FACTORS RELATED TO DIETARY BEHAVIORS IN VIETNAMESE PERSONS WITH RECURRENT KIDNEY STONE POST-OPERATION

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ABSTRACT: Urinary stone disease is one of the most common afflictions of modern society accounting for nearly 1 million visits to emergency departments (EDs) in the United States annually, although it has been described since antiquity. Diet behavior is an important factor in this disease because the structures of the stones are normally based on the diet which the patients took. Therefore, the purpose of this study was to examine the dietary behaviors, and to examine the relationships between factors and dietary behaviors among Vietnamese patients with recurrent kidney stone post-operation. A cross-sectional descriptive correlation design was applied to data collected from 112 participants treated at two urological surgical departments of Viet Duc Hospital and Military Medical no.103 Hospital from October to December 2013. All participants completed five section self-administered questionnaires. Data were analyzes using percentages, means, and standard deviation. Pearson's correlation coefficient was applied to determine the relationships among the study variables. The results show that age and body mass index were not significantly correlated with dietary behaviors. However, gender was negatively associated with dietary behaviors ($r = -.34$; $p < .05$). There were strong significant relationships between perceived self-efficacy of dietary behaviors, perceived benefits of dietary behaviors, perceived barriers of dietary behaviors and dietary behaviors, in which perceived benefits had the strongest correlation with the dependent variable ($r = 0.83$; $p < .05$). Based on the findings of this study, clinical nurses in the Urological Surgical Department should counsel patients about the benefit of dietary changes and prepare a discharge plan to promote healthy dietary behavior before patients return to their community.

Keywords: Kidney stone recurrence, Dietary behaviors, Post-operation

INTRODUCTION

The prevalence of renal stones is approximately 1 - 5% worldwide with a recurrence rate of 50%. Kidney stones affect a large percentage of the population with a life-time prevalence of 12% in men and 6% in women [1]. In Vietnam, although no official statistics are available, the prevalence of renal stones is about 2-3%, and 40-60% of those are kidney stones [2]. According to the statistics of the Urology Department of the Military Medical Hospital 108, the proportion of patients having kidney stones was more than 40% of all admissions in 2011. Stone recurrence is frustrating for patients who have made changes in their lifestyles and yet still experience stones.

After being advised by a physician to avoid food with calcium and to reduce amount of salt, Vietnamese patients will usually try to set strict rules for their diet. Nevertheless, some studies noted that it is necessary to provide a limited amount of calcium, or salt [3, 4] to maintain normal metabolic processes in the body. Findings of Dang and colleagues [2] showed that the group with recurrent kidney stones kept to a diet high in rich animal protein and calcium even though they knew about stones prevention. In addition, it was found that about 75% of patients could avoid a stone recurrence with general immunity consisting of

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change in dietary behavior [4]. Thus, dietary behavior plays a major role in post-operation patients as well as primary urinary stone prevention.

Pender stated "perceived competence or self-efficacy to execute a given behavior increases the likelihood of commitment to action and actual performance of the behavior" [5]. In addition, behavioral outcomes are affected by a number of factors, including personal characteristic and behavioral cognition. Each individual has a different background, perceived self-efficacy, perceived barriers and perceived benefits, such that the behavioral outcomes cannot be easily predicted. Empirical evidence shows that perceived self-efficacy and perceived benefits of action are predictive of healthy diets among 261 Korean-American adults in a study conducted by Shin [6].

In the nursing profession, nurses not only give patients medication and clean wounds daily, they also educate patients on how to prevent recurrence of kidney stones. To develop appropriate nursing interventions for kidney-stone patients, it is important to understand kidney stone patients' dietary behaviors and the factors that influence this behavior. The research problem in this study was that, when Vietnamese patients with kidney stones did not change their behavior, especially in diet, they were likely to suffer from recurrent kidney stones requiring surgery. Therefore, the purpose of this study, within the context of Pender's Health promotion model, was to examine dietary behavior in post-operation Vietnamese persons with kidney stones and also examine the relationships between perceived self-efficacy of dietary behaviors, perceived benefits of dietary behaviors, perceived barriers of dietary behaviors and dietary behaviors among this population. The results could help nurses to have more evidence to provide dietary counseling to persons with renal stones. They may be baseline information for health professionals to develop health education programs for these patients.

