

## Health Education Protocol for Patients Undergoing Shock-Wave Lithotripsy for Urolithiasis

<sup>1</sup>Rasha Ali Ahmed Abdelmowla, <sup>2</sup>Ahmed Abdelhamaid Shahat,  
<sup>1</sup>Hanan Ali Ahmed Abdelmowla, <sup>1</sup>Attyiat Hassan Hussein, <sup>3</sup>Rania M. Gamal,  
<sup>1</sup>Zienab Abd El-lateef Mohammad, <sup>2</sup>Medhat Ahmed Abdalla  
<sup>1</sup>Medical Surgical Nursing Department, Faculty of Nursing, Assiut University, Egypt  
<sup>2</sup>Urology Department, Faculty of Medicine, Assiut University, Egypt  
<sup>3</sup>Rheumatology and Rehabilitation Department, Faculty of Medicine, Assiut University, Egypt  
Corresponding Author: <sup>1</sup>Rasha Ali Ahmed Abdelmowla

### Abstract

**Background:** Shock-wave lithotripsy has become the treatment of choice for urolithiasis. **Aims:** Assess patients' knowledge and priorities towards shock-wave lithotripsy for urolithiasis and evaluate the effect of health education protocol on patients' knowledge and priorities towards shock-wave lithotripsy for urolithiasis. **Research design:** Pretest-posttest design. **Patients and methods:** A sample of 245 patients undergoing shock-wave lithotripsy for urolithiasis at Assiut Urology and Nephrology University Hospital for a period of 3 months with mean age  $35.21 \pm 17$  years. Patients were divided into: Group (A1) (123 patients did not have shock-wave lithotripsy before) and group (A2) (122 patients had previous experience of shock-wave lithotripsy). There were 86 males and 37 females in group (A1), while 81 males and 41 females in group (A2). **Tools:** Knowledge assessment questionnaire, patient priorities questionnaire and health education protocol (teaching booklet and oral education). **Results:** Patients' knowledge scores were significantly improved after implementation of the health education protocol and influence their priorities. **Conclusion:** Medical and nursing information significantly affect patients' knowledge scores and clarifies their priorities. **Recommendation:** Construction of health education center in shock-wave lithotripsy unit is necessary to provide patients with necessary oral and written information regarding their conditions.

**Keywords:** Health education protocol, Shock-wave lithotripsy, Urolithiasis

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### I. Introduction

Renal stone is a significant health problem all over the world. It affects about 5–12% of population all over the world. Its incidence depends on different factors including: geographical, climatic, dietary and genetic factors [1,2].

Shock-wave lithotripsy (SWL) is a popular, non-invasive and effective method for treatment of renal and ureteric stones who less than 2.5 cm. Although its adverse effects are infrequent; blood in urine for 72 hours and temporary pain are more common as the fragments pass out [3]. Other adverse effects may include: urinary tract infection due to bacteria released as stone breaks, bruising or blistering of skin, the need for further SWL treatment, failure to break stone(s) which may need alternative treatment especially for hard stone(s) or recurrence of stone(s) [4].

Shock waves are used to break down stone(s). It is produced by a machine and is focused on the stone(s) using ultrasound guidance or x-ray. Waves pass through the skin and break up the stone(s) into small fragments which come out in urine [5,6].

Education helps patients gain more knowledge to meet ongoing health care needs. Patients must gain enough knowledge to make decisions and to be able to take responsibility for self-management activities. Patients are educated to practice prevention techniques at home, improve their outcomes by promoting healthy behavior and proper involvement of patients in their care, treatment, and service decisions. Educational activities should be tailored to meet patients' needs and abilities [7,8].

To achieve patient-centred medical care, patient must be fully informed with all information about the condition, various treatment options and potential complications [9,10]. Also, health providers must be familiar with patient's priorities and expectations to reach to high level of patient's satisfaction [11].

One of the priorities of patients receiving SWL is to have an explanation about the procedure and its outcome. This necessitates healthcare providers to communicate effectively with patients. Combination of verbal and written information is more successful than verbal information only in increasing patient's knowledge and satisfaction [12].

A large number of patients (1009 cases of renal and ureteric stones per year) attending to SWL unit at Assiut Urology and Nephrology University Hospital and treated with SWL (Assiut Urology and Nephrology University Hospital records, 2016-2017) [13].

The importance of our study (health education protocol for patients undergoing shock-wave lithotripsy for urolithiasis) is motivated from its high incidence in a socially active generation, high recurrence rate, severe symptoms and high prevalence.

