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Assessment of Self-Care Management of Kidney Stone Saudi Patients in 2024

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ABSTRACT
Background: A common and significant issue that affects the urinary system as a result of dietary and lifestyle changes is kidney stones. The management of self-care has a significant impact on patients' health..
Aim of the study: Was to assess self-care management of kidney stones Saudi patients. Design: A descriptive research design.
Settings: This study was conducted at Urology Outpatient Clinics of University Hospital, Saudi Arabia.
Sampling: A convenient sample of kidney stone patients who attending in previously mentioned setting for six months (200 patients).
Data collection tools: Two tools were used to conduct this study; I. A structured interviewing questionnaire. II. Kidney stone patients' practices about self-care management.
Results: More than two fifths of the studied patients had poor total knowledge about kidney stone. While more than one third of them had average total knowledge about kidney stone. Less than three quarters of the studied patients had average total score of self-care pattern. While almost one fifth of them had good total score of self-care pattern.
Conclusions: There was highly statistically significant relation between studied patients' demographic characteristics and their total knowledge score moreover; there was highly statistically significant relation between studied patients' demographic characteristics and their total score of self-care pattern. Less than three quarters of studied patients had average total score of self-care pattern and less than half of studied patients had poor total knowledge about kidney stone.
Recommendations: Developing and implementing educational program for kidney stone patients to improve self-care management.

Keywords: Kidney stone,Self-care managements.

INTRODUCTION

A kidney stone is a hard substance formed from urine chemicals. Kidney stones can be classified as calcium oxalate, uric acid, cysteine, or struvite. Nephrolithotripsy, percutaneous nephrolithomy, shockwave lithotripsy, or uteroscopy can all be used to treat kidney stones. The stone could remain in the kidney or go into the ureter via the urinary tract. Tiny stones can occasionally pass through the urine without causing significant discomfort. However, immobile stones might result in a urine backup in the kidney, ureter, bladder, or urethra, which is what produces the pain (Lisa et al., 2019).

Kidney stones can be caused by a number of factors, including dehydration, heredity, excessive consumption of vitamins C and D, grapefruit juice, and purines (gout), congenital renal abnormalities, slow urine flow, which allows crystals to accumulate and damages the lining of the urinary tract, and a decrease in inhibitor substances that would prevent crystal accumulation. They may not cause any symptoms until they are passed into a ureter or urine flow is obstructed, at which point the risk of renal damage is greatest and the degree of pain is at its highest. (Yang et al., 2021).

Calcium stone management includes lowering dietary protein and sodium intake, drinking a lot of water, and taking drugs that make urine more acidic, like thiazide diuretics and ammonium chloride, if parathormone production is elevated. Allopurinol (Zyloprim) and a low-purine, low-protein diet are also recommended for uric stones. Additionally, a low-protein diet, urine alkalinization, and higher fluid consumption are associated with cystine stones; a diluted urine and a restricted intake of oxalate-containing foods (such as spinach, strawberries, rhubarb, chocolate, tea, peanuts, and wheat bran) are associated with oxalate stones (Lisa et al., 2019).

The recommended course of treatment for kidney stones must include kidney stone self-management practices, such as medication adherence, self-blood pressure monitoring, and lifestyle changes related to diet, exercise, and tobacco use. These practices have been linked to notable improvements in kidney stone (Flynn et al., 2017).

When it comes to kidney stones, community health nurses are crucial because they help patients manage their pain by giving them opioid analgesics (IV or intramuscular) and intramuscular NSAIDs as directed, encouraging and helping them to get into a comfortable position, helping them walk around to get some pain relief, keeping a close eye on their pain, and reporting any increases in severity as soon as they occur. Additionally, the nurse should concentrate on monitoring and managing complications by encouraging increased fluid intake and ambulation, starting IV fluids if the patient is unable to take enough oral fluids, keeping an eye on the patient's overall urine output and voiding patterns, encouraging ambulation as a way to move the stone through the urinary tract, and telling the patient to report any decrease in urine volume, bloody or cloudy urine, fever, or pain (Kritika & Alka 2018).

