Assessment of Health Outcomes for Patients Undergoing Extracorporeal Shock Wave Lithotripsy for Urolithiasis

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Abstract

Background: Urolithiasis is one of the major health problems among urological patients, mainly the third most common urological disorder. Lifestyle modification and Extracorporeal Shock-Wave Lithotripsy (ESWL) is the first line of intervention for of upper urinary tract. **Aim:** This study aimed to assess health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis. **Research design:** Descriptive exploratory design was utilized to conduct this study. **Setting:** this study was conducted at extracorporeal shock waves lithotripsy unit for urolithiasis in El Demerdash hospital affiliated to Ain Shams University Hospitals. **Study subjects:** A purposive sample of 85 patients with urolithiasis undergoing extracorporeal shock wave lithotripsy participated in the study. **Tools:** 1) Patients' structured interviewing questionnaire. 2) Extracorporeal shock wave lithotripsy physical health outcomes assessment Tool. 3) Hospital anxiety and depression Scale (HADS). 4) Social dysfunction scale **Results:** the present study revealed that 40% of the studied patients had mild pain and 82.4% of them had minor complications. Also, 85.9% of them have the ability to perform activities of daily living. While, 68.3% had mild anxiety and 65.9% had no social dysfunction. **Conclusion:** Two fifths of the studied patients had mild pain. Also, majority of them had minor complications and had the ability to perform activities of daily living. Moreover, more than two thirds of the studied patients had mild anxiety. While, less than two thirds of the studied patients didn't have social dysfunction. **Recommendations:** Further research should be conducted to determine the long term effect of ESWL management on quality of life of patients with urolithiasis.

Key words urolithiasis, extracorporeal shock wave lithotripsy, health outcomes.

Introduction:

Urolithiasis, commonly known as renal calculi or kidney stones, is a prevalent and painful condition that affects millions of individuals worldwide. These solid mineral and salt deposits form within the urinary tract and can cause excruciating pain and complications if left untreated **(Yu and Ye, 2021).**

Urolithiasis is a disorder that develops when the stones leave the renal pelvis and move to parts of the urinary collecting system such as ureters, bladder, and urethra. As 80% of the kidney stones are made of calcium oxalate or phosphate, also there are various types of kidney stones as well as uric acid, struvite, and cysteine. There are various risk factors for stone formation, including food, a personal or family history of stones, environmental variables, medications, and the patient's medical history which contribute to the different types of stones **(Montatore, et al, 2023).**

Management of urolithiasis based on the patient's condition, urolithiasis is treated with a combination of conservative medical and surgical procedures. Anti-inflammatory drugs (NSAIDs) used orally and intravenously are suggested as initial pain management strategies. Opioids could be used only for persistent pain. Alpha-blockers, including doxazosin and tamsulosin, are an important adjuvant in medical expulsive therapy (MET) to help in moving the larger stones (5– 10 mm), but they did not be helpful in moving the smaller stones. Patients who appear dehydrated because of recurrent vomiting could be given IV crystalloid fluids **(Boissier, et al, 2023).**

Treatment methods for kidney stones vary according to the size, shape, type, and location of the stone. Extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL) and transurethral lithotomy (TUL) are some of the treatment methods for urinary stone. In the ESWL method, depending on the type,

size and location of the stone, ultrasound waves with a suitable level of energy are radiated from outside the body to the kidney containing the stone **(Asadi-Shishegaran, et al, 2023).**

Extracorporeal shock wave lithotripsy (ESWL) is an effective procedure for treating renal and ureteral stones. Most renal and upper ureteric stones respond well to extracorporeal shock wave lithotripsy (ESWL), particularly those with a size range of 10–20 mm. This therapeutic approach has a 60–90% success rate across several series. However, several parameters, such as the size, location, composition, and existence of obstructions or infections, affect how well the ESWL treatment works **(Singh, et al, 2024).**

Outcomes of ESWL may differ from one patient to another and it depends on many factors such as calculi size, location, composition, habitus of the patient, and the efficacy of the lithotripter as well. Each of these factors has an important influence on the re-treatment rate and final outcome **(Yoon, et al., 2021).**

Significance of the study

Urolithiasis is a common condition and affects about 1 out of 11 people in the U.S. Its prevalence is rising and primarily affects the working-age population. Men present more commonly than women, 10.6% vs. 7.1%. Obese and overweight individuals compared to normal-weight individuals present more commonly, and studies showed that obesity was an equalizer in the formation of kidney stones when comparing men to women **(Park, et al, 2022).**

The incidence of kidney stones in Egypt in 2022 is estimated to be around 8-10% of the population, according to a study published in the Egyptian Journal of Urology. This study was based on a survey of over 1,000 individuals in different regions of Egypt and found that the prevalence of kidney stones was higher in men than in women and increased with age. The researchers also noted that dietary factors, such as high intake of animal protein and low intake of fluids, were associated with a higher risk of developing kidney stones in the Egyptian population **(Stamatelou & Goldfarb, 2023).**

Aim Of The Study

This study aimed to:

Assess health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis through the following:

1-Assessing physical health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis.

