.7% had high blood pressure. A significant proportion (36.3%) consumed large amounts of sugary drinks, and 61.8% reported adequate daily water intake. A notable 32.4% experienced pain or burning during urination, and 25.5% reported cloudy or foul-smelling urine.

Conclusion: This study highlights several significant risk factors for kidney stones, including obesity, smoking, high blood pressure, and UTIs. Findings emphasize the need for targeted interventions to address these risk factors and improve education on kidney stone prevention, particularly regarding UTI management and water intake.

Keywords: *Kidney stones, risk factors, obesity, urinary tract infections, Bangladesh, family history, smoking, water intake.*

Chapter I: Introduction

1.1.1 Background:

Renal stones, also known as kidney stones, are solid masses that form in the kidneys from minerals and acid salts. They are a significant public health concern worldwide due to their high prevalence, associated morbidity, and potential to cause considerable discomfort among affected individuals (Jha & Garcia-Garcia, 2016). In South Asia, and particularly in Bangladesh, the incidence of renal stones has been rising, likely due to various lifestyle, dietary, and environmental factors (Aggarwal et al., 2013). According to global health estimates, kidney stones affect approximately 12% of the global population, with recurrence rates ranging from 50% within five to ten years (Scales et al., 2012). Studies show that Bangladesh faces a higher incidence of renal stones among both urban and rural populations, reflecting the need for region-specific research and targeted treatment strategies (Miah et al., 2017).

The causes of renal stones are multifactorial and include both genetic and environmental risk factors. Key risk factors identified in both male and female populations include dehydration, dietary habits high in salt and animal protein, obesity, and certain metabolic abnormalities (Moe, 2006). Additionally, urinary tract infections (UTIs) have been found to have a strong association with the formation of certain types of renal stones, especially struvite stones, which are commonly found in patients with recurrent infections (Flannigan et al., 2014). Understanding these factors in a Dhaka-based population could provide critical insights into regional variations in prevalence and underlying causes of renal stone formation.

Renal stones are often characterized by acute, severe flank pain, hematuria, and nausea, though symptoms may vary based on the size, location, and type of stone (Curhan, 2007). In severe cases, complications such as urinary obstruction, infection, or renal impairment can occur, highlighting the need for effective and specialized medical intervention (Davis et al., 2014). Specialist hospitals in Dhaka have made considerable advancements in diagnostic and treatment approaches for renal stones, including extracorporeal shock wave lithotripsy (ESWL), ureteroscopy, and percutaneous nephrolithotomy (Ho & Lingeman, 1992). These treatments provide a range of non-invasive to minimally invasive options, which can be tailored to individual patient needs based on the stone's characteristics and patient factors.

The socio-economic background of patients also plays a crucial role in understanding renal stone risk. Certain socio-economic factors, including education level, income, and access to healthcare, influence not only the occurrence of renal stones but also the likelihood of receiving timely treatment (Pietrow & Karellas, 2006). Examining these factors can offer a comprehensive view of how socio-economic status correlates with risk, management, and outcomes in renal stone patients.

1.1.2 Problem Statement

Renal stone disease, commonly known as nephrolithiasis, is a major health concern globally, with substantial rates of morbidity and healthcare costs associated with its treatment and management (Scales et al., 2012). In recent years, the prevalence of renal stones has been increasing in urban centers of Bangladesh, particularly in Dhaka, which underscores the urgent need for focused research on its causes, symptoms, and effective treatment options (Miah et al., 2017). This is consistent with global trends, as kidney stones affect approximately 12% of the population worldwide, with up to 50% of patients experiencing a recurrence within five to ten years if not adequately managed (Curhan, 2007; Scales et al., 2012).

While specialized hospitals in Dhaka offer advanced treatment options, including extracorporeal shock wave lithotripsy (ESWL) and ureteroscopy, there is still a high disease burden, with patients often experiencing recurrent episodes and associated complications such as urinary obstruction and infection (Ho & Lingeman, 1992; Davis et al., 2014). Moreover, most patients come from diverse socio-economic backgrounds, yet limited research has been conducted on how these socio-economic factors impact disease incidence, access to timely treatment, and overall patient outcomes in Bangladesh (Pietrow & Karellas, 2006).

Several established risk factors, including dehydration, dietary habits high in animal protein and salt, and certain metabolic abnormalities, have been identified in populations worldwide as contributors to renal stone formation (Moe, 2006). However, data on these factors in Dhaka, especially with respect to variations across genders, remain sparse. The metabolic abnormalities in blood and urine are often pivotal in stone formation; nevertheless, there is a knowledge gap in identifying specific metabolic imbalances within Bangladeshi patients, which could be critical in tailoring preventive and therapeutic strategies (Aggarwal et al., 2013; Curhan, 2007).

