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TO DETERMINE THE FREQUENCY OF KIDNEY STONE ON ULTRASONOGRAPHY AT TERTIARY CARE HOSPITAL (RMI)

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Keywords:
nephrolithiasis, urinary tract infection, kidney stones, urinary calculi, concretions stone

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Abstract

Background: kidney stones are solid salt and mineral deposits. Renal calculi and nephrolithiasis are other names for them. Kidney stone presents as intense flank or stomach torment with queasiness and spewing. The stone affects the kidney by forming cysts and cause hydronephrosis and may also lead to kidney failure. Kidney stones were 10% common in US in 2013 and 2014. The frequency of kidney stone was determined in Pakistan including some places of Gilgit and Chitral.

Objective: The purpose of our study is to evaluate frequency of kidney stones on ultrasonography.

Design, setting and participants: The study was conducted in Rehman Medical Institute. A cross-sectional based study with a

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non-probability convenient sampling technique was selected. The sample size was 139. Duration of research project was 4-6 months.

Results: from the results of the study it was examined that there is slightly raise in the frequency of male individuals with the presence of kidney stone in their body as compared to the female individuals. The ratio include 72 male and 67 females. We divided our study population into age groups in which age group between (21-40) have higher percentage of kidney stone about 48.2%. The common type of kidney stone among the individuals the most common were concretions with ratio of 80 and calculus with 59.

Conclusion: As the data collected from the sample population who visit to the radiology department of Rehman Medical Institute for ultrasound it is concluded that the frequency of kidney stone occur higher in male as compared to female.

CHAPTER 1

INTRODUCTION

Among urologic conditions, kidney stones are the most painful. Developed inside the kidney, kidney stones are solid salt and mineral deposits. The renal papillae in the renal calyces and pelvis can either be free-floating mineral deposits or attached to them. Renal calculi and nephrolithiasis are other names for them (1). Kidney stone was a typical illness and stays a critical disease of bleakness and clinical use today. Kidney stone presents as intense flank or stomach torment with queasiness and spewing (2). When stones obstruct the passage of urine into or out of the kidneys, they cause issues and must be tested for using the term "kidney stone analysis." The stones cause excruciating agony, as well as morbidity and kidney impairment (3). Some of the physiochemical processes that contribute to the complicated process of stone formation including super saturation, development, accumulation, and detention of urinary stone (4).

Excessively acidic urine (pH 5.5) create a territory for kidney stone formation it is medical condition which include some complications like diarrhea and diabetes it also promote formation

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of cysteine and uric acid stones. Extremely alkaline urine (pH 6.7) which is related with the urinary tract infections increase the incidence of kidney stones in adults, particularly calcium and phosphate containing kidney stones. They are very rare in teenagers (5). Some individuals in different job sectors where there is increased workload not enough time for the workers to consume enough water to keep their body hydrated. People could not have easy access to restrooms or liquid. People who work in warmer areas are more likely to experience the problems which result in increase of kidney stones. Astronauts are more likely to develop kidney stones because they spend their days in zero-gravity conditions which causes bone calcium to be mobilized (6). Risk variables included a higher body mass index and a low dietary intake of magnesium, oxalate and potassium. Other factors which causes the risk of kidney stone include high blood pressure, thirst, eating choices, hereditary factors, metabolic diseases, obesity, diabetes mellitus, family history and UTI (7). There is conflicting evidence that kidney stone disease and hypertension are related. The incidence of kidney stones was considerably higher in hypertension patients according to the two long term studies with eight years follow up (8). Lower water intake is one of the risk factors that causes development of kidney stone. Drinking less water reduce diuresis which cause urine to become more concentrated. Minerals may become over saturated as a result, which could contribute to kidney stone development (9). The rising prevalence of kidney stone may be significantly influenced by dietary choices. A substantial risk of kidney stone was associated with increased total animal protein and meat consumption (10). Common metabolic disorder in children is idiopathic hypercalciuria. 75 to 80% of the children affected by this metabolic risk factors. Obesity is typically

described by body mass index as an abnormal buildup of fat. Obesity cause the formation of kidney stones because of the increase body weight the kidney work more than the normal value. People who are obese may have more salts, minerals in their body which may lead to stone formation. The development of incident kidney stones is inversely correlated with body size (11). According to some recent studies there is raise in prevalence of kidney stone in patients having diabetes mellitus.

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It is not yet sure that it is due to the cause of uric acid stone, calcium stone or both. Insulin resistance, a metabolic deregulation that may raise the risk of kidney stone development, is a hallmark of type 2 diabetes mellitus. Despite the fact that kidney stones are primarily caused by a low urine pH (12). By the year 2035, it is anticipated that more than 350 million people would be affected by diabetes, which has reached epidemic proportions globally. It is generally established that high blood sugar increases the chance of developing a diabetic kidney stone, but that the risk can be decreased by proper diet include limited amount of glucose essential for body (13). Individual with family history of kidney stone have an increase chance of kidney stone formation. A research study was conducted in the year 2009 in which family history positive are more common in female patients rather than in the male patients (14). A rising admission of dietary calcium and liquid are reliably connected with a diminished gamble of occurrence kidney stone in both people. Expanding proof proposes that kidney stone is related with fundamental illnesses like stoutness, diabetes, and Circulatory problems. Kidney stone puts a critical weight on the medical care framework, which is probably going to increment with time (15).