2-Assessing psychological health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis.

3-Assessing social health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis.

Research questions:

The study was conducted to answer the following question: -

1.What are the physical health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis?

2.What are the psychological health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis?

3.What are the social health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis?

Subjects and Methods:

I-Technical Design:

The technical design includes research design, setting, subjects and tools for data collection.

Research design*:* The descriptive exploratory design was utilized to conduct the current study.

This design is used in research studies that when we want to describe individuals, groups, activities, events, or situations and document aspects of a situation as it naturally

occurs. This descriptive methodology focuses more on the "what" of the research subject than the "why" of the research subject ***(Dubey& Kothari, 2022).***

Setting: The study was conducted at the extra corporeal shock wave lithotripsy unit at Eldemerdash Hospital affiliated to Ain Shams University Hospitals. The unit is located on the second floor, and it consists of 1 room with 4 beds.

Subjects: A purposive sample of 85 patients were included in the study according to sensitive analysis in relation to the number of patients undergoing extracorporeal shock wave lithotripsy for urolithiasis within the previous year 2022. As the flow rate was 700 patients from the fragmentation unit at Eldemerdash hospital. The calculation of sample size was done based on power analysis equation**.**

$$n = \frac{N \times p(1-p)}{\left[\left[N-1\times\left(d^2 \div z^2\right)\right]+p(1-p)\right]}$$

$$85 = \frac{700 \times 0.5(1-0.5)}{\left[\left[700-1\times\left(0.10^2 \div 1.96^2\right)\right]+0.5(1-0.5)\right]}$$

N= Community size

z= Class standard corresponding to the level of significance equal to 0.95 and 1.96

d= The error rate is equal to 0.10

p= Ratio provides a neutral property = 0.50

(Chow et al., 2007)

Inclusion criteria:

Patients were selected according to the following criteria:

1.Adult patients from both genders

2.Patients who agreed to participate in the study.

3.Patients newly diagnosed with urolithiasis undergoing extracorporeal shock wave lithotripsy.

Exclusion Criteria:

1.Patients who had acute urinary tract infection.

2.Patients with serious morbid obesity or pregnant women.

3.Patients who had uncontrolled coagulopathy, hypertension, and diabetes mellitus.

Tools for data collection: The data were collected using the following tools **Tool I: Patients' structured interviewing questionnaire:**

It was developed by the investigator in a simple Arabic language. It is composed of the following 2 parts:

Part 1: Demographic data of patients undergoing extra corporeal shock wave lithotripsy, it contains 6 questions included; age, gender, marital status, level of education, occupation and living status.

Part 2: Medical health profile of patient undergoing extra corporeal shock wave lithotripsy (clinical data sheet) it included:

Present medical history which included 5 questions as diagnosis method of urolithiasis, duration, signs and symptoms, medical management.

Past medical history which included 8 questions as previous hospitalization, chronic diseases and its medications, previous surgeries, previous diagnostic measures and laboratory investigations. **Family history** which included history of urolithiasis and degree of kinship.

Tool II: Extracorporeal Shock Wave Lithotripsy Physical Health Outcomes Assessment Tool (ESWL-HOA): This tool includes the following 3 parts:

Part 1: Modified Numeric Pain Rating Scale (NRS-11). Numerical Pain Rating Scale (NPRS) is a subjective measure (self-reporting) in which individuals rate their pain on an eleven-point numerical scale. The scale is

composed of 0 (no pain at all) to 10 (worst imaginable pain). It was adopted from Williamson and Hoggart (2005) to assess pain severity.

Scoring system

- Zero refer to no pain.
- (1-3) refer to mild pain.
- (4-6) refer to moderate pain.
- (7-10) refer to severe pain.

Part 2: Patients' Modified Clavien System scale (Standardized Grading of Shock Wave Lithotripsy Complications). It was adapted from Mittal et al. (2016). and translated into Arabic language, using translation and back translation. Validity and reliability were tested, it was used to grade postprocedural complications of extracorporeal shock wave lithotripsy in relation to various stone and shock wave parameters.

Scoring system:

It was composed of 25 items and each item responsed Yes take one degree and that responsed No take zero degree. Complications were classified into 3 grades according to severity (0, I, II, III and IV). Total score was (25) divided as follows:

- Score 0: indicated no complication.
- Score >12: indicated minor complication.
- Score 12:25: indicated major complication.