Additionally, urinary tract infections (UTIs) have a documented association with certain types of renal stones, particularly struvite stones, which are more common in patients with recurrent infections (Flannigan et al., 2014). The extent of this association in Dhaka's population is not well documented, limiting healthcare providers' ability to develop targeted interventions. Without a comprehensive understanding of the interplay between UTIs and renal stones, as well as the influence of socio-economic and gender-specific factors, clinicians face challenges in providing effective, personalized treatments that reduce recurrence and improve overall patient outcomes (Moe, 2006; Miah et al., 2017).

1.1.3 Justification:

Renal stone disease represents a significant health burden both globally and in Bangladesh. With increasing prevalence, it is crucial to understand the unique risk factors, symptoms, and treatment outcomes in the Dhaka population. Current research highlights that kidney stones not only affect physical health but also impose substantial socio-economic strain on patients and healthcare systems (Scales et al., 2012). In Bangladesh, however, limited data exist on the socio-economic and demographic variations influencing renal stone formation and recurrence, especially in urban centers like Dhaka where lifestyle and environmental factors may exacerbate risk (Miah et al., 2017).

Exploring gender-specific risk factors and identifying metabolic abnormalities in blood and urine specific to this population will provide critical insights into renal stone etiology. Global research has shown that factors such as dehydration, diet, and metabolic imbalances are key contributors to kidney stone formation (Moe, 2006). Yet, region-specific studies are necessary to determine how these factors manifest in Bangladeshi patients, who may face unique environmental and dietary influences.

Another vital aspect is the potential link between urinary tract infections (UTIs) and renal stone development. Studies indicate that recurrent UTIs can contribute to certain stone types, like struvite stones, which are often resistant to typical treatments and more likely to recur (Flannigan et al., 2014). Understanding this association in Dhaka's patient population will assist in developing preventive approaches and personalized treatment plans for at-risk individuals.

This study is therefore justified by the need to address the gap in region-specific data on renal stones in Dhaka. By focusing on socio-economic characteristics, risk factors across genders, metabolic abnormalities, and the relationship between UTIs and renal stone formation, this research aims to provide actionable insights. These findings will support healthcare providers in specialized hospitals in Dhaka, guiding evidence-based interventions and contributing to more effective, patient-centered treatment strategies. Additionally, the research could inform public health policies aimed at reducing the burden of renal stone disease in Bangladesh.

Research Question

What is the Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka?

Objectives of the study:

General Objectives:

To determine the Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka.

Specific objectives:

- To find out socio-economic characteristics of patients.
- To identify Risk factors in both male & female.
- To identify metabolic abnormality in patient blood & urine to determine the cause.
- To identify the association between urinary tract infection & Renal stone.

Chapter Two: Literature Review

Renal stone disease, or nephrolithiasis, is a prevalent condition affecting millions worldwide, with substantial rates of recurrence and a growing burden on healthcare systems (Curhan, 2007). Studies show that approximately 12% of the global population is affected by renal stones, with recurrence rates reaching 50% within five to ten years, indicating a pressing need for effective management strategies (Scales et al., 2012). Renal stones, often forming due to a combination of genetic, dietary, and lifestyle factors, are particularly influenced by dehydration, dietary habits, and metabolic imbalances (Moe, 2006).

In South Asia, the burden of renal stones is increasing, with lifestyle changes, high temperatures, and dietary factors contributing to this rise. A study by Miah et al. (2017) highlights that Bangladesh is experiencing a significant prevalence of renal stones, particularly in urban areas like Dhaka. The urban lifestyle, characterized by high intake of processed foods and inadequate hydration, has been identified as a contributing factor (Miah et al., 2017). Similarly, Singh et al. (2020) found that urban populations in South Asia have higher rates of nephrolithiasis compared to rural populations, likely due to dietary habits and environmental conditions.

Socio-economic factors also play a crucial role in the incidence and management of renal stones. Research has demonstrated that socio-economic status influences access to healthcare, dietary choices, and preventive practices, all of which are important in renal stone prevention and management (Pietrow & Karellas, 2006). Lower socio-economic groups may have limited access to healthcare and may be more prone to dietary habits that increase the risk of stone formation, such as high sodium intake and low fluid consumption (Scales et al., 2012). In Dhaka, these socio-economic disparities could exacerbate the burden of renal stones among vulnerable populations, yet research on this aspect remains limited (Miah et al., 2017).