With a little amount of 15% calcium phosphate, calcium oxalate kidney stones account for about 80% of kidney stones globally. Stones containing struvite, cysteine, and uric acid are all common, accounting for 10, 9 , and 1% of all stones, respectively (16). Promoters can increase the growth of kidney stone by number of mechanisms including urine PH, uric acid or urate (17). Although urine proteins are thought to be essential components for stone formation from calcium oxalate, which make up the majority of kidney stones (18). Mostly the calcium oxalate and phosphate which are the upper urinary stones are typically present in male majority while the ammonium and magnesium stones are mostly present in females (19). Compared to men, women are more likely to develop struvite stones. Struvite stones can grow quickly in males with a 2:1 prevalence rate, and if left untreated, they can get large enough to cover the entire intrarenal system. Patients with such stones have a 50% chance that they may lose one kidney if they do not undergo therapy (20). The most successive type of monogenic kidney stone is cystinuria. Since it isn't extremely solvent at a

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cysteine discharge causes repetitive urinary cysteine stone improvement when the pH for urine is normally under7. It has been found that these patients had a critical pervasiveness of extreme pulse and persistent kidney infection

(21). The most common type of kidney stone is calcium oxalate, which develops at Randall's plaque on the renal papillary surface (4). In the renal papilla's interstitial tissue, there is a little calcium plaque known as Randall's plaque. Urinary stone formation is thought to be facilitated by these plaques Idiopathic calcium oxalate stone formers are responsible for a large portion of Randall's plaque (22). Some inhibitors which decrease the formation of stone include Citrate, Pyrophosphate, Magnesium and Phosphate (17). Imaging of kidney stones is a key diagnostic technique and the initial step in deciding which require treatment option to use for the treatment of kidney stones the detection of kidney stones without a question, the most used diagnostic technique is ultrasound. It is quick, easy, effective, and produces advantages that are secure. Ultrasound used to show different stones whether they are radiolucent stones or the radiopaque stones. Because of the ionizing radiation, its low cost and safety from radiation exposure to the person body ultrasound is mostly common used for kidney stone detection (23). If the stone is smaller than 2mm, we use the CT modality, which has the potential to detect small kidney stones with ease (24). Due to its high susceptibility, accurate measurement of renal calculi, and ability to evaluate diseases unrelated to stones, non-contrast CT is the imaging technique that provides the most reliable results for kidney stones (25).

About 10–12% of people in developed countries, including 12% of males and 7% of females, have kidney stone disease (26). Despite the fact that kidney stone is a more normal illness in men as opposed to ladies, a few examinations over the course of the past many years show that the male to female proportion 3:1 is limiting. These finding might be related to adjusted risk factors for stone development among females and males. Changes in way of life and expanding stoutness in ladies might assume a part in moving of orientation difference (27). The gender gap in kidney stone disease is shrinking, according to recent studies. According to modern studies, females have

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experienced a larger increase in prevalence of kidney stone, who are also more likely to develop sepsis after endourological surgery, kidney stone episodes have a more negative impact on quality of life. However, when ambient temperatures are high, males are more likely to present with stone occurrence (28). Kidney stone can occur in 10 to 12% of the population which sadly include females during their pregnancy if kidney stone formation occur during pregnancy period it would be more painful than those who are non-pregnant women (29). The occurrence of kidney stones has steadily increased during the past 50 years. According to estimates, up to 50% of stone formation cases could reoccur within five years like because of the dietary habits not following proper intake of nutrients etc. (1). In the United State of America, stones prevalence appears to have steadied broadly in 2012. Kidney stones were 10% common in the United States of America in 2013 and 2014. The countries where the frequency is demonstrated to be rising are Italy, Spain, and Germany. Scotland have seen a modest decrease in occurrence, up to 3.5% from 3.83% (30). An estimated 5 to 7 million people in India suffer from the excruciating condition of kidney stones, which has a 15% prevalence worldwide. The situation in West Bengal further shows that Kidney stone is a significant health risk in both rural and city societies (31). In some districts of china a study for the prevalence was conducted for the ratio of kidney stone prevalence in the year 2011 to 2012. After the result of the study the kidney stone were diagnosed in about 6.14% male and 2.39% female (32). In Pakistan the ratio of kidney stones is 18.98% within the north of Pakistan, the prevalence varies from 9.4% in Gilgit and 2.4% in Chitral. The ratio across Pakistan in west is 28% and in north is 7.4% (33). Most of kidney stone approximately 95% are made up of crystalline. Only 5% of it are formed from matrix or proteins. Stone can be made of single distinct crystal or complex blend of numerous different crystals. Thus the prevalence of kidney stones is changing (18). Recurrence rates for kidney stone disease are comparatively high. For recurrence prevention, behavioural and nutritional changes are also required in addition to medication that is specifically matched to the type of stone. Kidney stones have increased in frequency during the last 40 years. Thus, the prognosis of "kidney stone" may range from an accidental unnoticed finding of little