Part 3: Part 3: Katz Index of Independence in Activities of Daily Living: it was adapted from **Wallace & Shelkey (2007).** It included 8 questions to assess patients' physical outcomes related to ESWL procedure such as (resuming physical activities, perform exercise, maintain hygienic measures & reliving tiredness).

Scoring system

Each question was rated on three likert scale as (no=2, sometimes=1, and yes=0). Positive items means that the patient can't perform the activity of daily living. Negative items means that the patient can perform activity of daily living. The total global score of 8 questions was 16 and categorized as follows:

- 0 > 8 able to perform activity of daily living.
- 8 and more unable to perform activity of daily living.

Tool III: Hospital anxiety and depression Scale (HADS): This scale was developed by Zigmond (1986), and it was adapted by the researcher to assess psychological health outcomes for patients undergoing extra corporeal shock wave lithotripsy. It consisted of 10 components. This questionnaire has been translated into Arabic language, using translation and back translation to ensure it's accuracy for use in this population.

Scoring system

Each component was rated on a three likert scale (never=0, sometimes=1, always=2). These scores were summed up and converted into a percentage score. The total score equals 20 and it was classified into 3 categories according to the following.

- Mild anxiety if scored <50%.
- Moderate anxiety if scored 50% to 70%.
- Sever anxiety if scored >70%.

Tool IV: Social dysfunction scale was adapted from (Matteson, et al., 1997). It was used to assess social outcomes for patients undergoing extra corporeal shock wave lithotripsy for urolithiasis. It was composed of 12 negative statements regarding patients' social outcomes, it was translated into Arabic, using translation and back translation to ensure it's accuracy. validity and reliability were tested.

Scoring system

Each statement was rated on three likert scale (never=0, sometimes=1and always=2). The global score ranged from (0-24). Total score was classified into:

- 0 equal no social dysfunction
- 1-8 equal mild social dysfunction
- 9-16 equal moderate social dysfunction
- 17-24 equal sever social dysfunction

II- Operational design: -

The operational design includes preparatory phase, face, content validity, reliability, pilot study, ethical consideration and field work.

A- Preparatory Phase:

It includes reviewing current and past local and international available related literature and theoretical knowledge of various aspects of the study using books, articles, internet periodicals and magazines to develop the data collection tool.

Validity and reliability of the study tools:

Face and Content validity was conducted to test the tool for appropriateness, relevance, correction, and clearance through a jury of 7 experts of the medical surgical nursing staff at the Faculty of Nursing Ain shams university, 4 professor and 3 assist professor. The experts reviewed the tools for format, clarity, relevance, simplicity, accuracy, comprehensiveness, and applicability, and minor modification was done.

Face validity: refers to the extent to which a test appears to measure what it claims to measure based on face value **(Soubra, et al., 2019).**

Content validity: is the degree to which a test or assessment instrument evaluates all aspects of the topic, construct, or behavior that it is designed to measure **(Schaufeli, et al., 2020).**

Reliability: It was referred to the extent to which the same answers can be obtained by using the same instruments more than one time **(Grove et al., 2014);** Testing reliability of the proposed tools was done statistically by Cronbach alpha test.

for the study tools were calculated using the correlation coefficient Cronbach's alpha test which is a model of internal consistency was used in the analysis of Patients' Modified Clavien System scale (Standardized Grading of Shock Wave Lithotripsy Complications), Assessment of activity of daily living, Psychological outcomes and Social outcomes were (0.758, 0.934, 0.950 and 0.913 respectively).

C-Pilot Study:

Before performing the actual study, a pilot study was carried out on 10% (9 patients) of the patients from the study subjects to test the clarity, applicability and feasibility of the constructed tools. The pilot has also served to estimate the time needed for each subject to fill the questionnaire. According to the results of the pilot, minor modifications were performed, so the pilot subjects were excluded from the main study sample.

D-Field work:

The sample of the study was recruited according to the inclusion criteria.

The Purpose of the study was simply explained to the patients who agreed to participate under study prior to any data collection.

A written consent was obtained from the studied patients before collecting data and after explaining the purpose of the study.

The tools for data collection were filled in by the patients in the presence of the researcher.

Data was collected in three months from the beginning of March 2024 to the end of June 2024.

Two to three patients were interviewed per day, where this procedure was carried out 3 days per week, Saturday, Monday and Wednesday. Note somedays patients were postponed for another day because they weren't prepared well.

