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Original article

Effects of a self-efficacy enhancement program on recurrence prevention behaviors among patients with urolithiasis

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Background: Patients with urolithiasis have inappropriate recurrence prevention behaviors caused by lack of confidence in performing behaviors, thereby causing increased recurrence of the disease. As a nurse, the researcher plays a major role in promoting recurrence prevention behaviors among patients using a self-efficacy enhancement program.
Objective: To study the effects of the self-efficacy enhancement program on recurrence prevention behaviors among patients with urolithiasis.
Methods: This study recruited 50 subjects aged 18 – 59 years who had been diagnosed with urolithiasis and received their surgery at King Chulalongkorn Memorial Hospital. The subjects were selected based on set inclusion criteria and assigned to experimental and control groups. The control groups received conventional care while the experimental groups attended a four-week self-efficacy enhancement program.
Results: The mean score on recurrence prevention behaviors of the control and experimental groups was 53.36 ± 3.70 and 61.76 ± 3.55 respectively. Therefore, the mean score on recurrence prevention behaviors of patients with urolithiasis in the experimental group who attended the self-efficacy enhancement program were significantly higher than the control group who received conventional care ($P < 0.05$).
Conclusion: The self-efficacy enhancement program was able to improve knowledge of recurrence urolithiasis prevention behaviors.

Keywords: Self-efficacy enhancement, recurrence prevention behaviors, urolithiasis.

Urolithiasis is a major public health problem with upward trends in every region of the world. In the United Kingdom, the incidence increased from 83,050 cases per year in 2010 to 86,742 cases per year in 2016. [1] In Thailand, urolithiasis incidence among in-patients increased from 82.05 per 100,000 people in 2014 to 90.75 in 2015.[2] Urolithiasis is largely found among adults aged 40 – 60 years. [3] The mechanisms involved the incidence of the disease are crystallization, enlargement and substances causing the formation of kidney stones such as calcium, oxalate, phosphate, uric acid and cysteine. Stones with calcium components are the most prevalent at 80 – 85% with more recurrence incidents than other types of stones. The etiology of urolithiasis includes unpreventable risk factors such as genetics, gender and age, etc. and preventable risk factors such as dietary behaviors, water intake, lack of exercise and obesity, etc. [4]

Urolithiasis recurrence has multiple effects on patients such as physical effects consisting of injuries or webbing in the renal tissues and leading to declining kidney function. [5] Psychological effects cause stress, anxiety, fear and suffering from pain and treatment. [6] As for the socioeconomic effects of recurrence, patients have higher treatment expenses from recurrence or complications such as infections, chronic kidney disease and end-stage renal failure with a need for hemodialysis, etc. [7] while also causing patients to have lower quality of life. [8] Therefore, if recurrence prevention behaviors could be supported in patients, the aforementioned impacts might be minimized.

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According to previous studies, patients with urolithiasis to have inappropriate recurrence prevention behaviors and overall recurrence prevention behaviors at only 42.16%. [9] This was caused by lack of confidence in self-care and low responsibility for personal health 40.33%. [10] In the area of dietary intake, patients eat food with incomplete nutrients and inappropriate ratios. [11] In terms of drinking, patients drink unclean water and insufficient amounts of water. [12] In the area of exercise, patients were found to have physical activity at less than half an hour per day. [13] Furthermore, in the area of receiving treatment by appointment, patients have been found to undergo examinations by appointment irregularly. [14]

Furthermore, according to the literature review, studies on urolithiasis recurrence prevention were found to have modified the food and water control behaviors of patients with urolithiasis by using health education programs implementing the self-efficacy theory. In one study, the experimental group was found to have modified behaviors better than the control group with significance. [15] Therefore, nurses play an important role in promoting patients' self-efficacy in performing urolithiasis recurrence prevention behaviors.

The purpose of this study was to compare recurrence prevention behaviors among patients with urolithiasis between patients who participated in the perceived self-efficacy enhancement program and patients who received routine care only. It was hypothesized that participants in the intervention group who received the self-efficacy enhancement program, will be better recurrence prevention behaviors than the control group who receiving conventional care.

Materials and methods

This study was based on the experimental posttest-only control group design. The subjects were 50 male and female patients aged 18 – 59 years who had been diagnosed with urolithiasis for the first time and came to receive surgery at the In-Patient Department, King Chulalongkorn Memorial Hospital. The subjects were selected based on inclusion criteria and divided into experimental and control groups with 25 subjects in each group. The experimental group received the self-efficacy enhancement program while the control group received routine care only. The subjects were selected based on the set criteria as persons diagnosed with urolithiasis who received surgery with stable symptoms and had no severe postoperative complications or limitations in the area of communication or hearing. Furthermore, the patients were willing to participate in the study with consent from patients' doctors and ability to communicate by telephone.