#### **Research hypothesis:**

Patients' knowledge scores after implementation of health education protocol will be improved and influence its priorities towards SWL for urolithiasis.

#### **Aims of the study:**

1. Assess patients' knowledge and priorities towards SWL for urolithiasis.
2. Evaluate the effect of health education protocol on patients' knowledge and priorities towards SWL for urolithiasis.

## **II. Patients and Methods**

**Research design:** Pretest-posttest design was used in our study.

#### **Patients, setting, and ethical considerations:**

Knowledge assessment questionnaire and patient's priorities questionnaire regarding SWL were introduced to 245 male and female patients in SWL unit at Assiut Urology and Nephrology University Hospital for a period of 3 months. Patients were diagnosed with renal or ureteric stones with mean age  $35.2 \pm 17$  years. Nature and purpose of our study were explained to patients and oral permission to conduct our study was obtained from every patient. Also, official permission was obtained from the local ethical committee. Patients were divided into: Group (A1) (123 patients did not have SWL before) and group (A2) (122 patients had previous experience of SWL). Patients' knowledge was assessed before and after implementation of the health education protocol. Also, priorities questionnaire was introduced to patients to assess their priorities. After that, health education protocol (booklet and verbal education regarding SWL) was introduced to patients. Knowledge assessment questionnaire and patient's priorities questionnaire were reintroduced to patients (A1 and A2) to evaluate the effect of the health education protocol. Exclusion criteria included patients working in medical field, high stone burden  $>2.5$ cm or hard stone as calcium oxalate monohydrate and cysteine.

#### **Tools:**

##### **I. Knowledge assessment questionnaire:**

We developed a knowledge assessment questionnaire to assess patients' knowledge about SWL. This questionnaire included 15 questions with a maximum score of 45. The questions were:

1. What is SWL?
2. How does SWL work?
3. What is the anatomy of urinary tract?
4. How is the stone formed?
5. What are the contraindications of SWL?
6. What are the complications of SWL?
7. How is the patient prepared for SWL?
8. What happens during SWL session?
9. What should you do after SWL session?
10. What are the medications you should receive after SWL session?
11. How is the follow up after SWL?
12. What are the expected symptoms after SWL?
13. What are the alarming symptoms after SWL?
14. What is the success rate of SWL in relation to stone(s) size?
15. What are the alternatives of SWL?

## **II. Patients' priorities questionnaire:**

We assessed patients' priorities towards SWL by an Arabic translation of the questionnaire developed by Kouriefs et al. [14]. This questionnaire included 15 aspects regarding SWL treatment. Each aspect was rated by patients on a numerical scale from 1 (least important) to 10 (most important) according to its importance for them. Previously mentioned knowledge assessment questionnaire and patient priorities questionnaire were introduced to patients in SWL unit for treatment of renal or ureteric stones. Patients were divided into: group (A1) included patients did not have SWL before, while group (A2) included patients had previous experience of SWL. Patients (A1 and A2) were exposed to our education. After that, knowledge assessment questionnaire and patient's priorities questionnaire were reintroduced to patients (A1 and A2).

One year after exposure to our health education protocol, telephone contact with the participants was tried to obtain another evaluation for their knowledge towards SWL using the same knowledge assessment questionnaire.

## **Health education protocol:**

Our health education protocol for patients undergoing SWL consisted of an Arabic information booklet and oral education. In designing the information booklet we were guided by similar booklets from University College London Hospitals[12] and British Association of Urological Surgeons[15]. The booklet content:

- Illustrated description of the procedure.
- Diagrams of anatomy of the urinary tract.
- Information regarding preparations prior to the procedure, analgesia and instructions for follow up arrangements.
- Success rates, complications and contraindications of SWL.
- Information about alternatives of SWL and prevention of stone recurrence.
- Directions to the location of the facility and contact information.

Verbal education was done through pre-SWL group educational sessions to explain the information present in the booklet and to answer patients' questions. Each patient was given copy of the booklet. One educational session was given to each group of patients. Each group consisted of 5-6 patients. Duration of the session range from 1.45 to 2 hour.

## **Content validity and reliability:**

The study tools and health education protocol formulated after extensive international literature review. The content and validity were checked and revised by seven academic expertise from staff of urology and medical surgical nursing departments in our university. Reliability (0.86) assessed by the correlation coefficient. Approval of the study procedures and questionnaires content was also obtained from the local ethical committee. Then the study procedures were conducted on 30 patients for testing clarity, feasibility and applicability of our study tools. No problem was encountered in these settings; so no changes were done in our study tools. The subjects selected for pilot study were included in the main study.