Significance of the study

according to Safdar et al., 2021, they reported that in Saudi Arabia urolithiasis is a common health problem with the local incidence being underreported. Within their study, the prevalence was 9.1%. We also observed a relatively high percentage of positive family history among renal stone patients (34.9%) that could be attributed to high rates of consanguinity. Although some patients are asymptomatic with their KSD, many will have pain, Urinary Tract Infection (UTI) or hematuria and may require multiple hospital admissions or multiple surgical procedures (**Thongprayoon et al., 2020).**

Kidney stone formation may also affect their kidney function with an impact on their self-care management. Patients with KSD can have increased levels of bodily pain, depression,lossofdays atworkandincreased anxiety and financial distress, leading to overalllowerself-carepractice.Theimpactof KSD on patients' is becoming increasingly important to consider, as the focus of treatment has shifted not just only from considering morbidity and mortality but also considering the impact on their health status (**Yang et al., 2021)**.

Aim of the study

The aim of the study was to assess self-care management of Saudi kidney stones patients.

Research questions

1. What is kidney stone patients' knowledge about self-care management?
2. What is kidney stone patient's self-care management?
3. Is there a relation between patients socio- demographic characteristics and their knowledge and practices about self- care regarding kidney stones?

Subjects and method

Research design

A descriptive research design was utilized to conduct this study.

Setting:

The study was carried out at Urology Outpatient Clinics inUniversity Hospital, Saudi Arabia.

Sampling:

A Convenient sample of all Saudi kidney stone patients who attending in previously mentioned setting for six months included in study. Total sample patient (200)

Tools for Data Collection: Two tools were used for data collection.

Tool I:A structured interviewing questionnaire schedule: it was consisted of three parts:

Part I: Demographic characteristics as age, sex, residence, marital status, level of education, occupation, residence, and family income. Family history of kidney stone as (there is history of kidney stone of family and the relationship of kinship

Part II: Patients general knowledge regarding kidney stone
Include "kidney stone mean, signs and symptoms of kidney stones, types of kidney stones, risk factors for kidney stones, tests that are done to diagnose kidney stones, complications of kidney stones, methods of preventing kidney stone and methods for treating kidney stones".

Part III: Self-care management, include "self-care management mean, self-care patients with kidneystones, physical care, the food for patients with kidney stones, the general methods of preventing kidneystones".

Scoring system of patients' knowledge
Each item was assigned a score of (2) give when answer was completely correct answer, a score (1) was given when the answer was incompletely correct and a score (0) wasgiven when the answer was wrong/don't know. All knowledge variables wereweighted according to items each question was scored as the following: Good if patients scored ≥ 75%, average if patientsscored50<75 and poor if patients scored <50%
Tool II: Kidney stone patient's practices about self-care management which include: Physical care, Psychological car, food for a patients with kidney stones, general methods of preventing kidney stones.
Scoring system for patients' self-care management: Each response was done as patients' reported self-care management was scored(2), sometimes doneaspatients' reported self-care management was scored(1) and not done as patients' reported self-care managementwas scored (0). These scores was calculated and self-care management score points was considered satisfactoryif the score of self-care management >60% while consideredunsatisfactoryifitis <60%Reliability and content validity of the tools:

Tools validity and reliability
The tool validity was done by three expertisewho reviewed the tools for clarity, relevance; comprehensive, applicability and reliability. The reliability was done by Cranach's Alpha which revealed that the internal consistency of knowledge was 0.81 and the internal consistency of the practices was 0.95.

Ethical consideration
The investigator clarified aim of the studied to patients included in the study. Patients' oral consent was obtained from them before their participation in the study. patients were assured that all gathered data was used for research purposes only and the study was harmless. Additionally,patients allow to withdrawal from the study at any time without giving the reason. Confidentially of the gathered data and results were secured.

Pilot study
A pilot study was carried out to testthe applicability, clarity, efficiency of tools and time needed for each tool. It was done on 10% (20 patients) of the total subjects (200 patients) who included in the present study. Minor modifications were done in form of adding or omission of some questions and the last form was developed.