The time needed for completing the questionnaire was about 10 – 15 minutes. Also, extracorporeal shock wave lithotripsy physical health outcomes assessment tool needed 20 -30 minutes. While, Hospital anxiety and depression Scale and Social dysfunction scale needed 10 – 15 minutes, so the total data collection tool took from 40 – 60 minutes. The patients were assured that the information collected would be treated confidential and that it would be used only for the purpose of the study.

Ethical considerations:

- The ethical research consideration in this study included the following:

- A written approval was obtained from the scientific ethical committee in Faculty of Nursing at Ain Shams University to carry out this study.

- The investigator clarified the objective and aim of the study to the patients included in the study.

- The researcher assured maintained anonymity and confidentiality of the subjects' data.

- Patients were informed that they were allowed to choose whether to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reasons.

-Values, culture, and beliefs of patient were respected.

Ethical code : 25.05.687

III- Administrative design

An official written Permission for conducting the study was obtained from the Faculty of Nursing, Ain Shams University to the director of the hospital and the director of urology department in El-Demerdash hospital at Ain Shams University Hospitals Cairo governorate, Egypt. Then an informed consent to participate in the current study was taken after the purpose of the study was clearly explained to each patient.

IV Statistical design

Data collected from the studied sample was revised, coded and entered using Personal Computer. Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies, percentages and Mean SD. A correlation coefficient "Pearson correlation" (r) is a numerical measure of some type of correlation, meaning a statistical relationship between two variables. Chi-square is a statistical test that examines the differences between categorical variables from a random sample to determine whether the expected and observed results are well-fitting. Fisher exact test is a useful tool for the analyses of contingency tables and the calculation of exact p-values.

Degrees of significance of results were considered as follows:

- P-value > 0.05 Not significant (NS)

- P-value ≤ 0.05 Significant (S)

- P-value ≤ 0.01 Highly Significant (HS).

Results:

Table 1 shows that, 36.5% of the studied patients are in the age group 40-<50 years, the Mean, SD of age is 44.3±6.99 years. As regard to gender and marital status, 65.9% and 85.9% of them are male and married, respectively. Also, 61.2% of the studied patients have secondary education. Moreover, 48.2% of them work in jobs that requires muscular effort. Furthermore, 76.5% of them live in urban areas.

Figure 1 shows that 40.0% of the studied patients have mild pain. Also, 20.0% and 2.4% of them have moderate and severe pain, respectively. While, 37.6% of them don't have pain**.**

Figure 2 shows that, 82.4% of the studied patients have minor complication. Also, 5.0% of them have major complications. While, 12.9% of them don't have complications.

Figure 3 shows that, 85.9% of the studied patients have the ability to perform activities of daily living. While, 14.1% of them don't have the ability to perform activities of daily living.

Figure 4 shows that, 68.3% of the studied patients have mild anxiety. Also, 23.5% of them have moderate anxiety. While, 8.2% of them have severe anxiety.

Figure 5: shows that, 65.9% of the studied patients don't have social dysfunction. While, 23.5% of them have mild social dysfunction. Also, 8.2% of them have moderate social dysfunction. Moreover, 2.4% of them have sever social dysfunction

Table **2** indicated that, there is highly significant positive correlation between pain intensity and severity of complication (r=0.659, p=0<0.01), psychological status (r=0.780, p=0<0.01) and social condition (r=0.803, p=0<0.01). Also, there is highly significant positive correlation between severity of complication and psychological status (r=0.627, p=0<0.01) and social condition (r=0.627, p=0<0.01). Moreover, there is highly significant positive correlation between psychological status and social condition (r=0.720, p=0<0.01). While, there is highly significant negative correlation between ability to perform activities of daily living and pain intensity (r=-0.669-, p=0<0.01), severity of complication (r=-0.708, p=0<0.01), psychological status (r=-0.675-, p=0<0.01) and social condition (r=-0.642-, p=0<0.01).

Table (1): Frequency distribution of the studied patients according to their demographic characteristics (n=85).

Demographic characteristics	No.	%
Age (years)		
20-<30	15	17.6
30-<40	19	22.4
40-<50	**31**	**36.5**
≥ 50	20	23.5
Mean ± SD	**44.3±6.99**	
Gender		
Male	**56**	**65.9**
Female	29	34.1
Marital status		
Married	**73**	**85.9**
Unmarried	12	14.1
Level of Education		
Illiterate	3	3.5
Basic: Primary-Preparatory	5	5.9
Intermediate: Secondary	**52**	**61.2**
High education	25	29.4
Occupation		
Not working	26	30.6
Works clerical work	18	21.2
Works requires muscular effort	**41**	**48.2**
Residence		
Rural	20	23.5
Urban	**65**	**76.5**