## **Statistics:**

The collected data was analyzed using IBM SPSS Statistics 19 software program. The means of knowledge assessment questionnaire score in both groups were compared using Student t-test to detect the difference in knowledge between the two groups. The means of knowledge for patients (A1 and A2) prior to and following education were compared using apaired t-test. For patients who replied late telephone contact, the means of knowledge assessment questionnaire score just after education and one year later were compared using apaired t-test to evaluate the durability of educational effect. The importance of each aspect of SWL treatment according to patients' priorities questionnaire were compared using paired t-test.

## **III. Results**

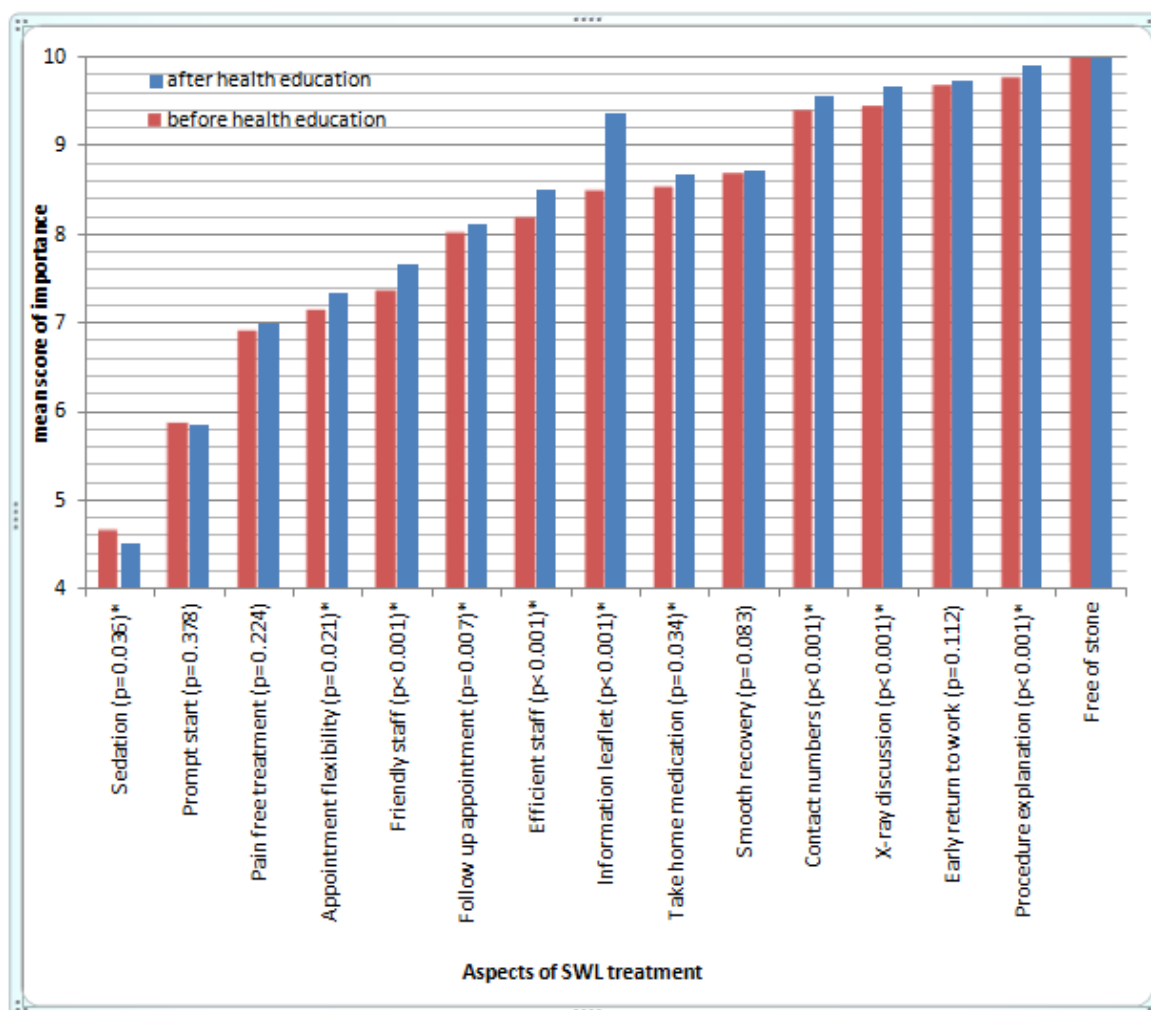
Valid questionnaires were obtained from 245 patients with mean age  $35.21 \pm 17$  years. There were 167 males and 78 females. Group (A1) included 123 patients and group (A2) included 122 patients. The mean age of patients in group (A1) was  $36.64 \pm 18.42$  years, and in group (A2) was  $36.85 \pm 17.47$  years ( $p$  value= 0.163). There were 86 males and 37 females in group (A1), while in group (A2) there were 81 males and 41 females ( $p$  value= 0.554).