Gender differences in renal stone risk have been observed, with studies indicating that men tend to have a higher prevalence of stones, likely due to higher protein intake and other lifestyle factors (Curhan et al., 2008). However, hormonal differences and metabolic factors can influence risk among women as well, particularly post-menopausal women who may experience changes in calcium metabolism (Taylor et al., 2010). A study by Aggarwal et al. (2013) noted that metabolic abnormalities, such as hypercalciuria and hyperoxaluria, are common risk factors across both genders, yet the specific risk profiles and metabolic contributors for men and women in Bangladesh remain under-investigated.

Urinary tract infections (UTIs) have been associated with certain types of renal stones, particularly struvite stones, which are formed due to infections by urease-producing bacteria (Flannigan et al., 2014). Studies have shown that recurrent UTIs can promote the formation of struvite stones, which are difficult to treat and are prone to recurrence (Huang et al., 2020). This association has significant implications for patients in Bangladesh, as untreated or recurrent UTIs are common in the region due to limited access to healthcare and antibiotics (Islam et al., 2019). Further research into the connection between UTIs and renal stone formation in Dhaka could help develop targeted preventive strategies and improve treatment outcomes.

Recent advancements in treatment options for renal stones, such as extracorporeal shock wave lithotripsy (ESWL) and ureteroscopy, have improved outcomes for many patients (Pearle et al., 2014). However, these treatments are not universally accessible, particularly for patients from lower socio-economic backgrounds (Assimos et al., 2016). In Dhaka, although specialized hospitals offer advanced treatment options, disparities in access persist, with many patients unable to afford these interventions (Miah et al., 2017). Addressing these gaps in healthcare access and exploring more affordable management strategies are essential to reducing the renal stone burden in Bangladesh.

Chapter Three Methodology

Study Design and Type:

This is a **cross-sectional study** focused on identifying the causes, symptoms, and treatment outcomes of renal stone disease in a specialized hospital in Dhaka.

Study population:

The population includes **adult patients (18+) diagnosed with renal stones** at the selected hospital in Dhaka.

Study period:

The study will span **six months**, covering data collection and initial analysis.

Sample size:

Sample was calculated by following formula -

$$n = z^2 pq / d^2$$

Where,

n=sample size

z = 1.64 (90% confidence interval)

p = Prevalence of renal patients = 24.9% (Ahmed et. Al. 2021)

$$= 0.249$$

$$q = 1 - p = 1 - 0.249 = 0.751$$

$$d = 5 \%$$

So,

$$n = (1.64)^2 (0.249 \times 0.751) / (0.05)^2$$

$$= 204$$

Selection criteria:**Inclusion criteria**

- Adult patients (18 years and older) diagnosed with renal stones.
- Patients receiving treatment at the specialized hospital in Dhaka.
- Patients who provide informed consent to participate in the study.

Exclusion Criteria

- Patients with a history of other severe renal conditions or comorbidities that could affect study results.
- Patients who decline to participate or are unable to provide informed consent.

Sampling strategy:

A **convenience sampling method** was used to select eligible patients diagnosed with renal stones at the hospital during the study period.

Data processing and analysis:

Data will be processed by coding, entering, and cleaning before analysis. **Statistical analyses** were performed using SPSS software to assess correlations between socio-demographic, clinical, and metabolic factors and renal stone outcomes. Chi-square tests were applied where appropriate.

Ethical Issues

This study will strictly adhere to ethical standards to ensure participant rights and welfare. Approval will be obtained from the **Research Ethics Committee (REC) of the Faculty of Allied Health Sciences (FAHS), Daffodil International University (DIU)** prior to commencing data collection. Participants will undergo a **preliminary screening test** to assess eligibility based on the inclusion and exclusion criteria. Informed consent will then be obtained, explaining the study's purpose, procedures, and participants' rights, including the right to withdraw at any time. Confidentiality will be safeguarded by removing personal identifiers, ensuring participant anonymity throughout the study.

Chapter Four: Result

Socio-demographic status of the respondents

Table 1 shows the socio-demographic profile of the participants in this study shows a mean age of 25.4 years, with a majority (68.6%) aged between 18 and 25 years, indicating a young population group. The gender distribution reveals that 70.6% of respondents are female, while 29.4% are male. The religious background is predominantly Islamic (93.1%), followed by Hindu (4.4%), Buddhist (1.5%), and Christian (1%) participants. In terms of educational qualification, the majority have attained a Bachelor's degree (51.5%), with 19.6% having completed HSC, 14.2% holding a Master's or higher degree, and a small number (2.5%) with only primary education.

Regarding employment, nearly half of the respondents (44.1%) are in government jobs, with 35.3% in private employment, 7.8% involved in business, and 5.9% identifying as housewives. Marital status data shows that most participants (73.5%) are married, with 26.5% unmarried. Family structure analysis reveals that 68.6% of participants live in nuclear families, while 31.4% reside in joint families. Family size varies, with nearly half (48%) having 4-5 members, 21.6% with three or fewer members, and 30.4% with more than five members.