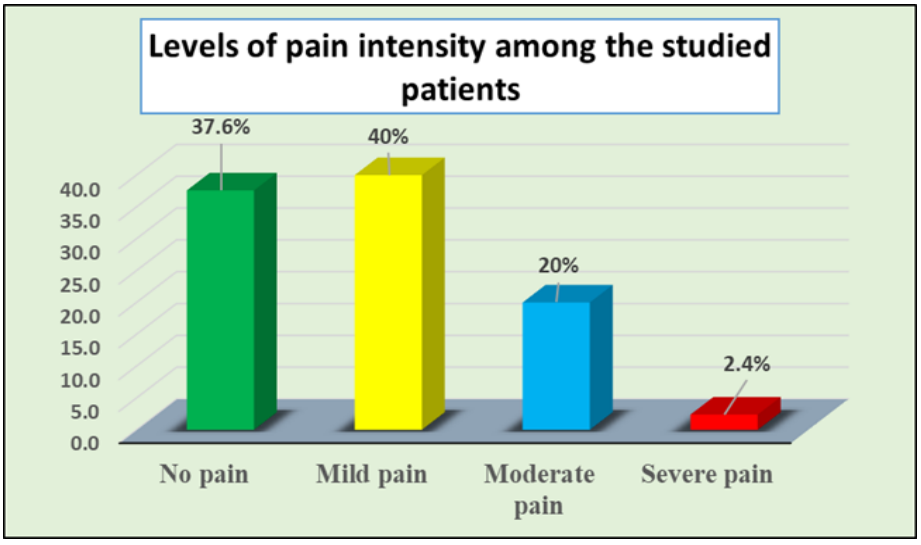

Figure (1): Percentage distribution of pain intensity among the studied patients **(n=85)**.

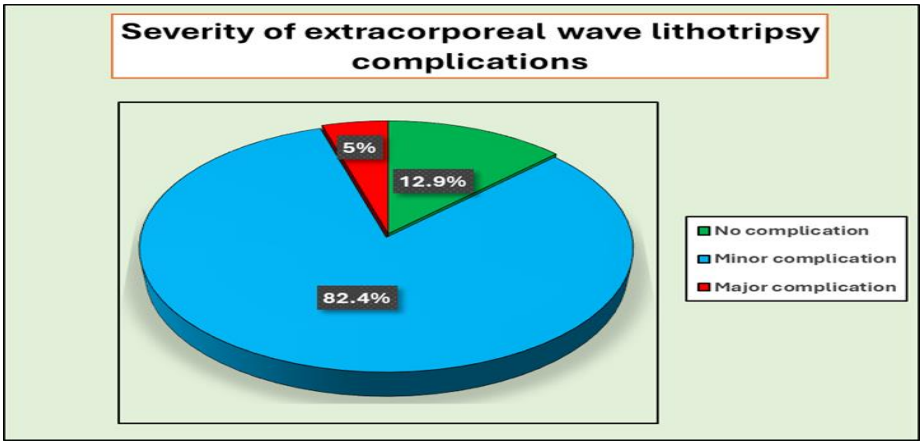

Figure (2): Percentage distribution of the studied patients according to their severity of extracorporeal wave lithotripsy complications **(n=85)**.

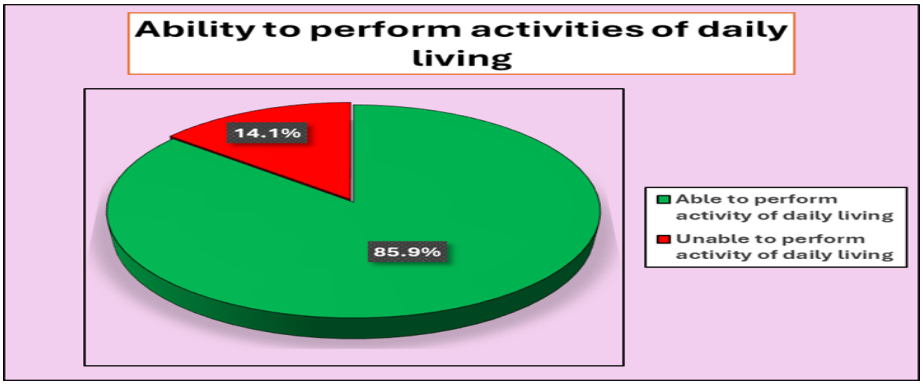

Figure (3): Percentage distribution of the studied patients according to their total ability to perform activities of daily living **(n=85).**