The mean score of knowledge for all patients (A1 and A2) was  $3.43 \pm 1.8$  and  $43.6 \pm 0.9$  prior to and following education respectively ( $p$ -value  $< 0.001$ , 95% confidence interval of the difference 39.7-40.5). Mean knowledge assessment score before application of health education protocol was  $1.85 \pm 1.4$  and  $5.02 \pm 2.5$  for group (A1) and group (A2) respectively ( $p$ value  $< 0.001$ , 95% confidence interval of the difference 2.7-3.7).

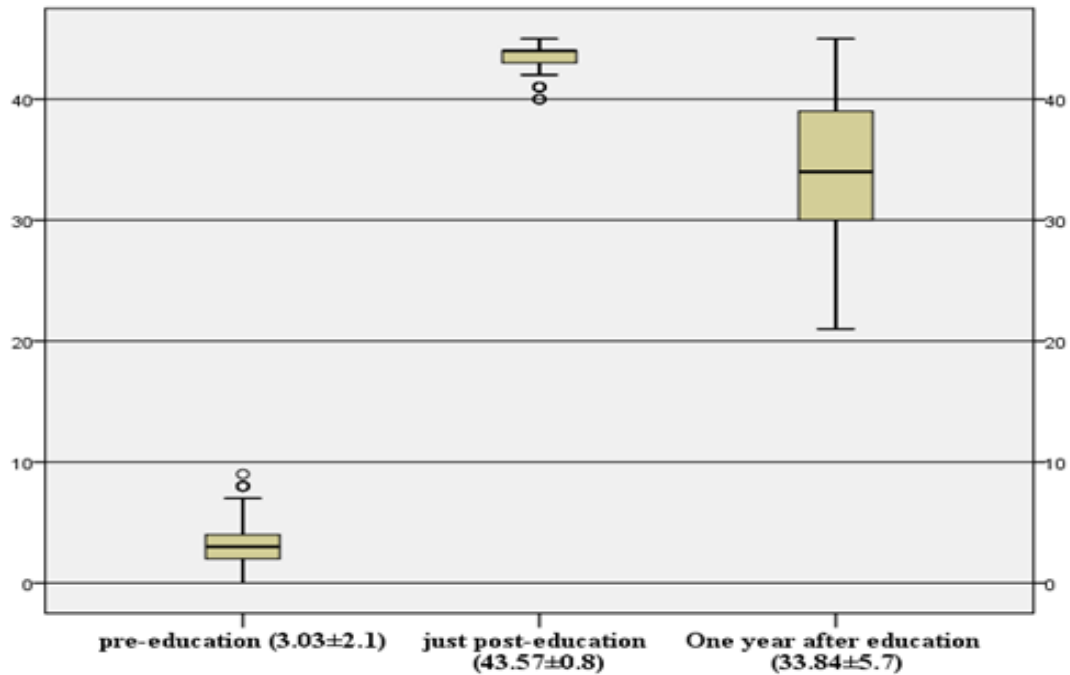
Mean knowledge assessment score after application of health education protocol was  $43.59 \pm 1.1$  and  $43.64 \pm 0.9$  for group(A1) and group (A2) respectively (p value= 0.709).

Regarding patients' priorities, being stone free was the most important aspect for all patients either before or after application of health education protocol. It was followed by explaining procedure, return to work early and normality and discussion of x-rays and progress. Following education, the importance of 12 aspects increased. This increase was statistically significant in nine aspects. The most significant increase was noticed in importance of (information leaflet) which progressed from the eighth to the sixth rank. Decrease in importance occurred in two aspects, and was statistically significant in one aspect (need for sedation during SWL). The chart in figure (1) demonstrates the change of importance in each aspect and its statistical significance.