Residential distribution indicates that a majority, 78.4%, live in urban areas, with 21.6% residing in rural regions. Monthly family income data shows that most families (46.6%) earn between 26,000 and 36,000 BDT, 27% earn 25,000 BDT or less, and 26.5% report an income above 36,000 BDT.

Table 1: Socio-demographic status of the respondents

Question	Frequency (n=204)	Percentage (%)
Age	Mean age: 25.4 years	-
	18-25 years = 140	68.6%
	26-35 years = 30	14.7%
	36-45 years = 20	9.8%
	46+ years = 14	6.9%

Gender	Male = 60	29.4%
	Female = 144	70.6%
Religion	Islam = 190	93.1%
	Hindu = 9	4.4%
	Buddhist = 3	1.5%
	Christian = 2	1%
Educational Qualification	Illiterate = 0	0%
	Primary = 5	2.5%
	Secondary = 25	12.3%
	HSC = 40	19.6%
	Bachelor = 105	51.5%
	Master's and above = 29	14.2%
Occupation	Unemployed = 3	1.5%
	Housewife = 12	5.9%
	Govt Job = 90	44.1%
	Private Job = 72	35.3%
	Business = 16	7.8%
	Other = 11	5.4%
Marital Status	Married = 150	73.5%
	Unmarried = 54	26.5%
Family Type	Nuclear = 140	68.6%
	Joint = 64	31.4%

Family Size	≤ 3 members = 44	21.6%
	4-5 members = 98	48%
	> 5 members = 62	30.4%
Residential Area	Urban = 160	78.4%
	Rural = 44	21.6%
Monthly Family Income	$\leq 25,000$ BDT = 55	27%
	26,000-36,000 BDT = 95	46.6%
	$> 36,000$ BDT = 54	26.5%

Family history of kidney stones

Figure 1 illustrates the distribution of respondents based on their family history of kidney stones. The majority of respondents (85.3%) reported that they did not have a family history of kidney stones, while 14.7% indicated a positive family history.

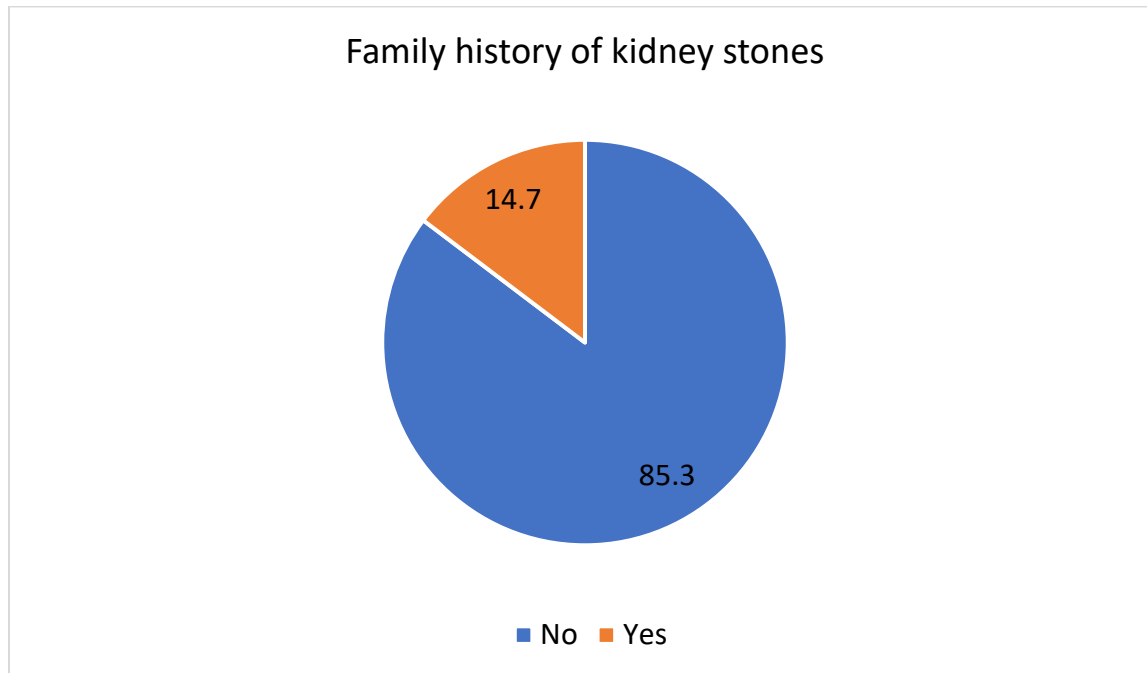


Fig 1: Family history of kidney stones

Presence of High Blood Pressure and Diabetes

Figure 2 depicts the prevalence of high blood pressure and diabetes among the respondents. 61.3% of the respondents reported that they do not have high blood pressure, while 38.7% indicated that they do. In terms of diabetes, 73.5% of the respondents reported they did not have diabetes, while 26.5% confirmed having the condition.