The sample size was calculated by opening the statistical power table and setting power of test at 80%, a medium effect size of 0.5 and statistical significance at .05. The desired sample size in each group was 22 subjects. Ten percent was added to the sample group to prevent data attrition, thereby bringing the number to 25 subjects in each group, or a total of 50 subjects. The experimental and control groups were matched in pairs with the most similar qualifications possible in terms of age, level of education and marital status. The researcher selected 25 pairs of subjects as specified. The study was conducted from November 2018 to May 2019.

The research instrumentation includes: demographic data record form collected data on gender, age, marital status, level of education, occupation, mean monthly income, kidney stone location and treatment rights. The questionnaire on urolithiasis recurrence prevention behaviors and form for measuring perceived self-efficacy was provided evidence of content validity by computing a content validity index (CVI) by five qualified experts with CVI at 0.86 and 0.87, respectively. Reliability was determined with Cronbach's Alpha Coefficient at 0.80 and 0.80, respectively.

In this study, the concepts of recurrence prevention behaviors consisted of: dietary intake, drinking water, exercise and coming to be examined by appointment. [16, 17] To promote self-efficacy enhancement program used bandura's self-efficacy theory. [18] Components include: 1) Reducing physical and emotional stimulation by building relationships, making introductions and speaking with patients to ask about patients' symptoms in addition to organizing facilities to be appropriate with a relaxing atmosphere and preparing patients before activities; the researcher encouraged patients with urolithiasis to have confidence in personal ability to prevent recurrence; 2) Learning vicariously from models in video media; the models were patients with urolithiasis who performed recurrence prevention behaviors appropriately; the presentation took 30 - 45 minutes and recurrence prevention handbooks were distributed for the patients to review at home; 3) Patients had

enactive mastery experience by practicing necessary skills after watching videos such as selecting appropriate foods for patients' type of kidney stone, recording the volume of water and urine per day, observing urine color, exercising appropriately by walking and assessing levels of exercise by testing patients verbally, encouraging patients and praising patients when patients performed accurately; 4) Verbal persuasion by teaching plan consisted of content on practices in preventing urolithiasis during the 1st week at Hospital. Allowing patients to ask questions concerning problems and doubts about performing necessary skills and reviewing skills in which patients had little or no confidence until patients gained confidence through performance. In addition, the researcher encouraged and praised the patients when they performed properly along with promoting for behaviors to be retained by patients.

This project was certified by the Institutional Review Board (IRB), Faculty of Medicine, Chulalongkorn University, IRB No. 610/61, and received permission from the Director, King Chulalongkorn Memorial Hospital, The Thai Red Cross Society.

Statistical analysis

Demographic data were analyzed using frequency distribution, percentage and mean scores. All values were reported as mean ± standard deviation (SD). Comparison of differences in mean recurrence prevention behavior scores of patients with urolithiasis was made after the experiment between groups using student unpaired *t* - test. A *P* - value < 0.05 was considered significantly significant.

Results

Table 1. Demographic and clinical characteristics of the control group (n = 25).

Demographic and clinical characteristics	Control group n (%)
Age (year)	
Mean ± SD	50.44 ± 9.34
Income (Baht/month)	
Mean ± SD	16,948.00 ± 15,308.52
Gender	
Male	15 (60%)
Female	10 (40%)
Status	
Single	5 (20%)
Married	19 (76%)
Widow	1 (4%)
Education	
Primary school	5 (20%)
Secondary school	8 (32%)
Diploma	2 (8%)
Bachelor degree	10 (40%)
Occupation	
Unemployed	3 (12%)
General employee	5 (20%)
Company employee	1 (4%)
Government employee	5 (20%)
Agriculturist	2 (8%)
Self-employed	9 (36%)
Location of urolithiasis	
Kidney	22 (88%)
Ureter	3 (12%)
Type of health care coverage universal	
Government coverage	12 (48%)
Coverage Scheme (the 30-Baht Scheme)	5 (20%)
Pay by themselves	8 (32%)

Table 2. Demographic and clinical characteristics of the experiment group (n = 25).

Demographic and clinical characteristics	Experiment group n (%)
Age (year)	
Mean ± SD	49.56 ± 9.73
Income (Baht/month)	
Mean ± SD	17,040.00 ± 14,805.63
Gender	
Male	15 (60%)
Female	10 (40%)
Status	
Single	3 (12%)
Married	19 (76%)
Widow	2 (8%)
Divorce	1 (4%)
Education	
Primary school	5 (20%)
Secondary school	10 (40%)
Diploma	1 (4%)
Bachelor degree	9 (36%)
Occupation	
Unemployed	8 (32%)
General employee	5 (20%)
Company employee	2 (8%)
Occupation	
Government employee	2 (8%)
Agriculturist	3 (12%)
Self-employed	5 (20%)
Location of urolithiasis	
Kidney	17 (68%)
Ureter	5 (20%)
Bladder	3 (12%)
Type of health care coverage universal	
Government coverage	4 (16%)
Coverage scheme (the 30-Baht Scheme)	15 (60%)
Social security	2 (8%)
Pay by themselves	4 (16%)

The patients with urolithiasis in the control and experimental groups had mean recurrence prevention behavior scores of 53.36 ± 3.70 and 61.76 ± 3.55, respectively. The mean recurrence prevention behavior scores of the experimental group were found to be significantly higher than the control group ($P < 0.05$). This finding indicates that the post-test recurrence prevention behaviors of patients with urolithiasis in the experimental group were better than those of the patients who received routine care only.