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clinical significance to repeated severe episodes of renal obstruction that result in kidney damage. Some broad techniques may be beneficial to prevent kidney problems from returning. (34). Kidney stone is exceptionally common across all segment bunches in the Western world and then some, and its frequency rates are increasing. Notwithstanding the dismalness of the intense occasion, stone infection frequently turns into a deep rooted issue that requires precaution treatment to lessen continuous horribleness (35). Some of the individuals might have passed kidney stones without any symptoms present while other may experience some symptoms that are thought to be caused by kidney stones (36). The lifetime recurrence rate for those who have already passed one kidney stone ranges from 60% to 80%. The rates of stone production vary significantly by region and by season. It's unclear why this variance occurred, although it could be related to the climate and the amount of minerals in the water (37). Recurrence symptoms might range from mild pain from self-cared stone passing to excruciating suffering and expensive emergency clinic, hospital, and surgical visits (36). For the advancement of more efficient treatments, repeat prevention is crucial, and this necessitates a clear insight of the mechanics underlying nephrolithiasis. On the off chance that a stone neglects to pass, different intercessions. Expanded liquid admission and dietary mediations can diminish the gamble of repeat (38). The removal of kidney stone can be done by surgical removal or laser surgery. For the removal of big stones in patients they would go under percutaneous lithotripsy. Pharmacological therapy and improvements in the daily life style can help to prevent the kidney stone recurrence.

Our research's goals are to identify the frequency of kidney stones that maybe caused by low water intake, obesity, diabetes mellitus, family history, personal history, genetic factors, metabolic disorders and urinary tract infections which leads to the formation of kidney stones. The occurrence of stone formation will reduce as a result of people modifying their eating choices, leading healthier lifestyles, and being more conscious of the risk factors.

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CHAPTER 2

LITERATURE REVIEW

Romero *et al.*, 2010 proposed a study for the prevalence and development of kidney stones that is arising all around the world. This study was conducted to determine the prevalence of kidney stone. Data for kidney stone were collected from the articles literature. Total number of 75 articles were studied for the survey and data were collected from around 20 countries. From the results the prevalence of kidney stones were high in Spain, Germany, Unites states of America. The prevalence rate of kidney stone in United States was 5.2%, in Spain about 10%. The prevalence of kidney stone was on its peak all around the world. The development of kidney stone may be seen in people with different ages and gender. Dietary habits and life style factors can reduce the development of kidney stone around the globe. However the prevalence of kidney stone may be different in the population of our country and there may be difference in aspects of age and gender so we can compare the prevalence ratio of kidney stone in our population with the previous proposed study countries. (30)

Sakhaee *et al.*, 2012 kidney stone formation occur mostly due to the life style factors and dietary habits. Over the past few years many new ideas are developed for the determination of kidney stone its treatment and diagnosis. From the results it's proved that kidney stone is danger health disease all around the globe. It causes many disease and risk factors including deformation of bone, heart disease, diabetes etc. Further studies are required for the investigation needed for the prevention of kidney stone formation. (16)

Abramowicz, 2013 determine the benefits of ultrasound for the diagnostic purpose. Due to its ionizing radiation and it is very less painful they are most commonly used in the procedure of Obestrics. In other modalities like CT and MRI there is an increase chance of misdiagnosis and on the other hand ultrasound doesn't use radiations. Ultrasound is very beneficial for the diagnosis purpose especially for pregnant women it doesn't produce any harm to the pregnant women or to her fetus. Ultrasound are ionized radiations not like used in x-rays. It is less expensive, perfectly

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safe and totally valid for the diagnostic procedures. It is also helpful for the detection of kidney stone. Its location where it is present, its size, and the type of kidney stone is present. (24)

Scales *et al.*, 2012 the prevalence of kidney stone was determined in United States of America in last few year. The purpose of this study was to check out the ratio of kidney stone and the factors involved in the formation of kidney stone. In 2010 the prevalence ratio was calculated through secondary data and results show the ratio of kidney stone formation was 9% in male and 7% in females. Many risk factor are associated with the prevalence of kidney stone. The common among them were hypertension, dietary factors and body mass index.