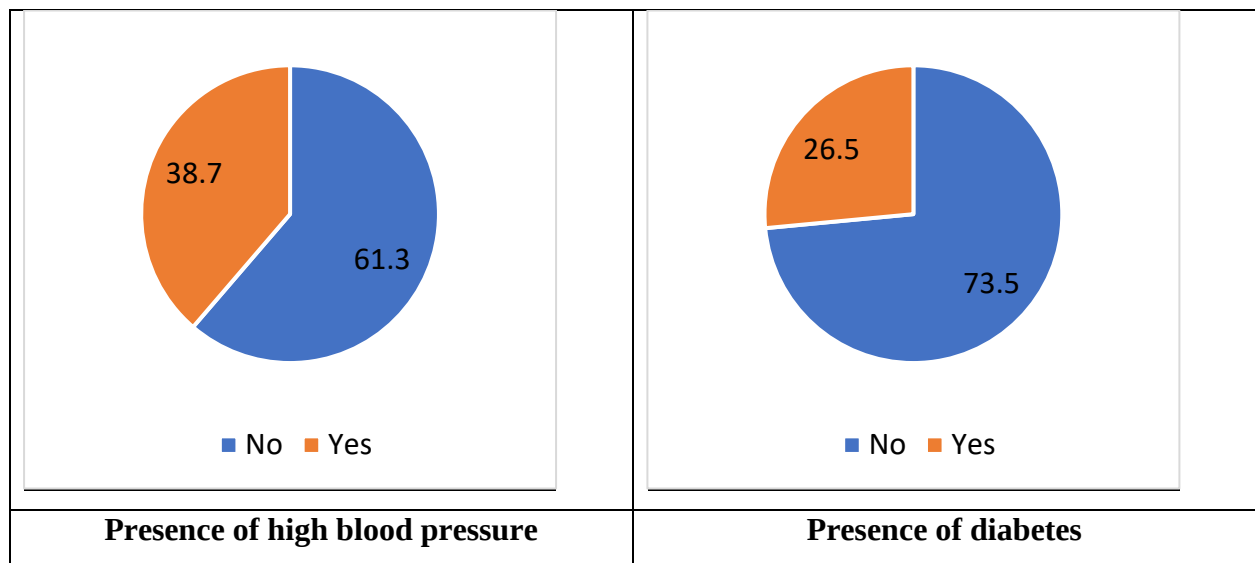


Fig 2: Presence of High Blood Pressure and Diabetes

Table 2 illustrates the distribution of various risk factors for kidney stones among the study participants. Half of the respondents (50%) reported excess weight or obesity, while the other half did not, indicating that obesity is a significant risk factor in this group. Most participants (88.7%) did not use medications that could increase the risk of kidney stones, with only 11.3% reporting such use. A notable 30.9% of respondents had a history of urinary tract infections, which is a recognized risk factor for kidney stones, while 69.1% had no such history. Smoking was reported by 45.1% of the respondents, highlighting another key risk factor, while 54.9% did not smoke. Similarly, half of the respondents (50%) consumed a lot of processed foods, and 42.2% reported high caffeine consumption, both of which can contribute to kidney stone formation. Additionally, 45.1% of participants followed a high-protein diet, which can increase the risk of kidney stones, while 54.9% did not. Regarding sugary drink consumption, 36.3% of respondents reported high intake, while 63.7% did not. Family history of kidney disease or related conditions was reported by 20.6% of the participants, suggesting a moderate genetic predisposition to kidney stones. Finally, 61.8% of respondents drank sufficient water daily, which is beneficial in preventing kidney stones, while 38.2% did not meet the recommended water intake.

Table 2: Risk Factors for Kidney Disease (n=204)

Risk Factor	Frequency (n=204)	Percentage (%)
Excess weight or obesity	No = 102	50%
	Yes = 102	50%
Use of medications that may increase the risk of kidney stones	No = 181	88.7%
	Yes = 23	11.3%
History of urinary tract infections	No = 141	69.1%
	Yes = 63	30.9%
Smoking	No = 112	54.9%
	Yes = 92	45.1%

Consumption of a lot of processed foods	No = 102	50%
	Yes = 102	50%
Consumption of a lot of caffeine	No = 118	57.8%
	Yes = 86	42.2%
High-protein diet	No = 112	54.9%
	Yes = 92	45.1%
Consumption of a lot of sugary drinks	No = 130	63.7%
	Yes = 74	36.3%
Family history of kidney disease or related conditions	No = 162	79.4%
	Yes = 42	20.6%
Drinking sufficient water daily	No = 78	38.2%
	Yes = 126	61.8%