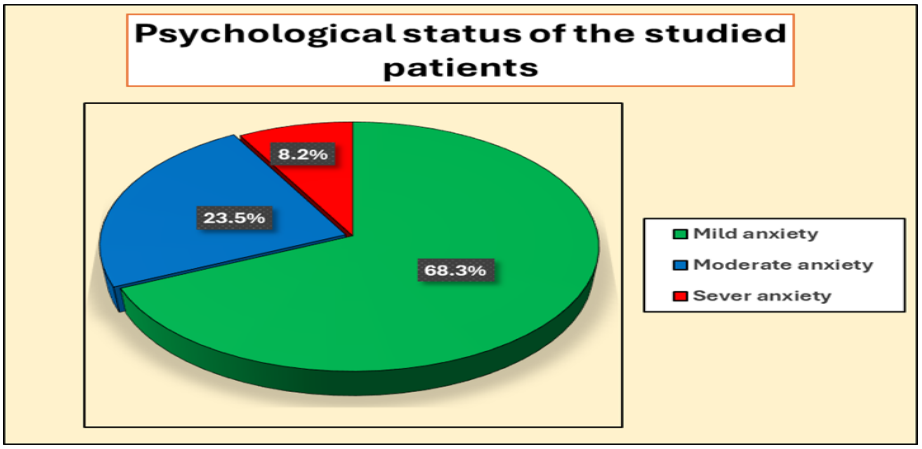

Figure (4): Percentage distribution of the studied patients according to their total psychological status **(n=85).**

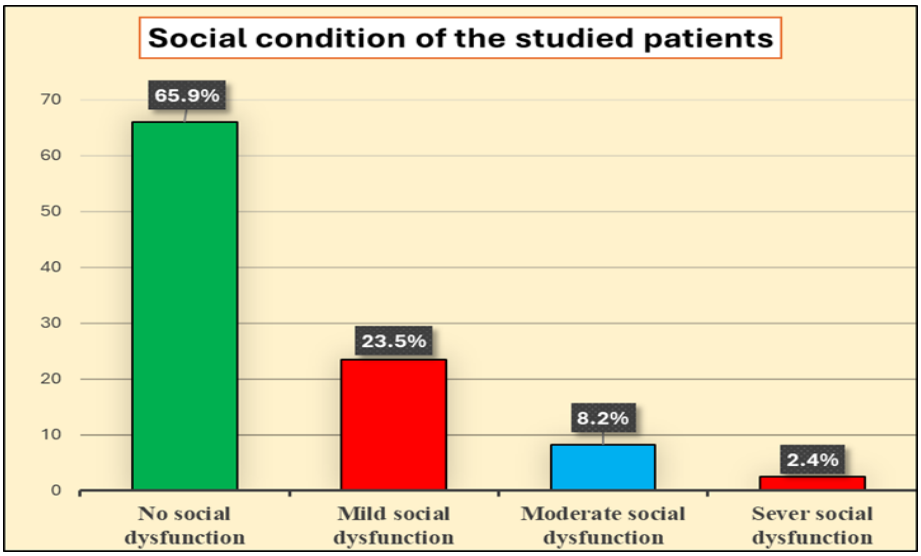

Figure (5): Percentage distribution of the studied patients according to their total social condition **(n=85).**

Table (2): Correlation between pain intensity, severity of complication, ability to perform activities of daily living, psychological status and social condition among the studied patients **(n=85).**

Variables	Pain intensity		Severity of complication		Ability to perform activities of daily living		Psychological status	
	r	P-Value	r	P-Value	r	P-Value	r	P-Value
Pain intensity								
Severity of complication	0.659	0.000**						
Ability to perform activities of daily living	-0.669-	0.000**	-0.708-	0.000**				
Psychological status	0.780	0.000**	0.627	0.000**	0.675	0.000**		
Social condition	0.803	0.000**	0.627	0.000**	0.642	0.000**	0.720	0.000**

(r)= Pearson correlation test**.** **(-)** = negative correlation**.** ******highly significant correlation at p ‹ 0.01**.**
Interpretation of r: **Weak** (0.1-0.24) **Intermediate** (0.25-0.74) **Strong** (0.75-0.99)

Discussion:

Urolithiasis is highly prevalent in urology and can present as an asymptomatic condition or as a painful, recurrent disease. Affected by a variety of factors, such as the climate and seasonal temperature variation, dietary habits, water quality, direct occupational exposure, inheritance and genetic constitution, latitude, and comorbidities, the incidence and prevalence of urolithiasis are characterized by a distinct geographical variation **(Qian, et al., 2022).**

Extracorporeal shock wave lithotripsy became one of the most important treatment options in the urology department due to its non-invasive nature for treating urinary stones less than 2 cm. Many factors can affect outcomes of ESWL such as stone size, site, composition, thickness, skin-to-stone distance, and presence of ureteral stent, anatomical feature of patients, the efficacy of lithotripter and experience of operator **(Cheng et al., 2022).**

So, this study was conducted to assess health outcomes for patients undergoing extracorporeal shock wave lithotripsy for urolithiasis.