Fieldwork
Data collection was carried out in the period from the beginning of January (2024) to the end of June (2024) covering six months .

Statistical analysis
The data collected were revised, coded, tabulated and statistically analyzed using Statistical Package for the Social Science (SPSS) version 20 for windows and running on IBM compatible computer.Results were presented by tables and graphs. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation) and chi-square coefficient (X2)was used.Reliability of the study tools was done using Cronbach's Alpha. A significant level value was consideredwhen p<0.05 and a highly significant level value wasconsidered when p < 0.001.

P < 0.05	Not significant
P > 0.05*	Significant
P >0.001 **	Highly significant

RESULTS

Table 1: Shows that, 48.5% of studied patients were 30<40 years. Also 52.5% of them were male and 72% of the studied patients were married. 44.5%of the studied patients were illiterates and 61.5% of the studied patients were not working. While 64 % of them lived in rural. In addition to, 52.5% of the studied patients had enough family income and 92% of the studiedpatientshadn'tfamilyhistoryofkidneystone and 6% of the relation were father. 62.5% of the studied patients had information from medical team.

Demographic characteristics	No	%
Age		
>30yearsold	35	17.5
30-40years	97	48.5
40-50years	31	15.5
+50years	37	18.5
Mean±SD 34.67±11.86		
Sex		
Male	105	52.5
Female	95	47.5
Marital status		
Single	19	9.5
Married	144	72.0
Widowed	37	18.5
Educational level		
Illiterates	89	44.5
Secondary education	61	30.5
University education or more	50	25.0
Occupation		
Working	77	38.5
Not working	123	61.5
Residence		
Urban	72	36.0
Rural	128	64.0
Income		
Enough	105	52.5
Not enough	95	47.5
There is history of kidney stones of family		
Yes	16	8.0
No	184	92.0
If yes, what is the relationship of kinship?Is it(n=8)		
Mother	4	2.0
Father	12	6.0
Source of information		
Medicalteam	125	62.5
Internet	31	15.5
Familyorfriends	20	10.0
Magazines and newspaper	67	33.5

Table 2: Shows that, 18%- 17% of the studied patients had completely correct answer regarding the general methods of preventing kidney stones and physical care respectively, while 92%-83% of them had incomplete correct answer regarding self-care for patients with kidney stones and the food for a patients with kidney stones respectively. In addition to; 67% and 45% of them had incorrect knowledge regarding self-care management mean and psychological care.

Self-care knowledge	Completely correct		Incomplete correct		Incorrect	
	No	%	No	%	No	%

Self-care management mean	16	8.0	50	25.0	134	67.0
Self-care for patients with kidney stones	8	4.0	184	92.0	8	4.0
Physical care	34	17.0	164	82.0	2	1.0
Psychological care	32	16.0	78	39	90	45.0
The food for a patients with kidney stones	30	15.0	166	83.0	4	2.0
The general methods of preventing kidney stones	36	18.0	164	82.0	0	0.0