In United States of America the kidney stone is present in about 1 of 11 patients. Improvement in life style and environment factors can help in this prevention. (39)

New & Somani, 2016 performed a study to review the quality of life in the individuals suffering from the kidney stone development. Articles were searched for to check out the quality of life in the individuals suffering from kidney stone. Total number of 1570 patients were included among 9 studies. Most of the studies were done whom results were concluded most of the individuals with stone have low quality of life which increase the symptoms like body pain, fever, nausea, vomiting, chills, hematuria and health factors. However more studies would be needed to improve the quality of life for the individuals having kidney stones. (40)

Ganesan *et al.*, 2017 the purpose of this study was to examine the accuracy of ultrasound. To check out how much ultrasound is accurate for the detection of kidney stone. For the collection of data 552 examinations of CT and US were done to observed number of patients having kidney stone that have gone through ultrasound for the diagnosis. From the result it was concluded that the specificity and sensitivity of ultrasound is 91 and 54% which is limited for the detection of kidney stone. One of five patients may misdiagnosed when using ultrasound. Ultrasound is used for the detection of kidney stone greater than 2mm. (23)

Jiang *et al.*, 2017 proposed a study for the prevalence of kidney stone and its risk factors which lead to the development of kidney stone. This study was conducted in Beijing, china. It was a cross-

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sectional base study the study was conducted in the year of 2011 to 2012. Individuals were taken randomly from the selected town. Total number of 3350 individuals including 2259 females and 1091 males. In the results of study the prevalence of kidney stones were diagnosed in about 6.14% and 2.39% female. The increase in the ratio of male individuals due to dietary habits, different environments, low water intake and family history which lead to increase in the development of kidney stones in male individuals. (32)

Pawar *et al.*, 2018 performed a study for the type of kidney stones in individuals whom kidneys are not well studied and may misdiagnose whether the stone is present or not. Also fail to determine which type of kidney stone formation is there. The aim of this study was to diagnose the type of kidney stones in individuals. Most of the studies were done for the prevalence and development of different type of kidney stones. A population base observational study were done whom results include the prevalence of kidney stone in the individuals were around 36%. The prevalence of kidney stone was less common in children as compared to the adults. According to the survey most stone were calcium oxalate stones and calcium phosphate stones. Uric acid and struvite were the less common among them. Further studies are needed for the prevalence of kidney stones and the type of stone in individuals. (41)

Mitra *et al.*, 2018 proposed a study that was conducted in 2018 on basis of genetic factors, dietary habits which causes the formation of kidney stone. The inclusion criteria of the study was the source of collecting water samples from the patients having kidney stones. High water intake can help can help to prevent the formation of kidney stones. Data collected from 1266 individuals having kidney stones in west Bengal, India. From the results of the study it was observed that half of the study population about 53% have water intake less than 3L on daily basis. All the water sample collected were suitable for consumption. More ever the study was conducted in particular region of India. (31)

Ferraro *et al.*, 2018 in performed a study about the recurrence of kidney stone formation. In this study they analyzed the risk factors (Dietary habits, lower water intake, hypertension,

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environmental factors and family history) which causes recurrence of kidney stone. Comparison of the diets between the individuals having hypercalciuria or calcium oxalate stones. The result of the study concluded about 34% of the individuals have experienced recurrence. Calcium oxalate may increase the chances of kidney stone recurrence. Some dietary habits and life style factors may also increase the recurrence of the kidney stone formation. Further studies must be done for creating awareness in individuals for the prevention of kidney stone recurrence.(38)

Lin *et al.*, 2020 there are many risk factors which increase the kidney stone formation. The most common among risk factors were life style factors and dietary habits. The aim of this study is to review and change the life style and dietary habits for the prevention of kidney stones. Observational study was conducted for the life style factors and risk of kidney stone in adults. 21,030 cases were identified and the total number of individuals involved in the study was 1,322,133. From the results of the study the most common risk factors were obesity, animal protein, meat protein, hypertension, genetic factors, family history, person history, diabetes mellitus, urinary tract infection etc. the results of this study was not totally sufficient however long term trials are further required for the investigation on risk factors which preventions we should take in our life to decrease the chances of development of kidney stone formation. (10)

Ordon *et al.*, 2020 this study was conducted on pregnant women for to determine the development of kidney stone during pregnancy period. Its risk factors and treatment. A population based cohort study was conducted for the data collection process. From the results of study it was concluded that women having kidney stones during their pregnancy period have increased risk for adverse birth out comes as compared to the women who are pregnant without the presence of kidney stones. (42)

CHAPTER 3

METHODOLOGY

3.1. STUDY DESIGN:

Descriptive cross-sectional study

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3.2. STUDY SETTING:

Tertiary care hospital (RMI), Hayatabad Peshawar

3.3. STUDY DURATION:

4-6 Months

3.4 SAMPLE SIZE:

The sample size of our study is 139 with the population mean of 10.2% and the confidence level of 95% with margin of error 5%. We used this formula for sample size:

$$n = \frac{z^2 P (1-P)}{e^2} \qquad n = \frac{(95)^2\ 10.1\ (1-10.1)}{(5)^2} = 139$$

Z score value for 95 is 1.96.