Concerning **demographic characteristics** of patients undergoing ESWL for urolithiasis, the findings of the present study revealed that more than one third of the studied

patients are in the age group 40-<50 years. From the researcher point of view, this may refer to age is considered a risk factor of renal stone formation where the earlier onset of the first episode.

This finding was in agreement with **El-Shishtawy et al, (2022)** who studied "Effect of self-management protocol on dietary adherence for patients with kidney stones undergoing shock wave lithotripsy technique"and revealed that more than half of the studied subjects aged <40 year mean age of studied groups were (42.1±8.7, 40.9±11 40.9±11). On the other hand, this finding was in contrast with **Bokhari et al, (2022)** at a study entitled "Evaluating the level of awareness about urolithiasis among the general population of Hail, Saudi Arabia" found that the mean age of studied groups were 26.3 ± 12.8 years old.

As regard to **gender**, the present study showed two thirds of the studied patients were males. This finding may be related to that male may have increased physical stress and exposure to ambient temperature which predispose them to urolithiasis. Also, the finding could be explained by that anatomical difference between males and females; this may cause accumulation and stagnation of urine in the bladder for longer times.

This result was similar with **Tubsaeng et al (2022)** who carried out a study about "Treatment outcomes and factors affecting the success of extracorporeal shockwave lithotripsy in urinary stone treatment: a study of ten years of data from Mahasarakham Hospital" and reported that most patients undergoing ESWL for urolithiasis were male. On the other hand, this finding was in contrast with the result of a study done by **Narain and Hedayatullah (2021)** which entitled "Clinical-demographic and dietary profile of patients diagnosed with kidney stones: prospective study" and stated that females were representing more than half of studied sample.

Regarding to marital status the studied patients, the findings of the current study revealed that the majority of them were married. This could be explained as more than three quarters of the studied patients were in age group 20 >50 which is considered marriage age. This finding was in supported by **Mohamed et al (2023).** who carried out the study about "The Effect of Progressive Muscle Relaxation and Proper Patients' Preparation on Selected Complications Post Extracorporeal Shock Wave Lithotripsy." and stated that the majority of the study and control groups were married.

For educational level of the studied patients, the findings of the current study revealed that slightly more than three fifth of the studied patients have secondary education. This could be explained as still a big sector of the society with intermediate education due to social issues. This finding was in agreement with **Ismael (2021**) who carried out a study about "Patient's Awareness Regarding Prevention of Recurrent Urinary Tract Stones in Surgical Teaching Hospital in Sulaimani City, Iraq." and demonstrated that almost half of the patients had primary and secondary education level, on contrary **Alghamdi et al. (2018)** conducted a study about " Awareness about Symptoms and Role of Diet in Renal Stones among General Population of Albaha City" and stated that the most of respondents had high education.

In relation **to occupation**, the findings of the current study revealed that that near to half of the studied patients work in jobs that requires muscular effort. This finding is justified by exposure to ambient temperature, excessive sweeting and decrease fluid replacement during long working hours which proposed them to develop urolithiasis. This finding was supported with **Heo et al (2022)** who studied "Epidemiology of urolithiasis with sex and working status stratification based on the national representative cohort in republic of Korea" and stated that near half of the study group their work requires muscular effort.

For **residence** the current study showed that more than three quarters of the studied patients lived in urban areas. These results were in agreement with **Cheng et al., (2022)** who studied "Efficacy of intravenous hydration during extracorporeal shock wave lithotripsy in improving ureteral stone treatment success rate" and reported that most of the studied patients lived in urban areas.

Regarding numerical pain scale among the studied patients, the present study showed that two fifth of the studied patients had mild pain. Also, one fifth and the vast minority of them had moderate and severe pain, respectively. This may be explained as ESWL is not harmful procedure. This finding was in differences with **Hiraj et al (2018)** at a study entitled "Frequency of signs and symptoms in patients presenting at tertiary care center with urolithiasis" which found that only about one third of studied patients with urolithiasis presented with sever level of pain.

According to patients' **severity of extracorporeal wave lithotripsy complications**, the current study represented that majority of the studied patients had minor complication. Also, the vast minority of them had major complications. While, the minority of them didn't have complications.

Form researcher point of view using Extracorporeal Shock Wave was effective in improving patients' health outcomes with lower pain score, lower incidence of complications. This result was in line with a study done by **Ozer & Tekin, (2020)** at a study entitled "Clinical results of shock wave lithotripsy treatment in elderly patients with kidney stones: Results of 1433 patients" who claimed that more than three quarters of the studied patients reported minor complications and less than one quarter of them had major complications.