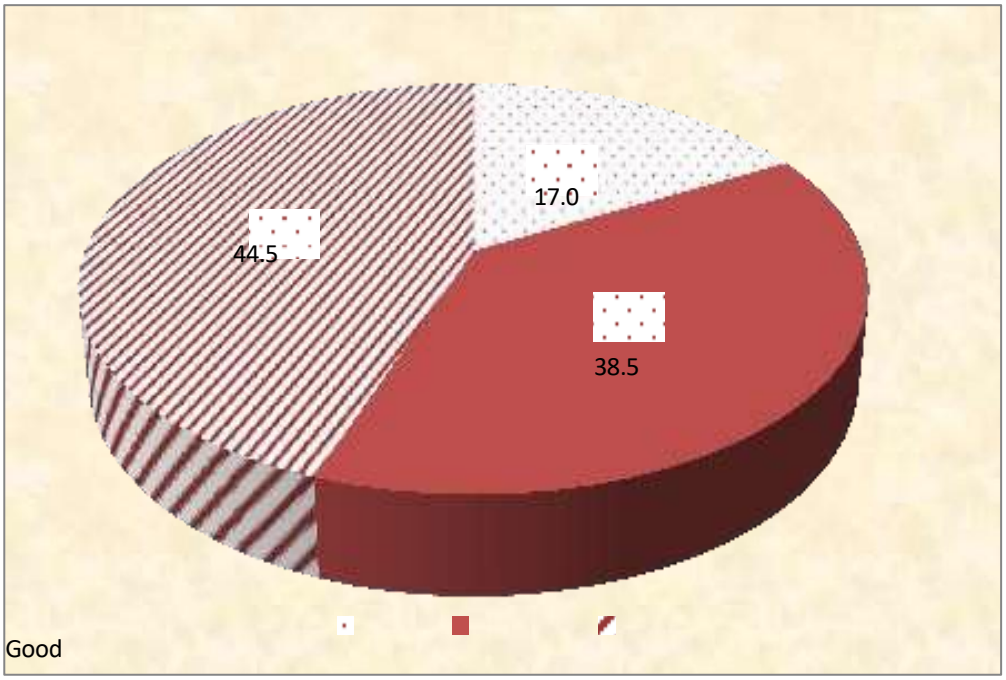

Figure 1:Clears that, 44.5%ofthe studied patients had poor total knowledge about kidney stone. While, 38.5% of them had average total knowledge about kidney stone. In addition to, 17 % of them had good total knowledge about kidney stone.

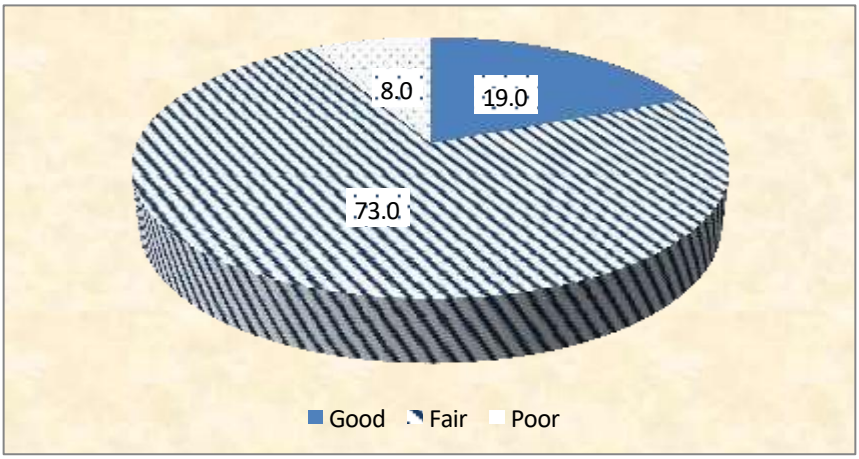

Figure 2: Clears that, 73% of the studied patients had average score of self-care pattern. While, 19% of them had good total score of self-management. In addition to, 8% of them had poor total score of self-pattern.

Table 3: Shows that, there were highly statistically significant relationbetween studied patients demographic characteristics and their total knowledge score
.P>0.001

Demographic characteristics	Total knowledge						X^2	P-value
	Poor (n=89)		Average (n=77)		Good (n=34)			
	No	%	No	%	No	%		
Age (years)								
>30yearsold	18	20.2	17	22.1	0	0.0	96.78	.000**
30-40years	26	29.2	37	48.1	34	100.0		
40-50years	8	9.0	23	29.9	0	0.0		
+50years	37	41.6	0	0.0	0	0.0		
Sex								
Male	44	49.4	61	79.2	0	0.0	59.96	.000**
Female	45	50.6	16	20.8	34	100.0		
Marital status								
Single	18	20.2	1	1.3	0	0.0	91.05	.000**
Married	34	38.2	76	98.7	34	100.0		
Widowed	37	41.6	0	0.0	0	0.0		
Educational level								
Illiterates	89	100.0	0	0.0	0	0.0	307.74	.000**
Secondary education	0	0.0	61	79.2	0	0.0		
University education or more	0	0.0	16	20.8	34	100.0		
Occupation								
Working	0	0.0	77	100.0	0	0.0	200	.000**
Not working	89	100.0	0	0.0	34	100.0		

Table 4: Shows that, there were highly statistically significant relationbetween studied patients demographic characteristics and their total self-care management score.

