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Investigating the Factors Relevant to Kidney Stone in Patients at Amir al-Muminin Hospital in Zabol City in 2017-2018

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Abstract

Background and Purpose: Kidney stone is the most prevalent chronic kidney disease. The disease is widespread throughout the world and it is estimated that stones at 50% will have a relapse again within 10 years. Despite all the scientific advances in appropriate diagnosis and treatment of kidney stones, we observed high relapse rate, about 50%, within 5 years. In this study the relation between kidney stones formation with occupation, weight gain and age was investigated.

Method: In this case-control study, 150 healthy individuals as control group and as treatment group 150 urinary tract stone patients from Amir al-Muminin Hospital of Zabol, that received definitive diagnosis on having stones, were recruited. Informational questionnaires about the disease were filled in through interviews with each patient under study. The information were collected and then coded and inserted into SPSS. T-test, Chi-Square test and Mann-Whitney test were used to calculate frequency, mean, and standard deviation of the variables in both control and treatment groups and to determine statistical differences between the different variables of the two groups.

Findings: The average age of kidney stone patients were 12/60 ± 40/12. The average age in control group were 11/37 ± 36/75. According to Independent Sample test the statistic difference between the patients and the control group was significant for age (p<0/05). In treatment group the highest frequency (36/7%) belonged to patients with high school diploma and in control group the highest frequency (61/3) belonged to those with associate degrees. Chi-Square test showed there was a significant difference between the two groups regarding the level of education (p<0/05) also there were significant differences between the two groups regarding their number of children and marital status (p<0/05). There were significant differences between the groups with regard to their gender, height, income and occupation (p<0/05). In treatment group the patients with overweight had the highest frequency value and in control group the highest frequency was for the patients with normal basal metabolic rate. The Independent Sample T-test showed a significant difference between the two groups concerning the basal metabolic rate.

Conclusion: In general, the results of the study indicates that age, weight gain and basal metabolic rate, low education level, marital status and the number of children can be in line with kidney stone formation.

Keywords: Kidney stone; Occupation; Weight gain; Agepedagogical support to persons with disabilities; Technology of psychological and pedagogical support for persons with disabilities

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Introduction

Kidney stone after urinary infections and prostate diseases is the third main reason patients attend urology clinics [1] and after hypertension it is the most prevalent chronic kidney diseases [2]. Urinary tract stone is one of the main health problems, bearing a significant portion in kidney failure and surgeries [3]. It seems the best way to control the disease and the resulting side effects, especially in the developing countries, is to prevent formation or the developing of the stones [4]. Researches show that rate of kidney stone disease is increasing all over the world [5]. In past decades the rate of kidney stone disease in the United States increased from 3/8 to 5/2 [6]. Studies from Asian and European countries also notified kidney stone disease increase. In previous studies the rate of kidney stone disease prevalence in Iran is reported to be between 1/9% to 5/7% [5,7]. Factors such as gender (male), overweight, low liquid intake, warm and dry climate, high dairy consumption, positive family history, high calcium, oxalate and cystine in urine, low magnesium in urine, overuse of vitamin D and diseases like hyperthyroidism, cancers and leukemia are known to increase the rate of kidney stone disease [8]. There are different types of kidney stones, including calcium oxalate, calcium phosphate, uric acid, cystine, struvite and mixed [9]. Kidney stones mainly contain

calcium salts, uric acid, cystine, struvite (stag horn). Calcium oxalate and calcium phosphate form 75 to 85 percent of the kidney stones and they may exist in combination in one stone. Calcium stones are more common in men and the median age of symptom appearance is the third decade of lifespan. Almost 60% of individuals that form calcium stone will re-form another stone within 10 years [10]. Urology stones are significant for the imposed economic and financial costs on society.

Studies showed 80% of kidney stones formed of calcium and of calcium compounds are calcium oxalate [11]. Kidney stones consist 5-10% of uric acid stones, 10-15% of struvite and less than 1% of cystine [12]. Iran is considered to be located on the kidney stone disease zone. Kidney stone prevalence is 2-3% in our zone [13,14]. Kidney stone formation increases with age in many areas. Men are suffering kidney stones more than women [15]. Modern way of life and bad eating habits-containing too much salt, animal protein and carbohydrate and also obesity are the factors that cause kidney stone. Cross-sectional studies show a significant relationship between these factors and kidney stone attack [16]. Besides the higher rate of kidney stone prevalence and recurrent stones are also common in the world and it is estimated that 50% of the stones will have a relapse within 10 years [17]. In Iran, the average percentage of relapses is 16% after one year, 33% after five years and 53 after ten years [7]. Different studies indicate some daily behaviors like: balanced BMI, enough physical exercises, balanced calcium intake, low salt consumption, low animal protein intake, balanced nutrition and adequate liquid intake especially for those with vigorous physical activities and exercises [2,3] are crucial in prevention of kidney stone formation [16-20].

