



# Evaluation of Renal Stones Public Awareness in Saudi Arabia

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## ABSTRACT

**Background:** Renal stone is a very common problem in human being, but it prevails in the hot regions more than other areas. The high existence and prevalence of kidney diseases in Saudi Arabia can be acknowledged as a result of certain abnormal food in the Gulf and Middle East regions with a decrease in calcium and high animal protein intake such as (chicken, meat and fish). Many studies explained that kidney problem is existed in Saudi Arabia and other Gulf countries more than European countries due to environmental factors. There is a great necessity to assess the intensity of public knowledge in a particular population, to make successful strategies and put into practice the management and anticipation of kidney diseases. **Aims:** The aim of this study is to investigate the level of awareness of the Saudi people about renal stones and to compare the level of awareness and different demographic factors. **Materials and Methods:** In this cross-sectional study, 420 participants were randomly enrolled from whom 46.2% were male and 53.8% were female. A pre-tested questionnaire was used for data collection. SPSS software was used to analyze the collected data. The relationship between socio-demographic factors of the participants and their level of awareness was calculated using Chi-square test. **Results:** The findings of the study indicated that the public in Saudi Arabia had a sufficient level of awareness, 88.3% of whom were recognized with a good level of Awareness. There was no significant difference between the level of education ( $P=0.495$ ), residence ( $P=0.883$ ), and occupation ( $P=0.370$ ) in relation to the level of awareness. A significant difference was observed in awareness based on the gender of participants. Females showed significantly higher awareness compared to males ( $P=0.001$ ). Additionally, married participants had a significantly higher awareness level compared to people with other marital statuses ( $P=0.009$ ). Finally, there was a significant relationship between age and level of awareness ( $P=0.000$ ). Our results showed that the level of knowledge improves with age increase. **Conclusion:** The level of awareness about renal stones was sufficient among general population in Saudi Arabia. There was a significant relationship among gender, age, marital status, and the level of awareness.

**Key Words:** Renal Stones, Awareness, Saudi Arabia.

eIJPPR 2020; 10(6):120-126

**HOW TO CITE THIS ARTICLE:** Bader Nasser Almosaieed, Faisal Abdulmohsin Alslimah, Salman Ahmed Alzarea, Sarah Bader Alsuwaylimi, Sager Loaie Algorashi, Rakan Ibrahim Alsuqub (2020). "Evaluation of Renal Stones Public Awareness in Saudi Arabia", International Journal of Pharmaceutical and Phytopharmacological Research, 10(6), pp.120-126.

## INTRODUCTION

The diseases related to kidney have become universal health problem [1-4]. There are numerous reports explaining that dangerous kidney diseases, mainly kidney failure prevail due to the particular medical and socio-demographical aspects [5]. Renal diseases are increasing very frequently due to hypertension, diabetes, obesity and cardiovascular diseases [6]. This problem is increasing day

by day and now it exists in about 10 to 15 percent of people globally [7].

In Saudi Arabia, the problem of the kidney stones is prevailing more than western countries. Many people in this country have to face kidney disorder especially kidney stones [8].

Renal stone is a very common problem in human being, but it prevails in the hot regions more than other areas. The high existence and prevalence of kidney diseases in Saudi Arabia can be acknowledged as the result of certain

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**Relevant conflicts of interest/financial disclosures:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Received:** 04 September 2020; **Revised:** 02 December 2020; **Accepted:** 08 December 2020



abnormal food in the Gulf and Middle East regions with a decrease in calcium and high animal protein intake such as (chicken, meat & fish). There is hot season in these regions and the water intake is very low. Therefore, the less volume of urine, hotness in the environment and less intake of calcium increases the danger of the formation of the renal stones. [9]. This difficulty is growing in the Saudi Arabia, due to the slight knowledge about the symptoms, grounds and management of kidney stones.

In the last two decades, infection in the kidney was considered as the most important cause of renal disease, but presently, it has turned into a less expected cause of chronic kidney diseases, mainly in the western countries [10]. Many consequential reports specify that hypertension and diabetes are the most common causes of the kidney diseases, globally [11].

It is true that if the kidney diseases are diagnosed in the earlier stages, it can decrease the possibility of the kidney failure by on time prevention and medical treatment; but it is only possible through the awareness about this disease [12]. Therefore, the public awareness plays an important role in controlling kidney problems, even the kidney failure.

