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Original Article

Relationship between Health-Promoting Lifestyle and Quality of Life in Urolithiasis Patients

Iman Nosratabadi[1], Saba Jahansaz[2], Elahe Norouzimoghaddam[2], Naimeh Pourramzani[1], Solmaz Saeidi[2,3]* and Ehsan Kazemnejad leily[4]

1. Department of Nursing, Sirjan School of Medical Sciences, Sirjan, Iran
2. Student Research Committee, Department of Nursing, Khalkhal University of Medical Sciences, Khalkhal, Iran
3. Shahid Besheshti School of Nursing and Midwifery, Guilan University of Medical Sciences, Guilan, Iran
4. Department of Medical Surgical Nursing, Guilan University of Medical Sciences, Guilan, Iran

Abstract

Background: Urolithiasis is one of the most common urological diagnoses. It represents a significant clinical and economic challenge for health care systems and affects a patient's Quality of Life (QOL). Lifestyle is a unique configuration of everyday behavior, which largely depends on the QOL available. As QOL should be an important outcome of urolithiasis management and there are few studies about that in these patients, this study was aimed at investigating the relationship between the health-promoting lifestyle and the QOL in urolithiasis patients.

Methods: This cross-sectional study was conducted in Rasht hospitals. 300 patients with urinary tract stones participated in this study. The questionnaire included three parts of demographic variables, the SF-12 QOL questionnaire and the health-promotion lifestyle profile. The collected data were analyzed using T-test, ANOVA, Pearson and linear regression. In all the variables, the significance level was considered $p<0.05$.

Results: The overall QOL score was 36.96±15.10 and the overall score for health-promoting lifestyle was 2.57±0.47 There was a significant relationship between the QOL and health-promoting lifestyle. Multivariate linear regression showed that health-promotion lifestyle, age and level of education were the predictors of QOL.

Conclusion: The present study demonstrated that a better lifestyle and a higher level of education can improve the QOL, therefore, to manage and prevent the recurrence of the disease, improving the lifestyle and increasing awareness regarding the disease is necessary.

Keywords: Cross-sectional studies, Humans, Life style, Linear models, Quality of life, Urolithiasis

*** Corresponding author**
Solmaz Saeidi, MD
Department of Nursing, Khalkhal University of Medical Sciences, Khalkhal, Iran
Tel: +98 902 1597926
Email: solmazsaeidi@chmail.ir

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Introduction

Urolithiasis is one of the most common urological diagnoses (1). Urolithiasis leads to renal failure, especially if it is not adequately diagnosed and treated and this is expected to increase (1). The worldwide prevalence, incidence and composition of calculi vary and have changed in the last several decades, with prevalence ranging from 7% to 13% in North America, 5%–9% in Europe, and 1%–5% in Asia (2), Furthermore, at least 50% of the patients will experience a stone recurrence within 10 years (3). Calcium nephrolithiasis, in combination with oxalate or, less frequently, phosphate is by far the most common form, representing 75% of all kidney stone phenotypes. Conversely, the prevalence of uric acid nephrolithiasis does not exceed 10% (4). Stone incidence is heavily influenced by geographical, climatic, ethnic, dietary, and genetic factors (5) and continuously rising due to social, economic, nutritional, and environmental changes in both developing and developed countries (6)

Urolithiasis is typically associated with renal colic. Although renal colic, the most common presentation of kidney stones is short-lived, still the acute event is associated with frequent hospital evaluation, emergency department visits, hospitalization, and surgical intervention causing depression, stress, absence from workdays, or impaired work performance (7). It represents a significant clinical and economic challenge for health care systems. In the US alone, over $2 billion is spent annually on treatment and care for this patient group (1). It is estimated to exceed $4 billion in the United States by 2030 (3). As well as the detrimental effects on a patient's Quality of Life (QOL) (3) a part from the physical, emotional and financial burden placed on patients, urolithiasis has also been associated with a significant negative impact on patients' Health-Related Quality of Life (HRQOL) (8) in several spheres, including work, financial expense, and lifestyle. Therefore, it has been suggested that HRQOL should be an important outcome of urolithiasis management (9).

QOL is an interdisciplinary concept, which has many meanings. Many different researchers deal with it, to mention only social scholars such as sociologists, philosophers, economists, statisticians to whom the state of health is of minor importance, as well as scholars from the field of medicine and psychology to whom the QOL depends on one's health. Health is understood as a positive state that can be assessed subjectively (10).