Pyelonephritis xanthogranulomatous and one or two sided kidney failure are among the chronic side effects of kidney stones [21,22].

At the present time, to remove the stones patients undergo different treatment methods such as preventive treatment methods (liquid intake, acidic and alkaline solvent) and surgical operation methods including kidney obstruction surgery, extracorporeal shock wave lithotripsy, ureteroscopic stone removal and percutaneous stone removal [23-25]. In 1986, more than 2 billion dollars spent on treatment, prevention and removal of urology stones and likewise on extracorporeal lithotripsy methods [26].

To diagnose factors causing the disease lays the ground to reduce the patients' disease stress and this can be helpful for patients. This disease is one of the most important debates of urology; many researches were done on it and different methods have been innovated for its diagnosis and treatment. Although this disease, in sever and end stages, can result in kidney failure and loss of the kidney, that would be both hurting for the patient and costing for the society (because of nephrectomy and dialysis), by on-time diagnosis, it would be cured by medical treatments and there would be no need for surgical operations [27,28]. In a study carried out by Taylor, et al [29] it is stated that obesity and overweight increases the risk of kidney stone formation and the risk was more in women than men. In research carried out by Fouladi, et al [30]they stated there were no significant differences between patients' BMI, their occupations, medical history, and drug consumption with the different types of urology stones expansion. Though with advances in nephrectomy and new diagnostic and treatment techniques, nowadays, kidney and urology tract stone lead to fewer deaths, the long-term side effects like the recurrent of stone formation, kidney failure and uremia still can hurt the patients [3-5]. Therefore, it is of crucial importance to find those prone to the disease [31]. Hence, taking into account that there is no accurate information in our society about how much the patients know about the kidney stone and its causing factors; the present study was done with the purpose of determining the relation of kidney stone to occupation, weight gain, and the age of the patients and it was carried out at Amir al-Muminin Hospital in Zabol city in 96-97 [32].

Research Method

In this case-control study, the treatment group, 150 urinary tract stones patients recruited from Amir al-Muminin Hospital of Zabol that received definitive diagnosis on having stones. Continuous sampling is used to select the treatment group participants among adults aged 18-60; all of them had urology tract stone, and were bedridden in the urology, neurology and the lithotripsy departments of the hospital or attended the clinic. The recruitment criteria for the treatment group under study included the following: having urinary tract stones, being in the age rang 18-60, having healthy kidney operation, having no chronic disease, and granting the written informed consent. The criteria for the withdrawal of the subject from the study included drug abduction, having a chronic disease or cancer, and suffering one kidney loss. Along with the statistical population, 150 individuals, aged 18-60, were recruited as control group that had no urinary tract stones but attended the hospital. All the criteria applied for the recruitment and withdrawal of the study subjects in treatment group also used in control group except that control group subjects had no symptoms of suffering urology tract stones and no medical history on kidney stone disease and lithotripsy. After elaborating the purpose of the study to participants and receiving their written informed consent, the informational questionnaire about the disease filled in through interview conduction with each of the patients under study. The information was collected then coded and was entered to SPSS statistical software. To calculate the frequency, mean and standard deviation of the variables in control and treatment group, descriptive statistic was used and to determine statistical differences between the different variables of the two groups T-test, Chi-Square test and Mann-Whitney test were employed.

To determine validity of data collection tools the content validity of questionnaire was tested through questionnaire distribution to 10 of the faculty members of Zabol Nursing and Midwifery Faculty; and reliability of tools was achieved through T-test with the correlation coefficient of 0.99.