In the past there was no specific treatment, but with the passage of time and during about last two decades, the urinary stone treatment was spectacularly transformed. Nowadays, the gigantic bulk of stone is reduced impulsively with conventional management, whereas, the remaining stone can be destroyed or discharged efficiently with smallest surgical involvements such as endourological techniques and shock wave lithotripsy (SWL). However, it is also true that a chief dilemma is the high reappearance rate even after surgery or shock wave lithotripsy.

There are many studies indicating that kidney problems exist in Saudi Arabia and other Gulf countries more than European countries due to the environmental factors. A recent inclusive survey has been performed to expose the occurrence of kidney diseases. This study explained that 9.4% of the population of the Saudi Arabia is suffering from kidney diseases [13]. Therefore, the performance of self-awareness is important to curb the kidney disease and its associated risk issue [14]. There is a great necessity to assess the intensity of public knowledge in a particular population, to make successful strategies and put into practice for management and anticipation of kidney diseases.

Executing the novel technique to increase awareness of the community about the early kidney stone can play an important role to reduce the number of cases. There are a few studies on renal stone and its causes, symptoms, screening, and management in Al-Riyadh city in Saudi Arabia.

In this study primarily, we aimed to assess the level of awareness of the Saudi population about renal stones. Additionally, compare the level of awareness and different demographic factors

## LITERATURE REVIEW

Ahmad et al. [15] explained the awareness of the people about renal stones in Saudi Arabia. This study has explored symptoms, causes and management of renal stones. This study is based on quantitative analysis and selected the cross sectional data of 407 participants from two different areas (Al-Riyadh & Al-Hassa) of the Saudi Arabia. This study collected data from October to November in the year 2017. This study applied statistical tests to find out the results, and concluded that this problem is increasing in Saudi Arabia, but there is very little awareness about the symptoms, causes, and management of renal stones. This study further explained that this problem prevails due to fewer intakes of water and overweight.

Ahmand M. A. [16] investigated the problem of prevalence and awareness of the urinary stones in the KSA. The aim of this study was to explore the composition of the stones and prevalence of urinary stones in the different age groups. This study collected 384 stones from 347 patients. These samples were submitted to Johns Hopkins Aramco health care from 2011 to 2013 and descriptive statistical test was applied to find out the results. This study found that renal stones were a very common problem in both genders, but the existence of stones in females was more than males. The mentioned study also explained that there are different factors other than climate conditions that can affect renal function in Saudi Arabia. These factors are water hardness, age, occupations, eating habits and body weight. This study concluded that there is no difference between renal stones and those of urinary bladder. The stones made of calcium are common in KSA. Causes of these stones are hot season and eating habits.

Saleh Hadi Alharbi et al. [17] investigated awareness and effective management of Saudi population about kidney diseases. This study collected the cross-sectional data by a survey and randomly selected the sample of 950 healthy Saudi people. The age of these participants was 18 to 65. For analysis of this study statistical techniques were applied, and it was found that renal problem is increasing very frequently among people of all age groups, and most volunteers do not even have basic knowledge about renal diseases. There are many causes for the prevalence of renal problems such as obesity, hypertension, and lack of self-awareness. This study concluded that it is necessary to provide awareness to people to curb this situation.

Saeed et al. [18] explained that kidney stones have become a very common disease among Saudi population. There are many causes for renal stones formation. The aim of this study was to find out the causes, symptoms and the

knowledge about kidney stones. This study selected Albaha city for the research. This study collected the data through a questionnaire. The sample size of this study consisted of 417 volunteers. This study found that a large number of people do not have awareness about renal stones, and do not know how to manage this disease. The mentioned study concluded that sufficient knowledge should be provided to the people. People can be aware about this disease through educational institutions, internet or by organizing seminars.

Khan et al. [19] tried to provide information about the composition of kidney stones biochemically. This study also elaborated the risk factors that increase the existence of kidney stones in the human body. For the analysis, this study collected 307 kidney stones from different patients. The duration of this analysis was about 1 year (from 2000 to 2001). These stones were sent to Riyadh lab for the analysis of their compositions. It was found out that the people of Riyadh are not aware of the cause and symptoms of the kidney stones. There are many factors such as dieting habits, environment, and psychical health can contribute to develop the stones in renal ducts. This study also found that calcium stones are common in Saudi people. Summer season is very effective to develop the stones. It is necessary to educate people about renal stones and their causes. This awareness can curb the increasing rate of renal stones.