Demographic characteristics	Total practices						X^2	P-value
	Poor (n=16)		Fair(n=146)		Good (n=38)			
	No	%	No	%	No	%		
Age (years)								
>30yearsold	16	100.0	18	12.3	1	2.6	122.53	.000**
30-40years	0	0.0	60	41.1	37	97.4		
40-50years	0	0.0	31	21.2	0	0.0		
+50years	0	0.0	37	25.3	0	0.0		
Sex								
Male	0	0.0	67	45.9	38	100.0	54.62	.000**
Female	16	100.0	79	54.1	0	0.0		
Marital status								
Single	0	0.0	18	12.3	1	2.6	25.35	.000**
Married	16	100.0	91	62.3	37	97.4		
Widowed	0	0.0	37	25.3	0	0.0		
Educational level								
Illiterates	0	0.0	89	61.0	0	0.0	154.05	.000**
Secondaryeducation	0	0.0	23	15.8	38	100.0		
Universityeducationormore	16	100.0	34	23.3	0	0.0		
Occupation								
Working	16	100.0	23	15.8	38	100.0	118.16	.000**
Not working	0	0.0	123	84.2	0	0.0		

Table 5: Shows that, there were highly statistically significant correlation between studied patients total knowledge score and totalself-caremanagementscore,p<0.000**

Practices	Total knowledge	P-value
Total practices	r	
	0.66	0.000**

DISCUSSION

According to demographic characteristics of the studied patients, the result of the current study illustrated that, nearly half of studied patients aged from 30to 40 years old and more than half of them were male. The result of study agreed with **Lisaetal**.,(**2019**)whofound that more than half of patients aged between 30& 40 years old and nearly two thirds of them were male, from the investigator point of view this maybe related to that the disease most commonly occur in middle age population due to sedentary life and increase intake of fast food. Conversely the finding study different with **Pennistonet al.,(2016)** who conducted in America at multidisciplinary stone or urology clinic and revealedthat,themeanageofstudied sample was 56 ±13 years old.

Regarding educational level of studied patients, the result of the current study illustrated that, nearlyhalf of studied patients were illiterates. The result of the study is supportedby**Abdelwahabetal.,(2021)**who conducted at Urology department at the Alexandria main University Hospital, and they revealed that more than one third of their study samplewas illiterate. This may be related to high number of them lives in rural areas which characterized by lack of infrastructures, cultures,andlackofawarenessabout importance of education. The finding study disagreedwith**Yangetal.,2021**whostudied conducted at in the Second Hospital of Tianjin Medical University, they revealed that more than three quarters of their study sample had secondary school education.

The result of the current study also revealed that nearly two thirds of patients weren't working and nearly half of them don't have enough income. The finding ofthe study is consistent with **Ahmed et al., 2019** who conducted in Patients with stonesata totalof 11stonecenters across the United States and revealed that more than half of studied patients weren't working and have insufficient income. from the investigator point of view this maybe related to the high rate of illiteracy and living inrural area, also it may be related to the pain that caused by the disease result in impaired their ability to work.

Conversely, the result of the study disagreed with **Mousa, &Chackra,(2019)** who revealed that, about three quartersofstudiedpatientswereworkingand had sufficient income

Pertainingtopatients'knowledgeabout kidney stone the result of the current study illustrated that one quarter of studied patients had adequate knowledge regarding definition of renal stones and more than one quarter of them had adequate knowledge about risk factorsforkidneystone,thefindingofthe study disagreed with **Jamnadass et al., (2018)** who conducted online and they revealed that more than half of studied patients had poor knowledge about definition and risk factors for kidney disease. This might be related to experiencing disease lead them to search and getting information from their treating doctor and nurse.

Regarding patients' knowledge about self-care management, the result of the current study revealed that, three quarters of studied patients had incorrect knowledge regarding self-care management and nearly half of them had impaired psychological status. The finding study is congruent with **Hess** (**2017**) who illustrated that more than half of studied patients had incorrect knowledge regarding self-care management.Thismight berelatedto lack of information source and afraid about the prognosis of disease result in stress and anxiety.