MATERIALS AND METHODS

A cross-sectional descriptive correlation design was used to explore the theoretical linkage among potential factors of personnel in post-operation Vietnamese patients with kidney stones. Generally, a descriptive correlation design facilitates examination of inter-relationships in a past or current situation. A total 112 participants from the Urological Surgical Departments of Viet Duc Hospital and the 'Military Medical Hospital no. 103' were recruited for this study. The sample size was determined using the PASS program with $\alpha = 0.05$, a 90% power, and moderate effect size of 0.3 [7] The inclusion criteria were: (1) being inpatients; (2) Representing both genders aged 18 to 59 years old, with a diagnosis of recurrent kidney stones (including new kinds of kidney stone formation in recurrent cases); (3) Having had at least one operation (any kind of treatment such as extracorporeal shock wave lithotripsy, percutaneous nephrolithotomy, ureteroscopy, or traditional operation); and (4) Being free from chronic illness, such as blood disease, lupus erythemotosis, hypertension, peptic ulcer, and malignancy. The study period was from October to December, 2013.

Instruments

Data collection used in this study consisted of a five-section, self-report questionnaire: (1) the Person Data Form focused on characteristics of: gender, age, weight, height, consumption of nutritional supplements, and time for operation; (2) the 11-item perceived self-efficacy of dietary behaviors; (3) the 14-item perceived benefits of dietary behaviors; (4) the 15-item perceived barriers of dietary behaviors; and the 19-item dietary behaviors. Each item of the questionnaire, except the personal data form, was rated on a five-point Likert scale, from 1 (no confidence/total disagree/never) to 5 (very high confidence/ totally agree/routinely). The questionnaire was firstly written in English, and then was translated into Vietnamese by the researcher. The questionnaire in Vietnamese version was also reviewed by two experts who are affluent in both English and Vietnamese languages. In this study, the content validity of the questionnaire was validated by four experts including two Thai and two Vietnamese experts. The reliability of each questionnaire's section was tested to establish internal consistency for each questionnaire (Cronbach's $\alpha > .80$), using 30 persons who had the same characteristics as the sample.

Data were analyzed using descriptive statistics such as frequency distributions, percentages, means and standard deviation. Also, Pearson's correlation coefficient with a statistical level at $\alpha = 0.05$ was performed to determine the relationship between independent variables and dependent variables.

RESULTS

In this study, there were 50.9% female and 49.1% male patients. The mean age was 50.2 years, (SD 8.4) and the majority of the personnel were in the 51-59 age-group (61.6%). Additionally, nearly 95%