Findings

Finding of this research showed that among patients suffering the kidney stone disease, 31-40 year-old patients had the highest (56/1%); and patients older than 50 had the lowest (2%) frequency value. In the control group the average age were 11/37 $\pm$ 36/75 and the highest frequency relates to age range 18-40. Average age of the treatment group was higher than the control group and Independent Sample T-test showed a significant difference between patients suffering kidney stones in treatment group and the control group concerning the age variable. In both treatment and control group most of the subjects were males with frequency percentages of 61/3% and 51/3% respectively. On the basis of Chi-Square test results there was no significant difference between the two groups concerning the gender factor.

In treatment group the highest value of frequency (36/7%) belonged to patients with high school diploma and the lowest value (11/3%) belonged to those with primary education; in control group the highest value of frequency (61/3%) belonged to those with associate degrees and the lowest value (2/1%) belonged to those with primary education. based on Chi-Square test, there was a significant difference

between the groups concerning education level (p=0/00).

14 participants (9/3%) of kidney stone patients were single and 136 participants (90/7%) were married; and in control group 27 persons (18%) were single and 123 persons (86%) were married. Calculation based on Chi-Square test showed there was a significant difference between the two groups concerning the marital status. In this way that the number of married ones in treatment group was significantly higher (p=0/02).

In treatment group the highest value of frequency (48/7%) belonged to overweight patients and the lowest value (2/0%) belonged to underweight patients; and in control group the highest value of frequency (66/7%) belonged to patients with normal weight and the lowest (3/3%) value belonged to underweight patients. The average BMI was 3/29 ± 25/12. The average BMI in control group was 3/09 ± 24/01. Independent T-test calculations showed regarding the BMI there was a significant difference between treatment and control groups in a way that participants of the treatment group had higher BMI in respect to control group (p=0/0003).

In treatment group the highest value of frequency (22%) belonged to patients with 3 children and the lowest value (6/7%) belonged to those with 6 children; and in control group the highest value of frequency (25/3%) belonged to patients with 2 children and the lowest value (5/3%) belonged to patients with 4 children. According to Mann-Whitney test the findings showed that the two groups had a significant difference (p=0/001) in a way that the number of the children in treatment group was higher.

The highest frequency value (33/3%) in treatment group related to employed patients and the lowest frequency value (4%) related to unemployed patients. 42 subjects (28%) had family history of kidney stone disease; in control group the highest frequency value (36%) related to employed and the lowest frequency value (4/7%) to retired patients. 45 subjects (30%) had family history of the disease. There was no significant statistic differences between the two groups concerning the occupation (p=0/09) and family history (p=0/7). Moreover, there was no significant difference between the groups concerning height and amount of income (Table 1and 2).

Conclusion

Findings of this present study on the basis of Independent Sample T-test showed there was a significant difference between the patients of treatment group and the participant of control group regarding age. So that the average age of patients suffering kidney stones (12/60 ± 40/12) was above the average age of control group (11/37 ± 36/75) and it is indicative of the age increasing sample of kidney stones in patients; likewise, it is consistent with the study by Safarinedjad, et al. [7] that claimed incidence of kidney stones increases with ageing; furthermore, kidney stones expansion with ageing also occurred in Germany, Island, Italy, Greece, Turkey and the United States that is consistent with the present study [6]. In this same study the highest value of frequency occurred for patients aged 31-40; whereas, in study by Dehgani, et al. [32] the most probable age range for kidney stones were 20-50; in study by Tasian, et al. [34] the highest incidence of kidney stone was among people aged 15-19 that was inconsistent with the present study. The reason behind these contrasts can be justified by the fact that urology stones develop in different areas due to different environmental, metabolic and genetic factors. Fouladi, et al. [31] investigation on 150 patients recruited from Ardabil medical surgery centers concluded that most of urology stone patients were in the age range 30-50 that is consistent with this same study. In study by Mogdas, et al. [35] the average age of kidney stone patients were 2/4 ± 45/7 where as, in the present study the average age of patients was lower.

Another finding of this research was the average weight of kidney stone patients were 10/85 ± 69/13 and in control group were 8/5 ± 66/30; also the average BMI in treatment group were 3/29 ± 25/12 and in control group were 3/09 ± 24/01; in treatment group the highest frequency value (48%) belonged to overweight patients and in control group the highest frequency value belonged to patients with normal BMI; Independent Sample T-test and Mann-Whitney test showed there was a significant difference between the two groups concerning BMI that indicates urology stones are significantly relevant with weight gain and obesity; also in studies by Walter, et al. [36], Asplin, et al. [37], Lotan, et al. [38], Ramila, et al. [6], Ahmed, et al. [39], Scales, et al. [40], Scales Jr, et al. [41], Safrinedjad, et al. [7], Mogadas, et al. [35], Shirazi, et al. [42] the BMI increase was in line with urology stones expansion and that is consistent to this same study [43]; also Sarica, et al. [44] in their research showed obesity increases the amount of stone constituents elements in urine that is consistent to our study.