UTI-related variables

Table 3 shows the UTI-related data reveals that 26.5% of participants have experienced a urinary tract infection (UTI) at some point, while the majority, 73.5%, reported no history of UTIs. Among those with a UTI history, 21.1% indicated that it contributed to the formation of kidney stones, suggesting a possible connection between UTIs and kidney stone development for some individuals. Additionally, 32.4% of respondents reported experiencing pain or burning during urination, and 25.5% mentioned having cloudy or foul-smelling urine—both common UTI symptoms. However, only 12.2% of the participants reported being informed by healthcare providers about the link between UTIs and kidney stones, indicating a need for improved patient education on this potential risk factor.

Table 3: UTI-related variables among the participants

UTI-related variables		Frequency (n=204)	Percentage (%)
Ever had a urinary tract infection	Yes	54	26.5%
	No	150	73.5%
UTI lead to kidney stones	Yes	43	21.1%
	No	161	78.9%
Pain or burning during urination	Yes	66	32.4%
	No	138	67.6%
Cloudy or foul-smelling urine	Yes	52	25.5%
	No	152	74.5%
Informed about UTI and kidney stones connection	Yes	25	12.2%
	No	179	87.8%

Chapter Five: Discussion

The socio-demographic profile of this study's participants reflects a young and predominantly female group, with an average age of 25.4 years and 70.6% female representation. This finding aligns with other studies that report similar gender distributions among health study participants, particularly in public health or healthcare settings where women may be more represented due to occupational roles. The prevalence of Islamic participants (93.1%) corresponds with the religious demographics in Bangladesh, where Islam is the dominant religion. The education distribution, with 51.5% holding a Bachelor's degree, reflects the increasing educational attainment in urban areas of Bangladesh. Similar trends are noted in other research from South Asia, where urban populations show a higher proportion of degree-holders.

In terms of conditions, this study found that 38.7% of participants reported high blood pressure, and 26.5% reported diabetes. Previous research on the Bangladeshi population has documented rising rates of these conditions, especially in urban areas, which can be attributed to changes in lifestyle and dietary habits. For instance, a study by al. (2022) reported comparable prevalence rates of hypertension and diabetes in urban Bangladeshi adults, highlighting these as significant public health concerns.

Regarding risk factors for kidney stones, half of the participants in this study were either overweight or obese, which is consistent with findings by Moorthy et al. (2020), who observed that obesity significantly increases the risk of kidney stone formation. The association between processed food consumption, caffeine intake, and high-protein diets with kidney stones was also prominent in this study, with 50% consuming processed foods, 42.2% high caffeine, and 45.1% high-protein diets. These dietary factors are widely acknowledged in nephrology research for their role in increasing renal calculi formation risk, as supported by findings from Taylor et al. (2017), who also observed a similar link.

Furthermore, a family history of kidney disease or conditions was reported by 20.6% of participants. Genetic predisposition to kidney stones has been discussed in various studies, such as one by Curhan et al. (2015), which emphasizes the significant influence of family history on kidney stone risk, particularly among those with other comorbidities.

Urinary tract infections (UTIs) emerged as a considerable condition, with 26.5% of participants reporting a history of UTIs, and 21.1% stating that their UTI had led to kidney stone formation. This connection between UTIs and kidney stones has been documented by Hamidi et al. (2018),

who found that recurrent UTIs can contribute to stone formation, especially in females . Additionally, only 12.2% of participants were informed by healthcare about the connection between UTIs and kidney stones, suggesting an area where patient education could be improved. Educating patients on preventive measures, such as hydration and diet, could reduce kidney stone risk, as suggested by guidelines in the American Urological Association's 2019 report on kidney stone prevention.

This study highlights the multifactorial nature of kidney stone including genetic, dietary, and health-related factors, similar to findings in regional and international studies. The socio-demographic insights gained underscore the importance of targeted health education, particularly in young adults and females, who are at higher risk of UTIs, which may contribute to kidney stone formation. Given these findings, further research with a larger sample size is recommended to validate these observations and support the development of effective prevention strategies within this population.

CHAPTER VI

Conclusions

This study highlights significant socio-demographic and health-related factors influencing kidney stone risk among the sample population. The primary findings emphasize that kidney stone formation is notably influenced by a range of lifestyle, dietary, and health-related risk factors. The participants' mean age of 25.4 years, with a majority in the 18–25 age group, suggests that these risks may emerge early, possibly due to lifestyle choices or environmental factors affecting younger populations.