Table 1 Frequency distribution of dietary behaviors

Dietary behaviors	Routinely	Frequently	Sometimes	Seldom	Never
	N (%)	N (%)	N (%)	N (%)	N (%)
- I drink 8 - 10 cups of water	100 (89.3)	6 (5.4)	1 (0.9)	2 (1.8)	3 (2.7)
- I eat salty sauce and gravy	78 (69.6)	33 (29.5)	0 (0.0)	1 (0.9)	0 (0.0)
- I drink a cup of coffee or tea	61 (54.5)	44 (39.3)	4 (3.6)	3 (2.7)	0 (0.0)
- I eat small portions of red meat	42 (37.5)	59 (52.7)	11 (9.8)	0 (0.0)	0 (0.0)
- I eat a pack of peanuts or cashews, soybeans	13 (11.6)	47 (42.0)	33 (29.5)	18 (16.1)	1 (0.9)
- I drink a glass of beer or a cup of wine	13 (11.6)	23 (20.5)	14 (12.5)	15 (13.4)	47 (42.0)
- I eat a slice of bread, a pack of cereal, biscuits or crackers	10 (8.9)	26 (23.2)	43 (38.4)	26 (23.2)	7 (6.3)
- I add more salt to my meal at the table	5 (4.5)	49 (43.8)	31 (27.7)	20 (17.9)	7 (6.3)
- I eat animal intestinal organs such as pig liver, pig heart, …	3 (2.7)	29 (25.9)	32 (28.6)	30 (26.8)	18 (16.1)
- I eat 1-2 eggs	2 (1.8)	15 (13.4)	81 (72.3)	14 (12.5)	0 (0.0)
- I eat sweet potatoes, celery, leeks	0 (0.0)	36 (32.1)	65 (58.0)	11 (9.8)	0 (0.0)
- I drink one glass of fruit, lemon, or tomato juice	0 (0.0)	26 (23.2)	78 (69.6)	6 (5.4)	2 (1.8)
- I drink one glass of fruit juice such as orange or grapefruit juice	0 (0.0)	15 (13.4)	52 (46.4)	44 (39.3)	1 (0.9)
- I eat spinach, beetroot, eggplant	0 (0.0)	14 (12.5)	79 (70.5)	19 (17.0)	0 (0.0)
- I eat seafood such as fish, crab, shrimp	0 (0.0)	0 (0.0)	36 (32.1)	53 (47.3)	23 (20.5)
- I eat calcium citrate supplement with meals	0 (0.0)	0 (0.0)	19 (17.0)	41 (36.6)	52 (46.4)
- I eat a can of processed food such as processed meat, processed fish	0 (0.0)	0 (0.0)	16 (14.3)	27 (24.1)	69 (61.6)
- I take vitamin C or D	0 (0.0)	0 (0.0)	12 (10.7)	52 (46.4)	48 (42.9)
- I eat 1 small tub of yoghurt or high calcium milk	0 (0.0)	0 (0.0)	0 (0.0)	21 (18.8)	91 (81.3)

Table 2 Correlation matrix of selected factors and studied variables (N=112)

Variables	1	2	3	4	5	6	7
1. Age	1						
2. Gender	.212	1					
3. BMI	.063	-.353*	1				
4. Perceived self-efficacy	-.151	-.280*	-.007	1			
5. Perceived barriers	-.096	-.338*	.153	.616*	1		
6. Perceived benefits	.019	.254*	-.021	-.624*	.515*	1	
7. Dietary behaviors	-.031	-.341*	.053	.826*	.722*	-.717	1

Note: *p<.01

of patients were married, and the most common education level was high school (44.6%). One-fourth of cases were soldiers and 28.6% of patients were farmers. For the clinical characteristics, most (81.3%) of the patients had normal weight and 70.5% had undergone at least one kidney stone operation. Only ten patients had nutritional problems (8.9%).

The finding shows that 89.3% of patients drank water routinely (Table 1). Nearly a third of patients (28.6%) ate animal intestinal organs (e.g., pig liver or heart) once or twice a week. However, more than sixty percent (61.6%) of patients answered that they never ate a can of processed meat or fish. Most (69.6%) of patients eat salty sauces and gravy daily and (43.8%) add more salt at the table to their dishes. Lastly, 46.4 % patients indicated that they never ate calcium supplement with meals, and 81.3% of patients never ate a small tub of yoghurt or high calcium milk.

The results from the correlation analysis show that age was not correlated with overall dietary behavior score (Table 2). Meanwhile, gender was negatively associated and body mass index was slightly significantly correlated with the total dietary behavior score ($p<.05$). There was a strong significant relationship between perceived self-efficacy of dietary behaviors, perceived benefits of dietary behaviors, perceived barriers of dietary behaviors and dietary behaviors. Perceived benefits had the strongest correlation with the dependent variable ($r = 0.826$, $p<.05$)