Lifestyle is connected to the QOL and it can be shaped not only by oneself. It can also be the result of conscious decisions of people who want to improve themselves and society. Lifestyle is a unique configuration of everyday behavior, which largely depends on the QOL available (10). Lifestyle can influence the risk of stone formation. Overweight and obese individuals have a higher risk of developing idiopathic calcium oxalate residues in the kidney resulting in renal stone formation. Furthermore, poor dietary habits such as a high salt diet, a high-protein diet, and extreme fasting could contribute to the increasing incidence of renal stones. The relationship between water intake and kidney stones has been addressed by several studies as hydration, which is considered to be a major determinant of stone formation (11).

Hence, this study aimed to study the relationship between health-promoting life style and QOL in urolithiasis patients. Hopefully, this study may facilitate the prevention of urinary stones formation and promotion of urolithiasis patients' QOL in the future.

Materials and Methods

The present study is cross-sectional that examines the health promotion lifestyle and QOL in urolithiasis patients and their relationship. The statistical population is patients with urinary tract stones referred to the hospitals of Rasht. Patients who had a definitive diagnosis of urolithiasis through ultrasound and radiology and were willing to participate in the study were included but events that disrupt health-promoting lifestyle, such as the death of family, damage or loss of source of income, the occurrence of other chronic diseases in the last 3 months and use of special diets during the research were the exclusion criteria. Before completing the questionnaires, the participants completed conscious consent form and they were assured that their information will remain confidential and they can withdraw from the study if they do not want to participate in this study.

Sampling was done between September and October 2021 based on the available sampling method. According to the Mirghafourvand *et al* (12), the mean and standard deviation of the lifestyle score was 2.2 (0.3), sample size with the following equation was estimated to be 276 people. With a probability of a 10% drop, approximately 300 samples were considered (d=0.002).

$$n = \frac{\sigma^2 Z^2_{1-\frac{\alpha}{2}}}{d^2}$$

The instrument used in the present study was a three-part questionnaire. The first part included demographic variables such as age, gender, Body Mass Index (BMI), past and familial urolithiasis history, level of education, monthly income level and vocation. The second part was the Health Promotion Lifestyle Profile II (HPLP-II) questionnaire which includes 52 questions and six dimensions of nutrition, physical activity, spiritual growth, health responsibility, stress management and interpersonal relationships. Its Persian validity and reliability have been verified by Mohammadi Zeidi and the internal correlation and Cronbach's alpha above 0.82 have been confirmed (13). The response is done by nurses on a 4-point Likert scale, and the scoring of this tool is between 1-4. The third part was the SF-12 QOL questionnaire, abbreviated form SF-36 which includes 12 questions and eight dimensions of physical activities, social activities, usual role activities, bodily pain, general mental health, usual role activities, vitality, and general health perceptions. Its validity and reliability have been verified by Montazeri and the internal correlation and Cronbach's alpha above 0.7 have been confirmed (14). The response is done by nurses on a 4-point Likert scale and the scoring of this tool is between 12-48.

The collected data were analyzed using SPSS version 22 (IBM Corp., Armonk, NY, USA). Descriptive results were presented using descriptive statistical methods (mean, standard deviation, and percentage). After examining the normality of the data using Kolmogorov-Sminrov and due to the normality of data independent, T-test was used to compare the mean in the two groups and the ANOVA test was used to evaluate the mean in more than two groups. If the ANOVA test was significant, the independent T-rest was used for pairwise comparison (gender, history of past urolithiasis, history of family urolithiasis) and the Pearson test was used for the relationship

Table 1. Results of descriptive statistics and mean comparison tests

Variables	Category	N (Percent)	Mean±SD	p-value
Gender	Female	125(41.7)	31.81±7.05	0.091*
	Male	175(58.3)	32.10±5.90	
History of past urolithiasis	Yes	213(71)	28.21±6.05	0.033*
	No	87(29)	31.43±7.43	
History of family urolithiasis	Yes	177(59)	32.74±7.24	0.152*
	No	123(41)	32.34±8.80	
Vocation	Housewife	76(25.3)	29.30±6.64	0.081**
	Self-employment	136(45.3)	30.01±6.32	
	Employee	88(29.3)	30.21±6.82	
Level of education	Illiterate	25(8.3)	28.43±5.05	0.042**
	Under diploma	82(27.3)	28.36±5.53	
	Diploma	94(31.3)	29.01±6.06	
	Academic	99(33)	31.26±7.12	
Monthly income	Very low	101(33.7)	29.23±5.98	0.027**
	Low	105(35.7)	29.76±5.07	
	Medium	84(28)	29.45±5.65	
	High	8(2.7)	32.56±7.97	