## METHODOLOGY

### Study Design:

This study is a cross-sectional one that was carried out among adult population in Saudi Arabia with regard to awareness of renal stones.

### Study Area:

This study was conducted in Saudi Arabia in 2020.

### Study Population:

The study population was adults who lived in Saudi Arabia, and agreed to fill out the questionnaire.

### Sample Size:

A Total of 382 was participated in the study.

### Data Collection Tools and Instruments:

A pre-tested questionnaire was used in data collection. The questionnaire includes questions about socio-demographic

factors and awareness of renal stones among adult population in Saudi Arabia.

### Data analysis:

Data was coded, entered, and analyzed using the Statistical Package for Social Science (SPSS) version 23. The level of awareness of adult population in Saudi Arabia regarding renal stones was assessed using a scoring system. A score of 1 was given to correct responses, and 0 was used for incorrect/do not know responses. Participants were categorized into two groups; scores less than 6 out of 12 were considered as poor level of awareness, while scores equal or greater than 6 were considered as good level of awareness. Furthermore, the relationship between socio-demographic factors of participants and their level of awareness was calculated using Chi-square test. A statistical significance was determined at  $p = 0.05$ .

### Ethical Concern:

The ethical approval was obtained from the ethical committee of the Basic Health Research Centre in King Fahad Medical City (KFMC).

## RESULTS:

In the present study the data was collected from 420 adult participants whose socio-demographic characteristics are shown in **Table 1**. It was found that 226 (53.8%) were females while 194 (46.2%) were males. The age distribution revealed that most of the participants (35.7%) were in the age group of (21-30) years and (24.8%) were in the age group of (41-50). 224 (53.3%) of the participants were married, 190 (45.2%) were single while few (1.4%) were divorced.

The participants' level of education ranged from primary education to university education, from maximum to minimum 329 (78.3%) university education, 66 (15.7%) secondary school education, 6 (1.4%) middle school education, and 5 (1.2%) primary school education; while, 14 (3.3%) were at other educational levels. The geographical distribution of the participants was as follows: 273 (65%) from the northern region, 87 (20.7%) from the central region, 33 (7.9%) from the eastern region, 20 (4.8%) from the western region, and 7 (1.7%) from the southern region. In addition, 188 (44.8%) of the participants had an occupation while 232 (55.2%) were unemployed.

**Table 1: Socio-demographic Information of the Study Participants (n=420)**

		Frequency	Percent
Gender	Male	194	46.2%
	Female	226	53.8%

<b>Age (Years)</b>	≤ 20	66	15.7%
	21 - 30	150	35.7%
	31 - 40	53	12.6%
	41 - 50	104	24.8%
	≥ 51	47	11.2%
<b>Marital Status</b>	Single	190	45.2%
	Married	224	53.3%
	Divorced	6	1.4%
<b>Level of Education</b>	Primary School	5	1.2%
	Middle School	6	1.4%
	Secondary School	66	15.7%
	University	329	78.3%
	Other	14	3.3%
<b>City of Residence</b>	Central Region	87	20.7%
	Western Region	20	4.8%
	Eastern Region	33	7.9%
	Northern Region	273	65%
	Southern Region	7	1.7%
<b>Occupation</b>	Yes	188	44.8%
	No	232	55.2%

Our data revealed that participants who had previous information about renal stones comprised (96.2%), their main source of information is family and friends that represented (63.3%), followed by social media (35.2%) and health care professionals (14.8%) (As shown in **Figure 1**). Lower percentage of the participants had a previous experience of renal stones (13.1%) while (86.9%) did not have.