Pertaining to prevention of kidneystone formation, the result of the current study illustrated that only about fifth of them had a correct and complete knowledge regarding stone prevention of recurrence of kidney stone formation. The result of the study if congruent with **Penniston et al., (2016)**, who found that revealed that more than half of their study sample had incorrect knowledge and lack of understanding of preventiveguidelinesregardingstone formation, from the investigator point ofview this may be interpreted that no one provide them with needed information and they didn't search for methods of preventing kidney stone formation.

The result of the current study illustrated that about half of studied patient had poor total knowledge regarding renal stone. The finding study agreed with **Hess, 2017** whofound that more than three quarters of his study sample had poor total level of knowledge regarding understanding of renal disease, this may be related to lack of exposure to adequate information and high illiteracy level,

Regarding studied patients' total score self-carepatternaboutself-caremanagement, the result of the current study illustrated that nearly three quarters of studied patients had average practice, The result of the study agreed with **Qaseem et al., (2018)** who revealed that more than half of studied patients had adequate practice regardingstone formation. this may be related to the effect ofguidelinesforlifestylemodification such as increased fluid intake, increase mobilization, decrease fatty food and adherence to medication intake.

Pertaining to the relation between total knowledge and patients demographic characteristic, the result of the current study illustrated that there were a highlystatistically significance difference between patientsageandtheirtotalknowledge, young male patients had good total knowledge than older patients The results of the study is agreed with **Moudi et al., 2017** who revealed that therewas statistically significant

difference between patients' age and their knowledge towardthedisease. From theresearcher point of view, this may be related to younger patients always search for information and acquire knowledge about their disease and their management to avoid further complications.

Regarding to the relation between total knowledge and patients marital status, the result of the current study illustrated that there were a highly statistically significance differencebetweenpatientsmaritalstatusand their total knowledge, married patients had good total knowledge than single and widow patients and also there were a highly statistically significance difference between patients educational level and their total knowledge, university and highly educated patients had a good total knowledge than illiterate and secondary educated patients. The finding of the study is congruent with **Abdelmowlaet al.,(2017)** who revealed that there were statistically significantrelationbetweenpatients'(marital statusandeducation)andtheirtotal knowledge regarding kidney stones. Thismay be related to that married patientsalways have a support motivation from their family to search for information about their disease to treat and prevent diseaserecurrence

Concerning the relation between total self-care management and patients' demographic characteristics, the result of the current study illustrated that, there were highly statistically significant difference between patients' age and total their practice. The finding of the study is congruent with **Abdelwahab et al., (2021)**, they revealedthat there were statistically significant relation between patients' age and their self- care management. This may be interpreted that younger patients had a good total practice; they do their best to depend on themselves and not to rely on others in meeting their essential needs and also prefer to solve their health problems without affording their families their fatigues.

The result of the current study illustrated that, there were highly statistically significant relation between patients' total self-care practice and their educationallevel& working status. The study iscongruent with **Abdelwahab et al., (2021)** they demonstrated, that highly educated and working patients adhere to self-care practice asincreasefluidintake,adequatelowfatdiet, adherencetoexercise,follow-upappointment and prescribed medication intake, this maybe interpreted that highly educated and workingpatientshada goodtotalpractice because are more knowledgeable, having a stronger sense of self-care, autonomy and regularly take care of themselves than less educated people.

Regarding the correlation between patients' knowledge and their total self-care management, the result of the current study showed that there was statisticallysignificant correlation between patients' knowledge and their total practice. This may be interpreted that patient with satisfactory knowledge had adequate performance regarding their self- care management. The finding of the studyis consistent with **Abdelmowla et al., 2017**who revealed that, there was a highly statistically significant correlation between patients knowledge and their total self-care management regarding kidney stones.

CONCLUSION

There was highly statistically significant relation between studied patients' demographic characteristics and their total knowledge score moreover; there was highly statistically significant relation between studied patients' demographic characteristics and their total self- care management score.