*Independent T-test, **ANOVA

Table 2. Health-promoting lifestyle score and its dimensions

Dimensions of health promoting life style	Nutrition	Health responsibility	interpersonal relations	Stress management	Physical activity	Spiritual growth	Overall health promoting life style
Mean±SD	2.84±0.46	2.92±0.47	2.03±0.64	2.51±0.49	2.31±0.45	2.79±0.45	2.57±0.47

Table 3. Quality of life score and its dimensions

Dimensions of quality of life	physical activities	Mental health	Physical role activities	Emotional role activities	Bodily pain	social activities	Vitality	General health perceptions	Overall quality of life
Mean±SD	37.76±15.68	40.32±14.34	38.20±15.60	29.13±16.01	28.40±15.65	27.08±15.03	40.40±16.10	37.69±16.87	36.96±15.10

Table 4. Results of quality of life correlation test with Health-promoting lifestyle

Dimensions of health promoting life style	Nutrition	Health responsibility	interpersonal relations	Stress management	Physical activity	Spiritual growth	Total health promoting life style
* r(p-value)	0.0231(0.323)	0.421(0.012)	0.010(0.231)	0.251(0.041)	0.324(0.025)	0.001(0.412)	0.441(0.012)

*Pearson test

Table 5. Results of simple and multivariate linear regression of health promoting life style and socio-demographic variables with quality of life

Variables	Simple linear regression		Multivariate linear regression*	
	Beta	p-value	Beta	p-value
Health-promoting lifestyle	0.375	0.001	0.339	0.001
Dimensions:				
Health responsibility	0.257	0.036	0.197	0.043
interpersonal relations	0.144	0.046	0.102	0.041
Nutrition	0.238	0.042	0.202	0.048
Physical activity	-0.255	0.039	-0.178	0.081
Stress management	-0.011	0.058	-0.010	0.057
Spiritual growth	0.127	0.065	0.115	0.071
Age	-0.269	0.001	-0.186	0.003
Gender	0.001	0.997	0.028	0.661
BMI	-0.041	0.469	0.030	0.582
History of past urolithiasis	0.031	0.588	0.010	0.849
History of family urolithiasis	-0.119	0.039	-0.076	0.157
Level of education	0.235	0.001	0.138	0.040
Vocation	0.032	0.571	-0.031	0.689
Monthly income	0.066	0.249	0.008	0.904

*R- square: 0.318; Body Mass Index (BMI)

between health-promoting lifestyle and QOL. Linear regression was utilized to examine the correlation between the dependent and independent variables. In all the variables, significance level was considered $p<0.05$.

Results

The results of the study showed that among the 300 participants, 58.3% were male and 41.7% were female. Their mean age was 46.15±14.69 and their BMI was 26.88±4.30. Other socio-demographic

characteristics are shown in table 1.

The overall score for health-promoting lifestyle was 2.57±0.47 and the highest score was in the "health responsibility" dimension (2.92±0.47) and the lowest score was in the dimension of "interpersonal relations" (2.03±0.64) (Table 2). The overall QOL score was 36.96±15.10 and the highest score was in dimension of the "vitality" (40.40±16.10) and the lowest score was in the "bodily pain" (28.40±15.65) dimension (Table 3). It means that the health-promoting lifestyle and QOL from the perspective of the participants in this study was moderate to weak.

Pearson test demonstrated that there is a significant relationship between the QOL and health-promoting lifestyle (p-value: 0.012, r: 0.441), stress management (p-value: 0.041, r: 0.251), physical activity (p-value: 0.025, r: 0.325) and health responsibility (p-value: 0.012, r: 0.421) dimensions (Table 4).

In simple linear regression, some factors such as health promotion lifestyle and some of its dimensions such as health responsibility, interpersonal relations, nutrition, physical activity, age, history of family urolithiasis and level of education became significant as predictors of QOL, but after multivariate linear regression, health-promotion lifestyle and health responsibility, interpersonal relations and nutrition dimensions, age and level of education remained in the model. 31.8 percent of QOL is predicted by these variables (Table 5).