DISCUSSION

From the results of this study, it can be seen that the participants had favorable dietary behaviors to prevent kidney stones such as drinking 8-10 cups of water daily, and avoid processed meat or fish (Table 1). An increase in fluid intake is routinely recommended for patients who have had kidney stones in order to decrease the likelihood of recurrence [8]. Higher fluid intake leads to increased urinary volume and, in turn, to a decreased concentration of lithogenic factors, presumably decreasing the rate of stone formation. Many patients ask what fluids are recommended, and which are prohibited. The simple answer is that water is the best, because it is cheap and safe. A key point is that the dilution of urine is necessary "24/7", or all day long, every day. In addition, decreased consumption of processed food is beneficial. There is more salt and sodium in processed foods because they have to have a longer shelf life. If the patients with kidney stones eat processed foods regularly, they cannot control the amount of sodium they consume. A high sodium intake leads to increased urinary calcium excretion independent of calcium reabsorption in the proximal tubule and along the loop of henle [8].

The findings of this study show that the cases still practiced poor dietary behavior despite health education interventions. For example, most of the patients ate salty sauce and/or gravy dishes or they added more salt at the table (Table 1). The reason might be almost patients were not used to reducing the amount of salts, they felt no delicious when enjoy the meals. Actually, the sodium in salt, when excreted by the kidneys, causes more calcium to be excreted into the urine. Additionally, excess salt in the diet results in a high urine pH and low urinary citrate. Therefore, salt restriction diminishes the risk of kidney stones. The goal of therapy should be a "no-added-salt diet" or the equivalent of 2g of salt per day or less [9].

Another problematic behavior is that more than four-fifths of patients in this study never ate high-calcium-milk yoghurt even though they had no calcium stone formation. This might be explained by patient misunderstanding that calcium should be avoided in every form to prevent kidney stones. Another possibility is that they had not been properly counseled by health workers, especially clinical nurses. Nevertheless, the benefit of calcium is not only for kidney stone prevention but also to maintain bone density. Especially, women need a higher amount of calcium during the menstrual period time monthly. People who form calcium oxalate stones are recommended to follow a daily 800mg -calcium diet [10]. Moreover, the data show that twice the patients with recurrent kidney stones had a low-calcium diet is compared to those with a low-protein, low-sodium diet. Because of fearing stone formation, the patients avoid every product related to calcium. Moreover, they had insufficient knowledge about dietary modification to prevent kidney stone disease due to they had only shared experience to the other patients in the same unit.

From the statistical analysis, this study found that age was not correlated with dietary behaviors (Table 2). This result is contrary to findings of previous studies. For instance, Wen [11] stated that the difference among the age groups is also associated with competency of self-care i.e., older age was associated with dependency on others. In addition, age was a significant predictor of diet behavior i.e., older adults showed a higher level of diet self-care compared to younger adults. The difference in this study could be In addition, Pender [5] showed that age is considered as one factor influencing eating behavior and also influences a person in healthy eating behavior due to physical ability changes such as metabolism even more slowly.

Meanwhile, gender was negatively correlated with dietary behaviors ($r = -0.341$, $p<.05$). However, the study of Unal [12] found that there was higher recurrent rate in males who had first-time treatment. On the other hand, Curhan [1] recommended that there may be a differential among dietary risk factors by age and gender because of the higher intake of dietary calcium, decreasing the risk of kidney stone formation in younger women.

Additionally, the results indicate that body mass index was not correlated with dietary behavior, which was consistent with Kahawong's study [13]. It is presumed that the reason that BMI was a significant predictor in this study was due to the low level of variation in the sample; further investigation is warranted.

As expected, perceived self-efficacy of dietary behaviors was significantly correlated with dietary behaviors. This result was consistent with previous studies. For instance, one study of Chinese adolescents living in New York and China indicated that there was positive relationship between self-efficacy and dietary behaviors [14]. This finding is also similar to Kang's results in 2012 [15]. He found that self-efficacy was the strongest significant predictor for healthy eating habits among Korean-Americans. In Thailand, Kahawong et al. [13] conducted a study to examine the predictors for nutritional health-promoting

behavior. Among the three significant predictors of perceived self-efficacy, age, and perceived health risks ($p < .01$), self-efficacy was the strongest variable influencing nutritional health-promoting behavior, explaining 30.9% of the variation in healthy eating habits using step-wise regression. However, in this study, perceived self-efficacy did not have the strongest correlation with dietary behaviors. It is possible that the patients in this study did not have a strong belief in their ability to adopt dietary behaviors to prevent recurrence of kidney stones. They responded that they did not belief in changing dietary behaviors unless being instructed clinical doctors and nurses' guideline. Therefore, it is necessary to have one short training program for clinical nurses to help patient giving more confidence in promoting healthy.