Most of the subjects under study in treatment and control group were males with frequency value of 61/3% and 51/3% respectively. The present research showed that on the basis of Mann-Whitney test there was no significant difference concerning the gender between kidney stone patients and control group. Different studies have contrasting results in regard with gender factor as in Tasian, et al. [33] female gender was the risk factor for kidney stone formation; also, in study by Leiske et al. on 43545 kidney stone patients in India, women had more stones than men [34]. In study by Mogadas, Trinchieri [45], Scales, et al. [40], Ramila[46], male gender indicated to be the risk factor for kidney stone formation. In study by Scales and Kourti [41] and Morovati men had more kidney stones than women.

In treatment and control group (33/3%) and (36%) respectively regarding occupation the highest value belonged to employed patients and there was no significant difference between the two groups in this regard and this was consistent with Mogadas study [35] and Fouladi [31] but it is inconsistent with Walter study [36] that indicated urology stones prevalence in employed individuals.

Table 1. Treatment and control group age comparison.

Variable	Group	Mean	Sd	T	Df	P
BMI	Treatment	40/12	12/60	2/43	298	0/016
	Control	36/75	11/37			

Table 2. Treatment and control group BMI comparison.

Variable	Group	Mean	Sd	T	Df	P
BMI	treatment	25/12	3/29	2/99	298	0/003
	control	24/1	3/09			

42 patients (28%) of treatment group and 45 patients (30%) of control group had kidney stone family history. Regarding family history there was no significant difference between the two groups that was consistent with Fouladi study. However, in studies by Walter, et al. [36], Mogadas, et al. [35], Koper and Jori[17], Safarinedjad, et al. [7], Lotan, et al. [37] kidney stone family history was significantly correlated with the disease. In most of the researches positive kidney stone family history is recognized to be highly correlative with prevalence and relapse of the stones. Researches point out positive family history increase the risk of kidney stone formation two times as much [42]. In study carried out by Anatole, et al. [43] it was reported an increased risk of kidney stone disease in first-degree relatives.

In treatment group, the highest frequency value (36/7%) related to patients with high school diploma and in control group the highest frequency value (61/3%) related to patients with associate degrees. Based on Chi-Square test, there was a significant difference between the groups regarding the education level in a way education level was lower in treatment group than in control group and this was consistent with Shirazi [42] and Morovati [47]. Krijer et al. in a case-control study stated that higher education correlates with low risk of kidney stone formation; the recognized probable reason was that different eating diets and behavioral routines were formed through raised awareness of individuals with higher education; this was consistent with our study [48].

In treatment group, 136 patients (90/7%) and in control group 123 participants (86%) were married. Based on Chi-Square test, there was a significant difference between the groups in regard with marital status in a way that being married had a positive correlation with the risk of kidney stone formation.

There was a significance difference between the two groups concerning the variable, the number of children, as the treatment group had more children and the other studies didn't address the issue: correlation of the kidney stone formation with the number of children. Perhaps one of the reasons the number of children correlates with risk of kidney stone formation is that when parents are busy nurturing their children have less time and attention to attend to their own eating diets and behavioral routines. Significant correlation is also observed, in the study by Morovvati, between the number of the family members and individuals' kidney stone preventive behavior [47].

It is worth mentioning that in the present study there was no significant difference between the height and income variables in the groups. This was consistent with study by Shirazi [42] and Mogadas [35].

In general, finding of the study showed that age range 30-40, weight gain, BMI, low education level, number of children, marital statues correlates with risk of kidney stone formation [48].