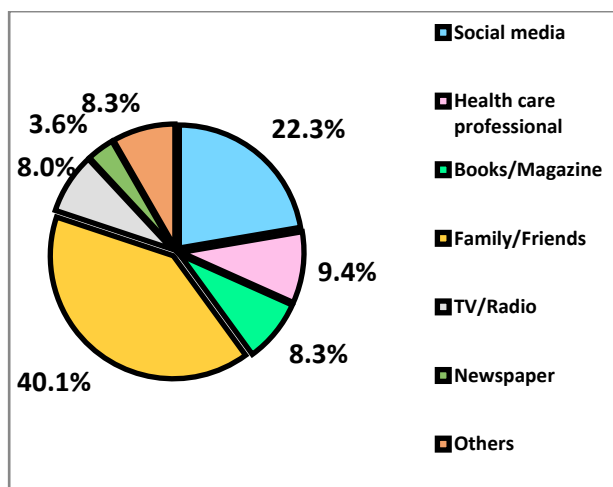
Amongst the renal stones symptoms, blood in the urine was the most selected (50.7%), followed by abdominal pain (45.7%), and vomiting (20.2%). While few of the participants (16.2%) knew that renal stones can be asymptomatic. Moreover, 277 (66%) thought that pain on urination was one of the associated symptoms. Participants were asked about their awareness of risk factors of renal stones. Most of the participants (49.5%) thought that drinking plenty of soft drinks could increase the risk of renal stone formation; 146 (34.8%) knew that genetic factors could be considered as risk factors, and having a history of renal stones could also increase the risk of renal stones occurrence (33.1%); however, only (21.2%) of the participants knew that obesity could increase the incidence of renal stones.

Some participants had calcium component stones as the most common types of renal stones (35.2%) while most of the participants (48.1%) did not know or did not have any opinion. Radiology imaging was the most chosen mode and the best diagnostic way of renal stones (54.8%), while 96 (22.9%) of the participants believed that urine analysis is the best one.

Three hundred ninety-seven (94.5%) of the participants knew that renal stones was a treatable disease, while few of the participants thought that it was untreatable (2.1%). Most of the participants (75.5%) believed that they ought to consult with an urologist if they had renal stones. The majority of the participants (91%) thought that renal stones ought to be treated as early as possible in order to prevent the complications, and 293 (67.4%) knew that renal stones cannot be transmitted to their children if they were suffering from the disease.

Concerning the preventive measures of renal stones, 371 (88.3%) of the participants knew that increasing water intakes could prevent the formation of renal stones and most of the participants (36.2%) believed that the recommended daily fluid intake might be 2 liters per day, and 135 (32.1%) thought that it ought to be 3 liters per day.

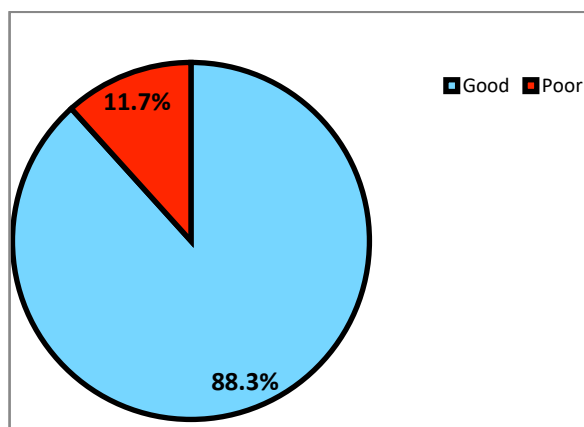
Eating plenty of fruits and vegetables was the top preventive measure against renal stones (59.8%), while approximately half of the participants (48.8%) thought that a low protein diet could be one of the preventive measures.



**Figure 1: Source of Information about Renal Stones**

\* Participants can choose more than one source (total of % ≠ 100)

Level of awareness about renal stones was classified based on the responses of the participants into either poor awareness level or good awareness level. There was high awareness among general population in Saudi Arabia where most of the participants (88.3%) were recognized with good level of awareness (as shown in the **Figure 2**).



**Figure 2: Level of Awareness of Public about Renal Stones**

Level of awareness of general population regarding renal stones was compared in different demographic groups using Chi-square test at the level of significance  $p$ -value < 0.05. There was no significant difference between level of education ( $P=0.495$ ), residence ( $P=0.883$ ), and occupation ( $P=0.370$ ) in relation to the level of awareness. A significant difference was observed in the awareness based on the gender of the participants. Females showed significantly higher awareness compared to males ( $P=0.001$ ). Additionally, married participants had a significantly higher awareness compared to people with other marital statuses ( $P=0.009$ ). Finally, there was a significant relationship between age and level of awareness ( $P=0.000$ ). Our results showed that the level of knowledge improves with age increase (as shown in **Table 2**).