According to the underlying assumptions of the HPM [16], people have free will in choosing their behaviors, and they tend to select more desirable health behaviors if they perceive that conditions support them to do so. With regard to health-promoting behavior, the assumptions also support the idea that the greater the perceived self-efficacy, the more the person will engage in the behavior in spite of the internal and external conflicts within the environment [16].

Similarly, perceived benefits of dietary behaviors were highly significantly correlated with dietary behaviors. This finding was similar to Patlak's study [17], in which he found that perceived benefits were positive correlates with health-promoting behaviors among HIV-infected patients. Likewise, one study with Korean-Americans found that perceived benefits were significant predictors for healthy eating habits using structural equation modeling ($\beta = .26$, $t = 2.26$, N=261) [6]. In this study, perceived benefits of dietary behaviors had the strongest correlation with total score of dietary behaviors. It is possible that the patients knew how to prevent kidney stones by nutritional changes but had difficulty putting this knowledge into practice. This could be caused by patients afraid of changing to new diet. The patients should be trained in one health promotion conference to learn how to adopt with the new diet and new behaviors.

Another finding of this study is that perceived barriers of dietary behaviors were strongly and significantly correlated with dietary behaviors. Barriers to health behavior include inconvenience, expense, difficulty, or time-consuming nature of a particular action or personal costs of performing a health behavior. In this study, the main barrier to nutritional behavior was the restricted diet. Most of patients said that it was too difficult for them follow the diet, such as avoiding animal protein and alcohol. Moreover, although they knew the benefits of less salt in their diet, they could not always control this when they did not prepare food by themselves. They felt tasteless when there is less amount of salt in their meals. One more reason, they complained that they had spent more time and money to follow one restricted diet, which lead to them more fatigued. Therefore, it is helpful to provide for patients in selecting alternative food with the same nutritional value to prevent recurrent kidney stone.

Additionally, according to Pender et al. [16], perceived barriers to action in the revised HPM affect health-promoting behavior directly as well as indirectly through decreasing commitment to a plan of action. Lytle et al. [18] studied predictors of fruit and vegetable intake among adolescents. It can be interpreted that the greater the perceived barriers, the fewer fruits/vegetables were consumed among adolescents. Similarly, Walker et al. [19] explored the determinants of physical activity and healthy eating habits among rural older women (N=179) according to the Health Promotion Model. By conducting canonical correlation analysis, barriers, benefits, self-efficacy, and interpersonal influences were significant factors related to healthy eating.

In conclusion, the present study found behavior-specific cognition is positively correlated to dietary behavior, whereas, individual characteristics were negatively correlated to dietary behavior. Therefore, nursing interventions that address all the significant factors should be implemented to help patients modify their lifestyles, especially regarding diet, to reduce the number of recurrent cases of kidney stones.

RECOMMENDATIONS

For nursing practice

Clinical nurses in urological surgical departments should counsel patients about the correlation between perceived self-efficacy of dietary behaviors, perceived benefits of dietary behaviors, perceived barriers of dietary behaviors and dietary behaviors to gradually change behaviors to decrease the number of cases of recurrent, post-operation kidney stones. The nurses should prepare a discharge plan of dietary behaviors before patients return to the home community.

For nursing education

The findings of this study provide new

knowledge about dietary behaviors and factors affecting those behaviors. Nursing training curricula should include this information, particularly in the field of urological surgical nursing. Moreover, health behavior should be a priority topic in this field.

For further studies

A non-pharmacological intervention should be developed to study how to manage dietary behaviors to prevent recurrent, post-operation kidney stones.

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