3.5. SAMPLING TECHNIQUE:

A Non-probability convenient sampling technique was selected.

3.6. INCLUSION CRITERIA:

1. Patients with symptoms of renal stones irrespective of age and gender.

3.7. EXCLUSION CRITERIA:

1. Diseases other than renal stones.

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3.8. DATA COLLECTION PROCEDURE:

Initial approval was taken from the ethical committee. For data collection, approval was sought from the research committee of Rehman College of Allied Health Sciences, RMI. After committee approval, approach was made to the head of department Radiology, RMI. For data collection proforma was used.

3.9. DATA ANALYSIS PROCEDURE:

The collected data will be processed through SPSS version 22 (statistical package for the social sciences)

CHAPTER 4

4.1 Age

TABLE 4.1 AGE OF PATIENTS

RESULTS

TABLE 4.1 AGE OF PATIENTS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	17	12.2	12.2	12.2
	21-40	67	48.2	48.2	60.4
	41-60	34	24.5	24.5	84.9
	61-80	21	15.1	15.1	100.0
	Total	139	100.0	100.0	

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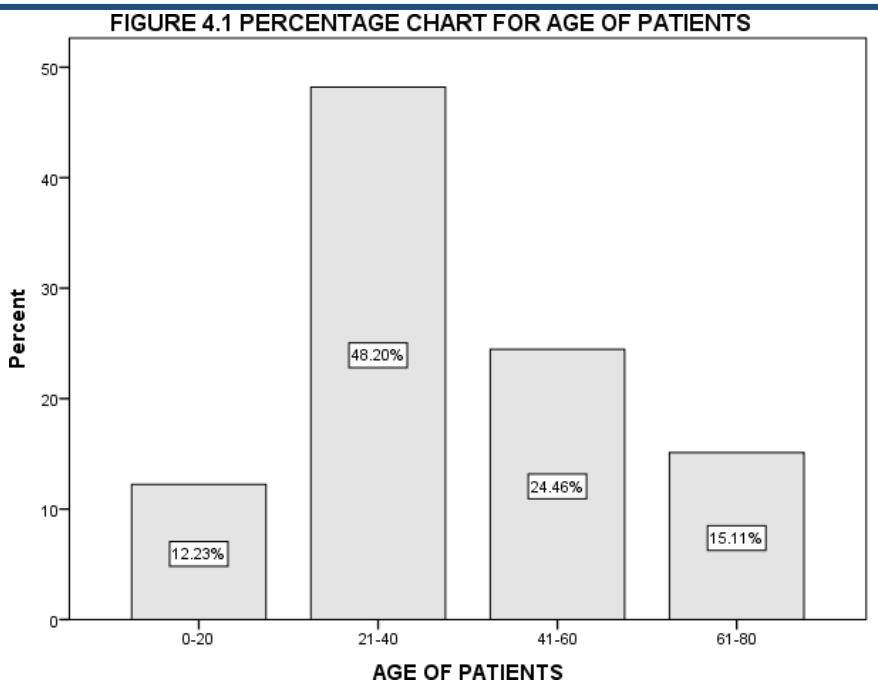

FIGURE 4.1 PERCENTAGE BAR CHART FOR AGE

In this cross-sectional study, a non-probability convenient sampling technique was selected, we have a sample size of 139. From the results of our study the percentage of kidney stones includes the respondents between age 0-20 were 12.23%, age 21-40 were 48.20%, age 41-60 were 24.5%, age 61-80 were 15.1%.

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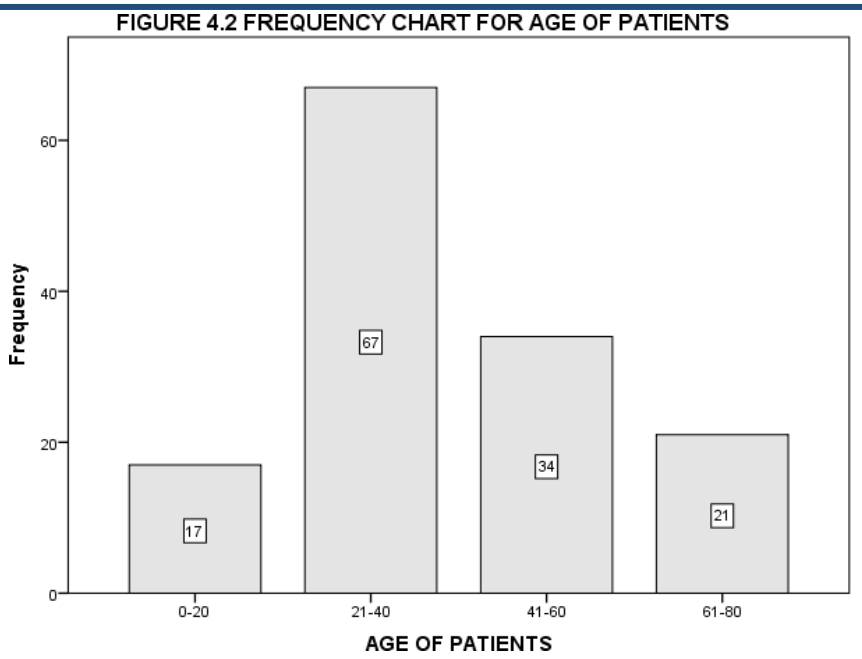

FIGURE 4.2 FREQUENCY BAR CHART FOR AGE

As examined the results this bar graph describe the ratio frequency of the patients those who were involved in the study population.