Discussion

According to this study of effects from the self-efficacy enhancement program on recurrence prevention behaviors among patients with urolithiasis, the findings revealed recurrence prevention behaviors of patients with urolithiasis in the experimental group after receiving the self-efficacy enhancement program to be better than patients who received routine care with statistical significance at 0.05 ($t = –8.195$, df = 48). The aforementioned findings were consistent with research hypothesis and can be discussed as follows: The experimental group received the self-efficacy enhancement program implemented from Bandura's Self-efficacy Theory (1997). The program consisted of the following activities: 1) reducing physical and emotional stimulation by building relationships, making introductions and speaking with

patients to ask questions regarding patients' symptoms in addition to organizing facilities to be appropriate with a relaxing atmosphere and preparing patients before activities. The researcher encouraged patients with urolithiasis to have confidence in personal ability to perform recurrence prevention behaviors; 2) vicarious learning to view models from video media with models who were patients with urolithiasis who performed appropriate recurrence prevention behaviors using 30 – 45 minutes and recurrence prevention handbooks were given to patients to review at home; 3) patients had enactive mastery experience by practicing necessary skills after watching videos such as selecting appropriate foods for patients' type of kidney stone, recording the volume of water and urine per day, observing urine color, exercising appropriately by walking and assessing levels of exercise by testing patients verbally, encouraging patients and praising patients when patients performed accurately; 4) verbal persuasion by teaching plan consisted of content on practices in preventing urolithiasis and reviewing skills in which patients lacked confidence until patients have confidence in performing. In addition, the researcher encouraged and praised patients when patients performed properly along with promoting for behaviors to be retained by patients. The findings concurred with a study which found patients with urolithiasis should receive more knowledge from healthcare personnel to promote performance of urolithiasis recurrence prevention behaviors. [19] Moreover, the findings were consistent with a study finding postoperative patients with urolithiasis who received education programs from nurses on food and water intake, exercise and coming for examinations by appointment to help patients have remind patients with urolithiasis to help patients increase water consumption to prevent urolithiasis recurrence. [20]

Perceived self-efficacy is a person's confidence in a personal ability to perform behaviors, causing patients to have more health promotion behaviors. [21] Additionally, self-efficacy was found to be the strongest predictor dietary behaviors in patients with urolithiasis. [22, 23] This concurred with the findings of a study which examined the effectiveness of health education programs applying the self-efficacy theory to modify food and water control behaviors among patients with urolithiasis within four weeks and found the experimental group to have significantly better behavioral changes than the control group. [15] In numerous studies, the self-efficacy program also enhanced patient's confidence in making their prevention behaviors. This finding was consistent with the study which found perceived self-efficacy to be a major factor enabling patients with chronic diseases to manage self-management behaviors. [24] Studies showed that patients with type 2 diabetes mellitus had self-efficacy directly influenced self-care behaviors. [25] Similarly, the self-efficacy program can be used to encourage preventive breast cancer behavior. [26]

This study, showed that if the patients had confidence in lifestyle change to prevent urolithiasis recurrence, by selecting foods which suppress incidence at an appropriate and sufficient volume of two to three liters per day and increasing the volume of water consumed to compensate for the body's fluid losses caused by thirst and heavy sweating, etc., exercising appropriately and consistently by walking for 30 minutes per day at least three times per week and coming to be treated when there are abnormal symptoms such as urinary tract infections or coming to monitor treatment results or receive recommendations on urolithiasis recurrence prevention in the areas of food and water consumption, etc. This caused the experimental group to have confidence in the ability to perform exhibited behaviors, leading to expected outcomes such as no urolithiasis recurrence, which caused patients to exert effort toward performing accurate and appropriate recurrence prevention behaviors.

The control group receiving routine care only was advised on the issue of recurrence prevention behaviors concerning dietary intake. These were general recommendations on water intake, exercise and examinations by appointment, etc. The recommendations were provided before urolithiasis patients were discharged from the hospital for self-care at home and helped patients become aware of general self-care guidelines without self-efficacy enhancement, which may have caused the patients to lack confidence in performing urolithiasis recurrence prevention behaviors.

Conclusion

The self-efficacy enhancement program effectively helped patients with urolithiasis to gain confidence in performing better behaviors in the areas of dietary intake, water consumption, exercising and coming to be examined according to appointments. Thus, the program can be used to provide care aimed at preventing recurrences of the disease.

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Conflict of interest

The authors, hereby, declare no conflict of interest.

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