**Table 2: The Relationship between Socio-demographic Characteristics of Participants and Their Level of Awareness**

Characteristic	Awareness of Renal Stones				P value
	Good		Poor		
	Number	Percentage	Number	Percentage	
<b>Gender</b>					
Male	160	82.5%	34	17.5%	0.001
Female	211	93.4%	15	6.6%	
<b>Age (Years)</b>					
≤ 20	48	72.7%	18	27.3%	0.000
21 - 30	130	86.7%	20	13.3%	
31 - 40	49	92.5%	4	7.5%	
41 - 50	98	94.2%	6	5.8%	
≥ 51	46	97.9%	1	2.1%	
<b>Marital Status</b>					
Single	158	83.2%	32	16.8%	0.009
Married	208	92.9%	16	7.1%	
Divorced	5	83.3%	1	16.7%	



Level of Education					
Primary School	5	100%	0	0	0.495
Middle School	6	100%	0	0	
Secondary School	55	83.3%	11	16.7%	
University	292	88.8%	37	11.2%	
Other	13	92.9%	1	7.1%	
City of Residence					
Central Region	79	90.8%	8	9.2%	0.883
Western Region	17	85%	3	15%	
Eastern Region	28	84.8%	5	15.2%	
Northern Region	241	88.3%	32	11.7%	
Southern Region	6	85.7%	1	14.3%	
Occupation					
Yes	169	89.9%	19	10.1%	0.370
No	202	87.1%	30	12.9%	

## DISCUSSION

This study involved random selection of 420 Saudi people to assess their awareness about renal stones, and to analyze if there was a significant relationship between demographic data of the participants and their level of awareness.

In this study, the participants who had previous information about renal stones comprised (96.2%), while in a study conducted by Saeed et al. (2018) only one third of the participants had previous information about renal stones. In our study the level of awareness about renal stones was assessed; 88.3% of the participants were recognized with good level of awareness. Lower percentage of awareness was reported by AlOtpi et al. (2020) [20] who stated that the average score on knowledge about kidney stones was 65.19 ±11 out of 95. Concerning the preventive measures of renal stones, 88.3% of the participants knew that increasing water intakes could prevent the formation of renal stones. This was in accordance with previously reported results by Almuhanha et al. (2018) who stated that 91.4% of the participants were aware that increased water intake decreased the formation of renal stones [21].

When the study participants asked about the best way to diagnose renal stones, radiology imaging was the most chosen and the best diagnostic method of renal stones (54.8%), which is similar to the findings of study that was conducted by Almuhanha et al. (2018) [21].

Level of awareness of general population with regard to renal stones was compared in different demographic groups. A significant difference was observed in awareness based on the gender and marital status of participants. Females showed significantly higher awareness compared

to males (P=0.001). Additionally, married participants had a significantly higher awareness compared to those with other marital statuses (P=0.009). On the contrary, AlOtpi et al. (2020) stated that males showed significantly higher scores of knowledge compared to females (p-value = 0.043). Moreover, single subjects (p-value = 0.003) showed significantly higher scores compared to their peers.

## CONCLUSION

The level of awareness about renal stones was sufficient among general population in Saudi Arabia. There was a significant relationship between gender, age, marital status, and the level of awareness.

## REFERENCES

- [1] Shamsuddin N, Gnanasan S, Karuppanan M, Farooqui M. A Call for an Educational Intervention Tool to Guide Selection of Complementary and Alternative Medicine (CAM) in Chronic Kidney Disease (CKD) Patients. Arch. Pharm. Pract. 2018;9(2):1-3.
- [2] Saeed S, Islahudin F, Makmor-Bakry M, Redzuan AM. The practice of complementary and alternative medicine among chronic kidney disease patients. J. Adv. Pharm. Educ. Res. 2018;8(3):30-36
- [3] AlSogair AA, Alharbi AA, Alharbi SH, Alateeq FA, Aloriney AM, Ahmed HG. Knowledge and Perceptions Toward Chronic Kidney Disease Prevention and Control in Saudi Arabia. Int. J. Pharm. Res. Allied Sci. 2019;8(1):77-83.
- [4] Zayet GK. Serum Hepatocytes growth factor in acute and chronic kidney disease patients and its relation to