Recommendations

Health educational program should be developed and implemented for kidney stone patients to increase their awareness about health practices toward kidney stone.

REFERENCES

1. Safdar, O. Y., Alzahrani, W. A., Ghanim, A. A., Nagadi, S. A., Alghamdi, S. J., Zaher, Z. F., &Albokhari, S. M. (2021). The prevalence of renal stones among local residents in Saudi Arabia. Journal of family medicine and primary care, 10(2), 974-977.
2. Abdelmowla, R., Hussein, A. &Shahat, A. (2017). Impact of nursing interventions and patients' education on quality of life regarding renal stones treated by percutaneous nephrolithotomy), Journal of Nursing Education and Practice, Vol. 7(12):P234-239.
3. Abdelwahab , D., Alaa El-deen , S.,Rezian, A., , Elhkouly, A (2021). Effect of lmplementing Evidence-Based Guidelineson Lifestyle Modification for Adult Patients with Renal Stone Undergoing ESWL Procedure, Egyptian Journal of Nursing & Health Sciences, EJNHS Vol.2(1): P234- 239.
4. Ahmed,T.,Tzou,D.,Bird,V.,Pais,V.,Steeper, N., Sur, R.,& Nakada ,S. (2019). Low Income and Nonwhite Race areStrongly Associated with Worse Quality ofLife in Patients with Nephrolithiasis, Journalof Endourology, Vol 32(8): P119-124.
5. Flynn, N.; Fetter, L. &Zimskind, P. (2017). Statistical analysis of patients with urinary calculi. JAMA; 18 (6): P 21 – 22.
6. Hess, B. (2017). Renal stone clinic survey: calcium stone formers' self-declared understanding of and adherence to physician's recommendations, Urolithiasi, Vol 45 (12): P363–370.
7. Jamnadass, E.,Aboumarzou,O.,&Somani, B.(2018).The Role of Social Media and Internet Search

Engines in Information Provision and Dissemination to Patients with Kidney Stone Disease: A Systematic Review from European Association of Urologists Young Academic Urologists, Journal of Endourology, Vol. 32(8): P 35-42.

8. Kritika, S.,& Gupta A. (2018).assessmentof nutritionalstatus anddietarypatternofpatients suffering from nephrolithiasis in different region of, prayagraj districts, uttarpradesh , International Journal of Advances in AgriculturalScienceandTechnology,Vol.5(2):P 13-20.
9. LiSa., B., Vaughan, ,L., Enders, F., & T., Rule, A.(2019). Predictors of Symptomatic Kidney Stone Recurrence After the First and Subsequent Episodes, Mayo ClinicProceedings ,Vol 94 (2): P202-210.
10. Moudi, E., Hosseini, S., &Bijani, A.(2017). Nephrolithiasis in elderly population; effect of demographic characteristics, Journal of Nephropathology, Vol.6(2): P 63-68.
11. Moussa, M., & Chakra, A. (2019). Encyclopedia of nutritional supplements: the essential quide for improving your health naturally. Prima Health v Vol 12(3); P325 – 25.
12. Penniston , K.,Wertheim, M., &Nakada ,S. (2016). Factors associated with patient recall of individualized dietary recommendationsforkidneystoneprevention
13. ,European Journal of Clinical Nutrition ,Vol 70(2): P 1062–1067 .
14. Qaseem , A., Forciea, M., & Starkey, M. (2018). Dietary and Pharmacologic Management to Prevent Recurrent Nephrolithiasis in Adults: A Clinical Practice Guideline From the American College of Physicians, Annals of Internal Medicine, Vol 174(7) : P 123-125
15. Thongprayoon , Ch., Krambeck , A., &Rule ,A. (2020). Determining the true burden of kidney stone disease, Nature ReviewsNephrology ,Vol 16(3): P 736–746.
16. Yang,X.,Li,Z.,Qi,Sh.,Xie,L.,Shi,Q.&Lui ,C. (2021). Incidence and Risk Factors for Bilateral Nephrolithiasis: A Large Case- retrospective Study: Vol1 .(2) : P1-24.