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References

1. Ketabchi A, Azizolahi GH (2008) Prevalence of symptomatic urinary calculi in Kerman, Iran. Urol J 5: 156-160.
2. Worcester E, Coe F (2008) Nephrolithiasis. Prim Care 35: 269- 369.
3. Anderson RA (2002) Complementary approach to urolithiasisprevention. World J Urol 20: 294-301.
4. Anatol T, Pinto Pereira L, Simeon D, Sawh L (2003) Riskfactors for urinary tract calculi in Trinidad. Trop MedInt Health 8: 348-353.
5. Stamatelou KK, Francis ME, Jones CA, Nyberg LM, Curhan GC (2003) Time trends in the reported prevalence of kidney stones in the United States: 1976–1994. Kidney Int 63: 1817-23.
6. Romero V, Akpinar H, Assimos DG (2010) Kidney stones: A global picture of prevalence, incidence, and associated risk factors. Rev Urol 12: 86-96.
7. Safarinejad MR (2007) Adult urolithiasis in a population-based study in Iran: prevalence, incidence, and associated risk factors. Urol Res 35: 73-82.
8. Basiri A, Shakhssalim N, Khoshdel A, Pakmanesh H, Radfar M (2011) Drinking water composition and incidence of urinary calculus introducing a new index.Iran J Kidney Dis 5: 15-20.
9. Erbagci A, Erbagci AB, Yilmaz M, Yagci F, Tarakcioglu M, et al. (2003) Pediatric urolithiasis evaluation of risk factors in 95 children.Scand J Urol Nephrol 37: 129-133.
10. Arjmand M (2005) Harrison's Principles of Internal Medicine. Casper D (1st edn) Tehran: Nasl Fardapress pp. 257-260.
11. Lineman JE, Smith LH, Woods JR, Newman DM (1989) Urinary Calculi: ESWL endourologyand medical therapy. In: Lingeman JE, Smith LH, Woods JR, Newman DM. UreteralCalculi (3rd edn) Philadelphia: Lea and Febiger, pp. 192-205.
12. Parmar MS (2004) Kidney stone. BMJ 328: 1420.
13. Erbagci A, Erbagci AB, Yilmaz M, Yagci F, Tarakcioglu M, et al. (2003) Pediatric urolithiasis evaluation of risk factors in 95 children.Scand J Urol Nephrol 37: 129-133.
14. Pearle MC, Patrin AW, Peter CA (2007) Urinary Lithiasis. In: Wein AJ, Kavoussi LR, Novick AC. Campbell-Walash Urology (3rd edn). Saunders, pp. 1363-1525.
15. Worcester E, Coe F (2008) Nephrolithiasis. Prim Care 35: 369-391.
16. Saxena A, Sharma RK (2010) Nutritional aspect of nephrolithiasis. Indian J Urol 26: 523-30.
17. Johri N, Cooper B, Robertson W, Choong S, Rickards D, et al. (2010) An Update and Practical Guide to Renal stone Management.Nephron Clin Pract 116: 159-171.
18. Borghi L, Schianchi T, Meschi T, Angela Guerra, Franca Allegri, et al. (2002) Comparison of two diets for the prevention of recurrent stones inidiopathic hypercalciuria. N Engl J Med 346: 77-84.
19. Robertson WG, Heyburn PJ, Peacock M, Hanes FA, Swaminathan R. (1997) Effect of high animal protein intake on the risk ofcalcium- stone formation in the urinary tract. J Clin Sci 57: 285- 8.
20. Kerstetter JE, Brien KO, Insogna K (2003) Low protein intake: the impact on calcium and bone homeostasis inhumans. J Nut 133: 855-61.
21. Menon M, Resnick M (2007) Urinary lithiasis: Etiology, diagnosis and medical management.
22. Khan SR, Thamilselvan S (2000) Nephrolithiasis: a consequence of renal epithelial cell exposure tooxalate and calcium oxalate crystals. Mol Urol 4: 305-12.
23. Grases F, Prieto RM, Gomila I, Sanchis P, Costa-Bauzá A (2009) Phytotherapy and renal stones: therole of antioxidants. A pilot study in Wistar rats. Urol Res 37: 35-40.
24. Moatar F (1997) History of herbal medicine. Faculty of pharmacy. Isfahan university of medicalsciences
25. Shafizadeh H (2002) Medicinal Plants in Lorestan. In: Lorestan University of medical science (1st edn) Haian, Iran.
26. Lineman JE,Smith LH, Woods JR, Newman DM. Urinary Calculi: ESWL endourologyand medical therapy in: Lingeman JE, Smith LH, Woods JR, Newman DM. UreteralCalculi. 3nd ed. Philadelphia: Lea and Febiger, 1989; 192-205.
27. Tanagho EA, McAninch JW (2000) Smith's General Urology (5th ed) McGraw-Hill, NewYork.
28. Tiselius HG (2003) Epidemiology and medical management of stone disease. BJU Int91: 758-767.
29. Taylor EN, Stampfer MJ, Curhan GC (2005) Obesity, weight gain, and the risk of kidney stones.JAMA 293: 455-462.
30. Fouladi N, Alimohamadi H, Hosenkhani A, Amani F, Ghoshadehroo R (2012) Relationship between Types of Urinary Tract Stones and it's Probably Risk Factors