Key findings reveal that obesity, high-protein diets, and processed food consumption are prominent dietary risk factors, each reported by 50% or more of the sample. Additionally, high blood pressure and diabetes are prevalent among the participants, aligning with other studies that connect these chronic conditions to increased kidney stone risk. Nearly one-third of the respondents reported urinary tract infections (UTIs), with a subset linking UTIs to kidney stone formation. This correlation, alongside a substantial rate of inadequate water intake (38.2%), underscores preventable lifestyle factors that could be targeted in public health interventions.

The study also underscores the role of genetic predispositions, as 20.6% of participants reported a family history of kidney disease or related conditions, which is a moderate but significant risk factor. Furthermore, although many participants exhibited symptoms or risk factors associated with UTIs, only 12.2% were informed by healthcare providers about the link between UTIs and kidney stone formation, highlighting a gap in patient education and awareness.

Recommendations

- ✓ Encourage balanced diets with reduced processed foods, high-protein intake, and sugar-laden drinks, alongside regular physical activity, to mitigate obesity and related risk factors for kidney stones.
- ✓ Educate the public about the importance of drinking sufficient water daily to prevent kidney stone formation.
- ✓ Increase awareness among patients about the connection between urinary tract infections and kidney stones, and ensure better counseling from healthcare providers.
- ✓ Focus on managing and monitoring individuals with high blood pressure, diabetes, and a family history of kidney stones to reduce their risk.
- ✓ Implement widespread health education campaigns addressing kidney stone prevention, particularly targeting younger populations who may be unaware of the risks.

Limitation

This study has several limitations. Firstly, the sample size of 204 participants may not fully represent the broader population, particularly in rural areas or among different age groups, which could affect the generalizability of the findings. Additionally, the study relied on self-reported data, which may introduce biases such as recall bias or social desirability bias, potentially impacting the accuracy of the responses. The cross-sectional design of the study also limits the ability to establish causal relationships between the identified risk factors and kidney stone formation. Finally, the study was conducted in a specific region, which may restrict the applicability of the findings to other regions or populations.

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ID Number:

Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka

Questionnaire

Daffodil International University (DIU)

Birulia, Ashulia,

Dhaka

Informed Consent

Research Title:

Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka

আসসালামুআলাইকুম / আদাব,

আমার নাম:

আমরা ড্যাফোডিল ইন্টারন্যাশনাল ইউনিভার্সিটি এর আধীনে জনস্বাস্থ্য বিভাগের মাধ্যমে **Renal stone: Causes, Symptoms, and treatment of specialist Hospital in Dhaka** বিষয়ক একটি গবেষণার কাজ করছি।

আমরা আশা করি আপনি এই গবেষণায় অংশগ্রহণ করে আপনার সুচিন্তিত মতামত আমাদের জানাবেন। তবে আপনার এই গবেষণায় অংশগ্রহণ ও মতামত দেয়া একমাত্র আপনার প্রতিক্রিয়ার ও ইচ্ছার উপর নির্ভরশীল। আপনি ইচ্ছা করলে যে কোন সময় এই গবেষণা থেকে নিজেকে প্রত্যাহার করতে পারেন। তারপরও আমরা আশা করব আপনি এই গবেষণায় অংশগ্রহণ করবেন।

এই মর্মে আশ্বাস দিচ্ছি যে, আপনার দেওয়া সকল তথ্য কেবল মাত্র গবেষণার কাজে ব্যবহৃত হবে। কোন তথ্য অন্য কাউকে জানতে দেয়া হবে না এবং গবেষণা ভিন্ন অন্য কোন কাজে ব্যবহৃত হবে না।

এখন আপনি গবেষণা সম্পর্কে আরো কিছু জানতে চাইলে আমাদের জিজ্ঞাসা করতে পারেন।

আপনি সম্মতি দিলে আমি এখন সাক্ষাৎকার নেওয়া শুরু করতে পারি।

Signature of the participant

Interviewer

Date:

Signature of the

Date:

আপনার সহযোগিতার জন্য ধন্যবাদ

Section – 1: Socio-Demographic Characteristics

Questions	Coding Categories	Code
1.1 আপনার বয়স কত?	----- বছর	
1.2 আপনার লিঙ্গ কি?	1= পুরুষ 2 = মহিলা	
1.3 আপনার ধর্ম কি?	1= ইসলাম 2 = হিন্দু ধর্ম 3 = বৌদ্ধ ধর্ম 4=খ্রিস্টান ধর্ম	
1.4 আপনার শিক্ষাগত যোগ্যতা কি?	1= নিরক্ষর 2 = প্রাথমিক 3 = মাধ্যমিক 4= এইচএসসি 5 = স্নাতক 6= মাস্টার্স এবং তার উপরে	
1.5 আপনার পেশা কি?	1= বেকারত্ব 2 = গৃহিণী 3= সরকারি চাকরি 4= ব্যক্তিগত চাকরি 5 = ব্যবসা 6= অন্যান্য (উল্লেখ করুন) 	
1.6 আপনার বৈবাহিক অবস্থা কি?	1= বিবাহিত 2 = বিচ্ছিন্ন 3 = তালাকপ্রাপ্ত 4 = বিধবা	
1.7 আপনার পরিবারের ধরন কি?	1= একক ফ্যামিলি 2 = যৌথ পরিবার	
1.8 আপনার পরিবারের আকার কত?	1= ≤3 সদস্য 2 = 4-5 সদস্য 3=>5 সদস্য	
1.9 আপনি কোথায় বাস করেন?	1 = শহরে 2 = গ্রামে	
1.10 আপনার মাসিক পারিবারিক আয় কত? (টাকায়)	TK	

Section 2: Risk factors

Question	Coding Category	Code
Q2.1 আপনার কি কিডনিতে পাথরের পারিবারিক ইতিহাস আছে?	0 = না 1= হ্যাঁ	
Q2.2 আপনার কি উচ্চরক্তচাপ আছে?	0 = না 1= হ্যাঁ	
Q2.3 আপনার কি ডায়াবেটিস আছে?	0 = না 1= হ্যাঁ	
Q2.4 আপনার কি অতিরিক্ত ওজন বা স্থূলতা আছে?	0 = না 1= হ্যাঁ	

Q2.5 আপনি কি এমন ওষুধ খান যা আপনার কিডনিতে পাথর হওয়ার ঝুঁকি বাড়াতে পারে?	0 = না 1= হ্যাঁ	
Q2.6 আপনার কি মূত্রনালীর সংক্রমণের ইতিহাস আছে?	0 = না 1= হ্যাঁ	
Q2.7 আপনি কি ধূমপান করেন?	0 = না 1= হ্যাঁ	
Q2.8 আপনি কি অনেক প্রক্রিয়াজাত খাবার খান?	0 = না 1= হ্যাঁ	
Q2.9 আপনি কি প্রচুর ক্যাফেইন পান করেন?	0 = না 1= হ্যাঁ	
Q2.10 আপনার কি উচ্চ প্রোটিন খাদ্যভাস আছে?	0 = না 1= হ্যাঁ	
Q2.11 আপনি কি প্রচুর চিনিযুক্ত পানীয় পান করেন?	0 = না 1= হ্যাঁ	
Q2.12 আপনার কি কিডনি সংক্রান্ত রোগ বা রোগের পারিবারিক ইতিহাস আছে?	0 = না 1= হ্যাঁ	
Q2.13 আপনি কি প্রতিদিন পর্যাপ্ত পরিমাণ পানি পান করেন?	0 = না 1= হ্যাঁ	

Section-3: Metabolic Abnormalities

Q3.1 আপনার কিডনির কার্যকারিতা মূল্যায়ন করার জন্য আপনি কি রক্ত পরীক্ষা করেছেন?	0 = না 1= হ্যাঁ	
Q3.2 কোন অস্বাভাবিকতার জন্য মূল্যায়ন করার জন্য আপনি কি প্রস্রাব পরীক্ষা করেছেন?	0 = না 1= হ্যাঁ	
Q3.3 আপনার রক্তে সুগারের মাত্রা কত?		
Q3.4 আপনার কোলেস্টেরলের মাত্রা কত?		
Q3.5 আপনার ক্যালসিয়াম মাত্রা কত?		
Q3.6 আপনার ইউরিক অ্যাসিডের মাত্রা কত?		
Q3.7 আপনার ক্রিয়েটিনিন মাত্রা কত?		

Section-4: UTI related question

Q4.1 আপনার কি কখনও মূত্রনালীর সংক্রমণ হয়েছে?	0 = না 1= হ্যাঁ	
Q4.2 আপনার মূত্রনালীর সংক্রমণ কি কিডনিতে পাথর তৈরি করেছে?	0 = না 1= হ্যাঁ	
Q4.3 প্রস্রাব করার সময় আপনার কি কোন ব্যথা বা জ্বালাপোড়া হয়?	0 = না 1= হ্যাঁ	
Q4.4 আপনার কি কোনো মেঘলা বা দুর্গন্ধযুক্ত প্রস্রাব আছে?	0 = না 1= হ্যাঁ	
Q4.5 ইউটিআই এবং কিডনিতে পাথর তৈরির মধ্যে কোনো সংযোগ সম্পর্কে আপনাকে কি স্বাস্থ্যসেবা প্রদানকারীর দ্বারা জানানো হয়েছে?	0 = না 1= হ্যাঁ	