4.2 Gender

TABLE 4.2 GENDER OF PATIENTS

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid male	72	51.8	51.8	51.8
female	67	48.2	48.2	100.0
Total	139	100.0	100.0	

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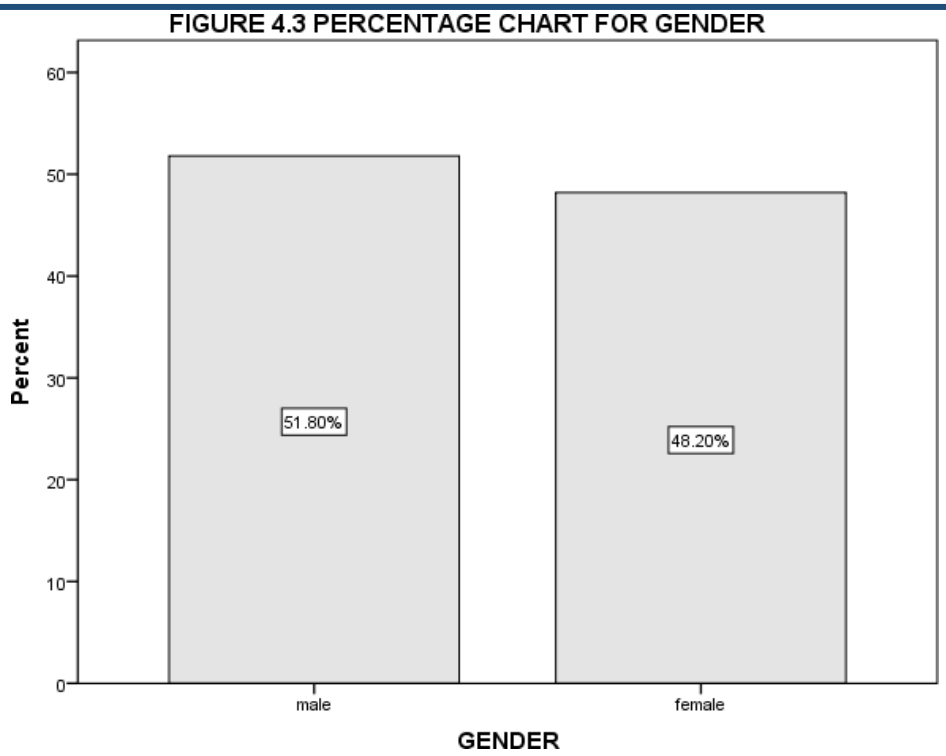

FIGURE 4.3 PERCENTAGE BAR CHART FOR GENDER

Our study showed that the total percentage of male individuals were 51.80% and total percentage of female individuals were about 48.20%.

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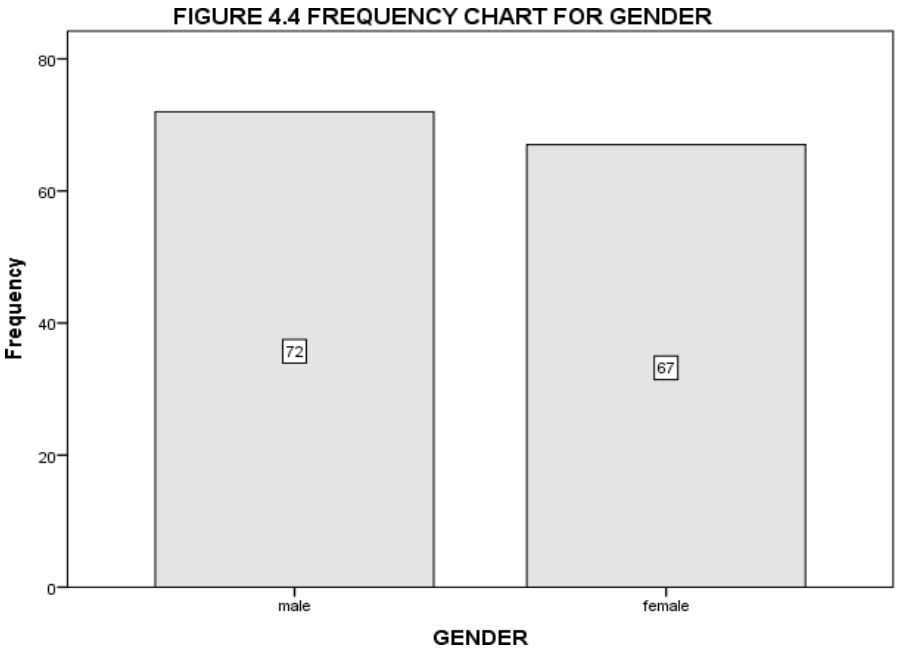

FIGURE 4.4 FREQUENCY BAR CHART FOR GENDER

In this cross sectional descriptive study, with the sample size of 139 the frequency of male individuals in our sample population is about 72 and female individuals in our sample population is 67.