- disease activity. *J. Adv. Pharm. Educ. Res.* 2018;8(3):74-80.
- [5] Ginawi, I.A. Gadelkarim Ahmed, H., Ashankyty, I. M., Altamimi, T., Almogbel, M., Alsuedaa, A., Akbar, D., Albeladi, F., Alrashdan, A., Jastaniah, S.D. Al-Hazimi, A.M. Survey for potential risk factors for susceptibility to chronic kidney disease in hail region, KSA. *Management in Health*, 2013; 17(2).
- [6] The National Kidney Foundation Disease Outcomes Quality Initiative (NKF KDOQI). "KDOQI clinical practice guidelines for chronic kidney disease. National Kidney Foundation, 2002.
- [7] Romero V, Akpınar H, Assimos DG. Kidney stones: A global picture of prevalence, incidence, and associated risk factors. *Rev Urol* 2010;12:e86-96.
- [8] Gault MH, Chafe L. Relationship of frequency, age, sex, stone weight and composition in 15,624 stones: comparison of results for 1980 to 1983 and 1995 to 1998. *J Urol.*, 2000; 164(2):302-7.
- [9] Elliott JPI, Gordon JO, Evans JW, Platt L. A stone season. A 10-year retrospective study of 768 surgical stone cases with respect to seasonal variation. *J Urol.*, 1975; 114(4):574-7.
- [10] Zhang, Q.L., Rothenbacher, D. Prevalence of chronic kidney disease in population-based studies: a systematic review. *BMC Public Health*, 2008; 8(1): 117.
- [11] Haroun, M. K., Jaar, B. G., Hoffman, S. C., Comstock, G. W., Klag, M. J., Coresh, J. Risk factors for chronic kidney disease: a prospective study of 23,534 men and women in Washington County, Maryland. *Journal of the American Society of Nephrology*, 2003; 14(11): 2934-41.
- [12] Glasscock, R. J., Winearls, Ch. Screening for CKD with eGFR: doubts and dangers. *Clinical Journal of the American Society of Nephrology*, 2008; 3(5): 1563-68.
- [13] Hussain Gadelkarim, A., Ginawi, I.A., M. Al-hazimi, A. Prevalence Estimates of Chronic Kidney Disease in Hail Region, KSA: in a Comprehensive Survey. *International Journal of Science and Research*, 2014; 3(7): 252-56.
- [14] C. Verhave, J., Troyanov, S., Mongeau, F., Fradette, L., Bouchard, J., Awadalla, Ph., Madore, F. Prevalence, awareness, and management of CKD and cardiovascular risk factors in publicly funded health care. *Clinical Journal of the American Society of Nephrology*, 2014; 9(4):713-19.
- [15] Mousa Almuhanha, A., Alomar, M., Khaled Alsalman, H., Ahmed Al-Mutayliq, A., Abdulrahman Alnasser, Kh. Public Awareness towards Renal Stone Causes, Symptoms and Management amongst Saudis; *The Egyptian Journal of Hospital Medicine*. 2018 January; 70 (4): 544-548.
- [16] Alkhunaizi, A.M. Urinary stones in Eastern Saudi Arabia: *Urology Annals*, Jan - Mar 2016. 2018; 8(1).
- [17] Hadi Alharbi, S., A. Bin ahmed, I., A. Alateeq, F., M. Aloriney, A., Gadelkarim Ahmed, H. Consciousness of Saudi General Population towards Chronic Kidney Disease; *International Journal of Medical Research & Health Sciences*, 2018, 7(12): 63-70.
- [18] Saeed Y.S. Alghamdi; Ali M.A. Alamri; Raed A.M. Alzahrani; Abdulrahman H.A. Alghamdi; Abdulaziz A.A. Alghamdi; Abdulrahman A.M. Alghamdi; Raad J.D. Alghamdi. Awareness about Symptoms and Role of Diet in Renal Stones among General Population of Albaha City. *The Egyptian Journal of Hospital Medicine*, 2018 January; 70: 50-59.
- [19] Khan, A.S., Ellahi Rai, M., Khan Gandapur, A.S., Pervaiz, A., Hussain Shah, A., Aba Hussain, A., Siddiq, M. Epidemiological risk factors and composition of urinary stones in Riyadh Saudi Arabia. *J Ayub Med Coll Abbottabad*, 2004; 16(3):56-8.
- [20] AlOpi AM, AlQurashi MM, AlTalhi AA, AlOtaibi AO, AlThomali IM, AlKhudaydi MS. Public awareness toward kidney stones risk factors in Saudi Arabia; a cross-sectional observational study. *International Journal of Medicine in Developing Countries*, 2020; 4(1): 101-106.
- [21] Almuhanha AM, Alomar M, Alsalman HK, Al-Mutayliq AA, Alnasser KA. Public awareness towards kidney stone causes, symptoms and management amongst Saudis. *Egypt J Hosp Med*. 2018;70(4).