in Patients Referred to Therapeutic-Surgery Centers in Ardabil City (2008-2009). J Ardabil Univ Med Sci 12: 59-67.

31. Stoller ML, Bolton DM (2004) Urinary StoneDisease. In: Tanagho EA, McAninch JW (eds)Smith's General Urology. (16th ed) Mc Graw Hill, New York, pp. 256-290.
32. Dehghani V A, Moein M R (2000) A demographic study of patients with urinary stone disease referred to the Shahid Rahnamoud Hospital, 1994-98. Feyz 4: 88-93.
33. Tasian GE, Ross ME, Song L, Sas DJ, Keren R, et al. (2016) Annual Incidence of Nephrolithiasis among Children and Adults in South Carolina from 1997 to 2012. Clin J Am Soc Nephrol 11: 488-496.
34. Lieske JC, Andrew D. Rule, Amy E. Krambeck, James C, Williams Eric J, et al. (2014) Stone Composition as a Function of Age and Sex. Clin J Am Soc Nephrol 9: 2141-2146.
35. Moghaddas F, Yousefi F, Bagheri F, Mohammadi M, Mahdian Arefi F, et al. (2015) The Effect of the Amount and Type of Liquid Intake on Kidney Calculi: A Case-Control Study. Irje 11: 54-60.
36. Sofia NH, Walter TM (2016) Prevalence and risk factors of kidney stone. Glob J Res Anal 5: 183-187.
37. Asplin JR (2009) Obesity and Urolithiasis. Adv Chronic Kidney Dis 16: 11-20.
38. Lotan Y, Daudon M, Bruyère F, Talaska G, Strippoli G, et al (2013) Impact of fluid intake in the prevention of urinary system diseases: a brief review. Curr Opin Nephrol Hypertens 22: S1-S10.
39. Ahmed MH, Ahmed HT, Khalil AA (2012) Renal Stone Disease and Obesity: What is Important for Urologists and Nephrologists? Ren Fail 34: 1348-1354.
40. Scales CD, Curtis LH, Norris RD, Springhart WP, et al. (2007) Changing gender prevalence of stone disease. J Urol 177: 979-982.
41. Scales Jr C, Smith A, Hanley J, Saigal C (2012) Prevalence of kidney stones in the United States. Eur urol 62: 160-165.
42. Shirazi F, Shahpourian F, Houshiarrad A, Hosseini F, Khachian A, et al. (2009) Association between dietary factors and renal stones in adults. Ir J Nut Sci Food Techn 4: 57-65.
43. Leonetti F, Dussol B, Berthezene P, Thrion X (1998) Dietary and urinary risk factors for stones in idiopathic calcium stone formers compared with healthy subjects. Nephrol Dial Transplant 13: 617-622.
44. Sarica K, Altay B, Erturhan S (2008) Effect of being overweight on stone-forming risk factors. Urology 71: 771-774.
45. Trinchieri A (2008) Epidemiology of urolithiasis: an update. Clin Cases Miner Bone Metab 5: 101-6.
46. Ramello A, Vitale C, Margella M (2000) Epidemiology of nephrolithiasis. J Nephrol 13: 65-70.
47. Morowatisharifabad M, Pirouzeh R, Hemayati R, Askarishahi M (2015) Preventive Behavior of ecurrent Kidney Stones and Its Relationship with its Knowledge and Receiving it. Monthly Journal of Yazd University of Medical Sciences 2: 85-91.
48. Bouya S, Balouchi A, Rafiemanesh H, Hesaraki M (2018) Prevalence of Chronic Kidney Disease in Iranian General Population: A Meta-Analysis and Systematic Review. Therapeutic apheresis and dialysis.