4.3 Types of Stones

TABLE 4.3 TYPE OF STONES

TABLE 4.3 TYPE OF STONES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Calculus	59	42.4	42.4	42.4
	concretions	80	57.6	57.6	100.0
	Total	139	100.0	100.0	

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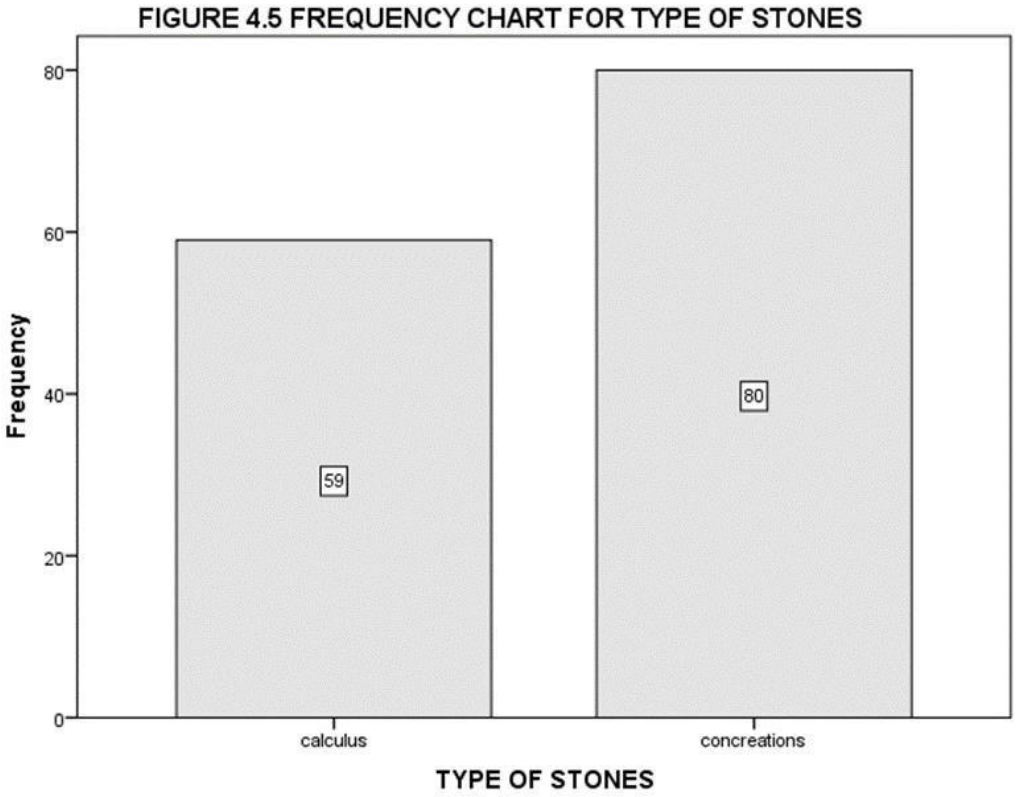

FIGURE 4.5 FREQUENCY CHART FOR STONES

As from the results of the study we determine the Frequency of kidney stones in our study population the two type of stones were examined in individuals which include the calculus and concretions. Out of 139 patients the ratio calculus were 59 and the ratio of concretions were 80. It is concluded that majority of the patients have the presence of concretions in their kidney.

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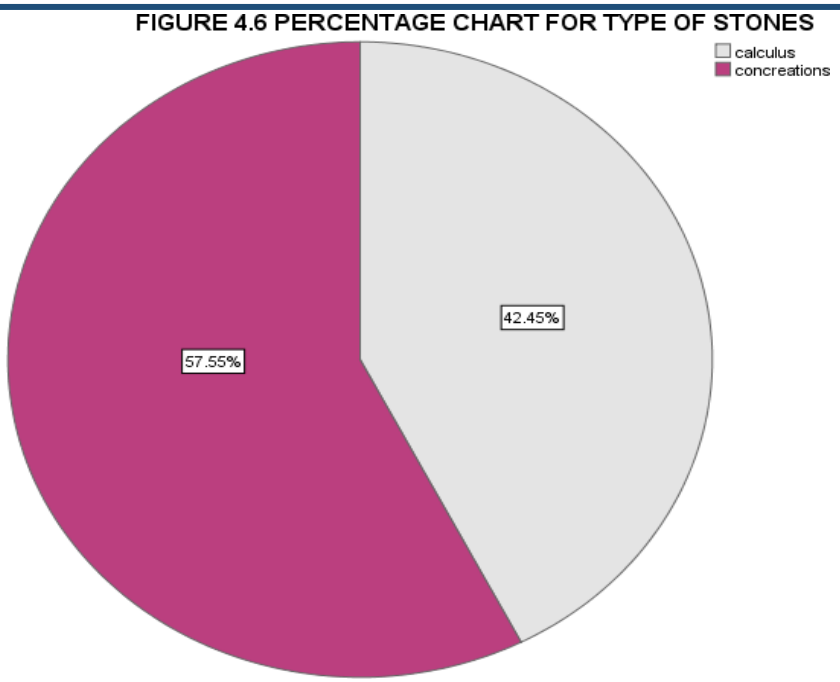