One year later, 116 patients (84 males and 32 females) replied our telephone calls and underwent knowledge assessment toward SWL one more time. Their mean age was  $35.4 \pm 17.6$  years. Their mean score was  $33.84 \pm 5.7$  which was significantly lower than their immediate post-education mean score (p-value <0.001, 95% confidence interval of the difference 9.7-11.9). Figure (2) shows the difference between knowledge assessment scores before, just after and one year after exposure to our health education protocol.



**Figure (1).** Patients' priorities regarding various aspects of SWL and its change after education.(\*) statistically significant change, (p) p-value [paired t-test] of the difference between importance score means before and after health education.



**Figure (2).** Box plot showing the difference between knowledge assessment scores before, just after and one year after exposure to SWL health education protocol regarding mean, maximum and minimum values. (mean±SD)

#### IV. Discussion

We developed a health education protocol for patients undergoing SWL for urolithiasis based on verbal and written information. It has been shown in several studies that providing health education for patients improves various aspects of health care [7]. Furthermore, it is common now to discharge patients shortly after certain procedures to decrease the length of hospital stay. However, this requires the patients to be able to manage various aspects of care after the procedure [16]. Shock-wave lithotripsy for renal or ureteric stones can be considered one of these procedures. Hence, health education of patients undergoing SWL is an important issue which was the motive to design a health education protocol for them.

Medical and nursing information for health education can be delivered in various formats including verbal information, written leaflets, follow up phone calls, audiovisual aids and E-mail communication. Using verbal information only has been proven to be deficient. It restricts the knowledge and the authority of its transfer in the hands of healthcare providers. Also, it may leave the patient helpless after discharge if cannot remember or refer to information. Combination of both verbal and written information was found to be more successful in increasing patient knowledge than verbal information alone [17].

On designing our health education protocol for patients undergoing SWL for urolithiasis we included both components to increase its impact on patients' knowledge. No doubt, patients who experienced a certain health problem have gained some information about it. This was clear in our study as the pre-education knowledge score was significantly higher in those with previous SWL experience. However, this score in both groups was too low indicating that knowledge gained from previous experience of SWL is not enough and that even those with previous experience would get benefit from our health education protocol. Moreover, patients' knowledge toward a health problem decreases with time. This was evident in our study on late evaluation of patients' knowledge. Most of patients lose interest after being cured. Continuous medical education is essential to preserve the educational effect.

Knowing patients' priorities and expectation is crucial to be able to offer a comprehensive healthcare and to improve patient experience during SWL. Patients have too much expectation towards SWL especially regarding stone clearance which may lead to disappointment after treatment [14]. From all methods of urolithiasis treatment, SWL is the most reported by patients to be unsuccessful [18]. This is mostly a problem of patient communication; and healthcare providers should ensure that patients' expectation is realistic. For this point, health education protocol can influence patients' expectation to be more reasonable.

It is logic for stone clearance to be the top priority for all patients. In spite of being a very important clinical issue, pain-free treatment did not represent a foremost priority for patients undergoing SWL. This is similar to the results obtained in previous studies assessing the same issue [12, 14]. This can be explained that patients might accept some pain to reach their ultimate goal of being stone free. On the other hand, the issues

related to understanding the condition, procedure and x-rays play a leading role in patients' priorities. This emphasizes the importance of health education prior to SWL.

After health education, the degree of importance has changed significantly regarding most of the treatment aspects. This demonstrates the influence of health education on patients' priorities. Moreover, patients felt the importance of health education after its implementation. This was reflected in the form of a marked increase in the degree of importance of information leaflets availability.

The clinical effect of increasing patients' knowledge toward SWL was not assessed in this study. It is supposed to increase patients' understanding and commitment to post-SWL instructions which may improve success rates and decrease complications. Furthermore, it may facilitate early detection of complications and improves its management. These postulates need to be proved through a prospective randomized controlled study to compare clinical outcomes in patients who underwent health education with those who received treatment without prior education.

## V. Conclusion and Recommendations

Patients with first time SWL and patients with previous experience need education to improve their knowledge regarding SWL. Our education improved patients' knowledge and influenced patients' priorities toward SWL. Continuous medical and nursing education is essential to preserve this educational effect. Being stone free is the first priority for patients undergoing SWL for urolithiasis. Shock-wave lithotripsy unit should be provided with health education center to provide patients with necessary instructions about their conditions. Successful patients' educational programs require medical and nursing staff resources to ensure high quality. Health systems need to allocate enough medical and nursing staff with expertise to these areas to succeed with patients engagement initiatives.

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