Discussion

This study aimed to investigate the relationship between health promotion lifestyle and QOL in urolithiasis patients. The results indicated that the overall score of lifestyle was moderate and between dimensions, the higher score was related to the health responsibility and the lowest was related to interpersonal relations. In Zhuo's study that was conducted in China to determine the relationship between diet and lifestyle with urinary tract stones, diet and lifestyle were the contributing factors (14).

In Michishita's study in China, maintaining an unhealthy lifestyle concerning habitual moderate exercise and late-night dinner significantly increased the incidence of Chronic Kidney Disease (CKD) *vs*. maintaining a healthy lifestyle. In addition, changing from a healthy to an unhealthy lifestyle and maintaining an unhealthy lifestyle concerning bedtime snacking also significantly increased the incidence of CKD *vs*. maintaining a healthy lifestyle (15). Therefore, to improve the treatment process, along with other drug treatments, behavior modification and health promotion lifestyle also benefited these patients.

As shown in the results, the average QOL scores, as estimated by the SF-12 questionnaire, were weak. In Bryant *et al*'s study examining QOL scores in patients with all forms of urolithiasis revealed a similar pattern (16). In this manner, Parr *et al*'s study reported that the average QOL scores, by the SF-36 questionnaire, were lower than the general Australian population (17). In addition, the results of Patel's study demonstrated an overall decrease in the QOL of stone formers in pain and physical function (18). Urolithiasis is a common disease with a life time prevalence between 10-15% and is increasing in incidence. Many of the patients that suffer from urolithiasis will undergo multiple stone episodes with recurrence approaching 100% at 25 years. Up to 2 million emergency department visits a year are related to urologic stone disease. For many people, urolithiasis is a chronic disease resulting in significant morbidity (18), all of which can affect the person's QOL.

The present study showed that by improving the lifestyle, the QOL is also improved. In a meta-analysis study of Delgado, significant improvements were found in the physical dimensions of the quality of scores for subjects in the active intervention compared to the group that received general lifestyle information. Mental health-related QOL was also significantly improved in the intervention group compared with the control group, therefore a lifestyle intervention significantly improves the QOL in all its domains (19). In Bhat's study, there was a relationship between HRQOL and lifestyle factors which include daily life physical activity, smoking, screen-based media, having breakfast and sleep time. The results indicate that lifestyle factors affect the HRQOL among young adults (20). A healthy lifestyle might improve overall health and vice versa inappropriate lifestyle effect overall health. Literature reviews are proof of the suggested nursing theory by changing lifestyle and progressively gaining healthy habits

which consider important indicators in all QOL domains (21).

In this study, with increasing age, QOL was reported low. Similar to this study, in breast cancer patients, the age group 21 to 50 years has shown better physical and psychological health respectively. The survivors of 60 years have shown the lowest life activities and low QOL (22). And a study showed that age was one of the major predictors of a marked reduction in HRQOL (23). It seems that in old age, due to the limitations created in physical and motor conditions, physical activity and exercise are associated with problems, and it can be inferred that having a good physical condition can be one of the facilitating factors (24).

This study showed that high education level was one of the predictors of a better QOL. In a study about the Health-related QOL after ischemic stroke, patients who had low education had a lower QOL (23). A study reported that hypertension patients with higher education levels demonstrated better health-related QOL (25). A possible explanation for this is that people with higher educational levels tend to have higher levels of health literacy, such as reducing salt intake, quitting smoking, restricting alcohol, and complying with medical advice, which is considered helpful for improving HRQOL (26).

Among the limitations of the study, it can be mentioned that the study is descriptive, the sampling method was readily available, and nutritional and environmental factors have not been investigated in detail, but a few studies to date have investigated this in people with urolithiasis, so for further investigations and to know various other factors on the occurrence of this disease, it is better to conduct more studies with more samples.

Conclusion

The present study reported that the health-promoting lifestyle score in patients with urinary stones is around the average score and the quality-of-life score is below the average. A better lifestyle and a higher level of education can improve the QOL, therefore, to manage and prevent the recurrence of the disease and improve the QOL of these patients, which is a common phenomenon, it is necessary, in addition to medical treatments, to take necessary measures to modify and improve the lifestyle and increase awareness to improve the health of these patients.

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Conflict of Interest

There was no conflict of interest in this manuscript.

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