FIGURE 4.6 PERCENTAGE PIE CHART FOR STONES

The percentage ratio of type of stone in our study population includes 57.55% of concretions and 42.45% of calculus.

CHAPTER 5

DISCUSSION

Kidney stones are mineral deposits that can either be free-floating or attached to the renal papillae in the renal calyces and pelvis. They are also referred to as nephrolithiasis and renal calculi (1). Nephrolithiasis may be localized to any part of the urothelial system causing common systematic symptoms. A kidney stone causes severe stomach or flank pain, nausea, and vomiting (2). Whether such a kidney stone is in the renal, bladder, or ureter, the diagnosis based on where in the body it is located. Stone development may not first manifest any indications. Later, a kidney stone causes severe stomach or flank pain, nausea, hematuria and vomiting (2). The most prevalent kidney stone

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type, calcium oxalate, accounts for about 80% of kidney stones in the world, with 15% calcium phosphate making up a very modest portion of those. Stones containing cysteine, struvite, and uric acid, which account for 9, 10, and 1% of all stones, respectively, are all too common (16).

According to latest researches, both industrialized and developing nations have seen an increase in the incidence of stone formation over the past several decades. This rising tendency is thought to be related to changes in eating patterns, reduced physical activity, and climate change, as well as lifestyle adjustment. It is estimated that up to 50% of cases of stone formation may return within five years. Kidney stones were 10% common in the United States of America in 2013 and 2014. The countries where the frequency is demonstrated to be rising are Italy, Spain, and Germany. Scotland have seen a modest decrease in occurrence, up to 3.5% from 3.83% (30). An estimated 5 to 7 million people (about twice the population of Oklahoma) in India suffer from kidney stones, which has a 15% prevalence worldwide.

Our present study found that currently kidney stones affect about 51.8% male and 48.2% female which concludes that male ratio is slightly higher than female ratio. Jiang *et al.* in (32) conducted a study in Beijing, China. In the results of study, the frequency of kidney stones was diagnosed in about 6.14% male and 2.39% female. The percentage in age group between 0-20 years is 17(12.2%), 21-40 years is 67(48.2%), 41-60 is 34(24.5%), 61-80 is 21(15.1%).Our study depicted that 42.4% were having calculus and 57.6% were having concretions in their kidney. Mitra *et al.* in (31) proposed a study that was conducted in 2018 on causes involved in the formation of kidney stone. The study was conducted in particular region of India and the frequency of kidney was 15%.

As the study was proposed for the prevalence of kidney stone in United States of America by Scales *et al.* in

(39) year of 2012 . The purpose of study was to check the ratio of kidney stones. Results show the ratio of kidney stone formation was 9% in male and 7% in females. Our study shows that the frequency in male was 51.80% and female 48.20%.

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In Pakistan the ratio of kidney stones is 18.98% within the north of Pakistan, the prevalence varies from 9.4% in Gilgit and 2.4% in Chital. The ratio across Pakistan in west is 28% and in north is 7.4% (43).

Studies have shown that sex and age are contributing factors, where male have higher tendency to form kidney stones than female. We choose ultrasound as the modality of choice because mostly kidney stones are diagnosed through ultrasound. It helps in finding the exact location of stone, its size and its type. It is a noninvasive test that is quick and easy to perform and has no harmful radiation. Ultrasound can detect cysts, tumors, abscesses, obstructions, fluid collection, and infection within or around the kidneys.

CHAPTER 6

CONCLUSION

Our study concluded that the frequency of kidney stone is slightly higher in male than female. As in our data collection, it shows that occurrence of kidney stone was more likely in 21-40 years age group about 48.2%. The reason behind this increase in percentage is unclear maybe it's because of dietary factor, genetic factor or other.

RECOMMENDATION:

Further study is needed on a large scale to find out the risk factors of kidney stone it is advised to do a research with more individuals that includes these ideas which highlights the need for public health awareness regarding this disease. However, knowledge of prevalence of kidney stone in Pakistan would be extremely useful for further research in future.

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