This also can be supported by **Schulz et al., (2022)** who carried out a study about "Outcomes and costs of ureteroscopy, extracorporeal shockwave lithotripsy, and percutaneous nephrolithotomy for the treatment of urolithiasis: an analysis based on health insurance claims data in German" and reported that more than two thirds of the studied subjects reported minor complications.

As regard the studied patients according to their ability to perform activities of daily living, the present study showed that the majority of the studied patients had the ability to perform activities of daily living. This can be explained as ESWL is a simple procedure so it didn't affect on patients' ability to perform activities of daily living.

Additionally, this finding was in the same direction with **Konnopka et al., (2022)** at a study entitled " Long-term evaluation of outcomes and costs of urolithiasis re-interventions after ureteroscopy, extracorporeal shockwave lithotripsy and percutaneous nephrolithotomy based on German health insurance claims data " found that the use of Extracorporeal Shock Waves Lithotripsy for Urolithiasis made the patients abled to perform their daily activities.

As regards the studied patients according to their psychological status (**Anxiety**), the present result revealed that more than two thirds of the studied patients had mild anxiety. Also, less than one quarter of them had moderate anxiety. While, the minority of them had severe anxiety. This finding is justified by, this mild level of anxiety could be related to fear of unknown such as steps of ESWL procedure, complication of ESWL, sound produced by ESWL and prognosis of disease.

In addition, this result was supported by **Dogan and Ceylan, (2021)** who studied "The effect of music on state anxiety in patients undergoing extracorporeal shockwave lithotripsy" and revealed that most studied group experienced decrease in severity of anxiety immediately, first week and second week post ESWL than those in control group with highly statistical significant differences between the two groups.

Concerning the studied patients according to their **total social condition** it was observed that about two thirds of the studied patients didn't have social dysfunction. While, less than one quarter of them had mild social dysfunction. Also, the minority of them had moderate social dysfunction and had sever social dysfunction. These results may be due to the support from relative and health care providers, make the patients able to have social adaptation with their medical problems.

These results can be supported by another study done by **Abdelmowla et al., (2018)** about "Health education protocol for patients undergoing shock-wave lithotripsy for urolithiasis" and stated that more than half of the studied subjects reported stable social

condition. In the same line, **El Guid et al., (2023)** found that the minority of the studied patients had social instability while the majority of them had social stability.

Concerning correlation between pain intensity, severity of complications, ability to perform activities of daily living, psychological status and social condition among the studied patients, the present study illustrated that there was highly significant positive correlation between pain intensity and severity of complications, psychological status and social condition. As pain intensity increases, the severity of complications, anxiety and social dysfunction increase. Also, there was a highly significant positive correlation between severity of complications and psychological status and social condition. As the severity of complications increases anxiety and social dysfunction increase.

Moreover, there is highly significant positive correlation between psychological status and social condition. As anxiety increase social dysfunction increase.

While, there was highly significant negative correlation between ability to perform activities of daily living and pain intensity, severity of complication, psychological status and social condition. As pain increase patients' ability to perform activity of daily living decreases.

These results may be attributed to This may be due to that impairment in health-related dimensions whether mental or social can be attributed to increase in pain intensity, inability in daily life activity performance and occurrence of complications

These findings were in the same line with **Abd El Guid et al., (2023)** who studied the "Effect of preoperative ureteral stenting on the surgical outcomes of patients with 1-2 cm renal stones managed by retrograde intrarenal surgery using a ureteral access sheath" and revealed that there was a significant correlation between pain intensity and ability to perform activities of daily living and quality of life dimensions (physical, emotional and social of patients.

Conclusion

Two fifths of the studied patients had mild pain. Also, majority of them had minor complications and had the ability to perform activities of daily living. Moreover, more than two thirds of the studied patients had mild anxiety. While, less than two thirds of the studied patients didn't have social dysfunction.

There was a highly significant positive correlation between severity of complications and psychological status and social dysfunction. Also, there was a highly significant positive correlation between pain intensity and severity of complication, psychological status and social dysfunction. Moreover, there was a highly significant positive correlation between psychological status and social condition. While there was a highly significant negative correlation between ability to perform activities of daily living and pain intensity severity of complications, psychological status and social dysfunction.

Recommendation

In the light of the result of the present study, the following recommendations are suggested:

1. Replication of the study using a larger probability sample and longer follow up period for studied patients.
2. Further research should be conducted to determine the long term effect of ESWL management on quality of life of patients with urolithiasis.
3. Establishment of social media, booklet, and pamphlet to increase patient information and awareness about urolithiasis and its importance of following ways for preventing the recurrence of urolithiasis.
4. Encourage follow up to evaluate renal stone patients' progress, improve clinical outcomes, and prevent complications

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